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GENEDEC

A quantitative and qualitative assessment of the socio-economic and environmental impacts of decoupling of direct payments on agricultural production, markets and land use in the EU

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Quali-quantitative assessment of socio-economic impacts of the Commission proposal of decoupling

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1 Objective of the work

This Deliverable 6 (D6) contain the main results of the research activity carry out in the framework of Working packaging (WP) 4 of GENEDEC project. WP4 has three main objectives:

to asses a quantitative assessment of socio-economic impacts of decoupling across Europe;

to systematise the typologies of strategic behaviour of farm households, which would result from the implementation of Commission proposal of decoupling, and assess their potential impacts on marketing strategies and rural development processes.

to provide models able to interact with different farm typologies and estimate the main effects on supply, land allocation, income, structural change, land quota distribution, rural landscape at macro and local level.

The main idea of WP 4 is to assess the effect of the decoupling of farmers in their socioeconomic environment not only by qualitative tools bat also by qualitative tools. In order to clarify the strategic behaviour of farmers, farm holders and family-farms, quantitative models has some difficult to catch all the aspects that can influences farmer strategies. The most important one is related to the capacity of farmers to see future scenario in respect to their socio cultural level, the specificity of their production chain and more in general on the characteristics and specificity of the network where they are related to.

This last aspect leads to one important consequence that influences the research activity. The main question of the research is if decoupling, via farmers adaptation capability, influences the characteristics of the specific chain. The idea is that each farmers play a role not inside to a "generic" market, but inside to a specific "filiere" or "food chain" and then the sustainability of the system is due to the capability of the food chain to react at the decoupling systems creating a new equilibrium that is not just economical. It depend by many factors as creating new products, new market position, human capability, integration with others food chain, capability to innovate, open new market.

Of course each food chain has his own specificity and this depend mainly by the type of farmers, by the type of products, by the characteristics of the industrial firms, by the characteristics of target market and by the relationship with the territory that supply the input (including labour) to others firms in the chain. In this context another dimension became important: the territory or the region where the food chain is located.

In order to better clarify WP 4 deal with food chains at regional level and the research will analyse the impact of decoupling on the food chain according to their socio economic characteristics and strategy.

It is clear that such analysis has two different dimension, one at micro level (the farm holder behaviour) and on at meso level (the food chain behaviour). If the first dimension focuses on farm holders using a combination of quantitative and qualitative tools, the second identifies the capacity for restructuring the food chain and identifying production and marketing strategies adopting only qualitative tools.

The research is carried out by case study approach and will consider 8 different food chain across Europe. Three of them are in Italy: Milk for Parmigiano Reggiano in Emilia Romagna, Durum wheat in Tuscany and Beef in Veneto/Emilia Romagna regions. Five food chain are localized in different region in Europe: Milk (Galicia, Asturias, Cantabria in Spain and Ireland), Soft Wheat (Centre France, England in UK), Rye (Sassony in Germany).

The structure of the Deliverable D6 is organized as follows. Chapter 2 contains the main characteristics of the used methodology. Those are the combination of quantitative and qualitative methodology organized in such way to analyse farmers and food chain behaviour with and without decoupling system, providing quantitative and qualitative inputs for a wider analysis of the impact of the decoupling on the food chain. Chapter 3 will focus on the analysis of each food chain in respect to the reference region or Country. Chapter 4 will consider the quantitative impact of decoupling on farm households estimated by Positive Mathematical Programming for a sample of farm household of each food chain that is considered. Chapter 5 will consider the qualitative impact of decoupling on farm households and on firm entrepreneur inside a specific food chain. Chapter 6 and Chapter 7 will resume the "strategic" effect of the decoupling on each food chain trough the SWOT analysis. Chapter 8 will contain policy recommendation for each food chain.

2 Metodology

2.1 Introduction

During the last twenty years, most agricultural economists have paid much attention to assess the agriculture policies impacts on farming. This field of studies has become a topic of interest since when European farmers started to be effectively protected from market risk by the CAP policies. Farm income in Europe, indeed, has depended a lot on agricultural policies. That support was mainly aimed at fostering both the modernisation process and the multifunctional role of agriculture systems.
Traditionally, much of the past analysis and theoretical debate on policy impacts at different levels (individual farms, farms types and administrational regions) has been mainly based on quantitative approaches, used for simulating the farmers' behaviours. More in particular, the central presumption in these models is that the configuration of economic variables can be explained as a result of the actions of rational actors (agriculture producers) having made choices that maximize their utility, taking into account both the market prices and the level of subsidies - coupled to some specific crops, decoupled to the production or linked to the adoption of specific farming methods -. Some researchers have backed away from normative theory, by adopting positive approaches, which allow to capture also the effective (real) entrepreneur behaviours under observation. For instance, both econometric and positive mathematical programming (PMP) methodologies comfortably match those kind of analysis.
On the other hands, few qualitative approaches have been developed in the field of evaluations of policy impacts on farming. In particular, using sociological methodologies (open semi-structured interviews and focus group discussions) can be argued to be needed for the analysis of stakeholders' behaviours at different decisional levels: all the economic operators involving along the supply chain, the farmers' unions, the producers' associations and the policy makers. Traditionally, qualitative models have been largely used in the marketing field, in order to understand both consumers and supply managers (i.e. the big retailers buyers) attitudes and strategies, in a context of unfixed market conditions. In other words, these indications can allow to focus on the strategies of the most representative stakeholders within the market arena. Conversely, such strategies are impossible to be captured through quantitative models, as they can be intertwined with emotional behaviours, suggesting new adapting scenarios.
These methodological tools are usually based on small units of analysis. As matter of fact, the sample should be representative in terms of strategies and behaviours.
However, both two mentioned approaches – quantitative and qualitative – show at least two main bottlenecks: the first one refers to the methodological approach, whereas the second one is more linked with the context of analysis.
Firstly, from the methodological point of view, a scarce inter-disciplinary approach emerged. As matter of fact, the two methodologies have been always used in a separate way. This fact has not allowed to capture the effective strategic farmers' behaviours, as they are not only depended on the structure and organisation of a single firm, but also on the socio-economic environment in which farmers are embedded. Therefore, analysis should point out also the complexity of the actors' network which may affect the farmers strategic behaviours, with special reference on those actors who can directly influence farmers reactions to the newly-introduced policy measures.
Secondly, concerning the context of analysis, nowadays, enterprises behaviours should be studied also in relation to those supply chains which are embedded in a specific territorial context. Within these supply chains, we can see that all the stakeholders – farmers, processors, provisions service agencies and retailers – are affected by the policy reform. In this context, supply chain boarders are not well defined, and they do not coincide with the administrative regional boundaries, as they are identified by the collective management sphere of action. In some cases, the supply chain boundaries involves some provinces (i.e. the Parmigiano Reggiano), or even, in some cases, it can overlaps those of the Region (i.e. the durum wheat in Tuscany, the beef chain in the Pianura Padana or the milk production in Ireland).
In our study, it would seem inevitable the need to integrate the two mentioned approaches – qualitative and quantitative - in relation to supply chain study at regional level. In other words, the main purpose of this work will be to investigate the dynamics of food supply chains through the analysis of stakeholders behaviours and to understand the main impacts on farming system.
Our models, aiming at simulating farmers behaviours, have been built through selecting farms from FADN data base specialised in defining the structural and productive features of individual farms or

production systems. For instance, the technical and economic data made available through the FADN data base has proved very useful in characterising different production systems, in terms of structural and economic size, production systems and processes productivity.

2.2 The quali-quantitative integrated approach

As previously mentioned, the primary purpose of this contribution is to devise methodological tools capable of explaining the wide range of economic and non economic variables that could have affected the farmers decision making, in front of a changed policy setting.
Results from the positive mathematical programming (PMP) are fruitful to well define the main agriculture trends, taking into account the limited imposed by the hypotheses at the basis of the model. Such approach , indeed, lacks to consider the complex range of variables which can drive entrepreneur's behaviours. For instance, many aspects such as his background, his family composition and the off – farms context can also strongly affect his decision making.
Therefore, it would seem inevitable the need to integrate the two mentioned approaches – qualitative and quantitative – in order to better understand the farmers decisional making and the impact of the reform on the rest of the food chain.
In order to integrate the two methodologies, the analysis on the farms and on the food chain will be articulated into the following three steps:

- I phase. Context analysis: food chain analysis.
- II phase. Simulation of the CAP reform impacts on the basis of the collected data during the previous phase.
- III phase. Assessment of strategic expectations and behaviours by using qualitative approaches and collecting data which can be fruitful in order to define the productive and economic organisation of the firms into the food chain.

2.2.1 Food chain analysis context

Emphasis on the reactions along the food supply chain, resulting from the decoupling regime implementation, instead of confining our view to only a singular productive sector, is based on the recognition that, within the modern agri-food development patterns, only through a supply chains approach -modalities of supply organisation could be investigated. In this context, strategies carried out by downstream and upstream stakeholders could noticeably affect farmers' behaviours. At supply chain level, indeed, it is possible to capture the main changes in the all economic variables concerning a wide range of action spheres, such as the firms size, the quality, the quantity and the technological level of the production, the nature of the organisation (ways of supply pool) and the commercial dimension (vertical integration between producers, supplier contracts, collective brands). According to these considerations, two main typologies of farmers can be identified: those who have a good level of coordination within the supply chain, and those not. The first ones are competing alone within a productive sector, whereas the strategies of the second type of farmers are strongly influenced and, sometimes, even driven, by those stakeholders who are steering the supply chain. Clearly, when the farm size is too small or the market too huge, a good degree of coordination becomes the only opportunity to compete.
This perspective encourages efforts into evaluating the overall supply chain performance, rather then just studying behaviours of individual farmers.
In this context, the elements taking in account are represented by the structural characteristics of the farms in the different food chain segments, performances, the strategies adopted nowadays and in a future perspective, co-ordination system and intensity of relations among food chain operators, the role of market policies and the quality management, and the relations with the territory.

2.2.2 The quantitative analysis about the farm performances and the reform effects.

Economic farm performances and future productive choices which can be adopted by farms within the new policy setting will be analysed.

Simulating farmers behaviours provides a good framework useful to identify the range of strategies that farmers and all the other supply chain stakeholders can adopted in the future.
In order to achieve this purpose, we used the mathematic programming methodology (PMP). This attempts to represent the productive, organizational and economic features of individual producers.
The starting hypothesis in this model is that farmers are in a condition of economic optimal and the range of productive strategies which can be adopted arises from this condition. Therefore, the dual value linked with the productive choices represents the only available information which can drive the level of production as far as the marginal cost of each productive process becomes less then or the same as the marginal profit and, in turn less or the same as the price.
The positive approach of this model points out a clear identification of the productive systems, the production volumes, the costs and the profits of a farm under analysis. Secondly, the likely effects on land use, profits and labour allocation have been estimated.

2.2.3 Qualitative analysis of food chain firms strategies

The qualitative approach is used to depth explore the complex range of factors that could have affected the stakeholders decision-making. Sociological methodologies (open semi-structured interviews and focus groups) are aimed at "capturing" the behaviours of family farm-households in relation to their resources and their relationship with the rural system.
The basic idea is that the strategic farmers' behaviours will be - or have already been - influenced by the decoupled regime. They are not only depend on the structure and organisation of the single firm, but also on the socio-economic and cultural environment in which farmers are embedded. Therefore, to deeply explore the main socio-economic effects of the CAP reform on the supply chain, typologies of farm household changes and strategic behaviour have been identified in three case study areas: Parma (for the Parmigiano Reggiano chain) Pisa and Grosseto (for the Durum Wheat chain). Furthermore, the results of the analysis will point out the complex network of actors which may affect the strategic behaviour of those chain, with special reference on the actors who influence farmers reaction to newly-introduced policy measures.

2.2.4 The SWOT analysis

In order to merge together the results of each step of the analysis and analyse the reaction of the chain at the variation of the policy scenario it is used the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). This methodology it is deeply used in the strategic planning activity with the specific goal to organize variables, data, and issues in respect to a specific problem or objective. The most advantages of the SWOT analysis is to be independent from typology of information and typology of data but at the same time it is able to provide a general and exhaustive evaluation of the problem providing a wide perspective of the future impacts and problems.
In the framework of Genedec project, and specifically in this part of the research, we want to implement a SWOT of the impact of decoupling on a specific food chain. In order to reach this result summarising, in one single framework, what had emerged from the various phases of the research, each phase of the quali-quantitatvie integrated approach for each specific chain will goes trough a SWOT process. In the end, all this information's will enable to researchers to better understand the global effect of decoupling on farmer family strategy, on environment impact, on the chain performance and so to provide a more general view of the impact of the reform.

2.3 PMP

In the original formula put forward by Paris and Arfini (1995), the methodology of the Positive Mathematical Programming (PMP) was based on a three-phase procedure the main parts of which are summarised below:

1. Estimation of marginal costs for the processes implemented. The aim of this phase is to recover some of the information regarding specific production costs the farmer uses to formulate the farm

production plan, through the estimation of marginal costs linked to the production processes implemented on the farm.

2. Estimation of the cost function. In the second phase, the PMP estimates a squared cost function able to provide a better representation of production costs, the farm cost function, which is more coherent with economic theory. The method of estimation used in this phase is based on maximum entropy.
3. Calibration of the model vs. the year of observation. In this phase, the economic-production situation observed is reproduced using only the information on production costs estimated during the previous phase. At this point the model can simulate the effects the main changes in agricultural policy will have

The model created for the analysis of agricultural policies follows to the procedure described integrated with specific constraints and conditions of the support new instruments introduced by the new CAP Reform contained in the horizontal regulation 1782/2003 and the regulation of the olive oil, tobacco, hops and cotton sectors proposed by the Council of Ministers.

2.3.1 The estimation of marginal costs by activities

The model was built on the basis of crop structure, considering the zoo-technical component and production within the farm. As far as the crops are concerned, reference has been made to annual production only and not to permanent tree production. The model was therefore built only using crops grown in farms collected by the Regio survey. For each of these, an objective function was defined on the order of:

(2.1) $$\max_{x_v^n} RL = \sum_{v=1}^{V} [x_v^n (pr_v^n - c_v^n)] + \sum_{v=1}^{V} xh_v^n sh_v^n$$

where x_v^n is the production level for each process, v=(1,...,V), of each farm in the sample, n=(1,...,N), while pr_v^n e c_v^n are, respectively, the price and the cost associated with each product level. The objective function takes into consideration the amounts of farm aids — defined as the product between the growing area, xh_v^n, and the per hectare aid level, sh_v^n — as part of the farm's gross margin (RL). The objective function specified in (2.1) is subject to a series of constraints that can be expressed as:

(2.2) $$\sum_{v=1}^{V} (a_v^n x_v^n) \le b^n$$

(2.3) $$x_v^n \le \bar{x}_v^n + \varepsilon$$

(2.4) $$x_v^n \ge 0$$

where a_v^n is the element of the technical matrix of the different activities implemented by each of the n farms in the sample. The constraint in equation (2.2) indicates the overall availability of scarce factors to be allocated among the various production processes V. In the present model the limiting factor is only the land to be used for the various production processes. Constraint (2.3), on the other hand, concerns the production capacity of each activity on the farm, defined according to the levels of production observed. The constraint in question reproduces the initial situation observed in terms of production levels for each farm activity. The term ε, a low positive number selected at will, serves to separate the structural constraint (2.2) from the calibrating constraint (2.3). In fact, if this term were omitted, the linear dependence between the two constraints would lead to dual positive values for the calibration constraints while the shadow price for the structure constraint in (2.2) would remain at zero making interpretation difficult and hardly reflecting reality (Paris and Arfini, 1995). (2.4) presents the known non-negativity constraint placed on the primary variables for the problem. The problem of linear programming (2.1)-(2.4) uses the calibration constraints to reconstruct the situation observed, restoring the dual values associated with the production capacity constraints in (2.3), λ_v^n.

This initial phase, therefore, serves to derive the dual variables specific to the production processes used on the farm. This information incorporates the technical and economic elements the farmer considers in defining the farm production plan.

2.3.2 Deriving the cost function

The objective of the second phase of the PMP procedure is to estimate the farm cost function. Starting from the vector of the shadow prices associated with the calibration constraints, we can determine a new cost function that meets both the criteria defined by economic theory of production costs and farm reality. To meet the non-linearity condition for the objective function of the third phase, a quadratic functional shape has been chosen (Howitt, 1995). Starting from the information on the problem of linear programming it is, therefore, possible to build a new quadratic cost function defined as follows:

(2.5) $$(\lambda + c)\bar{x} = \frac{1}{2}\bar{x}'Q\bar{x}$$

where λ and c are, respectively, the vector of the dual values that determine the first phase and the vector of the accounting costs drawn from the RICA data bank, $\bar{x}$ is the vector of the known production levels and Q the matrix of the non linear function of total costs. In (2.5) the elements for matrix Q are still unknown and must be derived through suitable estimation methods. In the literature (see Paris et al., 2000) estimation through application of the principle maximum entropy is preferred. With this principle, to derive the probability distribution for a given event, the uncertainty regarding the realization of that event must be maximised. To clarify the concept, we introduce the general formula of the entropy for s possible occurrences of the same phenomenon:

(2.6) $$H(p_1, p_2, ..., p_s) = \sum_{i=1}^{s} p_i \log \frac{1}{p_i} = -\sum_{i=1}^{s} p_i \log p_i$$

where p_i is the i-th probability of a probability distribution made up of s elements. From (2.6) one can see that if the probability $p_i = \frac{1}{s}$ — that is the case of uniform distribution, where the degree of uncertainty is highest — the function $H(p)$ is maximised and is an increasing, monotone function of s. The case of uniform distribution corresponds to the case where some elements are available for a given phenomenon. However, when we know some moments of the distribution, by following the above reasoning, we can maximize the entropy of the probability distribution by placing constraints on the moments used to derive it. In other words, we look for that probability distribution that, given the information on its moments, comes closest to the uniform distribution (Jaynes, 1957).

Considering that the entropy measures the degree of uncertainty regarding realization of a phenomenon, this approach can be applied to estimate a parameter the value of which can be defined within an as yet unknown probability distribution. On the basis of these concepts and the arrangement given by Paris and Howitt (1998), the parameters of matrix Q can be recovered by maximizing the probability distribution associated with an interval of suitably specified support values. The non linear programme of maximum entropy is presented here in the form derived by Cholesky's decomposition according to which the matrix $Q = LDL' = TT'$, where L is a triangular matrix, D a diagonal matrix and $T = LD^{1/2}$. The problem can then be resolved by maximizing a probability distribution for which we know the expected value, which corresponds to the marginal cost $(\lambda + c)$ determined in the first phase. The objective function of the problem of maximum entropy is thus presented as follows:

$$\max_{p^l_{(\cdot)},p^d_{(\cdot)},p^u} \quad - \sum_{v=1}^{V}\sum_{v'=1}^{V}\sum_{w=1}^{W}\left(p^l_{vv'w}\log p^l_{vv'w}\right) - \sum_{v=1}^{V}\sum_{v'=1}^{V}\sum_{w=1}^{W}\left(p^d_{vv'w}\log p^d_{vv'w}\right) - \sum_{w=1}^{W}\left(p^u_w \log p^u_w\right) \tag{2.7}$$

where $p^l_{(\cdot)}$ and $p^d_{(\cdot)}$ are the probability of the distribution associated with elements of the triangular matrix L and of the diagonal matrix D while $p^u_{(\cdot)}$ are elements of the probability of errors, or differences, vs. the farm costs-sum. In fact, estimation of the cost matrix is performed on the basis of the following equality:

$$\bar{\lambda}_v + \bar{c}_v = \sum_{v'=1}^{V}\left\{\sum_{v''=1}^{V}\left(T_{vv''}T_{v''v'}\right)\right\}\bar{x}_{v''} \tag{2.8}$$

In (2.8), $(\bar{\lambda}_{(\cdot)} + \bar{c}_{(\cdot)})$ is the average marginal cost of the production processes for the group of N farms considered in the model. $T_{(\cdot)}$ is an element of the matrix T obtained through Cholesky's decomposition. In fact:

$$T_{vv''} = \sum_{v'=1}^{V}\left\{\sum_{w=1}^{W}\left(p^l_{vv'w}z^l_{vv'w}\right)\sum_{w=1}^{W}\left(p^d_{vv'w}z^d_{vv'w}\right)^{1/2}\right\} \tag{2.9}$$

The relations inserted in (2.9) clarify the role of the support values in the process of estimating the cost matrix. The components $z^l_{(\cdot)}$ and $z^d_{(\cdot)}$ are the appropriately selected support values (Paris and Howitt, 1998). Associated with the distribution of probability, $p^l_{(\cdot)}$ and $p^d_{(\cdot)}$, they define the elements of the triangular matrix L and of the diagonal matrix D. It must be pointed out that the matrix Q is unique and is derived from the marginal costs of the farm-sum. In this context, the cost function specified according to the Q matrix is also called the frontier cost function, indicating that the farm-sum cost function is the most efficient activity cost structure (Paris and Arfini, 2000).
To define the quadratic marginal cost associated with each form in the sample, the difference (or error) vs. the average marginal cost must be determined. Thus, for the processes implemented — that is for those which are strictly positive — the individual marginal cost function is:

$$\lambda^n_v + c^n_v = \sum_{w=1}^{W}\left(p^{un}_{vw}z^{un}_{vw}\right) + \sum_{v'=1}^{V}\left\{\sum_{v''=1}^{V}\left(T_{vv''}T_{v'v''}\right)\right\}\bar{x}^n_{v''} \tag{2.10}$$

where $(\lambda^n_{(\cdot)} + c^n_{(\cdot)})$ is the individual marginal cost of the n-th farm. The average errors are given by the product obtained multiplying the specially identified support values $z^{un}_{(\cdot)}$ and the relative probabilities $p^{un}_{(\cdot)}$.
Moreover, given that the cost function contains all production processes implemented by the sample of farms considered, one must also consider those farms that have not implemented the entire range of processes identified for the sample as a whole. For this reason, the model calls for the following relation for N farms:

(2.11) $$\bar{\lambda}_v^n + \bar{c}_v^n \le \sum_{w=1}^{W}\left(p_{vw}^{un} z_{vw}^{un}\right) + \sum_{v'=1}^{V}\left\{\sum_{v''=1}^{V}\left(T_{vv''}T_{v'v''}\right)\right\}\bar{x}_{v''}^n$$

All the probability distributions referred to above must meet the following condition:

(2.12) $$\begin{cases} \sum_{w=1}^{W} p_{(\cdot)}^{l} = 1 \\ \sum_{w=1}^{W} p_{(\cdot)}^{d} = 1 \\ \sum_{w=1}^{W} p_{(\cdot)}^{un} = 1 \end{cases}$$

Problem (2.7)-(2.12) provides the probability distribution values for the elements of the triangular matrix L, the diagonal matrix D and for the vector of the residual marginal variable costs for each farm in the sample. The reconstruction of the elements that make up matrix Q is obtained by the following relation:

(2.13) $$q_{vv'} = \sum_{v''=1}^{V}\left\{T_{vv''}T_{v'v''}\right\}$$

where $q_{(\cdot)}$ is one of the parameters that make up the cost matrix Q. The cost function specified according to the above method preserves the technical information regarding the calibration constraints. If it is inserted in a problem similar to the one identified in the first phase, it makes it possible to reproduce the situation observed, but without the calibration constraints.

2.3.3 An alternative to the traditional PMP model

One of the important problem researchers encounter when the FADN archive is used with the objective to understand the probable dynamics of farm production plan and farm revenue consists in the absence of any kind of specific activity costs in the archive mentioned. This means that, when a PMP models has to be specified, the cost function recovered in the second phase of the methodology cannot be correctly derived, because a marginal cost associated with the calibrating constraint is equal zero. This happens for the farm activity with the lower marginal profit.
In other words, the lack in specific cost information at farm level doesn’t permit to derive the cost function parameters for the marginal product, since its marginal cost value is null. In order to solve this kind of difficulty, the literature provides a certain number of contributions modifying the traditional formulation of the PMP. In particular, the contribution of Heckelei (2002) in this context is relevant and provides a wide group of instruments permitting to assess the cost function starting from the observed production level.
In this case, one solution that we can adopt consists in implementing an alternative first phase, different from the traditional PMP model formulation, where we try to derive the shadow prices associated with the binding constraints and with the calibrating constraint by using the equilibrium conditions of the problem (2.1)-(2.3). This implies that the first phase of the PMP methodology changes in such a way that all the marginal costs can be recovered from the observed production information values and so directly by the second phase of PMP, which became the first PMP step.
One of the most useful principle to overcome the wrong occurrence concerning the lack in specific costs by activity is to directly define the first order conditions of the problems (2.1)-(2.3) and to optimise the problem by deriving the shadow prices values and the production levels minimizing the slackness variables associated with dual endogenous variables. Below we present an overview of the principles on which the alternative method to the traditional PMP is based.
In order to present the revisited PMP methodology without prior information about specific variable costs, we can say that that the first phase of PMP in the traditional approach due to Paris-Howitt (1998) is presented as a tautological procedure aiming to identify the marginal costs associated with the different farm products. In fact, the level of activity variables is already known before the model resolution and it doesn’t need to be derived by an optimisation problem. On the basis of this consideration, the first phase

of PMP can be avoided and substituted by an approach articulated in two steps. This new approach is obtained starting from the model proposals provided by Heckelei (2002), in which the first order optimality conditions are imposed in the first phase of PMP.

The Heckelei's book says that "*the general alternative to PMP with respect to calibrating or estimating a programming model is a simple methodological principle: always to directly use the first order condition of the optimisation model that is assumed to represent or approximate producer behaviour and is suitable to the simulation needs of the analysts*". The approach presented by Heckelei consists in a model of maximisation in which he overcomes the problem encountered when the data source transmits very poor information about farm behaviour by an estimation of shadow prices of resource constraints simultaneously with the other parameters of the model.

This methodology can provide a general and flexible tool for estimating parameters of duality based behavioural functions with explicit allocation of fixed factors. In this context, the only difference left between programming and econometric models is the model form used for simulation purposes (Heckelei, 2003). However, if the result of this kind of problem is known at the beginning of the analysis, also this first phase of Heckelei can be omitted for using only the optimality conditions.

The approach proposed in this paper, as alternative to the traditional PMP when the information doesn't permit to capture the costs associated with the individual farm activities, is widely based on the Heckelei alternative solution, but it differently considers the estimation of the marginal costs related to the binding inputs and the farm products.

In order to explain this approach, we can start writing the Langrangian function associated with the problem (2.1)-(2.3), where the variable costs in the objective function are supposed to be unknown :

(2.14) $$\boldsymbol{L} = (\boldsymbol{p} - \boldsymbol{c})'\boldsymbol{x} + \boldsymbol{sh}'\boldsymbol{h} + \boldsymbol{y}(\boldsymbol{b} - \boldsymbol{Ax}) + \boldsymbol{\lambda}(\overline{\boldsymbol{x}} + \boldsymbol{\varepsilon} - \boldsymbol{x})$$

From the Lagrangian function presented above we can derive, by the Kuhn-Tucker conditions, the optimality relation for the problem, as follows:

(2.15) $$\frac{\partial \boldsymbol{L}}{\partial \boldsymbol{y}} = \boldsymbol{Ax} - \boldsymbol{b} = 0$$

and

(2.16) $$\frac{\partial \boldsymbol{L}}{\partial \boldsymbol{x}} = \boldsymbol{A}'\boldsymbol{y} + \boldsymbol{\lambda} - \boldsymbol{r} = 0$$

The optimality condition (2.15) says that for the maximum level of the objective function the level of the variable $\boldsymbol{x}$ should use all the quantity of input available, in such a way that the structural constraint is completed. While the condition (2.16) establishes the economic condition on the basis of which the marginal cost must be equal or greater than the marginal revenue; in this case, the marginal revenue is represented by the vector $\boldsymbol{r}$. This vector is the result of all positive economic parameters considered by the objective function. In a more specific way, the elements of the vector are composed by the sum between the price of the product ant its level of aid. The element *v* for the farm *n* can assume the following specification:

(2.17) $$r_v^n = p_v^n + [sh_v^n a_v^n]$$

where *sh* is multiplied by the inverse yields of the crops to obtain the value of aid associated with one unit of product quantity.

If we look at the two optimality conditions above we can observe that for the condition (2.15) we perfectly know all the elements of the relation: the level of output that maximise the objective function of the PMP specification concerns the observed output. On the contrary, the condition (2.16) is not well known at the beginning of the solution process, as we have no prior information about the marginal costs related to the input and the shadow prices connected to the different processes.

At this level, Heckelei provides two types of solution:

- the shadow prices emerging from the first phase of the traditional PMP model can be derived by specific econometric tools (generalized least squares method, ...) directly applied to the equations (2.15) and (2.16);
- it is possible to know from stakeholders information and from the land market the marginal value of the land and use this kind of exogenous information to derive the shadow prices of the outputs;

In this framework, we propose a third alternative that match an endogenous estimation of all the dual values of the problem (2.1)-(2.3), but without the optimality condition (2.15), and the land use value for calculating the dual values for each activities.

We suppose that the farmer have a preference in ranting the land with a price not greater than the marginal internal process, that is the product with the lower contribution to the farmer total profit. Actually, the process of choice, in a framework of short-run horizon, is made considering the marginal contribution of each crops to the farm revenue and for this reason the land purchase is submitted to a comparison between the marginal cost of the land and the marginal productivity of this input for each production possibilities. All the processes composing the production plan of the farm have to be characterized by a non-negative economic return keeping in account the costs encounter for renting the land. According to this latter consideration, the maximum value of the land entering in the farmer decision system should not be greater to the lowest contribution to the farm revenue provided by a unit of output.
On the basis of this assumption, the value of the land in the decision process of each farmer can be calculated as:

$$\bar{y} = \min\left\{ p_v \, 1/a_v + sh_v \right\} \tag{2.18}$$

where the $\bar{y}$ is the maximum value of land for a certain farm estimated as the minimum marginal profit contribution among all the farm processes. The prior information about the shadow price of the land, instead to be exogenous, is endogenously derived by observed information.
The mechanism on the basis of this approach is the same applied to the first phase of the traditional PMP procedure. Indeed, the resolution of the linear programming model integrated with the constraints associated with the production capacity of the different farm activities carries out to the define a shadow price for the land provided by the marginal profit of the least profitable crop. The calibrating constraints are generally defined adding to the right hand side of the inequality a small perturbation component in such a way that only one crops remains without a positive shadow prices. In other words, the crop with the less contribution to the total farm profit leads to define the marginal value of the land. This is the reason why the choice of the minimum value of marginal revenue among all the crops activated by the farms is introduced in the condition presented above.
Using the results of this condition to reconstruct the cost function of the farms we can directly implement the maximum entropy problem so that we can estimate a quadratic cost function permitting to reproduce the observed production plan. In this case, like the traditional model, we reconstruct one Q matrix for the entire sample of farms and respect to this matrix we can estimate the deviations of the marginal farm costs from the so-called frontier cost. This means that we state for this new estimation problem two main relations: one concerning the sample, while the other formulated for each farm.
Indeed, the first row of the relations (2.19) represents the equivalence between the dual optimal condition and the marginal cost component of the quadratic cost function for all the farm; while, the second row introduce the farm information and for this reason the error component *u*, as the marginal cost deviation at farm level from the cost of the most efficiency farm in the sample, that is the fictive farm originating by the previous relation.

$$\begin{aligned} p_v^{avg} + sh_v^{avg} a_v^{avg} - \bar{y}^{avg} a_v^{avg} &= \sum\nolimits_{v'} q_{vv'} \bar{x}_{v'}^{sum} \\ p_v^{n} + sh_v^{n} a_v^{n} - \bar{y}^{n} a_v^{n} &= \sum\nolimits_{v'} q_{vv'} \bar{x}_{v'}^{n} + u_v^{n} \end{aligned} \tag{2.19}$$

(The subscript "avg" means that a parameter of the relation is obtained as average of the sample values.)
The resolution of a maximum entropy problem very similar to that one identified for the traditional framework of PMP, with only the two relation described above and without other kind of relations or information obtained from optimization processes (i.e. first phase of PMP), permits to estimate a cost function capable to achieve the calibrated solution in the subsequent "simulation" phase.

2.4 The qualitative analysis: the food supply chain approach

The qualitative approach is used to explore the complex range of factors that could have affected the stakeholder's decision-making. Sociological methodologies (open semi-structured interviews and focus groups) are aimed at "capturing" the behaviours of family farm-households in relation to their resources and their relationship with the rural system.
The basic idea is that the strategic farmers' behaviours will be - or have already been - influenced by the decoupled regime. They are not dependent only on the structure and organisation of the single firm, but also on the socio-economic and cultural environment in which farmers are embedded. Furthermore, the

results of the analysis point out the complex network of actors which may affect the strategic behaviour of those farmers, with special reference on the actors and factors that influence farmers reaction to newly-introduced policy measures.
Emphasis on the reactions along the food supply chain, resulting from the single-payment regime implementation, is based on the recognition that, within the modern agri-food development patterns, only through a supply chains approach modalities of supply organisation can be investigated. In this context, strategies carried out by downstream and upstream stakeholders could noticeably affect farmers' behaviours. At supply chain level, indeed, it is possible to capture the main changes in all economic variables concerning a wide range of action spheres.
This perspective encourages efforts into evaluating the overall supply chain performance, rather then just studying behaviours of individual farmers.
In this context, the elements taking into account are represented by the structural characteristics of the farmers and other firms in the different food chain segments, performances, the strategies adopted nowadays and in a future perspective, co-ordination system and intensity of relations among food chain operators, the role of market policies and the quality management, and the relations with the territory.

The supply chain analysis consist in two different phases:

a) a preliminary phase aiming at collecting information on general structure of the national and regional supply chain, analysing the national specific norms of single-payment implementation in the specific supply chain, and analysing the different positions of national and regional stakeholders in the supply chain. The structure of the analysis of each supply chain is organized as follow:

- The general structure of the supply chain (General overview of the supply chain, economic relevance in the region, general structure, other relevant issues) .
- The agricultural phase (surface, production and yields, evolution in time; incomes, gross value and added value; employment; number of farms; typologies of firms, their characteristics ; the role of the product in the farm economy); characteristics of the production: quality levels, organic production, others; structure of the supply; destination of the production; main problems;)
- The farm trading phase (number of firms, structure of the sector, and evolution in time; typologies of firms (cooperative sector vs. private sector), their characteristics ; structure of the supply (processing capacity), evolution in time ; destination of the production (regional market vs. national vs. export, type of channel, …))
- The first and second processing phase (number of plants, evolution in time; structure of the supply (processing capacity), evolution in time; employment; typologies of firms, their characteristics; the role of the product (durum wheat) in the firm economies; production levels (input-outputs), evolution in time; territorial provenance of inputs; territorial destination of outputs; characterization of the production: quality levels, organic production, others.
- The functioning of the supply chain (the links between the different stages of the supply chain; coordination mechanisms; inter-professional agreements; public and private institutions involved in the management of the supply chain, integration strategies in the supply chain; the presence of sub-supply chains based on product specificities (or other relevant factors); main problems faced by the supply chain; any other useful element.

This phase is based on on-desk methodologies and consider three food chain in Italy (Parmigiano Reggiano, Durum Wheat and Beef) and five food chain in others EU Countries: Milk (Spain and Ireland), Rye (Germany), Soft Wheat (UK and France);

b) a phase of deepening in specific production areas, aiming at exploring the actors' attitudes towards the new conditions generated by the MTR reform and focusing the most relevant motivations and decisional factors which affect the decisional making processes at each supply chain level. Data collection was carried out through the following tools: open interviews to the local key stakeholders (mainly directors or technicians of Consortia and co-operatives), to a sample of durum wheat growers and to the other stakeholders involved in supply chain. This phase is based on field analysis and concern only the three Italian food chain.

2.4.1 The qualitative analysis: the focus group

The Focus Group is a research technique that allows for the systematic gathering of observations, assessments and opinions that have been expressed by experts or by "consumers". This technique encourages the gathering of different points of view (Bertin 1986) on a topic, a process, a result and a product, implied in the broadest sense of the expression, allowing the researcher to reconstruct an articulated framework of the situation under examination.

It is, briefly, a "group interview", whose origin dates back to an experiment conducted by Merton during his years of collaboration with Lazarsfeld[1] (Krueger, 1994), at which time each participant had the opportunity of freely expressing his opinion with reference to the subject under discussion. During the Second World War, Merton applied this technique in the Research Branch of the United States Information and Education Division, for the analysis of training films and moral support made for the Army. The research, constituted the method base for the current technique, in spite of the fact that, over the years, different variations have been developed, widespread both within the scope of individual interviews as well as group interviews.

The Focus Group, in particular, has been widely used – above all in the United States - in market research, communication and consumer satisfaction. It has also, in any case, been widely used in social research, evaluative analysis and corporate and social policies.

The fundamental characteristic of the Focus Group is the presence of a group of individuals who directly answer the questions put by the researchers. The objective is not that of leading the group towards decision taking, nor that of seeking the consensus of all the participants in relation to the subject under discussion, but gathering as many opinions as possible from each participant, starting from his expertise, by means of a constructive comparison with the other participants. Each participant must, therefore, have the security of not only being able to tackle others, who share his/her own type of experience, but also feel free to express his/her point of view, and to support it, without any kind of conditioning whatsoever. The discussion, organised according to these conditions lets various points of view come to light, as well as the opinions and expectations of the participants, in a much more in-depth way than other research techniques do.

The Focus, therefore, is not a technique that is aimed at gathering statistically important information; it is, rather, useful for "pursuing a good idea" independently of its eventual "statistical weight". In other words, this technique consents to the "not obvious" coming to light, which would be much more difficult to achieve by means of quantitative type research.

In the particular case of the research conducted within the scope of the Genedec Project, the choice of the Focus Group, as a research instrument, was due to the necessity of integrating the analysis conducted on the basis of quantitative indicators with qualitative type information, which allows for defining, in particular, the problematic aspects relative to the decoupling application in the chosen sectors.

This instrument, furthermore, allows for the gathering, through just a few meetings[2], of the information and opinions from various individuals, with an advantage in terms of time and money, compared to using qualitative, recording instruments.

The Focus was realised with small groups, in order to encourage comparison among the participants and the exploration of different subjects (Corrao, 2002). The group, moreover, was homogeneous due to the participants coming from the same professional and social community, thus allowing for a facilitated relationship among the members and identification with the experience of the others.

In this research, two Focuses were chosen for each branch that is analysed. In the first one, information is recorded on the knowledge of the decoupling mechanism and, in general, the reform of the CAP, on the changes that had already been brought to agricultural, entrepreneurial activities and those that had been

[1] Merton, in some research conducted in 1941, in fact, proposed pursuing the subject concerning the investigation that was being dealt with to his colleague, through a discussion that was centred on a specific aspect (focus) by means of an exchange among a number of individuals. However, Merton subsequently declared that he did not believe that he was the "father" of the focus group; however, the similarities between that initial experiment and the focus group are many: it is a discussion that is centred on a specific object (focus), which has the aim of pursuing the issue by means of an exchange among a number of individuals.

[2] After 3-4 Focuses, the information that has been gathered is, generally, superfluous. It is not, therefore, necessary to foresee a greater number of meetings in the research design, unless there are some particular objectives (for example, checking, over time, the changes or submitting just a few aspects during each meeting).

foreseen. In the second one, instead, the results of the analysis conducted with the PMP were presented, with reference to which the participants were invited to make their own observations and comments.
Whilst during the first Focus will be possible to observe the capacity of understanding the direct connection between the decoupling mechanism and the strategies of the businesses in the sector, during the second meeting, the presentation of potential, future scenarios will able the participants to perform a greater abstraction operation and analyse the situation concerning the whole compartment, besides being able to place their own, operative reality inside the scenario that had been presented.
The Focuses are all audio recorded; the information gathered was dealt with by providing for a theme-ordered summary, which was backed up by the material quoted from the transcriptions – as, generally, occurs when this instrument is used.
The elements that emerged also merged into the SWOT analysis conducted during the final phase of each case study. The SWOT had the objective of summarising, in one, single framework, what had emerged from the various phases of the investigation (branch, focus, PMP).

3 The food supply chains

3.1 Durum wheat food chain

3.1.1 The evolution of the Common Market Organization in cereals

3.1.1.1 Mc Sharry Reform (1992)

The reform of the CMO in cereals of 1992, consisting of the two EEC Regulations of 1965 and 1966, aimed at reducing the cereals production surpluses, seen as the consequence of the previous arrangement based on protectionism and guaranteed minimum price.
The guiding lines of the Mc Sharry Reform were the reduction of the guaranteed minimum prices and the introduction of direct aids per hectares, based on the average yield of homogeneous areas, in order to compensate the reduction in producers' income due to the decreasing "official" price of cereals.
Furthermore the durum wheat producers could benefit from an additional aid, which was established only for the "traditional regions" and for those producers entitled of the additional production aid in the four-year period 1988-1991. A durum wheat producer of a traditional region could chose the durum wheat area eligible for the additional aid (EEC Reg.1765/92), among one of the four years considered.
During the 1990's the E.U. Regulation of 1992 has been amended several times in order to align with the world trade evolution. Within the durum wheat supply chain in particular the individual rights system for the producers of traditional areas has been cut out (EC Reg. 2309/97), and replaced by the introduction of a maximum guaranteed area (MGA) at EU level. The MGA was divided into national quotas between members. The total European eligible durum wheat area was 3.313 millions hectares, whereas the Italian MGA corresponded to 1.646 millions of hectares. Besides, in order to comply with the principle of the "neutral budget" the unitary amount for the traditional areas has been reduced from 358,6 Ecu/ha to 344 Ecu/ha. Furthermore 4.000 hectares (on a total of 73.000 in Europe) of Italian non traditional areas were eligible for a reduced durum wheat aid equal to 138,9 Ecu/ha.
In addition, according to the EC Reg. 2309/97 the durum wheat producers were obliged to use certified seeds as well as to conform the production to the farmed land.
Table 3-1 shows how the Italian MGA was distributed between the Italian regions. In case the total durum wheat national area exceeded the ceiling, the total aid amount per hectare (344,5 ECU/ha) would be proportionally reduced.
The EC Reg. 1784/2003 of the 29th of September 2003 concerning the CMO in cereals has repealed the EEC Reg.1966/1992.

- **Table 3-1 -** ***Traditional durum wheat Italian areas, defined on the basis of the campaign 1996/1997***

Region	**Hectares**		**Region**	**Hectares**
Abruzzo	38.797		Molise	74.647
Basilicata	215.772		Umbria	9.341
Calabria	58.668		Puglia	396.739
Campania	72.728		Sardegna	79.768
Lazio	80.616		Sicilia	374.802
Marche	125.172		Toscana	118.950
			Total	**1.646.000**

Note: The total area of the non traditional regions is 4000 hectares and comprehends the regions which do not appear in the previous table.

3.1.1.2 The Fischler Reform (MTR) of 2003

➢ *EC Reg. 1782/2003*

The EC Reg. 1782/2003 radically changed the previous European intervention system, by introducing the "single payment scheme" in order to apply the principle of "total decoupling". However, a rather high degree of freedom was left to the single Member States with respect to the implementation of the reform.
Furthermore according to the EC Reg. 1782/2003 an additional premium can be addressed to quality or environmental friendly productions as well as to good agricultural practices (cross-compliance).
The most relevant elements of the Fischler Reform can be resumed as the following:

- Total decoupling, which could have been softened by implementing some options at national level
- Art.69: the single Member States have the option to keep the 10% of the national amount for the direct aids in order to fund an additional aid arrangement (which can be linked to production) addressed to foster those agricultural practices which show a positive impact on the environment or enhancing the products' quality.
- Cross-compliance: the European aids are subordinated to the fulfilment of a set of rules, concerning the environment, the products' quality, animal welfare and food agriculture practices.
- Modulation: the 5% of direct payments can be used in order to foster the implementation of rural development policies. The total revenue has to be distributed between the different Member States aiming at privileging the more rural regions.

➢ *The EC Reg. 1782/2003 and the durum wheat*

With specific respect to the durum wheat the horizontal regulation contains a set of options and rules, which bring to three different options (Donati and Zuppiroli, 2003):

- a "coupled" quality premium to durum wheat production of 40 euro/ha for the traditional regions and the inclusion within the single payment scheme of the 100% of the payments per hectares (according to the Reg. EC 1251/99) for the COP (cereals, oilseed and protein) productions and of the 82% of the pre-existing additional aid for the durum wheat (285 euro/ha);
- rise of the payment linked to production adding the 25% of the payment per hectare (according to the Reg.1251/99 for the COP crops) to the quality premium of 40 euro/ha;
- additional rise of the aid linked to production adding the 40% of the additional aid for the durum wheat (285 euro/ha) to the quality premium of 40 euro/ha.

The above mentioned amounts are liable to a modulation charging of the 5% at full stretch, except for the exemption of the first 5.000 euro of total aid.
Each Member State can select the option which better fits to the characteristics of its territories.

3.1.2 The decoupling implementation for the durum wheat sector in Italy

3.1.2.1 Total decoupling

With respect to the implementation of the Fischler Reform, Italy opted for the total decoupling (D.M. 5th of August 2004) to be applied form the 1st of January 2005 onwards.
Despite at the beginning the Ministry of Agriculture was in favour of the hypothesis of partial decoupling keeping the 40% of the additional payment for the durum wheat linked to production, the final choice has been the total decoupling based on the previous payments.
Italy renounced either to the option of the payment regionalisation.

3.1.2.2 Durum wheat quality premium

The traditional regions still benefit from the allocation linked to production of 40 euro/ha for the durum wheat (EC Reg.1782/2003, art.72), according to the use of certified seeds of those varieties which are recognised as having higher quality attributes. The article 72 has been implemented by means of the EC Reg. 2237/2003 containing the modalities for the implementation of the EC Reg. 1782/2003, for what concerns the support scheme (title IV and IV bis) and the use of land set aside for the production of raw materials for the manufacture, and the following Ministry Decrees.
The EC Reg. 1973/2004 defines a set of four quality parameters, with the respective weighting percentages, for the durum wheat varieties eligible for the quality premium: content in proteins (40%), content in gluten (30%), yellow index (20%), specific weight (10%). Furthermore the varieties list has to be revised every two years.
The Ministry Decree (Mipaf) 15th of March 2005 contains the Italian enforcement of the EC Regs. 1782/2003 and 1973/2004, concerning the common measures for the support scheme and the use of land set aside. More specifically the D.M. sets the minimum quantity of durum wheat certified seeds, which is 180 kg/ha (art.7), as well as the list of varieties which are eligible for the quality premium. In practice 58 new varieties have been added to the list of 90 varieties of the previous DM 24th of September 2004 (see implementation of the art.69).
The specific quality premium is allocated according to maximum national area of 1.646.000 ha and distributed among the Regions (see table 3-1).

3.1.2.3 Implementation of the art.69

With respect to the enforcement of the art.69 the DM 5th of August 2004 sets establishes that the 8$^{\%}$ of the cereals sector fund is to be addressed to an additional entitlements per hectares to those producers who use certified seeds of certain varieties or cultivation, storage and other production practices more market-oriented.
Another DM concerning the implementation of the articles 8 and 9 of the DM 5th of August 2004 establishes that in the cereals sector the 8% of the art.8 is to be deducted in order to allocate the additional entitlement per hectare to the durum wheat, soft wheat and maize producers as well as to those producers who use at least two-year rotations.
With specific respect to the durum wheat the condition for the additional payment is the use of certified and OGM-free seeds (listed at the annex II) and with a minimum content in proteins (12,5%).
The maximum additional entitlement is 180 €/ha.

3.1.2.4 The new CMO in cereals

The new regulation of 2003 (EC Reg. 1784/2003) introduces new measures as well as principles which are dear to the tradition of CAP. In particular it brings out that "*market measures of a common import-export system as well as of a intervention system are needed in order to obtain a certain stability of the markets and to ensure equal living standards for producers*".
In the first place measures for the internal and external market need to be implemented.
On the internal EU market the intervention price (compulsory purchasing price for the agencies in charge to buy the products from producers) is 101.31 euro/ton susceptible to monthly variations from a minimum of 0,46 € in November up to a maximum of 3,22 € in May. On the other hand the foreign market regulation is based on a system of import customs duties and refunds (to the European exporter in order to cover the difference between the European and international export prices), which applies to the processed cereals products in order to gain access to the international market.
Furthermore an increase of the 55% of the import prices applies to the wheat sector. However, that duty may not exceed the rate of duty in the Common Customs Tariff.
The export refunds are generally set through tenders and they are homogeneous within the EU. Besides, additional refunds can be granted to send food aid outside the EU both for raw and processed products, according to precise modalities. Finally the refunds can differentiate according to the international market situation or where specific market conditions require it.

3.1.3 Stakeholders' positions towards the CAP reform implementation on the durum wheat supply chain

With respect to the supply chain structure the following groups of stakeholders, corresponding to different levels of the durum wheat supply chain, can be identified:

1. The upstream phase of the supply chain, in particular the seed industry, the machinery contrstructors and mechanisation service firms.
2. The cultivation phase, where the analysis should considers the durum wheat producers as well as the producers' associations and the professional associations.
3. The storage and first trading phase, which can be organised in cooperatives and firms' associations.
4. The processing phase, meaning the milling industry as well as the pasta and bread industry.
5. Other stakeholders corresponding to the institutional public level, such as the National Ministry of Agriculture and the Regional Agriculture Department.

More in detail the following associations play a role within the durum wheat supply chain:

LEVEL OF THE CHAIN	ASSOCIATIONS
UPSTREAM PHASE	**AIS** Italian seed producers association **ASSINDUSTRIA SEZIONE SEMENTIERI** Industrialists' association **ASSOSEME** Italian association of varieties producers **UNACMA** national union of the agricultural machinery traders **UNACOMA** national union of the agricultural machinery constructors **UNIMA** national union of agricultural machinery farms
CULTIVATION PHASE	**Grain Farmers' association** **AIS** Italian seed producers association **ASSOCIAZIONE CEREALICOLTORI TOSCANI** Tuscan grain producers association **UIAPROF Italian union of the wheat producers' associations** **Farmers' organisation** **CIA** the professional organisation representing farm labourers and small farms **COLDIRETTI** Italian farmers' confederation, representing the small family farms **CONFAGRICOLTURA** the professional organisation linked to the big entrepreneurial farms **Interprofessional bodies** **ASSINCER** Inter-professional wheat association
STORAGE AND FIRST TRADING PHASE	**Co-operatives** **AGCI** Italian cooperatives general association **ANCA-LEGACOOP** Agro-food cooperatives national association **CONFCOOPERATIVE-FEDAGRI** Italian federation of agro-food and agro cooperatives **UNCI** Italian cooperatives national union **ASSOCIAZIONE NAZIONALE CEREALISTI**, representing grain trading firms
PROCESSING PHASE	**ITALMOPA** Italian millers and pasta-producers association **UNIPI** pasta-producers Italian union **FLAI** Italian agro-industry workers' federation

Generally speaking, basically the groups in favour of the total decoupling is represented by the producers' associations and the professional organisations, who consider the total decoupling as a way to achieve higher quality levels and more profitable prices for the durum wheat, also due to the reduction of the durum wheat productions from non professional producers. The national milling and pasta industry expressed against the total decoupling, fearing a strong fall in the national availability of durum wheat and the consequent need to increase high-cost imports.
More in details, the different positions can be grouped according to the different levels of the supply chain.

3.1.3.1 Upstream phases:

Ais, assoseme, assindustria sez. Sementieri

- The seed producers are mainly concerned about the expected decrease in the quantity of seeding. As a matter of fact they foresee an average decrease of the 30% with negative effects also on the processing industry.
- The seed industries have suffered the decision of the total decoupling, without the possibility of finding alternative solutions more suitable to a better integration between the level of producers an the level of processors.
- They are concerned about the risk that a large quantity of seeds could not be sold as they have planned the varieties of the next crop year on the basis of the autumn 2003.
- They are critical towards the enforcement of the art. 69 to a set of varieties, which are not anymore demanded by the market.
- They foresee a possible orientation of farmers of traditional durum wheat areas towards more productive or easier crops, such as barley, soft wheat or proteic crops (as proteic peas), or towards those crops which are less demanding in term of investments. As a consequence the main danger for the durum wheat crops is to be marginalised.

Unima

- They are afraid of the negative effect of the total decoupling in reducing both the durum wheat areas and the use of mechanical operations, which would mean a reduction in work, profit and investments.

3.1.3.2 Cultivation phase

CIA

- They are in favour of the total decoupling as it implies a reduction in bureaucratic practices, which have been always seen as an obstacle by the large majority of the farmers, and enables producers to be more independent in their choice that should be based on the market demand.

COLDIRETTI

- The total decoupling holds the potential to bring to higher prices paid to producers thanks to the lower availability of the product.
- They foresee a reduction in the durum wheat national areas to which a higher quality of the product will correspond.

CONFAGRICOLTURA

- The decrease in the durum wheat area has to be seen as a factor in favour of the concentration of the production in the most suitable areas, holding the potentials to meet the market demand.
- The total decoupling fosters a more market-oriented producers' choice and the use of the entire E.U. funding.

3.1.3.3 Storage and first trading phase

Anca, agci, fedagri, unci

- They proposed to choose for a gradual implementation of decoupling to the durum wheat sector, starting from the partial decoupling.
- They are afraid their activity is going to decrease.
- They are in favour of the 8% destined to the art.69 although they would prefer the 10% for that measure.

3.1.3.4 Processing phase

Italmopa, unipi

- They hold one of the most polemical positions towards the Ministry of Agriculture as they have been excluded from the debate on the implementation of the MTR as well as from the choice of the list of varieties for the enforcement of the art.69.
- The were strongly against the immediate implementation of the total decoupling seen as fostering the phenomenon of abandonment of many durum wheat traditional areas, which would worsen even further the already existing shortness in national raw material. Furthermore they are concerned about the MTR long-term effects, as the average age of the durum wheat farmers is rather high so that they could be fostered to adopt extensive cultivation practices or to completely abandon the crop.
- Besides they are concerned about a decrease in quality, especially for those aspects related to the content in proteins, which foster the processing industry to buy extra-Eu raw material.
- They criticise producers as they did not make a stand on setting the list of varieties, based on the processing industry’s demand. As a matter of fact they firmly specify that the price paid to producers is based on the durum wheat quality and not on the available quantity. In this way they deny a possible effect of price increase due to the reduction in the durum wheat national area.
- The choice of the total decoupling does not improve the condition of neither the large majority of durum wheat producers nor the producers’ cooperatives. As a matter of fact the big producers and the marginal producers would be the only beneficiaries, being the first favoured by a reduction in the offer of durum wheat and the second not interested in producing as they would obtain the E.U. funds anyway.

3.1.3.5 Regional associations (Tuscany)

Associazione cerealicoltori toscani

- Basically they are in favour of the total decoupling for three reasons: in the first place the MTR plays a crucial role in fostering the concentration of the durum wheat surfaces in the most suitable areas as well as the development of the most productive and more market-oriented farms. In the second place the durum wheat monoculture, which gives a low quality product, is going to disappear favouring the implementation of good environmental practices. Finally the total decoupling holds the potential to foster the improvements of the durum wheat quality.
- They are critical towards the enforcement of the art. 69 both to certified seeds and cultivation practices. They propose the link between the quality bonus and specific production codes.
- They hold a critical position towards the processing industry for what concerns the choice of durum wheat form extra-EU countries. Indeed they claim that, in spite of the lower content in proteins, the Italian durum wheat has quality standards fitting to a high quality pasta production. Therefore an agreement is needed between producers and processors aiming at obtaining higher prices for the raw material.

To conclude the following table is a summary of the main stakeholders' opinions with respect of different options for the MTR.
The following set of "descriptors" has been used in order to give an idea of the nature of the different positions and critics:

1. quantity or production level
2. quality
3. bureaucracy
4. employment
5. environmental impact
6. coordination within the chain
7. effects on import-export

PHASE OF THE CHAIN	STAKEHOLDER	GENERAL POSITION	DESCRIPTOR	PARTIAL DECOUPLING	IMMEDIATE IMPLEMENTATION OF TOTAL DECOUPLING	ART. 69
Upstream phase	**AIS ASSOINDUSTRIA sez. SEMENTIERI**	there is the risk of severe yields reduction	quantity	in favour	against	against the current application
		high seeds quantities might be not sold by the seed industries	quantity			
		the art.69 has been applied to varieties which are not demanded by the market	quality			
	UNIMA	the total decoupling will lead to the abandonment of the durum wheat or to the minimum tillage meaning a decrease in work for the mechanisation service farms	employment	in favour	against	
Cultivation phase	**ASSOCIAZIONE CEREALICOLTORI TOSCANI**	the total decoupling encourages the displacement of the durum wheat to the most suitable areas	quality	against	in favour	against the current application
		the total decoupling represents the end for the durum wheat one-crop system	environmental impact			
		the total decoupling holds the potentials to improve the quality of the final product	quality			
		the choice of the varieties of the art.69 does not improve the quality of the product	quality			
	CIA	the total decoupling fosters the bureaucratic simplification	bureaucracy	against	in favour	
		the total decoupling enables the farms to be more market-oriented	-quality -effects on import-export -coordination within the chain			
	COLDIRETTI	they emphasise a possible effect of higher prices to producers	-coordination within the chain	against	in favour	
		the durum wheat quality is going to be higher	Quality			
	CONFAGRICOLTURA	the durum wheat is going to be more and more located in the most suitable areas	Quality	against	in favour	
		the total decoupling encourages a more market-oriented producers' choice	-quality -effects on import-export -coordination within the chain			
Storage and first trading phase	**ANCA AGCI FEDAGRI UNCI**	there is the risk of severe reduction of their own activity	employment	In favour	against	
Processing ase	**ITALMOPA UNIPI**	they have not been taken into account especially in the choice of the varieties of art.69	quality	in favour	against	against the current application
		there is the risk of abandonment of the durum wheat production with the consequent increasing lack in raw material	quantity			
		there is the risk of displacement of the durum wheat from the Southern regions to the Northern regions, corresponding in a lower quality	quality			

3.1.4 The Italian supply chains

3.1.4.1 The Durum wheat case study in Tuscany

In the first phase of the project work (May-June 2005) a preliminary on desk analysis of the durum wheat supply chain in Tuscany was conducted in order to describe the general framework of the topic.
The first section of the desk analysis gives a short description of each sector of the durum wheat supply chain in Tuscany according to the available data on their structure, production and the evolution along time. Moreover an analysis of the functioning of the supply chain has been tried considering the following relevant points: product exchanges between different phases and import-export, marketing channels, coordination mechanisms between firms and quality issues.
The second section focuses on the evolution of the Common Market Organization (CMO) in cereals, in fact within the E.U., the Mediterranean countries in particular, the durum wheat supply chain has been deeply influenced by the new rules of the CMO in cereals as well as by the specific previsions for the durum wheat. Besides, the CMO in cereals, together with the one of milk and beef meat, represents the most important intervention carried out within the Common Agricultural Policy (CAP). The CMO in cereals has been modified in different steps, the most important of which the Mc Sharry Reform (1992) and the MTR (2003).
Finally the last section points out the stakeholders' positions towards the CAP reform implementation on the durum wheat supply chain, by means an analysis at official positions expressed by different organisations involved in the supply chain at national and regional level.

3.1.4.2 Structure and functioning before the MTR

With respect to the durum wheat flour and pasta production Italy holds a leading position within the international context
As a matter of fact the durum wheat supply chain plays a crucial role with the Italian agro-food system being the input for consistent imports of raw materials and exports of the final products, which, as a whole, produced a positive annual balance exceeding 710 millions euro in 2004.

- **Table 3-2 - Italy, durum wheat trade balance 1995-2004 (euro)**

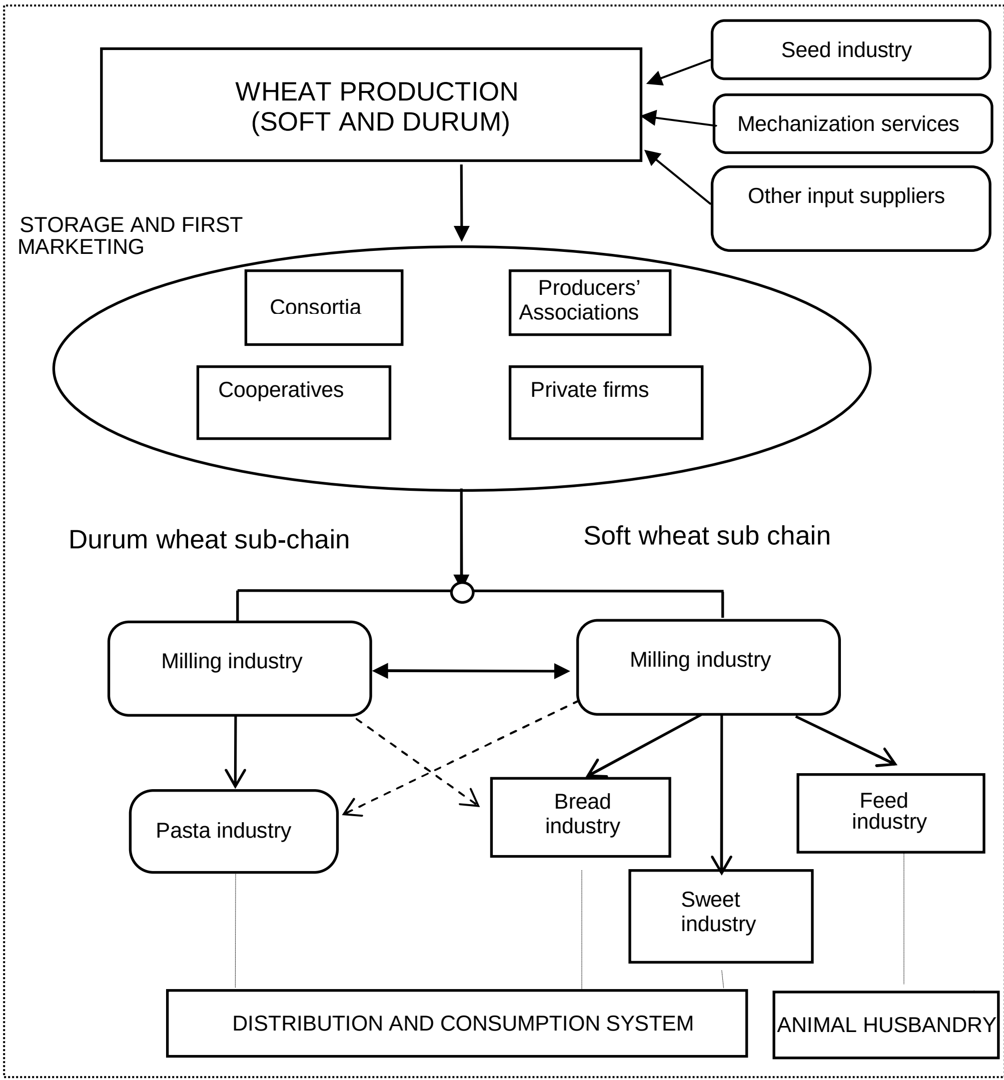
YEARS	DURUM WHEAT	DURUM WHEAT FLOUR	EGG PASTA 80 % (estimate)	DURUM WHEAT PASTA	OTHER TYPES OF PASTA 70% (estimate)	BRAN 30% (estimate)	BALANCE
1995	-203.982.768	35.245.421	66.764.055	566.104.469	37.865.205	-3.872.365	498.124.017
1996	-245.059.859	9.088.761	67.453.110	646.873.702	43.638.705	-3.285.542	518.708.877
1997	-303.708.686	9.697.501	71.037.758	698.338.562	36.496.389	-2.346.650	509.514.874
1998	-272.183.727	15.180.607	78.009.632	706.007.714	35.401.045	-952.475	561.462.796
1999	-158.552.175	13.282.973	84.564.842	691.582.630	28.431.343	-757.603	658.552.010
2000	-235.420.452	6.577.452	88.674.492	739.875.127	29.479.738	-1.707.858	627.478.499
2001	-379.521.070	15.728.713	90.822.370	808.573.403	29.625.822	-1.357.068	563.872.170
2002	-269.419.143	22.317.536	91.917.738	824.967.033	33.436.422	-2.071.876	701.147.710
2003	-299.481.506	17.033.054	82.309.630	770.667.120	34.861.640	-1.659.801	603.730.137
2004	-225.992.777	17.148.105	81.504.574	806.991.749	34.006.061	-2.689.871	710.967.841

Source: Italmopa processing of Istat data

The Italian durum wheat production is historically located in the Southern regions, especially Puglia and Sicily. In the past the location of the milling industry has been influenced by the geographical distribution of the raw material. In the last years however the technological progress in the logistic and storage sectors together with the increasing possibilities of gaining access to the international markets and the diversification of the quality standards demanded by the second processing industries enabled the setting up of some important durum wheat mills even in the Centre and Northern regions, as in the case of Tuscany.

The durum wheat supply chain is characterised by a high degree of complexity due to the several contact points with the soft wheat supply chain in the upstream phases (farm inputs supply, farming, stocking and trading). On the contrary, the two supply chains tend to split up in the downstream phases, as the first processing step (milling process) takes place in different and highly specialised industries. Furthermore the final destinations of the processed products differ form each other, as the durum wheat is destined to produce pasta whereas the soft wheat is used to produce bread and other bakery products.
Tuscany holds a rather marginal position within the national durum wheat sector, although the cultivation of the durum wheat is rather widespread within the region as a high number of farms, especially in the internal hilly areas, find it economically profitable, thanks to the specific EU payments. As a matter of fact the durum wheat cultivation is only a recent practice in the region, whereas the traditional cereal food crop has always been the soft wheat. However, by the time the specific premiums introduced by the CAP led to the crowding out of the soft wheat in favour of the durum wheat.
The rapid spread of the durum wheat within the region led to the crisis of the soft wheat milling industry, which used to be composed of several small-scale mills, suitable to a model based on local consumption, which is in contrast with the modern economic models.
On the contrary, the durum wheat processing industry has never been a typical component of the Tuscan wheat system as demonstrated by the presence of only a few durum wheat mills reliable on the national and international raw material supply and independent by the local supply. The increasing internationalisation and openness of the markets indeed has fostered the disconnection between the decision at the processing level and the logics of the local supply.
The Tuscan durum wheat supply chain needs to be analysed within the national context as, even though all the different phases take place within the region, it is characterised by a high degree of openness toward both the other Italian regions and the foreign markets.

- **Figure 3-1 -** ***Durum wheat supply chain structure***



3.1.4.3 The agricultural phase

The value of wheat marketing production (at basic prices) contributes to the 12-14% (depending on the year) out of the gross saleable production of Tuscany (with a negative peak of the 8, 9% in 2003).

In 2004 the saleable production at basic prices came to 294 millions of euro, including the CAP aids and other public aids which, in the case of grains, include the payment per hectare (63 €/ton multiplied for the regional historical yield), whereas in the case of the durum wheat comprehend the additional payment for the traditional regions (Tuscany is one of those) that is 344, 5 €/ha.

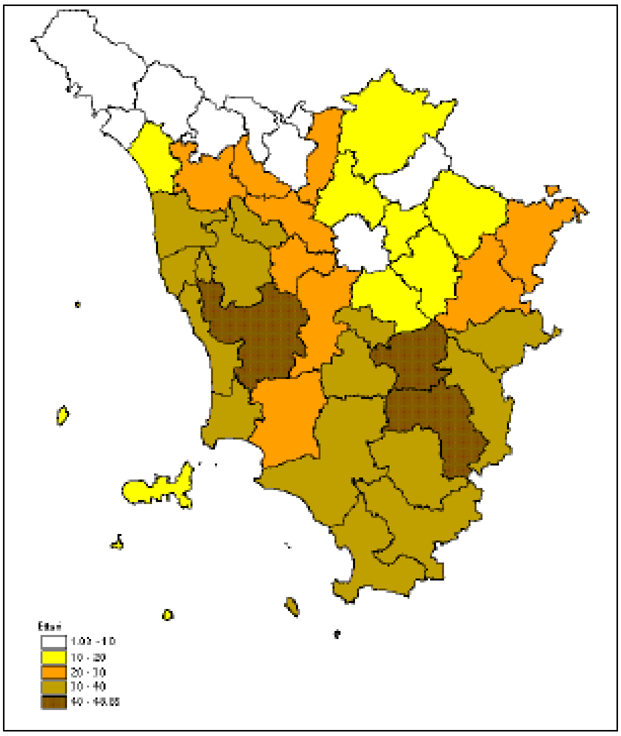
The relative importance of grains on the regional gross saleable production decreased during the 90s (in 1991-1992 it exceeded the 17%) due to the reduction which affected the maize and soft wheat sector, in spite of the rise in the durum wheat sector.

- **Table 3-3 - *Grain production in Tuscany, average of the period 2003-2004***

	Area *(Ha)*	**Total production** *(Q)*	**Yield** *(Q/Ha)*	**Harvest** *(Q)*
Durum wheat	162.499	4.755.286	28	4.699.793
Soft wheat	22.825	775.005	34	761.435
Barley	13.925	357.461	25	345.546
Oats	9.043	233.356	26	228.279
Rye	308	6.850	22	6.574
Other grains	1.092	19.247	18	17.837
Maize	30.402	1.836.117	61	1.707.785
Rice	397	27.425	69	27.425
Sorghum	942	24.150	26	21.408
TOTAL	**241.214**	**8.019.479**	**33**	**7.800.664**

Source: Istat – Tuscany Region

- **Figure 3-2 - *Incidence of the grain area per square metre (100 ha) of farmed land, in each Economic Local System (2000)***



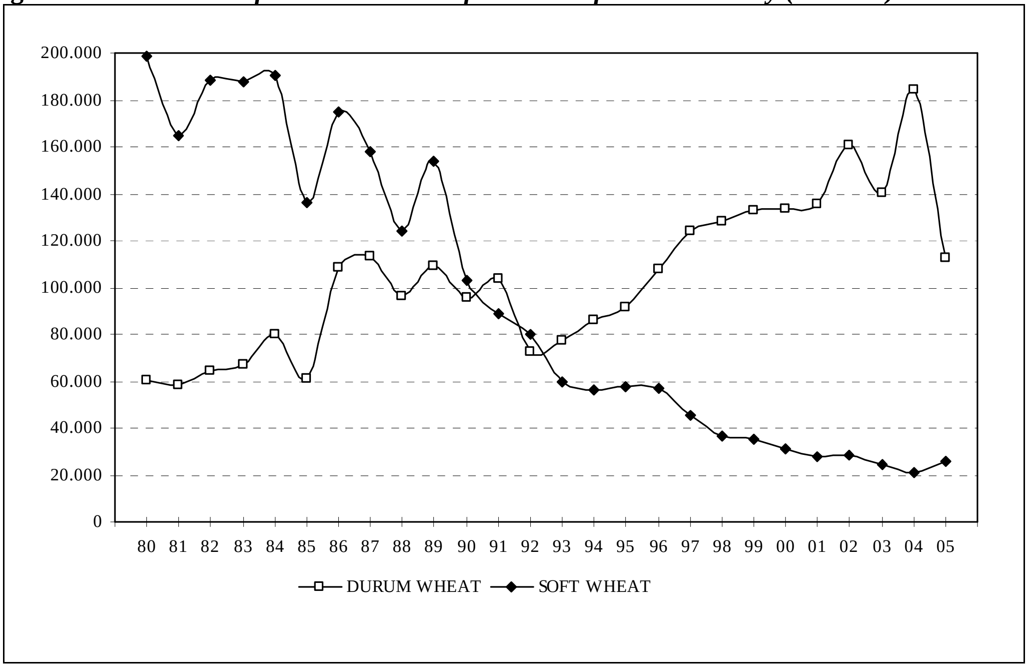
Source: Istat

The durum wheat is the main grain which is grown in Tuscany. Its importance constantly increased over the time starting from 1992 (with an interruption in 2003 due to adverse climatic conditions) till the implementation of the Fischler reform, which led to a strong reduction.

The production growth in the latest years was determined by the high prices on the market as well as by the strong reduction in rape and sunflower areas, due the cutting off of the specific aid for oilseed productions, the premiums of which have been levelled out as the ones of the other grain crops.

At present the durum wheat is grown in certain areas of Tuscany where it used to be absent in the past.

- **Figure 3-3 -** ***Evolution of the durum and soft wheat surfaces in Tuscany (hectares)***



Source: Istat – Tuscany Region

- **Table 3-4 -** ***Durum wheat areas and yields in Tuscany and Italy***

		Area (*Ha)*	**Production** **(***Q)*	**Yield** *(Q/Ha)*	**Harvest** *(Q)*
Tuscany	2000	133.291	4.172.235	31,30	4.102.666
Tuscany	2001	135.722	3.379.163	24,90	3.321.399
Tuscany	2002	160.782	4.882.750	30,37	4.761.262
Tuscany	2003	140.360	2.819.828	20,09	2.766.309
Tuscany	2004	184.638	6.690.743	36,24	6.633.276
Italy	2003	1.688.834	38.147.055	22,60	37.174.990
Italy	2004	1.772.132	56.662.220	32,00	55.457.058
Central Italy	2003	375883	10010519	26,6	9810076
Central Italy	2004	430119	17088978	39,7	16823058
Tuscany on Italy	2003	8,3%	7,4%	88,9%	7,4%
Tuscany on Italy	2004	10,4%	11,8%	113,2%	12,0%
Tuscany on Central Italy	2003	37,3%	28,2%	75,5%	28,2%
Tuscany on Central Italy	2004	42,9%	39,2%	91,3%	39,4%

Source: Istat

The production of durum wheat is strongly influenced by the yields variability. In the last year a negative peak occurred in 2003 whereas a positive peak was registered in 2004. As a matter of fact despite the Tuscan production of that year represents only about the 12% of the Italian durum wheat production, it is nevertheless about the 40% of the production of the Central Italy regions (Marche, Umbria, Lazio, and Abruzzo).
Furthermore Tuscany and Marche hold a privileged position compared to the markets of the Northern regions, where, in spite of the presence of the most important processing industries, the durum wheat is

not a popular crop as the climatic conditions are not suitable to obtain the production levels of the Centre and Southern regions.
The gross saleable production at basic prices amounted to 86 millions of euro in 2003, comprehending the aid allocated by the CAP.

In Tuscany the durum wheat has its privileged location in some provinces, especially the Southern ones, where the climate and soil characteristics better fit to this crop. In 2004 three provinces held the 80% of the total area: Grosseto, Siena and Pisa. The durum wheat cultivation however grew everywhere between 2000 and 2004, involving also the provinces where it used to be unknown.

- **Table 3-5 -** ***Durum wheat (total area in ha and harvest in .000 q)***

Area (ha)	1999	2000	2001	2002	2003	2004	2004 (%)	2004/2003	2004/2000
Arezzo	1.500	2.500	2.500	3.250	2.600	10.000	5,4%	74%	300%
Firenze	4.100	4.200	8.800	8.400	8.250	8.800	4,8%	6%	110%
Grosseto	51.550	52.200	53.000	69.000	61.000	70.000	37,9%	13%	34%
Livorno	10.200	11.600	11.150	13.500	12.200	14.000	7,6%	13%	21%
Lucca	17	14	12	12	190	183	0,1%	-4%	1207%
Massa	0	0	0	0	0	0	0,0%	…	…
Pisa	21.000	22.500	20.000	25.000	14.500	32.000	17,3%	55%	42%
Prato	240	247	30	30	590	625	0,3%	6%	153%
Pistoia	30	30	230	590	30	30	0,0%	0%	0%
Siena	44.583	40.000	40.000	41.000	41.000	49.000	26,5%	16%	23%
Tuscany	**133.22**	**133.291**	**135.722**	**160.782**	**140.36**	**184.638**	**100,0%**	**24%**	**39%**

Production (.000 q)	1999	2000	2001	2002	2003	2004	2004 in %	2004/2003	2004/2000
Arezzo	60	80	75	114	78	300	4,5%	74%	275%
Firenze	153	124	229	245	85	180	2,7%	53%	45%
Grosseto	1.640	1.566	954	1.826	915	2.450	36,9%	63%	56%
Livorno	393	435	374	533	360	700	10,6%	49%	61%
Lucca	1	1	1	1	8	9	0,1%	6%	1291%
Massa	0	0	0	0	0	0	0,0%	…	…
Pisa	662	608	360	740	276	1.254	18,9%	78%	106%
Prato	8	9	1	1	19	25	0,4%	24%	189%
Pistoia	1	1	9	22	1	1	0,0%	0%	10%
Siena	1.313	1.280	1.320	1.280	1.025	1.715	25,9%	40%	34%
Toscana	**4.23**	**4.103**	**3.321**	**4.761**	**2.767**	**6.634**	**100,0%**	**58%**	**62%**

Source: Istat and Region Tuscany

The EU aid fostered the growth of the durum wheat sector as the traditional regions, among which Tuscany, can benefit not only of the aid per hectares but also of the specific durum wheat aid.
According to the Reg. EC 2309/97 the previous system of individual rights to the additional aid has been abolished starting from the production campaign 1998/99 and replaced by the maximum guaranteed area (MGA) and an additional aid of 344 €/ha. In Italy the MGA has been distributed among the different regions, according to which Tuscany has the right to a durum wheat MGA of 118.950 ha.
As a consequence of the "liberalisation" of the durum wheat crop new farms gained access to the sector leading to an increase in the total area, which eventually exceeded the regional MGA.
According to the EU regulation in case the total area exceeds the MGA the aid has to be reduced proportionally to the extent of the surplus. In 2001 this penalty did not come into effect thanks to the compensation mechanism between regions on the national basis, as the total durum wheat national area was less than the MGA (indeed, the total hectares declared in order to obtain the additional aid were 1.642.536 whereas the national MGA was 1.646.000). In this way the Tuscan durum wheat producers could benefit of the entire additional aid thanks to the lack in MGA of other regions.
On the contrary in 2002 a high percentage of oilseed surfaces (especially sunflower) turned to the durum wheat production so that, in spite of a total area of 195.000 ha verified by Agea (the national Agency for EU payments), the area eligible for the specific aid has been 141.000 ha, thanks to the deficit of other regions.
Thus, the additional aid was cut off of the 27%, being 249, 38 €/ha instead of the full aid of 344, 50 €/ha, as the surplus in surface corresponded to that rate.
In 2003 the total Tuscan durum wheat area was 140.360 ha whereas it rose up to 184.638 ha in 2004.

In 2004 in Tuscany 24.214 durum wheat producers, covering a total area of 336.000 ha, applied for the specific aid, which resulted equal to 154,6 millions of euro. Obviously it was a potential amount, susceptible to reductions due to exceeding the national e/o regional MGA. In fact, the final amount recognised by the Tuscany payments' agency (ARTEA) and allocated in the end of the campaign (on the basis of the final balance), was 128,4 millions of euro that is the 87% of the total aid for grains.
The number of farms applying for the durum wheat specific aid is only a minority of the farms which grow grain crops, according to the last Istat census (around the 25%). This means that a large majority of the Tuscan farms is represented by small-scale and part-time family farms, even though the "seed crops" category is much wider according to Istat.
With respect to the location of the durum wheat cultivation within the region, the 85% of the regional area covers the provinces of Grosseto, Pisa, Siena and Livorno, where this crop represents more than the 50% of the area which applied for the EU aid.

- **Table 3-6 - *Tuscany: declared area distribution per province (2004)***

Province	Areas eligible for the EU aid (2004)					Non eligible areas	Total declared area
	Grain	**Industrial crops**	**Dry legumes**	**Other crops**	**Total (ha)**		
Arezzo	30.415,16	4.207,97	1.241,34	2.279,67	**38.090,32**	57.371,57	95.461,89
Firenze	20.087,14	924,70	1.593,94	2.499,24	**25.103,88**	64.532,44	89.636,32
Grosseto	84.956,16	2.178,00	3.810,48	4.787,70	**95.732,34**	149.999,92	245.732,26
Livorno	13.889,68	1.533,81	795,83	1.148,13	**17.367,46**	12.543,97	29.911,43
Lucca	4.812,90	83,01	21,26	569,89	**5.483,57**	3.060,49	8.544,06
Massa C.	114,98	0,00	0,15	0,30	**115,43**	1.337,30	1.452,73
Pisa	44.221,31	2.833,86	4.520,62	5.716,28	**57.291,44**	54.580,12	111.871,56
Pistoia	3.114,28	70,48	60,14	198,54	**3.443,44**	5.392,45	8.835,89
Prato	1.483,09	149,33	5,24	158,78	**1.796,44**	1.572,13	3.368,57
Siena	72.780,67	2.058,26	4.571,63	8.338,79	**87.746,34**	112.851,46	200.597,80
Others	3.308,51	282,89	232,31	349,92	**4.173,65**	6.757,91	10.931,56
Total	**279.183,9**	**14.322,32**	**16.852,95**	**26.047,25**	**336.344,3**	469.999,75	806.344,05
%	**83,0**	**4,3**	**5,0**	**7,7**	**100,00**		

Source: ARTEA

- **Table 3-7 - *Tuscany*: *declared grain area distribution per province (2004)***

Prov.	Grain (2004)						
	Maize	**Durum wheat**	**Paddy**	**Other grain**	**Intercrops**	**Total (ha)**	**%**
Arezzo	6.867,52	15.443,36	0,00	8.050,44	53,84	**30.415,16**	10,89
Firenze	5.333,82	9.935,50	0,00	4.816,68	1,14	**20.087,14**	7,19
Grosseto	10.645,55	63.798,88	286,24	10.225,49	0,00	**84.956,16**	30,43
Livorno	629,59	11.720,69	0,00	1.539,40	0,00	**13.889,68**	4,98
Lucca	4.143,38	369,96	0,00	296,06	3,50	**4.812,90**	1,72
Massa C.	67,99	0,00	0,00	47,01	0,00	**115,00**	0,04
Pisa	6.484,62	32.192,50	0,00	5.543,56	0,64	**44.221,31**	15,84
Pistoia	2.694,80	233,57	0,00	185,91	0,00	**3.114,28**	1,12
Prato	447,51	714,14	0,00	321,45	0,00	**1.483,09**	0,53
Siena	10.380,36	54.839,46	133,97	7.423,87	3,00	**72.780,67**	26,07
Altre	860,81	1.874,73	0,00	572,98	0,00	**3.308,53**	1,19
Total	**48555,94**	**191.122,79**	**420,21**	**39.022,86**	**62,12**	**279.183,92**	100,00

Source: ARTEA (regional Agency)

3.1.4.4 Quality production

- ***Milling quality***

According to the monitoring on the durum wheat quality, within the project "Differentiate storage of the durum wheat", which in Tuscany involves services' cooperatives and the Grain Producers' Association, the average quality of the Tuscan durum wheat is slightly higher than the Italian average, as shown in the table.

- **Table 3-8 - *Tuscan durum wheat quality***

PROVINCE	PROTEIN CONTENT (%)	GLUTEN CONTENT (%)
AREZZO	12,55	10,19
GROSSETO	12,73	10,66
PISA	12,02	9,67
SIENA	12,69	10,08
ITALIAN AVERAGE	11,90	9,45

Source: www.cerealicoltura.it

- ***Organic production***

In 2003 the organic grain total area in Tuscany was 34.748 hectares, 20.720 of which were cultivated with the organic method and 14.000 under the "conversion" period. Compared to 2001 the organic and "in conversion" area increased of the 37%.
Specific data on the organic durum wheat area are not available so far.

- ***Low input production (Tuscan mark "Agroqualità")***

Within the durum wheat supply chain several initiatives are addressed to generate a higher product's value added, using certified seeds, the quality of which refers to the territorial origin or to certain characteristics of the production process linked to the environment.
To this respect a remarkable example is a Tuscan bread which applied for the PDO as well as other initiatives addressed to enhance the value of certain products, both pasta and bread, through collective strategies based on the use of local raw material. In addition other initiative are based on the use of low input systems, officially recognised by the regional mark "Agriqualità" (LR 25/99), involving more than 10 bread and pasta producers.

3.1.4.5 Durum wheat farms

According to the available data on the farms' structure a distinction between the durum and the soft wheat farms is not possible so far. Hence we will refer to a series of information concerning the crop as a whole, moving form the assumption that the two crops present many similarities.
The more recent official data refer to the agriculture census of 2000 and result of extreme importance in order to qualify certain structural features of the farms, influencing the impact of the CAP. According to these data 19.000 Tuscan farms are involved in the durum and soft wheat production, which is around the 33% less than in the previous census.
The average wheat area in 2000 is 10 ha, thanks to an increase of the 7,9%. In addition the wheat incidence on the total farmed land increased of the 37, 8% as well.
Furthermore the gross income of the farms belonging to the chain is also increasing, thanks to the shift to the durum wheat, which is more remunerative than the soft, and to the specific EU aid.
The wheat farms use 5,8 millions of working days per year, even though they refer to the farm as a whole and not only to the wheat production process.

- **Table 3-9** - ***Wheat production in Tuscany: comparison between different aggregate parameters (1990-2000)***

	1990	2000	variation
Wheat farms	27.735	18.839	-32,1%
Wheat areas (ha)	169.771	183.117	7,9%
Average invested area per farm (ha)	6,12	10,00	58,0%
Farmed land (SAU) of the wheat farms (ha)	531.794	482.064	-9,4%
Wheat areas / farmed land	31,9%	37,8%	
Total farm area	841.754	725.557	-13,8%
Wheat standard gross income	148.670.661	172.818.713	16,2%
Total standard gross income of the wheat farm	625.619.528	565.667.104	-9,6%
Family labour working days (in total)	6.561.593	4.383.158	-33,2%
Non family labour working days	1.846.052	1.420.469	-23,1%
Total working days	8.407.645	5.803.627	-31,0%

Source: Istat data processing

The wheat cultivation is very concentrated, indeed the 57% of the total area belongs to only the 11% of the farms. At the opposite extreme the 35% of the farms covers only the 3, 7% of the total area.

- **Table 3-10** - ***Wheat production in Tuscany: farms, areas and PLV distribution per invested area classes (2000, areas in hectares)***

	< 1ha	1-2 ha	2-3 ha	3-5 ha	5-10 ha	
Farms	2.952	3.723	2.001	2.761	3.248	
Farms in %	15,7%	19,8%	10,6%	14,7%	17,2%	
Wheat area	1.399	5.444	5.287	11.403	24.008	
Area in %	0,8%	3,0%	2,9%	6,2%	13,1%	
Wheat PLV (€ x 1000)	1.403	5.706	5.794	12.955	27.949	
PLV in %	0,7%	2,6%	2,7%	6,0%	13,0%	
	10-20 ha	**20-30 ha**	**30-50 ha**	**50-100 ha**	**> 100 ha**	**Total**
Farms	2.138	763	635	430	188	18.839
Farms in %	11,3%	4,1%	3,4%	2,3%	1,0%	100,0%
Wheat area	30.914	18.989	25.014	30.469	30.190	183.117
Area in %	16,9%	10,4%	13,7%	16,6%	16,5%	100,0%
Wheat PLV (€ x 1000)	36.509	22.711	29.894	36.401	36.403	215.726
PLV in %	16,9%	10,5%	13,9%	16,9%	16,9%	100,0%

Source: Istat data processing

Other information can be deducted from wheat farms' data. More specifically each farm has been classified according to two parameters:

- The wheat economic incidence on the farm;
- The incidence of each farm on the total wheat supply of the region.

Basically the first parameter expresses the farm specialisation level within the chain, in terms of wheat gross contribution to the Standard Gross Income of each farm. According to this parameter the following classes have been defined for every farm belonging to the census:

Specialisation index (Is) (% RLS wheat over total farm RLS)			
High	100% >	Is	≥ 66%
Intermediate	66% >	Is	≥ 33%
Low	33% >	Is	≥ 10%
Marginal	10% >	Is	≥ 0%

The second parameter expresses the farm's importance within the chain, or rather the farm's importance compared to the creation of the regional supply. This indicator has been determined according to the wheat RLS. In other words, firstly the quartiles were determined according to the farm RLS and secondly they were used to identify the following wheat farms' classes of relevance.

Farm importance compared to the regional wheat supply chain	Criterion
Micro	First quartile per farm RLS
Small	Second quartile per farm RLS
Medium	Third quartile per farm RLS
Big	Fourth quartile per farm RLS

The final result was an economic classification of the wheat farms in sixteen different farm typologies. Furthermore we give a list of the most remarkable features emerging from the following tables:

- The regional production is extremely concentrated, indeed less than the 2% of the wheat farms covers the 24% of the regional area. On the other hand almost 15.000 small scale farms, the 78% of the total, cover the 27% of the regional area;
- The 20% of the wheat farm is highly specialised (more than 66% of the gross saleable production). Those farms have a diversified importance within the supply chain and they cover the 27% of the regional wheat area.
- The 30% of the farms' gross standard income derives from the wheat cultivation. However the wheat incidence is the 44, 2% for the big scale farms and only the 21, 6% for the small scale farms.

- **Table 3-11 -** ***Tuscan wheat farms' distribution according to the specialisation level and the respective importance within the supply chain***

Number of farms	**Farms' importance within the supply chain**				
Wheat importance within the farm	"micro"	"small"	"medium"	"big"	Total
Marginal (RLS <10%)	2.321	94	21	3	2.439
Low (RLS 10-33%)	5.146	690	258	65	6.159
Intermediate (RLS 33-66%)	4.634	1.174	455	162	6.425
High (RLS 66-100%)	2.727	663	302	124	3.816
Total	14.828	2.621	1.036	354	18.839
%	**Farms' importance within the supply chain**				
Wheat importance within the farm	"micro"	"small"	"medium"	"big"	Total
Marginal (RLS <10%)	12,3%	0,5%	0,1%	0,0%	12,9%
Low (RLS 10-33%)	27,3%	3,7%	1,4%	0,3%	32,7%
Intermediate (RLS 33-66%)	24,6%	6,2%	2,4%	0,9%	34,1%
High (RLS 66-100%)	14,5%	3,5%	1,6%	0,7%	20,3%
Total	78,7%	13,9%	5,5%	1,9%	100,0%

Source: our processing of Istat data and data from the 5th Agriculture Census

- **Table 3-12 -** ***Tuscan farms' wheat area distribution according to the specialisation level and the respective importance within the supply chain***

Invested area (ha)	**Farms' importance within the supply chain**				
Wheat importance within the farm	"micro"	"small"	"medium"	"big"	Total
Marginal (RLS <10%)	4.323	1.599	921	308	7.151
Low (RLS 10-33%)	16.074	11.835	11.256	7.636	46.801
Intermediate (RLS 33-66%)	18.833	19.835	19.882	21.146	79.696
High (RLS 66-100%)	9.956	11.094	13.083	15.336	49.469
Total	49.187	44.364	45.142	44.425	183.117

%	Farms' importance within the supply chain				
Wheat importance within the farm	"micro"	"small"	"medium"	"big"	Total
Marginal (RLS <10%)	2,4%	0,9%	0,5%	0,2%	3,9%
Low (RLS 10-33%)	8,8%	6,5%	6,1%	4,2%	25,6%
Intermediate (RLS 33-66%)	10,3%	10,8%	10,9%	11,5%	43,5%
High (RLS 66-100%)	5,4%	6,1%	7,1%	8,4%	27,0%
Total	26,9%	24,2%	24,7%	24,3%	100,0%

Source: our processing of Istat data and data from the 5th Agriculture Census

- **Table 3-13 -** ***Average wheat area per farm (ha)***

	Farms' importance within the supply chain				
Wheat importance within the farm	"micro"	"small"	"medium"	"big"	Total
Marginal (RLS <10%)	1,86	17,02	43,86	102,51	2,93
Low (RLS 10-33%)	3,12	17,15	43,63	117,47	7,60
Intermediate (RLS 33-66%)	4,06	16,90	43,70	130,53	12,40
High (RLS 66-100%)	3,65	16,73	43,32	123,68	12,96
Total	3,32	16,93	43,57	125,49	9,72

Source: our processing of Istat data and data from the 5th Agriculture Census

- **Table 3-14 -** ***Wheat RLS percentage incidence on the total farm RLS of the Tuscan farms***

% wheat RLS / total RLS	**Farms' importance within the supply chain**				
Wheat importance within the farm	"micro"	"small"	"medium"	"big"	Total
Marginal (RLS <10%)	4,4%	5,2%	3,7%	8,8%	4,6%
Low (RLS 10-33%)	19,2%	20,6%	20,6%	21,4%	20,3%
Intermediate (RLS 33-66%)	46,6%	47,1%	48,4%	49,9%	48,0%
High (RLS 66-100%)	83,7%	81,1%	80,9%	78,7%	80,7%
Total	21,6%	31,4%	33,6%	44,2%	30,6%

Source: our processing of Istat data and data from the 5th Agriculture Census

The 65% of the wheat farms is composed by part-time farms (defined as those farms where the farmers a/o at least another family member working days are less than 180). The percentage of the part-time farms for the Tuscan agriculture as a whole is much higher (89%), meaning that the wheat cultivation is more diffused in the full-time farms. Almost all the wheat farms (98%) are family businesses (defined as those farms where the family labour covers more than one third of the total farm labour), which is in line with the general agriculture situation in Tuscany. Furthermore about the 40% of the farms are classified as "non professional", meaning that the gross standard income is less than one agriculture labour unit, (which, referring to the year of the census, is about 7 UDE, where 1 UDE corresponds to 1200 €). Considering the Tuscan agriculture as a whole the non professional farms are about 80%of the total number of farms.

- **Table 3-15 -** ***Part time and other management forms in the wheat sector***

	Wheat farms	**Wheat area**	**Total farmed land (SAU)**
Part time	12.310	88.113	226.146
Full time	6.529	95.005	255.918
Part Time out of the total	65,3%	48,1%	46,9%
Direct management	18.407	166.712	430.901
Capitalistic management	432	16.406	51.163
Direct management out of the total	97,7%	91,0%	89,4%
Non professional	7.482	13.220	27.113
Professional	11.357	169.898	454.951
Non professional out of the total	39,7%	7,2%	5,6%

Source: our processing of Istat data and data from the 5th Agriculture Census

3.1.4.6 The wheat profitability

The source of the information referring to the wheat profitability is the data collection operated by ARSIA (regional agency for the agriculture innovation and development) through its network of accounting agriculture information.
These accounting data give important information, even though they are not representative of the entire regional grain sector.
The following remarkable elements can be pointed out referring to the period 1998-2003:

- The value of the CAP payments (general aid plus specific aid for the durum wheat, net of any penalties) per hectare has a strong incidence on the value of the gross output, which exceeds the 53% referring to grain farms as a whole, including payments deriving from the application of environmental measures (organic or low input systems). The payments' incidence on the gross output for the conventional farms is 49,9%;
- The crop profit (obtained considering a family labour cost of about 7, 60 €/hour) is around 163 €/ha (corresponding to about 5, 2 €/quintal) and rather homogeneous both in the plains and hilly areas. However, it is much less in the conventional farms (around 97 €/ha);
- The mechanical operations have the highest incidence on the total farm costs, almost 30% of the crop gross output), followed by the extra-farm inputs (around 18%) and the labour costs (15%), which is mainly family labour.

3.1.4.7 Marketing

Several informations referring to the market orientation of the main crops, including wheat (meaning durum and soft together), can be deduced from the Agriculture Census of 2000.
The use of the marketing channels is less diversified for the wheat than for other crops. The sale through producers'associations or cooperatives is the most common marketing channel, used by more than the 50% of the farms. In addition the 38% of the wheat farms uses a kind of sale without any contractual obligation, meaning sales on the farm to mediators, based on trustful relationships strenghtened by the time, including the sales of products as production factors to other farms. Other marketing channels are not really common. The selling directly to industries in particular covers less than the 5% of the wheat farms.
A large quantity of the Tuscan durum wheat is marketed through the storage centres of the region whereas the relationships between the farm and industrial processors are absolutely uncommon.

- **Table 3-16 -** ***Number of farms using different marketing forms***

Farms with:	Direct Selling	Sale to Industrial enterprises bound by contract	Sale to commercial enterprises bound by contract	Contractual or obligation free	Sale to Associations	Total answers (a)	Using at least one form (b)	versification dex (a/b)
Grain	1.673	231	837	8514	10.738	21.993	20.267	1,09
Grain % on (a)	7,6%	1,1%	3,8%	38,7%	48,8%	100,0%	7,6%	1,1%
Wheat	530	126	615	5962	8.150	15.383	14.536	1,06
Wheat % on (a)	3,4%	0,8%	4,0%	38,8%	53,0%	100,0%	3,4%	0,8%
Total	18.514	6.087	3.369	21.586	18.498	46.589	68.054	1,46
Total % on (a)	39,7%	13,1%	7,2%	46,3%	39,7%	100,0%	39,7%	13,1%

Source: processing of data from Istat and the Agriculture Census 2000

3.1.4.8 The farm trading phase

The storage centres represent the step of the durum wheat chain linking the agricultural phase to the industrial phase. The storage phase plays a key role within the supply chain as, aside from their main function, they determine the production orientation, through the input supply and the technical assistance to the farms, and the production concentration in quality homogeneous stocks, meeting the processing industry's demand. In fact the differentiation of wheat at the farm level would be hardly possible.
Furthermore the storage centres offers a set of services of fundamental importance for the supply chain, namely:

- they could act as buyers of the product but more often they offer to producers intermediation and storage services as well as other types of services such as advising about the wheat varieties to choose, information on the market, financial anticipation, pooling;
- with respect to the relationships with the downstream steps of the chain, the storage centres provide homogeneous stocks of products for what concerns their marketing attributes and responding to the buyers' demand. In addition they offer technical warrantees about the storage and processing processes as well as about the products' traceability. The "differentiated storage" plays a crucial role in the value improvement of the product, permitting to separate different products' stocks since their arrival at the processing industries, thanks to adequate parameters and facilities.

Basically the quality differentiation needs on one hand the availability of adequate facilities, requiring investments for the renovations of the storage techniques and the facilities themselves, on the other hand it needs an adequate recognition on the market in term of price, which is often absent as complained by producers.
Different typologies of enterprises are involved in the farm trading phase in Tuscany, namely private enterprises, cooperatives, producers' associations and provincial consortia. A marginal part of the total production is negotiated directly between the farms and the first processing enterprises (mills).
Even though recent data are not available it is evident that enterprises such as cooperatives, consortia and producers' associations, which are expressions of the rural world, manage an important part of the regional durum wheat production.
The regional mills represent the destination of only a small part of the durum wheat supply of Tuscany, as they have a rather small capacity and for the conditions market price. In this way the remaining part of the regional wheat is addressed to the Northern regions' mills (Emilia-Romagna and Piemonte), Umbria and rarely to the Southern regions.

3.1.4.9 The first processing phase (milling phase)

In 2004 the milling industry was composed of 510 mills, providing the processing of about 10,8 million tons of wheat, 5,8 million tons of soft wheat and 5,0 million tons of durum wheat. The operators involved in the chain are 5.100 and the turnover corresponds to 2.480 millions of euro.
Three different typologies of enterprise can be identified within the milling sector:

- the enterprises that are downstream integrated with the activities of the second processing, belonging to big groups and aiming at meeting the group's demand in terms of supply planning and quality standards;
- the enterprises that are upstream integrated with the agriculture activities. Basically they are farms' cooperatives aiming at enhancing value to the members' products;
- the non integrated enterprises, looking at the market for the raw materials supply as well as for the products' placing.

Besides, another important distinction is related to the specialisation on the processed product: indeed some mills are specialised in the durum wheat milling, some others in the soft wheat milling, whereas the so-called "alternate" mills process both the two raw material, thanks to adequate devices. Obviously the same enterprises can dispose of more than one mill.

The milling industry plays a crucial role in enhancing the wheat products' value, linking the agriculture production phase to the demand of the second processing industries. As a matter of fact, the processing sector, especially the pasta industries, is extremely focused upon the technological features of the flour, depending both on the process attributes and the final product as well as on another set of features, mainly of the process, which are the necessary precondition in order to meet the consumers' demand through a more and more increasing differentiation.
At the same time the operators of the milling sector are aware that a further development is needed in two fields: the process quality management (enterprise quality systems, traceability systems) and the capacity of processing organic and low input systems' wheat, more and more demanded by consumers.
Three different durum wheat mills operate in Tuscany at the moment, two of them are specialised and located respectively in the area of Florence and Livorno, whereas the third is an "alternate" mill, located in the province of Lucca. The mill in Livorno is the biggest in the region (the milling capacity is 600 q/h) and it is located in the harbour area of the city. Furthermore it belongs to the group "Grandi Molini", which is one of the main national companies involved in the milling sector, and is also equipped with a soft wheat mill with the same capacity. The durum wheat mill is addressed to the processing of imported raw material, whereas the final product is placed on the national market, especially the food industry, wholesalers and catering.
The other two mills process mainly local raw material, thanks to supply relationships with the consortia and the cooperatives, to which they guarantee interesting potential for the products' placing.
The Tuscan soft wheat milling sector is extremely fragmented (see the tables). There are many small scale farms, facing a difficult market situation, partly due to the aggressive strategies of the main national milling companies. In addition there is a shortage of national raw material, due the decreasing production.

- **Table 3-17 -** ***Tuscany: mills per province (2001)***

	SOFT WHEAT MILLS		**DURUM WHEAT MILLS**	
	n°	**Cap. (*)**	**n°**	**Cap. (*)**
2001				
Arezzo	3	326	0	0
Firenze	5	266	1	320
Livorno	2	600	1	600
Lucca	4	429	1	140
Massa C.	1	46	0	0
Pisa	2	234	0	0
Pistoia	0	0	0	0
Siena	6	274	0	0
Tuscany	22	2.175	3	1.060

(*) Total capacity (Ton. /24 h)

Source: Italmopa data processing

- **Table 3-18 -** ***Tuscany: durum wheat mills per capacity class (Ton. /24 h)***

	> 100		**50-100**		**10-50**		**0-10**		**TOTAL**	
	nr	**Cap. (*)**	**nr**	**Cap. (*)**	**nr**	**Cap. (*)**	**nr**	**Cap. (*)**	**nr**	**Cap. (*)**
2001										
Tuscany	3	1.060	0	0	0	0	0	0	2	460
Central Italy	9	3.070	2	140	0	0	0	0	10	2.610
Total	61	19.252	24	1.544	103	2.055	0	0	187	22.250
1996										
Tuscany	2	780	0	0	0	0	0	0	2	780

(*)Total capacity Ton. /24h.

Source: Italmopa

Data on the territorial origin of the Tuscan mill's supply are not available. According to the few available data the origin of the raw material is extremely changeable, depending on the yearly quality and the product's value for money.
The general strategy, adopted at least by the bigger mills, is comparing the value for money of the local wheat (or from neighbouring areas) with the costs of foreign wheat, especially those which can be provided in large stocks.
Due to the high transportation costs the mills can compete for the provision of local supply, the price of which can result comparable to the one of non local wheat with similar features.
The flour products of the national milling industry are mainly addressed to the national pasta industry, which in its turn produces for the national market as well as for the foreign market, in the same proportions. The bread production is not really important, whereas a modest part is exported as flour product.

- **Table 3-19 -** ***Utilisation of the wheat product, produced by the Italian milling industry (2004, provisional data in tons)***

DESTINATION:	Soft wheat flour products	Durum wheat flour products
1) Internal market:		
- bread	2.860.000	230.000
- pasta	25.000	1.611.000
- sweet products	530.000	-
- domestic use	215.000	13.000
- pizza and other food use	345.000	-
- flour products import	-12.000	-15.000
- pasta import	-	-28.000
Total internal market	**3.963.000**	**1.811.000**
2) Export		
- flour products	291.000	67.000
- pasta	26.000	1.522.000
Total export	**317.000**	**1.589.000**
T O T A L	**4.280.000**	**3.400.000**
WHEAT EQUIVALENTS	***5.790.000***	***5.030.000***

Source: ITALMOPA

3.1.4.10 The second processing phase: the pasta industry

The main destination of the durum wheat flour products is the pasta industry. Basically the pasta sector is composed of two typologies of enterprises: the so-called industrial pasta factories, producing dry pasta using high capital-based processes, on one hand and the soft pasta factories, mainly small-scale, located in urban areas, more local market oriented and using the direct selling, on the factory or through intermediating restaurants.
In 2003 the national pasta industry, which is the main user of the durum wheat flour, was composed (according to UNIPI) of 153 factories and more than 8.000 operators, for a total production of 3 millions ton (the processing capacity is 4, 5 millions ton, with an utilization rate of the 67%) and a gross production value of more than 3.300 euro, one third of which addressed to the foreign market. In 2004 a slight downturn occurred, resulting in a production value of 2.910 millions euro.
The pasta industry underwent a process of deep evolution consisting in the displacement of the production capacity from the traditional Southern regions to the North. The 68% of the milling capacity is located in the South whereas the requirements of the pasta industry in the same regions are less than the 50% of the

national one. As a consequence an interchange is needed between the North and the South and Tuscany holds the potential of having an intermediating role between these two areas.
The Tuscan pasta industry sector is composed of 8 enterprises (6 specialised in the dry pasta, one in the soft pasta and another one is specialised in both), located in the different provinces of the region. The total number of pasta factories underwent a strong downturn between 1996 and 2001, as well as the processing capacity and the number of operators, with a tendency much more negative than the national average.
The enterprise typology is much diversified, going from high quality and niche market oriented enterprises to the ones belonging to big national companies.

- **Table 3-20 - *Industrial pasta factories in Italy and Tuscany, (1996 and 2001)***

	Tuscany			Italy			Tuscany/Italy
	1996	**2001**	**Variation (%)**	**1996**	**2001**	**Variation (%)**	**2001**
Total number of farms	13	8	-38,5%	165	153	-7,3%	5,2%
Dry pasta	11	7	-36,4%	149	134	-10,1%	5,2%
Soft pasta	3	2	-33,3%	30	31	3,3%	6,5%
Processing capacity (*)							
total	12.646	9.060	-28,4%	144.041	164.959	14,5%	5,5%
Dry pasta	9.430	6.310	-33,1%	131.458	155.369	18,2%	4,1%
Soft pasta	3.216	2.750	-14,5%	12.583	9.590	-23,8%	28,7%
Number of operators	622	455	-26,8%	8.070	8.096	0,3%	5,6%
Dry pasta	545	396	-27,3%	6.857	6.642	-3,1%	6,0%
Soft pasta	77	59	-23,4%	1.213	1.454	19,9%	4,1%

(*)Total capacity Ton. /24 h.

Source: UNIPI data processing

The total number of enterprises belonging to the economic class of activity "food pasta production" is 326 (Unioncamere data), of which a large part is composed of artisanal enterprises, of small dimensions (2, 5 operators per local unit) and local market-oriented.
It is relevant to observe how the artisanal enterprises' trend in 1991-2000 differs from the industrial enterprises' trend: indeed the first underwent a development phase, whereas the second went to a crisis due to the increasing markets' openness as well as to the development of distribution channels.

- **Table 3-21 - *Local units and operators within the class of economic activity "Food pasta production", Tuscany, 1996 and 2001***

Enterprise typology	Number of local units		Variation	Number of operators		Variation	Operators per LU	
	1991	**2001**	**2001/1991**	**1991**	**2001**	**2001/1991**	**1991**	**2001**
Artisanal	264	293	11,0%	670	766	14,3%	2,5	2,6
Non artisanal	56	33	-41,1%	1.245	939	-24,6%	22,2	28,5
Total number of farms	320	326	1,9%	1.915	1.705	-11,0%	6,0	5,2

Source: Unioncamere

Basically, the relations between the pasta and the milling industries depend on the enterprises' scale. The industrial pasta factories demand big stocks homogeneous in quality and specific quality attributes, depending on the desired final product. The result is a strong competition between the suppliers.
On the contrary, with respect to the small scale factories, the high transportation costs prevent a strong competition.

3.1.4.11 The functioning and the main issues of the supply chain

The durum food supply chain functioning is strongly influenced by the raw material production structure, especially by its extreme fragmentation in a high number of small scale farms, often unspecialised. This situation is the origin of the main problematic issues of the supply chain, namely:

- high unitary production costs;
- heterogeneous cultivation systems and quality standards;
- difficulties and high costs for the supply concentration;
- low number of contractual integration agreements within the industry sector, especially those based on quality;
- problems related to the differentiated storage process resulting in a hard classification of the supply stocks.

In addition the European Regulation of the last fifteen years fostered the increase in production even in non suitable areas and non professional farms, through the provision of guaranteed financial aids, resulting in the amplification of the negative effects deriving from the already fragmented supply. As a matter of fact part of the regional production of the last years used to rely on the EU aid, from which it was strongly dependent.
The Tuscan durum wheat supply chain is open to the exchange with the external market (both other regions and foreign countries), depending on the harvest trends, the quality standards and the price trend.
The increasing raw material supply has led the storage centres to place a large part of their product outside the region, exploiting the regional favourable location, as Tuscany is the more northern "traditional" area and then closer to the Northern mills.
The development of the regional milling industry offered interesting opportunities to the regional producers, who could benefit of a vaster range of short-distance placing alternatives (which is extremely important considering the transportation costs incidence on the producers' price). However, the proximity of Livorno, providing both an important harbour and the biggest mill in the region, strategically enhances the openness to the external competition.
However, the marketing management of the agriculture supply is still deficient in several areas, which hardly meet the milling industries' demand. Certain structural attributes, such as the farms' fragmentation, the heterogeneous soil and climate conditions, the storage facilities' features inherited from the previous mass production, result in the resistance of the agricultural areas to the quality improvement and to the supply concentration. In addition adequate incentives, economic or of other nature, from the industrial sector are still missing.
There are some examples of contractual relationships between producers and the milling and pasta industry regarding products with a specific quality attributes, although they are only isolated cases, lacking of an internal systematic frame based on an inter-professional negotiation. However, we should consider some initiatives from the rural sector such as the production of pasta with durum wheat produced with low input systems, within the regional certification system "Agriqualità".

3.2 Milk for the production of Parmigiano reggiano

This section will analyse the main characteristic of the Parmigiano Reggiano cheese system. This product is very rooted in the Regione Emilia Romagna and represent one of the most important economic activity for the whole agriculture system of Emilia Romagna region.
Many different typology of actors are involved in the system and each of them has a very important role in the definition of the Quality Assurance Scheme (QAS) and in the economic performance of the entire system.
This part of the report will be organise in four section: section one (3.2.2.1) will introduce to the application of the EC Regulation 1782/2003 to the Italian dairy system and which are the position of the Italian stakeholder in the milk sector; section 2 (3.2.2.2) will provide a brief introduction to the Parmigiano Reggiano system; section three (3.2.2.3) will focus in detail on the milk production system of the Parmigiano Reggiano; section four ((3.2.2.4) will focus in detail on the dairy system of the Parmigiano Reggiano.

3.2.1 The Institutional framework of the Milk CMO in Italy

3.2.1.1 EC Reg. 1782/2003 and the Dairy Sector

The aim of the CAP reform in the dairy sector is the reduction of butter and SMP intervention price by a level of respectively 25% and 15% under the period 1st July 2003 and 1st July 2007.
The reform has additional effects to the grid of institutional prices leading to:
The abolition of the indicative milk price from 1st July 2004.
The reduction of the supplementary levy of 21,9% under the period 2003-2007 (from 356,30 euro/ton to 278,30 euro/ton)
The reduction of the milk consumption support in the schools of 21,9% under the period 2003-2007 (from 232,40 euro/ton to 181,50 euro/ton)

This important set of rules has lead the European Commission to increasingly support dairy farmers under the period 2004-2007 with a direct subsidy called “dairy premium” to compensate them by the milk price reduction. The premium will be in force at least until 31 March 2015 together with the milk quota system.

According to the Regulation with specific respect to the dairy sector, from 2004 to 2007 milk producers shall qualify for a dairy premium. The premium is granted per calendar year, per holding and per tonne of reference quantity eligible on the holding.

According to article 95 of Reg. 1782/2003, the individual reference quantity for milk available on the holding on 31 March of the calendar year concerned, expressed in tonnes, shall be multiplied by:
EUR 8,15/t for the calendar year 2004,
EUR 16,31/t for the calendar year 2005,
EUR 24,49/t for the calendar years 2006 and 2007

From 2004 to 2007, Member States shall, on a yearly basis, according to article 96 make supplementary payments to producers in their territory totalling the global amounts per year. Such payments shall be made according to objective criteria and in such a way as to ensure equal treatment between producers and to avoid market and competition distortions. Moreover, such payments shall not be linked to fluctuations of market prices. The global amount of supplementary payment expressed in Euro Million in Italy is summarised in Table 3-22.

- **Table 3-22 - Yearly budget for supplementary payment**

	2004	2005	2006 and 2007 onwards
Italy	36,34	72,89	109,33

In addition a modulation system is applied in order to detract a 5% from the total amount of premium in order to distribute financial resources to the second pillar (rural development) of the CAP reform.

The technical application of the MTR in the dairy sector is quite complicate and was mainly applied according to the rules defined in Reg. 795/2004 can be synthesised as follow:

1) according to article 16 for the purpose of establishing the reference amount of a dairy farmer finding himself in a situation referred to in Article 40 of Regulation (EC) No 1782/2003 who leases, because of that situation, his individual reference quantity or part of it according to Article 16 of Regulation (EC) No 1788/2003 during the twelve-month period ending on 31 March of the first year of application of the single payment scheme to the dairy premiums and additional payments, that individual reference quantity shall be deemed to be available on the holding of that farmer for that calendar year.

2) according to article 30, in case of dairy premium and additional payments, the LU shall be calculated by dividing the reference quantity used for the calculation of the amount of dairy premium and additional payment when included in the single payment scheme by the average milk yield provided for in Annex XVI of Regulation (EC) No 1973/2004 (2) applicable at that time or by the individual milk yield, in case the individual yield was higher than the average. Where a Member State makes use of the option provided for in Article 62 of Regulation (EC) No 1782/2003, the number of LU shall be modified accordingly.

3) according to article 31, Where a Member State makes use of the option provided for in the first paragraph of Article 62 of Regulation (EC) No 1782/2003 in 2005 or, in case of application of Article 71 of Regulation (EC) No 1782/2003, in the first year of application of the single payment scheme:
(a) in the case where a dairy farmer received other direct payments in the reference period:
— if he had hectares in the reference period, the payment entitlements shall be calculated, in accordance with Article 43 of Regulation (EC) No 1782/2003, on the basis of all the hectares which in the reference period gave right to those direct payments including the forage area;
— if he had no hectares in the reference period, he shall receive payment entitlements subject to special conditions calculated in accordance with Article 48 of Regulation (EC) No 1782/2003;
(b) in the case where a dairy farmer did not receive other direct payments in the reference period:
— if he has hectares, the payment entitlements shall be calculated by dividing the amount to be granted under Articles 95 and 96 of Regulation (EC) No 1782/2003 by the hectares he owns in 2005 or, in case of application of Article 71 of Regulation (EC) No 1782/2003, in the first year of application of the single payment scheme;
— If he has no hectares, he shall receive payment entitlements subject to special conditions calculated in accordance with Article 48 of Regulation (EC) No 1782/2003.

Where a Member State makes use of the option provided for in the first subparagraph of Article 62 of Regulation (EC) No 1782/2003 in 2006, Article 50 of that Regulation shall apply.

3.2.1.2 The Italian choice for the dairy sector

First of all it is important to explain that in practice Italian farmers did not receive the amount of premiums indicated in article 95 because the amount of quota milk to calculate the national premium is based on the quota available at national level in campaign 1999-2000 equal to 9.930.000 tons. This amount of quota sum in 2004 a basic premium of 80,93 million euros. After year 2000 when the national quota has been increased of 600.000 tons leading to a national quota of 10.530.000 tons the basic premium per tons to distribute when a linear distribution was applied was for example 2004 only 7,68 euro/tons instead of 8,15 euro/tons indicated in Reg.1782/2003.

Adding to the supplementary payment in 2004 Italian farmers have been entitled of a milk premium of 11,14 euro/ton instead of expected 11,61 euro/ton.
22,29 in 2005 instead of the potential 23,22 and 33,48 instead of 34,88 in a regime situation until 2014. In addition there is another premium decrease due to the modulation 4% in 2006 and 5% from 2007 forward. There are also other reduction of the milk premium due to the National Reserve. At the end the final premium received by the farmers is about 15% less of the nominal value of 34,88 decided at EU level, corresponding to a value of about 29-30 euro/ton.

Article 62 of the EC 1782/2003 give the possibility to include the dairy premium and additional payments provided for in Articles 95 and 96, shall be included at national regional level, in part or in full, in the single payment scheme starting from 2005 and the entitlements established shall
be modified accordingly. In the Italian case the decoupling scheme and the single payment in the dairy sector started on 1st January 2006 according to article 1 of D.M. 5th of August 2004

The application form is send by the farmers before 15th of May of the year to the national payment agency AGEA. The forms are received by the National Payment Agency AGEA in co-ordination with the regional governments

According to Reg. 796/2004 milk producers are invited to comply with the rules of cross compliance from 1st January 2005. If the cross-compliance rules are not respected, farmer can loose the right to receive the single farm payment.

3.2.1.3 Stakeholders' position towards the implementation of the MTR

There was a general concern in taking a clear position regarding the MTR in the milk sector by many of the actors involved. The main reason was the lack of information regarding a complete evaluation at national level of the possible future scenarios determined by the reform.

UNALAT is one of the most important producers organisation in the dairy sector representing several local dairy association. The implementation of the reform was considered generally positive. The main concerns were linked to the milk quota market because the reform could imply a change in the values mainly for quota leasing/or buy in order to define who is entitled to receive the milk premiums linked to the quota. A lot is in fact linked to the reference period to stipulate a contract to buy milk quota. The reference deadline was fixed at 15 December 2004. Those who bought a quota before this date would have a full availability of the quota by 1st April 2005 and he is the owner at 31st March 2006, this means also that he will get the Milk premium linked to the quota. For those who stipulate a contract after 15th Dec 2004, will have the quota availability in 2005 but they would not be entitled to receive the milk premium which will be kept by the old owner. At the end there will be a different market value of the quota depending by all these complicate mechanisms.
Basically UNALAT was oriented at the beginning to implement the decoupling system starting from 2007. This position was mainly related to the need to give order in the quota system after Decree 119/03 was issued. The decree 119 was in fact issued in order to provide additional measures to make it possible that the Italian quota system could work according the rules put in place at EU level. For this reason UNALAT was in favour to wait a couple of years to have the first results of the decree 119 in order to apply the CAP reform in a better regulated quota system.
From the other side to delay the decoupling system could influence the market and decrease the milk price. For these reasons the final proposal or "best solution" proposed by UNALAT was the start of decoupling in the milk sector in 2006.

COLDIRETTI farmers union, was in favour of the decoupling system in order to reduce the risks of additional beaurocrazy avoiding the negative results experienced by the quota system implementation. In addition decoupling system guarantee a yearly full premium at country level not depending by the production and the risks of a total national premium decreasing if the production decrease.

ASSOLATTE is the representative organization of the dairy industry in Italy. In 2003 the position of the Agro-Industry and the Dairy industry was generally in favour of the MTR, mainly because a reduction of the dairy market protection could be positive in order to open the market also to the export of Italian production. At the same time it is important to guarantee the supply of the raw materials necessary to keep the specific dairy chains operating in our country able to supply the dairy industry.

3.2.2 Origin of the Parmigiano Reggiano and overview of the chain

3.2.2.1 Historical aspects

The origin of the Parmigiano Reggiano was set up well before EC Regulation 2081/92. Actually, when the Italian government with "Decreto Ministeriale 17 giugno 1957" legally recognized the production of Parmigiano Reggiano and set up the QAS-PR, the scheme had already been operating for several decades.

Parmigiano Reggiano is a very ancient cheese with a long tradition and history that goes back to the 14th century. In this long history, the fundamental steps that led to the present version of the scheme were the development of the first cooperatives and the foundation of the private consortium managing the brand.

The first co-operative dairies appeared at the beginning of the 20th century. The co-operative production system had both advantages and disadvantages. The main advantages were that farmers were able to employ skilled cheese-makers to carry out the processing phase, and also that milk producers were made responsible for the quality of the final product. Moreover, the increase in size of cheese production led to an increase in market power and profits. The main disadvantage was in management and organization of the ripening phase, which lasts at least two years. From the beginning, the policy of cooperative member farmers was to sell cheese as soon as possible in order to reduce risk (both at quality and market level) and earn ready money for farming, but this led to problems with market management. This led most coops to transfer the ripening phase to specialised ripeners/wholesalers.

The Consorzio Volontario Interprovinciale del Grana Tipico (The Voluntary Inter-provincial Consortium of Typical Grana) was set up in 1934 by all dairy cooperatives and producers involved in the production of Grana Parmigiano Reggiano. The consortium introduced the brand name Parmigiano-Reggiano still in use today, and acted to safeguard the name and to promote the cheese collectively. In 1934 the Consortium defined the geographical area of origin to include the provinces of Parma, Reggio-Emilia, Modena, and the region to the south of the Po river in the province of Mantova. During 1937 the area of origin was extended to part of the Bologna province, to the west of the Reno River. This is the geographical area of origin still recognised today. In 1954 the Consorzio Volontario Interprovinciale del Grana Tipico was institutionally reorganized and became the Consorzio del Formaggio Parmigiano Reggiano (Consortium of Parmigiano Reggiano Cheese - CFPR) which is still operational. The area of production, trademark and governance bodies was unaltered compared to 1934, but subsequently the new CFPR incorporated national legislation on Designation of Origin and protection of national cheeses, that passed in 1954.

3.2.2.2 Some basic data

The basic data describing the Parmigiano Reggiano supply chain is presented in Table 3-23. The importance of this PDO product for the Italian dairy market is clear, since around 15% of total milk produced in Italy is used to produce Parmigiano-Reggiano(1.62 out of 10.96 million tons in the 2004/05 milk campaign). The scheme involves around 5,000 dairy farmers (10% of the Italian total) and 500 dairy processors (24% of the Italian total), with a large share of small and medium-size producers, both at the farm and at the processing level.

- **Table 3-23 - The Parmigiano-Reggiano supply chain**

	1995	2000	2004	2005
Number of dairy farms (1)	8,452	6,395	5,000	n.a
Milk delivered to dairies (t) (1)	1,479,282	1,560,068	1,621,192	n.a
Number of processors (2)	861	581	511	492
Production of Parmigiano Reggiano (t) (2)	109,427	110,128	116,855	118,979
Production of Parmigiano Reggiano (n of wheels) (2)	2,894,138	2,851,918	3.080.502	3.131.697

*Estimated value.

(1) Source: AGEA-MIPAF (quota delivered + quota direct sales).

(2) Source: CFPR.

Table 3-24 provides the main data on the Parmigiano Reggiano market for aged products (at least 22 months of ripening), together with that of its main competitor (Grana Padano). Total aged production is increasing over time and it is slightly below 110,000 tons, while Grana Padano production reaches 142,000 tons. Around 17% of Parmigiano-Reggiano is exported, mainly to countries with a strong Italian community (Germany, USA, Svitzerland, France, UK, Canada, Spain, Belgium and Japan), while the remaining 83% goes to the domestic market. In the domestic market, around 63% goes to household consumption thorough different retail channels (modern retailing, traditional and specialized shops, on-farm shops…) while the remaining 37% goes to a number of different destinations (industrial use, catering, hotels, restaurants,….).

- **Table 3-24 - The Parmigiano Reggiano and Grana Padano market (t)**

	2002	2003	2004	2005*	% change 03/02	% change 04/03	% change 05/04
Parmigiano-Reggiano							
Total aged production	102,291	102,641	107,749	109,666	0.3%	5.0%	1.8%
Stocks change	-1,000	2,000	7,000	1,000	-300.0%	250.0%	-85.7%
Product available	103,291	100,641	100,749	108,666	-2.6%	0.1%	7.9%
Exports	13,800	15,700	16,100	17,869	13.8%	2.5%	11.0%
Total domestic consumption	89,491	84,941	84,649	90,797	-5.1%	-0.3%	7.3%
Home consumption	63,371	56,439	53,523	54,092	-10.9%	-5.2%	1.1%
Away from home consumption and food industry use	26,120	28,502	31,126	36,705	9.1%	9.2%	17.9%
Grana Padano							
Total aged production	133,247	135,332	138,456	142,442	1.6%	2.3%	2.9%
Stocks change	-1,400	-2,000	-6,000	-3,000	42.9%	200.0%	-50.0%
Product available	134,647	137,332	144,456	145,442	2.0%	5.2%	0.7%
Exports	25,576	26,990	30,323	32,466	5.5%	12.3%	7.1%
Total domestic consumption	109,071	110,342	114,133	112,976	1.2%	3.4%	-1.0%
Home consumption	89,409	94,323	101,100	102,559	5.5%	7.2%	1.4%
Away from home consumption and food industry use	19,662	16,019	13,033	10,417	-18.5%	-18.6%	-20.1%

*estimates.

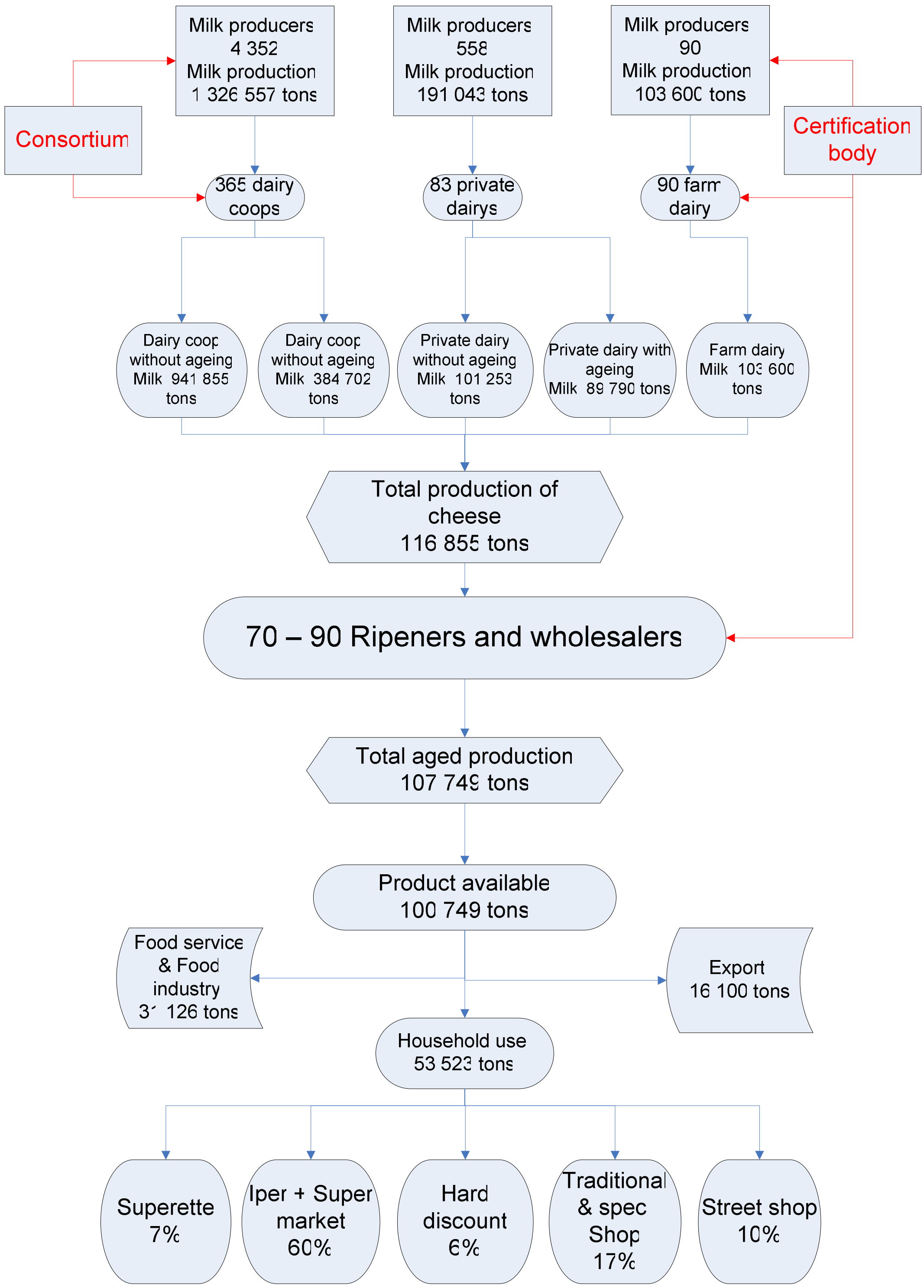
Grana cheeses have a long tradition in the Italian diet, since they are consumed by more than 90% of the households. There are three main products in the Grana cheese market, two PDO products (Parmigiano-Reggiano and Grana Padano) and a group of other non-PDO grana cheeses. Grana Padano is the main substitute for Parmigiano-Reggiano, and it can be taken as a reference product for comparison of the Parmigiano-Reggiano performance.

3.2.2.3 Actors and stages from producer to consumer

The chain of Parmigiano Reggiano is complex, given the presence of different types of actors and stakeholders that influence the structure and the behaviour of the chain.

Starting from dairy farmers up to consumers we can distinguish the following actors (Fig.3-4):

- **Figure 3-4 - Parmigiano Reggiano Chain (year 2004)**



I. Private actors:
1) Farmers
2) Dairy Coops:
Without ripening
With ripening
3) Private dairies:
Without ripening
With ripening
4) Farm dairies
5) Ripeners and wholesalers
6) Retailers

II. Public actors or intermediate institutions:
Consortium managing the brand (Consorzio Formaggio Parmigiano Reggiano – CFPR)
Certification body (Dipartimento Controllo Qualità Parmigiano Reggiano – DCQ-PR)

III. Other institutional actors:
Regione Emilia Romagna
Provincies of the area of Parmigiano Reggiano
Chambers of Commerce
Farmer unions

I) Private sector

1) Farmers
The production structure of Parmigiano Reggiano is based on a dense network of farms that supply milk to co-operative and / or private dairies located within the area defined by the PDO code of practice. The 5,000 farmers operating in the QAS must follow production regulations on milk-production techniques laid down by the CFPR and the milk they thus obtain is suitable for a method of production that still has artisan characteristics.
In the last few years, we have seen a sharp reduction in number of farms and a corresponding increase in the average size. There are several reasons for this concentration process. Farms try to exploit scale economies to compensate for fixed costs of new technological innovations which are replacing human labour, especially in feeding and cleaning of herds, waste management and milking. On one hand, this has led to better performances, but on the other hand these improvements have raised production costs, and forced farmers to resort to external credits.

2) Dairy Cooperatives
Dairy Cooperatives are at the core of the Parmigiano Reggiano system. They account for 72% of the 511 active dairies in 2004 and more than 74% of total cheese output. They are a form of aggregation for both production and society; they affect the families of the farmers participating and managing them. They are often the main, if not the only, source of income for farms, and the life-cycle of a cooperative very often coincides with the life-cycle of those farming families that deliver their milk to it.
So the strategy of co-operatives tends towards protection of farmer interests rather than those of the cooperative itself, and it may therefore be considered a somewhat short-term strategy. Most cooperative dairies allow the cheese to age in their warehouses for the shortest possible time, selling their output to dealers and ripening firms as soon as the quality and market conditions make it possible. In this way, besides reducing the technical and marketing risk of a production process stretched over more than two years, some management costs are reduced, especially those of the ageing process, but above all, the farmers who have provided the milk can be paid back as soon as possible, thus meeting their financial needs. In fact, unlike other sectors where co-operatives usually pay for their raw materials through periodically fixed down payments, Parmigiano Reggiano co-operative dairies pay for almost all the milk provided by members only when the cheese is sold.

Nowadays only 30% dairy cooperatives age their cheese for more than 12 months, and only few of them sell their cheese directly to modern retailers under their own brand. Most of them sell to wholesalers.

3) Private dairies
Private dairies are important in the supply chain of Parmigiano Reggiano as they produce about 18% of cheese and account for a great deal of innovation in the sector. They also tend to be strongly market-oriented. Private dairies buy their milk mainly from larger farms, which are unable to bear the long payment terms imposed by cooperatives. Unlike cooperatives they pay a monthly account for their milk and settle the balance according to the final cheese price. There can thus be competition against cooperative dairies to retain suppliers, which is often detrimental to cooperatives.
As a result of their organisation and structure, private dairies pay more attention to cost saving production techniques and they adopt quality systems for lowering technological risks in producing cheese from milk.
However, there are two types of private dairy. The first behaves like most cooperatives and ripens cheese only up to the first 12 months. The second carry out ripening after 12 months and sell the cheese under their own brand name. This type of private dairy is particularly dynamic and they often adopt active marketing strategies.

4) Farm dairies
These are dairy farms which produce Parmigiano Reggiano directly from their own milk. They have developed recently from larger farms, thanks also to subsidies from the Regional Rural Development Plans. They account for a total of 15% of dairies and produce 8% of total cheese. Some of them also sell cheese to ripeners after 12 months, while others continue the ripening process and sell cheese to wholesalers or retailers, or directly to consumers, either thorough the internet or through on-farm shops.

5) Ripeners and wholesalers
Ripeners and wholesalers carry out ripening of cheeses after 12 months until it is ready for sale. They thus carry out the technical function of ripening bearing the economic risk of trading on price variations.
There is an important distinction between operators active in the supply chain, who assume technical and economic risk, and operators who merely rent out their stores for ripening. These operators are usually banks or specialised entrepreneurs and they only play a technical and service role in the supply chain.
Ripeners/traders however play a key role in the marketplace. They are supplied by cooperative or private dairies, or by other ripeners. They buy both 12-month cheese and fully ripened cheese (more than 18 – 20 months old) and sell it to retailers under their own name and logo. Only a small proportion of them are based in the area of production specified by the CFPR. The largest traders also deal in Grana Padano cheese3 and carry out ripening outside the production area. These large traders play an important role in pricing policies towards retailers as they are in open competition with Parmigiano Reggiano processors carrying out the ripening phase.

6) Retailers
The retail system is quite differentiated as Parmigiano Reggiano is a product that must enter the assortment of all retailers, and is often a key element of their policy to attract customers and retain loyalty. This is done mainly through pricing policies (i.e. low prices, discounts, special offers) and quality policies (i.e. high quality and product differentiation according to the age of the cheese). Today, 75% of Parmigiano Reggiano is sold by large scale retailers (supermarkets, hypermarkets, superette and hard discount stores). The remaining 23% is sold through traditional/specialty shops and street shops, a share that is decreasing over time.

[3] Some recent analysis estimated that as much as 49% Parmigiano Reggiano was ripened outside the PDO area in 2004.

For the above reasons, Parmigiano-Reggiano can be considered a mass product, which play a key role in communication and quality differentiation policies carried out by retailers. These pricing policies are influencing the whole Parmigiano Reggiano supply chain.

II. Public actors

Public actors play a key role in the supply chain. Their job is to defend and guarantee production reputation and quality among producers and processors along and outside the chain. They ensure that a high level of quality is maintained, punish fraudulent imitations and other abuses, and thus create customer loyalty to their product. These public actors are the Consortium (CFPR) and the Certification Body (DCQ-PR).

1) The Consortium

Since 1954 the CFPR has played a fundamental role in the development of the entire sector. Its role in safeguarding was officially recognised by a law of 1955. This law awarded the PDO (Protected Denomination of Origin) marker to Parmigiano Reggiano; it defined ‘area of origin’ and product standards as well as inspection procedures and product safeguarding. To enforce this, the Inter-ministerial Decree of 17 June 1957 entrusted the CFPR with monitoring and controlling the quality of the protected output as well as marking the cheese with the official seal as established by the production regulations of the Consortium itself.

On the basis of this authority, the Consortium has carried out public functions since its foundation, erga omnes, despite being a private organisation. Besides managing and protecting a collective brand, it has helped to launch a unique product on the market, guaranteeing geographical origin, production techniques and quality. It has acted as a ‘guarantor’ towards consumers.

Another aim of the CFPR was to control and co-ordinate the market through ‘production plans. These plans, which were launched in 1982, indicated annual maximum production targets as well as the economic indicators used to fix the target. But in 1996, the Italian Antitrust Authority put a stop to these plans, since they were considered an attempt to restrict competition in the grana cheese market. However, a recent sentence of the same Antitrust Authority (2006) allows the CFPR to adopt production plans only in periods of market crisis, in order to re-establish normal market conditions.

Since EC Regulation 2081/92, the CFPR Statute has incorporated new European legislation without altering the essence and objectives of the Scheme or the activity of the Consortium.

Article 12 of the code of practice statute lays down that owners of the Consortium, who are automatically members of Scheme, are milk producers within the production area, private and cooperative dairies within the production area, and ripening firms which ripen the cheese for at least one year within the production area[4].

The responsibilities of the Consortium coincides with the general objectives of the QAS. The Consortium is thus a very important reference point for all the actors along the chain, including actors outside the Consortium such as ripeners.

To summarise, the Consortium is responsible for the definition of the main technical aspects of the QAS (feeding regulations, cheese production regulations, Marking regulations) but is also involved in brand protection, marketing, advertising and promotion. It is not the owner of the cheese, but cooperates with all actors to support the system and achieve greater market efficiency.

2) The Certification body

The DCQ-PR is a cooperative company formed in 1998, and it issues PDO certification for Parmigiano-Reggiano as authorised by the Ministry of Agriculture. DCQ-PR is also registered on the official list of certification bodies for PDO products and for Protected Geographical Indication (PGI) products held by the Ministry of Agriculture and operates independently as a third party according to EU Regulations, coordinated and supervised by the Ministry. Its main function is to carry out inspection activities completely independently of the CFPR, which has other complementary responsibilities.

[4] This division has important consequences from a marketing point of view because it implies an interruption in the supply chain. Ripenenrs who age cheese outside the PDO area after the first 12 months are not represented in the Parmigiano Reggiano Consortium.

The main function of the DCQ-PR is to control that the quality production standard of PDO Parmigiano-Reggiano conforms to the product specification guidelines at every stage of production, processing and ripening, up to 12 months.
The Consortium control the quality of the cheese after the first 12 months of ripening and is responsible for marking each wheel. The Official mark is accompanied by a quality classification, which consider three main categories, based on the presence of any external and internal defects (size, rind, hammer, probe, paste texture, aroma, flavour) that may be detected. The third category is the so-called “downgraded” or “reject” cheese, that cannot obtain the mark. When the quality evaluation is suspended, the Consortium can carry out additional controls later in the ripening phase.
Both DCQ-PR and CFPR are financed by dairies they pay the quality control of the cheese directly to the CFPR. The cost of the control is 6 euros for each wheel of cheese marked by CFPR. The 6 euros are shared between CFPR (5.85 euro), that covers the cost of all his activities, and the DCQ-PR (0.15 euro) for the inspection and validation activities.

III. Other institutional actors
These are public institutions at the level of Region and Province government. Their job is to support the Parmigiano Reggiano system through EU financed Regional Development Programs (RDP) and manage EU dairy policy instruments. An example of this is the technical assistance provided to farms and dairies, largely financed by the regional government.
Local Chambers of Commerce also make a contribution in promoting the image of the product and in supporting local traders. They also play a technical role in fixing the reference prices for the Cheese at different levels of aging

3.2.3 The structure and the economics of milk production in the Parmigiano-Reggiano area

3.2.3.1 The structure of the Parmigiano Reggiano milk producers

Milk producers are the starting point of the Parmigiano-Reggiano supply chain. In the Parmigiano-Reggiano producing area, most dairy farms are highly specialized, since the technological innovations introduced in milk production (especially in feeding and milking techniques) need to be managed by highly professional farmers. Thus, traditional “mixed” farms are declining and survive only where older farmers are still working.
The most relevant phenomenon that we have observed in the last decade has been the sharp reduction in the number of farms producing milk for Parmigiano Reggiano and the corresponding increase in their average size. In order to analyse this farm concentration process, we can use detailed statistics from AGEA, the agency that is responsible of the official database used to manage the dairy quota system. This databank registers all milk producers distinguishing between those who deliver their milk to dairies5 and those that process their milk on farm (direct sellers). This last category includes of course the Parmigiano Reggiano farm dairies.

[5] Figures provided by AGEA considers producers as quota holders and not as farms (the same quota holder may manage more than one farm).

Table 3-25 - Evolution of dairy farms in the Parmigiano Reggiano area and in Italy

	Deliveries			Direct sales			Total		
	1995/06	2004/05	%change	1995/06	2004/05	%change	1995/06	2004/05	%change
Parmigiano Reggiano									
Number of dairy farms	8,406	4,910	-41.6%	46	90	95.7%	8,452	5,000	-40.8%
Milk production (thousand tons)	1447.2	1517.6	4.9%	32.1	103.6	222.7%	1,479	1,621	9.6%
Average farm size (tons of milk)	172.2	309.1	79.5%	697.8	1151.1	65.0%	175.0	324.2	85.3%
Italy total									
Number of dairy farms	94,320	49,449	-47.6%	5,484	4293	-21.7%	99,804	52,674	-47.2%
Milk production (thousand tons)	10317	10636	3.1%	101.3	290	186.3%	10,419	10,926	4.9%
Average farm size (tons of milk)	109.4	215.1	96.6%	18.5	67.6	265.7%	104.4	207.4	98.7%

Source: elaborated from AGEA

In 2004, in the Parmigiano-Reggiano area we had 4,910 active farms delivering to dairies and 90 direct sellers, with a total of 5,000 farms (table 3-25). The first group shows a sharp decline with respect to 1995 (-41.6%), while the second shows a strong increase (+95.7%). This a clear signal of the increasing popularity of processing milk on farm, which often implies carrying out also the ripening phase in order to sell cheese directly to the consumers, either through on-farm shops or through the internet. For both groups we observe a strong increase in their average size: 309 tons for direct sellers (+79.5%) and 1151 tons for farm dairies (+65%), such that, despite the sharp decline in the total number of firms, milk production in the area increased almost 10% in the same period.

Comparing this data with the structural trends of the entire Italian dairy sector, one can draw some relevant information. First, milk production in the Parmigiano Reggiano is extremely relevant: 15% of the Italian milk goes to Parmigiano Reggiano, and if one considers that another 18% goes to Grana Padano and 3% goes to other grana cheeses, the grana cheese sector counts for 35% of the available milk. Second, the declining trend in the number of farms is less strong than in Italy as a whole (-41% against -47%), and this may be interpreted as a result of the PDO scheme, that has hampered structural change. While this may be considered a benefit for the area involved, it may also imply that we should expect a further decline in the number of farms in the next years, given that the average size of the Parmigiano Reggiano farms, although higher than the average Italian size, remains fairly small in absolute terms (324 tons of milk).

Table 3-26 - Evolution of dairy farms in the Parmigiano Reggiano area by altitude

	Deliveries			Direct sales			Total		
	1995/06	2004/05	%change	1995/06	2004/05	%change	1995/06	2004/05	%change
Number of dairy farms									
Valley	5,074	2,967	-41.5%	40	76	90.0%	5,114	3,043	-40.5%
Hill – mountain	3,332	1,943	-41.7%	6	14	133.3%	3,338	1,957	-41.4%
Total	8,406	4,910	-41.6%	46	90	95.7%	8,452	5,000	-40.8%
Milk production (thousand tons)									
Valley	1,124.0	1,140.0	1.4%	31.2	97.0	211.4%	1,155.2	1,237.0	7.1%
Hill – mountain	323.0	378.0	17.0%	1.0	6.6	580.4%	324.0	384.6	18.7%
Total	1,447.0	1,518.0	4.9%	32.1	103.6	222.5%	1,479.1	1,621.6	9.6%
Average farm size (tons of milk)									
Valley	221.5	384.2	73.4%	778.8	1276.3	63.9%	225.9	406.5	80.0%
Hill – mountain	96.9	194.5	100.7%	161.7	471.4	191.6%	97.1	196.5	102.5%
Total	172.1	309.2	79.6%	698.3	1151.1	64.9%	175.0	324.3	85.3%

Source: elaborated from AGEA

Of the 4,910 farms delivering to dairies in the area, 2,967 are in the plain areas of the Po valley and 1,943 are in hill and mountain areas (Table 3-26). It is worth noting that the process of concentration took place in both areas with approximately the same declining rate, which is again a signal that the PDO scheme may have hampered structural change also in the disadvantaged areas. Milk production has strongly increased in hill and mountain areas, as a result of the Italian specific management of the EU milk quota system, which gives priority to the disadvantaged areas in the compensation scheme.

However the core of the Parmigiano Reggiano milk production is in the Po valley plains, where we find 60 % of farms accounting for 75% of milk. Also farm dairies are mainly located in plain regions, but they have increased in number and size also in the mountain-hill areas. This may be interpreted as a signal that an increasing number of very dynamic farmers are managing the whole supply chain (milk production and processing; cheese ripening; direct sales to consumers) also in these disadvantaged areas.

Table 3-27 - Evolution of dairy farms in the Parmigiano Reggiano area by size

	Deliveries			Direct sales			Total		
	1995/06	2004/05	%change	1995/06	2004/05	%change	1995/06	2004/05	%change
Number of dairy farms									
< 20 t.	673	180	-73.3%	6	5	-16.7%	679	185	-72.8%
20-50 t.	1,479	452	-69.4%	1	5	400.0%	1,480	457	-69.1%
50-100 t.	1,867	693	-62.9%	1	1	0.0%	1,868	694	-62.8%
100 - 200 t	2,196	1,236	-43.7%	2	3	50.0%	2,198	1,239	-43.6%
> 200 t.	2,191	2,349	7.2%	36	76	111.1%	2,227	2,425	8.9%
Total	8,406	4,910	-41.6%	46	90	95.7%	8,452	5,000	-40.8%
Milk production (thousand tons)									
< 20 t.	8.2	2.0	-75.6%	0.1	0.1	20.0%	8.3	2.1	-75.0%
20-50 t.	51.9	16.0	-69.2%	0.0	0.2	433.3%	51.9	16.2	-68.9%
50-100 t.	137.1	51.6	-62.4%	0.1	0.1	11.1%	137.2	51.7	-62.3%
100 - 200 t	312.6	181.3	-42.0%	0.3	0.5	51.6%	312.9	181.8	-41.9%
> 200 t.	937.3	1,266.7	35.1%	31.7	102.8	224.8%	969.0	1,369.5	41.3%
Total	1,447.1	1,517.6	4.9%	32.1	103.6	222.4%	1,479.2	1,621.2	9.6%

Source: elaborated from AGEA

Looking at farms by production size and type (table 3-27), farms producing over 200 tonnes of milk account for 49% of all farms and account for 84% of total supply, which is a clear signal that medium and large producers are gaining increasing importance.

This concentration process is of course caused by the search for economies of scale by the most efficient farms, since technological innovation, especially in feeding and milking techniques, requires increasing financial resources. On the other side, small farms tend to exit the market for a number of reasons: a) shrinking in the size of the farming families, b) increases in pasturing and milking costs, c) the opportunity to sell milk quotas and capitalise their value.

The most important result of the process of concentration inside the Parmigiano Reggiano system is the gradual reduction of family farms and the growing presence of more "industrial" farm. In those farms the role of fixed inputs (technical equipment and capital) is more relevant with respect to labour and in particular family labour. In this framework the role of the farmer and his family is changing, since farming activities are typically carried out by hired workers (mainly from developing countries such as India, Pakistan, Senegal and North Africa), while the farmer and his family is more dedicated to directive, managerial and coordination activities.

According to the data from AGEA, in 2004 there were 90 farm dairies producing Parmigiano Reggiano from their milk, with an average size of around 1,150 tons of milk of these dairies processed less than 5,000 tonnes of milk annually. The majority of these dairies still sell the entire output to traders, but an increasing proportion of theme sell the ripened cheese directly to consumers, using on-farm shops or the internet6.

3.2.3.2 Production costs for milk producers

The code of practice on Parmigiano Reggiano milk outlaws the use of silage and limits the amount of flour and meal that cattle can be fed. This inevitably makes production costs higher especially as compared to other grana cheeses.

The Consorzio del Parmigiano Reggiano recently commissioned a survey of these costs from an independent research institute (CRPA7). The CRPA researchers carried out direct interviews of farms in the Parmigiano Reggiano and Grana Padano production areas. In this work we refer to the 2004 study based on a sample of 60 farms responding to a questionnaire survey. The collected information

[6] Examples of internet marketing farms are Azienda Agrizoo di S. Prospero (www.agri-zoo.it), Bertinelli (www.bertinelli.it), Galli (www.egalli.com), Hombre di Modena (www.Hombre.it).

[7] Centro Ricerche Produzioni Animali (Research Center for Animal Production)

concerned costs as well as technical and structural data (table 3-28). 8 The information on structural data was used to calculate interests and amortisation based on some reference prices of agricultural equipments. For other items detailed accounting data were used.

- **Table 3-28 - Main structural and technical characteristics of the CRPA sample (2004)**

	PR Plain	PR Hill and mountain	Grana Padano / Liquid milk
Number of farm	20	24	16
Farm data			
Average number of cows	99	78	116
Total milk production (ton/year)	784,654	595,300	1,042,708
Milk production (kg/cow/year)	7,875	7,517	8,897
Fat content (%)	3.57	3.68	3.65
Protein content (%)	3.28	3.21	3.28
Feeding			
Forage surface (ha)	62.3	65.2	50.7
N of Cow by forage surface (n)	1.6	1.2	2.2
Pellet consumption (kg/cow/year)	2 959	2 332	3 304
Kg of pellet per 100 kg of milk	37.57	31.02	32.9
Price			
Milk (€/kg)	39.42	40.20	36.41
Heifer Cows (€/kg)	0.45	0.44	0.58
Calves (€/head)	153.0	165.0	124.06
Rented land (€/kg)	329.77	184.73	518.91
Lobour cost (€/hours)	10.20	10.20	10.20
Milk quota value (€/kg)	0.56	0.53	0.63
Productivity			
Labour (kg/hours)	94	73	125.6
Land (tons/ha)	13.0	12.1	23.2

Source: CRPA

Costs were classified as specific or general. Specific costs were entirely a result of cattle production, such as the purchase of feed, forage production costs and veterinary services. General costs were those common to any production, such as expenditure on machinery used for forage and other crops. General and specific costs can be explicit or implicit. Explicit costs involve outlay and implicit costs are imputed, like labour provided by the family, interests on investment etc..
Two coefficients were used to allocate general costs among different outputs:
A = ratio between surface area of crops and total agricultural area (UAA);
B = ratio between earnings from milk and meat and total earnings.
The cost of labour supplied by the family was calculated on the basis of hours of work done by the farmer and family, at the salary rate for hired workers. Standard social security contributions were added to the hourly rate.
Interest on capital was rated at 2% of the capital value and at 1.9% of the value of stocks (average yield of government bonds over 12 months in 2003). Interest on future earnings was distinguished according to the use of milk (Parmigiano-Reggiano, Grana Padano or liquid milk), in order to reflect the different levels of risk.
The reference sample of 60 farms was divided into three groups: the first two groups are Parmigiano Reggiano milk farms in the Po valley area and mountain area and the third group are farms producing liquid milk or milk for Grana Padano (Table 3-29).

[8] The methodology adopted by the CRPA is quite different from that adopted by the FADN, since it considers in detail all the specific costs related to both forage and milk production, while the FADN objective is to determine total farm variable and fixed costs, without discriminating among different production processes.

- **Table 3-29 - Cost of production of milk for Parmigiano Reggiano and other uses**

Indicators	Milk use					
	Parmigiano-Reggiano				Grana Padano / Liquid milk	
	Plane		Hill- Mountain		Plane	
Cost	€/100 Kg	%	€/100 Kg	%	€/100 Kg	%
Animal purchase	0.88	1.83	0.12	0.20	0.01	0.03
Forage and pellets	16.04	33.38	15.53	26.52	13.31	32.34
Land tractors and rent	5.83	12.12	6.93	11.83	5.73	13.93
Buildings depreciation	2.94	6.11	3.60	6.15	2.19	5.31
Veterinary	1.84	3.82	1.86	3.17	1.44	3.49
General farm expense	4.25	8.85	4.28	7.31	3.88	9.44
DIRECT COST (WITHOUT SALARY)	**31.77**	**66.11**	**32.31**	**55.19**	**26.58**	**64.53**
Patrimonial value cost	2.52	5.25	2.17	3.71	2.17	5.28
Labour cost	11.47	23.86	21.20	36.21	10.74	26.08
Agrarian equipment cost	2.30	4.78	2.86	4.89	1.69	4.10
Production input cost	16.29	33.89	26.23	44.81	14.61	35.47
TOTAL GROSS MARGIN	**48.06**	**100.00**	**58.54**	**100.00**	**41.18**	**100.00**
Meat gross profit and EU payments	**2.72**	**5.67**	**3.36**	**6.75**	**4.80**	**11.68**
NET COST	**45.34**	**94.33**	**55.18**	**93.25**	**36.38**	**88.32**

Source: CRPA

In 2004 the cost of producing 100 kg milk for Parmigiano Reggiano for a valley farm with an average of 100 cows was 45,34 €. For a mountain farm with an average of 78 cows the cost was 55,18 €. For a farm in the third group, with an average of 116 cows, the net cost of production was 36,38 € (Table 3-29).

In the second half of 2004 prices of cattle feed returned to 2002 levels after the increase induced by the 2003 drought. Hay prices in fact increased by up to 70% in 2003 and in the first half of 2004. Feedstuff prices remained high for the whole of 2004 and started to fall only in 2005.

These trends affected production costs particularly for farms depending on the market for forage and feedstuffs. For Parmigiano Reggiano the availability of on-farm forage allowed farms to save 1.63% on direct costs, 1.57% of total costs and 2.6% on net costs. The fall in net costs was influenced by an increase in EU payments for beef (+5%) and the introduction of the new EU payments for milk. However, this did not make our sample of farms more profitable, as at the same time there was a sharp fall in the price of cheese, and consequently in the price of milk. Liquid milk farms suffered from the price increase of forage too, in spite of maize silage being available, and direct costs rose by 1.6%. But this was offset by higher productivity than 2003, reducing total costs by 1.24%. For these farms, net production costs fell by 3.69%, thanks to the increase in meat prices and to higher subsidies.

Graph 3-5 shows the big structural difference between liquid milk producers and Parmigiano Reggiano milk producers. However, there are very efficient farms in both categories, and economies of scale can be exploited. The main differences in costs are of course in foodstuffs, even if it is produced on-farm. A kg of milk for Parmigiano Reggiano costs more in terms of equipment and labour for hay harvesting, which is more expensive than silage.

In short, production costs for milk for Parmigiano Reggiano are about 20% higher than milk for Grana Padano or other industrial purposes because of the higher feeding costs. These costs can be lowered by exploiting economies of scale, and this appears to be occurring as many family farms increase their operating size, often employing hired labour, typically non-EU immigrants specialised in milking activities.

3.2.3.3 Farm gate milk prices

Farm gate milk prices vary significantly if the milk is supplied to a cooperative or to a private dairy.

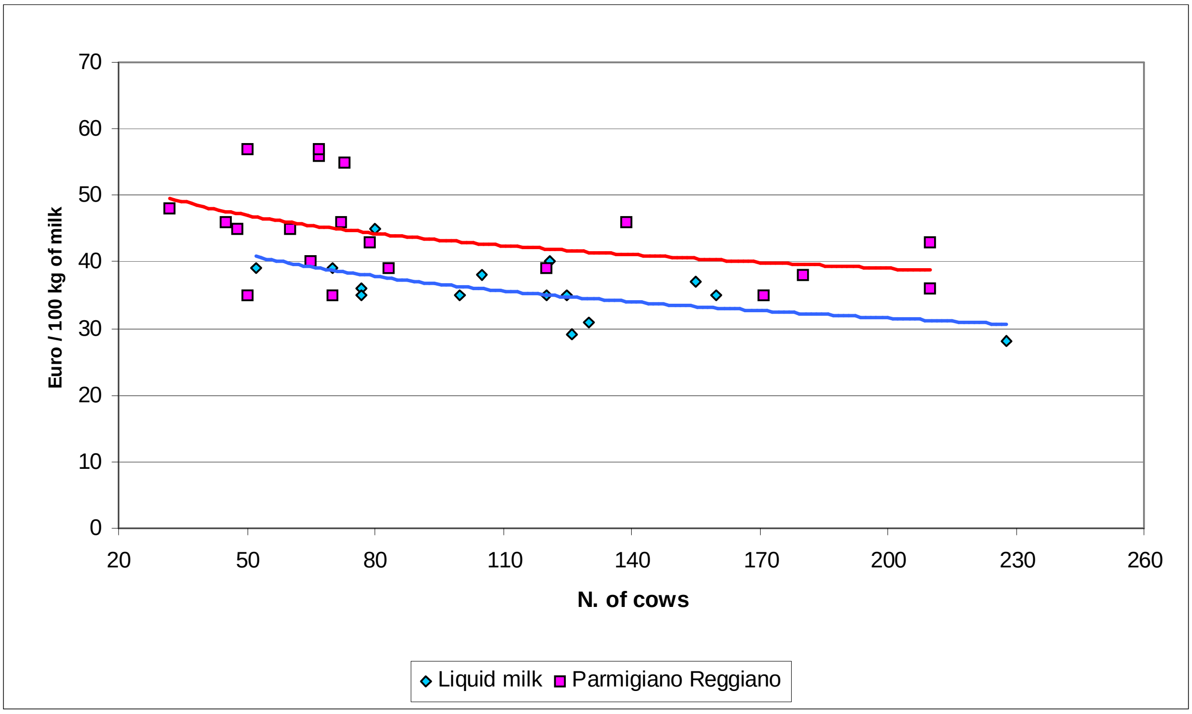
For cooperatives, the price is based on the difference between dairy earnings for cheese, butter and pig sales (i.e. many coops run a pig farm together with the dairy plant) and the processing costs of cheese-making. The price is established every year in spring for the milk delivered the year before and milk farmers are paid through a small instalment (around 20%) at the time of delivery and receive the balance only when the price is fixed (i.e. 24 months later for coops carrying out the ripening phase, 12 month later for the others). Dairies do not unfortunately publish these figures and there are no database collecting on the price paid by coops for their milk.

For private dairies a reference milk price is established by a committee at the local Chamber of Commerce and it is based on the price trend of Parmigiano Reggiano. However, there is often a delay in the price fixing, such that at the time of writing (October 2006) the price for 2004 has still not been fixed. Suppliers are paid by monthly instalment much closer to the final price, and this is making private dairies more attractive to a growing number of suppliers, despite the fact that cooperatives pay a higher price (Table 3-30).

For both types of dairy however the full payment is completed after one year and a half, as a result of market trends and at the time of sales of their 12-month ripened cheese.

FADN data are useful to show differences in the milk price for Parmigiano Reggiano and Grana Padano. For both cheeses, FADN prices are averages of milk delivered to private dairies and of milk delivered to coops. As shown by the FADN figures for 1990 –2002, the Parmigiano Reggiano milk price is always higher (i.e. the milk price premium of Parmigiano Reggiano ranged between 15 and 30%) (Table 3-31 and Graph. 3-5).

- **Figure 3-5 - Cost of production of milk by farm size**



- **Table 3-30 - Reference price of milk used for Parmigiano Reggiano (Euro /Kg of milk)**

Year	Chamber of Commerce of Parma	Chamber of Commerce of Reggio Emilia
1987	0.39	0.39
1988	0.44	0.44
1989	0.38	0.38
1990	0.32	0.32
1991	0.32	0.32
1992	0.33	0.33
1993	0.40	0.40
1994	0.52	0.52
1995	0.59	0.59
1996	0.52	0.52
1997	0.46	0.46
1998	0.39	0.39
1999	0.41	0.41
2000	0.47	0.47
2001	0.45	0.47
2002	0.51	0.50
2003	0.45	0.47
2004	-	0.38

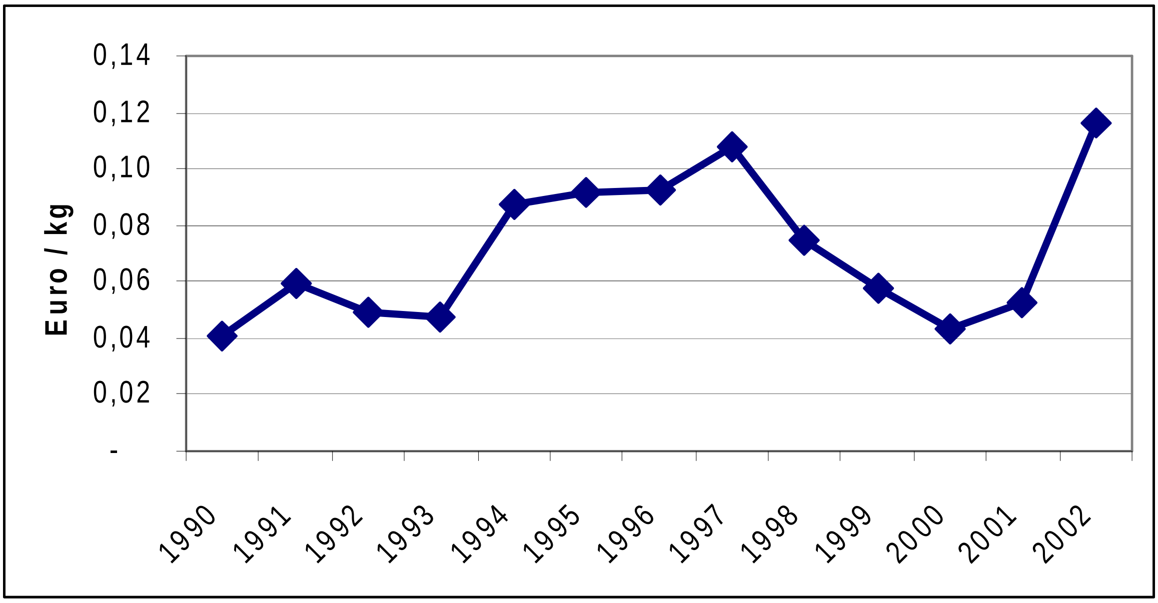
Source: AIPLE

- **Table 3-31 - Evolution of milk prices by destination**

	Milk price (Euro/kg)		Trend (1990=100)	
	Parmigiano Reggiano	Grana Padano	Parmigiano Reggiano	Grana Padano
1990	0.47	0.43	100.0	100.0
1991	0.45	0.40	96.7	92.0
1992	0.43	0.38	91.8	89.0
1993	0.41	0.36	86.8	84.0
1994	0.47	0.39	100.9	90.2
1995	0.47	0.38	100.0	87.9
1996	0.51	0.42	109.6	98.4
1997	0.51	0.40	109.1	94.3
1998	0.44	0.36	93.3	84.8
1999	0.42	0.36	89.1	84.0
2000	0.41	0.37	87.5	85.6
2001	0.43	0.38	91.8	88.3
2002	0.49	0.37	104.3	87.0

Source: Elaborations on FADN

Figure 3-6 - Price gap of milk between Parmigiano Reggiano and Grana Padano producers



3.2.3.4 Profitability and value added

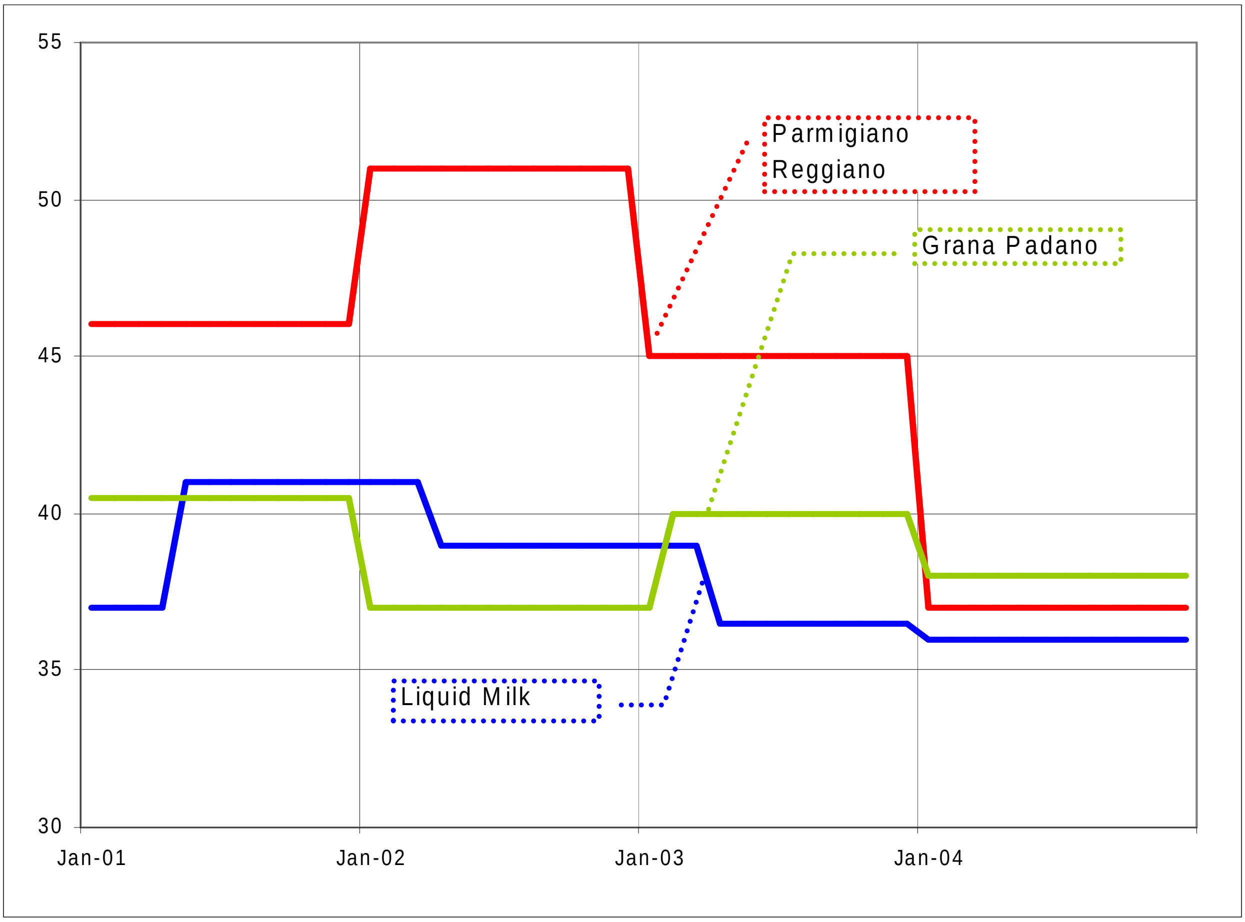
Profitability levels are assessed on milk prices together with the value of meat sales, EU subsidies received by the farm and other income such as awards, sale of manure etc.. CRPA figures show that in 2004 unit revenue was 42.15 €/100kg of milk in the Po valley farms, and 43.60 €/100kg in mountain farms. Grana Padano/liquid milk farms had a revenue of only 41,22 €/100kg.
Milk accounts for 90% of income, although 2004 was a difficult year for Parmigiano Reggiano and its incidence declined slightly (Table 3-32 and Graph 3-7).
Parmigiano–Reggiano milk prices fell in 2004 because the price of the cheese fell. Milk for Grana Padano also experienced a price fall of 3%. The fall in industrial milk price was much less noticeable, but fell again in 2005 and 2006 following the reduction of EU institutional prices for butter and skimmed milk powder. The effects of this are felt in Italy as well as in other countries.
Farm profits are thus negative for Parmigiano Reggiano milk farms and slightly positive for Grana Padano and liquid milk. This does not mean that Parmigiano Reggiano milk farms have a negative household income (computed as difference between revenues and all other costs excluding family labour), since they still provide most of the labour needed for milk production.

Table 3-32 - Dairy farm revenues by milk use

	Milk destination					
	Parmigiano-Reggiano				Grana Padano /Liquid milk	
	Plane		Hill- Mountain		Plane	
Revenue	€/100 Kg	%	€/100 Kg	%	€/100 Kg	%
Milk	39.42	93.53	40.20	92.22	36.41	88.33
Beef	2.00	4.74	2.80	6.46	2.25	5.46
EU payments	0.63	1.50	0.54	1.27	2.43	5.90
Others	0.09	0.22	0.02	0.05	0.12	0.31
Total revenue	**42.15**	**100.00**	**43.60**	**100.00**	**41.22**	**100.00**

Source: CRPA; SI-PR

- **Figure 3-7 - Evolution of milk price at farm gate level by destination (2001- 2004) (Euro/100 Kg)**



CRPA SI-PR

Po valley farms are estimated to have an average household income of 34,000 euro, or 4.64 €/100kg of milk, while mountain farms, more dependent on family labour, are estimated to have an income of 63,000 euro or 7,99 €/100kg of milk. Clearly family labour is paid at lower levels than official salaries. The rate is only 5.74 €/hour in valley farms and 7.8 €/hour in mountain farms (Table 3-33). The fact that mountain farms, despite their higher production costs, enjoy higher incomes is only due to their average share of family labour, which is much higher than in the plains, where farms heavily rely on hired labour.

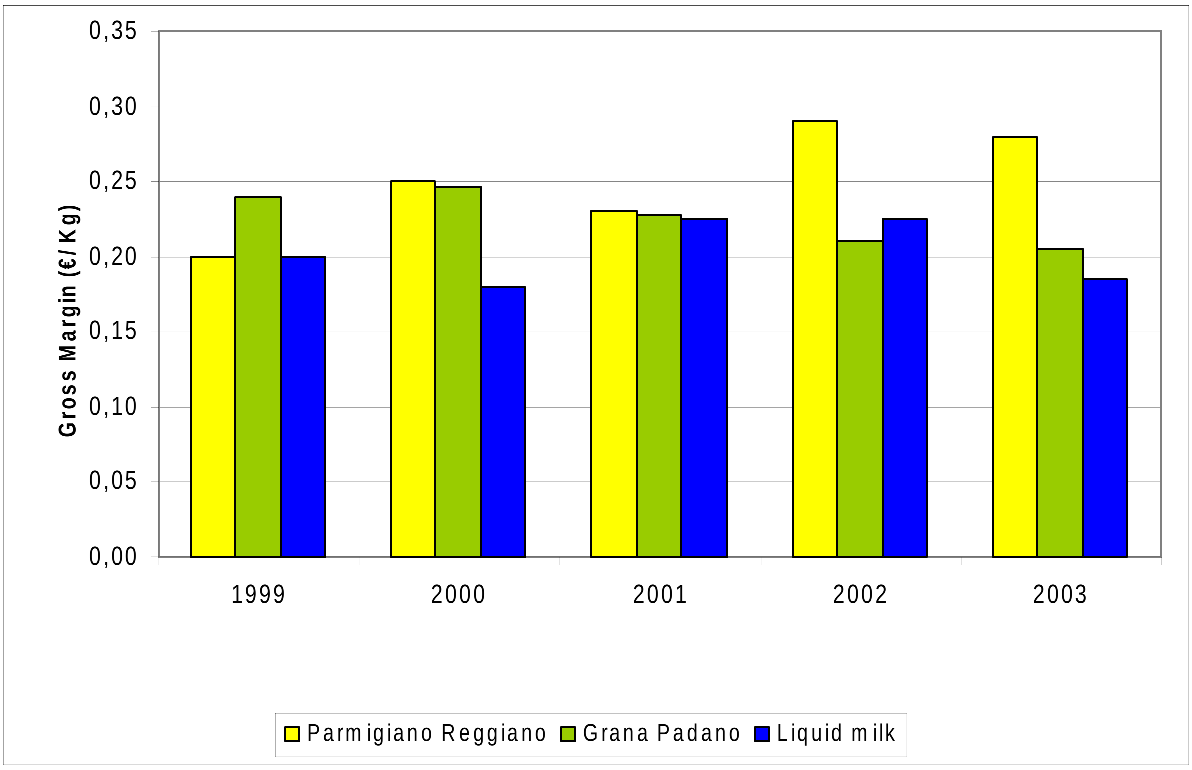
- **Table 3-33 - Profitability analysis of milk for Parmigiano Reggiano and others destinations**

Indicators	Milk destination Parmigiano-Reggiano Plane €/100 Kg	%	Hill- Mountain €/100 Kg	%	Grana Padano / Liquid milk Plane €/100 Kg	%
Total Income	42.15	100.00	43.60	100.00	41.22	100.00
Total Cost	48.06	114.02	58.54	134.26	41.18	0.99
PROFIT	-5.91	14.02	-14.94	34.26	0.04	0.01
Income indicators						
Family income						
Per farm in (000 €)	34.39		63.12		68.64	
per 100 kg	4.64		7.99		6.49	
Labour wage (€/hour)	5.74		7.8		12.42	

Source: CRPA; SI-PR

Finally, analysing gross margins for the three main destination of milk in the area, it is clear that, historically, Parmigiano Reggiano production was able to guarantee higher gross margins to farmers than liquid milk and Grana Padano (Graph 3-8). This made the effects of the 2004 crisis particularly evident due to the fall of Parmigiano Reggiano price registered in 2004[9].

- **Figure 3-8 - Gross Margin of milk production in relation to the processing destination (1999-2003)**



Source CRPA SI-PR

[9] At the moment information about the Gross Margin per kg of milk related to the year 2004 are not available.

3.2.4 Milk processors

3.2.4.1 The structure and localization of milk processing plants in Italy

The total number of dairies in Italy suffered a relevant reduction, -33.7%, over the period 1981-2004. This negative trend was concentrated mostly between 1981 and 1991, (-22.2%), while in the following years the industry undertook only minor adjustments.
The reduction did not equally affect all the different types of dairies. Cooperatives represented 55.9% of all dairies in 1981, but only 30.1% in 2004, with a 64.3% reduction of their number in 20 years. The reduction was particularly intense in the last period, -46.6% between 1991 and 2004, with a -10% in the last two years (table 3-34). This trend is a clear signal of the deep structural change that is characterizing the cooperatives, with the exit from the industry of the less efficient units and an attempt to grow or to change their style by the remaining ones. Most of the 2,344 Italian dairies producing in 2004, 62.5%, are private companies.
The majority of the Italian cheese plants (52.1%) are located in Northern Italy (table 2), prevalently in Emilia Romagna (22.2%), the region where 96% of the Parmigiano Reggiano pieces are produced. Nevertheless, the production is reallocating especially towards Southern Italy, where the number of plants increased by 87.6% over the period 1984-2004. The growth is concentrated between 1994 and 2004, and accelerated in the last three years.

- **Table 3-34 - Number of Italian dairies by firm's style**

Firm's type	1981	1991	2000	2001	2002	2003	2004
Private	1.291	1.253	1.299	1.305	1.304	1.472	1.465
On farm	109	71	87	83	81	81	76
Cooperative	1.977	1.320	828	789	785	713	705
Delivery centre	159	106	105	98	101	101	98
Total	3.536	2.750	2.319	2.275	2.271	2.367	2.344

Source: elaborated from Istat

3.2.4.2 The structure of the Parmigiano Reggiano industry in Emilia Romagna

The dominant processors' governance structure is the cooperative, although important changes characterized the evolution of the industry in recent years. In particular, the reduction in the revenues pushed the firms towards a process of rationalization which translates into higher efficiency. Given the particular production process, still based on traditional technologies, firms try to reduce costs implementing two basic changes: a size growth in order to exploit economies of scale, a privatization of their assets, with a reduction of the production share from cooperatives and a growth in the importance of private companies.
Economies of scale mostly affect logistics and transportation, but also pure processing costs can be reduced increasing daily production with a mechanization of the process and a lower labour intensity.
The cooperative structure of traditional dairies represents a constraint in the process of growth. The obsolete Italian legislation restrains the entry of new members and the merger of different cooperatives.
The analysis of structural data (table 3-35) shows the progressive and strong concentration of the industry over a period of 9 years, from 1995 to 2004.
In 2004, the total number of dairies producing Parmigiano Reggiano in the area of origin specified by the Consortium is about 27% lower than in 1995: over ¼ of the plants either interrupted the production

or merged during the period. Without taking into account the entry of new dairies, concentration determined the exit from the industry of 37 dairies between 1995 and 1998, 61 between 1998 and 2001, 68 between 2001 and 2004, indicating that the reorganization of the industry intensified over time. Looking at the two dominant types of dairies, private companies and cooperatives, the data show that the latter encountered more problems in terms of efficiency and therefore needed a stronger adjustment to the new market conditions. The number of cooperatives decreased from 525 in 1995 to 365 in 2004, -30.5%, particularly in the last three years of the series, between 2001 and 2004, with half of the total reduction during these three years. On the other hand, the number of private dairies decreased by only about 7% over the period, therefore showing a sufficient flexibility to adapt to the new competitive environment. Within the broad category of private dairies, a particularly interesting subset is represented by those dairies producing on farm: although the data available do not allow to look at them in detail, the consortium indicates that they more than doubled between 1993 and 2003.

- **Table 3-35 - Number of private and cooperative dairies in the Parmigiano Reggiano industry by province and tons of milk processed**

Province	1995			1998			2001			2004			2004/1995 (%)		
	n	q	q/n	n	q	q/n	n	q	q/n	n	q	q/n	Δ n	Δq	Δq/n
BOLOGNA															
Private companies	2	2931,885	1465,943	2	3264,155	1632,078	2	3741,784	1870,892	2	4026,211	2013,106	0	37,325	37,325
Cooperatives	8	14705,19	1838,148	8	16698,74	2087,343	8	16606,47	2075,809	8	17906,18	2238,272	0	21,76778	21,76778
All dairies	10	17637,07	1763,707	10	19962,9	1996,29	10	20348,26	2034,826	10	21932,39	2193,239	0	24,35392	24,35392
MANTOVA															
Private companies	3	7886,744	2628,915	6	11434,28	1905,714	7	13639,1	1948,442	6	17074,6	2845,766	100	116,4974	8,248708
Cooperatives	40	139019,3	3475,483	37	147261,8	3980,049	32	132291,5	4134,109	27	140566,6	5206,169	-32,5	1,112972	49,797
All dairies	43	146906,1	3416,42	43	158696,1	3690,607	39	145930,6	3741,81	33	157641,2	4777,005	-23,2558	7,307458	39,82487
MODENA															
Private companies	12	14682,47	1223,539	10	17497,11	1749,711	9	19265,22	2140,58	7	15757,17	2251,025	-41,6667	7,319662	83,97656
Cooperatives	134	266539,8	1989,103	122	285040,7	2336,399	111	291902,3	2629,75	93	297729,1	3201,388	-30,597	11,70155	60,94633
All dairies	146	281222,3	1926,18	132	302537,8	2291,953	120	311167,5	2593,063	100	313486,3	3134,863	-31,5068	11,47278	62,75026
PARMA															
Private companies	53	150953,8	2848,184	54	163154,2	3021,374	52	189101,6	3636,569	48	185361,1	3861,69	-9,43396	22,79332	35,5843
Cooperatives	168	370171	2203,399	158	393877,7	2492,897	143	374589	2619,504	126	381721,6	3029,536	-25	3,120331	37,49378
All dairies	221	521124,8	2358,031	212	557031,9	2627,509	195	563690,6	2890,721	174	567082,7	3259,096	-21,267	8,81899	38,21262
REGGIO EMILIA															
Private companies	19	37387,83	1967,781	18	36766,92	2042,607	16	28112,6	1757,038	20	42044,2	2102,21	5,263158	12,45423	6,831517
Cooperatives	175	442881,5	2530,752	162	465199,1	2871,6	136	433764,4	3189,444	111	415414,6	3742,474	-36,5714	-6,20187	47,87993
All dairies	194	480269,4	2475,615	180	501966	2788,7	152	461877	3038,664	131	457458,8	3492,052	-32,4742	-4,74954	41,05793
All private companies	89	213842,7	2402,727	90	232116,7	2579,074	86	253860,3	2951,864	83	264263,3	3183,895	-6,74157	23,57838	32,51175
All cooperatives	525	1233317	2349,175	487	1308078	2685,992	430	1249154	2905,008	365	1253338	3433,803	-30,4762	1,623358	46,17058
All dairies	614	1447160	2356,937	577	1540195	2669,315	516	1503014	2912,818	448	1517601	3387,503	-27,0358	4,867589	43,72478

n: number of dairies
q: metric tons of milk processed
Source: elaborated from ISTAT

The most evident result of the large decrease in the number of cooperatives and at the same time the increase of private dairies is that the former now represent 81.5 % of the plants producing Parmigiano Reggiano, with a share four percent lower than in 1995. In terms of milk processed, private dairies processed 17.4% of total milk deliveries in 2004, a share more than 3% higher than in 1995. Cooperatives still dominate the production, but the trend seems to award the higher efficiency of private plants.
Overall, although the number of processing plants has decreased substantially over the period, the volume of milk processed has not. Instead, it shows a slight increase between 1995 and 2004, almost 5%, indicating that the individual scale of production has increased as well. In 1995 private companies had an average capacity of 2,402.73 metric tones and of 3,183.90 in 2004, with a 31% increase in 9 years. Technological change in the cooperative plants has been even stronger, with a 46% increase in the average production scale. This is a clear sign of the turmoil that characterized the industry during the last decade. The direction of the effect is unambiguously towards a larger efficient scale of the plants, with a constant attempts to reduce production costs by curbing those costs that more than the others influence such a traditional production process, particularly labour.
The contribute of the 5 provinces constituting the area where the production of the cheese is allowed is quite heterogeneous and basically reflects the extension of the area in each province. The most traditional provinces are Parma and Reggio Emilia, where are located almost 70% of the processing plants, absorbing over a million metric tones of milk, 67.5% of the entire milk volume processed into Parmigiano Reggiano.
The Mantova dairies have the largest average production scale, 4,777.01, well above the overall industry's average, with private plants averaging more than 5,000 tons of milk processed in 2004. On the other hand, Bologna and Modena shows the smallest average plant size, but for Bologna this may be due to its marginal importance as a Parmigiano Reggiano producing area.
The average production scale shows the largest increase over time for the dairies located in the Modena province (+62.75%), especially if private companies (+83,98%), and this is determined by the fact that their initial situation, in 1995, presented very small and fragmented plants. The growth of the dairies was mainly determined by the significant reduction in the number of private dairies (-41.67), the most relevant across provinces.
Instead, the province with the highest reduction in the number of cooperatives (-36.6%) is Reggio Emilia, and this trend is responsible for the reduction in the volume of milk processed in this area; this is the only province showing a decrease in the quantity produced across the period.
Among the other provinces, Modena confirms to be the third area for importance, with a relevant increase of the milk processed (+11,47), and Parma maintains and reinforces the leadership with a +8.82 %.
A detailed analysis of the growth in terms of milk processed (table 3-36) indicates that the plants between 5001 and 10,000 and between 10,001 and 20,000 are probably the most efficient: their number increased respectively by 65.7% in the first class and more than tripled in the second. An opposite trend characterizes the smaller plants, particularly those too small to be efficient but not too far from efficiency, i.e. with a processing capacity between 501 and 2,000 tons of milk, which reduced to less than a half in 9 years. Surprisingly, the number of smallest plants did not change significantly, indicating that small high quality dairies can still be competitive in particular market segments. The trend towards concentration appears quite clearly.

- **Table 3-36 - Distribution of dairies by quantity of milk processed (metric tons)**

	Milk processed									
	1-100	101-200	201-500	501-1000	1001-2000	2001-5000	5001-10,000	10,001-20,000	more than 20,001	Total
BOLOGNA										
1995	0	0	0	1	6	3	0	0	0	10
1998	0	0	0	0	5	5	0	0	0	10
2001	0	0	0	0	6	4	0	0	0	10
2004	0	0	0	0	5	5	0	0	0	10
MANTOVA										
1995	0	0	0	1	9	25	8	0	0	43
1998	0	0	1	1	10	20	9	2	0	43
2001	0	1	0	4	5	18	10	1	0	39
2004	0	0	1	0	4	16	9	3	0	33
MODENA										
1995	1	0	5	23	72	39	5	1	0	146
1998	1	0	9	10	58	46	4	4	0	132
2001	1	1	6	14	46	38	9	5	0	120
2004	0	0	5	12	30	38	9	6	0	100
PARMA										
1995	1	0	5	26	97	80	9	2	1	221
1998	3	3	6	15	71	93	17	4	0	212
2001	2	3	5	12	70	82	17	3	1	195
2004	2	0	5	8	52	84	15	7	1	174
REGGIO EMILIA										
1995	1	1	5	18	77	76	13	3	0	194
1998	2	1	2	15	62	80	15	3	0	180
2001	1	0	4	12	40	71	21	3	0	152
2004	2	2	3	6	32	57	25	4	0	131
TOTAL										
1995	3	1	15	69	261	223	35	6	1	614
1998	6	4	18	41	206	244	45	13	0	577
2001	4	5	15	42	167	213	57	12	1	516
2004	4	2	14	26	123	200	58	20	1	448

Source: elaborated from ISTAT

This trend resembles the dynamics in the number of cooperatives, while the change in the number and distribution of private dairies is quite different. Here the growth starts from those plants processing more than 1,001 tons of milk, indicating that the optimal production scale for private plants could be lower than for cooperatives.

Modena, Parma and Mantova are the provinces where the dairies processing between 10 and 20 thousand tons proliferated, from 1 in 1995 to 6 in 2004, from 2 to 7 and from 0 to 3 respectively. For the first two provinces, a relevant growth also interests the size category between 5 and 10 thousand tons: these dairies almost doubled for Modena and increased by 2/3 for Parma. The other important province, Reggio Emilia, also registers an almost 100% increase for this size class.

At the same time, in this areas the plants processing between 501 and 2,000 tons suffer a drastic reduction, -60% for Reggio Emilia, -55.8% for Modena and -47.1% for Parma.

These structural changes are in line with the growth of the average production scale underlined above, with Modena showing the largest percent increase over the period, followed by Reggio Emilia and Parma.

The disaggregated trend for cooperatives and private dairies (tables 3-37 and 3-38) adds some interesting information. The number of private processing plants starts increasing from a size of 1,001 tons of milk processed (the data for 2001 represents an exception), indicating that private plants may have an efficient scale smaller than cooperatives. The opposite is true for cooperatives: only the number of largest plants, above 5,001 tons, increases between 1995 and 2004.

- **Table 3-37 - Distribution of private dairies by quantity of milk processed (metric tons)**

	1-100	101-200	201-500	501-1000	1001-2000	2001-5000	5001-10,000	10,001-20,000	more than 20,001	Total
BOLOGNA										
1995	0	0	0	1	0	1	0	0	0	2
1998	0	0	0	0	1	1	0	0	0	2
2001	0	0	0	0	1	1	0	0	0	2
2004	0	0	0	0	1	1	0	0	0	2
MANTOVA										
1995	0	0	0	1	0	2	0	0	0	3
1998	0	0	1	1	2	2	0	0	0	6
2001	0	1	0	1	2	2	1	0	0	7
2004	0	0	1	0	2	2	1	0	0	6
MODENA										
1995	1	0	4	4	2	0	1	0	0	12
1998	1	0	6	0	2	0	0	1	0	10
2001	1	0	3	1	2	1	0	1	0	9
2004	0	0	2	0	3	1	1	0	0	7
PARMA										
1995	1	0	3	9	21	14	2	2	1	53
1998	3	3	3	5	15	15	7	3	0	54
2001	1	3	3	5	12	17	8	2	1	52
2004	1	0	5	4	11	16	8	3	0	48
REGGIO EMILIA										
1995	1	1	3	6	6	0	1	1	0	19
1998	2	0	1	7	3	3	1	1	0	18
2001	1	0	3	4	2	4	2	0	0	16
2004	2	1	3	3	4	5	2	0	0	20
TOTAL										
1995	3	3	6	13	18	23	10	3	1	80
1998	3	0	13	13	17	22	11	3	0	82
2001	4	2	12	13	29	21	5	3	1	90
2004	3	1	11	7	21	25	12	3	0	83

Source: elaborated from ISTAT

- **Table 3-38 - Distribution of cooperative dairies by quantity of milk processed (metric tons)**

	1-100	101-200	201-500	501-1000	1001-2000	2001-5000	5001-10,000	10,001-20,000	more than 20,001	Total
BOLOGNA										
1995	0	0	0	0	6	2	0	0	0	8
1998	0	0	0	0	4	4	0	0	0	8
2001	0	0	0	0	5	3	0	0	0	8
2004	0	0	0	0	4	4	0	0	0	8
MANTOVA										
1995	0	0	0	0	9	23	8	0	0	40
1998	0	0	0	0	8	18	9	2	0	37
2001	0	0	0	3	3	16	9	1	0	32
2004	0	0	0	0	2	14	8	3	0	27
MODENA										
1995	0	0	1	19	70	39	4	1	0	134
1998	0	0	3	10	56	46	4	3	0	122
2001	0	1	3	13	44	37	9	4	0	111
2004	0	0	3	12	27	37	8	6	0	93
PARMA										
1995	0	0	2	17	76	66	7	0	0	168
1998	0	0	3	10	56	78	10	1	0	158
2001	1	0	2	7	58	65	9	1	0	143
2004	1	0		4	41	68	7	4	1	126
REGGIO EMILIA										
1995	0	0	2	12	71	76	12	2	0	175
1998	0	1	1	8	59	77	14	2	0	162
2001	0	0	1	8	38	67	19	3	0	136
2004	0	1		3	28	52	23	4	0	111
TOTAL										
1995	0	0	5	48	232	206	31	3	0	525
1998	0	1	7	28	183	223	37	8	0	487
2001	1	1	6	31	148	188	46	9	0	430
2004	1	1	3	19	102	175	46	17	1	365

Source: elaborated from ISTAT

Reggio Emilia and Modena offer the largest contribute to the growth of large cooperatives, while Parma, the major production area, records an increasing trend only for the largest cooperatives, those above 10,001 tons of milk processed, which pass from 1 to 5.

Therefore, the decrease in the number of cooperatives processing less than 5,000 tons of milk and at the same time the increase of both large cooperatives (above 5,000 tons of milk processed) and large private dairies (between 2,000 and 10,000 tons of milk processed) are responsible for the overall concentration of the industry.

The distribution of the cheese production among the different provinces (table 3-39) confirms the leadership of Parma and Reggio Emilia, with more than 1 million wheels (36.5% of total production) and almost 1 million (31.3%) respectively, followed by Modena, Mantova and Bologna. The most relevant difference between the two leading provinces is that almost 37% of the Parma production is still obtained from small dairies, plants with a processing capacity lower than 5,000 tons of milk, while in the Reggio Emilia area the largest contribution (42.2%) comes from the largest dairies, those processing more than 10,000 tones of milk per year. In no other province the small processing plants have shows such a role in the Parmigiano Reggiano production, the reason probably being the tradition of the Parma area, where the small dairies have always dominated the scene.

The location of the plants also plays a role in the relationship between plant size and production: almost half of the mountain production comes from small dairies, confirming the fact that in these area the

limited and sparse milk production needed a higher number of smaller dairies. The share reduces to about ¼ for the plain production, where the large dairies dominate.
The social structure of the small and medium plants refers mostly to the coop, as the concentration of the production in these structures indicates, with shares of 72% and 81% respectively. Cooperatives are also responsible for most of the cheese production of the large dairies, but their contribution is slightly lower (71%).

- **Table 3-39 - No. of wheels of cheese produced by the Parmigiano Reggiano system (2004)**

No. of wheels of cheese		Class of dimension in tonnes of milk			
		0 - 5.000	5.001 - 10.000	> 10.000	Total
Province of production	Bologna	19.261	12.795	23.088	55.144
	Mantova	35.851	100.585	198.036	334.472
	Modena	226.455	114.802	261.350	602.607
	Parma	415.107	363.158	346.599	1.124.864
	Reggio Emilia	216.576	339.757	407.082	963.415
Area of production	Mountain	335.211	264.709	88.393	688.313
	Plain	578.039	666.388	1.147.762	2.392.189
Social structure	Coop	656.082	758.749	880.135	2.294.966
	Private dairy	91.925	123.593	331.792	547.310
	Dairy farmers	165.243	48.755	24.228	238.226
Total		913.250	931.097	1.236.155	3.080.502

Source: CRPA / SI-PR

The production trend over the last 5 years (table 3-40) shows an almost 10% increase in the number of cheese wheels produced, but not all provinces contribute to this trend equally: Parma experienced the largest increase (11.4%), followed by Reggio Emilia (10.3%) and Modena (9.3%), while Mantova's production increases by only 6.9% and Bologna shows a negative trend (-3.2%). The production increases steadily in the two leading provinces, while Mantova, after a few ups and downs, seems to be addressed towards a growth in the last two years.

- **Table 3-40 - Production of Parmigiano Reggiano (number of wheels)**

Province of production	Year of production					
	2000	2001	2002	2003	2004	2005
Bologna	61.639	61.772	64.814	59.475	55.144	59.644
Mantova	323.891	315.115	316.712	312.886	334.472	346.146
Modena	561.531	586.471	586.192	587.870	602.607	613.535
Parma	1.027.476	1.027.269	1.060.116	1.078.645	1.124.864	1.144.738
Reggio Emilia	877.381	887.256	909.704	951.628	963.415	967.634
Total	2.851.918	2.877.883	2.937.538	2.990.504	3.080.502	3.131.697

Source: CRPA / SI-PR

- **Table 3-41 - Parmigiano-Reggiano traders with a 1% or higher market share (quantity, 2004)**

		%
1	Unigrana	13,5
2	Colla	7,2
3	Parmareggio	6,2
4	Boni	6,1
5	Ambrosi	5,7
6	Zanetti	5,1
7	Consorzio Latterie Mantovane	4,1
8	Gennari	4,0
9	Saviola	3,6
10	Alimentari Val d'Enza	2,1
11	Ferrari	2,0
12	Medeghini	1,7
13	Pelloni	1,7
14	Bertozzi	1,7
15	Dalla Bona	1,7
16	Euroformaggi	1,5
17	Agriform	1,0
	Totale	68,9

Source: Databank

Although a large number of small dairies characterize the industry, the list of the major cheese traders (table 3-41) indicates that the first eight firms provide more than 50% of the entire supply of Parmigiano Reggiano, the first four 1/3 and the market leader more than 13%.These selling companies do not necessarily produce the cheese themselves, and also the producing ones may also produce different types of cheese besides Parmgiano Reggiano. What they all do for sure is the aging of the product, in order to be able to sell ready-for-consumption cheese. Some of the companies, for example Colla, Zanetti and Ambrosi are vertically integrated into the production phase and the leader, Unigrana, is the commercial branch of a large consortium gathering 73 cooperative dairies. Usually, the presence of a group fairly large firms determines an oligopolistic core able to affect the equilibrium of the industry, in particular price. The homogeneous characteristics of Parmigiano Reggiano, identified by a collective brand, almost excludes the possibility of heavy differentiation strategies by individual firms. The competitive advantage that larger companies have compared to smaller units refers essentially to the possibility to exploit economies of scale, and scope, if other similar products are produced and sold through common distribution channels.

3.3 The Beef sector in Veneto

3.3.1 The Common Market Organization and the MTR

Until the medium-term CAP (Common Agricultural Policy) reform, the beef sector was one of the zootechnical divisions most affected by income and market support measures together with the dairy product sector. The old system of the Common Market Organization of beef, introduced starting from the Mc Sherry Reform, was improved under Agenda 2000 with the strengthening of the direct payment system accompanied by the downward adjustment of the intervention prices. The Fischler Reform (Reg. 1782/2003 EEC), introducing the decoupling principle, actually dismantled many of the support measures directly related to production, in the perspective of guiding the production choices of the farmers towards real market demands. The acceleration transmitted to this formulation after a few years from the reform brought about by Agenda 2000 represented a radical change in the prospects of meat cattle breeders accustomed to count on a well-constructed direct aid system coupled with production.

3.3.1.1 The common beef market organization under "Agenda 2000"

From the Mc Sharry Reform to Agenda 2000

The reform of the beef market organisation under Agenda 2000 was defined by Reg 1254/99 EEC. The contemplated measures concern direct payments to beef producers and the switch from the public support measures to an aid system to private storage, which represents one of the strongest innovations of the reform. All in all Agenda 2000 continued the formulation given by the Mc Sharry Reform by further reducing the importance of market support measures compensated by the increase of direct support to the breeders' income.

In the same time, it achieved a partial readjustment in resource allocation intended for direct payments for the benefit of Countries less inclined to extensive breeding that were penalised by the Mc Sharry reform of the beginning of the nineties. The purpose was achieved by lowering the age limits for the payments of premiums to male bovine animals and by introducing new income supports not bound by land availability: slaughter premium extended to all types of cattle, and additional payments freely managed by the member states according to one's specific conditions of production.

Income support of meat cattle breeders

In the provisions of Reg. 1254/99, the income support of the breeders is divided in the following production premiums:

Special premium: granted to a number of male bovine animals calculated according to the corporate availability of forage area (2 LU per Ha during the first year of application); each member state can fix a maximum headage limit per company of 90 animals.

Slaughter premium: granted to bulls, male and female bullocks and cows slaughtered at the age of 8 months or higher and to calves slaughtered at the age between 1 to 7 months.

Suckler-cow premium: granted to a number of suckler-cows equal to the individual amount held by the breeder and bound by the observance of a cattle load that in the year 2000 was set at 2 LU per Ha of forage area (starting from 2002 the limit was lowered to 1.8 LU)

Extensification payments: granted as an integration to the suckler-cow premium or to the special premium for male bovine animals on condition that the following cattle load per forage area is observed: during the year 2000 it should have been less than at least 2 LU (starting from 2002 the limit was lowered to 1.8 LU)

Deseasonalisation premium: granted as an integration to the special premium for male bovine animals to discourage slaughter concentration in limited periods of the year.

The overall number of eligible animals was fixed for each base premium; exceeding this limit would have implied a reduction of the granted unit premiums.

- **Table 3-42 - National ceiling for base premiums (no. of animals)**

	Male bovine animal special premium	Suckler-cow premium	Adult bovine animal slaughter premium	Calf slaughter premium
Germany	1,536,113	639,535	4,357,713	652,132
France	1,734,779	3,779,866	4,041,075	2,045,731
United Kingdom	1,361,978	1,699,511	3,266,212	26,271
Ireland	1,028,153	1,102,620	1,776,668	0
Spain	643,525	1,441,539	1,982,216	25,629
Italy	478,997	621,611	3,426,835	1,321,236
Austria	338,720	325,000	546,557	129,881
Denmark	221,688	112,932	711,589	54,700
Finland	200,000	55,000	382,536	10,090
Sweden	233,481	155,000	502,063	29,933
Belgium	228,787	394,253	711,232	335,935
Portugal	160,720	277,539	325,093	70,911
Netherlands	126,346	63,236	1,207,849	1,198,113
Greece	141,606	138,005	235,060	80,324
Luxembourg	18,922	18,537	21,867	3,432

For what concerns the premium amount, a progressive increase of the unit amounts was to be expected starting from the first year of application of the reform. In 2002, the reform would have fully come into force ensuring the maximum of the payment expected per animal:

- **Table 3-43 - Unit amount of the base premiums (€/animal)**

	2000	2001	2002 (and later)
Special premium	160	185	210
Suckler-cow premium	163	182	200
Adult bovine animal slaughter premium	27	53	80
Calf slaughter premium	17	33	50

The regulation assigned each Community partner a financial endowment directly managed by each State for the granting of additional payments as an integration of the premiums defined at the Community level. For Italy, resources reached 21.9 million euros in 2000 and were gradually raised to an overall amount of 65.6 million euros in 2002.

- **Table 3-44 - Financial endowment for additional payments (million euros)**

	2000	2001	2002 (and later)
Germany	29.5	58.9	88.4
France	31.1	62.3	93.4
United Kingdom	21.3	42.5	63.8
Ireland	10.5	20.9	31.4
Spain	11.0	22.1	33.1
Italy	21.9	43.7	65.6
Austria	4.0	8.0	12.0
Denmark	3.9	7.9	11.8
Finland	2.1	4.1	6.2
Sweden	3.1	6.1	9.2
Belgium	13.1	26.3	39.4
Portugal	2.1	4.1	6.2
Netherlands	8.4	16.9	25.3
Greece	1.3	2.5	3.8
Luxembourg	1.1	2.3	3.4
EU-15	164.4	328.7	493.0

When managing the Envelope, Italy decided to set up a payment in addition to the slaughter premium of male bovine animals and of meat-breed heifers binding it by a 5-month period during which the animals are kept in the farm. Starting from 2001, a substantial part of the overall resources were allocated only to male bovine animals that, apart from the minimum 5-month requirement during which the animals stayed in the cattle-shed, they were also part of a reliable system of voluntary labelling. Always as an additional payment to slaughter, it was decided to grant a premium to animals bred in compliance with the regulatory measures of organic production or PGI. As an integration to the suckler-cow premium, it was decided to grant an additional premium to cows born in Italy and registered in the genealogical books of meat breeds. In 2001, the unit amounts of additional premiums ranged from a minimum of Euro 21 per animal for calves kept in the farms for at least 5 months and a maximum of Euro 45 per animal of the additional premium to suckler cows and of the one granted to the breeders agreeing to the optional labelling system.

Forms of intervention and market support

The Reg. 1254/99 EEC provided the first reform phase of the beef market support that was applied during the period between January 1st, 2000 and June 30th, 2002 and implied the gradual decrease of the intervention price from Euro 3,475 per ton to Euro 3,013 per ton. The maximum yearly limit of public purchases all over the EU was set at 500,000 tons for the year 2001 and to 350,000 tons for the following years. The intervention would have started if the average community price of the carcasses or of the male bovine animals was less than 84% and 78%, respectively, of the intervention price. Starting from July 1st, 2002, the public intervention system was replaced by a private storage aid system granted when the average Community market of the carcasses of adult bovine animals is less than 103% of the basic price, set at Euro 2,224 per ton. Apart from the private storage aid, there also exists the possibility of making use of purchase incentives accessible to all those concerned at the conditions fixed by the beef management committee consisting of representatives of the Member states and chaired by a representative of the European Commission. This form of intervention, called “safety net”, is contemplated when the average price of bovine carcasses in a member state falls below Euro 1,560 per ton for at least two consecutive weeks.

3.3.1.2 The Fischler Reform (MTR)

The main issues of Reg. 1782/03 EEC

Compared to the setting given by the Mc Sharry reform and continued with Agenda 2000, the MTR of September 2003 (Reg. 1789/2003) brought a radical change in the direct payment system of which the beef sector was one of the main beneficiaries. As for the intervention mechanisms, MTR did not change the provisions of Reg. 1254/99 EEC.

In short, the main elements of the Fischler reform are set below

Decoupling: The decoupling mechanism introduced by Reg 1789/2003 EEC represents the most important change of MTR even if it was subdued by the right of the Member states to apply it partially with regard to some sectors. With decoupling, the aid system related to production for sectors such as sowable lands, dairy products, beef, veal, sheep and goats was replaced by the corporate single payment system calculated as the average of the amounts received during the 2000-2002 three-year period. The number of hectares that gave rise to payments during this period represented the number of aid rights. According to this principle, the farmer will have to demonstrate every year the full availability of a certain number of hectares of agricultural area equal to the number of rights acquired in order to be able to fully receive the amount due during the period of reference.

Cross-compliance: The collection of the single payment is conditioned by the observance of the so-called Compulsory Management Principles i.e. a series of rules (standard management requirements) obtained from a list of directives and regulations concerning environmental protection, public welfare and animal well-being. The Compulsory Management Principles were integrated with a series of regulations relative to the good agronomic and environmental conditions defined by the Member states to prevent the possible abandonment of the agricultural business from having consequences on the deterioration of the territory.

Modulation: The amount of the single payment is subject to an automatic reduction that was fixed (2007) at 5% (modulation). This mechanism was introduced in order to re-allocate resources from the first to the second mainstay of the Pac, in the perspective of increasing the available funds for rural development policies.

Support to specific types of agriculture and to quality productions (ex art. 69): The Member states can deduct up to 10% of the overall national or sectorial resources in order to stimulate - by means of coupled production premiums - specific types of agriculture important for the protection of the environment and for improving the quality of agricultural products.

The Reg. 1782/03 EEC and beef sector

For the beef, sowable land, sheep and goat sector, Reg. 1782/03 EEC allowed the Member states to choose payment systems partially coupled with production, allowing to maintain at least partially the previous system.

The different options provided for what concerns beef are set below:

Preservation of the 100% coupled calf slaughter premium; in this case, all the other direct premiums relating to the meat market organisation and accrued during the period of reference flow in the corporate single payment (decoupling);

Preservation of the 100% coupled suckler cow premium and of the 40% coupled adult bovine animal slaughter premium. The remarks at the previous point also apply to the other premiums;

Preservation of the 100% coupled slaughter premium;

Preservation of the 75% coupled male bovine animal special premium.

The Italian choice for the beef sector

With the Decree of August 5th, 2004, the Ministry for Agricultural Policies indicated the application principles of the Fischler reform in Italy. Compared to the general provisions, the choice was to adopt a completely decoupled system starting from January 1st, 2005 based on the payments collected in the 2000-2002 period of reference and not to resort to the regionalization option when assigning aid rights to the farmers. With regard to the beef sector, the Ministry made use of the possibility provided by art. 69 of Reg. 1782/03 EEC of deducting an amount of the sectorial ceiling to be appropriated to coupled payments aiming to support important productions for improving product quality and marketing.

The amount deducted for this purpose, equal to 31,5 million euros, corresponds to 7% of the national limit relative to the beef sector that amounts to 449 million euros in all. Similar choices were made also for the sowable land and sheep and goat sector, with 8 and 5% deductions, respectively.

The conditions for accessing the additional payments are fixed by the Ministry for Agricultural Policies and can be modified each year. Those valid for the year 2005, first year of application of the reform, and confirmed also for the year 2006, mainly aim at indemnifying the breeders of suckler cows and extensive breeding by means of a preservation premium for:

Meat breed suckler cows registered in the genealogical books;

Cows with dual ability bred in farms that comply with a cattle load equal or less than 1.4 LU/Ha. A further condition for collecting the additional premium is the availability of a permanent pasture area equal to at least 50% of the overall forage area;

Suckler cows other than those registered in the genealogical books aged less than 7, bred in farms with a number of animals greater than 5 LU and that comply with a cattle load equal or less than 1.4 LU/Ha of forage area. 50% of the overall forage area must be used as permanent pasture;

Male and female bovine animals aged between 8 and 20 for which the same conditions indicated at the previous point apply with regard to the cows not registered in the genealogical books (cattle load limit, company size limit and presence of permanent pasture). The payment is granted only if the animals are kept in the cattle-shed for at least 7 months.

Finally, a slaughter premium was contemplated for:

Male and female bovine animals slaughtered at an age ranging from 12 to 26 months; their meat is labelled on the basis of an optional labelling regulation (ex Reg. 1760/00 EEC) that must at least indicate the farm of origin. The premium is granted on condition that the bovine animals are kept in the farm for at least 7 months.

3.3.2 The MTR seen by the different stakeholders of beef supply chain

On the day after the agreement of Luxembourg of June 2003 that defined the terms of the Fischler Reform, most of the organisations of breeders and the employers' organisations objected to some aspects of the new PAC system.
Even before than on the advisability of the different decoupling options, the debate mainly concentrated on the calculation system of the corporate single payment that - whatever was the choice adopted by Italy - would have strongly penalised the Italian beef pipeline. The reference to the payments carried out in the 2000-2002 three-year period caused a considerable cut in resources at the disposal of the sector compared to the potentials guaranteed by the Agenda 2000.
The reason is related to the underutilisation of the resources appropriated to direct payments during the first years of application of the CMO due to the delays of the public administration in implementing the payment procedures and to the administrative problems related to the inefficient operation of Bovine animal records (centralised registration system of bovine animals). Compared to those provided by Agenda 2000, the new ceilings assigned by the MTR were reduced by 75% for what concerns calf slaughter premiums, by 45% for those relevant to the slaughtering of adult bovine animals and by 28% for suckler cows. All in all, the loss compared to the potentials of the CMO of Agenda 2000 was estimated to be of approx. 235 million euros corresponding to a more than 35% drop in available funds.

- Table 3-45 - Comparing the national ceilings of Agenda 2000 and MTR (no. of animals)

	Agenda 2000	MTR	MTR/Agenda2000 (%)
Adult bovine animal slaughter	3,426,835	1,892,201	55.2
Calf slaughter	1,321,236	320,677	24.2
Male bovine animals	478,997	385,075	80.4
Suckler cows	621,611	447,600	72.0

In front of this prospect, most of the field organisations backed up the need to modify the terms of application of the reform and, in particular, the calculation mechanism of the ceilings intended for the beef sector. The reason was the failure to collect in the 2000-2002 period the whole amount of the premiums requested by the breeders for reasons not within their control.
On the verge of the MTR launch, the Farmers' Unions present at the territory level and the national association of meat transformation industries publicly showed their concern for the strong penalisation that the Fischler reform would have caused to the sector. Especially ASSOCARNI, body representing the transformation industries, had officially requested the Ministry to back up, during the negotiations with the European Commission, the forward sliding of the period of reference considered for the granting of the corporate single payment. A similar position was assumed by UNICEB, the organisation representing beef dealers, which requested an exception by the Commission in favour of Italy for a different calculation system of the ceiling based not on the number of premiums paid to the breeders - lower than those actually requested - but on the number of animals slaughtered during the period of reference.

3.3.2.1 Stakeholders' position towards the implementation of the MTR

Acknowledging the final decision of the Commission, the debate shifted on the advisability of the different options pertaining to each state concerning the application of the Reform. During this second phase, the positions between the different groups of stakeholders differed.
a) Farmers' organisations
Even if in different ways, CIA and COLDIRETTI, the main Farmers' Organisations in Italy, recognised the advisability of a CAP reform aiming at the modernisation of the agricultural sector, the simplification of the administrative procedures for farmers and the stimulation of entrepreneurial behaviours oriented to market and consumer expectations. The backing to the reform was also justified by the subsequent legitimation of the Community agricultural expense that would have assured the European Union a stronger position in the international top management of WTO. Compared to the different decoupling options relevant to the beef sector, their position differed.

- COLDIRETTI sided with the total decoupling system because it would have allowed the full utilisation of all the Community resources and avoided the risk of loosing funds as in the previous years. With decoupling, all the financial ceiling assigned by the EU would have remained at Italy's disposal, regardless of any drop in production that was forecasted to occur also by adopting the partially coupled system.
- On the contrary, CIA backed up the advisability to keep coupled the suckler cow premiums in order to preserve the meat bovine zootechny in the deprived areas, most threatened by the decoupling effects. Both CIA and COLDIRETTI were in favour of the application of the additional aid as provided by art. 69 of Reg. 1782/03 EEC, and both considered it more appropriate not to put off the decisions after January 1st 2005
b) Cooperatives' organisations
- During the debate set up at the Ministry, the national organisations of the agroindustrial cooperatives, including ANCA-Legacoop e Fedagri, adopted a common position in favour of all the flexibility instruments provided for by Reg. 1782/03. Especially for the beef sector, they backed up the coupling option of 40% of slaughter premiums of adult bovine animals and of 100% for suckler cow premiums, justifying it as a solution able to impartially take into account the various components of the national zootechnic system. Choosing partial decoupling also meant adopting a gradual approach in the application of the Reform because it would have allowed to evaluate the effects of the choice and subsequently the advisability of switching to the completely decoupled system. On the contrary, if the total decoupling principle were to be chosen, it would not have need possible to go back on the decision. The partially coupled system would not have implied a further burdening of the bureaucratic and administrative procedures because the choice of resorting to a system of additional coupled premiums (ex art. 69) already implied in itself administrative procedures for the request of specific premiums.
c) Slaughtering and processed beef meat industries
- Meat producers represented by ASSOCARNI and by FEDERALIMENTARE (Federazione Italiana dell'Industria Alimentare, Italian Federation of Food Industry) immediately sided with the preservation of the slaughter premium coupled with production. The greatest concerns for the slaughtering industry were directed to safety and to the continuity of the supplies. The immediate switch to a completely decoupled system could have implied the abandonment of the business by the breeders and the drop in the offer of stockers, expected by the producers themselves by 10-15%, would have risked the supply of the slaughtering companies.
d) Beef farms, wholesalers and traders
- After sharing the request of the producers of sliding the application of the Reform to January 1st 2007, UNICEB – body representing beef butchers and dealers - assumed a different position compared to that of ASSOCARNI and FEDEALIMENTARE supporting the total decoupling proposal of the Italian government. The arguments of UNICEB underlined the distortion created by the premium system according to Agenda 2000 that by artfully increasing the demand of French animals for restalling (store calves) caused the strong increase in price of the import animals for fattening farms. With total decoupling, the conditions for redressing the market of bovine animals for restalling would be restored to the full advantage of the profitability of Italian farms. The dreaded drop in the Italian production, as represented by FEDERALIMENTARE, would not have occurred thanks to the improvement of the profitability prospects of the sector due to the expected increase in price of bovine animals for slaughter and to the decrease in the purchase cost of French calves. Moreover, the choice of assigning an amount of the national ceiling to a premium coupled with the suckler-cow would have helped in preserving the breeding cow assets in the most deprived areas.
e) Regional beef farmers associations (Veneto)
- Among the different regional breeder organisations also UNICARVE, the most important one as to the number of associates of the Venetian region, officially declared itself in favour of total decoupling. According to the motivations put forward by the Association, this was considered the best option for the meat bullock fattening sector (widely represented within UNICARVE) that could have benefited from:
a bureaucratic simplification due to the elimination of all the administrative procedures related to the request of single premiums;
a greater freedom of market choices that were strongly affected by searching direct payments under Agenda 2000;
a greater guarantee of subsidy granting, for what concerned the amounts and the collection time.
This request was also accompanied by the need of a full decoupling application starting from January 1st, 2005, putting an end to any other discussion that would have protracted the uncertainty climate created between the breeders. Concerning additional payments, the Association as organiser of its own regulation of

voluntary labelling, wished for the introduction of a contribution to the bullocks bred in compliance with quality regulations.

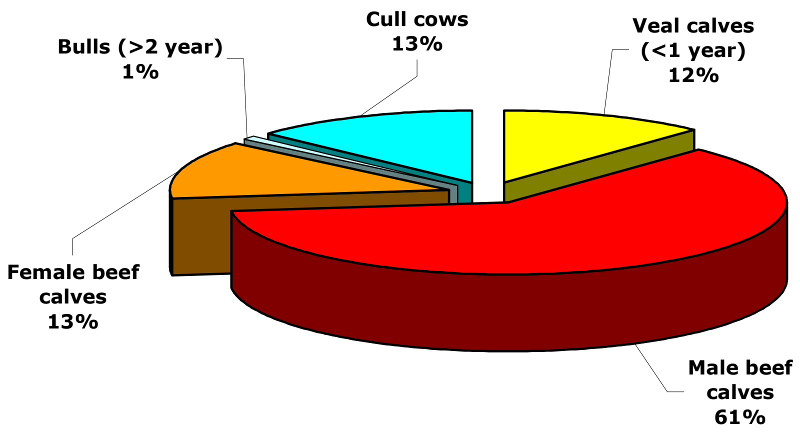
3.3.3 The structure of beef supply chain: beef farms

3.3.3.1 Beef production in Italy

The characteristics of the production of beef in Italy

The Italian beef production - that in 2004 reached 1.145 millions of tons (2004) - consists for approx. 75% of young bullock meat (male and female) aged more than one year. In 2004, 2 million and 600 thousand animals were slaughtered at an average live weight of approx. 600 kg. The remaining amount is represented by white meat calves totalling 984 thousand animals, and discarded cows (560 thousand animals) that form 12% of dead weight production.

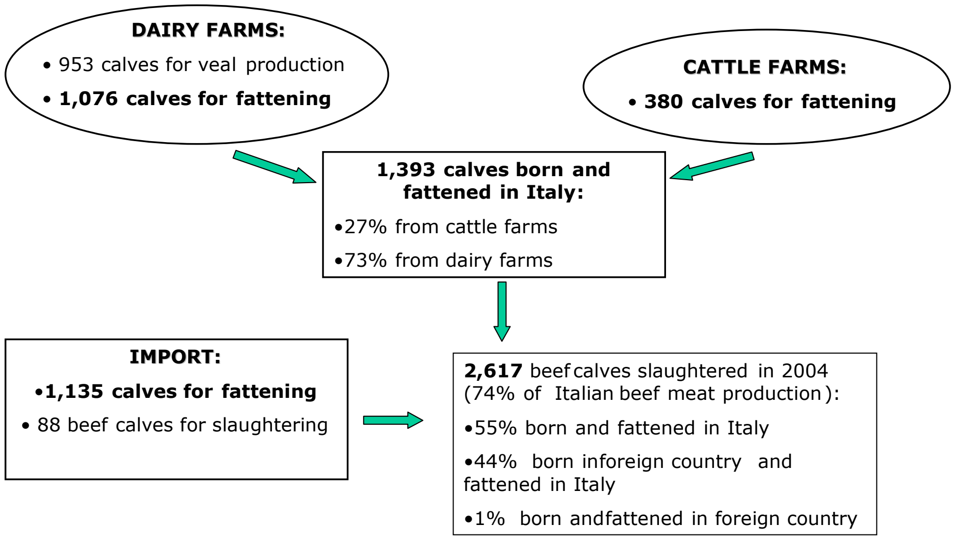
- **Figure 3-9 -Cattle slaughtering in Italy – 2004 (% on total dead weight production)**



Source: Istat

All the cows and approx. 97% of the white meat calves slaughtered every year come from milk farms and are animals born and bred in Italy. The origin of young male and female bullocks that make up 3/4 of the Italian production is different by origin - foreign or domestic - and by breed production specialisation or farm in which the animal is born and is bred (meat or milk).

- **Figure 3-10 -The beef calves flows - 2004 (.000 male and female aged >1 year) –**



Source: ISMEA estimates from Istat data

The breeding system of the young bullocks is based for more than 40% of the animals on the contribution of milk bovine zootechny that supplies approx. 1 million young calves to be fattened for meat production. Meat breed young bullocks coming from national farms of suckler cows are, on the contrary, the minority share: with approx. 380 thousand animals, they make up only 15% of all the slaughtering of this category.
The remaining amount equal to 45% of the young bullocks yearly slaughtered in Italy are meat breed animals born aboard and imported to Italy to be bred till the age of 18 months in farms specialised only in the fattening phase.

Causes of beef structural deficiency in Italy
The strong connection with milk zootechny and the meagreness of the suckler cow assets are the causes of the structural deficiency of the Italian production system, which strongly depends on foreign supplies of calves and also on meat imports. The production of animals born in Italy meets on average only 64% of internal consumption.

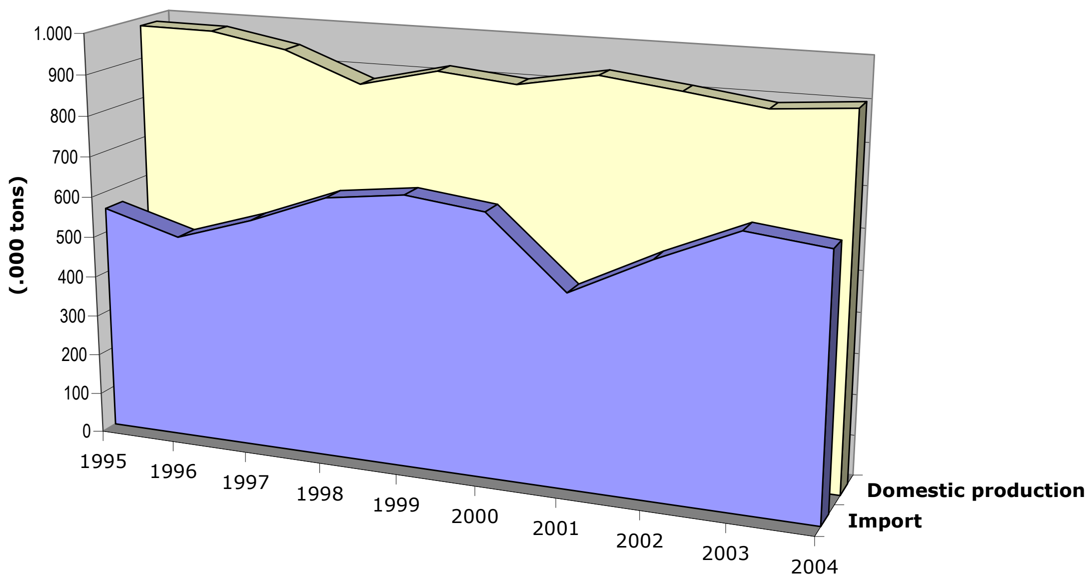
- **Table 3-46 - Italian beef supply balance sheet 2000-2004 (.000 tons)**

	2001	2002	2003	2004
Domestic cattle slaughtering	934	912	887	901
Foreign cattle slaughtering	197	221	240	244
Production	1,131	1,133	1,127	1,145
Beef meat import	276	350	416	392
Availability for consumption	1,407	1,482	1,543	1,537
Beef meat export	73	91	109	128
Consumption	1,334	1,392	1,434	1,409
% self-sufficiency	70.0	65.5	61.8	64.0

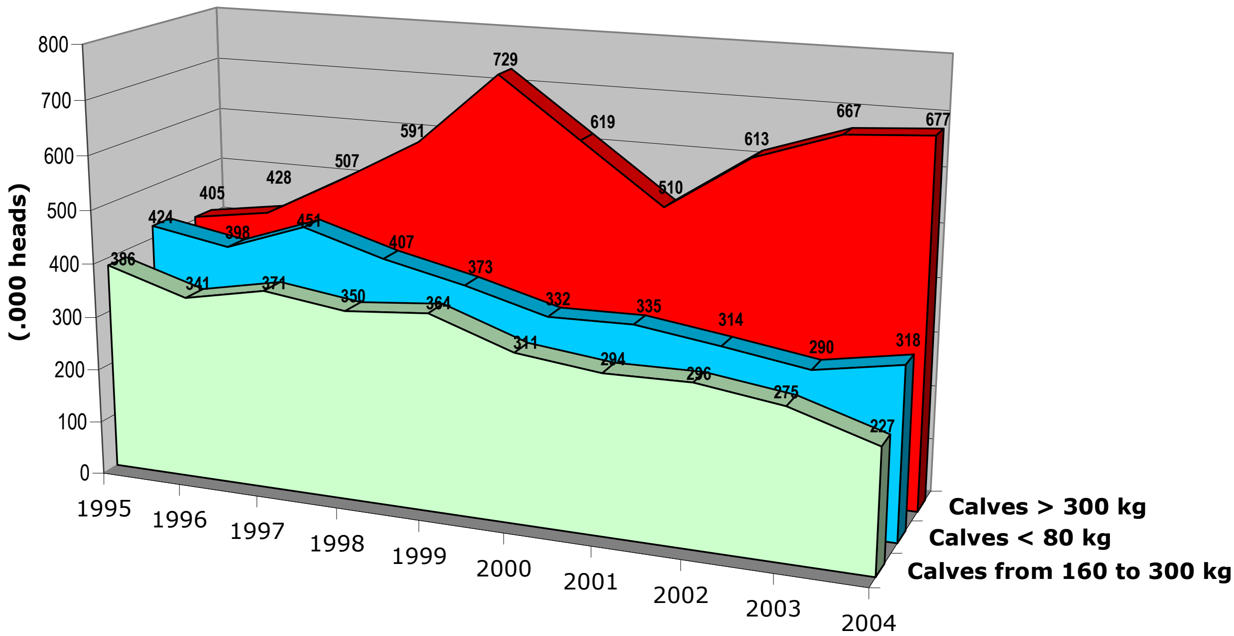
Source: CRPA estimates from Istat data
The deficiency of stockers born in Italy over the last few years widened due to the gradual contraction of domestic cow assets. Due to the system of the milk quotas and the increase in productivity per animal, the number of suckler cows over the last ten years decreased all in all by 30%, reaching 1,77 millions of animals. Only 450 thousand are meat breed suckler cows over a total of 2.22 million cows. Compared to countries where the extensive breeding of suckler cows is more developed, as in France, the Italian regions inclined to this type of breeding are penalised by the conformation of the ground and by the lower productivity of permanent forage crops. The lower availability of forage, and their lower productivity, reduced the capacity to preserve the national assets of suckler cows and they directed the specialisation of Italian farms towards dairy productions concentrated in the regions where forage rotation is more widely used.

The effects on the beef supply balance sheet was the low and gradual production decline from domestic animals that on average decreased by 0.9% per year from 1995 to 2004.

- **Figure 3-11 - Domestic production and beef meat import 1995-2004 (.000 tons)**



- **Figure 3-12 - Calves import for fattening1995-2004 (.000 heads)**



During the same period, meat import increased at a yearly average rate of 2.5%. Together with the import of foreign meat, a considerable supply flow of young calves for restalling developed over the years and made up for the poor availability of domestic meat calves. Over the last four years, Italy imported on average one million and a half of live bovine animals per year including only 165 thousand for direct slaughter. The remaining amount, equal to more than 1.35 million animals, are young bovine animals that end in Italy the fattening and finishing phase. These include approx. 650 thousand animals that exceed 300 kg of weight when purchased and most of them (90%) come from France (store calves). 60% of light animals for restalling (weaners) with weight ranging from 160 to 300 kg comes also from France totalling in this way approx. 300 thousand animals.

3.3.3.2 Beef farms system in North Italy and in Veneto

Production systems and their location

The distribution on the territory of beef production is characterised by the strong concentration in Northern Italy that reflects the milk bovine zootechny within the Po Valley. The first four regions of Northern Italy- Venetian region; Lombardy; Emilia-Romagna and Piedmont – represent just under two thirds of domestic production. Except for Piedmont that boasts suckler cow assets equal to 23% of the overall domestic value, in this area the farms are characterised by the prevailing specialisation of young bullock fattening.

This type of farm is born closely with the milk farm system that was an important supply basin of animals for restalling (weaners). As time passed by, starting from the sixties, part of the system loosened itself from the supply of milk animals or their crossbreeds, specialising in the fattening of young bovine animals imported from Northern Europe. This development course was favoured by the wide availability of well-watered areas for corn growing as well as by the easiness in finding by-products coming from the processing of sugar beets that are the basic and low-cost elements for feeding the cattle. The closeness with the French market of young calves selected for meat production finally reached production levels as to allow a high degree of specialisation.

- **Table 3-47 - Beef cattle herd in Italian regions - 2001**

	Veal (aged <1 year)		Cattle for slaughtering from 1 to 2 year aged		Cattle imported		Cattle for slaughtering >2 year	
	no.	%	no.	%	no.	%	no.	%
Venetian region	116,870	23.5	288,371	34.2	222,072	73.4	11,635	11.2
Lombardy	222,585	44.9	165,630	19.6	33,807	11.2	23,595	22.7
Piedmont	37,453	7.5	157,608	18.7	16,110	5.3	17,983	17.3
Emilia-Romagna	7,593	1.5	60,719	7.2	16,101	5.3	6,148	5.9
Northern Italy	389,157	78.4	688,385	81.6	298,469	98.6	62,513	60.2
Central Italy	36,242	7.3	71,763	8.5	2,517	0.8	14,566	14.0
Southern Italy	70,872	14.3	83,941	9.9	1,643	0.5	26,679	25.7
ITALY	496,271	100.0	844,089	100.0	302,629	100.0	103,758	100.0

Source: Istat

The production system consolidated in the basin of the Po Valley is very different from the extensive farming practiced in the dedicated areas of Central Apennines or of Southern Italy that refers in particular to some traditional Italian white breeds. The low production of permanent forages, and the more reduced areas of the rotation forages, determined a greater scattering of these farms on the territory, which prevents from identifying an extended and consolidated zootechnic system as the one of the Venetian region. Meat zootechny in these areas pesters suckler cow farms for the production of typically Italian calves that reach the age of slaughtering in the same farm where they were born, or are sold as animals for restalling to local fattening farms.

- **Table 3-48 - Suckler cows herd in Italian regions - 2001**

	Suckler cows	
	no.	%
Venetian region	5,961	1.3
Lombardy	16,706	3.7
Piedmont	99,624	22.4
Emilia-Romagna	17,620	4.0
Northern Italy	146,126	32.8
Central Italy	81,930	18.4
Southern Italy	237,539	48.8
ITALY	465,595	100.0

The distribution of cattle for slaughter in Northern Italy shows that the farm based on the fattening of young bullocks for restalling is particularly deep-rooted in the Venetian region. Against the suckler cow assets equal to 1.3% of the domestic total, 35% of bovine animals for slaughter at an age ranging from 1 to 2 years and nearly ¾ of the import fattening animals is concentrated in this region.

- **Table 3-49 - Beef cattle herd in Italian regions - 2001**

	Veal (aged <1 year)		Cattle for slaughtering from 1 to 2 year aged		Cattle imported		Cattle for slaughtering >2 year	
	no.	%	no.	%	no.	%	no.	%
Venetian region	116,870	23.5	288,371	34.2	222,072	73.4	11,635	11.2
Lombardy	222,585	44.9	165,630	19.6	33,807	11.2	23,595	22.7
Piedmont	37,453	7.5	157,608	18.7	16,110	5.3	17,983	17.3
Emilia-Romagna	7,593	1.5	60,719	7.2	16,101	5.3	6,148	5.9
Northern Italy	389,157	78.4	688,385	81.6	298,469	98.6	62,513	60.2
Central Italy	36,242	7.3	71,763	8.5	2,517	0.8	14,566	14.0
Southern Italy	70,872	14.3	83,941	9.9	1,643	0.5	26,679	25.7
ITALY	496,271	100.0	844,089	100.0	302,629	100.0	103,758	100.0

Source: Istat

Over the years, this form of specialisation consolidated unlike what occurred in other Italian regions. Compared to 1990, the stock of young bullocks for slaughter of the Venetian region increased by 40% whereas in the other regions of Northern Italy a decline occurred in favour of pig-breeding assets.

- Table 3-50 - Slaughtering cattle herd per provinces - 2001

	Cattle for slaughtering from 1 to 2 year aged		Cattle imported	
	no.	%	no.	%
Verona	84,134	29.2	74,625	33.6
Treviso	58,962	20.4	38,175	17.2
Padova	55,036	19.1	41,541	18.7
Vicenza	31,823	11.0	10,870	4.9
Venice	28,159	9.8	25,784	11.6
Rovigo	27,842	9.7	28,266	12.7
Belluno	2,415	0.8	2,811	1.3
Venetian region	288,371	100.0	222,072	100.0

Source: Istat

The structure of the farms

On a total of 43 thousand companies that breed young bullocks for slaughter aged 1 to 2 years in Italy, 95% has a size smaller than the 50 stalls and keeps only 34% of the animals. Compared to the Italian average and that of the other regions with a higher density of young bullocks for fattening, the structure of the meat bovine zootechny is more concentrated in the Venetian region. Small or very small farms (less than 50 stalls) are 80% of the total and sum up a number of animals equal to 10% of the regional stock. Among the bigger farms, the biggest class is comprised between 100 and 500 (11% of the farms). 39% of the animals is bred within these companies. 43% of the young bullocks are kept in companies with more than 500 stalls, which represent a little over 2% of the farms.

- Table 3-51 - Distribution of the young bullock farms (males aged from 1 to 2 years) per company size

	FARMS												
	Farm size (no.. heads)												
	1 - 49		50 - 99		100 - 499		500 - 999		1000 - 1999		2000 and above		total
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.
Venetian region	3,367	79.5	311	7.3	465	11.0	56	1.3	28	0.7	7	0.2	4,234
Lombardy	4,248	89.2	259	5.4	230	4.8	16	0.3	9	0.2	2	0.0	4,764
Piedmont	6,712	93.2	267	3.7	208	2.9	13	0.2	1	0.0	1	0.0	7,202
Emilia-Romagna	1,766	93.8	58	3.1	42	2.2	7	0.4	5	0.3	4	0.2	1,882
ITALY	41,163	95.0	1,017	2.3	1,017	2.3	94	0.2	43	0.1	14	0.0	43,348

Source: Istat

- Table 3-52 - Distribution of the stock of young bullocks (males aged from 1 to 2 years) per farm size

	BEEF CATTLE												
	Farm size (no. heads)												
	1 - 49		50 - 99		100 - 499		500 - 999		1000 - 1999		2000 and above		total
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.
Venetian region	23,152	9.7	21,044	8.8	91,912	38.5	37,299	15.6	36,955	15.5	28,113	11.8	238,475
Lombardy	37,351	30.6	17,050	14.0	42,555	34.8	10,406	8.5	10,383	8.5	4,448	3.6	122,193
Piedmont	49,734	41.2	17,757	14.7	40,365	33.4	8,148	6.7	1,290	1.1	3,427	2.8	120,721
Emilia-Romagna	9,337	20.2	4,033	8.7	8,788	19.0	4,672	10.1	7,674	16.6	11,640	25.2	46,144
ITALY	221,328	34.0	67,524	10.4	196,773	30.2	62,084	9.5	56,302	8.6	47,628	7.3	651,639

Source: Istat

Finishing cattle farms profitability

The profitability analysis of the meat bovine animal farm is carried out by Crpa in collaboration with the ISMEA (Istituto per i Servizi ai Mercati Agroalimentari, Institutes for Services to the Agroindustrial Markets) since 2001. For fattening farms, the sample is formed by a group of companies located in the Emiliana-Veneto Plain whose characteristics represent the type of prevailing farm in the North-Eastern region of Italy and especially in the Venetian region.

The average size of these farms is greater than 1,200 stalls and ranges from a minimum of approx. 300 to a maximum of more than 2,000 animals. Young bullocks are mainly French meat breeds such as Charolais and Limousine. The presence of import bovine animals imported from East Europe (Poland and Romania) is less common. The animals enter in the farm with a weight of 350 kg and carry out the fattening cycle after a period of 7/8 months when they reach a final weight of 630 Kg. The availability per company of forage area is 97 hectares and consists of corn for 90%. The corn ensiler is the main component of the food ration supplied to the young bullocks and in most cases it is also the only one produced within the company. The cattle load compared to the are used for the production of forages is equal to 7 LSU/Ha.

- Table 3-53 - Production costs and return excluding and taking account CAP premiums – euro/kg live weight

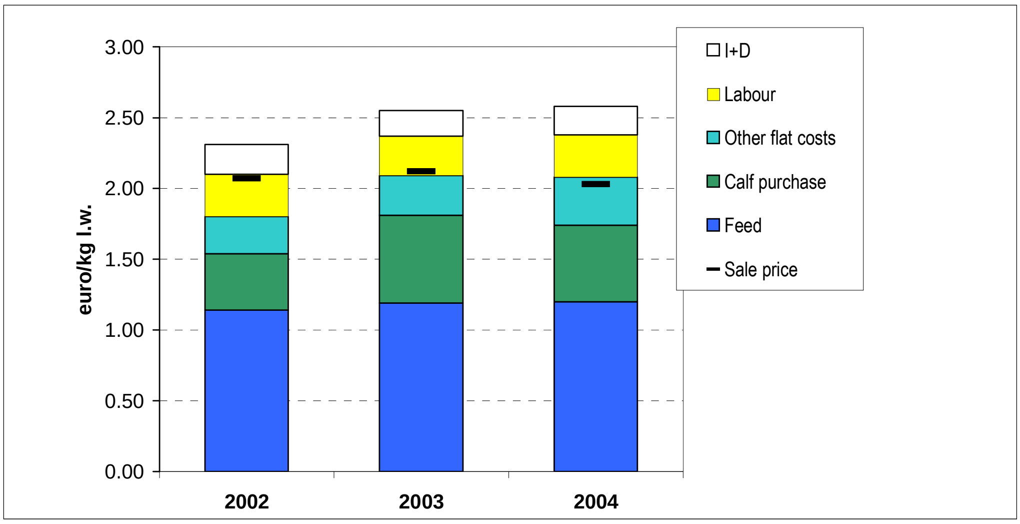
	2002	2003	2004
Feed	1.14	1.19	1.20
Calf purchase	0.40	0.62	0.54
Labour	0.30	0.28	0.30
Other flat costs	0.26	0.28	0.34
Interests+Depreciations	0.21	0.18	0.20
Total gross cost	2.32	2.55	2.58
Premiums	0.47	0.58	0.65
Total net cost	1.86	1.97	1.93
Sale price	2.07	2.12	2.03

Source: CRPA

The comparison with the costs of production - expressed per kg of live weight produced - shows that during the period ranging from 2002 to 2004 the sale price of the bullocks did not allow to reach positive profitability margins. During the same period, the net income of the company decreased due to the
overall increase in costs and in particular in the feed and purchase costs of the animal for restalling; these are the two items that most affect the total average cost;
and at the same time the fall in the average sale price

The decrease of the sale price and the increase in costs of production determined the gradual worsening of profitability:
In 2002, the sale price (2.07 €/kg) was equal to 90% of the total cost of production - an amount not sufficient for fully repaying the depreciations and the interests on invested capital, whereas in 2004 (2.03 €/kg) it helped to cover only 80% of the costs - an amount not sufficient for remunerating capital costs and all the family work used in the farm.

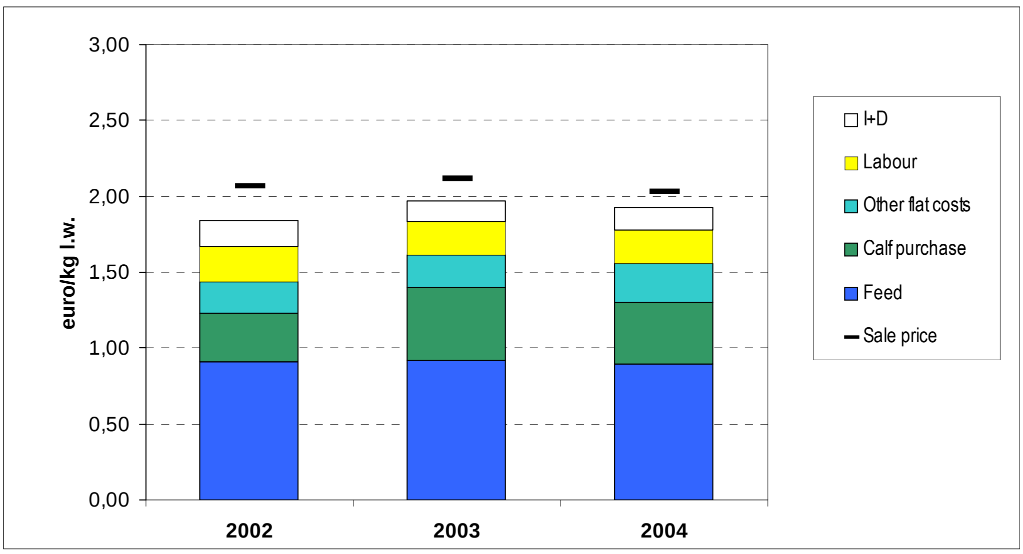
- **Figure 3-13 - Production costs and returns excluding CAP premiums**



Source: CRPA

Direct payments provided by the beef market organisation of Agenda 2000 had an essential role in stabilising the income of the farms. Through the premiums, the profitability margins of the companies remained positive on average. However, between 2002 and 2004, even if the contribution for reducing the costs given by the Pac aids passed from 20 to 25%, the net profit of the farms decreased. The unfavourable price performance of young bullocks and that of animals for restalling helped in wearing away part of the positive margins guaranteed by the premiums. The ratio between the average sale price and the cost net of the premiums in 2004 was equal to 112% whereas in 2004 it decreased to 105%

- **Figure 3-14 - Production costs and returns excluding CAP premiums**



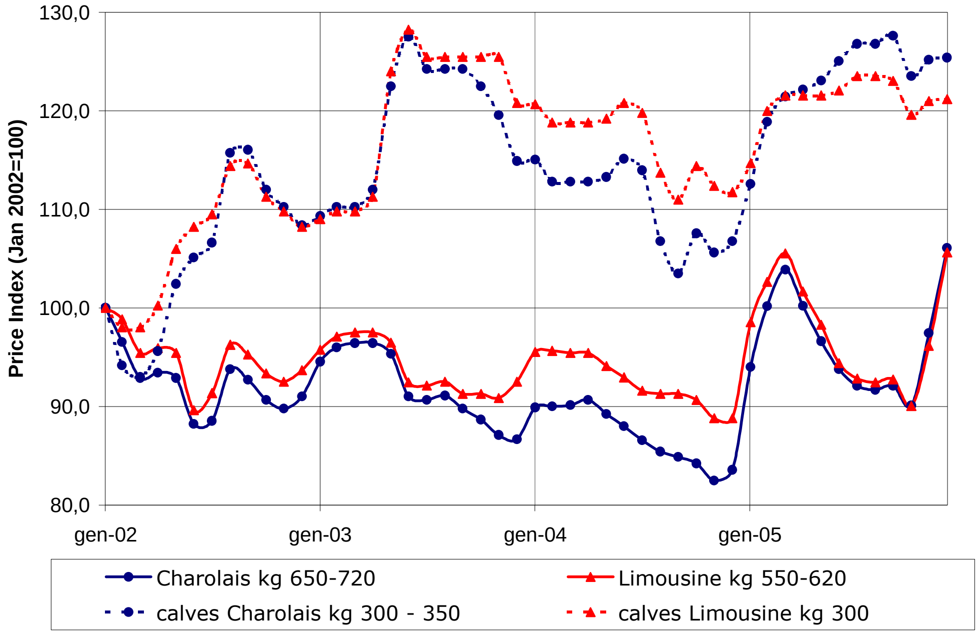
Source: CRPA

Price performance of the weaners and young bulls

The reduction of the profitability margins comprised between 2002 and 2004 was caused by the gradual worsening of the gross shed profits resulting from the difference between the sale price of the finished young bullock and that of purchase of the French animal for restalling. Partly, this was the consequence of a distortion of the market values related to the direct premium system of agenda 2000 and expanded by the special expectations of the breeders when preparing the Fischler reform.

The strong increase in prices of animals for restalling in the period ranging from 2001 to 2003 is partly the indirect effect created by the increase of the unit premiums provided by Agenda 2000, fully enforced in 2002, and by the following announcement of the introduction of the MTR, whose terms of application were not completely clear at that time. These two factors encouraged Italian breeders to increase their requests of French animals for restalling trying to obtain the highest receipts from the increase of the premiums coupled with production also in the perspective of increasing the amount of reference for the calculation of the corporate single payment. The consequence was the sudden rise of prices of the young calves that caused the gradual erosion of the income margins guaranteed by direct payments.

- **Figure 3-15 - Price development beef calves and bulls**



Source: CRPA

The increase in weight of the income support provided by the old beef market organisation did not compensate in the same period the effects of increase in price of the French store calves and by the downward trend of the prices of bovine animal for slaughter. The graph shows the indexed trend of the two variables and gives an idea on the widening of the differential between the two important variables for defining the profitability of the fattening farm.

- **Table 3-54 - Average price of beef calves and bulls from 2002 to 2005 (€/kg l.w.)**

	2002	2003	2004	2005
Bulls Charolais 650 KG	2.08	2.07	1.96	2.17
Yearly var (%)	+15.6	-0.6	-5.3	+10.6
Calves Charolais 300 KG	2.25	2.54	2.37	2.64
Yearly var (%)	+ 14.0	+12.9	-6.7	+11.3

Source: C.C.I.A.A. of Modena.

The last reform of Pac, with the introduction of the decoupling principle and the substantial cut to the ceiling of the sector, bound the profitability prospects by price stabilisation of the import calf and to the increase in prices of the finished young bullock.

In 2005, during the first year of application of the reform, at least one of the two conditions occurred, since the price of the young bullock for slaughter had never reached so high prices during the previous years.
The recovery of the internal market, attained after two years of gradual decrease, is bound to the substantial fall in slaughtering, equal in 2005 to 3.8%, that, considering the consumption stability context, was also induced by the introduction of the decoupling of production premiums. In 2005, no fall in prices of the store calves occurred on the French market, strictly related to the Italian demand. However, it must be considered that France decided to apply the reform only starting from this year, i.e. a year after what happened in Italy.

3.3.4 The structure of beef supply chain: beef industry

3.3.4.1 The structure of beef slaughtering and processing industry in Italy

The Italian industry of meat slaughtering derives from a reorganisation process that in the course of ten years - from 1990 to 2000, halved the number of facilities, from 5,000 to 2,200 units (Istat). During this period, apart from merger and acquisition deals aiming to achieve efficient size levels, several small-sized factories and most of the public structures, in particular, shut down. Public slaughterhouses revealed a substantial drop from 1,000 to ca. 400. In 2000, only 280 of the 2,200 facilities - including 76% located in Northern Italy - had the EEC mark and were able to market on the entire territory of the EU. Only 60 of these structures - forming 60% of national production - were specialised in slaughtering only bovine animals and in the first processing of their meat. These are slaughterhouses where the utilisation of technologies and equipment considerably increased productivity and allowed to reach a size higher than the average. The territorial concentration of these industries is even more accentuated compared to the overall slaughtering industries. 95% of these industries are located in Northern Italy, 43% in Lombardy, and 20% in Piedmont and in the Venetian region, respectively, each of them having a total of 12 factories.

- **Table 3-55 - Number of bovine animal slaughterhouses in Italy (2000)**

	Slaughterhouses		Including those having the EEC mark		Slaughterhouses specialised in bovine animals		Including those having the EEC mark	
	no.	%	no.	%	no.	%	no.	%
Lombardy	856	38.9	50	17.8	376	63.2	26	43.3
Piedmont	325	14.8	41	14.6	104	17.5	12	20.0
Venetian region	143	6.5	37	13.2	27	4.5	12	20.0
Emilia-Romagna	115	5.2	16	5.7	36	6.1	6	10.0
Northern Italy	1,670	76.0	151	53.7	583	98.0	57	95.0
Central Italy	151	6.9	39	13.9	9	1.5	2	3.3
Southern Italy	377	17.2	91	32.4	3	0.5	1	1.7
ITALY	2,198	100.0	281	100.0	595	100.0	60	100.0

Source: Istat.

If we consider the size, only 70 facilities - equal to 3% of the Italian structures - have a capacity greater than 10,000 animals per year. Less than half of these have a production potential of at least 20,000 animals slaughtered per year. The territorial distribution of these slaughterhouses is also characterised by the strong concentration in the North among which stands out the Venetian region where approximately two thirds of the big slaughterhouses are located.

- **Table 3-56 - Number of bovine animal slaughterhouses in Italy (2000)**

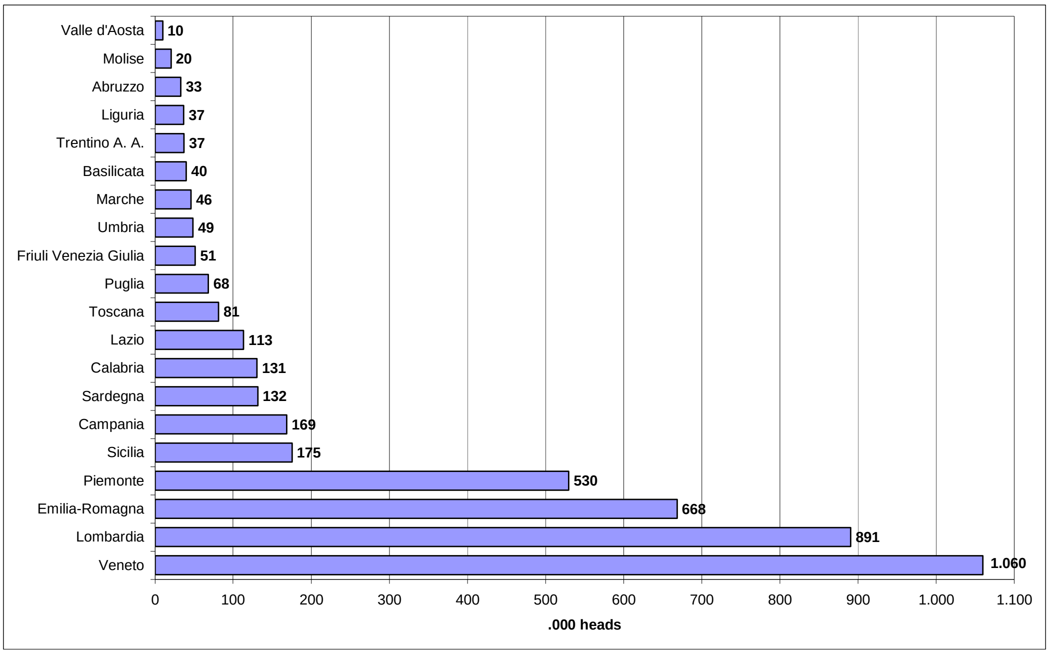
	< 500 animals		From 500 to 999		From 1,000 to 4,999		From 5,000 to 9,999		More than 10,000 animals		Total
	no.	%	no.	%	no.	%	no.	%	no.	%	no.
Venetian region	63	4.0	38	13.7	11	4.8	6	13.0	25	35.7	143
Lombardy	759	48.1	48	17.3	20	8.8	8	17.4	21	30.0	856
Piedmont	234	14.8	33	11.9	40	17.6	8	17.4	10	14.3	325
Emilia-Romagna	85	5.4	9	3.2	12	5.3	0	0.0	7	10.0	113
Northern Italy	1,338	84.8	147	52.9	97	42.7	23	50.0	65	92.9	1,670
Central Italy	53	3.4	41	14.7	46	20.3	9	19.6	2	2.9	151
Southern Italy	186	11.8	90	32.4	84	37.0	14	30.4	3	4.3	377
ITALY	1,577	100.0	278	100.0	227	100.0	46	100.0	70	100.0	2,198

Source: Istat.

The distribution of the slaughtering structures shows the similar concentration on the territory of meat bovine animal farms and that of beef production. In Italy, 75% of bovine animal slaughtering is concentrated in the

Po Valley regions, with a marked preponderance in the Venetian region. In 2002, 1.04 million animals were slaughtered in this region, equal to 25% of the domestic total.

- Figure 3-16 - Regional distribution of bovine animal slaughtering (2002)
Source: Istat.



3.3.4.2 The main operators

During the reorganisation phase of this sector, many slaughtering companies supported large investments in order to increase their size, implement quality control systems and diversify the activity towards products with a high-service content (packaged in protective atmosphere and second or third range preparations). Over the last few years, several regulatory measures of production as well as optional labelling systems were promoted on the initiative of the leading companies in order to differentiate the offer and mark out a strongly discredited product in the opinion of the consumers due to the BSE crisis.
Notwithstanding this process of modernisation that accompanied a greater production concentration, the sector is still characterised today by an accentuated fragmentation compared to the reality of other European countries. In 2003, the first two main operators of beef slaughtering and processing sector held a market share equal to 21% whereas all the other companies did not exceed 2% each (ISMEA, 2004). The first Italian industry in this field belongs to the Cremonini S.p.a. group whose activities through its subsidiaries vary from meat and processed food production, to catering and distribution for the food service. INALCA is the group company working in the beef sector. All the phases of the production process from beef slaughtering to dissection and transformation are carried out in three factories where the overall capacity is equal to 550 thousand animals per year. Other two facilities are specialised in tinned meat production and in other beef products of third and fourth range of which the company is the chief producer and exporter in Italy. The share of INALCA on the Italian beef market is around 14.5%.
UNIPEG, the second Italian industry in this sector, originated from the merger of two pre-existing companies belonging to the cooperative world, UNICARNI, based in Emilia-Romagna, and Macello Cooperativo Lavorazione Carni (Venetian region). Today, UNIPEG has an overall capacity equal to 400 thousand animals per year. With a 7% market share, it is the biggest cooperative industry in beef production and marketing. The activity is based on the contribution of a corporate base consisting of ca. 2,500 farms, distributed in the Italian regions with a higher density of meat bovine animal farms: Venetian region, Lombardy and Emilia-Romagna. Apart from slaughtering and first processing of meat, the activity of the cooperative includes also the packaging and production of preparations based on higher range meat (e.g. hamburger).

3.3.4.3 Supply strategies.

The need to have constant-quality supplies and the efforts to differentiate the product modified the relations between the slaughtering industry and the sector of meat bovine animal breeding especially starting from the mid eighties. One of the effects of this change was the redoubling of private labels that implied new forms of organisational and contractual coordination between the forward stage and the backward stages of the pipeline.
The beef sector was also the first sector within the meat industry to adopt product traceability systems, both compulsory – according to what is required by the EC regulations – and optional, in compliance with a product differentiation and qualification requirement. All this required the development of the relations between farms, industry and distribution and a coordination and organisational effort of the agricultural world.
As a consequence of this transformation, the exchanges on the cattle markets compared to all the sales of bovine animals for slaughter decreased, whereas there was an increase in the tendency of the slaughtering industry directly related to the breeders preferring steady relations as a guarantee of supply quality. The use of regulatory measures of production and optional labelling systems indicating the minimum requirements of the supplies and/or requiring the implementation of traceability systems and of ways of controlling the farms spread among market leaders in the relations with the suppliers. At the same time, the role of connection with the world of industry and distribution carried out by the manufacturers' association as bodies combining breeders increased. This process did not bring forth real interprofessional agreements - in spite of some attempts made in the past. Until now, all these numerous experiences involving the different operators of the pipeline are limited to raw material improvement through production specifications and to the need to ensure product traceability. They occurred on the initiative of industries, big distribution marks or regional farmer associations by fixing production requirements that imply contractual agreements with the farmers.

3.3.4.4 Quality trademarks.

The first beef qualification experiences by means of quality trademarks derive directly from the breeder associative system between the end of the seventies and the first half of the eighties. The setting-up of the first enhancement associations in order to protect the productions of fattening farms of Northern Italy ("Carni Bovine documentate" and CO.NA.ZO) and the meat deriving from Italian meat breed bovine animals (Co.AL.Vi. for the Piemontese breed and C.C.B.I. for the Chianina, Marchigiana, Romagnola and Podolica breed). The marks set up by these associations were later replaced by the IGP mark assigned to the unique beef product acknowledged by the EU for Italy and by the approval of specific systems of voluntary labelling. Similar initiatives were also promoted by the association of fattening farms of the Venetian region, UNICARVE. Their members sell every year more than 850 thousand bovine animals that correspond to 30% of national production of young bullocks. The association manages its own regulation of production ("ELETTA" mark) with whom more than 200 farms comply and a regulation of voluntary labelling followed by 690 member farms that imply a close collaboration and coordination among the supporting farms and the slaughterhouses that have an agreement for the management of the traceability system.
The main chains of modern distribution with "private label" moved in the same direction. This approach was followed for the first time in Italy by "Coop consumatori" at the end of the eighties also as a solution to the food scandals that reduced the consumers' faith in the safety of food products. The initiative was extended to all the main modern distribution chains that developed their own private trademarks and contracts through tenders with slaughtering companies that imply constraints also during the breeding stages.

3.3.4.5 The voluntary beef labelling systems

88 voluntary labelling systems were recognised and approved until now as from the issuing of the CE 1760/00 Reg.
The promoting subjects include
36 organisations of breeders of enhancement associations, different regional breeder associations (Venetian region, Emilia-Romagna; Piedmont; Umbria; Marche) and cooperative slaughtering companies;

40 private beef slaughtering, dissection and marketing companies
12 corporate trademarks of large-scale retail trade
The quantity and detail of the voluntary information added in the labels mostly depend on the position covered within the pipeline (farm; industry; distribution) of the organisation that coordinates the meat traceability system. This can be obtained from the compulsory documentation (passport) that indicates all the personal details of the bovine animal updated during the different stages of its life from birth to slaughtering. Other information (breeding system, food characteristics, restrictions on the use of antibiotics and of medical treatments) contemplate specific agreements with the breeders who shoulder the charges of production specifications and imply more specific controls in the farm and at the premises of feed factories that have an agreement.
Not all the acknowledged and approved regulations are actually operative because some organisations were not able to start labelling procedures due to organisational problems (hardware and software system enhancement, problems met during the procedures required for exchanging information among the subjects of the pipeline, etc.). According to the last report on the results of the inspections carried out by certification bodies - published by the Ministry for Agricultural Policies – the organisations that actually applied the labelling systems in 2004 were 65. In 2002, only 34 on a total of 53 regulations already approved by the Minister of Agriculture were operative. The overall number of farms involved during the same period increased from 5,700 to 10,500, whereas the dissection laboratories and the slaughterhouses passed from 367 to 411. The development of these initiatives in such a short time was the solution to the effects of the last BSE crisis that pressed for the adoption of product requalification strategies, also used as a competitive stimulus by the main operators of industry and large-scale retail trade. The initiatives started "from the bottom" i.e. promoted by several breeder associations were also boosted by the possibility for the member breeders to collect the production premiums(envelope) assigned to the animals that were part of the voluntary traceability circuits. When the Ministry of Agriculture defined the granting principles of the additional premiums to young bullock slaughtering within the beef market organisation of Agenda 2000, it set as a condition the participation to voluntary labelling systems indicating the genetic type of the bovine animal and providing information on the type of food and breeding. The methods established at a national level for the granting of the additional premiums induced all the most representative producers' associations to set up their own labelling regulations, since the additional premium represented a sort of compensation for the breeder's greater expenses and in many cases it represented the additional remuneration, becoming decisive for the breeders' participation. This formulation following the requests of the associations was maintained also with the last reform of beef market organisation. The coupled premiums provided by art. 69 of Reg. 1782/03 EEC include a payment for the bovine animals kept in the farm for at least 7 months and whose label indicates the name of the farm of origin. Compared to the previous system, during the first year of application of the Fischler Reform, the unit premiums suffered a strong reduction from 45 euro to ca. 20 euro, due to the assigned budget reduction and the increase in the breeders' demand. In the future, this type of incentive will be less and less substantial.

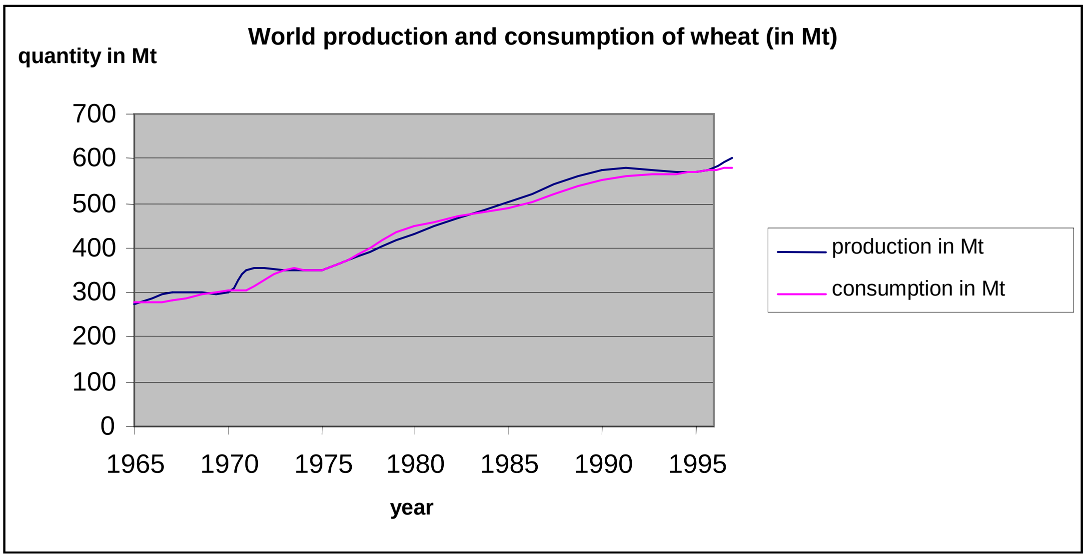
3.4 *The common wheat supply-chain in the Centre region*

3.4.1 The WTO and the 2003 Fischler Reform

The highly concentrated supply of common wheat has to cope with an atomised demand, and in addition to this the economic context of the past few years has not helped the countries of the EU to stand up to competition. In fact, due to the strong Euro, most notably the European market prices in 2003/2004 were very uncompetitive compared to the traditional competitors of North America, Australia and Argentina (which is making a comeback on the world market with a strongly growing production).
Since the 1980s, production has exceeded consumption, thus leading to an increase of stocks. The prices practiced do not reflect reality, as they are no longer governed by market rules (supply and demand) and free competition.
The main exporting nations establish export policies: they subsidise or offer "bonuses" according to the quantities of goods exported in order preserve or win new market segments. This phenomenon therefore leads to an artificial world price.
The World Trade Organisation (WTO) is against the agricultural policy of the EU member states, and therefore uses its political influence to make the EU implement a range of reforms, including: the Mac-Sharry Reform (1992), Agenda 2000 and the Fischler Reform, which is currently being implemented.

The Mac Sharry Reform(1992).
In 1986, agriculture became part of the GATT Agreement. Europe was accused of distorting the market with its agricultural policy, which cost Europe and its construction a lot. Moreover, it was a burden in terms of EU budgets.

- **Figure 3-17 - Production and consumption of common wheat from the mid-1960s to the mid-1990s.**



Source: C .I .C

Up until 1975-76 there was little deviation between production and consumption. Consumption had been slowed by the soaring worldwide prices of 1972-73.
From 1975 to 1981, the growth in the world wheat consumption took off very rapidly, despite the highly volatile world market prices. The period of instability that had begun during the first half of the 1970s had now reached a dimension that had never before been seen.
From 1980 until 1987 production progressed regularly, at a rhythm higher than consumption, leading to the increase in stocks and the collapse of the price of wheat.
In the 1990s, the production/consumption ratio never really saw any great stability between production and consumption, the consequence of a new economic context.
Europe needed to do something for its economy, and was therefore forced to modify its agricultural policy.

The Mc Sharry Reform, implemented in 1992, is based on three main issues:

- Reduction in the price of agricultural goods,
- Reduction in subsidies,
- Control of production through the set-aside of agricultural land.

The advantages of these points of the reform are the following:
Prices limit the motivation to intensive production and thus reduce production volumes,
The agricultural goods of the EU become more competitive compared to imported goods,
Subsidies are used to keep account of social problems linked to agriculture, and to maintain certain levels of production,
The social measures lead the way for environmental and structural improvements.

The numerous concessions made by the EU in its agricultural policies are a way of responding to the criticism of the WTO of distorting the market with its agricultural policy.
In the large crop segment, as far as production control is concerned, the tools established particularly for cereals (set-aside of agricultural land conditioning access to compensation) were shown to be effective, above all between 1993 and 1995. The practice of fallowing land helped, initially, to regulate the European cereal production.
The cereal surface areas were reduced between 1992 and 1994, by 13% in Great Britain and Denmark, 12% in France, 10% in Spain, 6% in Greece and Italy, and 3% in Germany.
Concerning cereals and oil seeds and pulses, the cultivated surface areas in France evolved between 1992 and 1997 as follows:

- Table 3-57 - Evolution of cultivated surface areas in France for cereals and oil seeds and pulses (in millions of hectares)

France	1991	1992	1993	1994	1995	1996	1997 (Oct.97)
Total common wheat	4652	4652	4290	4340	4516	4769	4850
Total durum wheat	495	425	223	234	230	270	267
Total barley	1750	1802	1622	1405	1387	1530	1684
Total maize	1767	1873	1849	1663	1650	1729	1801
Forage maize	1664	1521	1486	1475	1556	1578	1539
Total rape	731	665	550	671	864	875	988
Sunflower	1070	979	786	986	963	891	875
Soya	66	43	57	100	102	86	97
Peas and pulses	667	700	727	664	559	531	618

Source: French Ministry of Agriculture

Despite the good initial control (in spite of the noted increase in yield), the production of cereals began to increase again from 1996, without however creating stocks, as this sector was benefiting from a positive worldwide evolution, of which the EU, on the other hand, did not fully take advantage.

- Table 3-58 - Evolution in the production and use of European cereals since the implementation of the reform:

	1992/1993	1997/1998	Evolution
European production of cereals, of which:	179	204	+14%
Wheat	79	88	+12%
Barley	47	52	+10%
Maize	31	39	+24%
Durum wheat	9	7	-23%
Destination of European cereals:			
Internal animal feed	84	106	+26%
Other internal uses	62	68	+9%
Exports to third countries	37	65	
Evolution of cereal stocks	40	36	-9%
Of which: intervention stocks	33.5	13.1	-61%

Source: ONIC, Economic Information Service, April 1998.

As we can see, Europe only slightly took advantage of the opportunities offered by the worldwide cereal markets, bearing in mind the rigidity of the control tools.
France, which has 26% of the EU assisted cereal and oil seed/pulse surface area, was particularly affected[10] by the 1992 reform and the reconstruction of the agricultural support that followed. According to studies carried out by the Ministry of Agriculture in July 1997, between 1991 and 1995, the revenue grants received by French agriculture went from 13 to 49 billion francs, from 21 to 68 % of the total of gross allocation to productive agriculture. At the same time, the market support fell by 25 billion francs, with direct aid in 1995 representing an average of 109,000 francs per farm.
This distribution did not lead to reallocation, as the increase in grants was tied to the economic value of the farm.
Agricultural income became more and more dependent on direct support, and without aid almost half of cereal, cattle, beef and sheep-goat farmers would have no income.

[10] Source : www.senat.fr

- **Table 3-59 - Dependence Index (direct aid) of French farms in 1995 (as a % of income):**

Cereals, oil seed – pulses	95
Other large scale crops	50
Cattle – dairy	30
Cattle –beef	89
Sheep-goats	88
Grain eaters	24
Multi-crop	53
Multi-breeding (herbivores)	38
Large scale herbivore crops	63
Other orientations	7
Average	50

Source: RICA (Agricultural Accounting Information Network), BEP of the French Ministry of Agriculture (rounded figures)

The CAP reform of 1992 did nothing to rebalance the CAP tendency to favour certain production sectors and certain geographical areas.
At the dawn of the year 2000, the detailed analysis of the different challenges facing European agriculture shows the importance of the European and international changes in which the CAP must evolve.
New reforms are required for the CAP, particularly concerning certain price support measures, which will be replaced by palliative direct aid measures.
The CAP is under increasing pressure due to globalisation as the EU undertakes various bilateral and multilateral negotiations.

3.4.1.1 The 2000 reform.

Agenda 2000 is a proposal for the new CAP prepared by the Commission: the objectives of Brussels are:
To respond to the increase in the world markets and European enlargement,
To strengthen rural development and the environment,
To modulate direct aid at national level and set thresholds for farms.

The intervention price would be reduced by 20% starting from July 2000 (when it would be compensated at only 50%).
The set-aside of agricultural land would be decreased to 0% instead of 17.5 %. The exemption would however remain for small farmers (920 q).

3.4.1.2 The 2003 Fischler reform.

a) Regulation 1782/2003 .

The 2003 agreement on the CAP reform moves progressively away from direct support to production. According to the countries involved, as of 2005-2006 payments shall generally be separated from special productions (and therefore not depending from the level of support connected to the production type). The production choices of the farmers should thus better reflect the market signals. The general threshold imposed on agricultural support will remain in force until 2011.
The main components of the reform are as follows:
- single payment per farm, independent from production; a few elements linking payment and production may be maintained to avoid the abandon of some crops,
- payment subject to the respect for environmental, food safety, animal and vegetable health and animal welfare regulations; "eco-conditionality",
- strengthened rural development policy,
- reduction of direct payments.

The bonuses will be paid integrally on condition that the conditionality clauses are respected. The proposed changes foresee that direct payments be made within annual thresholds per farm and that the farmers be financially encouraged to improve product quality and protect the environment. Furthermore, the payment of direct aid will be reduced by 3% in 2005, 4% in 2006 and brought to 5% from 2007 onwards.

b. The choice of France.

France, the principal beneficiary of the CAP in 2001 (having received almost one quarter of the 40.5 billion11 euros of the EU budget), opposed the changes proposed to the CAP, as the amounts paid to farmers would have to be decoupled from production.
On 18th February 2004, France chose partial decoupling, indexing the payment destined to each agricultural concern to the specific experience of the farmer over the reference period (over a three year period from 2000 - 2002), rather than adopting an approach based on the average surface area as used in some other countries.
Partial decoupling is a little difficult to define: the Agricultural Commission of the European Parliament has made several proposals in this regard, all of which are very complex. One may be: for vegetable crops, a single coupled payment (associated to the production) (bonuses for cultivation) corresponding to 25%, while the remaining 75% would stay tied to surface areas and yield over the base period. On the other hand, support for cattle and sheep farming received between 2000 and 2002 would be converted into a single premium linked to the foraging area of the farm, and also linked to the hectare, by dividing it by the number of hectares eligible for support.

Therefore, the choice of France was:
To maintain coupled support to preserve market trend and production area localisation tools,
To apply decoupled (disassociated) aid from 2006,
To avoid speculation on the transfer of single payment rights,
To continue to privilege installation,
To establish a crisis management mechanism through the implementation of a 1% allocation of the modulation product.

The first phase of the implementation in 2005 concerns the conditionality of support (good agricultural and environmental practices including the maintenance of permanent pastures, environment protection, animal identification). Customized information of the farmers about their individual single payment rights (SPR), which they could receive in 2006. Application of the modulation to 3% on all direct aid.

[11] The bi-monthly bulletin ('la France') – 11th June 2004, volume 17 no. 10 - Agriculture et agroalimentaire Canada

The second phase of conditionality implementation: animal and vegetable health, notification of diseases, public health shall be implemented in 2006. Following this, the implementation of support disassociation (decoupling) (notification of the SPR, first decoupled payments).

From 2006 therefore the farmers will be eligible for two types of support:
- Decoupled aid, based on the individual payment rights mechanism linked to surface area, called “single payment right” (SPR). The payment of this support, whether crops have been produced or not, is subordinate to the maintenance of the land in a satisfactory agricultural condition. The SPR are established for each farm using the historical reference from the years 2000, 2001 and 2002. By historical reference, we refer to the average direct aid received during the period 2000 to 2002, according to the number of heads and surface area receiving incentives. Some adjustments will be made according to the evolution of the farms between 01/01/2000 and 15/05/2004.
- Support associated or coupled to production, being a part of the aid coupled at EU level: quality of durum wheat, pulse supplement, rice, nuts, energy farming and starch potatoes. On the other hand, France has decided to maintain support to the following fully or partially recoupled: COP support (cereals, oils and pulses); cattle, sheep and goat support.12

It goes of course without saying that the intervention prices remain current, the prices at which the storage agencies of each member state are obliged to purchase cereals offered to them by the farmers, providing certain quality criteria are respected. The prices paid by the storage agencies (cooperatives and merchants) also consider the same standards.

[12] Ministry of Agriculture, Fisheries and Rural Affairs: “The new CAP: national application methods for 2005, 2006, 2007.”

- **Table 3-60 - Minimum conditions for intervention (2005 – 2006 campaign):**

Minimum conditions for cereal intervention eligibility				
Period from 01/11/05 to 31/05/06	Durum wheat	Common wheat	Barley	Maize Sorghum
Maximum humidity %	14,5			
Maximum percentage % of non-cereal elements with impeccable quality	12			
Broken grains %	6	5	5	10
Impurities consisting of degraded grains, of which	5	7	12	5
burnt grains %	-	-	-	-
other cereals %	3	-	5	-
predator-damaged grains %	-	-	5	-
grains with seed colouration	-	-	-	-
grains burnt by drying %	0,5	0,5	3	3
speckled grains and grains affected by fusariosis %	5	-	-	-
of which grains affected by fusariosis %	1,5	-	-	-
Germinated grains %	4		6	
Other impurities % of which	3	3	3	3
harmful foreign grains	0,10	0,10	0,10	0,10
grains damaged by heating or brutal drying	0,05	0,05	-	-
other impurities: ergots	0,05	0,05	-	-
Maximum of mitadiné grains %	27	-	-	-
Maximum percent of tannin in sorghum (1)	-	-	-	1
Minimum specific weight kg/hl	78	73	62	-
Protein levels (1)	11,5	10,5	-	-
(Hagberg) falling number	220	220	-	-
Zeleny Index machinable and non-sticking if Zeleny is between 20 and 30	-	22	-	-

(1) percentage calculated on dry matter

Price increases and reductions: As cereal quality makes it acceptable for the intervention, price increases or reduction are applied according to the quality level.
The storage agencies (cooperatives, merchants) also consider these regulations in the prices applied to farmers.

- **Table 3-61 - Common wheat :**

Price reduction of 0.1 % outside the tolerance		
	Tolerance	€/T
Broken grains	3 %	0.05
Grain impurities	5 %	0.05
Sprouted grains	2.5%	0.005
Other impurities	1%	0.1

- Price reduction for humidity: 0.2€/ton per 1/10th of a point from 14.1% to 114.5%.
- Price increase for dryness: 0.1€/ton per 1/10th of a point from 13.4% to 10%.

The choice of seed is based on the relative baking strength. In France, 5 varieties cover half of the surface area: Apache , Caphorn, Isengrain, Charger, Ovantis.13

The reform implemented leads to a reduction in the price of cereals produced in the EU and reduces the need for export refunds so that it becomes progressively possible to meet the WTO requirements on EU exports of cereals and cereal-based food products that benefit from direct incentives (export refunds).
Before export, EU cereals must obtain "export certificates", which authorise the export. When the world price is lower than the European price, "returns" (subsidies) may also be paid to exporters by the European Commission.
If on the other hand the world price is higher than the European price, the Commission may tie the issue of certificates to the payment of taxes by exporters. The subsidies are still available, but in lower amounts than before.
On the other hand, modifications to farming practices, affecting the environment and causing soil and water pollution, are a means of financially sanctioning intensive farming methods.

[13] ONIC: "Quality of French wheat", Harvest 2005

3.4.2 The impact of the Fischler Reform on common wheat supply chain operators

3.4.2.1 The different supply chain operators:

The chain begins with seed and agricultural machinery producers, followed by the farmers, storage sites, primary processing (mills) and sales.
Many different bodies control and regulate the different phases. Primarily, the Ministry for Agriculture, Fisheries and Food, the French General Association of Wheat and Cereal Producers (AGPB), the National Association of French Millers (ANMF), the National Inter-professional Cereal Office (ONIC), the Federation of Agricultural Collection, Purchasing and Processing Cooperatives, the Federation of Agricultural Trade, the National Confederation of French Bakers and Pastry makers, the National Institute of Bakers and Pastry makers (INBP)…
The Ministry for Agriculture, Fisheries and Food dictates the policies to be followed.
Thereafter comes the ONIC, established by French law on 15th August 1936. This Public Authority, of an industrial and commercial nature, is staffed by civil servants and has financial independence, and is the largest paying body in Europe. Its main mission is the implementation of the Common Agricultural Policy.
As an Office for all cereals, it has far-reaching competencies both nationally and within the EU, as established in two French Decrees of 30th September 1953 and 27th July 1962, which amended the previous laws.
In particular, as a public and inter-professional body, the ONIC:
registers cereal collectors,
guarantees the payment due to producers through the “warranty” procedure,
assures the regulation of markets through public intervention,
supports exports by paying refunds,
contributes the market transparency through the dissemination of statistics, forecasts and international quotations,
participates in the valorisation and promotion of French cereals abroad,
encourages cereal traceability and quality processes,
contributes to drawing up national and EU regulations.

The ONIC covers the territory through its 17 Regional Offices, in order to best manage its national and EU missions.
As a pole for concertation and dialogue for all the stakeholders of this sector, the ONIC contributes to the development of the cereal supply chain in the general interests of all.
In 2003, in order to strengthen competitivity through effective logistics, the ONIC signed a “Guide of good practice for river transport” with the Voies Navigables de France (VNF) (French Navigable Waterways Board). These agreements respond to the hopes of the cereal sector, for the development of cheaper and less polluting methods of bulk transport, in particular waterways. The aim is to double the river transport of cereals by 2010.

3.4.2.2 The role of the different operators in the common wheat supply chain:

A. Seeds:

Increasingly strict environmental regulations and the importance of yields make the choice of seed and important one.

Farmers therefore call on different people when making their selection, as they need seeds that are best suited to the soil types and climatic conditions with the least possible quantities of fertilisers, pesticides …in order to meet the regulatory requirements.
For this reason, farmers refer to specialist seed traders, such as Limagrain; they contact researchers for fertility studies for their land, such as the cereals and forage institute ARVALIS. And of course, the ONIC is the seed selection control body.
French public research – mainly through the INRA – has been the driving force behind all the important technological progress benefiting seed variety innovation over the past half century. The fact that France has become the second largest seed producer in the world is largely thanks to the remarkable effectiveness of the INRA selectors.
The knowledge of the variety and the guarantee of quality are indispensable. Indeed, a certified seed must respect several quality criteria, including germination capacity, purity and health condition. Large scale crop species must demonstrate their additional agricultural value (yield, resistance to disease …) and/or technological value (breadmaking quality for wheat, for example). In 2004, the official French catalogue of species and varieties included 5082 varieties, representing 144 species14.
The decision-making authority is the Comité Permanent des Semences (CPS) (Permanent Seed Committee), which is an essential cog in the European mechanism.
The foundations of the European seed regulation date back to 1966, when Europe established a technical concertation authority to handle issues relating to the certification and registration of varieties in a common catalogue. Its task is to follow the implementation of the regulations and study regulatory evolution. Any modifications to a directive require the prior opinion of the CPS.
The last European seed regulations date back to 1994 (Reg. 2100/1994), when Europe established an EU protection mechanism for plant varieties, and later Reg. no.s 1768/95 and 2605/98 introduced some modifications, mainly concerning patents.
Today, free access to a genetic resource with patented genes is only partially permitted in European laws through the authorisation given to use a part of their harvest for resowing and under precisely defined conditions.
The plant variety protection and gene patent system does not allow farmers to freely use an existing variety to create another. This challenges research into plant improvement, and runs a clear risk for the French seed sector.
A new European regulation issued in 2004, introducing the notion of the “exception of the selector”, allows the use of a patented variety through the granting of a licence. This license authorised by the patent holder allows researchers to pursue their cereal improvement activities.
To conclude, we can state that the regulations applied to the seed sector may to some extent stop the progress of research and therefore limit the variety of seeds, and article 69 of the new CAP reform introduces some quality restrictions which do not necessarily respond to market demands.

B. Crops:

The political changes over the past few years have also led to changes in producer organisation.
The appearance of inequalities concerning the share of European aid (Reg. 1782/2003), through which support was delivered in a single payment for each farm, independent of the production according to the yield during the reference period; the difficulty in producing in respect of the new regulations and the increase in production costs have led farmers more and more to grouping within associations, farming organisations.
Often the product specifications regulate the production procedures and the organisation within a group. They purchase machinery together, combine their crop harvests ….
At national level, there is of course the “General Association of wheat and other cereal Producers” (AGPB).
There is therefore a general concentration of agricultural farms as shown in the following table.

[14] www.gnis.fr

- **Table 3-62 - general characteristics of farms in France:**

	Farms 2000	Farms 2003	UAA(ha) 2000	UAA(ha) 2003	ALU 2000	ALU 2003
Total	663,812	589,771	27,789,077	27,667,719	947,966	887,533
Used Agricultural Area (UAA)						
Less than 20 ha	324,077	266,828	1,836,317	1,580,399	277,295	242,855
20 to less than 50 ha	139,195	120,890	4,712,105	4,099,729	235,031	205,067
50 to less than 100 ha	122,213	118,287	8,672,741	8,439,591	235,680	227,634
100 to less than 200 ha	64,215	68,129	8,652,402	9,215,871	146,927	153,827
200 ha and above	14,112	15,636	3,915,512	4,332,129	53,034	58,150

Source : Agreste- structure survey 2003 and agricultural census 2000

ALU: annual labour unit, the amount of work done annually by one person working full time.

Two farms out of three are considered professional. The portion of cereal farms increased by 6% between 1988 and 200015.
The new CAP reform of 2003 makes the management of agricultural concerns even harder, as farmers are required to comply with numerous administrative requirements. Competitivity, the results of inter-professional organisation to improve product quality, promotion campaigns…
But the future of our cereal production depends on all of these political evolutions, evolutions in prospects and the structuring of our supply chains. The size and organisation of cereal farms can only adapt to the margins resulting from these evolutions. An organisation such as the AGPB must play an active role in all of these matters.16
Facing up to the competition requires these farms to assure profit margins that will permit them to invest, and to maintain the motivation of the farmers. The cost of mechanisation and labour play an important role in the competitivity of large crop farms. It has been demonstrated that the greater the farmed surface area, the higher the profit margins. In France, farmers already resort to various formulas for sharing material and equipment, and even labour, in order to assure cost reductions.17
The Fischler Reform and the single payment per farm over the reference period is therefore not positive for small farms, who continue to see their income drop as producer associations and organisations continue to gain.
The various seed regulations have led very rapidly to the restriction of and dependence on the choice of seed compared to large companies that make the most of their patents for transgenic seed. This is why more and more farmers prefer to keep their own seed, in order not to become dependent on the large companies, and continue their struggle for biodiversity.

C. Storage:

Before processing, crops are more and more often stored in collection and merchant cooperatives. Storage is a key step for quality, traceability and the respect for production specifications (which describe the various requirements to be respected). The storage cells are disinfected through atomisation several weeks prior to

[15] Agreste Centre – May 2001 no. 69
[16] AGPB- Congrès 2004 : Rapport d'orientation
[17] AGPB- Congrès 2004: Rapport d'orientation "Découplé, mais déterminés".

harvesting in order to avoid all risk of chemical pollution for the stored grain. This operation is done with the material supplied by the cooperative[18] .
In 2000/2001, the "French Federation of Agricultural Collection, Purchasing and Processing Cooperative" (FFCAT), which groups together 200 collection/purchasing cooperatives, had a turnover of more than 10 billion Euros. With 25,000 employees serving more than 300,000 members, these enterprises make up for 74% of the French national collection, with 42 million tons. [19]
Upstream from production, the cooperatives distribute agricultural supplies (fertiliser, seed) to their customers. Downstream, handling primary processing, the cooperatives are directly present, or present through branches, with mills, malthouses, corn houses…
One of the essential missions of FFCAT is to assure the safeguarding of the interests of the member cooperatives, by becoming involved in all the decisions that concern them when policies are initiated and decisions taken.
Today, almost 900 collectors (239 cooperatives and 644 merchants) are approved by the ONIC for the storage and sale of cereals, and 480 to cover the industry's needs (mills, animal feed producers, wheat starch manufacturers…).
The increase of the dollar over the Euro in the past few years has also not helped the cereal sector, as the currency distortions prevent EU wheat from being competitive in third countries[20]. The EU authorities must therefore widen the allocation of common wheat farming refunds (January 2005). Without this condition, it will not be possible to foresee the recovery of export activities. The refunds will facilitate the lightening of the stocks which could have had a serious effect on the operations of the European market. This means that, in view of the serious monetary deregulation, no country will be able to oppose the protection mechanisms within the framework of the WTO agricultural negotiations. In international negotiations, the representatives of the EU must assure that the importance of export interventions be recognised. Without this, the storage agencies would have no way of selling their stock.

D. Milling:

Most common wheat is sent to mills, which transform the wheat into flour and then sell it on directly to the bakers. The mills are often owned by cooperatives and associations. The National Association of French Mills (ANMF) dictates the criteria to be respected when preserving wheat, as well as production specifications for transformation (including the quality characteristics to be respected, the choice of land lots, the products authorised for treatment), and the production regulations to be followed. The milling associations, such as for example the "Moyenne et petite meunerie française" (MPMF), an umbrella for around 120 members, reflects the tradition and authenticity of the trades in the wheat-flour-bread chain.
The MPMF is involved in fundamental activities including the food surveillance plan, which is a veritable scientific vigil, assisting in the creation of increasingly healthy and safe products in line with the influence of the most recent CAP regulations.
All mills processing common wheat for human consumption and destined for the internal market must have a milling contingent. The creation of new mills is permitted only by transferring the contingent from a mill that has stopped processing. The ONIC is responsible for authorising and managing the operations relative to contingents and milling rights on behalf of the Consultative Milling Commission within the Ministry of Agriculture.
EU regulations on food safety are becoming more and more strict, bringing many human and financial constraints which in turn would imply additional support to the Member States in order to assure their compliance; for this reason, government agencies need additional aid in order to assure that private sector operators are not penalised. This would therefore save public bodies in EU Member states from further challenges, as the costs of failure for public bodies could have great importance for the private sector.

E. Animal and wheat starch industries:

Animal feed production, the second destination of use of common wheat, has seen an increase in the past few years, particularly following the ban on use of animal flours.

[18] "Réussir céréales grandes cultures", September 2005 no. 184
[19] www.ffcat.asso.fr
[20] www.agpb.fr: wheat export refunds.

For all cereals, usage hit 11.5 million t in 2002/2003. This figure fell to 10.8 million t in 2004, but generally speaking the use of wheat for animal feed is on the increase due mainly to the reduction in price.21
The third destination of use of wheat is the wheat starch industry. Europe is the second largest producer of wheat starch in the world, and in France there are six large industries, making it the top ranking country in the EU. Starch has a very strong market, in continuous growth. 50% of starch is used for the food processing industry, and the rest for non-food sectors: paper (26%), chemical (7%), pharmaceutical (7%) and bio ethanol (10%).

F. Flour markets:

The mills transforming wheat into flour have several markets: 69.2% breadmaking, 4.9% is bagged, 23.6% is used by the food processing industry and 23.6% is used for other purposes.22
The bakers have direct relations with the mills, also through consortia and associations. The "Confederation Nationale de la boulangerie-pâtisserie Française", and the "Institut Nationale de la boulangerie-Pâtisserie" to whom many bakers are associated, follow many quality criteria and different regulations for product certification. Many bakers' associations have a certified brand, such as for example "Banette".
The food industry, the second largest user of flour, is increasingly imposing criteria to be respected, to which all links in the supply chain must comply. This is due to the increasing demand for quality-certified products and the environmental compliance of products in line with the various food safety regulations.

3.4.2.3 Conclusion:

By studying the progression of the common wheat supply change we can see the evolution and importance of the changes produced by the recent evolutions in the 2003 CAP reform, but also how the needs of the various links in the chain have changed. Most of these changes are linked to problems of respect for the environment, which is one of the keystones of the Fischler Reform (EC Reg. 1782/2003).
Through its choice of applying the Fischler Reform, France has privileged a part of its aid based on a purely historical concept in relation to each farm. It also supports the reproduction of existing imbalances among farms, productions and regions, favouring the most productive farmers who already benefited from these aids23.
Even when aggregated, the available data concerning the distribution of support show large disparities between farms according to size, crops grown and regions. In France, out of the 537,000 existing farms, 460,000 farms receive direct aid (85%) while 77,000 (15%) do not receive any24.
This result cannot be separated from the growing concentration of agricultural concerns. In the past twenty years, 50% of farms have disappeared, as the average surface area has increased from 23.4 to 42 ha25.
Aid distributed according to crops differ depending on the type of crop categories (cereals, meat…). The accent placed on certain crops partly explains the geographical concentration of aid in areas more suited to these production types: Beauce, Ile de France, Picardie.
The concentration of aid on the farms dedicated to mass production constitutes a political choice to encourage intensive and export farming. This is therefore far removed from the myths according to which the CAP mission was to assure food autonomy and to support small farmers.
The current distribution of agricultural aid reflects the choice to support the food processing chain as a whole, which can in this way be supplied by raw materials at lower costs.

[21] Réussir céréales grandes cultures- May 2005 no. 181
[22] Réussir céréales grandes cultures- January 2005 no.177
[23] Confédération Paysanne: "Aides agricoles: autopsie d'un système inégalitaire", 2005
[24] Source: Ministry of Agriculture
[25] Source: Agreste- Ministry of Agriculture, quoted from "les principaux bénéficiaire de la PAC en France", dépêche AFP of 3.11.2005

3.4.3 Analysis of the common wheat supply chain

3.4.3.1 Common wheat in France:

A. Production:

In 2005, France gathered more than 35 million tons of wheat, the highest volume of the past five years. In quality terms, around 30 million tons are high quality and fall in classes “E” and “1”. The average protein content is 12.3%, one point higher than the previous year.
The French cereal chain has been moving towards quality production over the past few years, and by now 9 out of 10 hectares are dedicated to breadmaking wheat, following strict and careful selection of the seed varieties. More than 85% of the harvest is upper quality wheat, a third of which falls into “E” class, which is a very high range product.26
Estimated at around 5 M ha, the wheat-sown surface areas for the 2005 harvest have grown by 140,000 ha compared to the previous year. On the other hand, maize is losing ground (-110,000 ha). It now covers 1.66 M ha, compared to 1.77 M ha last year. Barley is also slightly decreased, to less than 1.6 M ha (-30,000 ha compared to the previous year).
Superior breadmaking wheat has gathered even more ground during the 2005 harvest. It now covers 80% of wheat-sown surface areas compared to 77% in 2004 and only 45% in 199827. Including also ordinary bread wheats – 10% of surface area – the bread varieties cover 9 ha out of 10. The decline of wheat “for other purposes” (mainly forage), is also noted. This represents no more than 10% of surface area compared to 32% in 199828.
Today, the development of new varieties allows for the creation of very satisfactory bread mixes, offering elastic, stretchy doughs that hydrate well and have good volume.
By combining both quality and quantity, the French cereal chain is today fully compensated by the efforts made over the past few years: choice of varieties, modified farming practices, strengthened classification policy.

- **Table 3-63 - Evolution in the share of cereal surface areas in France from 1998 to 2004 (in thousands of ha):**

	Common wheat	Durum wheat	Barley	Oats	Maize
2004	4,826	405	1,626	124	1,796
2003	4,523	353	1,758	136	1,685
2002	4,900	334	1,643	145	1,817
2001	4,463	306	1,705	118	1,914
2000	4,929	337	1,573	111	1,834
1999	4,788	326	1,535	122	1,759
1998	4,938	296	1,535	122	1,759

Source: AGPB

[26] ARVALIS: « Qualité des blés français 2005 »
[27] Source ONIC: Harvest 2005
[28] Source ONIC: Results of a survey carried out in January 2005 of around 5,000 farmers

- **Table 3-64 - evolution of cereal production in France from 1998 to 2004 (in thousands of tons):**

	Common wheat	Durum wheat	Barley	Oats	Maize
2004	37,489	2,064	10,999	594	15,743
2003	29,047	1,428	9,844	555	11,991
2002	37,347	1,639	10,933	728	16,013
2001	30,233	1,339	9,806	485	16,476
2000	35,682	1,673	9,927	503	16,469
1999	35,463	1,539	9,540	551	15,643
1998	38,269	1,545	10,592	658	15,204

Source: AGPB

As we can see from the two tables above, common wheat is the most frequently cultivated cereal in France. We can see a slight decrease in the surface area dedicated to common wheat crops between 1998 (4,938 m ha) and 2001(4,463 m ha), possibly linked to the 2000 CAP, but the effect was short-lived, as the areas increased once more from 2002 to reach 4,900 m ha.

B. Production distribution:

France has always been a large common wheat producer, with many regions in the Centre and North of France sharing the production. The surface areas farmed over the years have remained fairly stable. Yields on the other hand vary greatly according to the climatic risks, amount of fertilisers, and above all the seed quality. Over the past decades, great progress has been made and new regulations implemented in line with political reform.

- **Table 3-65 - Main common wheat producing regions in France:**

Regions	Surface area (ha) 2004	Production (q) 2004	Yield (q/ha) 2004
Bourgogne	320,100	24,007,500	75
Bretagne	295,400	22,019,000	75
Centre	732,600	54,383,000	75
Champagne- Ardenne	387,800	34,213,000	88
Haute- Normandie	246,500	21,979,000	89
Nord- Pas- de- Calais	540,000	50,220,000	93
Picardie	516,700	47,472,000	92

Regions	Surface area (ha) 2003	Production (q) 2003	Yield (q/ha) 2003
Bourgogne	292,100	14,605,000	50
Bretagne	274,000	19,080,000	69
Centre	690,200	39,231,400	57
Champagne- Ardenne	385,300	26,090,700	68
Haute- Normandie	240,000	19,278,000	80
Nord- Pas- de- Calais	256,000	22,478,500	88
Picardie	499,600	39,512,500	79

Regions	Surface area (ha) 2002	Production (q) 2002	Yield (q/ha) 2002
Bourgogne	341,950	24,061,740	70
Bretagne	301,500	22,011,380	73
Centre	759,500	59,212,900	78
Champagne- Ardenne	402,600	37,791,800	81
Haute- Normandie	243,800	20,831,000	85
Nord- Pas- de- Calais	257,000	21,961,000	85
Picardie	509,000	44,009,500	86

Source: Agreste

As we can see from the above tables, the Centre region is the largest producer of common wheat in France, despite the fact that its yield is not one of the best.

C. Wheat production markets:

The use of common wheat is in slight decline in the bread making sector, as its use in wheat starch manufacturing, biscuit making and animal feed production increases.

- **Table 3-66 - Common wheat production balance in France (in thousands of tons):**

	98/99	99/00	00/01	01/02	02/03	03/04	04/05*	05/06*
Resources								
Surface areas (1 000 ha)	4,938	4 788	4,912	4,463	4,900	4,523	4,826	4,864
Yield (q/ha)	77.5	74.1	72.6	67.7	76.2	64.3	78	72
Production (1 000t)	38,269	35,463	35,682	30,233	37,347	29,047	37,489	35,110
Self-consumption	3,741	4,069	3,907	3,929	4,300	3,240	4,129	4,344
Self-consumption in%	9.80%	11.50%	10.90%	13.00%	11.52%	11.15%	11.00%	12.40%
Resources for the market								
Carry over stock	4,321	7,844	5,523	3,392	3,070	4,020	1,913	4,741
Collection	34,528	31,394	31,775	26,304	33,020	25,820	33,360	30,766
Grain imports	259	217	264	319	290	200	135	130
Incorporations	72	77	79	70			62	60
Total resources	39,180	39,532	37,641	30,085	36,460	30,100	35,581	35,697

Source: ONIC
* : 2004/2005: provisional for December 2005
* : 2005/2006: forecast for December 2005

- **Table 3-67 - Use of common wheat in France (in thousands of tons):**

	98/99	99/00	00/01	01/02	04/05*	05/06*
Internal use						
Breadmaking	3 072	3 045	3 121	3109	2 986	2985
Starch	1 921	2 005	2 277	2046	2 748	2 800
Biscuits, sweets and pastries…	928	960	959	951	1 035	1 035
Other uses	812	774	801	805	830	830
Seeds	463	446	434	420	387	385
Animal feed producers	5 993	5 860	6 805	6200	5 750	6 400
Others (including industrial fallow land)	558	774	663	642	0	400
Wastage	345	314	318	263	334	308
Total internal use	14 092	14 177	15 376	14 796	14 070	15 143
Self-consumption (non-market)	3 741	4 069	3 907	3 929	4 129	4 344
EU sales-Exports						
Grains						
EU	8 8871	9 469	10 953	7 274	8 736	8 700
Other supplies within the EU	145	155	188			
Third countries	6 538	7 452	6 089	3 780	7 012	6 200
Intervention exports to Belgium		819	100			
FOD	75	84	83	90	102	102
EU food aid	217	298	248	118		
Total Exports of grains	15 809	18 277	17 661	11 263	15 851	15 002
Products (flour)						
EU	196	222	211	263	254	250
Third countries	1 173	1 312	946	651	644	550
Food aid	66	21	55	40	21	20
Total exports of flour	1 435	1 554	1 212	955	920	820
Total exports	17 244	19 831	18 873	12 218	16 770	15 822
Total usage	35 077	38 077	38 156	30 943	34 969	35 309
Carried over:						
Free market	3 977	2 301	2 840	2 812	2 738	3 072
- collectors	3 205	1 464	2 013	2 020	2 008	
- FAB	96	128	139	173	173	
- export warehouses	100	128	119	55	0	
- mills	576	523	510	490	472	
- starch industry		58	59	74	85	
Intervention	3 867	3 222	552	259	2 003	1 705
Total declared stock	7 844	5 523	3 392	3 071	4 741	4 732
Carried over stock (1)	7 844	5 523	3 392	3 071	4 741	4 732
(balance)						
Previous stock (2)	8 095	6 104	4 185	4 482		
Difference (1)-(2)	-251	-581	-793	-1 411		
Total usage and report	42 921	43 601	41 548	34 014	39 710	40 041

Source: ONIC
* : 2004/2005: provisional for December 2005
* : 2005/2006: forecast for December 2005

Despite the fact that half of the wheat produced in France crosses its borders, in export terms there are a number of factors that block the competitivity of French arable crops.
In the various export markets, our wheat competes mainly with that produced by the United States, Canada, Australia, Argentina, but also Ukraine and Kazakhstan. In order to measure the level of competitivity of French wheat compared to its competitors, ARVALIS compared "full" production costs per ton of wheat from "performing" farms in each of these countries.

At the exchange rates of May 2004, we can distinguish three groups of country for the level of competitive of their "reference farms": firstly Argentine and Kazakhstan with respective production costs of 30 Euros/t and 43 Euros/t ; then Australia, at 77 E/t and Ukraine at 80 E/t and finally Canada, USA and France, which all have similar production costs of around 130 E/t.
Three main elements can help to explain the difference in production costs: exchange rates, used quantities and volumes (seeds, water, fertiliser…), variable costs, mechanisation and labour costs, and the cost of services and products.

- **Table 3-68 - Common wheat exports (millions of tons):**

	01/02	02/03*	03/04*	04/05**
EU grain exports	7.27	6.9	8.70	8.50
Third country grain exports	3.99	8.70	4.60	7.00
Total exports	11.26	15.6	13.3	15.50

Source : AGPB

* Source: ONIC
**Source: AGPB, forecast

- **Table 3-69 - Cereal exports from France in volume (millions of tons):**

	01/02	02/03	03/04	04/05
EU grain exports	20.79	19.53	19.25	19.93
Third country grain exports	6.24	7.32	10.04	6.15
Total exports	27.03	26.85	29.29	26.08

Source: AGPB

3.4.3.2 General structure of the supply chain :

A. Seeds:

For cereals, seed production is mainly carried out in the cereal regions. This facilitates purchasing for the farmers, offering a suitable range of varieties and reduced transport costs, and the existence of a veritable network of producers in different regions in any case assures the response to the evolution in varieties and to climatic risks that may occur in certain regions.
The seed sector, the first link in the common wheat supply chain, has to comply with many regulations. First of all it must respect the European rules (EC Directive 66/401), implemented by the ONIC which oversees to assure that the large seed producers respect the applicable legislation.
The seed sector is also the first element of integration within the chain, by selling certified grains that respect the farmers' demand.
In France, cereal traceability is being constantly expanded, and in 2004, the ONIC decided to spend a further 1.3 million Euros on its "cereal traceability" programme. This programme launched in 2001 involved the

subsidy of IT equipment for use in recording and following data concerning grain batches, land lots up to loading on ships in the ports. The information gathered in this way concerns crop interventions, farm storage, farmers' deliveries, storage and gathering of grains at the collection agencies (cooperatives, merchants), transport operations, and port silo storage.

7 port silos and 251 collection agencies involve 60,400 farmers since 2002 in this project proposed by the ONIC.

The mobilisation of a new tranche of 1.3 M Euros is destined to satisfy the applications made in 2003. The ONIC has also considered a possible extension of this mechanism upstream in the chain (mills, animal feed producers)29.

The environmental issues and many regulations have led to many changes in production methods, and surface areas cultivated under production charters: "Céréales de France" cover more than 600,000 hectares in 2005, an increase of more than 100,000 ha compared to 2004.

Launched in 2001, these Charters are references for national qualities, describing the methods of farming hard and common wheat, brewing barley and maize, to best contribute to the quality of the cereals and assure the protection of the environment.

In 2005, 72 cereal collection agencies (cooperatives, grain merchants) and technical agricultural development bodies signed the Charters, bringing 24,000 farmers into the project.

This project is managed by ARVALIS, the technical cereal institute, and by IRTAC (Institut de recherche technologique agroalimentaire des céréales). Adhesion to the Charters is annual, and the respect thereof is controlled by independent inspection bodies. A reference list of bodies and farmers will be drawn up in October 2005 in the light of the inspections, and for the first time food processing companies using cereals supplies by the referenced bodies may mark their product packaging with the brand "Céréales de France-Charte Qualité Environnement"30.

In the past few years France has therefore seen an evolution in produced quality. Superior bread wheats and improved wheats sown in France for the 2005 harvest have represented around 80% of wheat surface areas, increasing by 2% compared to the sown areas for the 2003 harvest. This is the sixth consecutive increase31.

Wheat quality is measured in terms of protein content, baking strength and the Falling Number (time index for grain falling), with class E being the best quality.

- **Table 3-70 - Classification of common wheat quality:**

Classes	Proteins	(W) baking strength	Hagberg (Falling Number)	Share 2005
E	Greater than 12%	Greater than 250	Greater than 220	25%
1	11-12.5%	160-250	Greater than 220	61%
2	10.5-11.5%	According to contract specification	Greater than 180	11%
3	Less than 10.5%	Not specified	Not specified	3%

Sources: "Qualité des blés Français 2005" - ONIC/ ARVALIS

Proteins: (Nx5.7) % M.S
W: 100 000 Joules/g
Falling Number (Hagberg): seconds

B. Farm structure:

[29] Blé contact - no. 161 February 2004
[30] Blé Contact - no. 176 September 2005
[31] Blé Contact - no. 166 September 2004

Over the past few years, the farmers have organised themselves in associations or inter-professional groups, in order to be able to comply with the new reforms, cope with growing costs, demand and so on.
This phenomenon has led to a concentration of increasingly large and competitive agricultural concerns, to the detriment of small family-run farms. Moreover, with the new 2003 CAP reform, (in which crop aid will be paid according to the cultivated surface area and no longer according to the produced quantities), this will accentuate the gap between small and large farms, and the small farmer will find it more and more difficult to survive.

- **Table 3-71 - common wheat producing farms:**

Year	Number of farms	Surface area (ha)
1988	439,148	4,380,339
2000	263,770	4,896,507

Source: Agreste- Agricultural census 1988 and 2000

- **Table 3-72 - individually owned and co-owned equipment:**

	Farms 1988	Farms 2000	Fleet 1988	Fleet 2000
Tractors of less than 55 hp din	589,627	317,458	712659	385089
Tractors from 55 to 79 hp din	419,646	332,179	520752	451389
Tractors from 80 to 134 hp	173,275	245,919	231467	379209
Tractors of 135 hp and above	9,725	37,892	11,408	48,283
Total tractors	823,908	557,814	1,476,285	1,263,971
Combine harvesters	144,796	97,667	128,420	91,141
Self-driven maize harvesters	15,484	3,233	123,065	2,926
Large bailers	81,600	134,512	70,950	127,297
Self-driven silo filler	…	4,694	…	3,647
Crop sprayers	…	12,943	…	12,428
Slurry spreaders and buriers	…	2,174	…	2,055
Telescopic loaders	…	17,094	…	16,822

Source: Agreste- Agricultural census 1988 and 2000

The strong tendency towards specialisation, like the reduction of margins, increase the sensitivity of farms towards risks of a certain size, the fragile structure of certain farms (one-crop farming, no regulatory stocks, debt…) may lead some of these, even those that are still viable, to stop running, as an unexpected phenomenon breaks the fragile economic balance. The price fluctuations of vegetable crops could also be particularly strong for the smaller farms.
In 2003, the 118,000 farms dominated by arable crops that covered half of French agricultural soil and cultivated 80% of these surface areas for cereals, oil seeds and pulses and COP-aided fallow land, represented 41% of the French agricultural economy, and the agricultural economic mainstay of the Bassin parisien, Picardie, Champagne-Ardennes, and the Centre regions, but also a large portion of Lorraine, northern Bourgogne, Poitou-Charentes and the South-West plains32. Arable land represented 62% of the 32.5 million hectares dedicated to agriculture. More than 1.15 million people worked in farming in 2003; 20 % of the 6 million people living in rural municipalities.

[32] Source: agricultural census

- **Table 3-73 - Share of agricultural farms:**

Share of farms by size

	1988		2000		2003	
	Number*	UAA**	Number*	UAA**	Number*	UAA**
Less than 5 ha	278	519	193	362	151	293
From 5 to 20 ha	279	3,238	132	1,464	115	1,287
From 20 to 50 ha	288	9,348	138	4,666	121	4,100
From 50 to 100 ha	128	8,709	122	8,662	118	8,440
From 100 to 200 ha	37	4,864	64	8,655	68	9,216
200 ha and above	7	1,918	15	4,047	16	4,332
Total	1,017	28,596	664	27,856	590	27,668

Source: Ministry of Agriculture and Fisheries, Scees, Agreste

*: number in thousands
**: UAA in thousands of ha

A study by INSEE into the profit margin of wheat production shows how the production results of one hectare of wheat have seen drastic decline over the past 10 years. In fact, the net margin of a hectare of common wheat in Euros, went from almost 270 per ha in 1991 to 80 per ha in 2001, a fall of 70%[33].
At the same time, over the period 1988-2000, the average surface area of arable farms increased by 7% to reach an average of 100 European size units (ESU), which is the equivalent of 150 ha of wheat. The workforce has fallen by one third. In fact, despite drastic restructuring and an increase in productivity in arable farms, their profits have seriously dropped.
According to the Institut Nationale de la Recherche Agronomique (INRA), the simulation of the impact of the CAP reform of 21st June 2003 on the representative sample of cereal farms in the “intermediate” regions (Poitou-Charentes, Centre, Bourgogne and Lorraine) leads to an additional constant drop in income per ha of 9% from 2002 to 2012, despite increased productivity by quintal/ha/year of common wheat and a reduction in actual fixed costs per ha[34].
This simulation suggests that the drop in hectare income may be compensated by increasing the size of the farms: “a reduction of 9% in ha. income compensated by an increase in surface area of 14% translates into an increase in overall farm income of 4%”. But there are limited possibilities for enlargement: the simulation effectively shows that the rate of abandon of farms – and therefore the possibility for enlargement – is on the decrease, following the many cases of early retirement during the period 1990-1999 and the resulting rejuvenation of the age pyramid.
Once again therefore, if nothing is done we will see further decreases in hectare income, and equally farm income, over the next ten years. In order to survive therefore, arable farms need to “re-earn” 150 to 200 Euros per hectare, by reducing costs.

C. Storage:

Cereal cooperatives aim for maximum efficiency in terms of silo safety. FFCAT – the French Federation of Cereal Cooperatives – has established a safety authorisation procedure for silos, within the framework of buildings classified for environmental protection. There are around 1000 of these silos in France, those with a storage capacity of more than 15,000 cubic metres.
The purpose of the procedure, called SAGESS, is to help cooperatives to create and maintain the most effective possible systems (special equipment, working methods) to assure silo safety. A certification

[33] Source : INSEE – “D’une réforme de la politique agricole à l’autre” no. 927- Octobre 2003
[34] Source : INRA- “La révision à mi-parcours de la PAC et les exploitions céréalières des régions intermédiaires”

committee comprising representatives of insurance companies and the regional directorate for industrial and industrial environmental and risk research (INERIS)35.
Technical progress begins at the farm through grain ventilation, and in 2004 ARVALIS – the “Institut du végétal, l’institut technique des céréals” – and its partner MTE launched “Sec-Lis”, a grain ventilation piloting tool used during farm storage. Ventilation helps to fight insects and mould, which thrive in the relatively high temperature of the grain at the time of harvest. This process is done by blowing fresher air into the perforated grilles that run through the grain cells. The farmer is also able to control the ventilation time and check for any anomalies. Sec-Lis therefore assures grain preservation at lower costs, and removes the risks of badly managed ventilation that could compromise quality36.

D. Mills:

Today in France there are 517 working mills. The large number of companies and their difference in size assure economic milling activity across the territory. Depending on the company structure, the customers of the produced flour may be local, regional or international. The milling sector comprises a majority of private, family-run businesses. From South to North, West to East, mills can be found in all of the French regions. Historically this capillary extension across the territory is linked to France’s agricultural vocation: most regions produce common wheat, and therefore the milling activities evolved all over the “hexagon”. Millers have therefore always enjoyed business relations with local cereal farmers and local bakers.
Despite the reduction in the number of mills since the 1950s, the profession has managed to organise itself in order to preserve an inherited and balanced geographical presence, which today constitutes a determining factor in terms of quality, food safety and environmental protection. A 1935 decree-law sets an annual milling limit for each mill, a threshold for the quantity of common wheat the mill is authorised to transform into flour. Still today the mills are subjected to this annual wheat grinding limit for flour destined for national human consumption: the "contingent". This contingent, expressed in tons, may be totally or partially transformed into “milling rights", which can also be granted to other mills.

- **Table 3-74 - the top 12 milling firms in France:**

Company and department	Turnover (1,000 Euros)
Grands Moulins de Paris (94)	285,213
Soufflet Meunerie (10)	220,000
Grands Moulins Strasbourg (67)	167,092
Moulin Soufflet sa (10)	159,930
Goupe Nicot (71)	97,000
Groupe Celbert (35)	95,000
GMS Meunerie (67)	85,529
Française de Meunerie (10)	79,617
Euromil Nord (51)	51,594
Grands Moulins Maurel (13)	48,184
Grands Moulins Storione (13)	45,052
Hebert (28)	40,011

Source: La Dépêche/ Petit meunier

Flour is destined mainly for human food purposes. Around 87% of flour produced in French mills, almost 3.8 million tons in 2003, are used for the national market.
Small bakeries are still by far the largest customer for the flour. This however is also on the decrease, as industrial bakeries take a greater hold on the market. Among the other flour users, we find food industries (biscuits and pastries...), animal feed and wheat starch.
France holds first place in the European milling market, with a total production of 4.38 million tons of flour in 2003 of which more than 17% is destined for export, but the development of the export market remains obstructed by the progression of the competitors. The construction of mills in some traditional importing

[35] Blé Contact - no. 168 November 2004
[36] Blé Contact - no. 168 November 2004

countries and the distance of the milling businesses from French ports, leading to higher transport costs, area the two main factors that lie behind the reduction in French exports.
In order to overcome a crisis of over-production due to the reduction in foreign markets, the French milling industry has established a restructuring plan that aims to reduce milling capacities for both export and internal markets.
The notion of service, deep-rooted in the culture of this profession, is mainly represented by the relations between the millers and the bakers, is confirmed through a set of “Quality” measures.
To promote the farming of French wheat with strong baking strength, the “Association Nationale de la Meunerie Française” (ANMF) publishes two lists of recommended common wheat varieties that are used to produce excellent quality French bread, for professional operators upstream of the chain. It should be noted that the test protocol introduced by the ANMF in partnership with the ‘Comité Technique Permanent de la Sélection des plantes cultivées’ (CTPS) and the ‘Institut Technique des Céréals et des Fourrages’ (ITCF) also allows for the identification of varieties with interesting bread making characteristics, in addition to the development of new wheat varieties.
In the field of health quality and food safety, the ANMF has published the “Guide de bonnes pratiques hygiéniques” (Guide to good hygiene practice) to facilitate the application of the EEC Directive 93/43. A reference point for mills, this guide describes the methods used to manage hygiene in a flexible manner, using an approach based on the HACCP method (Hazard Analysis Critical Control Point). This method is used to assess the dangers and establish risk management systems based on prevention. This project has been completed by a study carried out among the suppliers of the mills within the chain.

E. Bakeries:

In France, 34,000 bakers put their expertise at the service of the consumers. Quality is more than ever at the centre of the worries of these men and women who work for the consumers. The “Confederation Nationale de la Boulangerie” is the national body that represents the small bread and pastry making company managers. In 1976 it negotiated a National Collective Bargaining Contract to complete the provisions of the Labour Code and manage the relations between employees and employers in the profession.
Although the volume of bread consumption is now fairly stable, its quality is evolving, and traditional French breads are gaining territory. On the other hand, cakes, pastries, sandwiches, quiches and pizzas,… attract other customers to the shops, generating a turnover at least equal to that of traditional bread products.
With more than 70% of the bread market, the small bakers enjoy the special affection of the population, which overall makes 75% of its food purchases in the large scale distribution chains.

F. Intervention policies:

EC regulation no. 1253/99, supporting the common organisation of cereal markets, foresees the intervention of the EU in purchasing cereals. When demanded by the market, intervention measures may be decided: the following table shows the intervention prices set until 2006 before the last CAP reforms (up to Agenda 2000).

- **Table 3-75 - Evolution of the EU intervention price (in Euros/ton):**

Year	Common wheat
July 1992	163.49
July 1993	115.49
July 1994	106.60
July 1994 to June 2000	119.19
July 2000	110.25
July 2001	101.31
July 2002 to 2006	101.31

Source: (Technical centre for agricultural and rural cooperation)

This reduction in support price is compensated by direct subsidies paid to producers, which have been increased from the previous 54 Euros to 63 per ton (the amount received by the producer is the product of the base amount per ton per average yield, determined in the regionalisation plan for each region).
The following tables retrace the different aid received by France from 1990 to 2003 for all cereals.

- **Table 3-76 - indirect aid for cereals (in million Euros):**

Year	Indirect aid	Direct aid	Export refunds
1990	1,232.3	58.8	1,168.5
1991	1,815.5	87.7	1,835.0
1992	2,174.1	233.2	1,281.9
1993	2,630.7	2,287.7	1,131.3
1994	760.5	3,086.8	589.1
1995	512.1	3,730.1	474.4
1996	106.6	3,767.1	53.8
1997	286.8	3,673.3	209.9
1998	649.9	3,703.3	262.2
1999	794.1	3,689.2	402.8
2000	536.2	3,908.8	306.0
2001	181.6	4,208.2	108.6
2002	161.9	4,362.2	68.2
2003	229.4	4,309.7	134.6

Source: Ministry of Agriculture and Fisheries

As we can see, export refunds have decreased since 1994, going from 1,168.5 M Euros in 1990 to 589.1 in 1994, partly due to the effect of the Mac-Sharry Reform, while direct aid has increased greatly, going from 58.8 in 1990 to 4,309.7 in 2003. These figures are explained by the changes in agricultural support implemented under the Mac-Sharry, Agenda 2000 and Fischler Reforms.

3.4.4 Analysis of the common wheat supply chain in the Centre region

3.4.4.1 The common wheat supply chain in the Centre region:

The Centre region is a large cereal producing region in the heart of Europe: in 2004, France produced one quarter of the cereal production for enlarged Europe, and the Centre region alone produced 3% of this.
It is the largest cereal region in France in terms of cultivated surface area: almost 2.4 million hectares, 63% of the regional territory, compared to the national average of 54%. The essential wealth of the Centre region lies in the diversity of its agriculture, from cereals to goat rearing, passing through horticulture and organic farming. This range of crops adds variety to the landscape, the cereal plains of the Beauce to the grass meadows south of Indre and Cher, passing through the Loire Valley.From a geographical point of view, the Centre region is composed of 18 very different agricultural regions and 6 departments: Cher, Eure-et-Loir, Indre, Indre-et-Loire, Loir-et-Cher and Loiret.According to the 2000 census, it groups around 33,050 farms, 2.37 million ha of UAA, and an average yield of common wheat of 72 q/ha (which is the French national average), 440,000 hectares of forage (of which 53% permanent grassland), 72,300 dairy cows, 202,000 suckler cows, 101,000 goats, and 187 food processing businesses employing more than 10 staff.37
Wheat is by far the queen of the Centre region crops, in both those areas with satisfactory potential and those with more limited yields. Many farms fall within an "intermediary region" context (average yield, limited range of crops), weakened by the CAP reforms of 1992 and 1999.

A) Common wheat production:

The total surface area of the Centre region is 3,954,000 ha, with a UAA of 2.4 million ha of total area. Cereal was cultivated on a surface area of 1,232,000 ha in 2003, of which 691,500 were common wheat crops.

- **Table 3-77 - cereal production in thousands of tons:**

	Cereal production 2003	Cereal production 2004	Growth 04/03 in %	Common wheat production 2004
France	54,807	70,393	28.4	37,631
Centre	7,168	9,340	30.3	5,435

Source: Insee - Centre region

[37] Data source: SRSA DRAF Centre, INSEE, survey.

- **Table 3-78 - Evolution of the surface area cultivated with common wheat:**

Source: Centre region Chamber of agriculture

COMMON WHEAT Surface area (ha)	Cher	Eure- et Loir	Indre	Indre- et Loire	Loir- et Cher	Loiret	Centre Region	France	CENTRE/ France
1990	121,395	188,000	111,900	116,200	87,000	129,000	753,495	4,748,711	15.87
1991	116,300	172,500	108,400	112,200	76,000	124,000	709,400	4,652,193	15.25
1992	111,711	175,000	105,400	104,100	79,000	124,000	699,211	4,651,950	15.03
1993	103,645	192,000	98,800	101,100	96,600	124,000	716,145	4,287,961	16.70
1994	107,540	192,000	104,800	98,500	98,500	123,000	724,340	4,338,295	16.70
1995	110,926	193,000	109,500	96,500	98,500	124,000	732,426	4,513,460	16.23
1996	117,292	194,050	114,300	108,500	100,000	128,000	762,142	4,764,021	16.00
1997	118,086	199,000	115,800	111,200	103,500	129,000	776,586	4,840,720	16.04
1998	121,258	200,000	117,000	112,200	101,500	131,000	782,958	4,934,692	15.87
1999	116,000	191,500	117,000	106,200	94,000	122,500	747,200	4,775,160	15.65
2000	123,000	194,000	119,700	108,300	93,000	126,600	764,644	4,910,512	15.57
2001	113,500	177,000	114,500	91,200	80,000	116,500	692,700	4,462,792	15.52
2002	114,000	188,000	119,500	117,000	97,000	124,000	759,500	4,894,835	15.52
2003	108,100	176,500	113,600	109,300	87,000	97,000	691,500	4,523,235	15.29
2004	114,000	186,500	116,900	113,200	87,000	115,000	732,600	4,832,757	15.16

As we can see from the above table, the surface area dedicated to common wheat crops in the region represents around 15% of the French surface area.
The latter was slightly reduced in 2001 and 2003 and progressively increases from 2004. the decrease in surface area in 2001 and 2003 is the consequence of the Agenda 2000 policies.
In 2001 fallow land surfaces increased notably: 200,300 ha compared to 176,000 ha in 2000 and 167,000 ha in 1999. This now represents 8.3% of the UAA. Common wheat fell by 8 quintals per ha, to 65 quintals/ha; production fell in all departments. Surface area fell by 72,000 ha, to 692,700 ha.[38]
2002 saw a reduction in fallow land: 179,000 ha compared to 200 in 2001, representing 7.4% of UAA. These areas were mostly returned to crop farming, to the benefit of cereal crops. Thus the cereal-cultivated areas saw a slight increase (+ 5,500 ha) to represent around 53% of UAA. This progression affects above all common wheat: the surface area for this crop went from 692,700 ha to 759,500 ha, an increase of 9%. At the same time, yield increased by 13 q, reaching an excellent average level of 78 q/ha. Production increased in all departments, exceeding 59 million quintals.

- **Table 3-79 - Total surface area and number of farms according to size cultivating common wheat in the Centre region in 2000:**

		Less than 10 ha (1)	10 to less than 30	30 to less than 50	50 to less than 50	70 and above	Total
Common wheat	Number of farms	5,315	6,073	4,732	2,778	2,733	21,631
	Surface area (ha)	21,431	118,499	185,659	163,598	275,456	764,644

Agricultural census 2000 - AGRESTE - Agricultural campaign 1999-2000

[38] Source: INSEE Centre – “2001: une année à oublier”

- **Table 3-80 - Share of cereal crops in the region:**

2002	Surface area ha	Production q	Yield q/ha
Cereal:	1,274,773	96,951,744	76
Common wheat	759,500	59,212,900	78
Durum wheat	39,950	2,833,500	71
Barley	253,000	17,820,400	70
Maize	152,903	13,646,944	89
Oilseeds:	330,405	9,674,770	29
Of which rape	245,550	7,675,000	31
Pulses	58,900	2,908,120	49

2003	Surface area ha	Production q	Yield q/ha
Cereal:	1,232,480	70,921,700	58
Common wheat	691,500	39,231,400	57
Durum wheat	65,200	3,324,700	51
Barley	266,150	14,525,000	55
Maize	140,470	11,218,300	80
Oilseeds:	349,220	1,022,935	29
Of which rape	253,750	7,984,550	31
Pulses	62,405	2,632,010	42

Source: INSEE

- **Table 3-81 - common wheat production in the region:**

	2002	2003	2004	2005
Surface area (ha)	759,500	690,200	732,600	739,200
Production (quintals)	59,212,900	39,231,400	54,300,000	51,500,000
Yield (q/ha)	76	57	74	70

Source: Agreste - Centre region

The 2004 crop was good in both quantity and quality terms, with wheat yield higher than the average of the previous five years, with a yield of 74 q/ha, and with the common wheat harvest lying in second place only to the record harvest of 2002. On the other hand, the markets dropped due to a supply surplus. In fact, the cereal quotations were in clear decline compared to 2003 and the average of the past three years.
The common wheat crop estimated at 5.2 million tons in 2005, decreases by 5% compared to 2004, but remains 1.5% higher than the average of the five-year period 2000/2004. The 2005 yield, estimated at 70 quintals per ha, is 4 quintals lower than the previous year, but still falls within a “normal year” range. The specific weights are good, and the protein levels very good.

B. Common wheat farms in the region:

At the end of the 19th century, the profound change in the agricultural world was confirmed, indeed accelerated. Inexorably, farms were disappearing from the landscape.

At the last census of 2000, there were 33,000 in the Centre region, compared to the 53,000 counted at the 1988 census, a fall of 40% in the number of farms39. Therefore, two out of three no longer fall within the classes corresponding to small professional farms (from 8 to 40 ESU - European size units). On the other hand, the number of units greater than 40 ESU has increased by 20%. As in 1988, two farms out of three are considered “professional”. The portion of farms with a cereal vocation has increased by 6% (51% in 2000 compared to 45% in 1988).
So, productivity oblige, the use of temporary workers has increased to the detriment of permanent staff. Legal status has evolved, better adapting to the currently attractive context.

- **Table 3-82 - Evolution of the number of farms growing common wheat and surface area cultivated:**

year	Farms (number)	Surface area (ha)
1988	33,527	715,351
2000	21,631	764,644

Source: Agreste – Agricultural census 1988 and 2000

- **Table 3-83 - Farms by size and used agricultural area (UAA) :**

	1970		1988		2003	
UAA	Farms	UAA	Farms	UAA	Farms	UAA
Less than 10 ha	33.2	101.7	16.2	50.4	7.5	24.7
10 to less than 20 ha	12.4	182.1	5.3	76.3	1.7	24.7
20 to less than 50 ha	23.2	763.1	12.2	420.9	3.7	125.2
50 to less than 100 ha	11.9	815.3	12.7	899.9	6.8	517.8
100 ha and above	4.4	681.7	6.6	1,002.6	9.9	1,643.3
Total	**85.0**	**2,543.8**	**53.0**	**2,450.0**	**29.7**	**2,335.8**

Source: Agreste - Agricultural census 1970 and 1988, structure survey 2003

- Farms: in thousands
- UAA: in thousands of ha

Overall the region has seen a reduction in UAA, by 208,000 ha between 1970 and 2003. The overall number of farms decreased by 55,300 between 1970 and 2003.
As the years go by, the phenomenon of disappearance of small farms increases, to the benefit of large farms (which is linked to the concentration of several small farms) which are better organised and above all more productive.

- **Table 3-84 - Evolution of the legal structure of the farms:**

	Farm (number)			UAA (ha)		
	1988	2000	2003*	1988	2000	2003*
Statute:						
Individual farm	47,712	24,932	21,300	1,905,28	1,286,271	1,183,700
GAEC *	2,152	1,817	1,900	249,071	292,376	312,200
EARL*	125	3,995	4,500	13,261	496,199	570,900
Other companies or partnerships	1,484	1,630	1,900	189,961	250,742	268,900
Other statutes	1,491	676		92,443	40,106	
Total	**53,000**	**33,050**	**29,700**	**2,450,000**	**2,365,694**	**2,335,800**

Source: Agreste: Census 1988 and 2000 and structure survey 2003(*).

[39] Source: AGRESTE – Agricutlrual census 1988 and 2000.

For 2003, headings "other companies, partnerships and other statutes" are grouped together.
EARL: limited stock farm
GAEC: joint farm group
The EARL (limited stock farm), is an attractive status, as while in 1988 more than 86% of farmers had opted for an individual partnership, in 2000 only 75 % of farmers adopted this solution. The company forms seem to better respond to the fiscal needs of farms.

But in 2000, 3,995 farms, compared with only 125 in 1988, chose the EARL as a statute. The number of GAEC (joint farm groups), which are more demanding in terms of co-responsibility, falls below 1,900 farms. The other business forms found, particularly civil societies, have developed differently according to the department, but above all in Cher, Eure-et-Loir and Indre.

Differences between professional and non-professional farms:

- **Table 3-85 - General characteristics of agricultural farms:**

	Farms (number)		UAA (ha)		ALU	
	2000	2003	2000	2003	2000	2003
UAA						
Less than 20 ha	11,475	9,285	59,769	49,457	10,065	8,801
20 to less than 50 ha	4,443	3,674	151,797	125,236	6,930	6,024
50 to less than 100 ha	7,511	6,806	561,462	517, 806	11,730	9,686
100 to less than 200 ha	7,773	7,876	1,066,188	1,086,744	13,681	13,391
200 ha and above	1,849	2,059	500,646	556,538	5,688	6,238
Total	**33,051**	**29,700**	**2,339,862**	**2,335,781**	**48,095**	**44,140**

- **Table 3-86 - General characteristics of professional farms:**

	Farms (number)		UAA (ha)		ALU	
	2000	2003	2000	2003	2000	2003
UAA						
Less than 20 ha	2,288	1,993	18,789	15,583	6,869	6,203
20 to less than 50 ha	2,984	2,327	103,282	79,391	6,341	5,524
50 to less than 100 ha	6,637	5,797	501,580	447,540	11,327	9,323
100 to less than 200 ha	7,620	7,634	1,047,114	1,056,839	13,610	13,270
200 ha and above	1,849	2,055	500,646	555,620	5,688	6,238
Total	**21,378**	**19,806**	**2,171,411**	**2,154,972**	**43 835**	**40 468**

Sources: Agreste - structure survey 2003 and agricultural census 2000

Professional farms: according to ministerial criteria, these employ at least 75% of a full time job per year.

Overall, the Centre region is composed of a larger number of non-professional farms, despite the reduction we have seen between 2000 and 2003, when the total number of non-professional farms fell from 33,051 to 29,700.

Non-professional farms are above all small ones (less than 20 ha), while the number of farms covering 200 ha and more are on the increase (from 1,849 in 2000 to 2,059 in 2003).
Concerning professional farms, these are above all medium-large sized farms. In 2000 out of the total of 21,378 farms, 6,637 cultivated between 50 ha and 100 ha, 7,620 from 100 to 200 ha. Between 2000 and 2003 the number of farms cultivating more than 200 ha increased, from 1,849 to 2,055 in 2003.
Generally speaking, for professional and non-professional farms, we can see a reduction in the number of small farms, to the benefit of large ones, and as the UAA remains unchanged we can say that there has been a phenomenon of farm concentration.
This concentration is largely explained by the need to increase productivity, the pooling of production equipment (see the table below), working methods and so on, although this phenomenon is also largely linked to the evolution of agricultural policy.

- **Table 3-87 - Owned or co-owned equipment for all the farms in the region:**

	Farms 1988	Farms 2000	Fleet 1988	Fleet 2000
Tractors less than 55 hp din	25,747	12,826	31,185	15,661
Tractors from 55 to 79 hp din	24,689	16,723	30,997	22,382
Tractors from 80 to 134 hp	17,776	17,937	26,491	32,320
Tractors 135 hp and above	1,216	4,577	1,367	5,539
Total tractors	43,462	28,513	90,040	75,902
Combine harvesters	22,214	14,622	20,611	13,842
Motorised maize harvesters	1,399	267	1,177	243
Large bailers	3,104	4,729	2,805	4,522
Self- driven silo fillers	…	194	…	166
Crop sprayers	…	833	…	732
Slurry spreaders and buriers	…	109	…	104
Telescopic loaders	…	789	…	790

Source: Agreste - Agricultural census 1988 and 2000

We can see from the above table, the increase in the number of tractors with at least 135 hp between 1988 and 2000 and the correlation with the evolution of the fleet, which can be explained by the phenomenon of cooperation and concentration among farms. They group together to purchase heavier machinery and work together in order to be more productive, by reducing their production costs.
The ability to stand up to the competition requires farms to assure profits that allow them to invest, and that keep farmers' motivation high.
Between 1991 and 2001, the net profit per hectare of wheat in France fell from 270 to 80 euros, a 3.5-fold reduction.
According to the studies by the INRA, the latest CAP reform would lower the net margin for large crops by a further 10%, under equal conditions.
Mechanisation and labour costs play an important role in large farm competitivity. It has been demonstrated that as the farmed surface areas increase, greater profit margins are to be had.
The works carried out by ARVALIS also demonstrated that the equipment investment costs per hectare decrease very rapidly from 100 to 1000 ha of farmed surface area. In fact, by multiplying the surface areas by 4, equipment investments are multiplied only by 1.3.

In France, farmers already resort to various forms of equipment and labour pooling in order to reduce costs. The common crop rotation formula, in which not only equipment and labour but also the crop rotation itself are pooled, represents a particularly advantageous solution.
By practicing common crop rotation, farms benefit from the same economies of scale as industrial farms, without changing their initial farm legal status, whether single ownership or singly owned limited stock farm … and in this way they are assured the possibility of withdrawing in case of need.
The second advantage of common crop rotation practices is that the dynamic created by this type of pooling promotes the implementation of new activities, as the working time saved through the change in scale of

equipment can be readdressed to new activities, both in the expansion of the farm and in other fields. This is another way of increasing the added value offered by common crop rotation.

- **Table 3-88 - Annual labour unit per agricultural farm in the Centre region:**

	RGA * 1988	RGA* 2000
Number of ALU	42,268	27,302

Source : Ministry of agriculture and fisheries

ALU : amount of work done by one person working full time for one year
RGA* : General Agricultural Census

We can therefore see how the ALU has decreased over the past few years, mainly linked to the technical evolution of production methods and greater mechanisation.

- **Table 3-89 - Staff working in agricultural in the Centre region (thousands of ALU):**

	1970	1988	2003
Family population:	101.6	60.2	31.7
Of who farm managers and co-managers	60.2	42.3	26.0
Permanent staff	21.9	11.1	8.0
Seasonal staff	4.0	3.1	4.1
ETA, CUMA(wine growing machinery syndicate)	0.3	0.3	0.4
Total ALU	127.8	74.7	44.1

Source: Agreste – Agricultural census 1970 and 1988, structure survey 2003

As we can see, between 1970 and 2003, both the number of people working in agriculture and the ALU decreased.
The number of seasonal workers increased, in 1970 it represented 3% of the total farm workers, while in 2003 this value stood at 9%.

- **Table 3-90 - Agriculture accounts in the region (in million euros):**

	1990	1995	2000	2003
Vegetable production*	2,820.2	2,756.1	2,764.8	2,721.3
+ animal production *	750.2	722.3	767.0	795.7
+ Services *	118.4	120.4	143.7	164.1
= Total production *	30,688.8	3,598.8	3,675.5	3,681.1
- intermediary consumption (excl. VAT.)	1,836.2	1,704.1	1,837.7	1,894.4
= Gross added value	1,852 6	1,894.7	1,083.8	1,786.7
+ Farm subsidies	35.7	140.8	77.7	135.2
- Production tax	99.1	77.3	75.6	60.2
- Consumption of fixed capital	544.1	534.5	573.9	633.4
= Agricultural result **	1,245.1	1,423.7	1,265.9	1,228.3
	Thousands of euros			
Average agricultural result per worker	18.3	26.1	26.0	26.6
	index 1990=100			
Average agricultural result per worker in real terms	100.0	127.9	121.0	117.5

* : Price basis value
** : Net added value after factor costs
Source : Agreste - Regional agricultural accounts

We can see how, since 1990, cereal production accounts are declining, partly linked to the increase in production costs and the decrease in cereal prices.
We can equally see the large increase in farm subsidies, which increased from a total of 35.7 M Euros in 1990 to 135.5 M Euros in 2003, to compensate the falling prices of agricultural goods as a result of the CAP reforms.

C. The seed sector:

As we have seen above, the ONIC plays a fundamental role in applying the CAP, as its tasks include the assurance of the traceability of grain crops, from harvest to issue onto the market by the collector or exportation by sea from the port storage silos. Financial support is given to projects that use the implementation of powerful ICT tools and equipment to record and monitor all data required for traceability.
At the centre of this mechanism, the collectors have access to two levels of aid. If full traceability is assured from the land to final retail, a lump sum basic support of 20,000 Euros is paid to the collector for the investments in IT technology for this purpose. In order to benefit from this support, the project must involve a minimum of 50 producers.
The support of the ONIC is subordinate to the implementation of a quality policy at all levels involved :
production: through the implementation of tools to encourage quality (production contracts and charters)
storage: through the implementation of “good storage practices” (monitoring of ventilation, temperature, recording of any treatments …)

Furthermore the operator must undertake to classify the collected wheat using a grid adopted by the cereal supply chain in 1999, to respond to the market segmentation[40].

The Centre region has a key player in the cereal quality assurance demanded by the ONIC: “Epis-Centre”. This has a parallel role, with constant research to improve the quality of grain collection and storage.
Epis-Centre assures the sale of goods (seed, fertilisers, crop protection, animal feed), as well as the production of certified seed and the collection, storage and sale of grains and technical assistance services.
It also has a European trading role: marketing, storage, shipping and logistics as well as the processing of cereals and oil seed and pulses: animal nutrition, aviculture, malthouses, oil seed processing, small bakeries.
At national level, Epis-Centre is one of the largest grain collectors, with an average collection of 2.2 million tons. Around 75% of the collection covers straw cereals, wheat and barley, and 25 % to oil seeds and maize.
The complementarity of the activities carried out by Epis-Centre have led to the opening up of the Berry-Nivernais basin, and assure the duration and valorisation of production. Epis-Centre has a turnover of around 1 billion euros.
It is a consortium of six cooperatives from the departments of Indre, Cher and Nièvre, covering the Berry-Nivernais region.
In this area, 8,750 associate farmer work in close collaboration with the technicians to assure the development of quality vegetable and animal crops that respect the environment.
Epis-Centre purchases the common wheat, on one hand, from the harvests of its members, and on the other hand, directly from non-member producers. The milling market represents around 20-30% of the Epis-Centre sales of common wheat.
As Berry-Nivernais is not a large basin for consumption and processing, Epis-Centre implements a policy of market security, which translates into the development of new trades. Epis-Centre has developed a mainly regional processing mechanism (animal feed, mills, malthouses, oil extraction) but also an international mechanism for malthouses, to follow its brewery clients, which represents a valorisation potential of almost 50% of the collection.
Epis-Centre has also strengthened its ties with the markets of the Mediterranean Basin, through the trading company “Européen Granit”, with branches in a number of countries, and through logistical developments with its own fleet of wagons and port silos.
Epis-Centre employs 1,760 staff, and for the 2004/2005 harvest more than 4 million tons of grain was marketed. The turnover for 2004/2005 is around 1 billion Euros.

Here below are some other figures concerning Epis-Centre for the period 2004/2005[41] :

Grain farming: 37%
European trading: 33%
Processing: 30%
Consolidated turnover: 997.4 M euros
Gross operating surplus: 36.4 M euros
Self-financing capacity: 28.5 M euros
Working capital: 69.1 M euros
Own funds: 211.5 M euros
Nett result: 10.1 M euros
Member farms: 8,750
Staff: 1,760

Source : Epis-Centre: “Key figures”

[40] Source: ONIC.
[41] Epis- Centre: “Key figures”

Activities	June 2005	
Collection	2.1 Mt	
Purchasing	169 M Euros	**Staff: 864**
Seed	37,000 t	
Grain trading/ PPK logistics	2.3 Mt	**Staff: 49**
animal feed	440,000 t	
Aviculture	45,500 t	
Malthouses	424,000 t	**Staff: 847**
Mills	84,000 t	
Bakers	4.6 M euros	
Agricultural self-service	9.2 M euros	

Source : Epis- Centre: "Key figures"

D. The importance of the quality of common wheat:

For 2005, the common wheat harvest is of very high quality, reaching 35 Mt of which 31 Mt is collected and sold.
French wheats harvested in 2005 should take pride of place for bread wheats, but should be equally appetising for animal feed producers, who are expected to use around 20%, in volume terms more than 6 Mt. In fact, more than three quarters of the wheat has a protein level of higher than 13.2 % MS (N x 6.25), against a national average of 13.5% MS. In 2005, almost all class 3 wheats (not for baking purposes) fall within the richest protein category (3-1). Animal feed producers may also use wheats with low SW, but with high protein content, which are present in the other classes of the ONIC grille.

- **Table 3-91 - common wheat quality criteria in 2005 :**

	France	Centre
Ideal water content	13.2%	12.5 to 12.9%
Average specific weight 2005	76.5 kg/hl	77.1 to 78 kg/hl
Average starch content	68% MS	67.5% to 68% MS
Average protein content	13.5% MS	13.5 to 14% MS

MS (N x 6.25) Source: Complementary studies carried out by the ONIC and ARVALIS.

The national average of 13.2% water content for 2005, is an almost perfect value for preservation, therefore the Centre region, with a water content of between 12.5 and 12.9%, can boast wheat with good preservation capacities.
The national specific weight is 76.5 kg/hl, and that of the Centre region falls between 77.1 and 78 kg/hl, which is better, and the wheat of this region can therefore be said to have a good specific weight.
The average starch content for this year has reached 68% MS, and for this region falls between 67.5 and 68%, which is a satisfactory result.

As far as protein content is concerned, the average is 13.5 MS, and that of the region of between 13.5 and 14%, can therefore be considered a wheat with very good baking qualities.
We can therefore conclude that the quality of the common wheat in the Centre region for 2005 is very high.

As we have seen before, policy changes and new food habits have led to an increase in the number of products that certify product quality and the respect for environmental standards.
In the Centre region, official quality marking is represented by a “red label” for flour quality. Superior quality breadmaking flour is processed without emulsifiers, beans or soya (which distorts the flavour of the bread). It comes from common wheats selected for their breadmaking qualities.
The red label for breadmaking flour has been used since 1989, and 200 bakeries in the region affix this label.
In 2001, 180,000 tons of this flour was produced nationally, of which 15,000 tons for the Centre region, where bread produced using this flour is sold by the name of “Banette”.
There is a certifying body, CERTIPAQ, and a Banette laboratory.
Among the various flour producers adhering to this label in the Centre region, we may list Minoterie Matignon, S.A. moulins de Chérisy and Minoteries Cantin.
The special needs are controlled in order to assure not only the superior quality but also the regularity of breadmaking.
This flour is mainly destined for bakers. It is delivered in marked 50 kg sacks or in bulk.

E. Transformation and sale of common wheat:

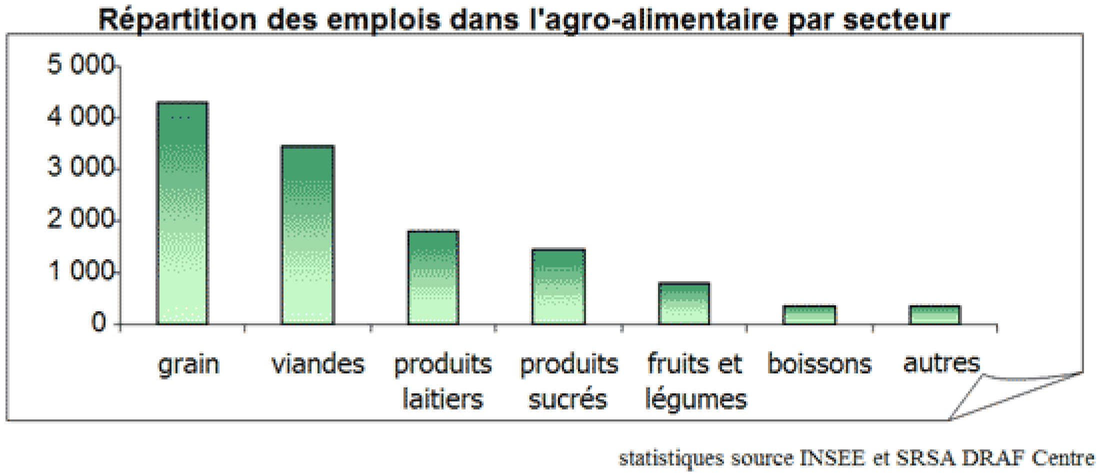
In 2002, with 4.42 million tons of flour produced, of which 736 000 tons for export, France is one of the leading countries in Europe for the production of common wheat flour. Almost 70% of this is used in breadmaking.The mill is the central link in the common wheat supply chain. Located in the centre of the chain, French mills assure the primary transformation of the raw material. This chain includes wheat cereal producers, upstream, and bakers and other customers of the mills downstream.
The small baker continues to hold first position downstream in the common wheat chain, even though industrial bakers and large scale distribution sectors are increasing at a constant rate.
Biscuit and pastry manufacturers fall in the second largest downstream sector. This sector is also on the increase.The co-products, fragments of outer skins, husks and other by-products of the transformation process are called middlings. Constituted by bran and sharps, they are mainly used for animal feeds.

According to the statistics available for 2004, in France in the census, 517 mills were counted, with a milling threshold of 5,254,094.9 t, with the Centre region alone counting 21 mills with a milling threshold of 241,363.4 t42.As far as exports are concerned, in 2004 French millers worked with more than 90 countries around the world, of which 26.48% in the EU and the remainder across the rest of the globe, starting with Libya (19.7%), Angola (10.67%), Guinea (4.76%), Cuba (4.60%), Central African Republic (3.66%), Mali (3.43%), Chad (3.02%), Burkina Faso (3%), Ivory Coast (2.46%), Polynesia (2.43%), Niger (1.70%) and Mauritania (1.61%)43.
Each year, the AMNF (Association Nationale de la Meunerie Française) publishes a list of the varieties of wheats recommended by the milling association (the VRM sheet) addressed to cereal farmers and collectors in order to guarantee the cultivation of varieties with good baking quality, on one hand, and to classify the varieties stored in the silos on the other hand. The varieties registered with the VRM respond to elite specifications, as used pure they are able to produce French bread of the highest quality. This list is completed by the list of Blés Panifiables Meunerie Française (BPMF – French Millers’ Breadmaking Wheats), which includes the breadmaking wheats and relative mixes recommended by the profession.

In terms of employment in the grain sector, in the Centre region there are around 4,300 workers (59 establishments). Primary transformation counts for around 2,100 jobs: mills, malthouses, animal feed producers (for both farm animals and domestic pets). A little over half of the workers fall within secondary transformation: industrial baking and pastry making, biscuit and pasta factories.

[42] Source: ONIC
[43] Source: www.latoque.fr

- **Figure 3-18 - Share of employment in the food processing sector:**



Source of statistics: INSEE and SRSA DRAF, Centre

The milling and baking sectors have been in decline for several years. A study carried out by the ONIC has highlighted:
A drop of 54% of exports between 1999 and 2003, accompanied by a risk of carry-over onto the internal market, which cannot absorb such volumes;
Increased costs following investments made to company with the standards set in the regulations, which could jeopardise some businesses;
An increase in the bargaining power by some industrial customers; an increasingly exacerbated competition on the internal market.
For the ONIC, these facts lead to the need to reduce the milling capacities of the mills, placing the accent on exporting mills. Furthermore, the Office also considers it necessary to implement restructuring at European level, as the globalisation of markets becomes an unavoidable parameter for the milling industry.
The drop in exports seen in 2004 continues to penalise the profession through the underuse of its production tools, as no increases in the internal market have been recorded for several years. Also concerning mill finance, the fluctuation of raw material prices, pressure on the sales price of finished products, traceability requirements and the increase in costs (including salaries, transport, energy) all expose these businesses to clear economic tensions44.
In 2004, breadmaking, the main market for the milling industry, represented 67% of market segments, seeing a drop of 2.6% compared to the previous year.

The most important mill groups in the Centre region are: Grands moulins de Semblancay, Minoteries du Coutelet, Minoteries Viron, Moulin Osmeaux et Raimbert Claude and Minoteries Cantin.
The Minoteries Cantin group, with a turnover of 39 million Euros in 2001, represents the largest milling group in the Centre region. The group produces and sells to various customers: bakers, medium and large scale distribution, other flour-using industries.
Minoteries Cantin sources its common wheat directly from producers but also through common wheat "wholesaler" intermediaries (agricultural cooperatives or private companies), as well as from the Epis-Centre.
For the 2000/2001 campaign, nationally Minoteries Cantin represented a percentage of less than 10%45 of tons sold out of the total of French production, and a percentage of less than 10%46 of sold flour (French production - exports + imports). Regionally, the group is present in the ONIC Centre and ONIC Auvergne regions, and in this area represents almost 20 - 30% of total flour production.

[44] Source: www.latoque.fr
[45] Original data not given, but in any case between: 0 and 10%   Source: www.finances.gouv.fr
[46] Original data not given, but in any case between: 0 and 10%   Source: www.finances.gouv.fr

It should be noted that there is a large number of players in the common wheat marketing game in France. The ONIC lists more than 300 active companies in this sector in France.
Small baking concerns remain the main outlet for flour, which is why the mills are particularly attentive to the evolution of the bread market, with 47% of total volume used on the internal market; industrial bakers, biscuit and pastry makers are the other main customers:
5.74 million tons of wheat used;
4.42 million tons of flour produced;
A turnover of 1.48 billion Euros47.

The “red label” breadmaking flour in the Centre region (which certifies the respect for special criteria, in particular the respect for the production specifications, which are controlled in order to assure not only the superior quality but also the regularity of bread making conditions) is mostly destined for bakeries.
Partly due to the high quality of its breadmaking flour, the Centre region is one of the top French regions for the production of common wheat, with 55 million quintals in 2001, mostly composed of breadmaking wheats. Exports play an important role, with around 20% of volume used to produce flour in France, of which a little less than half in the Centre region and the rest in the other regions (in particular Ile-de-France).

3.4.4.2 The importance of the role of the CAP:

A. Support for agriculture in the region:

Like many other regions, the Centre benefits from agricultural support under the CAP every year. Every year, the region has to present a support declaration to the EU: this is assessed according to different criteria. At the end of the assessment, the region is informed of the effective aid it will actually receive.

- **Table 3-92 - CAP agricultural support declarations (unit: dossier):**

	Total 2002	Total 2003	Total 2004
Cher	3,116	3,440	3,373
Eure et Loir	4,527	4,580	4,507
Indre	4,491	4,775	4,699
Indre et Loire	4,021	4,151	4,050
Loir et Cher	3,236	3,340	3,271
Loiret	3,675	3,681	3,605
Centre region	23,066	23,967	23,505

Source: Agreste Centre, Edition 2005

[47] Source : ONIC

- **Table 3-93 - Surface areas for supported crops in the Centre (ha) :**

	Cereal	Common wheat	Oil crops	Pulses	Set-aside	UAA declared	COP aided and set aside
2000	1,239,871	757,012	310,265	61,361	231,078	2,335,756	1,846,103
2001	1,231,518	682,820	297,115	64,178	249,880	2,332,845	1,843,393
2002	1,283,646	749,554	269,693	58,949	231,447	2,331,417	1,844,086
2003	1,255,683	683,423	290,816	62,630	233,415	2,326,942	1,843,325
2004	1,273,468	721,067	324,509	59,918	182,586	2,325,733	1,841,341

Source: Agreste Centre – Edition 2005

As we can see, the common wheat surface areas benefit most from CAP aid in the region.
In addition to the CAP aid, farmers sell their production to the ONIC which, in its role as public storage agency, helps them to lower their stocks.
For 2005, the ONIC counted 2.57 Mt of cereals applying for intervention in France, of which around 90% for the wheat of the 2004/2005 campaign, which should lead to a real takeover volume of around 2.5 Mt.
Of this 2.57 Mt applying for intervention, the Centre region alone offered 893,813 t of common wheat[48]. The "Application for intervention" is the procedure through which the operators cover themselves against trade fluctuations by withdrawing their cereals from the market through a public storage mechanism. It is conditional to the respect for certain quality criteria set by European regulation, so that French cereals applying for intervention are purchased by the ONIC at the EC intervention prices, then stored before being returned to the market when the conditions are more favourable.

Very often in the absence of the many types of support agricultural concerns are able to receive, a large number of them would be destined to close; as we can see from the accounting figures for 2003, there is a very high proportion of subsidies in the total result.

- **Table 3-94 - Total results for 2003 (average per farm):**

	Cereals and large scale crops	All farms
Turnover	112	120
Intermediate consumption, stoppages insurance	89	90
Gross added value	24	31
Subsidies	49	43
Gross operating surplus	65	63
Depreciation	28	27
Working profit	39	37
Financial costs	1	5
Pre-tax operating result	34	33

Unit: thousand Euros

Source: Agreste - "Comptes et revenus" (Agricultural accounting information network RICA)

[48] Source: ONIC

B. The effects of the CAP reforms on the Centre region:

1. The 1992 reform:

As far as large-scale crops are concerned, since 1993 favourable support has been given to common wheat and rape. Crops adapted very quickly to the 1992 CAP reform. Rape crops expanded due to the non-food markets, and common wheat took hold over barley.
The farmers were obliged to adapt to this new reform, which in particular introduced set-aside for agricultural land and price reductions for large scale crops, and rapidly adapted their crop rotation programmes.
In their choice of cereals, for which compensatory aid had been unified, they preferred the most profitable crops. From this, the success of common wheat. This led to a large increase in income, at least until 1997.
Common wheat, the surface areas of which progressed from 1994 to then drop again, following the introduction of the doubling of the compulsory set-aside rate in 1999, which put a stop to this growth.
Furthermore, the Centre region was also able to take advantage of the COP aid in this reform. In 1999, the Eure-et-Loir received 1,077 million francs, Cher 781 million francs, Loiret 755 million francs, Indre 717 million francs and Eure 699 million francs, with a regional total of 4,029 million francs, while the total French amount was 33,866 million francs. The Centre region alone received 12% of COP aid destined for France49.

2. Agenda 2000:

A new direction, based on the combination of price reductions and compensatory aid. The purpose of this CAP reform was to expand and intensify the 1992 reform, by replacing price support measures by direct aid and accompanying this process with a coherent rural policy.
The Centre region is "Target Zone 2", the transitory support zone affected by the DOCUP, targeting 765 municipalities out of 1842 (Agenda 2000). These zones cover almost half of the territory of the Centre region and affect more than 30% of the regional population.
The Target 2 DOCUP for the Centre region, definitively approved on 22nd March 2001, covers four priority measures:
Measure 1: to accompany the conversion of economic activities and improve competitivity
Measure 2: to strengthen the attractiveness of the territories
Measure 3: to promote the conditions for stable, quality development
Measure 4: to promote rural development.
The reform also includes technical assistance measures for the management, information, monitoring, control and evaluation of the programme.

The Centre region DOCUP budget is 729.5 million Euros of which 95.06 (13% of the total) is destined for rural development. The share of European Funds is 199.25 million Euros for the Structural Funds (ERDF and ESF) and 27.727 million Euros for the Guarantee Section of the European Agriculture Guidance and Guarantee Fund (EAGGF) which finances the rural development measures of the programme. The total of aid is valid for the period 2000/2006 and is decided during the Agenda 2000.

First pillar aid concerns hectare payments, farm and large volume aid, for large scale farms. The amount of direct aid (1st and 2nd pillars) is strictly tied to the specialisation and size of the farms, which partly explains the geographical distribution of the aid, the other fundamental element being the disproportion between the 1st and 2nd pillars, in terms of credit volumes. The consequence of all this, is on one hand, aid allocation that is strongly influenced by the level of specialisation of farms in the region and by the size of agricultural businesses, and on the other hand by the considerable differences between departments or regions.
But the Centre region should not complain of the aid received from the Agenda 2000. The Centre receives the second highest amount of aid after the Midi-Pyrénées region, which received a total amount of 785,660,256 Euros in 2002, and the Centre region will receive a total of 726,290,545 Euros for aid linked to

[49] Agreste: Agreste primeur, no. 74 of 15/06/2000.

the two pillars. For this year, overall for aid linked to the two pillars, France received a total amount of 8,104,044,359 euros50.

3. The 2003 CAP reform:

Conditionality of payments, generalised modulation, decoupling: the 2003 CAP reform is the clear evidence of the consequences for agriculture in the Centre region. Due to the extent of the upset it caused, it compares more closely to the 1992 reform than to that of 1999.

During the resolution voted by the Centre Region Regional Chamber of Agriculture concerning the new reform, it was noted:

That the simulations carried out on farms show large potential losses of income for the farms;

That the decoupling of payments leads to the risk of abandon for production, particularly in the most fragile areas;

That the reform could lead to the disorganisation of certain supply chains (beef, lamb, durum wheat), and the destabilisation of other sectors (milk) ;

That a veritable drought in the upstream and downstream fabric could result, bringing serious consequences for the commercial circuits in terms of competitivity;

That the region is strongly exposed to this reform, due to its dependence on the CAP and its “intermediary region” nature.

More concretely, the modifications to the cereal sector in the region are:

Monthly increases: aiming to increase the intervention price by pillars during the campaign, these have been halved starting from the sales campaign of 2004/2005 (2004 Harvest). They fell from 0.93 Euros/t/month to 0.46 Euros/t/month. In the initial proposal of January 2003, monthly increases had been totally removed. A 5% reduction in the intervention price of cereals was also foreseen, partially composed by a 5% increase in direct payment (from 63 Euros/t to 66 Euros/t). This provision was completely abandoned.

As far as the single farm payment is concerned (decoupling) :

The creation of a single payment for farm income support, starting from 2005 on a historical basis (average surface areas, volumes and animals recorded in 2000-2001-2002 excluding any exceptional circumstances), decoupled (untied from the production volumes). A national threshold was established (France 8.055 billion Euros for 2007)

The decoupled payment will include the “1st pillar” payments, for cereals, oil seeds and pulses, durum wheat (after the reform), leguminous grains, starch potatoes (40% of the payment), textile plants, dehydrated forage …

The decoupled payment calculated for each farm will be divided into “payment rights”, in which there will be “eligible” hectares (used for crops benefiting from aid or forage areas used for animal pasture during the reference period). “Fallow land rights”, calculated according to the historical compulsory fallow lands under the CAP (10% of the average cereal and pulse and oil crops areas during the period 2000/2002) will be distinguished from the others, “decoupled payment rights”.

In February 2004, France chose to apply the 25% partial recoupling methods for cereals.

4. Hypothesis of the consequences of the 2003 reform on agriculture:

The CAP reform may lead to a reduction in certain regional crops, or on the contrary an increase for others. These swinging risks have been assessed basically through the contacts made in the affected sectors.

The consequences for large crops, a reduction in monthly cereal increases: a price pressure estimated at 2%.

The halving of the monthly increases has far from negligible effects. It means a 1.4% reduction in the average value of intervention prices, and leads to a “mechanical” reduction of 2.1% of the cost price of imported cereals, considering the cereal customs duties calculation methods described in the WTO Marrakech agreements of 1994.

[50] Source: “Les aides des premier et second piliers de la PAC et les résultats d’exploitations départementaux en France” - November 2004.

With no other changes in conditions, this provision should therefore lead to a downwards pressure on cereal prices in the EU[51]. As a result we must therefore estimate an average reduction of 2% in the price to the farmers.

This could therefore lead to the risk of abandoning production of large scale crops, a clear risk in fragile regions due more to sociological reasons than economic ones. The decoupled payments will not be subordinate to an obligation to produce; a simple plot of agricultural land, maintained in respect of “good agricultural and environmental practices” to be defined, should be sufficient to activate the payments. The farmers could therefore be tempted to stop production, particularly in more fragile regions where there is limited profitability in crop production.

As far as the macro-economic consequences of the 2003 reform are concerned, the sectoral modifications for large scale crops could be estimated at 23 million Euros of potential macro-economic losses for large scale crops (without modulation - lowest valorisation of cereals, losses in terms of durum wheat supplement and modification to the pulses supplement) in the Centre region, which is 16% of the French total.
It is mostly the lower valorisation of cereals (halving of the monthly increases) which is responsible for this loss, around 19 million Euros. The loss of the durum wheat supplement represents 4 million Euros.

- **Table 3-95 - macro-economic effects of the reform on large crops, in millions of euros:**

	Cher	E- et- L	Indre	I- et- L	L -et- C	Loiret	Region	France
Monthly increase	-2.7	-5.0	-2.3	-2.5	-2.7	-3.6	-18.7	-138
Durum wheat	-0.1	-1.1	-0.2	-0.2	-1.3	-1.1	-4.0	-7.0
Pulses	0	-0.2	0.1	0	-0.1	-0.1	-0.3	0
Total	-2.7	-6.3	-2.5	-2.7	-4.1	-4.7	-23.0	-145

Source: Report of the Economic Commission – May 2004: Hypothesis of the macro-economic consequences of the reform.

The consequences of the implementation of decoupled payments can be seen in the complexity of the decoupled payment management methods.
There may be a risk of a drop in the number of farms, and while in future these may lead to the acquisition of payment rights by young farmers, it would most certainly be halted by an increase in the cost of recovery.
The risk of litigation between land owners and farmers. The rights belong to the farm by regulation, and if these rights are not tied to the land (the rights change hands only when the land changes hands), the farmer could leave the farm taking his rights with him, creating a prejudice for the land (and thus the landowner) which would have to purchase rights from elsewhere in order to recover. The farming statute would be seriously affected in the event of certain rights management options being selected.

[51] Report of the Economic Commission – May 2004

3.5 *The soft wheat supply chain for bread and biscuit making in the United Kingdom*[52]

3.5.1 The structure and functioning of the wheat supply chain before the midterm review reforms

3.5.1.1 The general structure of the supply chain

Within the United Kingdom (UK), the major multiple food retailers (supermarkets) exercise much market dominance and therefore are able to exert considerable influence on how the food they sell is both sourced and presented to the public. The several recent food scares experienced in the UK such as BSE and outbreaks of salmonella poisoning and of foot and mouth disease, have provided further impetus to the philosophy of 'farm to fork' traceability of food. It can, therefore, be said with some justification that the primary aim of food supply chain management is to guarantee as far as it is possible to do so, the production of safe, healthy and wholesome products where the derivation, processing and presentation of those products can be traced through each step of the chain from the initial producer/farmer to the plate of the final consumer.

Bourlakis & Weightman (2004) state succinctly "Food supply chains operate in a complex, dynamic, time-critical environment where product integrity is vital… Food and its supply are significant parts of every national economy". The food supply chain extends, as we might anticipate, across a wide range of commercial activity from farming to food manufacturing, from wholesaling to retailing and from catering into the wider service sector. In their Strategy for Sustainable Farming and Food document, the Department for Environment, Food and Rural Affairs (DEFRA) (2002a) calculated the food and drink manufacturing sector to be the second largest sector in terms of output when compared to any other manufacturing sector, employed around 0.5m people and estimated that it added value (value of sales less cost of all inputs except salaries and wages) of some £19.9bn in 2002 (Table 3-96). Taken as a whole, the food chain is considered to employ some 12.5% of all UK workers and is estimated to comprise 8% of the UK economy. Farms in the UK are believed to supply around 75% of all the raw materials used within the country's food-manufacturing sector.

[52] The views and opinions expressed in this report are solely those of the authors. As such, they may not reflect those of the following bodies to whom they are grateful for permission to use both data and materials originally produced by them:

Allied Mills
Cereals Industry Forum,
Department for Environment, Food and Rural Affairs (DEFRA),
National Association of British & Irish Millers (NABIM)
Soil Association

- **Table 3-96 - The UK food supply chain: value added and employment**

	Value added		Employment (Number of employees)		Value added/employee	
	2002 (£bn)	1999 (£bn)	2002	1999	2002	1999
Retailers	17.0	12.5	1 110 000	947 000	15 454	13 199
Caterers	13.8	11.8	1 254 000	1 119 000	11 005	10 545
Wholesalers	5.5	4.6	192 000	220 000	28 645	20 909
Manufacturers	19.9	18.7	476 000	455 000	41 806	41 098
Farmers & producers	6.6	8.2	557 000	527 000	11 849	15 560

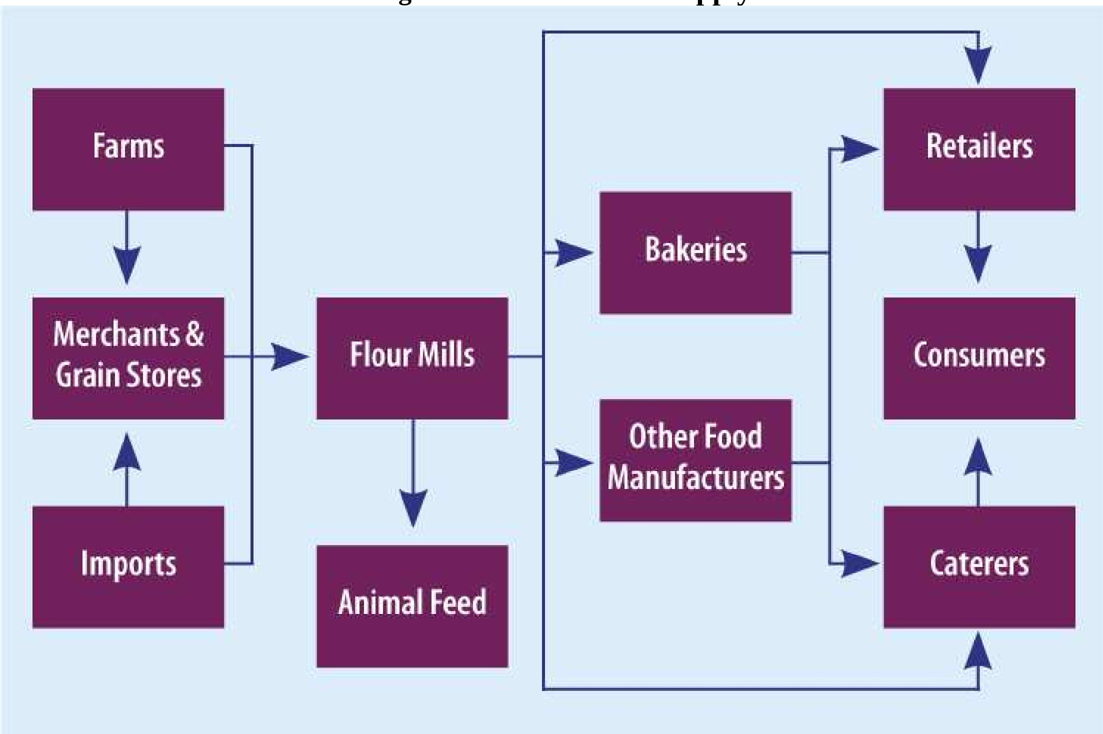
Source: Bourlakis & Weightman (2002).

The Common Agricultural Policy (CAP) prior to the Fischler mid-term reform process was largely restricted to a regime of subsidies that supported the production of certain basic commodities, for example, beef, sheep meat, wheat, barley and oilseeds. The Fischler reforms, agreed in June 2003 under Regulation 1782/2003 (EC, 2003), compelled Member States to effectively ‘de-couple’ future subsidy payments from production and instead, shift the basis of payment from volume of commodity produced to an ‘income support’ for farmers based on the area of land farmed (‘eligible hectares’). In addition, underlying the main thrust of the mid-term review reforms was to be the redirection of some of the payments previously made to farmers for the production of commodities toward increased spending on so-called Pillar II programmes, broadly the Rural Development budget, including the bolstering of national agri-environment schemes. As it has transpired, only Luxembourg and the UK have opted to fully de-couple production Pillar I subsidies.

DEFRA produce numerous informative statistics and surveys regarding agricultural activity throughout the UK. A small number of these statistics appear throughout this report in abridged or adapted form. Additionally, DEFRA have kindly provided a wheat supply chain diagram (Annex III.2), which they describe as a ‘work in progress’ and is reproduced here with that caveat in mind.
The Food Chain Centre (FCC), in conjunction with the Home Grown Cereals Authority (HGCA) has recently published a study of the soft wheat supply chain through their jointly commissioned body the Cereals Industry Forum (CIF). The study incorporates specific organisations within the supply chain by way of illustration and has also been published electronically (posted 18 October 2005) and is available to download from the CIF website (CIF, 2005). The objective of the CIF study was to investigate the supply chain from farmer to manufacturer, in this instance, a biscuit maker, identifying ‘failure to meet customers’ expectations’ of not providing ‘the right goods first time, on time, every time’. A major finding was that almost 50% of the grain delivered to the millers did not meet the quality specification or allocated delivery time, and was rejected. Such failures are costly in terms of increased wastage, increased transport costs and time spent on unnecessary tasks as well as leading to customer dissatisfaction (CIF, 2005). The study proved very useful in informing the present paper as also has information derived from the individual websites of several of the organisations included in the study. The Current State Map published by the CIF (2005) in their study is reproduced here as Annex III.4.

It would be helpful to include at this point, a simple supply chain diagram for soft wheat (Figure 3-19. See also Appendices 2 and 4 for further supply chain diagrams). Grain arrives at the flour mills from three sources: from merchants and grain stores (including farmer controlled businesses); from imports both from within the EU or from other countries such as the USA and Canada; or directly from the farmer/producer. Once the grain has been milled, the millers supply flour products to bakeries, other food manufacturers, the catering industry or to the retail market for home baking. Not all bread produced and sold in the UK uses whole grain flour, indeed most bread is baked from refined white flour. The morning goods market is worth almost £2.9bn with the equivalent of over 12 million loaves produced each day (Leland, 2006). The unused by-products of the milling process are returned to the supply chain and used as a component in animal feedstuffs.

- **Figure 3-19 - Soft wheat supply chain**



Source: National Association of British & Irish Millers (2005a & b).

3.5.1.2 The agricultural phase

Location and extent of production

Within the UK, we may make a very broad generalisation as regards farming activity, by saying that to the west and north of the country, mixed farming and livestock based systems generally prevail whereas to the south and east, arable systems generally predominate. There are, however, many exceptions to this broad generalisation. There is, for example, much arable cultivation in the west and north and no little livestock farming in the south and east, but generally we may accept this simple analogue as a broadly acceptable model of the whole.

Amongst the most important regions of the UK in area terms for arable cultivation and thus, cereals including soft wheat, are the two Government Office Regions (NUTS 1) in England of East Midlands and East of England (Figure 3-20). Geographically these regions comprise the counties of Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, Nottinghamshire (East Midlands) and Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk, Suffolk (East of England). Annex III.3 following provides a simple map of the Government Office Regions in the UK. Northern Ireland, Scotland and Wales are 'areas' for NUTS 1 purposes. Much of the following comment and statistics produced in this paper will focus on the East of England region unless stated otherwise. The following Tables 3-97, 3-98 and 3-99 seek to illustrate the predominance of wheat cultivation in the East of England GOR and to set its relative importance in that GOR within the context of the whole of England and the UK.

- **Table 3-97 - Land area cultivated to soft wheat in the East of England**

EAST OF ENGLAND				
	Area (‘000 ha)	Total tillage area (‘000 ha)	% of area to wheat	Number of tillage holdings
2004	512	1 040	49	10 677
2003	481	1 014	47	10 891
2002	528	1 048	50	10 980

Source: DEFRA (2002b, 2003b, 2004b)

- **Table 3-98 - Land area cultivated to soft wheat in whole of England**

ENGLAND				
	Area (‘000 ha)	Total tillage area (‘000 ha)	% of area to wheat	Number of tillage holdings
2004	1 865	3 933	47	58 539
2003	1 727	3 835	45	59 079
2002	1 876	3 922	48	60 019

Source: DEFRA (2002b, 2003b, 2004b)

- **Table 3-99 - Land area cultivated to soft wheat in whole of United Kingdom**

UNITED KINGDOM				
	Area (‘000 ha)	Total tillage area (‘000 ha)	% of area to wheat	Number of tillage holdings
2004	1 990	4 623	43	Data not available
2003	1 837	4 507	41	251 200
2002	1 996	4 605	43	246 500

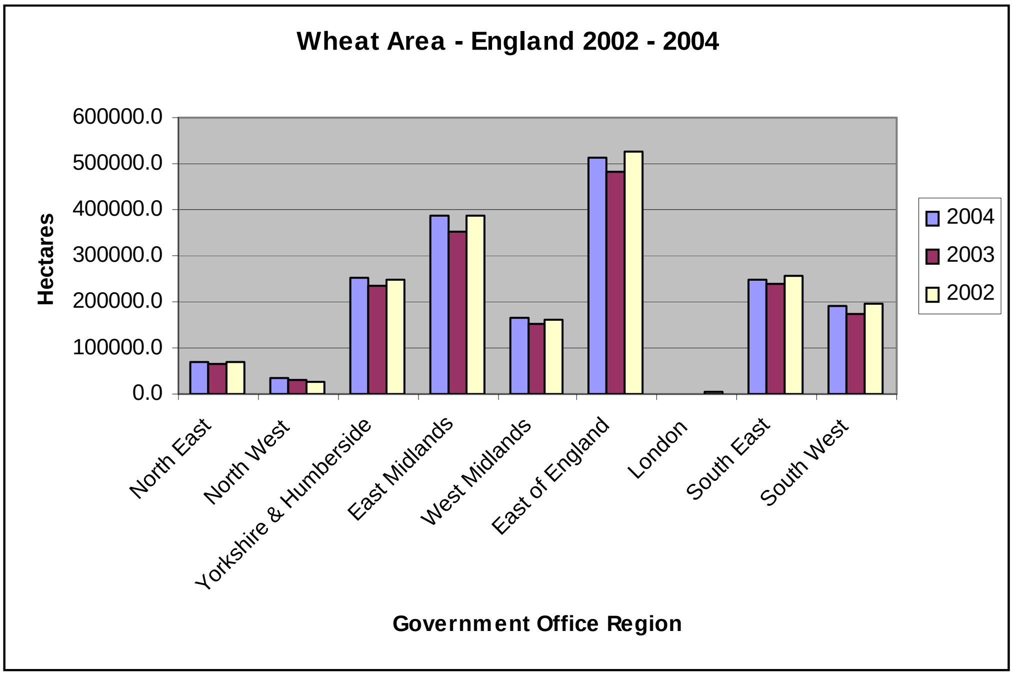
Source: DEFRA (2003a, 2005a)

As we might expect, at least in England, the number of holdings is decreasing year on year with the continuing process of rationalisation and restructuring of UK agriculture seen for much of the last century. However, as can been seen from Table 3-99, the total number of tillage holdings in the UK has risen to 251,200 as at 30 June 2003 from the 2002 figure of 246,500. Data for the year ended 30 June 2004, has not yet been published. We should keep in mind that the DEFRA statistic includes tillage and grassland area in the same figure. We understand from DEFRA, that the increase is as the result of changes in the way in which data on the number of holdings in the UK, is collected and analysed by them. For this purpose, DEFRA collates data for the whole of the UK. We understand that DEFRA is presently working to improve the accuracy of the data on its database as regards holding numbers and also that it is now allocating a holding number to all those smallholders who might keep only a very small number of animals. The rationale for these changes, is to increase the ‘traceability’ of livestock and livestock owners in case of need in the event of a future large-scale animal disease outbreak. Many of the holdings in question fall into the ‘very small’ category being under 8 European Standard Units in area. The European Size Unit (ESU) is a measure of ‘financial potential of the holding in terms of the margins which might be expected from crops and livestock. The threshold of 8 ESU is judged to be the minimum for full-time holdings’ (DEFRA, 2005a). Of the 304,800 total holdings in the UK as at 30 June 2003, 191,900 (63%) were less than 8 ESU in size (DEFRA, 2005a).

Figure 3-20 emphasises the preponderance of arable cropping in the east of England with the GORs of East of England and East Midlands having the largest areas devoted to wheat in the country followed by the South

East and Yorkshire and Humberside GORs, which are also geographically, eastern areas. We should note, however, that the English GORs are not homogenous and do not contain the same land area either in total area within the regional boundary or, perhaps of particular importance in the present context, in the area devoted to agriculture, although in general terms, we may assume these four regions to be broadly similar in overall area. Figure 3-20 does, however, with the foregoing caveat in mind, present a real picture of the greater part of English wheat cultivation taking part in the drier and warmer eastern regions of the country and less cultivation in the milder, more moist western and northern regions. In addition, the eastern regions of the whole of the UK tend to be less hilly and flatter, thus being more amenable to the use of large scale agricultural machines and operations, whereas the north and west of the UK tends to be hillier. All major hill country in the UK tends to lie in the west and north.

- **Figure 3-20 - Area planted to wheat in England by GOR 2002 - 2004**



Source: DEFRA (2002b, 2003b, 2005b).

Agriculture in the UK 2004 (DEFRA, 2005a) reports the total area of agricultural land in the UK to be 18.4m hectares, which approximates to 77% of the total land area (Table 3-100). The area utilised for production of crops including wheat, amounts to about 25% of the total area of agricultural land at 4.6m ha. Most of the rest of the land has either been grassland for more than 5 years (33%), grassland for less than 5 years (7%) and sole right rough grazing (25%) the balance being set-aside (3%) and ‘all other land’ (5%). The area cultivated to wheat at approximately 44% of the cropped area (3.1m ha of 4.6m ha in 2004), constitutes a significant proportion of the total. Other important arable crops such as barley, oilseed rape, sugar beet and potatoes take up approximately 22%, 11%, 3% and a further 3% respectively of the UK total cropped area. Peas and beans at 5% with horticulture (4%) make up much of the remaining area with all other arable crops taken together, including cereals such as oats, rye, triticale and durum plus fibre crops like linseed, at around 11% of the total cropped area, complete the distribution of the crops and cropped area of the UK (DEFRA, 2005a).

- **Table 3-100 - Total UK crop areas ('000 ha)**

		2004	2003	2002
Cereals:		3133	3059	3245
of which	wheat	1990	1837	1996
	barley	1010	1078	1101
Other arable crops:		1129	1092	993
of which	oilseed rape	498	460	357
Potatoes		149	145	158
Horticulture		175	176	176
Total		4 593	4 478	4 573
Total all land area in agricultural holdings		17 200	17 230	17 271
Common rough grazing (estimated)		1 237	1 236	1 234

Source: DEFRA (2005a).

Volume and value of production

The area committed to wheat cultivation on an annual basis varies, as it is influenced by present market price for the commodity, the short-term views of farmers whether optimistic or otherwise, the various market/price/supply predications published by bodies such as the Home Grown Cereals Authority (HGCA) and lastly but perhaps rather often, by the weather conditions prevailing both at the time of seed-bed preparation but also to some extent, by those of the previous harvest-time. If we take as an example from Table 3-100, the area cultivated in 2002 and assign an index figure of 100 to that year, we can see that in 2003 about 92% of the area used in the previous year was cultivated, whereas in 2004, a very similar area to 2002 was used, but by 2005, the area had fallen again to less than 94%. If we then consider the market prices for both milling wheat and feed wheat over that period, we can see, for example, that the area cultivated in 2004 and the volume of harvested production in that year, can arguably be considered to be the product of the previous year average price for milling wheat, which reveals an increase of 17% on the previous year (2002).

If we extend the index number methodology further and examine the percentage of volume of harvested production that milling wheat constitutes (2002 = 100), we see that in 2003, the percentage was 89%, in 2004, 97% and in 2005, 93%. In other words, the percentage of the UK harvest that is of milling wheat quality remains high despite other external factors such as weather and market price. In fact, the actual volume of milling wheat remains essentially constant year on year, varying in a narrow range from a low of 5,576,000t in 2004 to a high of 5,616,000t in 2002. The proportion of feed wheat also remains fairly constant year on year varying in a range (2002 = 100) from 100 (2002) to 105.4 (2005). As a proportion of total volume of harvested production, milling wheat comprises around 35% - 39% during the period reviewed here and feed wheat around 41% - 47%.

We may generalise that the UK imports some milling quality wheat from the EU and from North America and exports feed wheat, although the overall trading account is not large (Table 3-108). The proportion of the volume of harvested production varies from year to year in response to the factors previously noted, i.e., weather, which

Table 3-101 - UK wheat production

	2005 (provisional)	2004	2003	2002
Area ('000 ha)	1 869	1 990	1 837	1 996
Yield (t/ha)	8.0	7.8	7.8	8.0
Volume of harvested production ('000 t)	14 877	15 473	14 288	15 973
Value of production at market prices (£m)1	979	1 211	1 089	1 033
Prices: (£/t) Milling wheat	73	86	83	71
Feed wheat	66	76	75	63
Volume used for: ('000 t)2 Milling	5 612	5 576	5 592	5 616
Feed	6 830	6 633	6 712	6 478

1 Excludes subsidies and taxes 2 Includes imported and exported wheat Source: DEFRA (2005a)

affects quality and grain nitrogen content and market prices. From the data presented here (Table 3-101) we can conclude that as much as 20% of UK total volume production may be exported in a good harvest year.

Farm Incomes

DEFRA publish data annually on average farm incomes by agricultural sector. Data extracted from the most recent edition of Agriculture in the United Kingdom 2004 (DEFRA, 2005a) is included here as Table 3-102. It should be noted that there is no published data for Northern Ireland or Wales as regards cereal farming, as this farm type is effectively not present in those countries. A farming system totally committed to cereal production may be a simple system to manage and maintain but, economically speaking, it is not a diversified one. A strength of a mixed farming system could be argued to be that should the market price of one produced commodity fall, say beef meat prices, another may be stable or increasing and thus there is an element of cross-subsidisation. A cereal producing farmer concentrating in the main on one commodity, say wheat, really has limited choices available to him should market prices of the commodity fall and/or his input prices, say nitrogen fertiliser or chemical sprays, increase. He may grow more barley or oilseed rape but similar market forces may also be in play on those commodities influencing the final price received. Table 3-102 evidences the volatility of cereal production in terms of farm income year on year. The figures also reveal the very low or even negative farm income returns in Scotland for three years out of the four.

Table 3-102 - Net farm income by country for Cereals farm type

	2004/5 (Provisional) £	2003/4 £	2002/3 £	2001/21 £
United Kingdom	14 500	35 500	11 000	5 000
England	17 500	38 700	13 200	5 900
Scotland	(4 000)	17 300	500	1 100

1Excluding farms subjected to Foot and Mouth Disease cull
Source: DEFRA (2005a)

Employment

The aggregate numbers of workers including farmers and managers both full-time and part-time continues to fall in parallel with the advancing rationalisation and restructuring of British agriculture. The following data Tables 3-103 and 3-104 for numbers employed in the East of England and in the whole of England for the period 2002 – 2004 have been extracted from DEFRA statistics. They tell their own tale and little further explanation seems necessary.

- **Table 3-103 - Employment figures for East of England GOR 2002 – 2004**

		2002	2003	2004
Farmers	Full-time	11 593	11 094	10 673
	Part-time	14 885	14 637	15 538
Managers	Full-time	1 994	1 866	2 145
	Part-time	693	603	1 092
Males	Full-time	9 767	8 735	8 221
	Part-time	1 811	1 715	1 951
Females	Full-time	1 654	1 379	1 319
	Part-time	2 766	2 359	2 286
Casuals		7 681	7 028	7 938
Total		52 748	49 110	51 219
Holdings		17 832	16 987	17 104

- **Table 3-104 - Employment figures for whole of England 2002 – 2004**

		2002	2003	2004
Farmers	Full-time	103 782	100 468	98 154
	Part-time	121 739	118655	126 295
Managers	Full-time	9 267	8 877	10 209
	Part-time	2 893	2 685	4 635
Males	Full-time	49 025	44 635	42 626
	Part-time	13 773	12 843	14 574
Females	Full-time	9 641	8 001	7 799
	Part-time	14 941	13 320	13 749
Casuals		46 954	44 933	49 511
Total		371 824	354 381	367 585
Holdings		146 268	137 992	137 733

Source: DEFRA (2004b)

Subsidies

The East of England Development Agency and Andersons (2003) stated that, 'The East of England receives 25% of the UK arable CAP receipts and 4% of livestock receipts'. These simple statistics underline the previous comment regarding the predominant type of farming activity occurring in the East of England GOR. From within the nine GORs in England, it can be clearly seen that arable farming is an important agricultural activity in the East of England. Table 3-105 below, extracted and adapted from the EEDA/Andersons (2003) report, provides monetary values for estimated CAP receipts for the East of England GOR and for England in aggregate for 2001.

They further note that, 'The majority (85%) of payments in England in 2001 were for production-linked payments (1st Pillar) – a total of £1.2bn. The six counties in the East of England area received £224m (19%)'. By way of contrast, 'Rural Development measures (2nd Pillar) [Agri-environmental schemes, Project Based Schemes and Hill Farming Allowances, although none of the latter are paid to farmers in the East of England GOR] make up the remaining £208m for England, of which £17m (8%) is attached to the East of England' (EEDA/Andersons, 2003).

- **Table 3-105 - Estimated CAP receipts for East of England GOR and England 2001**

	East of England (£M)	England (£M)	East of England (%)
Arable	210	848	25
Livestock	14	356	4
Total	224	1204	19

Source: EEDA/Andersons (2003).

Bread wheat varieties
NABIM (2005b) report that the significant majority of wheat milled by their members and thus within the UK, is home produced by the home market (in excess of 80% from at least 1995/96 to date) and they believe that, in part, this result can be ascribed to British farmers increasingly growing appropriate wheat varieties. Some corroborative evidence for this belief can be gained from Nix (2004) who states that, 'The proportion of the UK wheat area sown with milling varieties has risen from a fifth several years ago to approximately a third (grade 1 and 2 varieties combined) for recent harvests'. NABIM (2005a) lists individual wheat varieties by 'group' (Nix favours 'grade' as nomenclature) according to their potential protein yield and Hagberg number. The NABIM (2005a) schedule of varieties and their suitability or otherwise for bread and biscuit making, is included as Annex III.1.

Organic production
The organic sector overall continues to grow year on year with total sales of organic produce by value reaching £1.119bn in 2003/2004, up from £1.015bn in the previous year (Soil Association, 2004). At April 2004, there were 3,995 holdings registered as either organic or of in-conversion status, 1.3% of all agricultural holdings in the UK. By far the largest segment of the total of UK organic land is grassland, some 90% of the total area of 560,874 hectares in 2003/2004 (Soil Association, 2004).

It can be seen from Table 3-106 that the amount of land committed to arable production, including wheat, is increasing year on year but is still not significant in national terms at 48,494 ha at April 2004, a 9% increase on the previous year and about 8% of all

- Table 3-106 - Fully organic farmed area by enterprise April 2002 – April 2004

	2002	2003	2004	% total agricultural land2
Arable1	26 400	44 413	48 494	1.0
of which: wheat	6 850	14 394	16 027	-
Grassland	424 266	469 499	560 874	5.0
Other sectors	7 934	20 355	20 931	-
UK Total	458 600	534 267	630 299	3.7

1Arable includes cereals, set-aside and field peas & beans for fodder
2 Fully organic land, excluding land in-conversion, as a proportion of the total UK agricultural land for each enterprise type
Source: Soil Association (2004)

organic land. Of this figure, 16,027 ha was cultivated to wheat as at April 2004 (Soil Association, 2004). Assuming the total area of agricultural land in the UK to be 18.4m hectares (DEFRA, 2005a), the organic area committed to all arable equates to
0.26% of UK agricultural land and that organic land used for wheat production in 2003/4 to 0.09%. Organic wheat yields in the UK on average, can be estimated to be in the region of 3-4 t/ha (Lampkin et al, 2004), which should be compared to the average UK yield obtained from conventionally grown crops of around 7-8 t/ha, as previously noted in Table 3-101 (DEFRA, 2005a).

3.5.1.3 The farm trading phase

Traditionally, farmers would have either pre-sold their grain harvest to millers or feed merchants directly ('growing to order') or cultivated a crop speculatively in the belief (or hope) of finding a willing buyer for any surplus at harvest-time. In such cases, the farmer would have to suffer the costs and effort of on-farm grain storage themselves. While some farmers still market their grain in this way, in modern times, perhaps some organic growers may follow this course, it can be seen that the financial risk of non-sale of produce where over-reliance has inadvertently perhaps been placed on finding a willing buyer or merchant, coupled with the risk of grain spoiling for want of appropriate storage conditions, can be a financially onerous one. These types of risk have lead to the development of off-farm storage and marketing facilities to which additional services, such as the financial factoring of produce and thereby producing an income stream, albeit a discounted one from 'real' market values and the cleaning of grain to exclude material such as leaf and twigs, which might otherwise contaminate the load and reduce the price paid (CIF, 2005), are often added.

While there is a financial cost to the farmer for the provision of this type of service, the off-farm stores are often owned by a local farmer co-operative, a so-called farmer controlled business (FCB). FCBs may or may not be incorporated as a private company, but whether unincorporated or a company, the members may expect to share in any profits made. More especially, however, they gain the benefits of not needing to invest in costly crop storage and grain protection measures themselves, the grain being stored in purpose built facilities with the responsibility for its supervision being effectively passed to the expert store management team. In the instance of the food chain analysis study previously mentioned (CIF, 2005), the off-farm storage facilities were provided by a farmer owned company, Fengrain Limited, based in Wimblington, Cambridgeshire. This limited company, founded in 1972 (Fengrain, 2005), is typical of similar organisations based throughout the UK in those regions and areas where cereal and other arable production is a significant farming activity.

To quote from their website, Fengrain Ltd (2005) is "managed by a professional management and marketing team", experienced in both grain storage and grain marketing, offering those services to both members and non-members. Grain is delivered to store after harvesting thus minimising the need for costly on-farm storage and is on-delivered in due course to the next stage in the supply chain, usually millers or feed grain merchants, depending on the quality of the grain held in store, market demand and market prices. The company are thus responsible for securing the onward sale of the farmers' grain either fulfilling existing forward contracts or selling into the spot market as circumstances direct. Fengrain (2005) report (on their website) that they market, 'over 800,000 tonnes of combinable crops annually on behalf of over 1,500 farmers in Eastern England and the Midlands'. In addition, they have storage capacity at their Wimblington and Linton sites sufficient to store '200,000 tonnes of combinable crops' at any one time.

Roberts (2006) states succinctly that, 'While the UK [author's italics] stands out in Europe for having large efficient farms, it also stands out for having a very small and fragmented FCB sector'. He goes on to state that the, 'Total FCB output in England [author's italics] at some £3.5 - £4.0bn, is equivalent to 30-35% of gross agricultural output of around £11.5bn' whereas, in comparison, the FCB output in Sweden and Denmark is approximately double that of their agricultural industries. The Plunkett Foundation note 'that there are currently 563 FCBs in the UK, employing some 3,600 staff with a combined membership of 241,000 producers'. It is noted that turnover amounted to £5.4bn in 1999 mostly on account of marketing members' produce (Plunkett Foundation, 2006).

We might reasonably assume that these comparisons provide a measure of the value that can be added to farm products by an FCB in the effective marketing, processing and delivery of services. As Roberts (2006) states, 'The UK farming industry is part of a supply chain leading to a huge and growing market' an opportunity for those willing and able to take it because if not, perhaps 'someone else will'. It can be seen that FCBs within the UK have some distance to travel before they can favourably compare their size and performance with that of their Scandinavian neighbours.

The building of strong and effective FCBs can be seen, therefore, to be of significant benefit to farmers in two major respects. First, it would arguably provide a greater degree of control to farmers within the supply chain, farmers and farming at the farm scale being a highly fragmented segment of the chain particularly when compared to the few large, effective numbers of millers/processors, manufacturers/bakers and retailers. Second, FCBs can capture some of the financial benefits of added value, which would be passed back to members either in the form of lower costs or dividends or perhaps, both.

Organic milling wheat commands a large premium over conventionally produced wheat, perhaps as much as 143% (Jones et al, 2003) with prices as high as £165/t (Lampkin et al., 2004) making production profitable for many organic growers. However, much of the total volume of UK production is either retained on-farm for livestock feed or sold as feed to other local organic farmers. Organic producers essentially use two main outlets for their wheat with 56% of producers (52% in total sales value) selling to a grain merchant and 38% of producers (26% of sales) selling directly to other livestock farms (Jones et al, 2003). A primary element of organic farming systems for most organic producers, is the operation of a mixed type of system and as such, the retention of home-produced grain for livestock feed, is a major and vital segment of the farm system.

3.5.1.4 The first processing phase (milling)

The UK is considered to be virtually "self-sufficient in flour and operates a small positive trade balance" (NABIM, 2005b). A spate of bankruptcies in the late 1980s and early 1990s amongst organisations in the agricultural supply industries such as grain and seed merchanting businesses, lead to significant economic rationalisation according to Montague (2000), who provides a useful and concise history of the growth and development of the agricultural merchants' business.

Essentially, the causes of the boom and bust cycle of business development and retrenchment, can be explained by the causal effects of, say, successive UK government and EU economic intervention attempting to provide the necessary economic stimulus and environment to produce a secure, healthy and wholesome supply of food for its electorate while continuing to provide employment in rural areas and in the related agricultural industries generally. The squeezing of profit margins, insufficient investment by companies with limited capital resource base, together with a succession of see-sawing, often high, interest rates and what can arguably be seen to be the 'complications' introduced to the sector as a result of the varying application and interpretation of the CAP, had all contributed to the fluctuating fortunes of those businesses engaged in the agricultural service and supply industry.

The milling industry has proved to be no exception to the boom and bust cycle. By the early 1990s, 75% of all flour production in the UK was concentrated in the hands of just three milling businesses, Spillers, Rank Hovis and Associated British Foods (ABF). In addition to that market concentration, around 50% of compound animal feeds were produced by four manufacturers, BOCM Pauls, Dalgety, ABF and Bibby. Montague (2000) notes that, "By 1990, ABF was the country's largest flour miller accounting for 28 per cent of wheat processing and 15 per cent of cereal exports".

According to NABIM (2005b) figures, there are presently 31 milling companies in the UK operating from 67 mills. Of these companies, two millers produce around half of UK flour production with a further 20 companies producing a significant amount of the remainder. NABIM (2005b) points out that the structure of the UK milling industry stands in stark contrast to, say, the industry in France, which produces a similar volume of flour, around 4.5 million tonnes, from about 520 mills. It ought however, perhaps, to be remembered at this point, that although France and the UK produce similar quantities of flour and have similar sized populations, around 60 million, that there is a significant difference in the respective geographic size and population distributions of the two countries and that therefore we might expect to see different logistical constraints on the milling industries within the UK and France. It should also be noted that the number of millers in the UK has declined from around 150 in 1950 to the present figure of 31 (NABIM, 2005b), the reduction being largely the result of competitive pressures within the sector leading to rationalisation. Table 3-107 below, extracted from data published by NABIM (2005b), is a comparison of the flour production volumes of seven EU Member States.

- **Table 3-107 - Flour production data from seven EU Member States for 2004**

Country	Number of mills	Flour production (tonnes)	Average production per mill (tonnes)	Estimated total output of 'larger' mills (%)
France	523	4 419 863	8 451	48
Germany	348	5 200 869	14 945	89
Italy	332	4 490 000	13 524	69
Netherlands	29	1 130 300	38 976	90
Poland	700	2 700 000	3 857	43
Spain	219	2 600 000	11 872	81
United Kingdom	67	4 387 000	65 478	88

Source: NABIM (2005a).

The UK milling industry consumes around 4.7 million tonnes of home grown soft wheat each year. Not surprisingly perhaps, for a largely self-contained, self-sourcing domestic market, NABIM (2005a) is anxious to see similar volumes of home-grown wheat continuing to be supplied to its members by British farmers despite the market adjustments that the Fischler/MTR CAP reforms might imply. It may, however, be that this aspiration may not be practically achievable, should the price of home-grown wheat not remain competitive with potential supplies either from other EU Member States or from non-EU producers such as, perhaps, Canada, USA and Ukraine.

Figures from NABIM (2005b), inform us that the percentage of home grown wheat used by its members has increased from 62% in crop year 1985/86 to an estimated 84% in 2004/05 while the proportion of wheat milled in the UK that is not home grown but produced in other EU Member States, has fallen from 21% to 8.3%. In addition, the volume of imported wheat from non-EU producers has fallen from 17% to 7% over the same period (Table 3-108). Montague (2000) provides a similar figure stating that 'by 1996 millers were using 86% of home-grown wheat in the grist for bread making'.

It is considered that at least some of the increase in usage of home grown wheat is because of farmer willingness to grow suitable improved varieties (see Annex III.1), especially those varieties most suited to bread-making, although NABIM (2005b) also report that, 'This performance is now under threat as the proportion of good quality bread wheat varieties has declined sharply in the last two years'.

- **Table 3-108 - UK millers' wheat usage**

Crop Year	Home grown	EU	Other Countries	Total	Total UK harvest
1985/86	2998 (62%)	1016 (21%)	820 (17%)	4834	12050
1995/96	4640 (86%)	456 (9%)	291 (5%)	5387	14310
2001/02	4657 (83%)	418 (7%)	557 (10%)	5631	11540
2002/03	4751 (84%)	365 (7%)	507 (9%)	5623	16006
2003/04	4760 (86%)	347 (6%)	457 (8%)	5564	14288
2004/05e	4728 (84.4%)	465 (8.3%)	409 (7.3%)	5602	15473

Source: NABIM (2005b).

Considering again the CIF (2005) study, we note that the miller included in the analysis was Heygates. From information extracted from the company history section of their website (Heygates, 2005), Heygates consider themselves to be the largest independent milling company in the UK. The Heygate family have been involved in milling from the eighteenth century and, presently, the company employs over 800 staff working in six mills on three separate sites in Bugbrooke, Northamptonshire, Downham Market, Norfolk and Tring, Hertfordshire. The six mills, each producing different products, mill about 350,000 tonnes of wheat each year and produce approximately 5000 tonnes of flour each week. Table 3-109 below details flour production for the whole of the UK milling industry for the period 2001/2 to 2004/5, using data provided by NABIM (2005b)

- **Table 3-109 - Flour production 2001/2 to 2004/5**

Crop year	2001/2 ('000 tonnes)	2002/3 ('000 tonnes)	2003/4 ('000 tonnes)	2004/5 (est.) ('000 tonnes)
Flour production	4438	4397	4387	4465
Use	%	%	%	%
Bread White	53.5	53.9	54.8	53.1
Brown	3	2.9	3	3.2
Wholemeal	4.9	4.7	4.2	4.6
Biscuit	12.2	12.7	12.3	13.2
Cake	1.7	1.5	1.3	1.5
Pre-packed	3.1	2.2	2.1	2.1
Food ingredients	11	11.3	4.6	4.8
Starch	5	4.7	11.1	10.9
Other	5.6	6	6.7	6.5

Source: NABIM (2005b).

The CIF (2005) study identified two significant problems in terms of the efficient working of the supply chain of particular relevance at this point. First, Heygates needed to order as much as 25% more grain for milling from its suppliers (including Fengrain Ltd but not exclusively from that single supplier) because of difficulties experienced in deliveries not being made on time, or of lower than acceptable quality, 'no-shows' or rejections of numerous kinds. It was acknowledged by all parties within the survey that as transport costs along the chain form a significant proportion of final product cost, and it must be assumed, a significant risk to profitability overall, that rejected deliveries and other avoidable transport movements, should be reduced as far as possible if not, ideally, totally eliminated. It was estimated that as much as 15% of delivery errors were as a result of rejected loads. This sum equates to 6% of total deliveries and was calculated to cost £15,000 a year in this study case example. It should be noted that measurements had been made that specifically identified, 'Fengrain's delivery performance [to be] above the average for Heygates' suppliers but [that] errors still arose' (CIF, 2005).

Second, it was identified that 'less than 10% of wheat [delivered] is stored in Fengrain's central store (55,000 tonnes) and 550,000 tonnes stored on the farm. There is a similar pattern across the whole industry where less than 15% of cereals are located in central stores' (CIF, 2005). There is a clear and unequivocal implication in this statement in that it is acknowledged that much milling wheat is held on-farm rather than in intermediate grain stores such as those managed by Fengrain. Of itself, this requires the transport of grain from farm to mill rather than from store to mill, a situation that might add to rejected loads as a result of, for example, deliveries not being made within a prescribed 'delivery window' or extra costs being incurred because of 'extra sievables' such as pieces of straw or leaf (CIF, 2005). The implication is that such rejections might not have arisen if the grain had been managed and marketed by a professional intermediate holding organisation. Rejections occurred however in deliveries to mill from both stores and direct from farmers.

Montague (2000) has much to report on the rationalisation that has taken place in the milling industry and in the supply chain generally, in the final decade of the 20th century. She documents the growth and development of the agricultural industry in the UK over the 200 years up to the end of the millennium. In connection with previous comments in this paper regarding the largely self-sufficient nature of the milling industry in its use of home-grown wheat, she notes that 'Flour millers announced that by 2000 they would only buy grain grown under farm-quality assurance schemes, which imposed strict controls on use of fertilisers, pesticides, harvesting, storage and transport'. The UK Agricultural Supply Trade Association has now merged with the Fertiliser Manufacturers Association and several other crop protection distributors to form the Agricultural Industries Confederation (AIC) and has 'launched a code of practice for road haulage that was designed to take supervision of crops to the next stage between the farm gate and point of processing'.

While such types of policy ostensibly seek to improve standards within an industry, it could also be argued that there is a degree of economic protectionism for home-growers who choose to subscribe to farm assurance schemes, although no doubt many farmers might counter argue that membership of such schemes is critical to them in order to maintain the marketability of their product.

3.5.1.5 The second processing phase (bread and biscuit making)

In the CIF (2005) wheat supply chain study, the role of processor is assumed by United Biscuits (UB). UB (2005) holds around 26% of the UK market and considers itself to be three times the size of the second largest biscuit manufacturer in the UK. The Company was formed in 1934 following the merger of two Scottish family businesses, McVitie & Price and MacFarlane Lang. Since that date, UB has grown both through internal growth and by take-over of, or amalgamation with, other competitor businesses.

The published business results for UB for their 2004 financial year-end reveal business profit of £164m on turnover of £1.2bn with 36% of group business profit being generated from non-UK operations. UB operates from three business sites in England (Hayes in Middlesex, Liverpool and High Wycombe, Buckinghamshire) with biscuit manufacturing plant both in England at Harlesden (Middlesex), Manchester, Carlisle, Halifax and in Scotland (Glasgow). In addition to its UK operations, UB has extensive business interests within the EU with sites in Belgium, France, Holland, Portugal and Spain.

The CIF (2005) study highlighted an occasional problem of communications breakdown between UB and the millers included in the study, Heygates. The study noted that UB has restricted capacity for silo storage of flour at its processing sites. Problems have arisen when the dial-up computer advice system linking UB and Heygates was unavailable and the silo management team at UB also could not otherwise be contacted by telephone. In such circumstances, Heygates had sent deliveries to UB only for them to be rejected at the processing site, as silos were already full with no additional capacity to accept further supplies.

Such breakdowns in logistical planning can clearly have significant cost implications for both miller and processor. The study reports that 1.5% of deliveries made by Heygates to UB were rejected because of full flour silos. The timing of deliveries to UB from Heygates (and from other flour suppliers to UB) is critical as UB operates what might be described as a ‘just in time’ policy where it holds only one days flour usage as a buffer stock. While this is arguably good management practice in that capital invested in stock is kept to a minimum, the policy needs close control and precise supervision to work well in practice and to ensure that the manufacturing process, likely to be near to or actually, a 24/7 production line, cannot afford to be halted for any prolonged length of time owing to shortage of raw material.

3.5.1.6 The functioning of the supply chain

The CIF (2005) analysis developed an action plan to identify pinch-points in the supply chain studied and this may be used as a reasonable basis for comment on the soft wheat supply chain as a whole assuming that we accept the study and its participant organisation as representative of the whole industry.

The seven key features of the CIF (2005) action plan were, in brief:
Reduce the number of rejected deliveries to a minimum, especially those made to the miller.
Improve transport movement efficiency through better planning.
Improve information flow throughout the chain (‘farm-to-fork’).
Inform farmers more effectively regarding grain testing arrangements.
Reduce any duplication occurring in the testing and inspection regime.
Rationalise stock holding points.
Improve processing efficiency wherever failure located.

The CIF (2005) study concluded that the total lead-time from farm to the end of the manufacturing process was 532 hours and involved 62 individual steps. Of this time, only 62 minutes, under 0.2% of total time, was spent adding value to the product. This lead-time figure did not include the average six month period grain spent in storage facilities. As the study correctly noted, there would appear to be plenty of scope for speeding up the supply chain and improving the flow of the 'evolving' product throughout the total process.

While there are a large number of farmer/producers of milling wheat, many of these are located in a relatively small geographical area of the UK; they tend to be located in areas suitable for growing the crop. The UK is a small country in terms of geographical area overall. At the other end of the supply chain, there are a relatively small number of very large retailers, food manufacturers and milling companies. It would appear feasible therefore that an expansion of the storage intermediate segment of the supply chain with increased overall storage (and marketing) capacity, may provide opportunities for a significant stream-lining and speeding-up of the supply chain. To some extent this may already be happening further down the chain with the average area of the typical cereal/arable farm gradually increasing in a bid to achieve economies of scale.

3.5.2 The enforcement of the mid-term review reforms in the wheat supply chain

3.5.2.1 The Mid-Term Review of 2003 and the UK: the implementation of the Fischler Reforms

The CAP of the EU has, from its inception, been a policy of product price support by use of various economic devices, such as export subsidies, guaranteed minimum prices, headage payments for livestock, etc. The MacSharry Reforms of 1992, instigated by the EU under pressure from other trading nations and the General Agreement on Tariffs and Trade (subsequently, the World Trade Organisation), began to dismantle the overt price support mechanisms (the former protectionist' regime), replacing them with less trade distorting measures ('green box payments') such as a rural development programme. In England, these measures subsequently evolved into the England Rural Development Programme (ERDP).

Under the MacSharry 1992 reforms, cereal support prices were to be cut by around 30% over three years. By way of compensation, flat rate payments/hectare for all cereals based on average yields were to be made provided a new set-aside scheme was adhered to by all farmers claiming payments on areas under cultivation exceeding 16 hectares. At the same time, intervention support would only be available for wheat of bread making quality. The set-aside scheme requirement was for 15% of land on which area payments to be claimed were sought, the payment being £208/ha. The intervention price was to fall from £117/tonne in 1992/3 to £80/t by 1995/6 with area payments commencing at £115/ha in 1993/4 rising to £208/ha in 1995/6 (Nix, 1993).

Following integration of the MacSharry reforms in the early 1990s, subsequent reform of the CAP occurred with the adoption of the Agenda 2000 reforms, which were 'finally agreed in March 1999' (Nix, 2001). As regards arable crops, including soft wheat, the Agenda 2000 reforms reduced the cereals intervention price of €119.9/tonne by 15% in two stages as from 1 July 2000 and 1 July 2001. At the same time, area payments for all cereals were to rise from the then present €54.34/t to €58.67 in 2000 and €63 from 2001 onwards (Nix, 2001). The calculation of area payments was made by multiplying 'prescribed regional yields/ha by payment rates expressed in €/t' (Nix, 2001). Nix considered that the prescribed regional yields were unlikely to change during 2001 despite their being 'under review' at the time of the publication of the 2001 Pocketbook (Table 3-110).

- **Table 3-110 - Regional cereal yields 2001 (tonnes/hectare)**

England	Scotland (non LFA)	Scotland (LFA)	Wales (non LFA)	Wales (LFA)	Northern Ireland (non LFA)	Northern Ireland
5.89	5.67	5.21	5.17	5.05	5.22	5.03

Source: Nix (2001).

3.5.2.2 Rural Development issues

The England Rural Development Programme (ERDP) has two elements, divided between land-based programmes such as the agri-environmental schemes (e.g., Countryside Stewardship, Environmentally Sensitive Areas and Organic Farming Scheme) and project-based programmes such as the Vocational Training Scheme. Similar programmes were put in place in each of Wales, Scotland and Northern Ireland. The present ERDP comes to an end at the end of 2006 and the agri-environment schemes are now closed for new entrants but are being replaced by a new scheme known as the Environmental Stewardship Scheme.

The transfer of funding from direct agricultural support payments in the 'blue box' to rural development programmes, which were placed in the so-called 'green box', whilst welcomed by the WTO and others as far as those rearrangements went, have been considered by the WTO and others such as the Cairns Group, to be of insufficient monetary volume or significance to effectively close the issue of 'trade distorting agricultural policy'. The EU has continued to be pressured both from outside and increasingly from within Member States (MS), to extend the process of 'greening' the CAP and, in parallel, to continue to dismantle any and all remaining trade distorting aid support provided to farmers (Agra Europe, 2006).

3.5.2.3 The Fischler Reforms

The Fischler Reforms of 2003 were published in Council Regulation 1782/2003 (EC, 2003) and, amongst other things, established 'an income support for farmers (hereinafter referred to as 'the single payment scheme' (Article 1). (All following references to 'Articles' should be read as deriving from Reg 1782/2003 (EC, 2003) unless otherwise stated). Under the Regulation, Member States would be required to adopt a regime of 'decoupled' income support to farmers who would no longer receive subsidies for the production of certain specified 'supported' crops. In future, the 'single farm payment' (SFP) payable to farmers, would be based on the number of 'eligible hectares' held by the farmer/landowner during a specified reference period of 2000-2002 (Article 38). An alternative period of 1997-1999 could be used in agreed 'hardship cases' (Article 40). Farmers not previously producing supported crops or only in part production of supported crops, can now enter the single payment scheme and receive income support where previously none was due.

Member States were given a degree of freedom under EC Reg. 1782/2003 to maintain for some previously supported crops, an element of coupling, some times described as 're-coupling' or 'partial de-coupling'. The United Kingdom decided to fully decouple all (10) major production subsidies for the most significant 'broad acre' crops. Within the UK, each of its four constituent parts, namely England, Wales, Scotland and Northern Ireland, whilst accepting and adopting full decoupling, have each done so by different means. However, all countries within the UK instituted the Regulation at the earliest possible date of 1 January 2005, as did a number of other EU-15 Member States.

England adopted a process often described as a 'dynamic hybrid' regime. Over a period of eight years ending in 2012, payments initially largely based on historic receipts, that is subsidy received during the reference period, together with an element of area based payment, would transmute by degrees, into a fully area based income support (Table 3-111). England also decided to establish three regions with three differing rates of payment per hectare. The regions are: '(i) land comprising the upland Severely Disadvantaged Areas (SDA); (ii) moorland within the upland SDA; and (iii) all land outside the SDA', that is, by definition, lowland (DEFRA, 2004a)

- **Table 3-111 - Schedule of Single Farm Payments in England**

	2005	2006	2007	2008	2009	2010	2011	2012
Flat Rate (%)	10	15	30	45	60	75	90	100
Historic receipts (%)	90	85	70	55	40	25	10	0

Source: Adapted from DEFRA (2004a).

Northern Ireland decided to instigate a regime referred to as a 'static vertical' hybrid whereby the income support contains elements of both historic receipts and area payments but unlike the hybrid to be used in England, the proportions of historic and area payments are not intended to change year by year but rather retain the initial fixed proportions. Both Wales and Scotland have established historic receipts only regimes with no element of area based payments but they differ from each other in that Scotland, alone amongst the four home nations, decided to establish a 'national envelope', effectively an additional degree of modulation, to support its beef rearing sector. Apart from this isolated example, it is important to keep in mind that apart from Luxembourg, the UK is the only MS to have opted under EC Reg 1782/2003 to fully decouple its agricultural subsidies from production.

3.5.2.4 Cross-compliance

Under Regulation 1782/2003 (EC, 2003) farmers and land-owners are now to be paid for maintaining their land in good agricultural and environmental condition (GAEC). They are also required to observe certain statutory minimum requirements (SMR) that are, in fact, already enshrined in EU law. Each Member State, or in some cases, individual region(s) within a Member State, are permitted to adopt as many GAECs as are deemed appropriate for their particular national circumstances but must observe all 18 SMRs.

In addition to the differing regimes adopted by the four home countries of the UK concerning the basis for calculation of the SFP, there are also differences as regards the adoption of the good agricultural and environmental conditions of the cross-compliance mechanism. All four home countries, through their respective national governments or assemblies, have adopted conditions within the wording of both Article 6 and Annex IV of 1782/2003, but the drafted regulations they have chosen to adopt are in terms considered specifically relevant to the topographies, climate and soil types of each individual country.

3.5.3 The expected effects on the supply chain of the mid-term review reforms

3.5.3.1 Decoupling of production subsidies from supported commodities

The extent to which subsidies are to be decoupled from the production of supported commodities in each Member State is, as with GAEC in cross-compliance, subject to a degree of flexibility in their enactment within national legislation. The result of such ad hoc implementation can be seen by considering the example of the UK, which has adopted a regime of complete decoupling of all main production subsidies throughout the UK, but with the adoption of marginally different GAECs in each of the four constituent 'regions', that is England, Wales, Scotland and Northern Ireland. Alternatively, other Member States, for example, France, at least as regards decoupling of production subsidies, appear to have chosen, in some instances, to retain as much coupled subsidy as the Luxembourg Agreement permits. Luxembourg is the only other Member State to join the UK in totally decoupling subsidy from production.

The UK food supply chain is clearly closely connected to the volume of home-produced food and, as previously noted, it is considered that UK farms provide around three-quarters of the raw materials that enter the UK supply chain (Bourlakis and Weightman, 2004). The volume of production before the adoption of the mid-term reforms was, arguably, able to be manipulated to some extent, by the amount of subsidy funding available to farmers through the so-called Pillar 1 production instruments. With the withdrawal of such instruments including livestock headage payments, it could reasonably be anticipated that the volume of previously supported commodities, would fall across all Member States, as farmers adjust to the demands of the new market place and to the price structures that will subsist in those markets for their products.

The Single Farm Payment in the UK, a farming economy completely decoupled from production targets with farmers being paid subsidy, at least at the present, based on the number of eligible hectares they hold, may encourage some cereal growers, presumably the most efficient or entrepreneurial, to expand operations whereas other smaller producers may decide to withdraw from cereals in suitable areas, switching to other crops or perhaps in some instances to retire from farming completely. In any event, the process of rationalisation seems set to continue for the foreseeable future.

3.5.3.2 Some estimates of the likely impact on land use and food production of decoupling

It is anticipated that the impact of the mid-term review reforms on land use and food production within the EU could be far reaching. Of the published predictions of the likely impacts of the Fischler Reforms as regards the UK generally, and soft wheat production in the UK specifically, that we have considered, there is general agreement that overall, the area of land devoted to soft wheat production will fall but there is less consensus as to the amount of land that might be withdrawn from wheat production. DEFRA (2003c) consider that around 17.5% of land used for cultivation of all cereals including soft wheat, might be withdrawn from cereal production, whereas Moss et al. (2005) consider a figure of around 0.6% to be a more likely prospect (Table 3-112) .

In the same paper, DEFRA (2003c) predicted a smaller fall in area cultivated to all cereals in the EU-15 of 7.5%, as a direct result of the mid-term reforms. The published predictions that considered the likely impacts of the reforms in the EU-15 and the UK and reviewed for this report (Binfield et al., 2003; EC, 2003; OECD, 2004 and Teagasc, 2003) are mostly consistent in reporting a figure in the range of 2.0% - 2.5% reduction in cultivated area, although Binfield et al. (2004) are lower than this range at 0.5%, but DEFRA (2003c) are again considerably higher than other commentators at 7.5%. It should be noted that the DEFRA figure is for all cereals grown in the UK but even allowing for this, with soft wheat being around 45% - 50% of the total area devoted to all cereals in the East of England GOR (and around 40% - 43% for the whole of the UK), the predicted decline in area remains significantly different to other commentators.

It might be concluded, therefore, that whereas there appears to be little consensus as regards the area of land that might be withdrawn from soft wheat production within the UK and EU-15, there is, however, no doubt as to the direction of the likely impacts of the Fischler Reforms.

- Table 3-112 - Some estimates of the likely impact of the Mid-Term Review on land use and agricultural production in the EU-15 (% change on baseline)

Geographical region	Date	Soft wheat area	Barley area	Oilseeds area	Source of estimate
UK	2008	-17.51,3	-17.51,3	-	DEFRA (2003c)
UK	2014	-0.6	-0.3	-1.0	Moss et al. (2005)
EU-15	2008	-7.51,3	-7.51,3	-	DEFRA (2003c)
EU-15	2009-2010	-2.6	-0.9	-2.9	EC (2003)
EU-15	2007-2012	-0.5	-0.4	-0.4	Binfield et al. (2004)
EU-15	2008	-2.2	-2.52	-2.8	OECD (2004)
EU-15	2010	-2.0	-1.0	-	Teagasc (2003)
Germany	2012	-9.01,3	-7.03,4	-29.03	Offermann et al. (2004)
Portugal	2010	-7.5	-7.0	-100.0	Soares et al. (2004)

- Not reported.
1 All cereals.
2 For barley, maize and rye together.
3 Average of reported range of values.
4 Food oilseeds for human consumption only.

3.5.3.3 Stakeholder consultation

As part of Work Package 1 of the GENEDEC research project, a consultation was undertaken with a selected but broad-ranging panel of interested stakeholders (Wooldridge & Tranter, 2005). In that report it was noted, amongst other things, that there was wide-ranging concern that the general public may object to farmers continuing to receive subsidy although they were no longer required to produce food merely keeping their fields in good agricultural and environmental condition. In addition, the mid-term reforms did not of themselves provide any guarantee that farmers/landowners would adopt sustainable land management practices. Indeed, we might now say from the vantage point of 12 months more experience, that those farmers who have not applied for the SFP (and there are some albeit in the main, those with small farmed areas) are not obligated by the GAEC even though they are obligated to observe the Statutory Minimum Regulations element of the SFP.

We may now say perhaps as regards the latter and with some confidence, that the cross-compliance measures together with their policing by investigation officials, will very likely ensure that sustainable practices are adopted generally. Further, should as many farmers join the new ‘broad and shallow’ agri-environmental scheme (Entry Level Scheme of Environmental Stewardship) as DEFRA hope (some 70%) together with those who may also apply for funding under the more prescriptive Higher Level Scheme of ES, we might see future improvements overall in farmland biodiversity indicators, including the management and prevention of soil erosion with consequent improvements to water quality both as drinking water but also in rivers, streams and ponds.

A number of stakeholders (Wooldridge and Tranter, 2005) voiced the opinion that levels of production would fall across all agricultural sectors as a consequence of the withdrawal of production subsidies. In addition, the view was expressed that in the short-term at least, there would be little certainty in terms of market prices for commodities. As at the time of writing this report, it can only be said that markets, prices and production levels are still far from established at or around new norms as many farmer/producers have appeared to adopt a policy of ‘wait and see’. Most respondents to our consultation did say, less unequivocally, that they expected to see the level of intensity of production fall and generally more extensive methods of production be employed.

3.5.3.4 Milling

The UK milling industry as has already been noted above (NABIM, 2005b), is highly rationalised insofar as there are few major milling companies producing the bulk of the UK’s flour requirements from a very few number of mills. There would appear therefore to be very little future advantage that can be accrued to the supply chain from further rationalisation of the milling segment of the supply chain. However, as has also already been noted, there does appear to be significant scope in improving communications within the supply chain from farmer/producer through the ‘middle-man’ businesses be they farmer controlled businesses/co-operatives or other grain holding facilities (including the farmer/producers themselves) to the milling companies and on to the manufacturer/processor (CIF, 2005). A degree of vertical integration seems therefore inevitable even should this be merely a strengthening of existing customer-supplier links rather than a more formal business amalgamation.

NABIM (2005a) publicly state that they wish to see the present supply of around 85% of UK miller’s wheat requirements being sourced from British and Irish farmers, continue. The de-coupled SFP regime seeks to re-connect farmers with the market place. Economic logic dictates that farmers will produce those commodities on which they can make a reasonable return. While we can assume from past behaviour that not all farmers always behave in the most economically logical manner, we can reasonably assume that over the short to medium term, many present producers of wheat for the milling industry will seriously consider the advisability of continuing to produce should the end product not provide sufficient return. It is acknowledged that farmers need to be able to draw a living income from their business but also to produce sufficient surplus return for them to be able to continue to invest in their business in order to upgrade or replace equipment and on-farm facilities as necessary. It can, therefore, be argued that along with continuing to seek economic efficiencies within their own businesses, many producers may be forced to amalgamate with others either by way of a formal sale of their business or by the less radical means of, for example, joining a so-called machinery circle with other farmers in order to share costs with them and thus seek to capture the economies of scale that larger business units bring. They might also hope that the British consumer may be encouraged by whatever means, to continue to support home production of bread wheat by paying a fair and honest price at the retail outlet for the end product(s).

3.5.3.5 Supply chain analysis

We have previously noted above that the Cereals Industry Forum and the Food Chain Centre (CIF, 2005), are conducting research presently on a number of individual food supply chains within British agriculture and that they have already reported on the soft wheat chain (see previous sections and Annex III.4). It is to be hoped that such research will lead to increasing efficiencies within their respective supply chains. The CIF study (2005) identified that one of the major inefficiencies was the 35% of deliveries to mills not arriving within the pre-agreed time slot, which included 7% of deliveries that did not arrive at all. In addition, a further 3% of deliveries were noted to be rejected on quality grounds (NABIM, 2006). NABIM (2006) comment further that as a consequence of the difficulties caused within the supply chain by these logistical inefficiencies, millers tend to 'over-book' deliveries resulting in further disruption as deliveries are then subsequently turned away from mills on occasion owing to lack of on-site storage capacity.

3.5.3.6 Alternative crops

It is likely that in the short to medium-term that some of the more marginal agriculturally productive lowlands, will be withdrawn from arable production. We have noted above that much of the arable cropping land within the UK, is located in the drier and warmer south and east, especially in England. Should some of this land be withdrawn from cereal production, and we might reasonably assume at this point that an otherwise alternative arable crop such as sugar beet would also not be cultivated on such land following the imminent reform of the sugar regime, it is likely that reversion to grassland might occur. It is possible that some productive effort might be switched to malting barley or to hard durum wheat as alternatives to soft wheat, but presently, markets are relatively undeveloped for these products, particularly hard wheat. The production of more feed wheat is also a possibility but whatever alternative crops are adopted, the key remains production with the prospect of reasonable profit for the farmer/producer. Again, we may see the cultivation of biomass products such as elephant grass (Miscanthus) or in damper areas, short rotation coppice willow. These alternatives would likely be seen by the general public as environmentally preferable alternatives. Indeed wheat could be grown for the production of bio-ethanol and thereby make a positive contribution to the UK's renewable fuels obligation.

3.5.3.7 Evidence of farmer behavioural change

We are at the time of writing (March 2006), still within the current arable crop sowing season, the first complete season since the commencement of the SFP system. It is, therefore, still too early to discern with any clarity, whether British agriculture has yet become more purely market orientated and customer facing than it might otherwise have been had the SPS not been adopted by the EU. Early anecdotal evidence suggests that, in England at least, little has changed in terms of planting and cultivation planning. This view is supported by the recently published results of a survey of farmers co-ordinated by the University of Nottingham and reported in Farmers Weekly (24 February 2006b). The survey was based upon responses received from farmers who are members of the annual farm business survey conducted by a number of regional academic centres in England on behalf of DEFRA and which feed into the FADN/RICA network.

The survey concluded, amongst other things, that farmers generally continue to hold a cautious view of the agricultural economy for the near future and prefer to adopt a policy of 'wait and see' as regards the prospects that the SFP de-coupled market place may hold for them. Only around 50% of arable farmer respondents reported that they had discussed the implications of the SFP on their farm business with their banker, accountant or consultant. Arising from an entirely separate annual survey carried out in Scotland, there have been media reports that farmers are beginning to reduce the area planted to cereals especially in the most marginal areas and on the most marginal soils (The Royal Bank of Scotland, 2005). It is expected that production of beef will decline within most of the UK following the abolition of the several beef subsidies although Scotland may prove to be the exception to this rather general presumption because of its national envelope support for that sector.

The same issue of Farmers Weekly (24 February 2006c), also reported that an initial tranche of full single farm payments due to farmers in England, had been despatched by the Rural Payments Agency (an agency of DEFRA) on Monday 20 February with a second tranche expected on Wednesday 22 February, while the RPA's counterparts in Wales, were reported to be preparing to send out balancing payments for farmers in Wales by the end of February, an initial advance part-payment having previously been made (Farmers Weekly, 2006a). Similarly, balancing payments are due to be sent to farmers in Scotland and Northern Ireland by the end of March. The delay in making full payments in Wales, Scotland and Northern Ireland had been brought about by a delay in agreeing the national reserve 'scale-back' figure at 4.2% of individual SFPs, which deduction is to be applied on payments to all farmers within the UK.

We may, therefore, say by way of summary in this section, that both the anecdotal and empirical evidence that we have to date, suggests that few farmers have yet altered their cropping systems or farm plans. Our anecdotal evidence comes from both informal conversations with farmers attending seminars or other events at the University of Reading, conducted over recent months and from those conversations the Investigation Officers of the Farm Business Survey team based at Reading have had with their respondent farmers. We have noted that the Farm Business Survey in England, managed in seven regional centres including Reading but centrally co-ordinated at the University of Nottingham, have reported to DEFRA and in the farming press (Farmers' Weekly, 2006b), that a sample of farmers they have spoken to specifically on the subject of the SFP and its implications as it concerns their own businesses, have in many instances, yet to take any professional third-party advice from the usual sources of bank manager, accountant, agronomist or consultant. The Report to DEFRA strongly suggested that many farmers are adopting the age-old policy of 'wait and see'.

3.5.3.8 Agri-environment schemes

Another indicator of farmer behavioural change, can be measured by examining the number of applications made to the new 'broad and shallow' agri-environmental Entry Level Scheme (ELS) option of Environmental Stewardship Scheme (ESS). ESS replaces the existing Countryside Stewardship, Environmentally Sensitive Area and the Organic Farming Schemes, which have been delivered to date under the auspices of the England Rural Development Programme (ERDP). Similar schemes both old and new, exist or existed in Wales, Scotland and Northern Ireland mirroring in all major respects the schemes in England. The most recent data published by DEFRA (2006) notes that some 60,000 application packs for the ESS had been sent out to farmers with 15,000 live agreements in place covering 1.9 m hectares of land. DEFRA have set a target of 70% of farmers in England to be signed up for the ELS with, it is hoped, a significant proportion of those farmers also applying for further funding under the more stringent but remunerative, Higher Level Scheme (HLS). Presently, empirical evidence would suggest that the numbers applying for funding under the ELS are broadly in line with DEFRA's expectations but that the number of farmers applying for entry to the HLS, is proceeding more slowly. This may, however, be because a substantial number of potential HLS candidate farmers/land-owners are presently managing land under the (less prescriptive) CS or ESA schemes and, having a period of time still to run on their agreements, the balance of five years in many instances, have no particular urgency to apply to join the HLS.

The agri-environment schemes are to be funded by the additional national modulation deductions from SFP that are to be levied throughout the UK. It might be anticipated therefore that a second surge of applications for funding under the ESS may be expected after the receipt of SFP in February and March (for most farmers in England), when these income support payments are finally received by farmers. It cannot be overlooked however, that numerous farmers are said to have been delayed in making application for ESS funding owing to the evident inability of the Rural Payments Agency to provide farmers and landowners with definitive maps of their fields and field boundaries, a necessary part of the application procedure.

3.5.3.9 Conclusions

To end this Section specifically and this report generally, we draw the following conclusions as regards the possible and likely impacts of the Fischler Reforms on the soft wheat supply chain in the UK.

We anticipate the more extensive production of previously supported commodities generally including soft wheat, certainly a lessening of intensity in most areas of the UK and by most farmers, as producers adjust to the realities of the new decoupled market place.

Increased focus on production of premium-earning bread making quality Grade 1 wheat varieties wherever profitably feasible, mostly in the eastern regions of England but in the certain knowledge that the good agricultural and environmental conditions element of cross-compliance will ensure farmers are more mindful than ever before of the need to introduce effective soil management practices including control of nitrate run-off and other pollutants.

An overall reduction in harvested production volume.

In parallel with reduction in overall volume, a reduction in exports of feed wheat, more of which 'surplus' will be retained for home market use.

Continuing studies by groups such as the Food Chain Centre and the Cereals Industry Forum focusing on cost control, cost reduction and increased efficiencies that can be achieved within the supply chain from producer to final consumer.

Continuing restructuring and rationalisation of the supply chain between businesses active within the chain either formally by vertical and horizontal integration (e.g., take-over's and amalgamations) or by increasing use of service agreement type arrangements.

Possible increase in formation and growth of FCB type business units and machinery sharing co-operatives as a means of enabling farmers' who wish to remain in farming to do so, while at the same time, seeking both to reduce their own costs and to capture more value for themselves from the supply chain.

The development of alternative crops for those farmers on more agriculturally less productive land and for whom, therefore, wheat production without production subsidy support becomes a marginally profitable activity.

Continued slow growth in the production of organic wheat in parallel with increasing consumer demand for organically produced food.

3.6 Analysis of the RYE supply chain in Germany

3.6.1 Introduction

Following Poland, Germany is the most important producer of rye in the EU. Rye production is characteristic for regions with low-quality sandy soils, where rye is competitive compared to a few competing crops. Rye is also a main component of traditional German brown-bread manufacturing.
The production and use of rye is influenced by the policy framework, but also by technical progress. Rye production has been favoured by cereal intervention within the cereal market regime, with the effect that about half of production has been stocked in intervention stores without a prospective market outlet. The problem of rising intervention stocks was solved with the 2003 CAP Reform, in which rye intervention was abolished from the 2004 harvest year onwards. In bread manufacturing there is a trend in partly substituting rye by wheat floor. Feed use is rather price dependent and impaired by behavioural constraints. New outlets might be realised in highly subsidized bio fuel production, mainly in the production of ethanol.
Although changes occur in the policy framework under the 2003 CAP Reform (phasing out of rye intervention, decoupling of direct payments), rye production will continue mainly on sandy soil regions because of lacking production alternatives. Past and future trends will be discussed in this study. Starting with the national perspective of rye production and use, the study then focuses on the Brandenburg region which features the highest concentration of rye production in Germany. The study is based on statistical information, publications and online documents. Open questions were clarified via telephone calls with local experts.53

3.6.2 The policy framework

Rye is included in the market regulation for cereals. The most important elements of the regulation under the Agenda 2000 were:
Price protection and market intervention
Compensatory payments
Prices were stabilised by intervention, meaning that state agencies buy cereals if prices drops under a fixed threshold. Only wheat, barley and rye were included in the intervention scheme. The intervention price was the same for all three cereals. Intervention prices are determined at the wholesale level, which means that prices are not totally stabilised at the producer level. Intervention is restricted to the period from Nov. 1 to May 31 of a harvest year. Intervention is allowed for cereals of a determined quality (VO 824/00) 54: moisture content <= 14.4 %, a total of 12 % of broken grain, etc, weight 70 kg/100 l, enzyme activity expressed by 'Fallzahl' of at least 150sec and an ergot content lower than 0.05 %.
Compensatory payments (compensating for income losses due to a reduction of the intervention prices) were determined on the basis of regionally differentiated reference yields for cereals given in Annex 1, Table A1.
The economic framework has changed considerably under the 2003 CAP reform:
Rye intervention was abolished starting with the 2004 harvest year. Existing rye intervention stocks are successively sold on the EU market or exported.
Direct payments are totally decoupled from 2005 onwards, where in a so-called dynamic hybrid model premia are continuously harmonized, ending in unified entitlement levels for UAA (excl. permanent crops) in 2013 (Annex IV, Table A2).
Direct payments are reduced by Modulation. There is an exemption in the Regulation 1782/2003 (Article 10.3) that 'member states shall receive 80 % of the amount from Modulation.' For member states (10.4) where the rye area is > 5 % of the cereals area in 2000-2002, and where rye production is more than 50 % of

[53] Stakeholder interviews were not undertaken because rather broad views are available online.
[54] Euro Lex L 100, 20.04.2000, p 31.

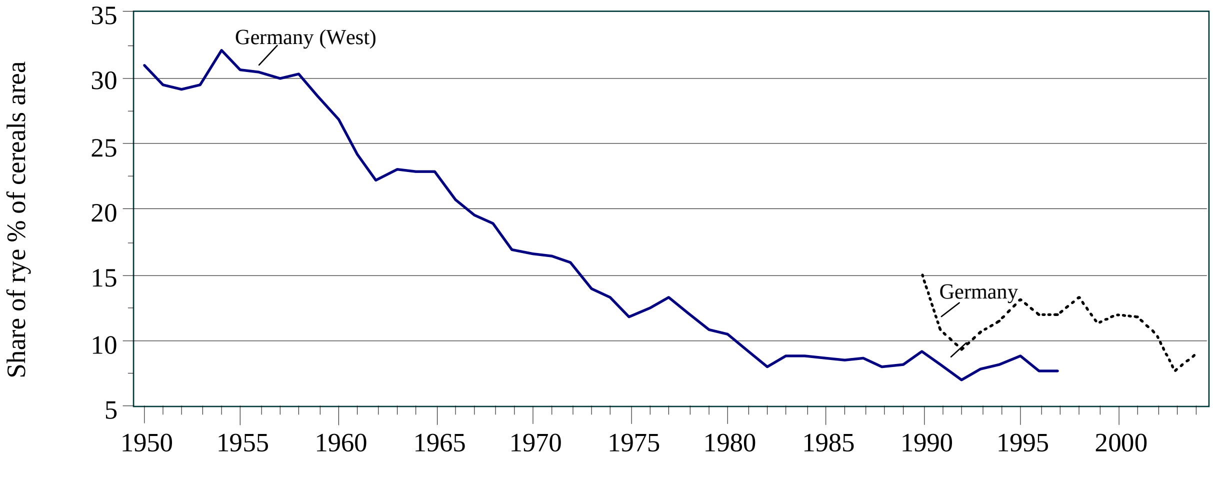
EU (15) production, 90 % of the amount from modulation shall be reallocated to the member state concerned. The additional funds shall be allocated to regions with rye production.
The effects of these regulations can be summarized as follows:
Before the 2003 CAP Reform, the economics of rye production were largely influenced by intervention. With an unified intervention price for wheat, barley and rye, intervention was the most economic way of sale for rye. As much rye as possible was sold to the intervention agency, insofar as quality constraints were fulfilled. As the 'Fallzahl' and the ergot content changes from year to year due to weather conditions in the harvest period, intervention sales varied. Food use is rather constant (about 0.9 mil tons), while feed use was not at all competitive because the market price in relation to feed cereals was higher than the substitution relationship for feed use. Production and market surpluses increased after German unification.
Due to a drastic price drop 'without intervention' under the 2003 CAP Reform, rye areas and production have been reduced, the feed use increased and the negative image of rye as feed improved. Low rye prices gave an incentive for technological development, i.e., technical uses as foam or as raw material for bio energy use (mainly ethanol). Meanwhile, large-scale ethanol plants were built in East Germany allowing the use of 1/4 of rye production. Bio energy production is mainly influenced by national regulations, i.e., fuel tax exemptions for liquid fuels and high minimum prices for electricity generation based on biomass.
The back-payments from Modulation funds shall be paid in addition to ‘Compensatory allowances' for less favoured areas. They will amount to about 50 €/ha[55], but the rules for these payments are not at all clear.

3.6.3 Development of rye production and use

3.6.3.1 Rye Production

National level
In the 1950s, rye was an important cereal in Germany (West). From the total of about 5 mill. hectares of cereals, 30 % was rye (Figure 3-21). The rye share decreased continuously to 7 and 8 % until 1985, and became stable in the succeeding years. After German reunification, the share of rye of total cereals (about 7 mill. hectares) doubled briefly and has dropped below 10 % again since 2003. During the last ten years, the rye area in the west of Germany decreased more than in the east.

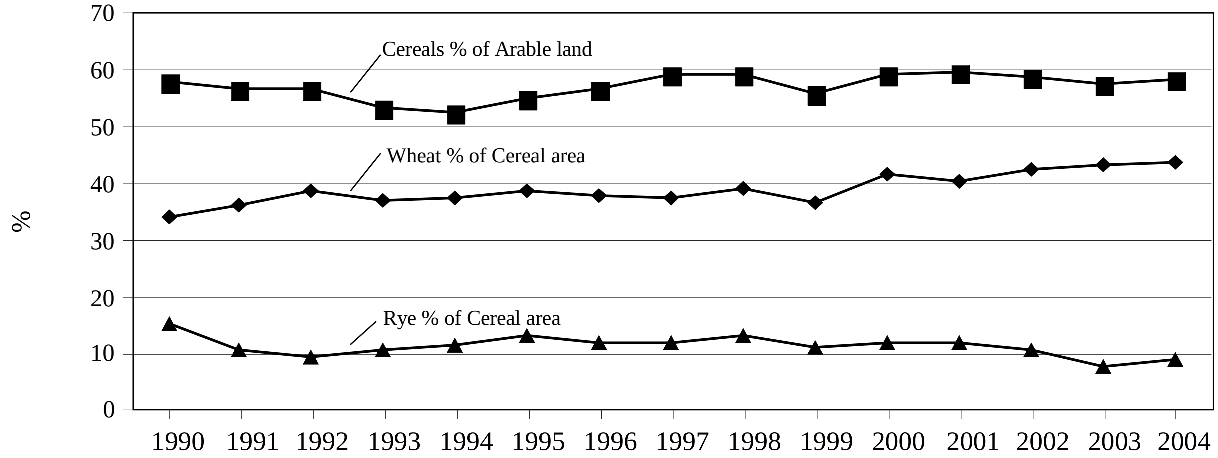
- **Figure 3-21 - Development of rye area**



The development of rye and wheat areas since 1990 is shown in Figure 3-22. Roughly less than 60 % of arable land is cultivated with cereals. The share of wheat of total cereals increased from 33 % in 1990 to 43 % in 2005. An opposite trend can be observed for rye; its share was 15 % in 1990, then it dropped in 1991 and stabilised at around 10 % until 2002. It was further reduced in the succeeding year; the rye area is around 0.6 mill. hectares today.

[55] Tiedemann (2005)

- **Figure 3-22 - Development of cereals area**

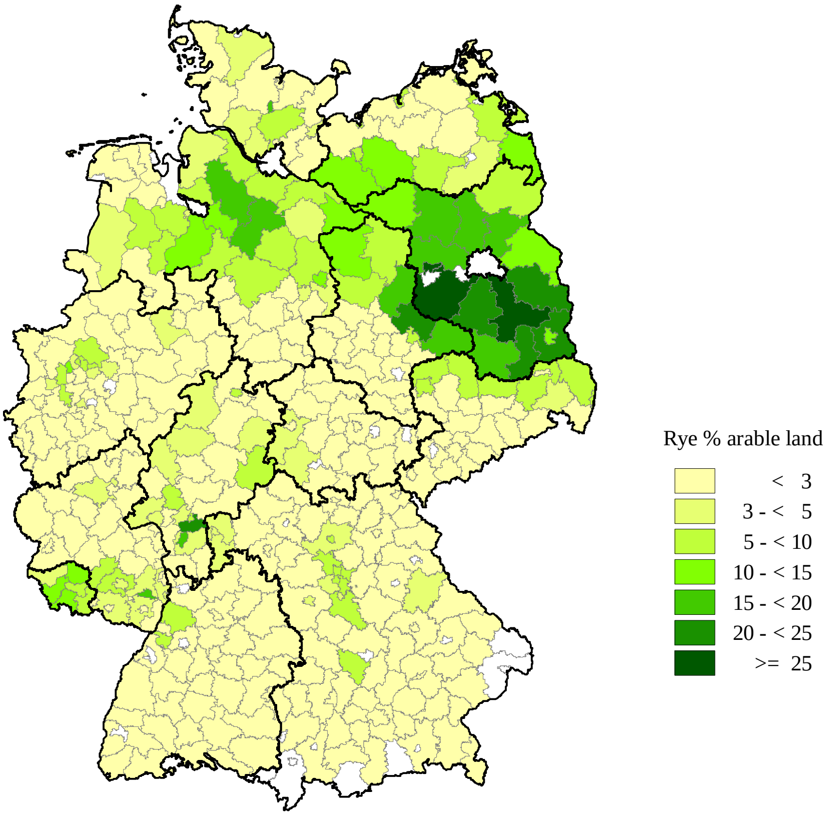


Source: FAL-BW, Kreisdaten.

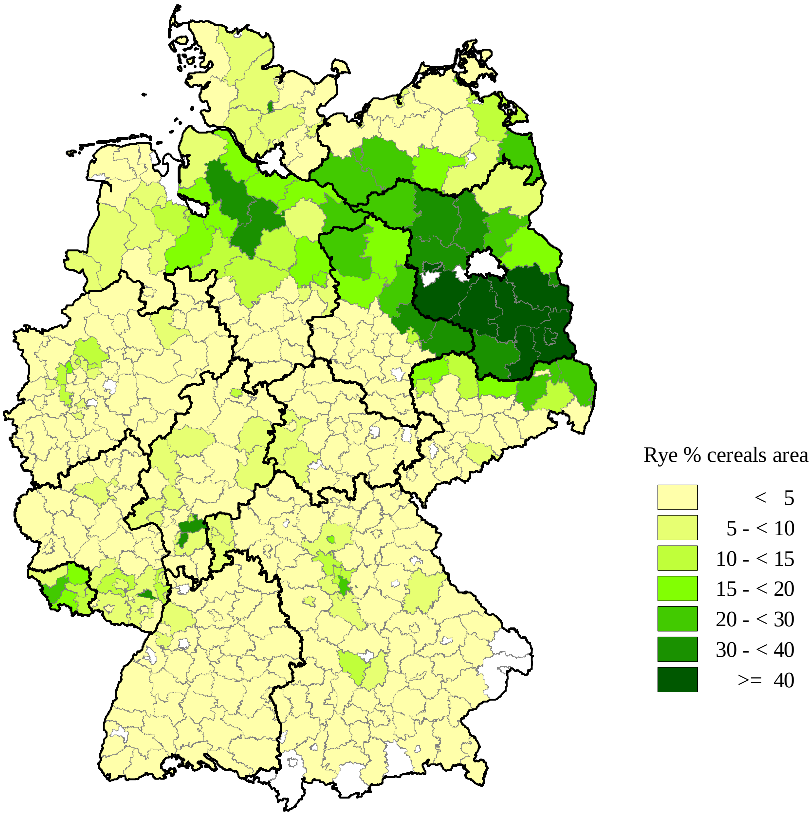
Although rye is produced abroad, production (2003) is mainly concentrated on sandy soil areas of Brandenburg, northern Sachsen-Anhalt, southern Mecklenburg-Vorpommern and north-eastern Lower Saxony (see Map 1). The share of rye on arable land in these regions varies between 5 and 26 %; maximum levels of more than 25 % are reached in two counties south of Berlin. In about half of the counties in Brandenburg, the share of rye on cereal areas is more than 40 % (Map 2); regional averages go up to 55 %. At the farm level – in a few cases - rye monocultures in combination with obligatory set-aside are even possible. The main reason for this heavy regional concentration is that rye is the only crop which can be cultivated on poor sandy soils. There are only a few production alternatives (mainly lupines), or the setting-aside of land, fallowing or forestation with pine. As obligatory set-aside had been restricted to 33 % of the eligible COP (Cereals, Oilseeds and Protein Crop) areas, arable land use was not abandoned under the former CAP. Under the new 2003 CAP regime, there is no upper limit for set aside, such that arable land might become fallow or be minimally maintained to fulfil the Cross Compliance criteria.

Based on 2003 EU-FADN data, about 30,000 farms (represented) produce rye (see Table 3-113). In 53 % of the farms, the rye share on cereal areas is less than 10 %, in another 33 % it is between 10 and 20 %, 12 % between 20 and 40 % and in 2.7 % it is more than 40 %. Farms with a rye share of more than 50 % are mainly concentrated in large (> 250 ha of UAA) and medium (25-50 ha UAA) size classes.

- **Figure 3-23 - Share of rye on arable land (2003**



- **Figure 3-24 - Share of rye on cereals area (2003)**



- **Table 3-113 - Distribution of farms with rye production in Germany (2003)**

Share of rye % of cereals area	Farm size ha UAA ☯25	25 - 50	50 - 75	75 - 100	100 - 250	250 - 500	500 - 750	750 - 1 000	> 1 000	Total
0.01 - 10	3.26	17.53	10.30	6.25	11.48	2.18	0.32	0.51	1.96	**53.79**
10 - 20	2.63	9.02	6.01	4.35	6.63	1.19	0.21	0.28	1.03	**31.36**
20 - 30	1.03	2.78	1.40	0.43	2.16	0.22	0.05	0.02	0.43	**8.52**
30 - 40	0.07	1.18	0.80	0.60	0.63	0.14	0.09	0.00	0.13	**3.65**
40 - 50	0.09	0.42	0.38	0.13	0.36	0.04	0.03	0.00	0.00	**1.46**
> 50	0.15	0.53	0.09	0.00	0.41	0.04	0.00	0.00	0.00	**1.21**
Total	**7.23**	**31.46**	**18.99**	**11.76**	**21.68**	**3.81**	**0.69**	**0.82**	**3.55**	**100.00**

Source: INLB-EU-DG-AGRI/G3, own calculations.

Continuously rising yields were realised between 1990 and 2001 (see Figure 3-25). After lower yields in 2002 and 2003 due to bad weather conditions, yields rose again. Today, the average cereal yield is 76 qn/ha. Wheat yields are higher (81 qn/ha). Rye yields are significantly lower - minus 20 qn/ha compared to wheat - for the whole period. The main reasons for this development are:

Lower degree of technical progress (fewer breeding efforts due to the small seed market for rye).

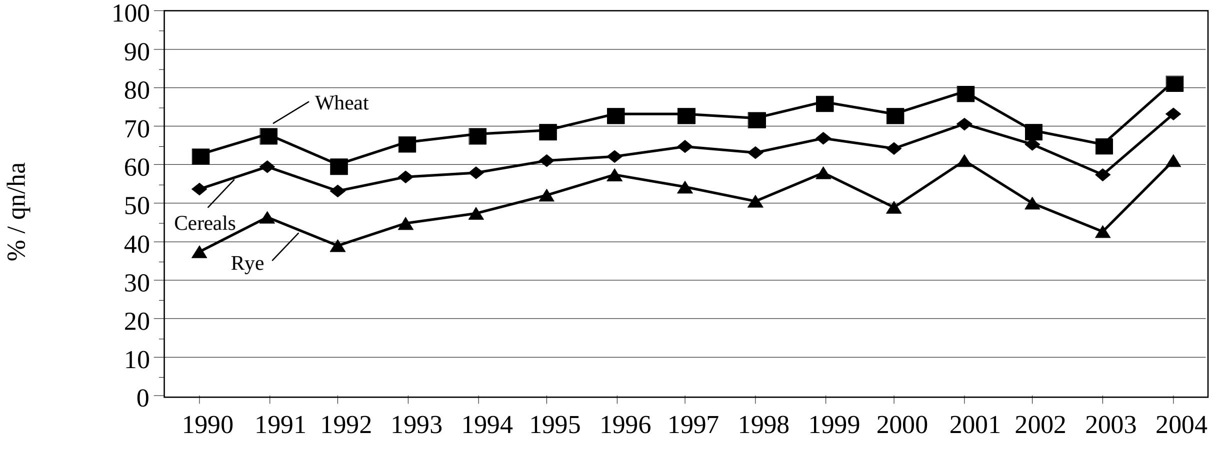
Weak natural conditions, especially sandy soil and low rainfall in a large portion of the typical rye areas.

Map 3 shows that rye yields are at the lowest level (< 30 qn/ha) in regions of high rye concentration. Highest yields are reached in northern Germany (Schleswig-Holstein) and in a belt from the East to the West. Soils are better and rainfall is higher in these regions. Also, high yielding hybrid varieties are grown in these regions. It has to be mentioned that the yield potential of hybrid varieties on average soil quality is not much below that of wheat. Producing hybrid varieties on sandy soils is more risky, therefore conventional breeds are grown there.

Situation in Brandenburg

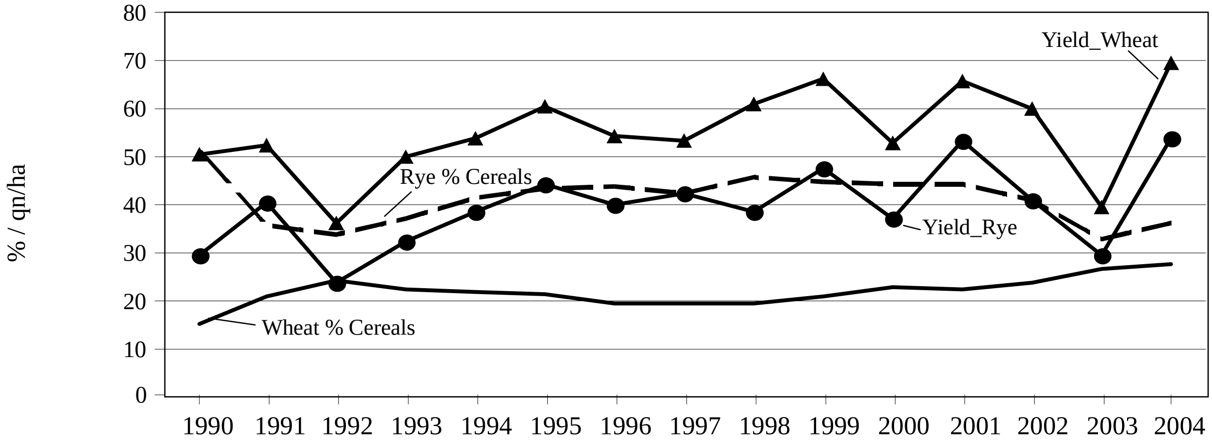
The situation in Brandenburg is the opposite of the sector average (Figure 3-26): the rye share on cereal areas varied between 33 and 45 % during 1990 and 2004; the maximum was reached during 1995 and 2001, then it decreased to one-third. Due to poor soil conditions, the wheat share is much below the German average; it increased from 15 to 25 % between 1990 and 1992, then was constant until 2002 and further increased up to 27 % in 2005.

- **Figure 3-25 - Development of cereal yields (Germany)**



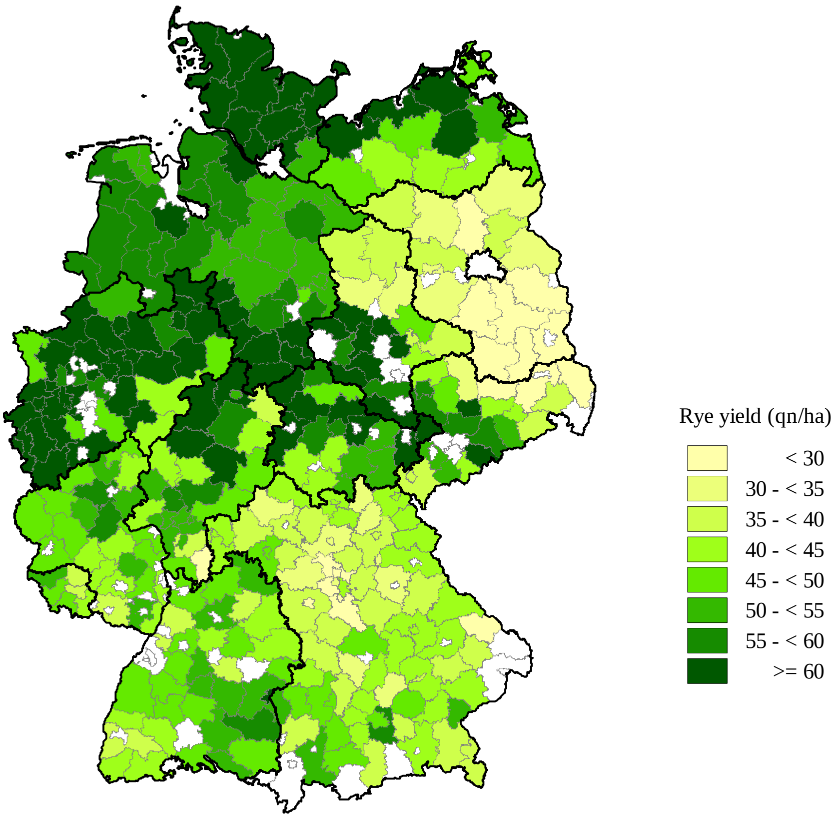
Source: FAL-BW, Kreisdaten.

- **Figure 3-26 - Development of rye and wheat areas / yields in Brandenburg**



Source: FAL-BW, Kreisdaten.

- **Figure 3-27 - Yields of rye (2003)**



Yields are relatively low for both cereals at the poor soil quality locations. Compared to wheat, rye yield is around 20 qn/ha less. Both cereals show relatively high yield variations, mainly due to shortages in rainfall. Yields were lowest in 1992 and 2003; yield variation in Brandenburg is higher than in the whole country.

About 1800 farms (represented) grow rye (Table 3-114). Rye production is mainly concentrated in farms with 100 to 500 ha and more than 1000 ha of UAA. In one-third of these farms, the rye share on cereal area is less than 10 %; this might be true for farms with better soils. In another third of farms, the rye share is 10-20 %, and in 23 % of farms it is 20-30 %. Only 10 % of farms show rye shares greater than one-third. Therefore rye monoculture seems to be rare although it is possible.

Table 3-114 - Distribution of farms with rye production in Brandenburg (2003)

Share of rye % of cereals area	Farm size ha UAA ≤75	75 - 100	100 - 250	250 - 500	500 - 750	750 - 1 000	> 1 000	Total
0.01 - 10	0.00	2.93	10.69	8.35	1.09	3.12	5.85	**32.03**
10 - 20	0.00	1.51	9.57	9.19	1.09	2.64	8.85	**32.85**
20 - 30	3.08	0.64	13.97	1.09	0.00	0.40	4.31	**23.50**
30 - 40	0.00	0.00	2.29	2.32	1.57	0.00	1.70	**7.87**
40 - 50	0.00	0.00	2.00	0.00	0.48	0.00	0.00	**2.47**
> 50	0.00	0.00	1.27	0.00	0.00	0.00	0.00	**1.27**
Total	**3.08**	**5.07**	**39.79**	**20.95**	**4.22**	**6.17**	**20.71**	**100.00**

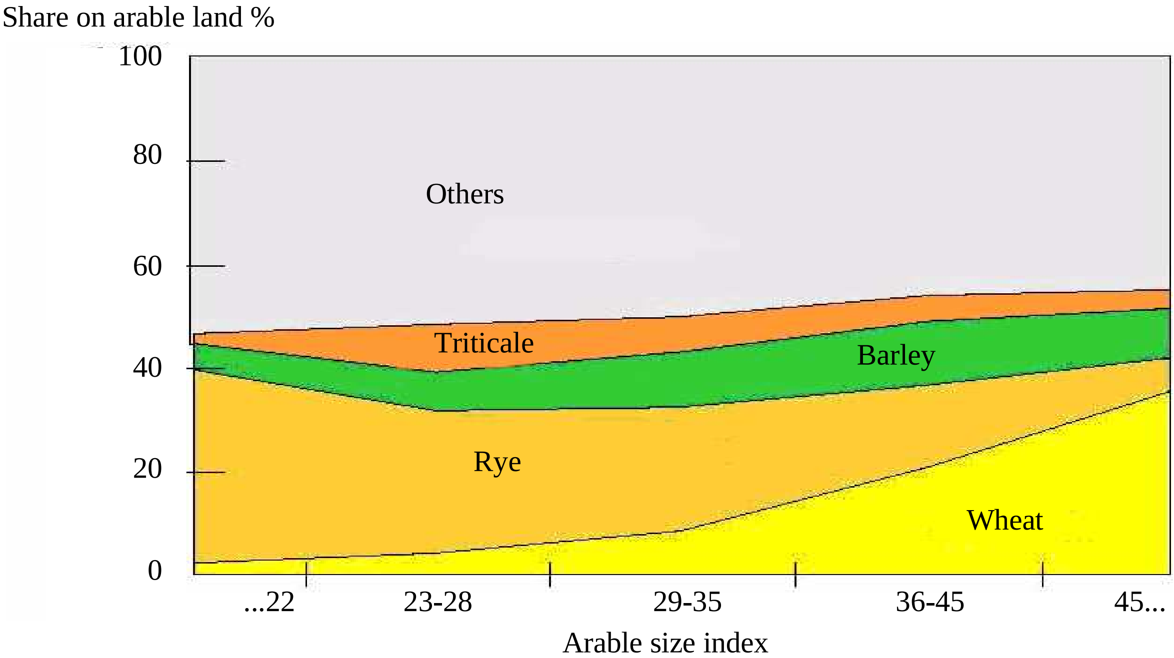
Source: INLB-EU-DG-AGRI/G3, own calculations.

According to Dennert and Fischbeck (1999), rye has relatively low requirements on soil quality compared to other cereals. The distribution of soil quality of arable land in Brandenburg compared to the West and East of Germany is shown below (Gaggern and Hanff, 2002):

Arable soil index	0-25	26-40	41-65	66-100
West %	3.5	34.7	48.3	13.6
East %	4.8	52.1	30.9	12.2
Brandenburg %	19	64.3	18.7	0

There are no 'good' arable soils in Brandenburg, but a relatively high share of poor and low quality soils.
Referring to the use of arable land in Brandenburg (Figure 3-28), rye is the dominating cereal for low quality soils (soil index <22). With an increasing soil index, the share of cereals increases from 50 to 60 %. For soil class 23-28, the share of rye decreases in favour of barley and triticale. For good soils (index > 45), wheat is the most important cereal, while the share of rye is relatively low.
Rye is mainly produced on poor soils. Referring to the year 2000, rye yield in location type V was 23 qn/ha, it was 37qn/ha on type IV and 64 qn/ha on best soils (type I). Part of the yield variation may be due to breeds; on good soils hybrid breeds with higher yield potential are grown while on poor soils mainly 'traditional' breeds with a better adaptation ability with regard to drought are grown.

- **Figure 3-28 - Distribution of arable land use in Brandenburg**



Source: v. Gaggern, Hanff (2002) Roggen - Situationsbericht Land Brandenburg.

According to Dennert and Fischbeck (1999), rye has the following competitive advantages:

It is the only cereal which can be grown on poor soils

Yields are on the level of wheat in crop rotations with a high share of cereals, a rye monoculture is even possible

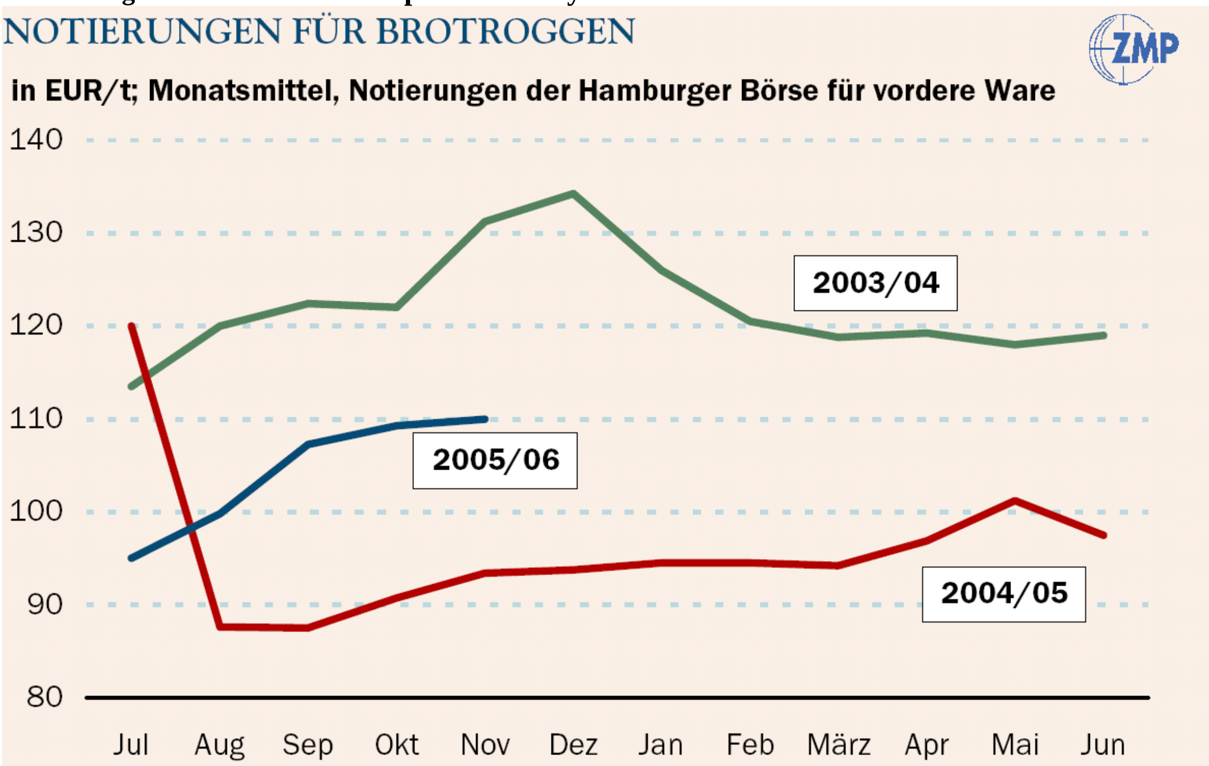
Hybrid varieties grown on good soils have a high yield potential

Intensity of rye is lower than for wheat; fertilizer and pesticide input is lower.

The main problem with rye is on the market side, i.e., prices and market outlets. Under the conditions of the former CAP, a main part of ‘quality’ rye was sold to intervention agencies. Low quality rye was used mainly as feed. Prices for feed rye were lower and a market chain, especially in concentrated feed manufacturing, could not be established for 'residual' quantities. The phasing out of rye intervention under the 2003 CAP Reform induced a significant price drop to 65 €/t (Figure 3-29), which gave an incentive for feed use and new market outlets in ethanol production. On the other hand, economic competitiveness of rye production became much worse, such that production has been reduced.

Table 3-115 shows the cost and gross margins of rye production in Brandenburg referring to the five soil qualities. Yields vary between 64 and 23 qn/ha depending on soil quality, and variable costs vary between 366 and 176 €/ha. Gross margins, including direct payments (Agenda 2000 conditions) are 366 €/ha for good soils and 270 €/ha for poor soils; the variation is much less than those of yields and variable costs. Excluding direct payments, which is the case for decoupled payments, the gross margin is only 114 €/ha for good soils and will become slightly negative for poor soils. Fixed costs can not be covered under the conditions of decoupled payments. Labour input in large sized farms is only 3 hours/ha. It doubles for 5 ha plots, but gross margins don't differ much.

- **Figure 3-29 - Price development food rye**



Source: ZMP.

Comparing yields, cost and gross margins with wheat (Table 3-116) the following conclusions can be drawn:
Yields are higher than for rye on good soils
Gross margin of wheat is about 100 €/ha higher than for rye on good soils, while gross margins for rye are higher in soil class IV

- **Table 3-115 - Gross margin calculation for rye (Brandenburg)**

	Unit	Arable soil class I	II	III	IV	V
Large plots						
Output / yield						
Yield	qn/ha	64	57	46	35	23
Price	€/qn	7.5	7.5	7.5	7.5	7.5
Output	€/ha	480	427.5	345	262.5	172.5
Direct payments (DP)	€/ha	*274*	*274*	*274*	*274*	*274*
Costs Variable						
Seed	€/ha	21	21	21	21	21
Fertilizer	€/ha	129	114	92	7	46
Plant protection	€/ha	86	65	52	28	23
Interest	€/ha	6	5	4	3	2
Machinery	€/ha	103	97	90	83	76
Drying	€/ha	21	19	15	12	8
Total variable costs	€/ha	366	321	274	154	176
Gross margin						
ecxl. DP	€/ha	114	106.5	71	108.5	-3.5
incl. DP	€/ha	388	380.5	345	382.5	270.5
Fixed and other costs						
Depreciation	€/ha	74	69	63	57	51
Hired labout	€/ha	42	39	36	39	36
Land rent	€/ha	151	124	101	84	68
Others	€/ha	31	29	27	25	22
Revenue						
ecxl. DP	€/ha	-184	-154.5	-156	-96.5	-180.5
incl. DP	€/ha	90	119.5	118	177.5	93.5
Labour requirement	h/ha	3.2	3	2.8	3	2.8
Fertilizer						
Nitrogen	kg/ha	125	112	90	69	45
Phosphorus	kg/ha	28	25	20	15	10
Potasium	kg/ha	90	80	64	50	33
Smaller plots (5 ha)						
Machinery	€/ha	105	99	93	87	83
Gross margin						
ecxl. DP	€/ha	112	104.5	68	104.5	-10.5
incl. DP	€/ha	386	378.5	342	378.5	263.5
Labour requirement	h/ha	5.7	5.4	5.2	5.5	5.3

Source: Landesamt für Verbraucherschutz, Landwirtschaft und Flurneuordnung, Datensammlung Ackerbau....,
4. überarbeitete Auflage, Januar 2005; modified

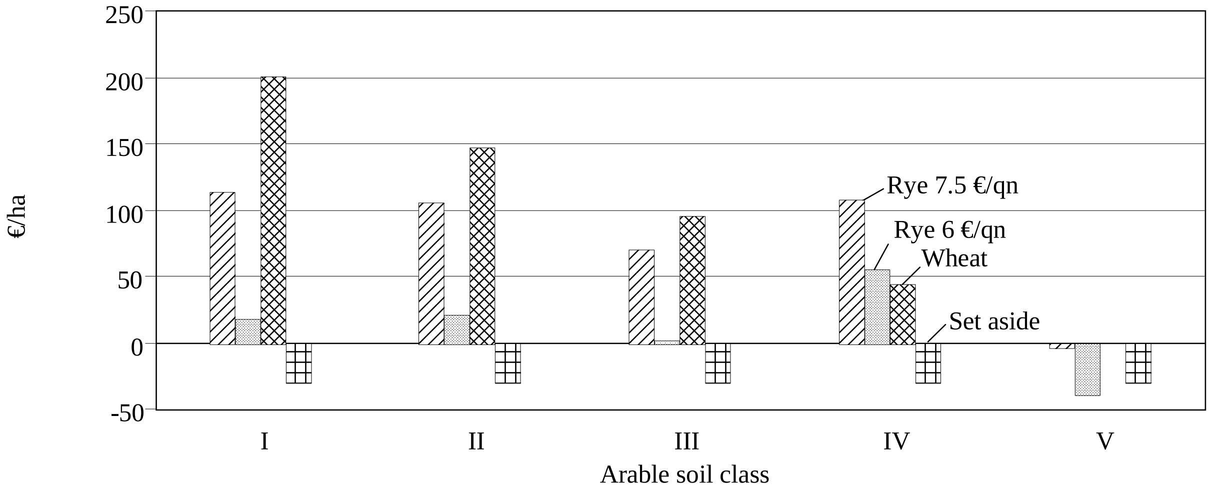
- **Table 3-116 - Gross margin calculation for winter wheat (Brandenburg)**

	Unit	Arable soil class I	II	III	IV
Large plots					
Output / yield					
Yield	qn/ha	75	63	50	38
Price	€/qn	9.2	9.2	9.2	9.2
Output	€/ha	690	579.6	460	349.6
Direct payments (DP)	€/ha	*274*	*274*	*274*	*274*
Costs variable					
Seed	€/ha	56	56	56	56
Fertilizer	€/ha	164	137	111	82
Plant protection	€/ha	117	101	74	58
Interest	€/ha	8	7	5	4
Machinery	€/ha	119	110	101	92
Drying	€/ha	25	21	17	13
Total variable costs	€/ha	489	432	364	305
Gross margin					
ecxl. DP	€/ha	201	147.6	96	44.6
incl. DP	€/ha	475.0	421.6	370.0	318.6
Fixed and other costs					
Depreciation	€/ha	89	80	71	64
Hired labout	€/ha	52	48	44	42
Land rent	€/ha	151	124	101	84
Others	€/ha	37	33	30	27
Revenue					
ecxl. DP	€/ha	-128.0	-137.4	-150.0	-172.4
incl. DP	€/ha	146.0	136.6	124.0	101.6
Labour requirement	h/ha	4.0	3.7	3.4	3.2
Fertilizer					
Nitrogen	kg/ha	169	131	113	85
Phosphorus	kg/ha	35	29	24	17
Potasium	kg/ha	112	94	75	57
Smaller plots (5 ha)					
Machinery	€/ha	128	118	110	102
Gross margin					
ecxl. DP	€/ha	192.0	139.6	87.0	34.6
incl. DP	€/ha	466.0	413.6	361.0	308.6
Labour requirement	h/ha	7.2	6.7	6.3	6.0

Source: Landesamt für Verbraucherschutz, Landwirtschaft und Flurneuordnung, Datensammlung Ackerbau.., 4. überarbeitete Auflage, Januar 2005, modified

With regard to competitiveness, gross margins under conditions of decoupling (exl. direct payments) are compared for wheat and rye assuming prices of 7.5 and 6 €/qn, and maintenance costs for set-aside (Figure3-30). For soil categories I to III wheat is competitive; with a rye price of only 6 €/ha gross margins are at a level of 5 to 25 €/ha. Rye is competitive in soil type IV. The gross margin is negative on soil type V. Here the question arises of whether to produce (rye) or to transform it to set-aside. As maintenance costs for set-aside are about 30 €/ha, it is worth producing rye if its price is at least 7.5 €/qn. If the price is only 6 €/qn, set aside is more favourable. In contrast to the former market regime, there is no upper limit for set aside under the 2003 CAP Reform, so a 100 % set-aside (fallow) of arable land could be realised on less favourable arable land. Rye production might be influenced by small subsidies derived from Modulation for this low level of gross margins on poor soils , if 50 €/ha56 - as proposed in Sachsen-Anhalt - were to be linked to rye production. If the amount were to be paid as a totally decoupled payment, it would not have an effect on (rye) production.

- **Figure 3-30 - Gross margin of rye, wheat and set-aside in Brandenburg**



Adaptation strategies in rye production

As previously mentioned, the economic performance of rye production worsened due to the 2003 CAP Reform:

Even price drops for rye to 6 €/qn are too high. It is clear that rye prices must be less than for wheat. Its substitution value for feed use is only 90 % of other feed cereals, processing costs for bread-making using rye flour are higher than for wheat.

On medium and good soils, rye can easily be substituted by other cereals, oilseeds, potatoes and protein crops.

On poor (sandy) soils, rye (other than lupines) is the only crop with agronomic value. If prices are low, set-aside (fallow) will become favourable. There is a risk of land abandonment on sandy soil regions, a further reduction of labour use and employment.

The aforementioned points are also a result of model calculations by Uhlmann and Kleinhanss (2002). Similar results were obtained in an analysis by local experts (v. Gaggern and Hanff, 2002). On soil type I, rye can be totally substituted by other crops, the substitution potential is estimated to be 45 and 20 % for soil type II and III, while for soil types VI and V rye can not be substituted. The option of land abandonment was not considered at that time (2002), because set-aside was restricted to 1/3 of the areas included in the arable crop scheme. Otherwise it was argued that farmers are not in favour of permanent set-aside (fallow) because of soil impoverishment, an increase of permanent weeds (i.e., couch grass) and the high cost of re-cultivating arable crops after several years of fallow. There is no clear indication for land abandonment at the moment. Production continues on arable soils, even on poor sandy soils. Farmers don't like to declare land 'fallow' because it is more strictly monitored within Cross Compliance as compared to, e.g., intercrops or rather extensive cropping activities.57 Surveys are needed to draw a clear picture of this situation.

Another strategy is oriented towards new market outlets for rye. Feasible technologies and uses which allow appropriate returns are being sought. The IFG (Institute of Cereal Technology) and the Institute for

56 In Brandenburg, the amount from Modulation will be paid on top of compensatory allowance for less favoured areas (LFA). It will be 8 €/ha; referring to rye (rye share 20 %) it will be 40 €/ha. The amount is used to compensate for the already decided reduction of LFA payments.

57 Personal information from Dr. Neubert and Mr Hanff, Landesamt für Verbraucherschutz, Brandenburg.

Agrartechnik are developing technologies for technical use included extruded foams, lactic acid, etc. Two private companies realised large investments in ethanol production using rye as the main raw material. New technologies in fermentation were developed which don't yet function properly so that full capacities of ethanol plants are not achieved during the first campaign. Other options, such as direct burning (for heating purposes) or as fermentation substrate for biogas are developed and realised.

3.6.3.2 Market balance and use of rye

As previously mentioned, rye is used for food, feed and 'technical uses'. Market balances are only available until 2003/04 (see Table 3-117). The last two years are not included, so that technical applications and changes in usage patterns can only be described based on experts' statements.

- Table 3-117 - Production and market balance for rye 1999/2000 – 2003/04 in 1 000 tons

	1999/2000	2000/01	2001/02	2002/03	2003/04+
Production	4.291	4.208	5.172	3.700	2.303
Beginning stock	4.045	3.644	4.254	5.533	5.466
Ending stock	3.644	4.254	5.533	5.466	3.601
Export	2.499	1.229	1.199	1.215	1.900
Import	47	41	33	91	38
Domestic use	2.240	2.410	2.727	2.643	2.306
- seed	112	110	96	55	65
- feed	1.038	1.255	1.564	1.563	1.240
- losses	111	108	127	98	70
- industrial	31	17	16	17	12
- food	948	920	924	910	919

Source: ZMP (2005) Getreide, Ölsaaten, Futtermittel. Marktbilanz 2005.

Due to changes in the rye area and yields the usable production amounted to 4.5 mill. tons in 1999/00, and to 5.2 mill. tons in 2001/02. Due to area reduction and low yields, the usable production decreased to 3.7 mill. tons in 2002/03 and to only 2.3 mill. tons in 2003/04. The use of rye in Germany in this period was rather stable at a level of 2.2 to 2.7 mill. tons.

The use as feed (mainly for bread-making) slightly decreased from 0.95 mill. tons in 1999/00 to 0.92 mill. tons in 2003/04.

The use as feed varied between 1 to 1.5 mill. tons. Feed use is partially a residual market for rye which doesn't reach the quality requirements for intervention and / or milling (flour). Feed use was relatively high in 2002 (and the following year), where only 42 % of rye reached food quality standards (Lindhauer et al., 2004). Feed use is also price sensitive.

Seed use, technical uses and losses are of minor importance.

1.2 to 2.3 mill. tons of rye were exported after intervention, the main part to third countries (export subsidies). Only a small part is exported for food to Belarus and Russia (see Table 3-118). Exports are mainly realised if locally produced rye in these countries doesn't reach quality standards. Exports to these countries were reduced considerably during the last years. Up to 0.6 mill. tons were exported to South Korea and Japan, where rye is partly used as fish feed in aquaculture.58 Rye demand decreased drastically in South Korea.

58 Rye has the advantage that the level at which it floats can be exactly determined through extrusion processes.

- Table 3-118 - **Export of rye 1999/2000 – 2003/04 in tons**

	1999/2000	2000/01	2001/02	2002/03	2003/04
Netherlands	45.188	62.456	239.854	179.610	196.894
Bellarus	180.890	29.072	85	60	70
Russia	441.633	135.631	5.852	-	-
South Korea	368.603	107.225	110.643	26.830	86.171
Japan	329.069	322.002	298.485	412.949	263.927
other countries	670.532	618.009	270.973	238.340	651.605
Total	**2.035.914**	**1.274.394**	**925.893**	**857.789**	**1.198.667**

Source: ZMP (2005) Getreide, Ölsaaten, Futtermittel. Marktbilanz 2005.

Within the EU, rye is mainly exported to the Netherlands which uses rye as cheap raw material for feed manufacturing. Imports increased during the last two years (not expressed in the table).

The main problem for rye exports is that there is no ‘large’ demand on the world market. Food demand mainly exists in those countries which are traditionally rye producers (Russia), while rye was not appreciated as feed even in Germany.

Therefore about 50 % of German rye was sold to intervention. As production was greater than total demand, intervention stocks increased to around 5 mill. tons in Germany. Intervention stock was mainly exported with high costs, because prices were much less than for other feed cereals on the world market. A totally different market situation has existed so far in Poland: Rye production was almost the same as in Germany, but without intervention half of it was used for food and the remaining part for feed. Had rye intervention not been phased out before EU accession by Poland, rye intervention stocks would have become larger than ever.

3.6.3.3 Using strategies and potential market outlets

Intervention sales are still taking place, but stocks will be exhausted in the near future. Therefore the future of rye production and its use will be determined by the market, i.e. prices, quality and technical innovations.

Flour and bread production

Rye is an important compound of ‘traditional’ German brown bread. Brown bread has dietary advantages like lower digestibility, lower energy, higher fibre content, etc. This is partially determined by the content of non-starch carbohydrates. However, rye use is more or less constant or slightly reduced.

Use of rye flour in bread-making has disadvantages compared to wheat flour and raises the cost of bread making. Therefore, rye flour is partly be substituted by wheat flour and malt extracts are used to provide the brown colour. This trend is particularly apparent in industrial bread-making, with an increased market share at the expense of artisan bakeries (Uhlmann and Kleinhanss, 2002).

Although the production structures for rye are changing, a real shortage of rye for food purposes does not exist. Should rye production be drastically reduced, such shortages could occur at the regional level. Considerable market potentials could only be realised if ‘white bread’ would partly be substituted by brown bread based on rye in other EU member states.

Due to the abolition of rye intervention, prices of food rye decreased drastically from 120 to 88 €/ton in 2004 (Figure 3-29). In response to shortages in rye supply production reduced and rye prices moved up to 100 €/ton at the beginning of the harvest year 2005/06 (ZMP 2005).

Map 4 shows the distribution of mills and milling capacities at Laender level. Of the total of 336 mills in 2003/04, about half are located in southern Germany. In total they processed 7.43 mill. tons of cereals for flour, 88 % wheat and 12 % rye. Seven percent of the flour is exported.

Milling capacities for rye (Table 3-119) are located mainly in Bavaria (19 %), Lower Saxony (16 %) and North Rhine-Westphalia (14 %). Only 3 % of rye milling capacities are located in Brandenburg, where about one quarter of rye production is located. Therefore it can be concluded that rye milling capacities are located close to the consumption of rye flour. Only 1.2 % of rye flour is exported.

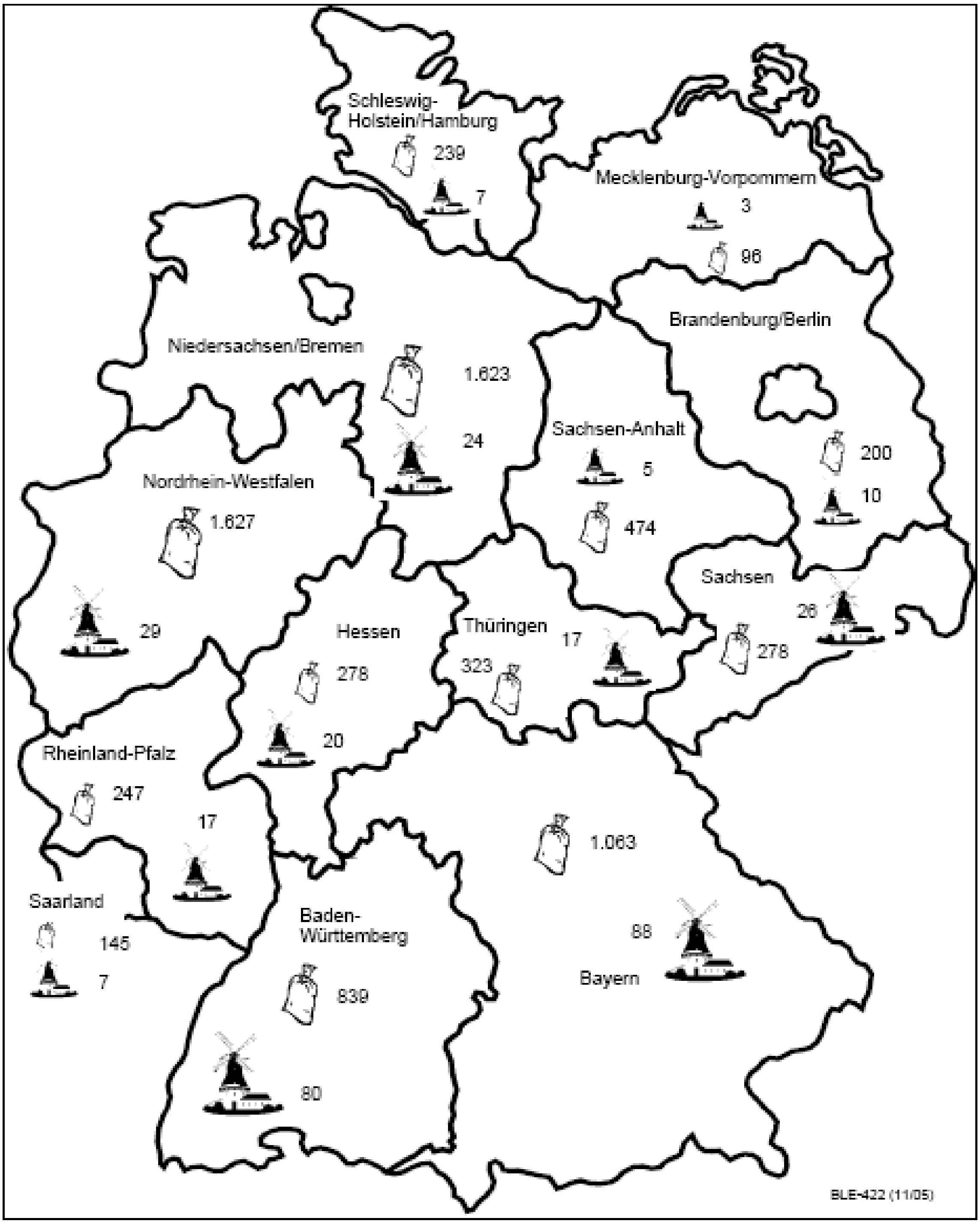
Feed use of rye

Due to its content of ‘non-starch carbohydrates (cellulose, beta-glucan, pentoses, pectin) rye is less digestible by animals. Due to dietary constraints rye can be used for feed for pig fattening, dairy cows and beef fattening. Technically it can be used as a feed component of up to 30 % (50 %). It should not be used for

Sows, as even small contents of ergot could induce spontaneous abortion

Laying hens, because of negative influence on flavour of eggs

Map 4: Distributation of grain mills at Laender level



Source: BMVEL (2006) Struktur der Mühlenwirtschaft 2004/2005.
http://www.ble/data/000BB54390CA139E89026521C0A8D816.0.pdf

- **Table 3-119 - Use of food rye in cereal mills (1 000 tons)**

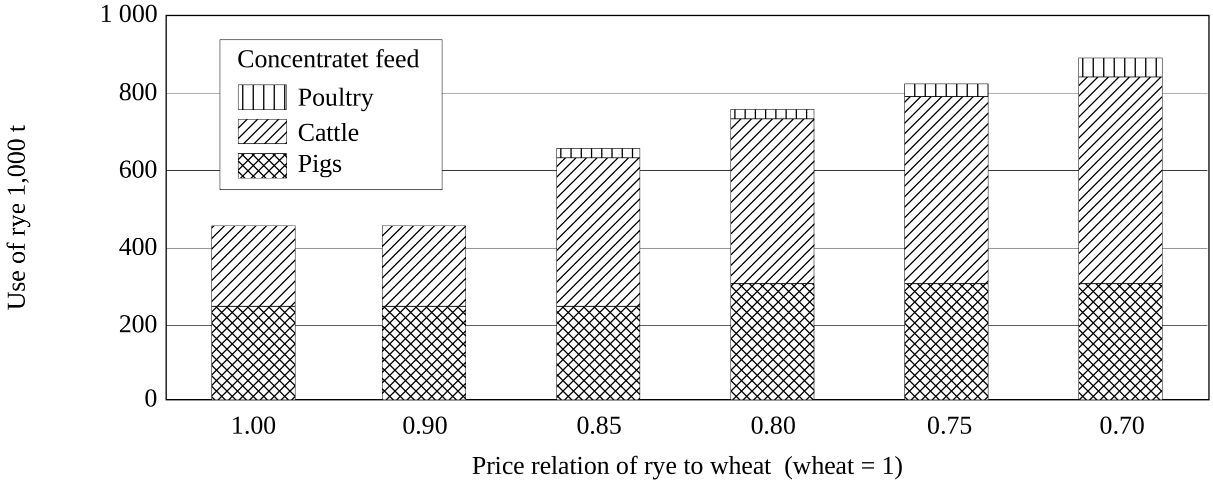
Size (1 000 tons)	D	BW	BY	BB/BE	HE	MV	NI/HB	NW	RP	SL	SN	ST	SH/HH	TH
0,5 t to 5 t	122	6	25	28	11	25	6	34	5	2	10	30	51	11
5 to 10 t	52	8	7		2		20	13	7	26	5			36
10 to 25 t	120	4	31		32				25					
25 to 50 t	164		41				29	73	12		51			
50 to 100 t	116	17	65											
100 200 t	193						90	56						
200 t >	127													
Total	**895**	**35**	**169**	**28**	**46**	**25**	**146**	**175**	**49**	**28**	**65**	**30**	**51**	**47**

Source: BMELV (2005), Struktur der Mühlenwirtschaft 2004/2005.
http://www.ble/data/000BB54390CA139E89026521C0A8D816.0.pdf

Other problems are:
Contamination by ergot, especially of hybrid varieties. Traditional breeds are less affected. Better hybrid breeds are coming on the market; another solution is a mixture of at least 10 % traditional breeds in seed.
Bad image of rye as feed with the effect that farmers refused to buy feed concentrates containing rye. This negative image became less important as the price of rye reduced such that rye became a competitive feed compound.
Model calculation by Uhlmann and Kleinhanss (2002) showed that rye will be competitive in farm processed pig feed, if rye is at least 10-15 % cheaper than other feed cereals. Market potential for rye in industrial feed manufacturing[59] due to lower rye prices could double in Germany from 0.4 to 0.9 mill. tons (Figure 3-31). The highest market potential could be realised in cattle feed, it is much less for pigs and it will be relatively small for poultry. This projections made in 2002 are not far from reality, because rye use in concentrated feed manufacturing increased from 0.67 mill. tons in 2000/01 to 1.15 mill. tons in 2004/05 (Table 3-120). Referring to the total feed use of rye it has to be mentioned, that only one quarter to one half of rye is used for farm processed feed. This is due to the following reasons:
Rye producers are mainly located on sandy soil regions, where farms located in the East of Germany don’t have much livestock.
Intervention prices were more attractive than the substitution value of rye as feed; therefore rye was sold insofar as quality standards of food rye were reached.

[59] Model calculation by a large commercial feed company. Results were aggregated at sector level.

- Figure 3-31 - Use of rye in concentrated feed manufacteriong - projections -



Source: Uhlmann, Kleinhanss (2002).

This will change after phasing out of the rye intervention. Due to production structures, the bulk of rye for feed will be used for concentrated feed processing under the condition that rye prices remain lower than of other feed cereals.
The feed strategy might be restricted by the new market outlet for rye as a raw material for bio energy.

Rye as a raw material for bio-energy
The production of bio-fuels is influenced by rising energy prices and the policy framework. Community regulations allow fuel tax exemptions for bio-fuels, further there is an obligation to replace 5.75 % to mineral fuels with bio-fuels in the year 2010.
The former Social Democratic/Green government introduced favourable measures for bio-energy with the aim of substituting nuclear energy with 'green energy':
Fuel tax exemption for bio-fuels until 2009 (ethanol, vegetable-oil esters, vegetable oils used as fuels), previously applied only for pure bio-fuels, but in the past two years also for mixtures with mineral fuels. The latter is a prerequisite for ethanol, which normally should be used in mixtures of up to 10 % of ethanol.
High minimum prices for electricity based on organic raw materials and an additional subsidy of up to 6 ct/KWh for biomass use.

- Table 3-120 - Use of rye (and cereals) for the production of contracted feed (1 000 tons)

Year	Cereals	Rye
1995/96	6.253	928
1996/97	6.682	849
1997/98	6.278	622
1998/99	6.734	704
1999/2000	6.763	571
2000/01	7.328	671
2001/02	8.096	867
2002/03	8.486	927
2003/04	8.534	1.062
2004/05	8.854	1.149

Ethanol

Large capacities for ethanol production have been built, are under construction, or are planned (Map 5), most of them are using cereals as raw materials. At least two use rye as a raw material. New technologies with regard to rye use are being developed. Due to technical problems these ethanol plants have not reached their full processing capacities yet. The capacity of two of these plants is 0.26 mill. m3, using 0.9 mill. tons of cereals. The market potential for cereals for ethanol production is estimated to be 2 mill. tons in the medium-term and 4 mill. tons in the long-term.

Based on estimates for the last year[60] 0.1 mill. tons of rye was used for ethanol production. Advantages of rye are the relatively low costs (rye prices are lower than for wheat), ethanol yields only slightly less than for wheat, although it has a 5 % lower starch content. Disadvantages are its lower feed value and problems if rye is contaminated with ergot or fusarium.

Based on model calculations ethanol production seems to be competitive. Key factors are high prices for mineral fuels, tax exemptions and low raw material prices. For the first ethanol campaign rye was contracted at a price of 6.5 €/qn. This price was not attractive for farmers so that their interest in such contracts were low; instead they reduced rye production. Due to increasing prices for food quality rye, rye prices for ethanol production of 8 to 9 €/ qn seems to be more reliable.

[60] Roggenforum

Map 5: Location of Bio-Ethanol plants (realised/planned)

Source: Kuhn (2004), Bio-Ethanolproduktion in Deutschland. NBE (Nordbrandenburger Bio Energie GmbH & Co KG), Fachtagung "Biogene Kraftstoffe", Congress Center Essen, March, 16,2004.

Biogas
In searching for alternative uses, rye, either milled grain or the whole crop (directly as silage), is also used for biogas production. Both possibilities are technically feasible. They seem to be economically feasible too under condition of large processing capacities, combined use of biogas for the generation of electricity and use of by-product heat for heating purposes. Beside the high price obtained for electricity sales, additional subsidies (6 ct/KWh) can be claimed for biomass use.
Heating energy
Direct burning of rye (grain) is based on the same strategy of searching for alternative uses. It is technically feasible for large units and electricity generation. Pollution problems have not been solved for burning systems for house heating. As for the other alternatives this option is mainly stimulated by subsidies and state intervention in favour of 'green energy.'
Industrial raw materials
In addition to the above-mentioned production of foams based on rye a pilot plant for the production of lactic acid based on rye has been built up in Brandenburg. Lactic acid is further processed to bio-polymers. The capacity of this pilot plant is 10 tons of lactic acid annually using 100 tons of rye. There is no information on future market potentials of lactic acid and derived products.

3.6.4 Summary and conclusion

Rye has been an important cereal in Germany. It is adapted to less favourable soil conditions (sandy soils) and it served as a basic raw material for traditional German 'brown bread'. It served for bread making, feed and in small quantities for alcohol (liquor) production. Due to the Common Market Organisation for cereals – intervention and unified intervention price – a virtual market was built up storing rye in large intervention stores. With the help of subsidies it was mainly exported. Exports became more and more limited as rye is not a bulk cereal on the world market.
With almost the same production, the market was balanced in Poland using half of its rye for food and the other half for feed. The situation would have become comparable to the EU-15 if the rye intervention had not been abandoned before EU accession by Poland. Short term effects of this measure in Germany were the following:
Significant price reduction, especially for low quality rye
Reduction of production
Increasing use as feed
Search for new market outlets, mainly in highly subsidized markets of bio-energy.
From an agronomic point of view, rye is the only cereal which can be grown on sandy soils. It is less sensitive to drought and needs less inputs, but yields are below average cereal yields. Under the former arable crop regime with coupled premia and an upper limit of 33 % set-aside of COP areas, rye production was stabilized.
Under decoupling, production has to compete with non-production in maintaining the land with regard to Cross Compliances. (i.e., cutting the grass / weeds once a year). Additional premia derived from Modulation (Pillar II) funds are being used to stabilise rye production.
Market potentials for rye are the following:
Food use, mainly for brown bread, is rather constant or digresses slightly due to technical innovation (colouring brown bread with malt extracts)
Feed use in combination with other energy-rich feed compounds, which is mainly determined by a favourable price relationship
Production for the manufacture of bio-fuels / bio-energy. Large market potentials exist. Although increasing energy prices, these production lines are mainly favoured by national regulations (minimum prices for electricity from biomass, fuel tax exemption) and additional subsidies (non-food bonus for electricity based on biomass), investment aid, etc.
From the author's point of view, current bio-energy strategies are not economically sustainable in the medium term.

3.7 *The dairy sector supply chain in Ireland*

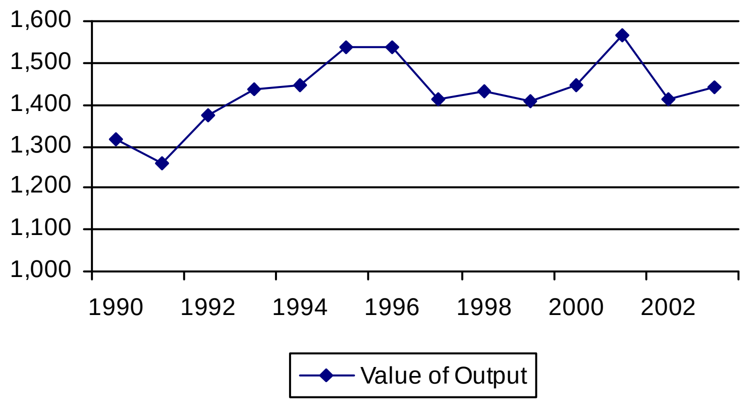
3.7.1 Structure and Functioning of the Dairy Sector Supply Chain in Ireland ante the MTR

3.7.1.1 General Overview of the Supply Chain

The Irish dairy industry is a very important sector of the Irish economy. It is the single largest contributor to gross agricultural output, over 30 percent in 2003. Ireland has a long tradition and success as a major producer and exporter of quality dairy products. There are approximately 25,000 dairy farmers and the total amount of milk processed is 5.6 billon litres. The processing sector employs 9,000 people. The industry has a total output of €2.9bn. With a large dairy industry relative to domestic population, Ireland exports a much greater proportion of its dairy output that any other EU country, approximately 75% of product was exported in 2003. Six companies process 80% of the milk pool (top 3 process approximately 55% of the milk pool). Kerrygold is a top international food brand.

Ireland has a total land area of just over 7 million hectares. Agriculture utilises approximately 4.4 million hectares. Almost 90 percent of Irish farmland is under grassland and rough grazing. In 2003 the gross value added in the agricultural sector accounted for approximately 2.2% of national gross domestic product compared to over 8% in 1990. While agriculture accounted for approximately 6 percent of total employment in Ireland in 2004. The national milk quota is approximately 6 billion litres of milk supplied by the national herd of dairy cows of 1,176,000 head of animals. Within the agricultural sector, dairy products account for approximately 30 percent of the €4,800 million worth of output in 2003. The evolving value of dairy products is displayed in Figure 3-32 below, although the variation is quite low due to the constraints of milk quota.

- **Figure 3-32 - Value of Dairy Output**



Source: Central Statistics Office of Ireland 2005

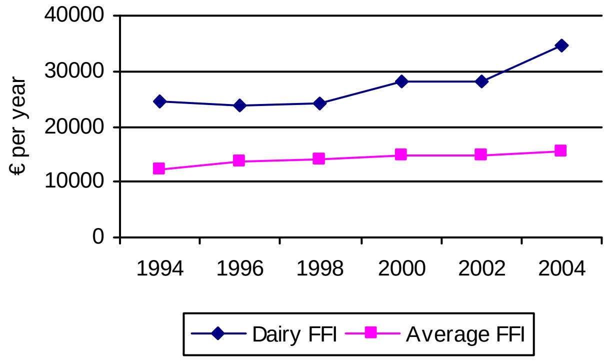
There are two main dairying regions in the Ireland, the south-west and the north-east (which extends into parts of Northern Ireland). The south-west dairying region includes north and east Kerry, almost all of Cork and Limerick and substantial parts of Tipperary, Waterford and Kilkenny, as well as south-east Clare. Almost 70% of the dairy herd is located in the South-West, Mid-West and South-East regions. While both the main dairying regions are important, there are substantial differences between them in terms of scale and intensity of production with dairy farms in the south-west being the larger and more intensive producers (Lafferty et al, 1999).

3.7.2 The agricultural phase

3.7.2.1 The Farming Sector

In Ireland, dairy production is generally considered the most lucrative farming system. In 2003, the average family farm income on full-time dairy farms in Ireland was approximately €33,000 compared to just under €16,000 on cattle rearing farms, the poorest sector (NFS 2003). National Farm Survey figures also show that on average, dairy farm incomes exceed average industrial wages. Figure 3-33 shows average dairy farm income in Ireland and average farm incomes across all systems from 1994 to 2004. Throughout the period average incomes on dairy farms exceeded the income on farms across all sectors.

- **Figure 3-33 - Family Farm Income: Dairy Farms and All Farms**



Source: Teagasc National Farm Survey Data

Despite the apparent relative profitability of dairy farming, dairy farm numbers are declining faster than any other system of farming. According to DAFRD figures (2003) there are approximately 25,000 active dairy producers in Ireland currently supplying the national quota of 5,000 million litres of milk. This compares to 28,000 in 2001 and a significantly larger 42,000 active suppliers ten years earlier in 1993.

- **Table 3-121 - Dairy Farm Numbers and Size Distribution61**

Size in '000 Gallons	<20	20 < 40	40 < 60	60 < 100	>100	Total
Number of Producers 2003	5,451	9,123	5,371	4,060	1,204	25,209
Percentage of total 2003	22	36	21	16	5	100
Number of Producers 2001	6,530	9,840	7,248	3,168	1,028	27,814
Percentage of total 2001	24	35	25	12	4	100
Number of Producers 1993	22,311	11,626	4,470	2,226	757	41,390
Percentage of total 1993	54	28	11	5	2	100

Source: Department of Agriculture Food and Rural Development

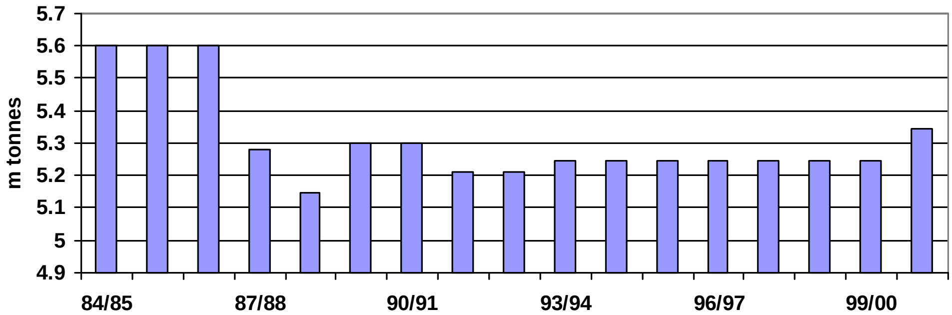
Table 3-121 shows total dairy farm numbers and their size distribution for selected years. From 1993 to 2003 the total number of dairy producers declined by approximately 40 percent. With a fixed national milk quota, a decline in the number of producers has consequent structural effects, specifically concentration of quota onto fewer holdings. In 2003, 22 percent of producers supplied 20,000 gallons or less compared to 54

[61] This data is not available in litres. One gallon equals 4.54 litres.

per cent of producers in 1993. The number of very large farms, producing 100,000 gallons or more, has increased by over 70 percent in the ten year period. The pace of structural change in dairy farming has been faster than any other farming sector. The figures above show a 40 percent decline in dairy farm numbers in the ten years following 1993. CSO figures show that over the same period the number of cattle farms decreased by less than 15 percent.

Dairy production in Ireland, as in all other EU member states, is constrained by milk production quotas. When the quota system was introduced in 1984, the initial milk quotas were fixed at 1981 deliveries plus 2% for most member state, with Ireland and Italy being exceptions. Ireland was allowed to use the 1983 milk delivery volume, which was then 5.28 million tonnes, supplemented by an additional 245,000 tonne allocation from the Community reserve. Figure 3-34 shows quota volumes allocated to Ireland since the introduction of the quota system.

- **Figure 3-34 - Milk Quota Volumes: Ireland 1984/85 – 2000/01**



Source: EC Dairy Facts and Figures

The drop in EU milk production, which occurred in 1985 and 1986, did not have the desired effect of restoring a balance to the dairy sector. In April 1986, under a programme known as the Community Cessation Scheme, the Council decided to further reduce the total guaranteed quantities in 87/88 (by 2%) and 88/89 (by 1%).More importantly, a temporary quota cessation scheme was introduced in 1987/88. Under this scheme 4% of the quota was suspended in 87/88, 5.5% in 88/89 and 4.5% in 89/90, 90/91 and 91/92 after which time it was decided that the "temporary" cessation would continue indefinitely. The quota system was renewed again in 1992 and extended until the end of the century. As part of the MacSharry CAP reforms in 1992, it was initially proposed to reduce the quota by a further 3%, although ultimately this policy was not contained in the reforms that were finally agreed. However, the co-responsibility levy was abolished at this time. There were no further changes to the quota system through the rest of the 1990's. Ireland was among five EU member states which were granted quota increases in the 2000/01 and 2001/02 milk years. Ireland's quota reference volume increased by 2.9% over this period, with no change in the butterfat reference level (European Commission 1999). Milk production levels in Ireland currently accounts for 4.1% of the total production in the EU 25.

In Ireland the transfer of milk quota between farmers is operated through an administered system and for the most part there is no private market for the sale, purchase or lease of milk quota rights that are not attached to land. All producers exiting the industry are obligated to sell their milk quota to the central restructuring pool at an administratively determined price. The Minister for Agriculture announces the milk quota price annually. Prices since the scheme began in 1998 are presented in Table 3-122.

- **Table 3-122 - Restructured Quota Price Euro per Litre**

Year	1998	1999	2000	2001	2002	2003
Price € per Litre	0.44	0.43	0.38	0.34	0.30	0.31

Source: DAFRD (2002) 1997 to 2002 prices

Milk quota is sold from the restructuring pool to producers that wish to expand production at the administratively determined prices presented above. However, access to restructured quota is restrictive; the resale of quota is governed by priority groupings which are inversely related to current milk quota size. Over the last number of years, 50 per cent of the milk that entered the restructuring scheme was allocated to the first priority group, i.e. those with quotas less than 200,000 litres, 35 per cent of the quota was allocated to the second group, those between 200,000 and 300,000 litres and the last 15 per cent was allocated to those exceeding 300,000 litres. In addition to size discrimination, access to quota is also spatially ring-fenced and co-operative based. This means that quota belonging to an exiting farmer from, for example, the north-western part of the country, cannot be reallocated to a producer in the south, the underlying objective being the retention of milk quota in disadvantaged areas.

3.7.2.2 Production Systems

The Irish climate is cool, humid and maritime characterised by an evenly distributed annual rainfall and relatively narrow annual temperature range, averaging 4.5°C in winter and 15.5°C in summer. These climatic features promote a long grass-growing season ranging between 330 days/year in the South-West to around 250 days/year in the North-East. Hence the predominant approach to milk production in Ireland aims to maximise grazed grass in the diet of the dairy cow. This involves compact spring calving to grass over a 90-day period (February to April) with lactation length varying from 280 to 300 days. In this system almost 90 percent of the diet is grass based either as grazed grass or grass-silage. It has been estimated that up to 85 percent of milk produced in Ireland comes from grazed grass (Dillon & Stakelum, 1999). A substantial proportion of the silage component of the diet is fed during the non-lactating period of between 65 to 85 days during the winter. Data from the National Farm Survey 2000 (Connolly et al., 2001) indicate that average stocking rates on dairy farms in Ireland are just under 2.0 livestock units to the hectare.

With the exception of liquid milk producers, Irish dairy farmers have continually adjusted the date of calving, so that through compact calving the total herd calves around the time of lowest milk production cost. While this maximises production cost efficiency from a grass-based production perspective, it also results in increasing supply levels in the peak months of March to June. The table below illustrates how seasonality has actually gradually disimproved over the decade (Prospectus 2003). In 2001, the peak month production (May), as measured by milk deliveries, was six times the lowest month's production (January). This ratio has gradually disimproved over the last decade, having gone as low as 4.7 in 1993, see Table 3-123. This seasonality leads to poor capacity utilisation in the Irish processing sector, adding to the operating costs of processors. Ireland's capacity utilisation (measured by 12 times peak month production as a percentage of current total production) has only registered a slight increase from 57.9% in 1986 to 60.8% in 2001, (Prospectus 2003).

- **Table 3-123 - Seasonality of milk supply ('000 tonnes)**

	1991	1997	1998	1999	2000	2001
Peak Month delivery	740	748	700	710	717	731
Low Month Delivery	137	131	124	119	122	122
Peak to trough Ratio	5.4	5.7	5.6	6.0	5.9	6.0

Source: Department of Agriculture and Food (2002)

3.7.3 The farm trading phase

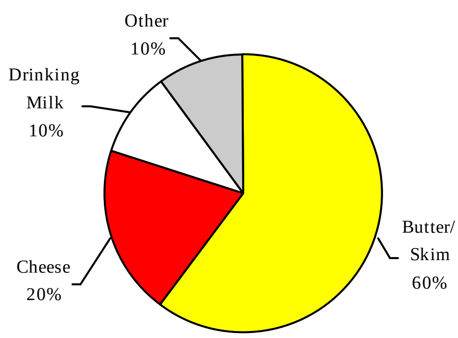
3.7.3.1 Farm to Factory

Generally milk is collected at the farm by the milk processors in refrigerated bulk milk tanks. For farmers producing small volumes of milk and/or who are located in remote areas, milk may be brought by the farmer to a central collection point in mobile refrigerated tanks from where it is collected in bulk milk lorries by the processors. A recent survey on milk collection found that the industry as a whole is almost 100 per cent based on refrigerated milk collected ex-farm. In the Peak production season milk is collected every second day, in the low peak season it is collected three times a week and in the trough season it is collected only twice a week. It is therefore necessary for farmers to have refrigerated bulk tanks. The structure of primary production has resulted in high milk assembly costs, estimated to be double those of Ireland's major competitors (Operational Programme for Industrial Development, Food Sub-Programme, 1995). Under-utilisation of vehicles due to seasonality of output also contributes significantly to the high milk assembly costs. Based on specific company costs, the weighted national average milk transport cost was 1.13 cent per litre or about 57 million per annum, (Quinlan et al 2005).

3.7.3.2 Product Portfolio and Pricing

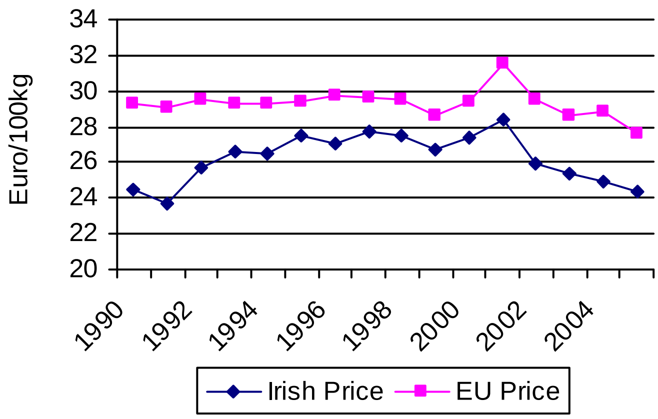
The milk produced in Ireland is primarily for the manufacturing market. Due to the small population base in Ireland, fluid milk comprises only a small portion of milk usage, i.e. 10%. A high proportion of Ireland's output is still in base or commodity type products such as butter, powder, casein and bulk cheese which results in a lower level of value being added. The production portfolio of Irish products is presented in Figure 3-35.

- **Figure 3-35 - Milk Usage in Ireland**



Approximately 60 percent of the milk produced in Ireland is manufactured into butter and skim milk powder, hence Ireland's considerable reliance on the intervention scheme. A further 20 percent of the milk is used to manufacture cheese products. Crucially, the seasonality problem outlined above restricts the types of products that can be produced, and thus constrains the industry's potential to produce certain products that require year round milk supply. Hence the industry is confined to producing a "low value added" product mix and resulting in significant reliance on the intervention scheme. This reliance is reflected in the fact that Ireland is the highest ranking EU country in terms of percentage of milk allocated to butter and amongst the lowest ranked in terms of milk allocation to cheese. Taking the utilisation of skim milk, Ireland is also the highest ranked in terms of allocation to skim milk powder but is also highest ranked in terms of allocation to casein and its derivatives (Keane, 1995). This dependence on intervention means that the milk price in Ireland tends to be lower than the average EU milk price. The data presented in figure 3-36 shows the differences in the two milk price series.

- **Figure 3-36 - Average Irish and EU Farm Level Milk Price**



Source: Donnellan (2005)

The market for organic food in Ireland is currently very small. It was valued at up to €25 m in a report by Cowan, Henchion, O'Reilly and Conway, published by the Western Development Commission (2001). This represents only about 0.4% of the value of the total food market, compared to a 2% average in the EU. Dairy products have a 10% share of all organic sales. Sales are about half of the European average. The liquid milk market in Ireland is valued at €430 m with consumption per capita at about 146 litres per annum. Market share for organic liquid milk is less than 0.1 % of this so the market is very much a niche. Retailer premia vary from 20 to 40%.

3.7.3.3 Dairy Processors

The majority of the milk produced in Ireland is handled through co-operatives. Co-operatives, some of which are co-op-PLCs, are responsible for one hundred percent of the milk collection, 97 percent of the milk processing and 65 percent of livestock marketing. The Irish co-operatives are owned and controlled democratically by the farmers. By pooling their resources together, farmers are able to increase their purchasing power, boost their marketing efforts and reduce the risks associated with new sole trading. However, in recent years four of the largest five processors changed their ownership structure from co-operative to a hybrid co-op/plc. The reasons for this change in ownership structure include: the need to gain additional capital for growth, the need to provide shareholders with current market value for their shares and the need to provide a mechanism to motivate and reward executive staff (Harte, 1995).

There are currently 15 processors of milk, plus baby food and chocolate crumb manufacturers (excluding liquid milk). At present, six companies process 80% of the milk pool of 5.338 million tonnes, with this number rising to eight processing 90% of the milk pool. The concentration of processing is significantly less than other countries. There is limited data available in relation to processing plants, but the table below, taken from the 2003 Prospectus Report, provides an overview of how the number of processing plants has changed over the last decade.

- **Table 3-124 - Number of Irish Processing Plant by Product Output**

	1991	1994	1997	1999	2000
Cheese	9	12	11	10	10
Butter	20	19	16	15	11
Powder	12	14	11	13	11
Casein	-	-	-	7	7

Source: Prospectus 2003 Report

The most noticeable change in the main product plants has been the reduction in the number of butter plants, falling from 20 plants in 1991 to 11 plants currently, with butter production falling by just 8.6% during the same period. It is also worth noting that while the number of cheese plants has only risen from 9 to 10 over the last decade, production of cheese has risen by 67% in this period. In addition to increasing concentration, the dairy companies have diversified internationally and out of the dairy industry in response to milk quota restrictions. While the number of companies processing the majority of the milk pool provides an indication of the level of concentration and the scale of individual companies that exists within an industry, it is also necessary to investigate other measures of scale. One such measure of scale is the average size of plants, as measured by the average annual production of each product by each plant. Changes in production are taken into account by determining the average plant output as measured by the average annual production for each plant.

- Table 3-125 - Average output of plants - Ireland (average annual production ’000 tonnes)

	1991	1994	1997	1999	2001/2
Cheese	8	7.8	7.8	9.7	12
Butter	7	6.7	8.7	9	11.6
Powder	17.2	11.8	13	10	9.9
Casein	-	-	-	6.6	6.9

Source: Prospectus 2003 Report

As co-operatives tend to be owned and operated by their members, i.e. the farmers, the chief objective of the majority of the Irish co-operatives has been to pay the maximum milk price possible to the farmers. This policy has resulted in typically low levels of re-investment in the co-operatives and hence many of the processing facilities tend to be old and out of date. Consequently, the amounts spent on new product development, reinvestment research and development is lower in Ireland’s dairy industry than among our competitors in Denmark and the Netherlands. According to the Prospectus report, Ireland’s expenditure on R & D was 0.2% of turnover that is well below the levels in the Netherlands (0.4%) and New Zealand (0.6%). Ireland’s reinvestment rate is 2.6% of turnover that again is less than the industry average in the Netherlands (2.8%), New Zealand (4.8%) and Arla (4.5%).

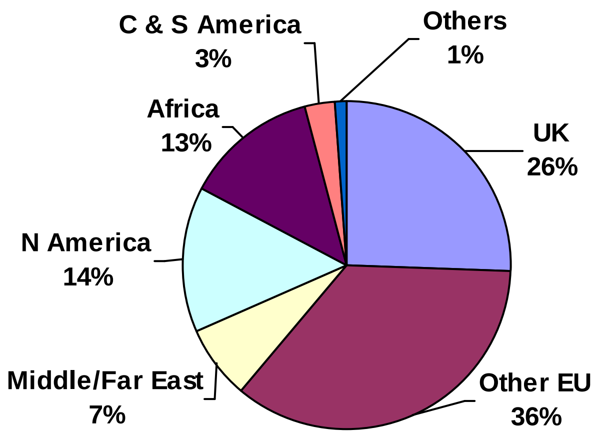
3.7.4 The Product Placement Phase

3.7.4.1 Product Destination

Ireland is a major user of EU market intervention support for butter and skimmed milk powder. Ireland has relied heavily on this EU support as a means of selling both butter and skimmed milk powder. Statistics from the Irish department of Agriculture show that Ireland has accounted for between 27% and 35% of the EU intervention for butter, in 2002 even though it accounted for only about 8% of production.

As explained, due to the small domestic population base the majority of Irish milk production is exported as Ireland has a self-sufficiency rate of over 400 percent. However, Ireland’s peripheral location and island status puts it at a commercial and logistical disadvantage. Irish processors face market access costs caused mainly by the additional transport costs involved in getting their product to market. The distance from market also limits the types of product that can be produced as the possibility of short shelf life products is constrained. Almost 90 percent of the butter produced in Ireland is exported, 85% of the skimmed milk powder, 90 percent of the casein, 90 percent of the whole milk powder and 80 percent of the cheese. As shown in figure 3-37, over 60 percent of dairy exports remain within the EU with a quarter of all export dairy product destined for the UK market. North America and Africa are of about equal importance taking approximately 14% of the exported product.

- **Figure 3-37 - Export Destination for Dairy Products**



Source: Irish Dairy Board 2005

The growing scale and market share of retailers is impacting on the sale of dairy products. Many of the retailers have now developed in more than one country and are expanding significantly beyond their original market. This very large scale is giving them enormous buying power and they are passing more of the costs onto suppliers. An example of this is in Ireland demanding contributions to advertising and promotion, merchandising, development of own label products. The foodservice sector has also been going through dramatic change and rapid growth. It has been estimated that in Ireland the food service sector is growing at twice the rate of the retail sector. A number of the Irish dairy co-ops and companies supply the foodservice sector including Glanbia, Kerry, Dairygold, Carbery and others.

3.7.4.2 Marketing

The Irish Dairy Board (IDB), originally known as Bord Bainne, was founded in 1961 to market Irish dairy produce to export markets. The IDB is owned and operated by the dairy processing co-operatives. The IDB has developed an extensive international packing and distribution infrastructure. It provides a marketing and distribution capacity to Irish processors, particularly, to the smaller to mid-sized processors who distribute the vast majority of their output through the IDB. It purchases commodity products from the processing companies and sells them in export markets. Kerrygold, its main brand, has been developed over the last 40 years into a major international dairy brand, which is now sold in over 60 countries. Although butter remains the leading product, the Kerrygold portfolio now includes a range of cheeses, milk powders and other diversified products. The produce of all co-operatives is marketed internationally through the Irish Dairy Board under one brand name. The IDB offers the processors, especially smaller ones, the advantages of achieving rapid penetration of overseas markets in a less risky manner than individual marketing schemes.

3.7.4.3 Distribution

There is limited data available on the routes to market or distribution channels employed by the Irish dairy processing sector. However, the Irish Dairy Board has broken down sales of Irish product by product type, and the Prospectus report has also compiled sales data. The figures from the IDB, in the table below, indicate a significant movement away from commodity products towards consumer brands and food ingredients.

- **Table 3-126 - Sales of Irish Dairy Products by Product Type**

Percentage of Sales	1990	1996	2001
Consumer Brands	26	33	41
Food Ingredients	20	24	32
Commodity	54	43	27

Source: Irish Dairy Board 2002

Retail is the most important distribution channel for butter. Table 3-127 showing the distribution channels employed by the dairy processing sector is based on data gathered by the Prospectus Report and the Irish Dairy Board for 2001. Retail is the most significant channel for butter, with 45% of sales, followed by industrial ingredients representing 29%. Cheese sales to retail are also strong at 33% but are dispersed across all channels, including 7% in foodservice. WMP sales are predominantly for further processing, while 59% of SMP is sold as an industrial ingredient.

- **Table 3-127 - Sales of Irish Dairy Products by Distribution Channel**

Percentage of Sales	Butter	Cheese	WMP	SMP
Retail	45	33	19	2
Industrial ingredients	29	27	15	59
Wholesale	13	14	4	35
Further processing	7	8	58	4
Foodservice	1	7	4	0
Other	5	11	0	0

Source: Prospectus Report

3.7.5 The Enforcement of the MTR in the Supply Chain

3.7.5.1 MTR Decisions on Product Pricing

As part of the MTR agreement it was decided that the quota system will be retained until 2014/15 and the 1.2% EU quota increase will go ahead as outlined in Agenda 2000 but there will be no further increases in milk quotas are agreed. The MTR also agreed reductions in the intervention prices for some of the main dairy products. From 2004 intervention prices are reduced on a phased basis by 25 per cent for butter (over four years) and 15 percent for skimmed milk powder (over three years). The target price for milk is abolished. There will be a gradual phasing in of a 30,000 tonne annual limit on butter intervention purchases before tendering, starting from 2004 at 70,000 tonnes and reaching 30,000 tonnes (in 10,000 tonnes annual reductions) by 2008.

While there are no specific reductions in the intervention prices for beef in these reforms, calf prices are expected to decline. Under Agenda 2000 over €500 could be claimed in premiums in the lifetime of a male beef animal, in the form of special beef premiums, slaughter premiums and extensification premiums. For the past number of years, some of this €500 was transmitted back into the sale value of calves and resulted in a higher calf price. Dairy farmers who typically sell calves soon after birth benefit from this price transmission effect. In a scenario with complete decoupling, it will no longer be necessary to stock male animals in order to receive that €500 and therefore it is expected that the demand for male calves will decline. With the supply of male calves from the dairy herd remaining more or less static and the demand for calves declining, the price would be expected to decline also. This is also likely to impact negatively on farm income on dairy farms in Ireland.

3.7.5.2 MTR Decisions on Price Compensation and Payment Scheme

Following extensive analysis and consultation, on 19 October 2003, Ireland became the first member state to announce its choice of options for implementing the decisions which were announced under the MTR. The decision was to be the maximum amount of decoupling of direct payments from production and the decoupling was to be done at the earliest possible date. The single farm payments were to be made on a 'historical' basis and there would be no regionalisation. The decoupled payment for a farmer will be based on the average of the relevant aid payments over a reference period of 2000, 2001 and 2002. This will be divided by the area of 'eligible land' on the farm. Eligible land is any type of agricultural land, except that used for growing permanent crops, (such as fruit and forestry) and includes land used for sugar beet even though there was no direct 'compensation' payments for producers of this crop.

A dairy premium compensation package will partially offset these milk price reductions. This dairy compensation will be introduced from 2004 onwards. The payments have two components. The first component is a payment associated with milk quotas held whether owned or leased in on March 31st 2005. The second component can be distributed as Member States see fit once the basis for its allocation is objective. In total if these payments are paid on a flat rate basis they are equivalent to €11.81 per tonne in 2004, €23.65 per tonne in 2005 and €35.5 per tonne from 2006 to 2012. This is equivalent to 1.2 cent/litre in 2004, 2.4 cent/litre in 2005 and 3.6 cent/litre from 2006 onwards. This compensation replaces the 2.5 cent/litre previously scheduled under Agenda 2000. This compensation does not fully offset the decline in the value of milk sold. The compensation will be decoupled from production from 2005 onwards. This means that farmers that exit production in 2006 will be compensated for milk produced in 2005 up until 2012 even though they are no longer in production. Similarly, farmers expanding production and purchasing quota after 2005 will only receive the milk price and not the associated compensation as they did not supply the quota in 2005.

The dairy compensation becomes part of the Single Farm Payment Scheme. The estimated Single Farm Payments per farm are presented in Table 3-128.

- **Table 3-128 - Estimated Entitlement by Farm System in Ireland 2005.**

Farm System	Average Entitlement (Euro)
Dairy	10,852
Dairy and Other	17,310
Cattle Rearing	10,513
Cattle Other	14,346
Tillage	21,526
Sheep	9,877
Average – All Systems	12,309

Source: Breen and Hennessy 2003 p71 and Thorne, 2004.

The average Single Farm Payment per farm is €12,300. However, there is some variation across systems. Mixed dairy farms, on average, have the highest SFP of €17,300. These farms have a dairy enterprise but are not specialist they typically rear their own calves for beef or else grow cereals in addition to producing milk. Such farms would be in receipt of dairy compensation as well as substantial livestock and cereal premium. Previous figures showed cattle farmers' high reliance on direct payments, although they are in receipt of significant volumes of direct payments, they typically tend to operate smaller operations than dairy farmers and as seen on a per hectare basis receive a larger payment than the specialist dairy farm.

Given that the size of Ireland's milk quota is to remain unchanged following MTR, it is envisaged that the majority of the implications of the reform will occur at the farm level. It is estimated that the milk quota will still be filled and so the processors will manage the same amount of product, passing a lower price on to the farmers.

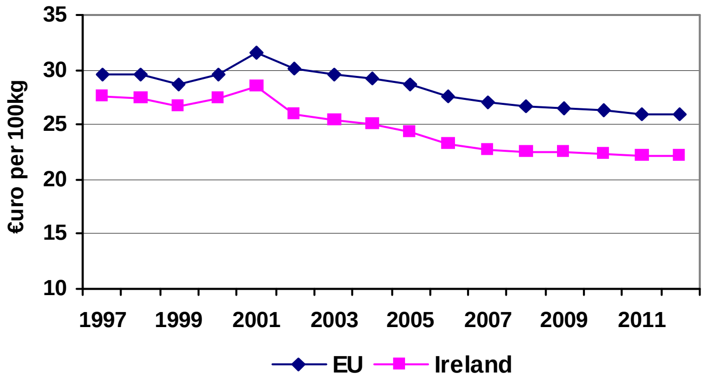
3.7.6 The MTR Expected Effects

3.7.6.1 The Farm Level Effects

It is projected that under the MTR the price of all dairy commodities will fall. Further reductions in the intervention prices of butter will considerably reduce the market price of butter relative to the level it would have been under Agenda 2000. SMP prices should remain broadly at Agenda 2000 levels since the Luxembourg Agreement will mean similar SMP intervention price cuts to those already agreed. Relative to where existing policies would have brought us by 2012, cheese, butter and WMP price reductions of 8 %, 4 %, 6 % respectively are projected under the reform.

The combined effect of the reforms examined to reduce the EU and Irish average milk price by about 5% relative to the 2012 Baseline (Agenda 2000) position. This would put Irish milk prices at about 22 cent per litre in 2012, some 4 cent below the EU average. The overall effect on EU and Irish milk prices of the scenario is summarised in Figure 3-38.

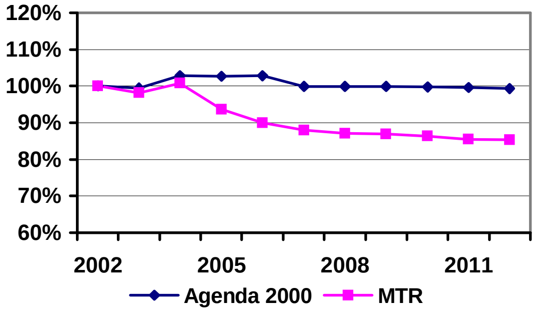
- **Figure 3-38 - EU and Irish Farm Milk Price under MTR to 2012**



Source: FAPRI-Ireland Partnership Model (2003).

Reduced calf and milk prices will have a negative effect on the return to milking cows. The value of milk sales plus coupled compensation along with enterprise gross margin is presented in Figure 3-39. Under Agenda 2000, compensation for the price reductions was to be coupled to production and therefore is included in the value of milk sales. However, under the MTR, dairy compensation is decoupled and therefore is not included in the value of milk sales. The total value of milk sales is 15 % lower by 2012 under the MTR than a continuation of Agenda 2000, because the compensation is decoupled from production, it is not included in the return to milking cows.

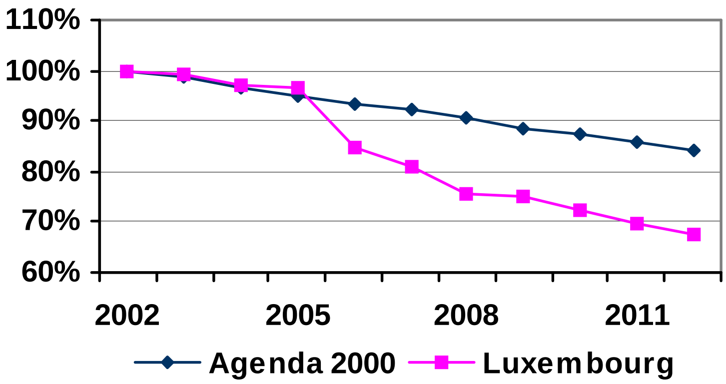
- **Figure 3-39 - Value of Milk Sales and Coupled Compensation**



Source: FAPRI-Ireland Farm Level Model (2003).

A more accelerated exit from dairy farming than has been experienced in recent years is expected in the future due to the changes in the coupled profitability of dairy farming resulting from the MTR. The decoupling of dairy compensation makes retirement or exit from dairy farming more attractive as this payment can be retained even if milk is no longer produced. Lower margins are expected to push farmers out of the industry while decoupled dairy compensation is likely to entice them out. As dairy compensation is decoupled from production from 2005, it is projected that a large number of farmers will exit or retire from dairy farming, sell their milk quota and retain their decoupled payments. Figure 3-40 shows projections of dairy farm numbers under a continuation of Agenda 2000 and also under the MTR reforms.

- **Figure 3-40 - Projections of Dairy Farm Numbers**



Source: FAPRI-Ireland Farm Level Model (2003)

There were approximately 26,500 dairy farmers in 2003, if past exit trends were to continue, we should expect to have about 22,000 dairy farmers by 2012 under Agenda 2000 policy, - a 15 % reduction on current numbers. The FAPRI-Ireland's farm level research (Breen, Hennessy and Thorne 2005) projects that post decoupling, farm numbers will fall more significantly. It is projected that there will be a 33 % reduction in dairy farm numbers over the next ten years.

3.7.6.2 Other Supply Chain Effects

Relatively little research has been conducted on the likely impact of the MTR on the dairy processing sector. However, the research conducted at farm level suggests that despite the fall off in dairy farm numbers, the milk quota is still projected to be filled and therefore it is expected that average farm size will increase in line with the decline in farm numbers. As the milk quota transfer system is regionally ring-fenced, it is projected that farmers in “regionally disadvantaged areas” will increase farm size faster than those farming in areas where the rate of exit is slower. The regional ring fencing of quotas is tied to co-operative areas. This means that even if there is a large decline in the number of suppliers, it is unlikely that any particular co-operative will lose product volume as it is more likely that the product will be produced by other expanding farmers in the same region. In other words, the co-operatives are more or less guaranteed their product volume. Fewer farmers however, will mean a concentration of production onto fewer units and therefore lower collection costs for co-operatives.

The major implication of the MTR for the dairy processing sector is the effect on intervention prices. As explained earlier, the Irish dairy sector is largely dependent on the intervention scheme as the processing sector is mostly involved in the production of low value commodity type products. There have been various attempts over the years for the processing sector to move into higher value added products but this has proved difficult due to the seasonality of production at farm level. The further erosion of the value of intervention products due to the MTR is likely to once again encourage processors to diversify into more value-added production.

3.8 *Supply chain analysis: cows' milk cheese supply chain in spain*

3.8.1 The structure and functioning of the supply chain ante the mtr

3.8.1.1 A Description of the Supply Chain

In this working paper, the Spanish supply chain for the production of cow's milk cheeses is described. The phases in this food supply chain are:

Primary production: Dairy farmers
Processing: Cheese makers
Distribution channels: Wholesalers, retailers (supermarkets, hypermarkets, traditional shops, others)
Consumption: Households, restaurants and foodservices, institutions

A short description for each sector of the supply chain is provided below.

Primary production: Dairy farmers

According to the Council Directive 96 / 16 / EC, the Spanish Ministry of Agriculture, Food and Fisheries publishes the results of the dairy surveys. In Table 3-129, some relevant results for the cows' milk cheese supply chain are shown from the year 1998 to the year 2004.

- **Table 3-129 - data for the primary production sector.**

Year	Cows' Milk Collection (1000 tons)	Imports of Whole Milk (Including Raw Milk) (1000 tons)	Dairy Cows (1000 heads)	Specialist dairying holdings (number)
1998	5482,000	137,700	1283,000	
1999	5664,200	105,800	1231,000	
2000	5413,209	165,408	1156,684	46910
2001	5763,008	145,675	1102,000	
2002	5933,002	158,437	1188,732	
2003	5874.228	131,020	1111,460	35720
2004	5880,183	205,408	1082,825	
Source: EUROSTAT				

Table 3-130 shows a comparison of the collection of cows' milk in Spain, France, Italy, and EU-15.

While the collection in Italy tends to decrease, it remains relatively steady in France.

- **Table 3-130 - Cow's milk collection in Spain, France, Italy, and EU-15.**

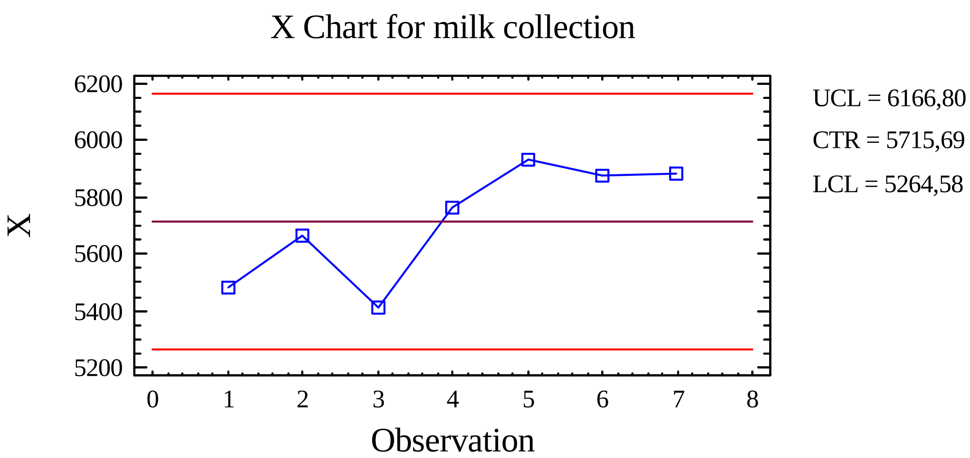
Source: EUROSTAT

milkitem *pro* **Products obtained (1000 t)**

prodmilk *mc001* **Cows' milk collection**

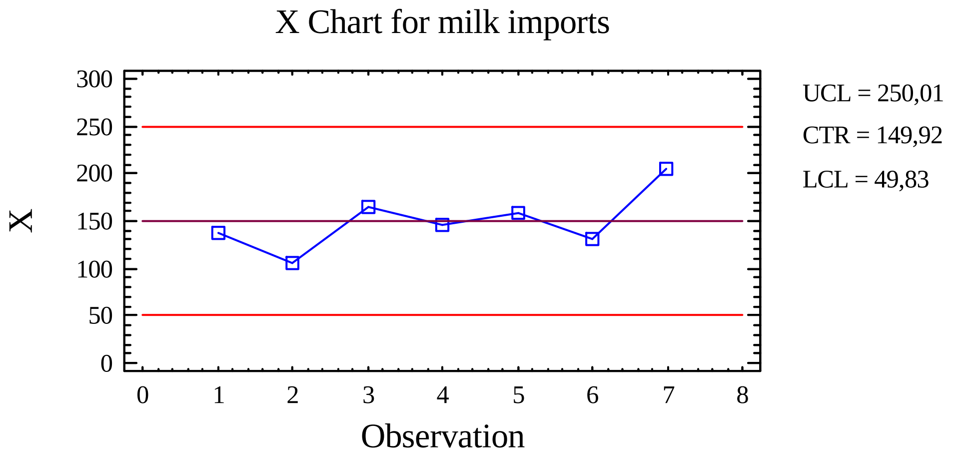
<> time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
Geo							
***eu15* European Union (15 countries)**	113695.640	114973.940	114458.210	114884.240	114584.900	115268.660	114162.710
***es* Spain**	5482.000	5664.200	5413.209	5763.008	5933.002	5874.228	5880.183
***fr* France**	23032.000	23109.000	23303.400	23222.070	23635.005	23119.160	22914.680
***it* Italy**	10292.000	10325.410	10083.610	10005.800	9984.801	9991.800	9994.120

Cows' milk collection figures have stayed relatively stable in Spain during this period. However, in Figure 3-41, the Shewhart's control chart for individual data suggests a slight tendency to increase of this variable. This slight increase is consistent with the increase of the milk quota assigned to Spain in 550,000 tons between 2000 and 2002 (64% of the total increase was implemented in 2000/2001 and 36% in 2001/2002).



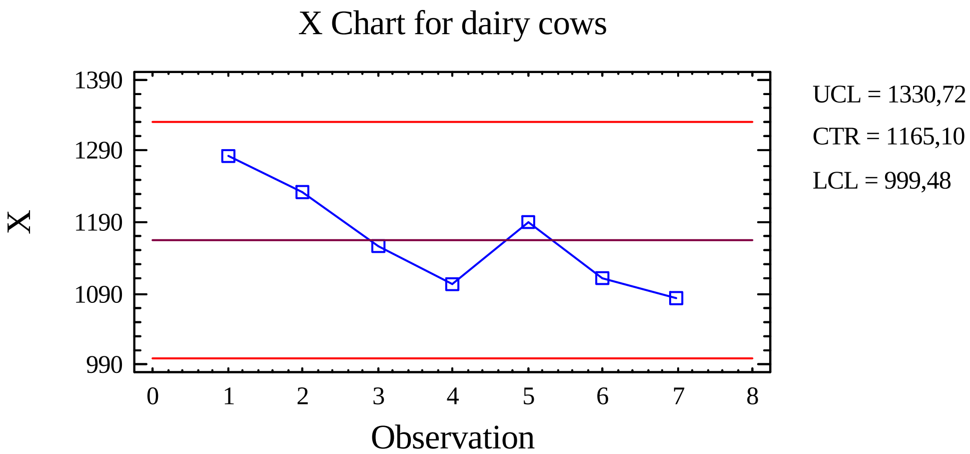
- **Figure 3-41 - Cows' milk collection data represented by using a Shewhart's control chart for individual data.**

The imports of whole milk have also stayed relatively stable, although the increase in year 2004 has been the largest in the period (Figure 3-42). The increase in the milk quota assigned to Spain has not implied a reduction in the imports of whole milk. In Spain, there is a clear deficit in the production of cows' milk with respect to the consumption of milk.



- **Figure 3-42 - Whole milk imports data represented by using a Shewhart's control chart for individual data.**

The number of dairy cows has a clear tendency to decrease (Figure 3-43). This fact could be partly explained by the combination of an increased production of dairy cows and the quota regime. Fewer cows are needed to produce the same amount of milk.



- **Figure 3-43 - Evolution of the number of dairy cows, represented by using a Shewhart's control chart for individual data.**

The total number of specialist dairy holdings has decreased a 24% from 2000 to 2003. As we will see below, one of the most important national policies for the dairy sector in Spain is designed to support withdrawal from milk production. The possibility of selling the quota is also contributing to stimulate the abandonment of the activity. Another factor is the difficulties for transferring the family farm to the next generation. Dairy farming is a very demanding activity in terms of time. Over the whole week, the milking of cows requires fixed schedules that interfere with leisure time. It is difficult to find qualified workers for dairy farms and the introduction of new technologies such as milking robots is very limited in Spain. The opportunity cost of time could be very relevant in this sector. The profitability per hour worked should be high enough to incentive staying in business. The possibility of selling the quota can facilitate the change from dairy farming to another business activity. For this reason, milk price trends are very important because of their influence on the profitability per hour worked.

Table 3-130 shows the values for cows' milk price of the deflected EC index for producer price. This table provides a comparison of the evolution of this index in Spain, France, Italy, and EU-15. These values suggest that deflected prices of milk are falling in Spain. The decrease with respect to the 1995 index is lower than the decrease in EU-15 or in Italy, but larger than the decrease in France.

- **Table 3-131 - EC index for cows’ milk price in Spain, France, Italy, and EU-15.**

dim_sc1 5 Deflated EC-index of producer prices
baseyear i95 1995 = 100
dim_sc3 2 Annual index or annual weighting
ind_outp 5160 Cows' milk

<>	time	1998	1999	2000	2001	2002	2003	2004
Geo								
eu15 European Union (15 countries)		94.2	89.2	89.4	93.3	86.7	83.5	:
es Spain		98.9	95.1	91.3	99.8	89.8	87.2	:
fr France		96.8	94.4	95.0	97.1	92.9	89.6	:
it Italy		91.2	87.6	85.6	86.1	84.4	82.3	:

Source: EUROSTAT

It is also interesting the information provided by Table 3-132. Despite the fall in the deflected index shown in Table 3-131, the prices for raw cows’ milk have stayed relatively stable during this period. This is important for dairy farmers, because they have had the perception of operating in a market more stable than other animal production markets (for instance, poultry or pig production). This price stability affects to risk perceptions of dairy productions. Milk quota regime could be determining for this price stability. The need of buying milk quota rights constitutes an entrance barrier for new competitors. It seems that this entrance barrier has been relatively effective providing price stability in this market.

- **Table 3-132 - Prices per 100 kg for raw cows' milk.**

currency eur Euro (from 1.1.1999)/ECU (up to 31.12.1998)
prod_ani 5185 Raw cows' milk; actual fat content - prices per 100 kg

<>	time	1998	1999	2000	2001	2002	2003	2004
Geo								
es Spain		28.23	27.56	27.38	30.68	28.64	28.67	30.76
fr France		30.13	29.41	30.28	31.47	30.64	:	:
it Italy		34.79	34.13	:	:	:	:	:

Source: EUROSTAT

In this desk analysis, we selected FADN specialist dairy farms for Galicia, Asturias, Cantabria, and Pais Vasco. Table 3-133 shows some regional data related to the decrease in number of dairy cows and specialist dairying holdings. The largest decreases correspond to Asturias and Pais Vasco. Although Asturias has suffered a long crisis in the industry and mining sectors, both in Asturias and in Pais Vasco, a larger availability of jobs in non primary sector activities could facilitate the change of activity after withdrawing of dairying and selling the milk quota rights.

Table 3-134 shows the evolution of the Standard Gross Margin per dairy cow from 1996 to 2000. This evolution seems to be very positive during this period. But a major driver of this evolution could be the disappearance of the smaller and more inefficient farms. The dairy sector has experimented a restructuring during this period. Recent studies in Spain are suggesting that this restructuring has allowed a significant proportion of family farms in the regions selected to adapt to changes in the microenvironment in order to be competitive (MAPA, 2003). But this restructuring has required significant investments in equipments, genetics and quota acquisition. Both increased fixed costs and increased opportunity costs could increase the financial vulnerability of some dairy farms to abrupt falls of milk prices.

- **Table 3-133 - Regional data for the primary production sector in Spain.**

		Spain	Galicia	Asturias	Cantabria	Pais Vasco
Dairy Cows (number)	2000	1242310	451900	134070	111290	40650
	2003	1096410	392370	110500	98600	35160
Dairy Cows (% Decrease)		-11,74	-13,17	-17,58	-11,40	-13,51
Specialist dairying holdings (number)	2000	46910	24010	8020	4960	2120
	2003	35720	17910	5760	3760	1440
Specialist dairying holdings (% Decrease)		-23,85	-25,41	-28,18	-24,19	-32,08
Source: EUROSTAT						

- **Table 3-134 - Standard Gross Margin for dairy cows in the Spanish regions considered.**

status x SGM coefficients for all holdings
fieldid j07_ecu_per_head Dairy cows

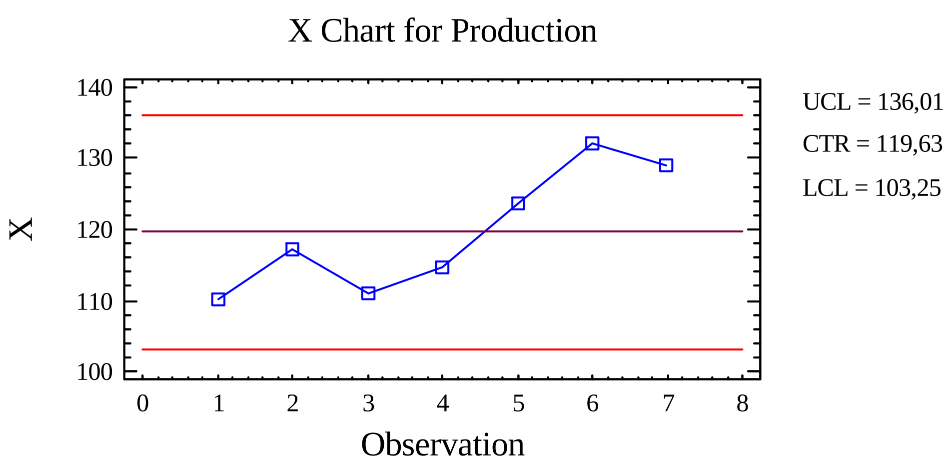
<>	time	1996a00	2000a00	2002a00
sgm_reg				
es11 Galicia		660.27	953.63	:
es12 Principado de Asturias		667.88	899.14	:
es13 Cantabria		545	863.14	:
es21 Pais Vasco		909.78	953.63	:

3.8.1.2 Industry: Cows' milk cheese producers

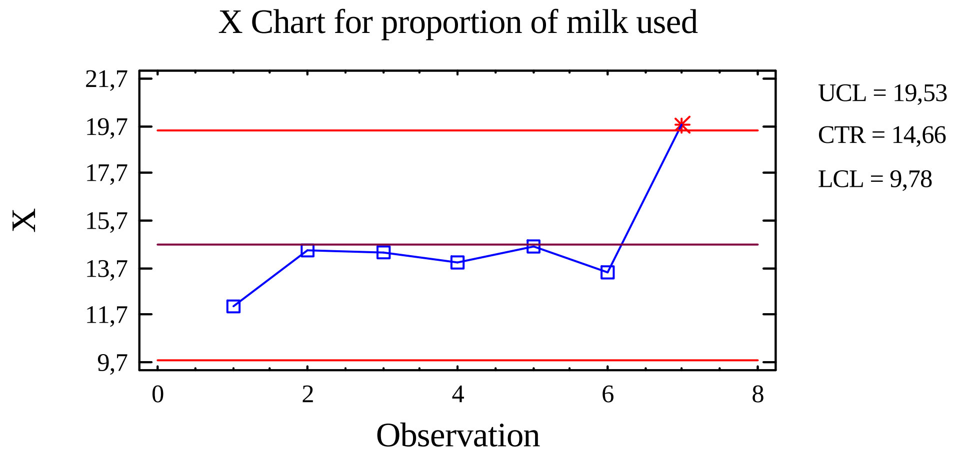
The Spanish production of cheese from cows' milk (pure) is shown in Table 3-135. This production has a slight tendency to increase (Figure 3-44). Figure 3-45 shows an abrupt rise of the cows' milk utilized for producing cheese from cows' milk. This rise could be explained by the large increase, in the year 2004, in the utilization of skimmed milk and buttermilk for the production of this type of cheese. But it does not seem consistent with the production corresponding to the year 2004 (Table 3-135).

- **Table 3-135 - Production of Cheese from Cows' Milk (Pure) in Spain.**

Year	Cows' Milk Collection (1000 tons)	Production of Cheese from Cows' Milk (Pure) (1000 tons)	Utilisation of Whole Milk for Production of Cheese from Cows' Milk (Pure) (1000 tons)	Utilization of Skimmed milk and Buttermilk for Production of Cheese from Cows' Milk (Pure) (1000 tons)	Proportion (%) of Milk Collected Utilized for Production of Cheese from Cows' Milk (Pure)
1998	5482,000	110,200	622,600	38,600	12,06
1999	5664,200	117,100	550,400	269,400	14,47
2000	5413,209	111,048	521,924	255,410	14,36
2001	5763,008	114,563	486,138	315,801	13,92
2002	5933,002	123,651	597,244	268,310	14,59
2003	5874.228	131,971	611,749	180,076	13,48
2004	5880,183	128,888	521,383	638,605	19,73
Source: EUROSTAT					



- **Figure 3-44 - Shewhart's control chart for individual data, representing the production of cows' milk cheese (pure).**



- **Figure 3-45 - Shewhart's control chart for individual data of the proportion of the collected milk utilized for producing cows' milk cheese (pure).**

The production of cheese from cows' milk (pure) is much smaller in Spain than in France or Italy (Table 3-136). This also applies to the proportion of milk collected (whole milk plus skimmed milk and buttermilk) used for producing this type of cheese. From tables 3-130, 3-137, and 3-138, it is possible to calculate that, during the period considered, this proportion was between 65 % and 73 % in the case of Italy and between 46 % and 49 % in the case of France. In Spain, this proportion fluctuated between 12 % and 19% (Table 3-135).

- Table 3-136 - Comparison of the production of cheese from cows' milk in Spain, France, and Italy.

milkitem pro Products obtained (1000 t)
prodmilk mc241 Cheese from cows' milk (pure)

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
Geo								
es Spain		110.200	117.100	111.048	114.563	123.651	131.971	128.888
fr France		1556.000	1571.000	1611.500	1652.238	1668.789	1676.012	1702.974
it Italy		908.200	920.000	927.250	948.700	971.702	986.690	978.000

Source: EUROSTAT

- Table 3-137 - Comparison of the utilization of skimmed milk and buttermilk for producing cheese from cows' milk in Spain, France, and Italy.

milkitem usm Utilization of skimmed milk and buttermilk (1000 t)
prodmilk mc241 Cheese from cows'milk (pure)

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
Geo								
es Spain		38.600	269.400	255.410	315.801	268.310	180.076	638.605
fr France		2816.000	2834.000	2940.200	3043.326	3083.074	3111.479	3184.084
it Italy		280.000	364.330	302.690	289.400	315.358	339.300	410.976

- Table 3-138 - Comparison of the utilization of whole milk for producing cheese from cows' milk in Spain, France, and Italy.

milkitem uwm Utilization of whole milk (1000 t)
prodmilk mc241 Cheese from cows'milk (pure)

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
Geo								
es Spain		622.600	550.400	521.924	486.138	597.244	611.749	521.383
fr France		7858.000	7858.000	8003.200	8063.179	8073.459	7919.713	8106.068
it Italy		6532.000	6375.640	7062.430	6753.700	6898.453	6985.800	6849.593

The distribution of cheese producing enterprises, by different classes of cheese production, is shown in Table 3-139. These provisional data has been obtained from the 2004 survey carried out by the Spanish Ministry of Agriculture, Fisheries and Food. These data indicate that the level of concentration in this subsector is very high. Only 12 enterprises are producing the 53 % of the total production. These data includes the production of cheese from cows' milk and from milk of other species (ewes and goats).

- **Table 3-139 - Structure of the cheese production sector in Spain.**

time 2004a00
geo es Spain

<>	Sizetons	le_100 100 or less	101_1000 Between 101 and 1000	1001_4000 Between 1001 and 4000	4001_10000 Between 4001 and 10000	gt_10000 More than 10000
strucpro						
ne Number of enterprises		283	160	34	5	7
ap Annual production (1000 t)		8.700	50.900	81.600	32.000	129.900

Source: Spanish Ministry of Agriculture, Fisheries and Food

Table 3-140 confirms this concentration. Only 5 companies have productions greater than 30,000 tons. These companies produce different types of cheeses. In Spain, processed cheese represents a 38.4 % of total sales of cheese (MERCASA, 2005). Processed cheese is mainly elaborated with cows' milk. A 30 % of the total sales corresponds to different types of regional cheeses. Cheese elaborated with mixes of milks from cows, ewes and goats represents a 71 % of the latter market share. The popular Manchego, ewes' milk cheese with Designation of Origin, only reaches an 8 % of the sales corresponding to regional cheeses.

- **Table 3-140 - Main companies producing and importing cheese in Spain.**

PRINCIPALES EMPRESAS FABRICANTES E IMPORTADORAS DE QUESOS	
EMPRESA	PRODUCCIÓN TONELADAS
GRUPO TGT	76.200
KRAFT FOODS ESPAÑA, S.A.	36.500
QUESOS FORLASA, S.A.	33.600
MANTEQUERÍAS ARIAS, S.A.	32.500
LÁCTEAS GARCÍA BAQUERO, S.A.	30.000
LACTALIS IBERIA, S.A.	13.000
LÁCTEAS DEL JARAMA, S.A.	12.500
QUESERÍAS LAFUENTE, S.A.	10.298
QUESERÍAS ENTREPINARES, S.A.	9.985
CORP. ALIM. PEÑASANTA, S.A.	9.400

– Datos de 2003. *FUENTE: Alimarket.*

Source: MERCASA, 2005

A tendency of the production of cheese to increase is shown in Table 3-141. Likewise, exports and imports tend to increase in all the geographical units considered. In this growth of the market for cheese, it is difficult to determine the role played by the cheese produced exclusively from cows' milk. In the Spanish cheese market, the major intra-EU15 imports come from France (approximately a third of these imports), the Netherlands, Denmark and Germany. Intra-EU15 exports mainly go to Portugal and Italy (MERCASA, 2005).

- **Table 3-141 - A comparison of production, exports and imports of cheese in Spain, France, and Italy.**

variable prod_us Usable production
unit 1000t Thousands of tons
fooditem f_011412 Cheese

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
geo								
eu15 European Union (15 countries)		6645.068	6714.095	:	7171.733	7168.786	7264.812	:
es Spain		273.100	282.500	:	283.624	308.061	315.426	:
Fr France		1690.000	1693.000	1761.000	1807.440	1829.236	1840.652	1872.851
it Italy		1058.000	1068.530	1068.000	1130.000	1111.634	1136.272	1126.113

variable exp_tot Total exports (for EU aggregate: Exports to third countries)
unit 1000t Thousands of tons
fooditem f_011412 Cheese

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
geo								
eu15 European Union (15 countries)		338.210	292.666	:	365.899	385.334	417.639	:
es Spain		21.800	30.500	:	43.000	45.955	47.806	:
Fr France		373.000	407.000	396.000	449.245	439.919	473.230	510.846
it Italy		141.000	155.000	164.000	172.000	187.312	194.311	208.578

variable imp_tot Total imports (for EU aggregate : imports from third countries)
unit 1000t Thousands of tons
fooditem f_011412 Cheese

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
geo								
eu15 European Union (15 countries)		121.308	123.589	:	174.682	157.412	221.405	:
es Spain		88.400	105.700	:	118.000	121.530	130.120	:
Fr France		137.000	172.000	177.000	189.073	179.000	186.243	185.353
it Italy		268.000	282.000	307.000	306.000	303.391	326.946	348.962

variable exp_int_eu15 Intra-EU15 exports
unit 1000t Thousands of tons
fooditem f_011412 Cheese

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
geo								
eu15 European Union (15 countries)		1608.664	1711.711	:	1871.677	1886.568	2101.022	:
es Spain		19.100	27.700	:	38.900	42.250	43.820	:
Fr France		338.000	366.000	358.000	402.669	391.013	421.320	455.076
it Italy		94.000	104.000	108.000	112.000	130.938	131.462	141.423

variable imp_int_eu15 Intra-EU15 imports
unit 1000t Thousands of tons
fooditem f_011412 Cheese

<>	time	1998a00	1999a00	2000a00	2001a00	2002a00	2003a00	2004a00
geo								
eu15 European Union (15 countries)		1602.525	1691.035	:	1759.808	1817.271	1913.331	:
es Spain		86.400	103.300	:	114.350	117.000	125.964	:
Fr France		122.000	150.000	156.000	174.056	168.115	174.753	177.128
it Italy		254.000	268.000	294.000	293.000	289.851	312.424	323.018

3.8.1.3 Distribution and consumption

In Spain, there are about 600,000 retail shops, including traditional shops and large-scale retailers. The Spanish distribution sector is very dynamic. Over the last few years, there have been many mergers and acquisitions with a consequent concentration of this activity in the hands of few operators. This process was particularly significant in the food distribution sector, in which a 48% of the total market share was hold by the 5 leading firms in 2004 (ICE Madrid, 2004). The sector is currently dominated by large-scale retailers to the detriment of traditional retail shops. Likewise, in 2003, the level of concentration was very high in the discount and hypermarket distribution channels (ICE Madrid, 2004). In both cases, the first three leading companies held a joint market share greater than 75 % of the total sales (European Commission, 2005). These two distribution channels are dominated by multinational corporations (Carrefour, Auchan, Lidl, Tengelmann). In 2003, the concentration in the supermarket sector was much lower (since this segment includes local, regional and national groups, too). Some years ago, wholesale distribution represented a strong segment of Spanish distribution. However, the importance of central purchasing organizations has recently decreased because an increasing number of operators in the distribution sector have decided to manage purchasing on their own (ICE Madrid, 2004).

Table 3-142 shows the consumption of dairy products (excluding the consumption of milk) in Spain for the year 2003. Per capita consumption is 7.5 kilograms of cheese. This per capita consumption is below the EU average (12 kilograms of cheese). Cheese represents a 20.66 % of the total amount of dairy products sold. An 85.23 % of the total amount of cheese sold is bought by households, a 13.47 % is bought by restaurant and foodservices, and a 1.30 % is bought by institutions. A 53,47 % of the cheese bought by households is acquired in supermarkets (Table 3-143). A 23,12 % is acquired in hypermarkets (Table 3-143). Large retailers are major players in this food supply chain. Their bargaining power is very high and they used to be the most important customers of the major cheese producing companies.

- **Table 3-142 - Consumption of dairy products in Spain.**

CONSUMO DE PRODUCTOS LÁCTEOS EN ESPAÑA

	EN MILLONES DE KILOS				KILOS	% S/TOTAL CANTIDAD COMPRADA		
	HOGARES	HOSTELERÍA Y RESTAURACIÓN	INSTITUCIONES	TOTAL CANTIDAD COMPRADA	TOTAL PER CÁPITA	HOGARES	HOSTELERÍA	INSTITUCIONES
TOTAL DERIVADOS LÁCTEOS	**1.196,75**	**232,97**	**48,66**	**1.478,38**	**36,07**	**80,9**	**15,8**	**3,3**
BATIDOS DE YOGUR	29,47	0,75	0,53	30,76	0,80	95,8	2,4	1,7
BATIDOS DE LECHE	77,30	80,78	0,83	158,92	3,90	48,6	50,8	0,5
MANTEQUILLA	6,13	10,69	0,79	17,62	0,40	34,8	60,7	4,5
YOGURES	439,71	24,42	30,82	494,94	12,10	88,8	4,9	6,2
NATURAL	113,34	6,83	10,55	130,71	3,19	86,7	5,2	8,1
SABORES	125,47	15,24	16,87	157,58	3,80	79,6	9,7	10,7
FRUTAS	44,26	0,82	2,04	47,12	1,10	93,9	1,7	4,3
OTROS	156,64	1,49	1,35	159,48	3,90	98,2	0,9	0,8
QUESOS	260,30	41,15	3,97	305,42	7,50	85,2	13,5	1,3
OTROS PRODUCTOS LÁCTEOS	383,84	75,18	11,71	470,73	11,50	81,5	16,0	2,5

– Datos de 2003.

FUENTE: Ministerio de Agricultura, Pesca y Alimentación.

Source: MERCASA, 2005

For some quality cheese such as traditional cheeses with Denomination of Origin, other distribution channels (traditional shops, shops specialized in quality foodstuffs, direct selling, wholesalers specialized in restaurants) could also be important.

- **Table 3-143 - Market shares for different distribution channels selling cheese.**

Source: MERCASA, 2005

3.8.2 The Role of Quality Labels in the Supply Chain

The European Union has promoted two types of food quality names based on their geographical origin: the protected geographical indication (PGI) and the protected designation of origin (PDO). In Spain, there are 24 PDOs for cheese. 7 of these PDOs are cheeses exclusively elaborated with milk from cows:

Afuega'l Pitu (Asturias)
Arzúa-Ulloa (Galicia)
Formatge de L'Alt Urgell i La Cerdanya (Cataluña)
Mahón (Mallorca)
Queixo Tetilla (Galicia)
Queso de Cantabria (Cantabria)
San Simón da Costa (Galicia)

In geographical units considered in this analysis (Galicia, Asturias, Cantabria, and Pais Vasco), there are 11 cheeses with Designation of Origin:

4 PDOs in Galicia, 3 are cows' milk cheeses (pure).
3 PDOs in Asturias, only 1 of them is a cows' milk cheese (pure).
3 PDOs in Cantabria, only 1 of them is a cows' milk cheese (pure).
1 PDO in Pais Vasco y Navarra, which is an ewes' milk cheese.

- **Table 3-144 - Protected Designations of Origin for Cheese and Dairy Products in Spain**

Denominaciones de Origen o Indicaciones Geográficas D.O. o I.G.	Consejo Regulador	Comunidad Autónoma	Tipo de Producto
AFUEGA'L PITU	Consejo Regulador de la D.O.P."AFUEGA'L PITU"	PRINCIPADO DE ASTURIAS	QUESOS Y PRODUCTOS LÁCTEOS
ARZÚA-ULLOA	Consejo Regulador de la D.O.P "ARZÚA-ULLOA"	GALICIA	QUESOS Y PRODUCTOS LÁCTEOS
CABRALES	Consejo Regulador de la D.O.P. "CABRALES"	PRINCIPADO DE ASTURIAS	QUESOS Y PRODUCTOS LÁCTEOS
CEBREIRO	Consejo Regulador de la D.O.P. "Cebreiro"	GALICIA	QUESOS Y PRODUCTOS

Denominaciones de Origen o Indicaciones Geográficas			
D.O. o I.G.	Consejo Regulador	Comunidad Autónoma	Tipo de Producto
			LÁCTEOS
GAMONEDO	Consejería de Medio Rural y Pesca del Principado de Asturias	PRINCIPADO DE ASTURIAS	QUESOS Y PRODUCTOS LÁCTEOS
IDIAZÁBAL	Consejo Regulador de la D.O.P. "IDIAZÁBAL"	PLURICOMUNITARIA	QUESOS Y PRODUCTOS LÁCTEOS
MAHÓN-MENORCA	Consejo Regulador de la D.O.P. "MAHÓN-MENORCA"	ISLAS BALEARES	QUESOS Y PRODUCTOS LÁCTEOS
MANTEQUILLA DE L'ALT URGELL Y LA CERDANYA	Consejo Regulador de la D.O.P. "MANTEQUILLA DE L'ALT URGELL Y LA CERDANYA"	CATALUÑA	QUESOS Y PRODUCTOS LÁCTEOS
MANTEQUILLA DE SORIA	Consejo Regulador de D.O. "Mantequilla de Soria"	CASTILLA Y LEÓN	QUESOS Y PRODUCTOS LÁCTEOS
PICÓN-BEJES-TRESVISO	Consejo Regulador de la D.O.P. "PICÓN-BEJES-TRESVISO"	CANTABRIA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO DE CANTABRIA	Consejo Regulador de la D.O.P. "QUESO DE CANTABRIA"	CANTABRIA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO DE LA SERENA	Consejo Regulador de la D.O.P. "QUESO DE LA SERENA"	EXTREMADURA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO DE L'ALT URGELL Y LA CERDANYA	Consejo Regulador de la D.O.P. "QUESO DE L'ALT URGELL Y LA CERDANYA"	CATALUÑA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO DE MURCIA	Consejo Regulador de las DD.OO.PP. "QUESO DE MURCIA Y QUESO DE MURCIA AL VINO"	REGIÓN DE MURCIA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO DE MURCIA AL VINO	Consejo Regulador de las DD.OO.PP. "QUESO DE MURCIA Y QUESO DE MURCIA AL VINO"	REGIÓN DE MURCIA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO DE VALDEÓN	Consejo Regulador de la I.G.P "QUESO DE VALDEÓN"	CASTILLA Y LEÓN	QUESOS Y PRODUCTOS LÁCTEOS
QUESO IBORES	Consejo Regulador de la D.O.P. "QUESO IBORES"	EXTREMADURA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO MAJORERO	Consejo Regulador de la D.O.P. "QUESO MAJORERO"	CANARIAS	QUESOS Y PRODUCTOS LÁCTEOS
QUESO MANCHEGO	Consejo Regulador de la D.O.P. "QUESO MANCHEGO"	CASTILLA-LA MANCHA	QUESOS Y PRODUCTOS LÁCTEOS
QUESO PALMERO	Consejo Regulador de la D.O.P. "QUESO PALMERO"	CANARIAS	QUESOS Y PRODUCTOS LÁCTEOS
QUESO TETILLA	Consejo Regulador de la D.O.P.	GALICIA	QUESOS Y

Denominaciones de Origen o Indicaciones Geográficas			
D.O. o I.G.	Consejo Regulador	Comunidad Autónoma	Tipo de Producto
	"QUESO TETILLA"		PRODUCTOS LÁCTEOS
QUESO ZAMORANO	Consejo Regulador de la D.O.P. "QUESO ZAMORANO"	CASTILLA Y LEÓN	QUESOS Y PRODUCTOS LÁCTEOS
QUESUCOS DE LIÉBANA	Consejo Regulador de la D.O.P. "QUESUCOS DE LIÉBANA"	CANTABRIA	QUESOS Y PRODUCTOS LÁCTEOS
RONCAL	Consejo Regulador de la D.O.P. "RONCAL"	COMUNIDAD FORAL DE NAVARRA	QUESOS Y PRODUCTOS LÁCTEOS
SAN SIMÓN DA COSTA	Consejo Regulador de la D.O.P. "San Simón da Costa"	GALICIA	QUESOS Y PRODUCTOS LÁCTEOS
TORTA DEL CASAR	Consejo Regulador de la D.O.P. "TORTA DEL CASAR"	EXTREMADURA	QUESOS Y PRODUCTOS LÁCTEOS

Source: Ministry of Agriculture, Fisheries and Food

3.8.2.1 The Designation of Origin "Arzúa-Ulloa"

The geographical area protected by this PDO includes 15 municipalities in the province of A Coruña and 9 in the province of Lugo. Both NUTS III units (A Coruña and Lugo) are located in Galicia. Under this Designation of Origin, around 600 producers and 21 cheese makers are registered. The production is 2,200 tons. This production is mainly consumed in Galicia (MERCASA, 2005).

Arzúa-Ulloa

DENOMINACIÓN DE ORIGEN

ZONA GEOGRÁFICA: El territorio de producción y elaboración del tradicional queso gallego amparado por la DO comprende 15 municipios de la provincia de A Coruña y otros 9 de la de Lugo.

CARACTERÍSTiCAS: Se elabora con leche de vaca cruda, entera o pasteurizada de las razas Rubia Gallega, Frisona y Pardo Alpina. El tiempo mínimo de maduración es de 6 días y se producen 3 variedades: Queso Arzúa-Ulloa, Queso Arzúa-Ulloa de Granja y Queso Arzúa-Ulloa Curado. De fina corteza lenticular de color amarillo, sabor suave, ligeramente salado y con un punto ácido muy característico.

DATOS BÁSICOS: Están inscritos más de 600 productores y 21 queserías que elaboran y comercializan una media anual de unos 2,2 millones de kilos de las 3 variedades de quesos con Denominación, que se consumen en su práctica totalidad en el mercado regional de Galicia.

Source: MERCASA, 2005

3.8.2.2 The Designation of Origin "Queixo Tetilla"

The geographical area protected by this PDO includes the four provinces of the Autonomous Community of Galicia. Under this Designation of Origin, 727 producers and 31 cheese makers are registered. The production of this cheese is approximately 2,100 tons. 95 % of this production is consumed in the Spanish market. A 5 % of the total production is exported (MERCASA, 2005).

Queixo Tetilla ***(Queso Tetilla)***

DENOMINACIÓN DE ORIGEN PROTEGIDA

ZONA GEOGRÁFICA: La zona de producción y elaboración de queso comprende las cuatro provincias de la comunidad autónoma de Galicia.

CARACTERÍSTICAS: Se elabora con leche entera de vaca de las razas Gallega, Frisona, Pardo Alpina y Rubia Gallega. El tiempo mínimo de maduración es de 7 días después del proceso de salado. De forma cónica, su peso oscila entre 500 gramos y 1,5 kilos. De aroma suave, su sabor es láctico, mantecoso, ligeramente ácido y graso al paladar.

DATOS BÁSICOS: Están inscritas más de 13.500 vacas y 727 explotaciones ganaderas que producen más de 17 millones de litros de leche. Las 31 queserías registradas producen una media anual de 2,1 millones de kilos de queso, que se comercializan en un 95% en el mercado nacional y el 5% restante se destina a la exportación.

Source: MERCASA, 2005

3.8.2.3 The Designation of Origin "Queso de Cantabria"

The geographical area protected by this PDO includes most of the municipalities of the Autonomous Community of Cantabria. Under this Designation of Origin, 32 producers and 4 cheese makers are registered. The production of this cheese is approximately 275 tons. All the production is sold in the domestic market (MERCASA, 2005).

Queso de Cantabria

DENOMINACIÓN DE ORIGEN PROTEGIDA

ZONA GEOGRÁFICA: La zona de elaboración y producción de este queso, conocido como queso de nata, se extiende por todo el territorio de Cantabria, a excepción de las cuencas hidrográficas de los ríos Urdón y Cervera y los municipios de Tresviso y Bejes.

CARACTERÍSTICAS: En su elaboración se utiliza exclusivamente leche entera de vaca de la raza Frisona. El período mínimo de maduración es de 7 días a partir de la fecha de finalización del proceso de salado. El peso oscila entre 400 gramos y 2,8 kilos, con un color levemente amarillo y de corteza lisa, blanda y natural, resulta un queso graso, de pasta prensada, semicocida, con textura mantecosa y sabor suave, olor aromático y fresco.

DATOS BÁSICOS: Las 1.279 vacas censadas en 32 explotaciones ganaderas producen más de 2,7 millones de litros de leche al año, y 4 empresas producen y comercializan una media anual de 274.814 kilos de queso, vendidos en su totalidad en el mercado interior.

Source: MERCASA, 2005

3.8.2.4 The Designation of Origin "San Simón da Costa"

The geographical area protected by this PDO includes 2 municipalities of province of Lugo (Galicia). Under this Designation of Origin, 7 cheese makers are registered. The production of this cheese is approximately 200 tons (MERCASA, 2005).

San Simón da Costa

DENOMINACIÓN DE ORIGEN

ZONA GEOGRÁFICA: El ámbito de producción y elaboración se localiza en 4 parroquias del municipio de Villalba y en 2 parroquias del municipio de Murás, al noroeste de la provincia de Lugo, en Galicia.

CARACTERÍSTICAS: El queso se elabora con leche de vaca procedente de las razas Rubia Gallega, Pardo-Alpina, Frisona y sus cruces. El proceso de maduración es de 60 días y después se procede al ahumado con madera de abedul. El queso presenta una forma entre peonza y bala, su corteza es de color amarillo-ocre y algo grasienta. La pasta es de textura fina, grasa, semidura, de color entre blanco y amarillo, y suave al corte. Se comercializa en formato ordinario de 0,8 a 1,5 kilos y en formato bufón de 400 gramos a 800 gramos.

DATOS BÁSICOS: El Consejo Regulador tiene registradas 7 empresas queseras, que comercializan una media anual de 200.000 kilos de queso con Denominación de Origen.

Source: MERCASA, 2005

3.8.2.5 Comments on DOPs

All these Designations of Origin are having a very limited impact on the selling of these cheeses in foreign markets. In general, productions are very low, compromising the success of marketing initiatives oriented to introduce these products in foreign markets. In the case of cows' milk cheeses, "Mahon-Menorca" is the D.O. with a highest production (3,000 tons), exporting a 5 % of the total production (MERCASA, 2005).

3.8.2.6 Food Quality Certification Schemes Promoted by Autonomous Community Governments

Autonomous community governments are promoting different schemes for food quality certification. Most of these schemes are relying in the certification by an independent third-party body accredited according to the requirements of ISO / IEC Guide ISO 65 for this specific task. In the geographical units selected for this study (Galicia, Asturias, Cantabria, Pais Vasco), three schemes have been promoted:

GALICIA CALIDADE. Label issued in 1999. The body responsible for the drafting of the standard is the Xunta de Galicia. The third-party is any external body authorised by the Dirección General de Consumo of the Xunta de Galicia. Accreditation according to the requirements of ISO / IEC Guide ISO 65 is not required. There are two firms certified for milk and dairy products (European Commission, 2005).

CALIDAD CONTROLADA. Label issued in 2003. The body responsible for the drafting of the standard is ODECA, an autonomous agency dependant of the Gobierno de Cantabria. Products of recognised quality (DOP; IGP, etc...), are certified by the authorised bodies according to ODECA. Other quality labels can be certified by accredited certification bodies, accreditated complying with the requirements of ISO / IEC Guide ISO 65. Currently, there are no firms certified under this scheme (European Commission, 2005).

EUSKOLABEL. Label issued in 1994. The body responsible for the drafting of the standard is Fundación Kailitatea, a private foundation promoted by the Gobierno Vasco. The Fundación Kailitatea is accredited by ENAC (National Body for Accreditation) for certifying beef meat (European Commission, 2005).

In these autonomous communities, the abovementioned schemes currently are not playing any role in the assurance of the quality of cows' milk cheeses. Probably, quality schemes promoted by private organizations (associations of producers, agricultural and food inter-industry organizations, retailers) could have a greater interest in the future.

3.8.3 Horizontal and Vertical Relations within the Food Supply Chain

3.8.3.1 Horizontal Relations within the Cheese Distribution Sector

Considering the different channels in which large-scale retailers (discounts, supermarkets and hypermarkets) operate, while in the supermarket channel, the top leading company (Mercadona) does not have a clear dominating position, in the discount and hypermarket channels the top leading company (i.e. Carrefour in both cases) holds a very large share of the total number of outlets, which is also much greater than the share hold by its competitors. However, Mercadona has experienced a large increase in the number of outlets (970 in 2006) and its sales has also boosted significantly.

In the purchasing market, the two currently operating central purchasing organizations have to face the competition of the big, independent large-scale retailers (ICE Madrid, 2004). Taking into account that a 53.47 % of the total sales of cheese to final consumers is performed in supermarkets and a 23.12 in hypermarkets (Table 3-143), the bargaining power of this key customers of cheese makers could be considered as moderate or high.

- **Table 3-145 - Supermarkets: main retailers (2003)**

Retailers	Number of outlets	% Share
Mercadona	770	6,6
Gruppo Caprabo	578	4,9
Ahold supermercados	576	4,9
Total	11.680	100,0

Source: ICE Madrid

- **Table 3-146 - Discounts: main retailers (2003)**

Retailers	Number of outlets	% Share
DIA S.A. - Grupo Carrefour	2.566	80,3
Lidl Supermercados	362	11,3
Plus Supermercados - Tengelmann España	208	6,5
Total	3.196	100,0

Source: ICE Madrid

- **Table 3-147 - Hypermarkets: main retailers (2003)**

Retailers	Number of outlets	% Share
Centros Comerciales Carrefour	119	41,0
Eroski*	69	23,8
Alcampo**	45	15,5
Total	290	100,0

Source: ICE Madrid
*Brands: Eroski, Erosmer Iberica
**Alcampo is an affiliate of Auchan retailer

3.8.3.2 Horizontal Relations within the Cheese Production Subsector

An important share of total cheese production is concentrated in the hands of five companies (Table 3-140). Of these companies, two are multinationals, the American Kraft Foods and the French Lactalis (President). Quesos Forlasa and Lácteas García Baquero mainly produce ewes' milk cheeses. In the geographical units considered, LACTALIS IBERIA (Galicia), QUESERÍAS LAFUENTE (Cantabria) and CAPSA (Asturias) are the largest cheese producers. For these latter companies, an important proportion of their production is constituted by different types of cows' milk cheese. KRAFT FOODS ESPAÑA has two factories near to Galicia and Asturias: one in Hospital de Orbigo (León), which produces the cheese Philadelphia, and another in Zamora, where the cheese Mama Luise is produced. Both products are elaborated exclusively with cows' milk.

3.8.3.3 Horizontal Relations within Dairy Farmers.

The Spanish primary sector is currently characterised by many different types of horizontal coordination interacting at different levels. Economic associations (i.e. cooperatives, Sociedades Agrarias de Transformación; producer groups) are oriented to carrying out activities connected with agricultural production, processing and sale of agricultural products or supply of services to their members. The main shareholder in CAPSA is a Sociedad Agraria de Transformación (SAT), Central Lechera Asturiana. There are two types of cooperatives: first degree and second degree. Second degree cooperatives could be described as cooperatives of first degree cooperatives. For instance, in Cantabria, first degree cooperatives such as Cuenca del Besaya, Lechera SAM, Ruiseñada-Comillas, Siete Villas, Valles Unidos del Asón y Virgen de Valvanuz are united under the second degree cooperative SERGACAN. Currently, there is a project for the fusion of the three second degree cooperatives operating in Galicia (CECOOP S. COOP. G.), Asturias (CICA), and CANTABRIA (SERGACAN). CENTRO INTERCOOPERATIVO DEL CAMPO DE

ASTURIAS (C.I.C.A.). A major objective of this initiative is increasing the bargaining power of the primary sector producers, mainly with respect to their suppliers. Forward vertical integration initiatives in the dairy sector are limited. The largest cooperative in Spain is a cooperative located in Orense (Galicia), COREN, but dairy products are a minor business line of COREN in comparison with poultry products or pig products.

3.8.3.4 Vertical Relations within the Dairy Production Subsector

In general, in this food supply chain, large-scale retailers have a large bargaining power over the operators of the upstream sectors. The forms of horizontal coordination present at the dairy production level can hardly compensate the bargaining power of downstream operators

In Spain, there are two established forms of coordination within the food supply chains:

The agricultural and food inter-industry organizations (Organizaciones Interprofesionales Agroalimentarias – OIA)
The standard agricultural and food contracts (Contratos Tipo de Productos Agroalimentarios).

OIAs are ruled by the 38/1994 Spanish law and are composed of organizations representing - regardless their legal form - the economic interests of the agricultural, food industry and, if necessary, distribution sectors. Only one OIA can be recognized for each food supply chain identified by a specific agro-food product. Recognition requires the fulfilment of some representativeness requirements. OIAs' objectives are the increase in the efficiency and transparency of the markets, the improvement in the quality of products and production processes within the specific food chain, the adjustment of the production to the demand requirements, the fostering of R&D activities, and the provision of science-based information to consumers improving communication between producers and society. For dairy products, the OIA is INLAC, recognized in 2000.

In Spain, milk is paid to farmers mainly according to the fat and protein contents. The inter-industry organization existing then, CILE, started to promote in 1986 the creation of inter-industry laboratories to determine the fat and protein contents of the milk collected by the industry. The objective was to have an independent laboratory acting as a third-party impartial judge of the quality of the milk supplied by dairy farmers to the industry. An inter-industry laboratory was established in each autonomous region. Most of these laboratories are currently accredited according to the ISO 17025 standard by ENAC, the Spanish body for accreditation. But samples are taking by the industry and the fairness of this system has been called into question by some associations of farmers (FEPLAC, 2001). In order to improve the ability of the system to generate trust in both stakeholders (producers and processing companies), the taking of samples could be carried out by accredited third-party bodies.

The standard agro-food contracts are governed by the 2/2000 Spanish law. The main objective pursued through these contracts is to increase the transparency of the agro-food markets, thus promoting competition. The standard agro-food contracts serve as model for the drawing up of the contracts between private parties. Only one standard agro-food contract can be homologated for each product type. This figure is not being applied in the dairy sector.

The price paid by the industry for the milk collected to a particular farmer usually is fixed in an individual bargaining process. There are no orientativa prices or regional milk markets that can be used as a reference (MAPA, 2003). Because the geographical dispersion of the production and the deficiencies in the road network, milk processing companies try to optimize the milk collection routes. For this reason, in some areas, only a very few companies collect milk. This situation tends to enhance the bargaining power of milk processing companies with respect to some individual dairy farmers. Cooperatives try to compensate this situation, but their success seems to be limited in many cases.

3.8.4 The enforcement of the mtr in the supply chain

3.8.4.1 The 2003 CAP Reform

The implementation of the reform of the Common Agricultural Policy, agreed in June 2003, introduces changes in the EU dairy regime with respect to milk quotas and market support as well as introducing the concept of direct aids to dairy farmers. The central element of the reform is the introduction of the 'Single Payment Scheme' (SPS) – the decoupled aid payment that incorporates and replaces many of the former direct aids to farmers.

In the MTR, the milk quota regime has been extended to 31 March 2015. Spain is one of the exceptions for the three annual increases of 0.5 % of quota volumes contemplated for 11 of the EU-15 Member States. The reason was a quota increase agreed earlier for Spain. The milk quota assigned to Spain was increased in 550,000 tons between 2000 and 2002 (64% of the total increase was implemented in 2000/2001 and 36% in 2001/2002).

The MTR introduces certain elements of flexibility in the implementation of the milk quota system by the Member States, but reinforces financial discipline by requiring Member States to pay superlevy even before they have collected all contributions from individual farmers. In Spain, individual farmers are responsible of paying superlevy.

The Target Price for milk was originally introduced as a benchmark against which farmers could compare their milk price. Intervention prices were originally calculated from the Target Price. Guaranteeing that milk prices for farmers would be maintained at a reasonable level was the major objective of intervention measures. As the use of intervention has been drastically reduced in recent years and will continue to do so, the Target Price became largely academic and was abolished on 1 July 2004 as part of the MTR (European Commission, 2003). Since the superlevy was calculated as 115 % of the Target Price before the MTR, the new dairy regulation had to establish specific values for the superlevy. Those values were:

- EUR 33.27/100 kg for 2004/05;
- EUR 30.91/100 kg for 2005/06;
- EUR 28.54/100 kg for 2006/07;
- EUR 27.83/100 kg for 2007/08 and subsequent periods.

If we compare these amounts to the milk prices in Table 3-148, in the case of Spain, we can notice that they seem to have the ability to prevent possible circumstantial incentives for exceeding the individual milk quota. However, milk quota has been exceeded frequently in Spain. Over the last ten years, Spain has exceeded the milk quota assigned five times: in 1995-1996 (2,2 %), in 1996-1997 (1,1 %), in 1998-1999 (0,7 %), in 1999-2000 (1,5 %), and in 2004-2005 (1,1 %).

- **Table 3-148 - Prices per 100 kg for raw cows' milk.**

currency eur Euro (from 1.1.1999)/ECU (up to 31.12.1998)
prod_ani 5185 Raw cows' milk; actual fat content - prices per 100 kg

<>	time	1998	1999	2000	2001	2002	2003	2004
Geo								
es Spain		28.23	27.56	27.38	30.68	28.64	28.67	30.76
fr France		30.13	29.41	30.28	31.47	30.64	:	:
it Italy		34.79	34.13	:	:	:	:	:

Source: EUROSTAT

As in other agricultural sectors, the MTR has also oriented the elements of dairy market support towards a 'safety-net' approach, with public intervention (buying into storage) for butter and skimmed milk powder being a measure of last resort. According to this orientation, the butter intervention price is being reduced by 25 % over a four-year period, beginning on 1 July 2004, the four reductions being three times 7 % plus a final cut of 4 % in 2007. The intervention price for skimmed milk powder is being reduced by 15 % over a three-year period, with reductions of 5 % in each of 2004, 2005 and 2006.

Despite the importance of dairy market support mechanisms is relatively low in Spain (Table 3-149), the abovementioned reductions in the interventions prices could have effects on the French milk market at the long term. Milk prices in the French market can have an influence on milk prices in Spain because whole milk imports mainly come from France and Portugal.

- **Table 3-149 - Expenditure on different CAP measures for the dairy sector in the EU and Spain.**

GASTO SECTOR LÁCTEO ESPAÑA/UE POR LÍNEAS DE AYUDA
(MEDIA 93-99)

Concepto	UE (Meuros)	España (Meuros)	% España/UE sobre línea de ayuda	% UE línea de ayuda sobre gasto total
Restituciones	1.925,2	18,4	1,0	47,0
Ayuda mantequilla	692,9	8,6	1,2	16,9
Ayuda leche en polvo	806,8	–1,3	–0,2	19,7
Ayuda queso	105,1	0,0	0,0	2,6
Otras medidas	564,1	36,5	6,5	13,8
Total	4.094,2	62,2	1,5	100,0

Source: MAPA, 2003

In order to compensate to milk producers for cuts in intervention prices, the MTR introduces from 2004 to 2007 support payments paid directly to producers. These will be paid per calendar year and per holding. The payments consist initially of two elements: dairy premiums paid equally to all milk producers; additional payments paid to milk producers according to criteria decided by the Member States.

The total amounts available for direct dairy premiums in a given year are based on quota held at the end of the preceding quota year and are as follows:

- EUR 8.15/tonne of quota for calendar year 2004;
- EUR 16.31/tonne of quota for calendar year 2005;
- EUR 24.49/tonne of quota for calendar year 2006.

In Spain, these support payments were implemented by means of the Royal Decree 543 / 2004 published on April 14th 2004. The maximum amount for the additional payment per holding was set up as follows:

- EUR 3,000 for year 2004;
- EUR 6,000 for year 2005;
- EUR 9,000 for year 2006.

Different criteria were proposed for modulating the additional payment. The final decision on the criteria used to calculate the additional payment is taken by each Autonomous Community government.

Likewise, the TMR establishes that Member states may introduce the Single Payment Scheme in 2005, 2006 or 2007. Dairy payments may be included in the SPS beginning in any one of these years. The decision of the Spanish Government has been to introduce the Single Payment Scheme in 2006 (MAPA, 2004). The single payment will be calculated according to the quota available in the holding on March 31 2006. Before introducing the Single Payment Scheme, it was implemented a redistribution of quota, having priority small and medium farms considered economically viable and located on territories where alternatives to milk production were difficult to find. The Royal Decree 620 / 2005, issued on May 27th 2005, establishes the criteria and conditions for implementing this agricultural policy initiative. This national regulation included aids (26,372,416 euros) for the voluntary abandonment of the activity. The milk quota liberated (296,536 tons) was allocated to the national reserve. 330,000 tons of milk quota were distributed between 12,600 dairy farmers at very low price: between 0.14 and 0.50 euros per kg of quota (ASAJA, 2006). This measure has been especially interesting for holdings in the geographical units considered in this report: Galicia, Asturias, Cantabria, and Pais Vasco. In these regions, there are a greater number of dairy farms which fulfil the criteria and conditions set up in the Royal Decree 620 / 2005.

3.8.5 The mtr expected effects

3.8.5.1 Effects on Dairy Producers

Dairy farmers have not been received support payments before 2004. The single payment can have a positive effect on the financial feasibility of many Spanish dairy farms. It can be expected that the milk quota regime keeps providing a certain stability to milk prices. But farmers will have to face increasing production costs and milk prices relatively stable or decreasing slightly. Labor costs and fixed costs linked with investments can become a significant challenge for dairy farms. Opportunity costs can become also especially high in the case of holdings with land whose officially assigned use can be changed to land for urban development. In the geographical units considered, the most efficient farms are frequently located in the coastal areas. But in these areas, the demand for land for developments for tourism and residence is increasing rapidly. In this situation, the tendency to a lower number of holdings, each time larger and more efficient, probably will keep on. In Northern Spain, not always the more suitable land is going to be available for milk production. However, this trend could contribute to keep some population in marginal areas (mountains, isolated valleys) of Northern Spain. Another major challenge is the willingness of the next generation to take over the hard job of dairy farming. It is very demanding both in time and in schedules. The availability and the cost of qualified workers will be a determining factor. Despite they can help, new technologies such as milking robots are not enough to overcome the hardest aspects of this job.

There are some concerns about the impact of cross-compliance on the competitiveness of dairy farms in an increasingly global environment (Tió, 2004). Depending on how good practice standards are defined, the requirement of linking the SPS to the respect of environmental, food safety, animal and plant health and animal welfare standards, keeping all farmland in good agricultural and environmental condition, could increase considerably the costs of dairy farming. If the environmental, food safety and animal welfare standards are reasonable and similar to the adopted by third countries with leading positions in the dairy sector at an international level, the SPS could compensate this increase in costs and cross-compliance could contribute to remove the worries of some consumer segments on the undoubted hazards of “bad agricultural practices”. Consumers and society has become key stakeholders for dairy producers. However, environmental, food safety and animal welfare policies of the European Union should be actually science-based, avoiding the tendencies to the overuse of the precautionary principle.

It is difficult to anticipate the effects of the MTR on the cooperative movement. Cooperatives are increasing the bargaining power of dairy producers an can reduce the costs of “cross-compliance” by providing technical support for the implementation of good agricultural practices. Likewise, cooperatives can foster the introduction of quality and food safety schemes that can contribute to generate trust on both key customers and final consumers. It is no clear how modulation is going to be applied on the SPS for the dairy sector. As we have commented above, some recent initiatives of agricultural policy (Royal Decree 620 / 2005) have tried to strengthen the market position of small and medium dairy farms considered economically viable and located in territories where there no clear alternatives to milk production. Anyway, the tendency seems to be fewer and larger dairy farms. Financially and technically stronger farms could contribute to reinforce the cooperative movement.

For cows’ milk cheeses from the Northern Spanish regions considered in this study, it has been shown above that a low number of producers is registered under the different Protected Designations of Origin (PDO). Production of quality traditional cheeses could be an opportunity to be explored by dairy farmers and by their cooperatives. In most cases, this opportunity is limited because of the smallness of the geographical areas protected by some of the PDOs abovementioned. Low production volumes restrict the ability to access regularly to distribution channels such as large-scale retailers, where stock breaks are hardly allowed to suppliers.

3.8.5.2 Effects on Cheese Making Companies

We have seen there are different types of cheese making companies. First, there are some multinational companies, such as LACTALIS IBERIA and KRAFT FOODS ESPAÑA. When multinational companies are facing major changes in the business environment, they usually reconsider their decisions on international location (Grant, 2002). It is not known yet whether the last downsizing decision of KRAFT FOODS INTERNATIONAL will affect to the Spanish Division (El Mundo, 2006). Whatever the decision they may take, probably the weight of the MTR on the decision process will be very low. Other factors are most important in this type of strategic decisions. On the contrary, LACTALIS IBERIA took over in 2004 some dairy processing companies (Central Lechera Vallosiletana and El Prado-Cervera), reinforcing its competitive position (Cinco Días, 2004). Recently, LACTALIS and NESTLÉ have established a strategic alliance for producing and marketing different dairy products, including the ewes' milk cured cheese La Flor de Esgueva (El País, 2006). Everything seems to suggest a clear tendency to a greater concentration in the dairy industry. Confirming this trend, one of the most important Spanish companies in the dairy sector, CAPSA, has suffered recently an attempt of takeover (Cinco Días, 2006).

While the milk quota regime has contributed to stabilize milk prices, it has supposed a ceiling for milk production in Spain that has limited the export capacity of the Spanish dairy industry. Spanish dairy companies have a consolidated domestic market, but they have difficulties to introduce their products in other markets (MAPA, 2003). In the cheese making sector, there are also some technological problems that limit the ability of Spanish companies for exporting their products. Further efforts are needed in process standardization and control. In the case of traditional cheeses under PDOs, this weakness is more severe. Most times, these cheeses are only sold in regional markets and exports out of the region of origin are very limited. The low number of milk producers registered under some PDOs limits the total production of these cheeses. Redefining a PDO to increase the number of producers that can register is a difficult process. Another quality schemes such as quality labels or product certification under ISO Guide 65 could be an alternative.

The extension of the milk quota regime entails a limitation for cheese making producers because it limits the availability of milk. However, it also can be considered as an entrance barrier because companies compete by suppliers, trying to minimize transportation costs. Fewer and larger milk producers could also be a threat for small and medium cheese makers. Large dairy companies have a better bargaining position for holding large milk producers as suppliers, especially if they produce good quality milk. The quality of milk is an important factor in the elaboration of quality cheeses. But the supply of quality milk could become more and more difficult for small and medium cheese makers. An alternative is forward vertical integration by cooperatives of milk producers. Cooperative ownership of their own cheese making plants could be a clear opportunity for increasing the income perceived by milk producers.

4 THE EFFECTS OF THE CAP REFORM ON EUROPEN AGRICULTURAL CASE STUDIES

The present analysis aims to provide a prediction about the impact of the Fischler's reform on the case studies selected at Italian and European level. For Italy, three agricultural sectors were selected in order to have an appreciation of the farm reaction towards the total decoupling and the market dynamics. More specifically:

1) Farms producing durum wheat in Tuscany;
2) Dairy farms producing milk to produce Parmigiano-Reggiano cheese;
3) Beef oriented farms in Veneto.

This analysis is completed by an evaluation carried out on five satellite case studies at European level, in particular:

1) Farms producing soft wheat inside French region Centre;
2) Soft wheat producers in England;
3) Rye producers in Germany;
4) Dairy farms in Ireland;
5) Dairy farms in Galicia, Asturias and Cantabria.

The evaluation is carried out by adopting a methodology widely used to asses the farmer responses with respect to changes in agricultural policy measures, the Positive Mathematical Programming (PMP).

As already described in the methodology section, PMP methodology allows to capture the dynamics of those variables characterising the farmer behaviour within a territorial context. Briefly, the PMP, through a reconstruction of the total cost function, kept in account inside the decision process of the entrepreneur, reproduces the allocation choices of farmers. In this way, the phase of prediction can consider the relevant information known or only perceived by farmers about the structure of their costs related to the farm production system.

The information used by the model to map and estimate the productive reactions is mainly collected by the FADN archive. Where it existed sources of information more reliable and precise, FADN data has been substituted by the first one. The farm information used in the analysis concerns the year 2002, that is a year preceding the introduction of the new CAP scheme in the European agriculture.

The PMP model considers all the policy measures introduced by Reg. 1782/2003 and, in particular, the decoupling system (and its various declinations) and the aid modulation. The main results provided by the model used in this study are related to the variations in the land allocation, that is the impact of the policy change on the farmers decision planning. Linked with the production plan change, the model is able to asses the effect of this new organisation of the farm on the main economic variables leading the entrepreneur decisions (gross margin, GSP, level of aids and total production costs). Furthermore, the model structure can assess the impact of the decoupling effects on the working efforts organization inside the farms concerned by the study.

The evaluation process considers the new agricultural policy scenarios and the likely influence of the agricultural price perspectives provided by the estimations of ESIM model produced by the German research institute FAL (see deliverable 7).

Policy scenarios

The hypothesis adopted for evaluating the Fischler's reform concerns two main scenarios: the mere implementation of the total decoupling scheme for the agricultural sectors indicated by the Reg. EC 1782/2003 and its recent modifications, and the impact of a hypothesized variation in market prices associated with the reforms. More specifically :

1. **Baseline** scenario: a baseline is developed in order to establish a scenario of reference on the basis of which it is possible to compare the base situation with the modification in policy measures. The baseline is formulated keeping in account the CAP rules in force before 2005, that is before the application of the horizontal Regulation EC 1782/2003 .

2. **S1**: the hypothesis formulated for this scenario concerns the application of the Reg. EU 1782/2003 in the option of total decoupling for all the agricultural product, milk included, according to the annex VI of the horizontal regulation.

3. **S2**: S1 + variation in product prices as presented in table 4-1.

- **Table 4-1 - Real price change[%], 2013 in comparison to baseyear [2002] and deflated with 1,5% p.a.**

Product	Scenario
	Single Farm Payment (%)
SOFT WHEAT	2,3
DURUM WHEAT	3,7
BARLEY	-5,7
CORN	-14,8
RYE	-14,0
OTHER GRAIN	-15,5
RICE	-48,4
SUGAR	-24,9
POTATO	-37,7
SOYBEAN	0,3
RAPSEED	-3,8
SUNSEED	-5,0
MANIOC	12,2
SMAIZE	-32,9
FODDER	-46,2
GRAS	-42,5
CGF	10,5
MILK	-22,4
BEEF	-4,6
SHEEP	37,6
PORK	0,5
POULTRY	-2,1
EGGS	-4,0

4.1 Impact analysis on farms producing durum wheat in Tuscany

4.1.1 Sample description

The analysis has been focused on farms with durum wheat production and it has been based on a sample of farms from the FADN data-base of the Tuscany Region. More precisely, we selected 56 farms in the Province of Pisa and Grosseto.

Each year, the FADN data base collects the estate of accounts and the productive systems of a farms sample, representative at regional level. Farms are considered as professional agriculture holdings. As a result, there is a bias towards bigger farms: the majority of the farms founds in the class with a surface over 30 ha, whereas 14 farms are from the category with a surface between 20-30 ha and only 8 farms from the smallest category (<20 ha).

For this farm typology, the farm size can gives a good indicator also for the economic size, as the strong incidence of the crops within the productive farm system. As might be expected, the size of the farm determines the work organization. Into the smallest farms, a strong incidence of family labour emerged: 1.21 AWU for the first class and 1.42 AWU for the second one. A little use of extra-farm employers is recorded in the second farms class.

Generally, we can see that the size of farm is directly proportional to the family labour involvement, and even in a lesser proportion way, to the off-farm employment. This fact can be ascribable to the need of wages and salaries just during some specific period of over work (during the sowing or the harvest).

The following table shows the number of productive processes for each farm size class. It emerges that with the increase of the size also the number of activities increases. The productive diversification contributes to reduce the market risks.

- Table 4-2 - Description of the data sample for the impact analysis on farms producing durum wheat in Tuscany

Classes of UAA	n. farms	Average AAU	AWU fam	AWU extra	AWU tot	n. crops	UAA		Average GSP
							COP	Other arable crops	
0-20	8	14.95	1.21	0.00	1.21	6	7.37	3.27	11,994
20-30	14	23.52	1.42	0.03	1.46	7	7.37	5.00	36,376
30-50	15	41.35	2.19	0.16	2.35	9	11.71	4.60	50,225
>50	19	115.86	2.66	0.37	3.03	10	33.90	12.48	79,063
Sample	56	58.40	2.02	0.17	2.19	8	18.63	7.60	51,085

It is interesting to note that the number of crops increases with the augmentation of the farm size. This means that in the smallest farms the production options are more constrained that in larger farms. In case of market crisis, the farms with greater options can substantially reduce the effect on the farm economic performances. Furthermore, one can note that the bigger farms are more specialized that the smaller in the COP productions. Actually, the first two class the incidence of COP out of total arable crops is less than 70%, while for the other two classes the quota dedicated to COP crops is more than 70%.

Such farms are characterized by the cultivation of permanent crops, like olives and vineyards. The incidence of these crops on the agricultural area is quite negligible, but in term of economic results is relevant. The GSP values presented in the table above reflects not only the value generated by the cultivation of COP crops, but also the value of saleable production originating by permanent crops. In particular, the largest class of size composed by 19 farms, has an average surface harvested with permanent crops equal to 10 hectares.

4.1.2 The land use

The policy and market scenarios have been applied in respect to each farm included in the Italian FADN dataset. More specifically, for each farms the model is capable to provide detailed information on the land allocation resulting under the application of decoupling, the economic results achieved and the subsequent new distribution of the work effort among the different agricultural activity.
The most immediate effect of the decoupling implementation has been a significant relative reduction in the durum wheat production, even though in absolute value the variation is quite slight.
In the first two classes of size, for scenario S1, the durum wheat surface is decreased by 15% and about 30% on the baseline, that corresponds to a reduction by 1,2 and 2,7 ha respectively.
It is interesting to note that the decreasing trend in surface is more remarkable for the bigger size farms where the reduction has been over 20%: - 5 ha in the case of farms with an area ranging from 30-50, whereas – 12 ha in the case of the biggest farms class (>50 ha).

- **Table 4-3 - Land use impact after the reform application on farms producing durum wheat in Tuscany**

Class of AAU	Crops	Baseline	Sim1	Sim2	Sim1	Sim2
		(ha)			(Var. %)	
0-20	Durum wheat	8.1	6.9	7.0	-14.9	-12.9
	Other COP	1.2	1.4	1.2	20.5	6.0
	Fodder crops	1.6	2.0	2.0	21.3	26.6
	Other Arables	1.6	1.6	1.6	-0.2	-4.9
	GPA	0.0	0.6	0.6		
20-30	Durum wheat	9.2	6.5	8.2	-28.9	-11.5
	Other COP	1.8	3.4	1.8	82.5	-2.8
	Fodder crops	3.9	4.1	4.0	3.7	3.2
	Other Arables	2.6	2.7	2.7	4.6	4.0
	GPA	0.0	0.9	0.9		
30-50	Durum wheat	19.0	12.9	14.7	-32.1	-22.5
	Other COP	2.9	5.4	3.7	83.5	25.7
	Fodder crops	8.0	8.5	8.5	6.8	6.4
	Other Arables	3.0	4.4	4.3	49.0	45.7
	GPA	0.0	1.6	1.6		
>50	Durum wheat	53.7	41.0	45.5	-23.7	-15.3
	Other COP	10.5	16.1	11.4	53.3	8.2
	Fodder crops	19.1	21.6	21.6	12.8	12.8
	Other Arables	4.3	4.5	4.8	6.0	12.0
	GPA	0.0	4.4	4.4		

The reduction of surface dedicate to durum wheat observed in the scenario S1 is compensated by an augmentation of surface invested in other COP crops – in particular sunflower – and fodder crops. This transfer of land from durum wheat to oilseeds and meadows can be explained by a strategy, captured inside the economic relation of the model, made by farmers and finalized to minimize the production costs. Actually, decoupling allows to concentrate the production on the products with the lowest cost of input use. In this specific case, farms prefer to produce sunflower and fodder crops instead of durum wheat.
The application of the market scenario, as depicted by scenario S2, the situation for durum wheat improves with respect the mere application of decoupling, but there are no doubts that for those farms policy measures has more influence than the market scenario. It is important to remark that the variation in durum wheat price is quite modest, bout +3,7%. It is probable that a greater increase could further improve the results obtained in S2.

\- Figure 4-1 - Dynamic of land use by class of size in farms producing durum wheat in Tuscany

Fig. 4-1a: Dynamic of land use of the class of size 0-20 ha

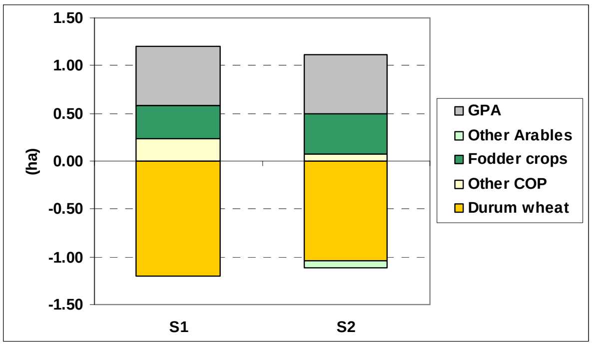


Fig. 4-1b: Dynamic of land use of the class of size 20-30 ha

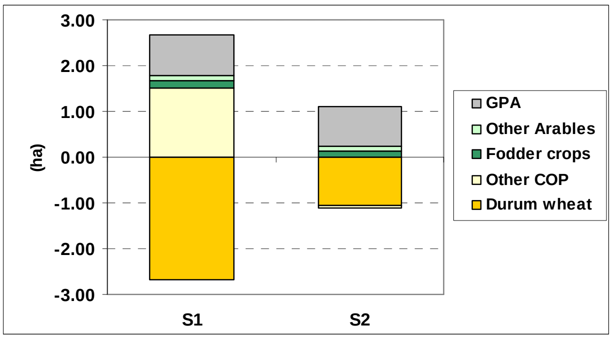


Fig. 4-1c: Dynamic of land use of the class of size 30-50 ha

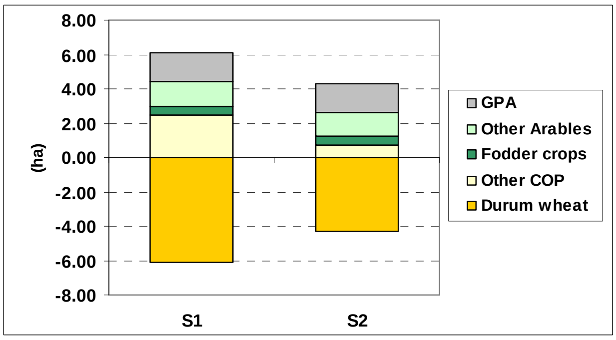
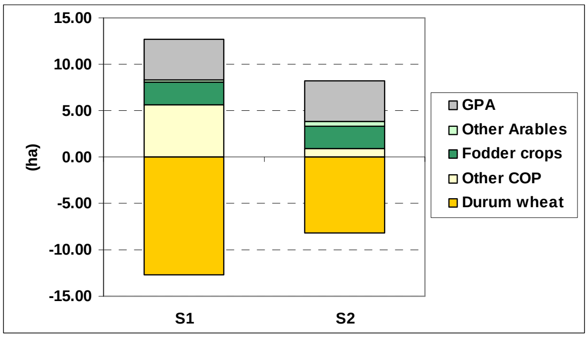


Fig. 4-1d: Dynamic of land use of the class of size > 50 ha



The figure above portrayed the dynamics of the land throughout the two scenarios hypothesized in the present study. It is evident that for such farms the crops more affected by the decoupling measure is the durum wheat that in all the scenarios and for every class of size presents the highest variation in term of hectares. The land lost by durum wheat is captured by the oilseeds and fodder crops. Furthermore, there is a new activity that takes an important place in the process of substitution: the good practice area. The good practice area (GPA) is an eligible part of the farm land, on which farmers cannot produce anything and at the same time they are obliged to keep it in good agronomic conditions according to the Regulation EC 1782/2003. The appearance of such surface confirms the orientation of farms to select the production plan less input demanding.

4.1.3 The economic results

The economic data show a rather positive trend in gross margin. As matter of fact, the reduction in the gross saleable production, as a consequence of the increasing surfaces of some other cereals and forage crops, has been counterbalanced by a strong decrease in the production costs. Therefore, the increasing in gross margin per hectare is the result of the reduced production costs together with a rather constant level of subsidy.

Even if farm gross income slight decreased within the class of the smaller farms, the decoupling has fostered an increase in the average income per family member within the other classes of farms.

In almost all classes of size decoupling leads to an abatement of GSP and productions costs. An for those farms, the reduction in production costs corresponds to a similar fall but less intense in the gross saleable production. The result is n increase in the gross margin level.

Among the classes of size, the first class seems to be very dependent by the coupled aids. Actually, the modulation of aids that cuts the aids by 4,4% with respect to the baseline is a signal of such reliance to the subsidy. Furthermore, the class of size including farms between 30 and 50 hectare demonstrates to be extremely reactive to the decoupling. In such farms, the reduction of durum wheat corresponds to a cost minimization process and to a process of investment in other arable crops, like sugar beet. This strategy leads to an increase in the GSP and consequent increase, but less than proportional, of total variable costs.

- Table 4-4 - Economic results for farms producing durum wheat in Tuscany (average values)

Class of UAA	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
0-20	GSP	649.9	586.4	511.5	-9.8	-21.3
	Net subsidy	326.0	311.8	311.8	-4.4	-4.4
	Variable costs	791.6	717.9	691.6	-9.3	-12.6
	Gross margin	184.4	180.3	131.7	-2.2	-28.6
20-30	GSP	1640.4	1664.1	1640.1	1.4	-0.0
	Net subsidy	274.6	261.3	261.6	-4.9	-4.7
	Variable costs	1566.1	1555.8	1554.8	-0.7	-0.7
	Gross margin	348.9	369.5	346.9	5.9	-0.6
30-50	GSP	883.3	1386.6	1347.7	57.0	52.6
	Net subsidy	293.0	279.1	279.1	-4.7	-4.7
	Variable costs	1012.1	1466.1	1459.6	44.9	44.2
	Gross margin	164.2	199.7	167.2	21.6	1.8
> 50	GSP	629.8	589.3	565.2	-6.4	-10.3
	Net subsidy	319.8	303.9	303.9	-5.0	-5.0
	Variable costs	745.2	677.4	665.9	-9.1	-10.6
	Gross margin	204.3	215.7	203.2	5.6	-0.6

The market price scenario, S2, contribute to further reduce the GSP level, but, in this case, the reduction in GSP is not followed by a similar reduction in production cost, so that the level of gross margin decrease in almost every class of size.

- Table 4-5 - Gross margin for farms producing durum wheat in Tuscany

Class of AAU	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-20	ML/Ha	184	180	132	-2.2	-28.6
	ML/AWU fam	2,204	2,155	1,574		
20-30	ML/Ha	349	370	347	5.9	-0.6
	ML/AWU fam	4,978	5,273	4,950		
30-50	ML/Ha	164	200	167	21.6	1.8
	ML/AWU fam	2,855	3,471	2,906		
>50	ML/Ha	204	216	203	5.6	-0.6
	ML/AWU fam	7,786	8,219	7,742		

The analysis of the results per hectares and per family annual working units, one can say that the farm typologies producing durum wheat in Tuscany are quite similar with respect the income generated by the farm activity. Indeed, the absolute results observed for the smallest farms are not very different from the farms with an acreage between 30-50 ha. Only the largest class of size is far for the other ones. Farms with a total agricultural surface greater than 50 hectare show gross margin per farm working unit of 7.786 euros, while the second best results (the second class of size) is equal to about 5.000 euros. As we have already remarked, except for the first class, the influence of price variation doesn't affect the gross margin level recorded in the base situation: the situation is substantially stable or tends to increase.

4.1.4 The labour

Concerning the organisation of the labour, we can see that the decoupling implementation has affected the use of wages and salaries. Significant drops in the use of waged workers have been recorded in both two scenarios and for all the classes of farm size.
The decoupling implementation has provided an increase in the family labour flexibility, especially in the first and in the last classes of farms.

- Table 4-6 - Dynamics in labour organization for farms producing durum wheat in Tuscany

Class of AAU	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
0-20	Family	1.04	0.96	0.94	-7.8	-10.2
	Extra-family	0.00	0.00	0.00		
20-30	Family	1.23	1.17	1.17	-4.4	-4.3
	Extra-family	0.03	0.01	0.01	-60.3	-60.3
30-50	Family	1.89	1.79	1.78	-5.6	-5.7
	Extra-family	0.14	0.06	0.06	-57.4	-57.4
>50	Family	2.30	2.06	2.06	-10.2	-10.4
	Extra-family	0.32	0.15	0.15	-53.8	-53.8

Generally, we can see that the positive effects of the decoupling regime on the farm income are also due to the reduction in the use of wages and salaries. Furthermore, the influence market price variation is not relevant in term of use of labour inside the farms if compared with them ere application of the decoupling.

4.2 Impact analysis on dairy farms in Parmigiano-Reggiano area in Italy

4.2.1 Sample description

One of the most important food chain inside the Italian agri-food system is represented by the milk chain. The Italian milk sector is very rich in term of dairy products and, in particular, of different types of cheese. Among those cheeses, the typical products have an important role in the economy of rural areas and, in certain case, represents a crucial element in order to permit the survival of certain lagging rural areas in the country (i.e. mountain). Inside the typical cheeses of Italy, as we have showed in the description of the food chain, the Parmigiano-Reggiano cheese represents the most important in term of turnover and in term of farms involved in the food chain. For this reason, the analysis on the impact of the decoupling for the dairy sector in Italy has been led with respect a sample of farms taken by the Parmigiano-Reggiano area.

The sample is composed by 10 farms, which 5 are localized in plain area, while the other five holdings are place in mountain areas. The criteria of selection would respond to the double issue concerning the evaluation of the reaction of the farms present in the richer plain areas and the behaviour of those farms producing milk in difficult areas requiring high cost of production. Furthermore, in order to capture the efficiency degree, the farms considered in the present study are split into 5 class of size. The criteria to define the farm size is the number of cows bred by each farm. The table below shows a situation where the great part of farms is distributed into the third class of size, between 50 and 75 cows. The process of concentration of the milk production portrayed by the last national census along a decade, clearly shows that the size of the stables inside the areas of Parmigiano-Reggiano production is going to increase.

- Table 4-7 - Description of the data sample for the impact analysis on farms producing milk in Parmigiano-Reggiano area

Class of LU	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		Cows	Average GSP
							COP	Other arable crops		
0-25	1	47	2.00	0.00	2.00	3	14.0	33.0	22	202,186
25-50	2	32	3.00	0.00	3.00	5	20.5	11.8	43	344,782
50-75	4	56	3.30	0.70	4.00	5	16.7	39.2	67	476,717
75-100	2	50	1.50	1.20	2.70	3	5.8	44.5	85	553,504
> 100	1	139	6.00	3.00	9.00	2	0.0	139.0	134	782,674

In general, those farms own a number of hectares greater than the number of cows bred. Only in the mountain areas, where the breading is fed with the fodder crops originating from grassland, the physical dimension of the farm exceeds the number of animals bred. The first class of size, constituted by one farm localized in mountain, by only 22 cows, those two cows can count on meadows extended for 33 hectares. While 14 hectares are dedicated to cereals. For such farms, the Cop production is a function of rotation to permit the restoring of the land fertility after a fodder crop cultivation. Only for the second class, cereals seem represent an important activity inside the farming system.

The class with highest number of farms is characterized by a stable with 67 heads and 56 hectares of land distributed between cereals and meadows. Despite other European regions, where the rich grassland permit abundant feed for animals along the year, the Parmigiano-Reggiano region can guarantee, in average, feed from April to October. So those farms, with a number of hectares lower than the number of cows bred, are likely dependent to the fodder product market.

In the fourth class of size, one can enumerate 2 holdings, each one breading, in average, 85 cows. While the largest class, represented by one farm, owns 134 cows fed by using 139 hectares of meadows and grassland. Such farm is localized in mountain and is totally oriented to produce milk used for Parmigiano-Reggiano. The land is located to two crops: grassland and meadows. The production of the farms fields is entirely use to feed the animals bred. View the absence of COP crops, we can say that the farming system is based on an extensive use of the land.

Regards on the production value, it is mainly produced by the milk activity, that contributes for the greatest part of the sales to the total GSP. The level of GSP is very relied on the average milk yield and on the milk market price. The level of the GSP increases proportionally with the average number of the cows bred by each farms.
The cows breading is one of the most labour demanding activity in agriculture. The daily needs of cows involve farmers and its family during the entire year. This is the reason why all the classes of size present a high number of annual working unit involved in the farm activity. The first two classes can only count on the family works, while for the other classes the external work is quite important. The biggest farm has a very important family work component: six annual working units constitutes the contribution work of the family.

4.2.2 The land use

The PMP model described previously is applied to each individual farm in order to evaluate the effects of the introduction of the decoupling on the farm production plan, on the consequent economic effects and on the organization of the work efforts. In other words, the simulations have been developed with respect to each farm obtaining the new organization of the farm activities. The results achieved have been then aggregated in class of livestock unit as described above. The figures showed by the tables and graphs are related to the average farms of each class of size.
In general, the new CAP reform highlights a curb in the level of cereals for all the classes of size with a considerable transfer towards the fodder crops. The relative importance in the cereal reduction corresponds to a modest increase in the hectares of fodder crops. Actually, the first class of size in S1 leaves about 20% of the surface cultivate with cereals in the baseline. This reduction corresponds to 2 hectares only of increase in fodder crops. Also for the other farm typologies the reduction in cereals corresponds to an augmentation of grassland and meadows equal to no more than 2 hectares.
If we compare this results with the same ones obtained applying to the decoupling the variation in market price as predicted by ESIM model, we should reach results very similar to the first scenario. The decrease of some cereals out of wheat reinforces the augmentation of the fodder crops, that in percentage term increase in all the classes, but in real term the increase in the acreage is very modest.

- Table 4-8 - Land use impact after the reform application on farms milk in Parmigiano-Reggiano area

Class of LU	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
0-25	Wheat	0.0	0.0	0.0		
	Other cereals	14.0	11.2	10.7	-20.3	-23.6
	Fodder crops	33.0	35.8	36.3	8.6	10.0
	BPA	0.0	0.0	0.0		
25-50	Wheat	0.6	0.0	1.2	-100.0	92.8
	Other cereals	19.9	18.2	15.6	-8.5	-21.4
	Fodder crops	11.8	13.1	14.5	11.7	23.7
	BPA	0.0	0.9	0.9		
50-75	Wheat	4.4	3.4	3.7	-22.1	-15.2
	Other cereals	12.3	10.7	9.1	-13.7	-26.5
	Fodder crops	39.2	41.3	42.6	5.2	8.4
	BPA	0.0	0.6	0.6		
75-100	Wheat	4.5	2.5	2.8	-44.0	-37.3
	Other cereals	1.3	1.2	0.6	-3.0	-51.4
	Fodder crops	44.5	46.5	46.8	4.5	5.2
	BPA	0.0	0.0	0.0		
> 100	Wheat	0.0	0.0	0.0		
	Other cereals	0.0	0.0	0.0		
	Fodder crops	139.0	139.0	139.0	0.0	0.0
	BPA	0.0	0.0	0.0		

The results achieved should be read in relation to the main farm activity, that is the production of milk. Furthermore, the transfer of land from cereal to fodder crops should be view as a strategy adopted by farmers in order to minimize the total cost of production. Actually, the decoupling of the aid permits to use the entitlements for eligible land cultivated with fodder crops, giving thus an incentive to produce these kind of crops.

- **Figure 4-2 - Dynamic of land use by class of size in farms producing Parmigiano-Reggiano**

Fig. 4-2a: Dynamic of land use of the class of size 0-25 heads

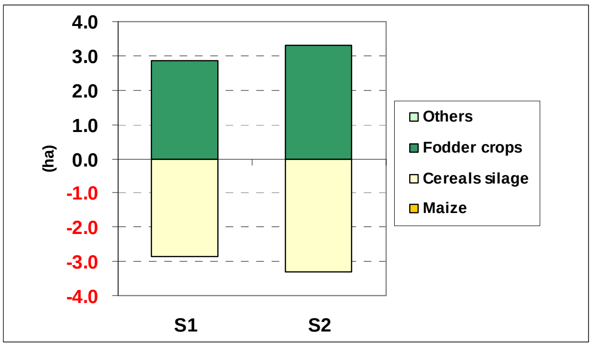


Fig. 4-2b: Dynamic of land use of the class of size 25-50 heads

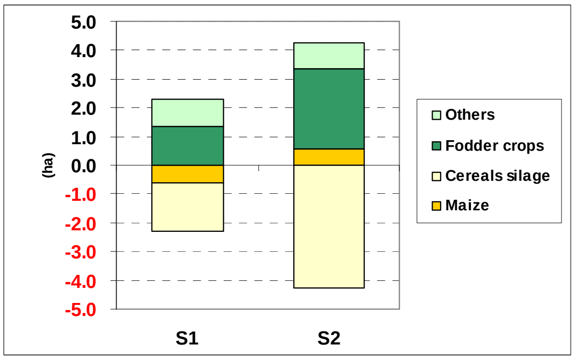


Fig. 4-2c: Dynamic of land use of the class of size 50-75 heads

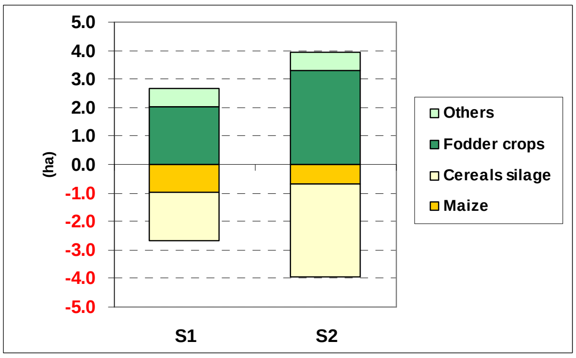


Fig. 4-2d: Dynamic of land use of the class of size 75-100 heads

The figures above portrayed the dynamics among crops resulting by the scenario simulations already described. The decoupling doesn't have relevant impact on the organization of the vegetal processes inside the farms. Actually, all the classes of size show a negligible transfer of land among crop in the scenario S1. Despite the mere application of the decoupling, the introduction of price variation leads to a more sensible reaction in the new allocation of the land. In both cases the products affected by reform are cereals and fodder crops. The average values considered for each class of size signals that no more than 4 hectares are concerned by the decoupling scenarios hypothesized.

4.2.3 The animal production

The results obtained for animal production applying the decoupling of the aids highlight as the separation of the aid from the level of production doesn't have a real influence on the level of milk cows bred. This result is obtained both for the small farms and for the bigger farms. Actually, the scenario S1 leads to reduction by about 4% for the smallest breading and a variation by -3% for the second class of size, that means a substantial stability of the milk livestock in those farms.
Wee have to highlight that the smallest farms are localized in the mountain regions where there are other agricultural economic opportunities out of milk production. This farm process permit an adequate revenue for the entrepreneur and his family. Data by national census shows that despite the strong reduction of farms in mountain regions, the only typology survived is the farms producing milk for Parmigiano-Reggiano cheese. This a relevant example on how a typical product can keep the farmers inside the lagging regions, providing a service for the entire society.

For the two biggest classes of size the intervention of the aids decoupling is negligible: the milk livestock remains stable on the starting level. The surplus obtained by the value of the entitlements and, in particular, by the new premium on milk quota will be likely invested in the dairy activity.
All changes if the milk price reduces by 22%. In this case, the smallest dairy farms don't have chances to continue the production of milk. The high cost of production, the curb in the profitability degree of the milk process and the single farm payment contribute to incentive farmers to abandon the activity, in order to minimize the costs and capitalizing the value of the milk quota.
Also the others dairy farms are affected by the reduction in milk price, but with a reducing intensity in relation to the size of the farm. This result confirms the fragility of the sector that is influenced cyclically by the Parmigiano-Reggiano market. The market price of such cheese is out of control by farmers that are price takers. Furthermore, the stringent Consortia regulation in relation the farming system management doesn't permit relevant return of scale. This is the reason why also for the larger class of size the reduction of milk price leads to a relevant decrease in milk livestock.

- Table 4-9 - Variation of livestock after the reform application on farms producing milk in Parmigiano-Reggiano area

Class of LU	Activity	Baseline	S1	S2	S1	S2
		(LU)			(Var. %)	
0-25	Milk cows	22	21	0	-3.9	-100.0
	Others	3	1	3	-63.9	-2.3
25-50	Milk cows	43	41	0	-2.8	-100.0
	Others	10	7	8	-26.8	-15.6
50-75	Milk cows	67	66	14	-1.3	-79.3
	Others	14	12	13	-12.3	-6.4
75-100	Milk cows	85	85	33	-0.3	-61.4
	Others	22	21	21	-2.5	-4.3
> 100	Milk cows	134	134	78	-0.0	-41.6
	Others	28	28	28	-0.3	-0.4

The Parmigiano-Reggiano sector demonstrates a high sensibility to the market price rather than to the decoupling introduction. The farming system is constrained to adopt production methods more efficient and more input saving, because the production standards imposed by the Consortium of Parmigiano-Reggiano prevent innovations that could affect the traditional quality of the product.

4.2.4 The economic results

In term of economic values, the decoupling should leads to a generalized increasing of the farm revenue. The level of gross margin in scenario 1 signals an increase with respect the base situation for every class of size. The reason of the augmentation is mainly due to the new premium on milk quota that has been integrated inside the single farm payment. This new decoupled payment has increased the value of net subsidy received in the base situation. The relative augmentation of the total farm payment is more evident in the farms with less COP crops in relation the total farms acreage. Although, in real term, the most relevant variation results from the breading with more than 25 heads and less than 100 heads. In such farms, the aids increase in average by more than 70 euros per hectare. The absolute value of the single payment augmentation shows also the level of the milk productivity of the different typology of farms. The lowest increasing concerns the first and last class of size, that are the two farms localized in mountain areas. For those farms the milk premium with respect the baseline increases, in average, by 50 euro/ha. This means that in such areas the milk yields is low with respect the number of animals. Both for small farms and large farms, the productivity per cow is quite low with respect the average level recorded for the farms in plain.

- Table 4-10 - Economic results for farms producing milk in Parmigiano-Reggiano area (average values)

Class of LU	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
0-25	GSP	2436.0	2294.8	629.8	-5.8	-74.1
	Net subsidy	56.7	103.8	103.8	83.1	83.1
	Variable costs	2347.5	2200.5	600.1	-6.3	-74.4
	Gross margin	145.2	198.0	133.4	36.4	-8.1
25-50	GSP	3071.6	2943.2	297.6	-4.2	-90.3
	Net subsidy	59.9	132.5	132.5	121.3	121.3
	Variable costs	3028.7	2894.4	339.5	-4.4	-88.8
	Gross margin	102.7	181.4	90.6	76.7	-11.8
50-75	GSP	2644.8	2595.4	768.6	-1.9	-70.9
	Net subsidy	31.2	102.5	102.5	228.3	228.3
	Variable costs	2543.6	2490.6	779.3	-2.1	-69.4
	Gross margin	132.4	207.3	91.8	56.6	-30.7
75-100	GSP	2620.1	2611.3	1140.0	-0.3	-56.5
	Net subsidy	9.1	84.2	84.2	820.4	820.4
	Variable costs	2467.8	2455.9	1112.7	-0.5	-54.9
	Gross margin	161.5	239.6	111.5	48.4	-31.0
> 100	GSP	2054.3	2053.5	1293.6	-0.0	-37.0
	Net subsidy	0.0	57.5	57.5		
	Variable costs	1884.0	1883.2	1231.8	-0.0	-34.6
	Gross margin	170.3	227.7	119.3	33.7	-29.9

Furthermore, as we have already observed for other case studies presented in this report, the decoupling implies the reduction of the costs due to the transfer of land from activities with high cost of production to activities with low cost of input use. So, augmentations of aids associated with a reduction in production costs more intense than the reduction observed for GSP produce an improvement in the level of gross margin.
The introduction of a negative variation in milk price is very penalizing for every farms: the groos margin reduces the total amount respect the base period.

- Table 4-11 - Gross margin for farms producing milk in Parmigiano-Reggiano area

Class of LU	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-25	GM/Ha	145	198	133	36.4	-8.1
	GM/AWU fam	6,026	8,218	5,537		
25-50	GM/Ha	103	181	91	76.7	-11.8
	GM/AWU fam	3,842	6,787	3,390		
50-75	GM/Ha	132	207	92	56.6	-30.7
	GM/AWU fam	7,342	11,495	5,091		
75-100	GM/Ha	161	240	111	48.4	-31.0
	GM/AWU fam	22,743	33,741	15,699		
> 100	GM/Ha	170	228	119	33.7	-29.9
	GM/AWU fam	10,815	14,460	7,578		

The measurement of the gross margin per ha and per annual work unit confirms the analysis previously depicted. The farms localized in plain (the three middle classes) can benefit of the decoupling more than the others in relative terms. The analysis of the gross margin per family work units portrayed a situation where the decoupling rises the family income and, one can say, improves the economic sustainability of the farms localized in lagging regions. The greater decoupled aid provided by the new milk quota payment can sustain farms to invest more in dairy activity or to diversify the activity towards different sector (rural tourism, beef production, etc.). While farms with old holders and/or without successors can remains inside the farms, continuing the farms activity with the objective to conserve the estate.

4.2.5 The labour

The decoupling of the aids doesn't produce a strong reduction of the annual working units inside the farms producing milk for Parmigiano-Reggiano cheese. This means that the decoupling in specialized farms don't induce to exit from the sector. Also for the small farms, the few available activity options, the milk production seem to be the only activity able to produce an adequate level of revenue for the holders and his family. In socio-economic point of view, in this specific sector, the single farm payment doesn't affect the sector employment and allows to keep in marginal areas agricultural activities sustaining the vitality of rural areas and the environment preservation. This is the reason why decoupling in this sector con be viewed as multifunctional levy for rural development.

- **Table 4-12 - Dynamics in labour organization for farms producing milk in Parmigiano-Reggiano area**

Class of LU	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
0-25	Family	2.0	1.8	1.4	-8.8	-29.8
	Extra-family	0.0	0.0	0.0		
25-50	Family	3.0	2.6	1.5	-12.2	-49.0
	Extra-family	0.0	0.0	0.0		
50-75	Family	3.3	3.1	2.1	-5.3	-34.3
	Extra-family	0.8	0.7	0.5	-0.3	-35.2
75-100	Family	1.5	1.5	1.5	0.0	0.0
	Extra-family	1.3	1.2	0.5	-1.9	-61.8
> 100	Family	6.0	6.0	6.0	0.0	0.0
	Extra-family	3.0	3.0	1.5	-0.2	-48.7

Although, if the decoupling is associated with a relevant curb in milk market price, the economic profitability of the entire farming system cannot support the dairy production, so that mainly the small farms are obliged to abandon the sector. The exit from the sector an the important reduction sustained also in the larger farms should induce an important decrease in the farms working effort. In particular, in farms where only the family contributes to the farm activity, the annual working units required for managing the farm reduce between 30% and 50%. While, in farms conducted by using external work, the total efforts reduce for the extra-family workers.

4.3 *Impact analysis on beef breeding in Veneto*

4.3.1 Sample description

According to the national statistical data, the great beef production is concentrated in the area of Pianura-Padana (Po Valley), where more than 80% of the total beef cattle are bred. In particular, there are four regions that entirely contribute to the beef production in North Italy: Veneto, Lombardia, Piemonte and Emilia-Romagna. Veneto is the most important region in term of number of meat oriented cattle bred after Lombardia region. The method of breading is divided in two main farming system. The first one, the most relevant in term of involved farms, concerns a process of fattening of cattle, where calves are purchased from specialized farms, frequently localized in France. This kind of breading characterizes Lombardia, Veneto and Emilia-Romagna. The second beef farming system is the close cycle breading, where the entire process of veal and cattle fattening is lead by the farm. This kind of breading method, called “cow-veal line”, is mainly concentrated in Piemonte.

The information adopted in order to prepare the quantitative models and evaluate the impact of the CAP reform on the Venetian breeding originates from the beef data owned by CRPA, a public research institute specialized on animal productions. CRPA collects information about a statistically consistent sample of farms specialised in breeding fattening cattle over regions Emilia-Romagna, Piemonte, Lombardia and Veneto. Into this dataset, the information about six different typologies of farms has been extracted and organized on the basis the number of animals bred for the reference year.

The six Venetian beef oriented farms have been aggregated according to 4 classes of size, as showed by the table below. Every farm is characterized by relevant dimension of the number of stalls associated with no big extension of farm land. Actually, it is quite normal that such farms concentrate their investments on the breading, purchasing a considerable part of the feed outside. The acreage is important in order to cultivate fodder crops to transform in silage feed for the livestock and to have a adequate surface where throw up the breading wastes. Furthermore, the number of cattle bred in a given year doesn’t correspond to the effective stable capacity. Such farms keep calves for 6-8 months, the period needed for fattening, and then restart a new cycle within the same year.

- **Table 4-13 - Description of the data sample for the impact analysis on beef oriented farms in Veneto**

Class of LU	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		n. Cattle	Average GSP
							COP	Other arable crops		
0-200	1	15	2.00	0.00	2.00	3	15.0	0.0	149	396,825
200-800	1	55	1.00	1.00	2.00	1	55.0	0.0	796	2,296,053
800-1600	2	46	1.50	1.00	2.50	2	46.0	0.0	2512	2,153,302
> 1600	2	69	1.00	1.50	2.50	1	69.0	0.0	3209	6,050,154

The largest farm breeds more than 3.000 cattle and owns only 69 hectares cultivated in monoculture of cereal silage crop. Also the other classes have a similar structure very specialized in cattle breeding. Although, it is interesting to note that some of these farms produce also milk. The number of milk cows in not so relevant as the beef livestock but it has a certain weight on the economic results of the farm.

The value of the saleable production is proportional to the size of farms. Only the second farm presents a GSP greater than the farms appertaining to the third class. This is likely due to the different quality of the beef cattle produced by such farms and by the relative high incidence of the milk production inside the farm activity.

Regards on the labour, data shows very similar of annual working effort for every type of farm with no sensible differences according to the farm size. The information collected by each farms on this variable is likely underestimated, but it is true as well that the beef oriented breading in Veneto is characterized by an "industrial" process, where technology can permit to manage breading with different size using a same working effort level.

4.3.2 The land use

The effects of decoupling on the land allocation of the beef oriented farms in Veneto don't present a significant variation with respect to the observed situation. The very constrained number of crop produced and the relative small surface harvested have contribute to maintain the observed production organization. The crops cultivated in such farms have to be considered in strict connection with the breading, as a part of unique farming process. These crops are not oriented to the market but they are an important input (feed input) for the beef activity.
Only the smallest farm, between 0 and 200 heads, presents a land allocation richer than the other farm typologies. The very small surface cultivated is dedicated to produce maize grain, wheat and fodder maize. We can hypothesize that the land owned by such farm is finalized to respond at the environmental regulation provisions and only a little part to the feeding needs of breading. The rest of feeding requirements are more likely purchased outside the farms.
For these farms, the decoupling as not serious effects: the only negative variation is recorded by the maize grain that transfers about 0,20 hectares to soft wheat. While the application of price influences leads to a greater modification of the land allocation among crops. In particular, the reduction of the maize (grain and fodder) profitability produces a curb in such crop with an important transfer of land to wheat that increase in absolute farms by 9 hectares.

- **Table 4-14 - Land use impact after the reform application on beef oriented farms in Veneto**

Class of LU	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
0-200	Wheat	3.80	4.01	12.71	5.6	234.6
	Maize grain	2.00	1.79	1.79	-10.7	-10.7
	Fodder maize	8.70	8.70	0.00	-0.0	-100.0
	GPA	0.00	0.00	0.00		
200-800	Wheat	0.00	0.00	0.00		
	Maize grain	0.00	0.00	0.00		
	Fodder maize	55.00	55.00	52.25	0.0	-5.0
	GPA	0.00	0.00	2.75		
800-1600	Wheat	0.00	0.00	0.00		
	Maize grain	20.15	19.96	20.65	-0.9	2.5
	Fodder maize	25.35	25.54	22.58	0.7	-10.9
	GPA	0.00	0.00	2.28		
> 1600	Wheat	0.00	0.00	0.00		
	Maize grain	0.00	0.00	0.00		
	Fodder maize	69.00	69.00	65.55	0.0	-5.0
	GPA	0.00	0.00	3.45		

In spite of the third class of size, where the two crops enter in substitution between them with very modest changes with respect the baseline, the other classes of size don't present important variation both in case of mere application of decoupling and in case of the price influence. The land allocation for those farms remains stable at the starting situation.
The decoupling associated with the price variation leads to emerging a new farm activity, the land subjected to good agronomic practices (GPA). The proportion of the land invested in GPA is very modest with respect the total land use, but confirm a certain rigidity to such farms to find alternatives to fodder crops to feed the farm livestock.

- **Figure 4-3 - Dynamic of land use by class of size in farms producing Beef in Veneto**

Fig. 4-3a: Dynamic of land use of the class of size 0-200 heads

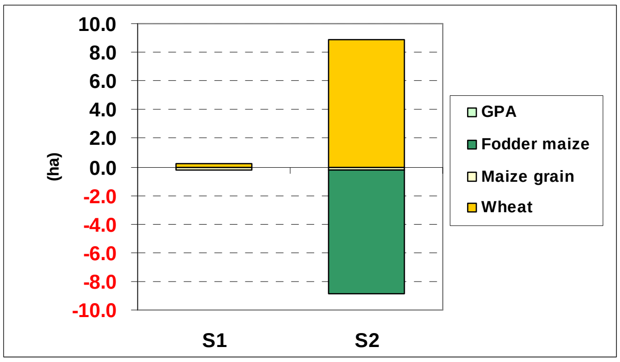


Fig. 4-3b: Dynamic of land use of the class of size 200-800 heads

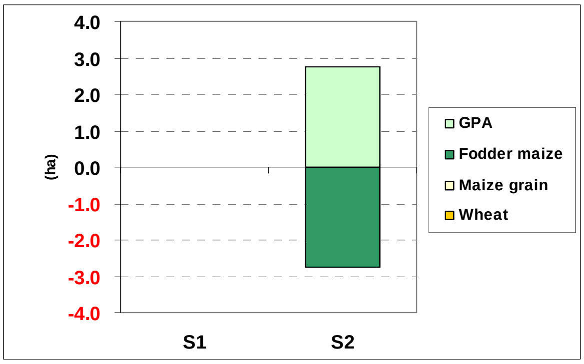


Fig. 4-3c: Dynamic of land use of the class of size 800-1600 heads

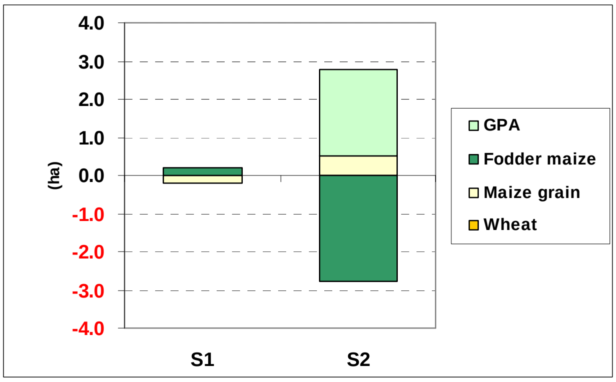
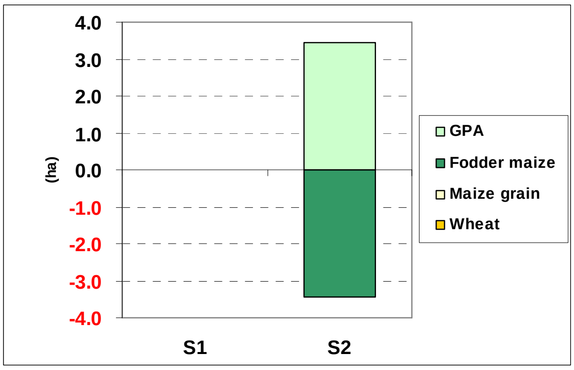


Fig. 4-3d: Dynamic of land use of the class of size > 1600 heads



The figures above demonstrates that the main crops concerned by the land variation are the fodder maize and the good practice area. The absolute level of transfers is very low (it doesn't reach 4 hectares in the largest farm), but it confirms a process of progressive reduction in the amount of livestock owned by farms. The beef oriented farms in Veneto demonstrates to be very sensitive to the market price but also in relation to the process of decoupling. The loss of the linkage between premium and beef head leads farmers to choose a production plan less input demanding in order to reduce the costs of production. This consideration can be addressed towards the small and medium holdings, while the largest farms can still count on important return to scale, that in this sector is important to maintain a positive profitability.

4.3.3 The animal production

The reaction of the beef oriented farms with respect to the application of decoupling shows that the great part of such farms is very dependent on the coupled payment per head. Actually, three classes out of four presents strong reduction in the number of animals bred. In particular, the smallest class of size should abandon the beef breading and keep the production of milk. The strategy followed by such farms seem to prefer a production plan focused on milk production and on the minimization of the total variable costs.
The relevance of the return of scale level is showed by the results achieved by the second and third classes. Those classes are characterized by a very larger farm structure with respect the first one and the effects of decoupling are less negative than for the smallest farms. Indeed, the separation between subsidy and the number of heads produces a reduction by 47% and 44% according to the dimension, confirming that the dimension is important to define the farm strategy.

In this sense, the largest farms can benefit of further return of scale. The reduction of beef heads in scenario S1 for the farms with more than 1600 heads is about 12% in relation to the baseline. For this class as for the others, the consistence of cows is not affected by decoupling. This means the milk production is remarkably profitable in such farms, which can sustain cost of production extremely lower with respect to dairy farms that are not specialized in beef production.

- **Table 4-15 - Variation of livestock after the reform application on beef oriented farms in Veneto**

Class of LU	Activity	Baseline	S1	S2	S1	S2
		(LU)			(Var. %)	
0-200	Beef	149	0	0	-100.0	-100.0
	Cows	22	22	0	-0.1	-100.0
200-800	Beef	796	415	0	-47.9	-100.0
	Cows	119	119	0	-0.1	-100.0
800-1600	Beef	2,512	1,396	342	-44.4	-86.4
	Cows	377	377	0	-0.1	-100.0
> 1600	Beef	3,209	2,834	2,373	-11.7	-26.0
	Cows	481	481	164	-0.0	-65.8

The predicted variation in market prices induces a strong reaction in every class of size. The first two classes are strongly affected by the new market condition and abandon the animal production activity, both for the beef production and for milk production. It is important to note that also for the milk the ESIM model estimates a reduction in market price. The third farm can keep part of the initial beef livestock, but the reduction is, in any case, dramatic. The low variable costs sustained by the largest farms permits to lose only 26% of the observed situation. The milk production also for this class has many difficulties to support the predicted reduction in market price.

4.3.4 The economic results

The estimated drastic reduction of beef animals applying the decoupling scenarios leads to a strong change in the economic results. The results achieved on the gross margin repeat substantially the values obtained for other food chains, that is a generalized improvement of the farm income. Actually, decoupling permits to define a production more in line with the effective convenience of each crop respect to the others. This is the reason why the farmers can decrease the volume of those productions with highest costs, activating other kind of activities with lower variable costs. For such farms the single farm payment could represent a good incentive to close the breading and produce crop in order to capture the public subsidy. In this sense, the market orients only in part the choices of farmers. In this sector, the strong rigidity of farms cannot permit wide production alternatives, so that the exit from the breading activity and maintenance of the land is the only profitable solution towards these new scenarios.

- Table 4-16 - Economic results for beef oriented farms in Veneto (average values)

Class of LU	Economic results	Baseline	S1	S2	S1	S2
		(euro/lu)			(Var. %)	
0-20	GSP	2663.3	1545.0	0.0	-42.0	-100.0
	Net subsidy	91.1	111.3	111.3	22.1	22.1
	Variable costs	2669.6	1505.0	0.0	-43.6	-100.0
	Gross margin	84.8	151.3	117.3	78.4	38.3
20-40	GSP	2884.5	2219.5	1103.8	-23.1	-61.7
	Net subsidy	79.5	101.3	101.3	27.5	27.5
	Variable costs	2717.6	2039.5	1128.6	-25.0	-58.5
	Gross margin	246.3	281.4	76.5	14.2	-68.9
40-60	GSP	1714.4	1253.4	577.7	-26.9	-66.3
	Net subsidy	69.8	88.0	88.0	26.2	26.2
	Variable costs	1600.4	1127.2	547.6	-29.6	-65.8
	Gross margin	183.8	214.3	118.1	16.6	-35.7
> 60	GSP	1885.7	1727.7	1309.4	-8.4	-30.6
	Net subsidy	62.6	85.6	85.6	36.6	36.6
	Variable costs	1617.1	1456.0	1166.0	-10.0	-27.9
	Gross margin	331.1	357.3	228.9	7.9	-30.9

Only the largest and most specialized farms could sustain the decoupling and a possible reduction in beef price. In other words, only farms that have organized the farming system considering the market impulses and not the public subsidies have possibilities to face the new policy system and the market dynamics.
Analysing the economic results it arises that an important component that has contributed to the positive performances is the increase in the level of net subsidies. This augmentation is produced by the new premium on the milk quota that has been integrated inside the single farm payment. Furthermore the new land allocation has produced a curb in variable costs higher than the decrease estimated for the GSP.

- Table 4-17 - Gross margin for beef oriented farms in Veneto

Class of LU	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-200	GM/LU	85	151	117	78.4	38.3
	GM/AWU fam	6,317	11,271	8,736		
200-800	GM/LU	246	281	76	14.2	-68.9
	GM/AWU fam	196,093	223,980	60,891		
800-1600	GM/LU	184	214	118	16.6	-35.7
	GM/AWU fam	153,888	179,403	98,926		
> 1600	GM/LU	331	357	229	7.9	-30.9
	GM/AWU fam	1,062,460	1,146,374	734,483		

The modification in market prices produces sensible reduction in gross margin level. Only the smallest class of size keep the positive results thanks to the complete abandon of production. This kind of farms should exit from the animal production sector for leading the farm activity with the specific objective of capturing the single farm payment.

4.3.5 The labour

It is evident that the strong reduction in the number of beef heads bred by the different class of size implies a reduction of the work contribution to the farm activity. In particular, the first and smallest class of size shows a decrease by 80% of the family annual working unit in the scenario S1 and a further reduction if a

modification in the market prices arises. This farm typology is conducted by using only family work and the decision to withdraw the beef production creates greater possibilities to spend the time outside the farms.
The second and third classes of size are affected by a strong reduction of the animal heads both in S1 and S2. The consequence for those two classes is a consistent reduction of the annual working units. In term of socio economic impact, the decoupling seems to have a non negligible effect on the extra family work supply.

- **Table 4-18 - Dynamics in labour organization for beef oriented farms in Veneto**

Class of LU	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
0-200	Family	2.0	0.4	0.2	-80.2	-92.2
	Extra-family	0.0	0.0	0.0		
200-800	Family	1.0	1.0	0.1	0.0	-89.2
	Extra-family	1.0	0.2	0.0		
800-1600	Family	1.5	1.1	0.4	-29.8	-71.0
	Extra-family	1.0	0.6	0.0	-42.3	-100.0
> 1600	Family	1.0	1.0	0.9	-4.1	-12.8
	Extra-family	1.5	1.3	0.8	-16.2	-49.2

The reinforcement of the sector by an improvement of the average efficiency of farms can contribute to keep the working force in the sector. According to the results achieved, the greater competivness of the entire sector can be reached by an increase of the dimension, but also and in particular by a new organisation of the farm inputs, in order to minimize the costs of production.

4.4 Impact analysis on CENTRE region

4.4.1 Sample description

The analysis conducted for France agriculture concerns one of the most important cereal supplier French region: region Centre. The food-chain description presented previously shows a strong production concentration in this region for cereals (more than 25% of the total national cereal production), in term of agriculture production and stock services. While the plants specialized on the last phase of the wheat treatment (the milling) is distributed on the national territory.

In order to evaluate the impact of the decoupling system on the production plan decision made by farmers, a sample of farms extracted from FADN archives for year 2002 was composed. The sample extracted concerns all the farms producing cereals into Centre region and it was stratified according to the class of size of each farm. Table 4-19 presents information about the FADN sample, where it is possible to see that only the four classes of size are available in this kind of region and for such crops.

- Table 4-19 - Description of the data sample for the impact analysis of Centre region (France)

Classes of UAA	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		Average GSP
							COP	Other arable crops	
20-50	290	45	1.10	2.00	3.10	3	5.2	0.0	349,003
50-100	923	92	1.20	2.20	3.40	12	71.2	4.4	425,499
100-300	2221	226	1.20	0.30	1.50	13	133.2	61.7	171,421
>300	2764	677	1.40	0.50	1.90	15	500.0	108.4	447,998

In total, the FADN collects 461 farms representing a universe constituted by 6168 farms, mainly distributed in the class of size with more than 100 hectares. Only 1.000 farms are concentrated in the first two classes. These last ones are internally composed by farms specialized in more sectors out of cereals. The first class, from 20 to 50 hectares, harvests in average three arable crops, whom only 5 hectares addressed to COP crops. This means that cereals for such farms are a marginal production, while the main production are represented by other activity like vineyards and orchards. Actually, the gross saleable production is in average higher than the biggest class of size. For the second class of size, it is evident that cereals and the other COP crops represent the most important part of the farm production plan, but also for this kind of farms part of the acreage is dedicated to productions out of arable crops. The GSP so high is explained by the presence of orchards in the permanent crops and tobacco inside the other arable crops.

The last two classes are composed by farms very specialized in cereals and in particular in soft wheat. The other cereals (barley and durum wheat) are important as well. This classes are characterized by a production mix very articulated: 13 different type of crops produced for the third class and 15 for the last one. The wide dimension of such farms allows a intense differentiation in the production plan supporting the need of rotation of the land harvested by soft wheat and other cereals.

The use of family labour is not very intense. The family work need increase proportionally with the farm dimension, but in any case it doesn't reach 2 units. This means that for the cereals production, the intensive production over wide area permits investments in mechanization and/or use of third part service (private service providers or producers cooperatives).

The engagement of the extra-family work is very dependent to the type of activities lead inside the farms. The firs two classes involve 2 extra family worker during an agrarian year, even if the farm dimensions are not so relevant. Although, the presence of the permanent crops and tobacco engender intense work requirements. While the other two farms, the work is almost entirely in charge to the family components. The extra-family labour is used only in the most demanding period of the year for cereal crops (harvesting and seeding).

4.4.2 The land use

The PMP model used in this specific study adopts a methodology based on calibration of the base productive situation of the group of farms concerned, where the permanent crops (olives, orchards, vineyards and so on) are not included in the analysis. This is because sometimes, for some classes, the total acreage doesn't correspond to the respective class range. The results presented below are related to the average farm for each class of size considered.

The decoupling has effects very similar for every class of size. In scenario S1, the total decoupling leads to a situation where the decreasing of cereals corresponds to an augmentation of the hectares harvested with fodder crops. Only of the second class of size, the soft wheat reveals a very little increasing. The process of substitution between COP crops and fodder crops is the expression of a farm strategy based on the minimisation of the production costs. This kind of farm practice is captured by the model. The entitlements arising from the decoupling are spread on the total eligible surface, in which the fodder crops represents one important farm eligible activity. Out of the first two classes, where the incidence of the fodder crops is very low, the last two classes show a large transfer of land from cereals to fodder crops.

In any case, general speaking, the decoupling measure shouldn't menace the cereal production in Centre region. The highest reduction is sowed for the class from 100 to 300 hectares, with a curb not higher than 8,5%.

- **Table 4-20 - Land use impact after the reform application on Centre region (France)**

Class of UAA	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
20-50	Soft wheat	3.4	3.4	5.2	-0.0	53.3
	Other cereals	1.8	1.8	0.0	0.0	-100.0
	Fodder crops	0.0	0.0	0.0		
	Others	0.0	0.0	0.0		
50-100	Soft wheat	31.1	31.1	51.2	0.2	65.0
	Other cereals	39.0	36.7	14.9	-5.9	-61.7
	Fodder crops	2.6	4.7	4.7	82.3	82.3
	Others	3.0	3.1	4.8	4.0	60.5
100-300	Soft wheat	60.6	55.4	76.8	-8.5	26.7
	Other cereals	72.8	67.6	45.2	-7.1	-37.8
	Fodder crops	24.9	34.9	34.9	40.4	40.4
	Others	7.1	7.4	8.4	4.5	18.4
> 300	Soft wheat	223.3	220.0	266.4	-1.5	19.3
	Other cereals	267.2	257.9	204.6	-3.5	-23.4
	Fodder crops	47.0	62.3	64.9	32.5	38.1
	Others	30.4	27.7	32.0	-8.8	5.1

If we consider the scenario of total decoupling and market price modification (S2), the trend of cereals change completely. The estimated reduction in other cereals, like barley, associated to a modest increasing in the price of the soft wheat leads to an important augmentation of the acreage dedicated to the soft wheat. In particular, one can show that the new market panorama induces a further decrease in barley and other cereals. The strong predicted reduction in the fodder crop price seem to have a very marginal role in the dynamics among farm activities. For such crop, the decoupling drives the displacement of land in own advantage. The overall model results demonstrate how the soft wheat for this type of farm remain a profitable crop, both in case of total decoupling and in case of intervention of market prices modifications.

- **Figure 4-4 - Dynamic of land use by class of size in farms producing soft wheat in France**

Fig. 4-4a: Dynamic of land use of the class of size 20-50 ha

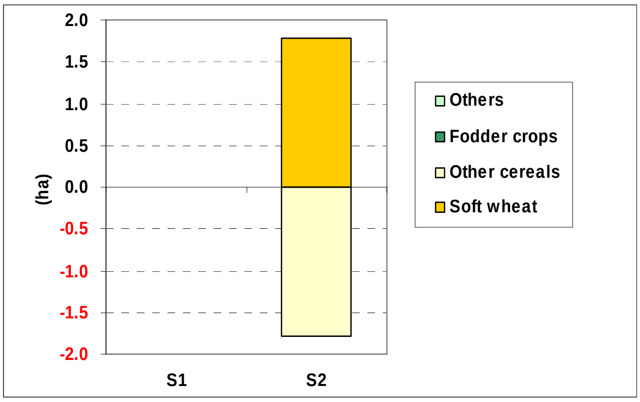


Fig. 4-4b: Dynamic of land use of the class of size 50-100 ha

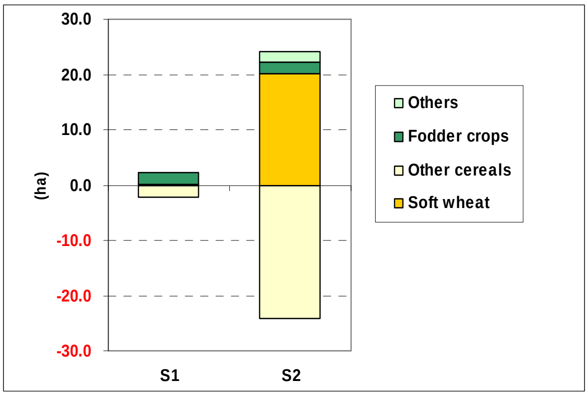


Fig. 4-4c: Dynamic of land use of the class of size 100-300 ha

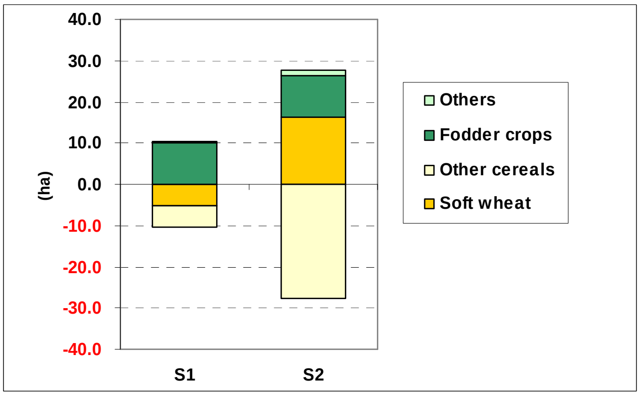
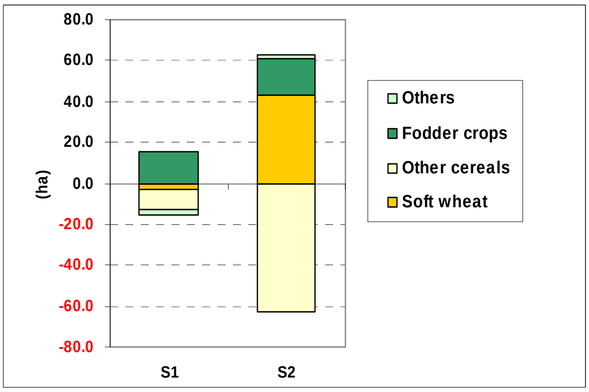


Fig. 4-4d: Dynamic of land use of the class of size > 300 ha



The figures presented above show that the total decoupling, without any other environmental changes, produces a decrease in cereals with a subsequent improving of the surfaces harvested with fodder crops. While, the market price scenarios induce the most relevant dynamics affecting in great part the cereals. In the second scenario, one can assist to a small reaction of the other crops different from cereals and fodder crops. Inside this group of crops, the sugar beet, even if its market price reduces, shows a signal of augmentation. This kind of dynamics of sugar beet is also due to the fact that this crop can benefit of farm entitlements as it represents an eligible surface.

4.4.3 The economic results

The solutions of the PMP model provide several information about variations of some important economic variables. In this context, the analysis will focus on changes in the revenue levels (GSP), level of aids, production costs and on the gross margin modification.

The results obtained in term of variation of gross margin are largely dependent to the decoupling system. In particular, one can observe in the first scenario a small reduction of gross margin mainly due to the aid cut operated by the modulation system. This reduction increases when product market prices change. In this second case, there is not any mix of crops than can keep the level of gross margin previously observed. The reduction in almost all the crops, as estimated by ESIM model, induce a generalized decrease in gross sellable production with strong influence on the participation of each crop to the gross margin. Only the first class portrayed a situation quite different with respect the other classes. Actually the market variations influence the smallest class only for three processes (soft wheat, barley and durum wheat), for which the ESIM model predicts an improving of the market conditions for everything but durum wheat.

- Table 4-21 - **Economic results for Centre region (France)**

Class of UAA	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
20-50	GSP	514.8	514.8	585.6	0.0	13.7
	Net subsidy	275.9	262.2	262.2	-4.9	-4.9
	Variable costs	535.2	542.8	600.6	1.4	12.2
	Gross margin	247.8	234.2	247.2	-5.5	-0.3
50-100	GSP	666.6	669.3	592.0	0.4	-11.2
	Net subsidy	264.8	251.6	251.6	-5.0	-5.0
	Variable costs	655.8	651.7	601.5	-0.6	-8.3
	Gross margin	274.8	269.1	242.1	-2.0	-11.9
100-300	GSP	696.4	662.4	633.1	-4.9	-9.1
	Net subsidy	229.3	218.0	218.0	-4.9	-4.9
	Variable costs	603.9	569.1	581.8	-5.8	-3.7
	Gross margin	321.8	311.4	269.4	-3.2	-16.3
> 300	GSP	758.0	729.1	696.2	-3.8	-8.2
	Net subsidy	247.8	235.5	235.5	-4.9	-4.9
	Variable costs	458.4	433.6	475.3	-5.4	3.7
	Gross margin	547.3	531.1	456.4	-3.0	-16.6

It is interesting to remark that for all the farms composing the sample the modulation reduce the total amount of the single payment. For all the classes the percentage of reduction of the subsidy is close to 5% the maximum percentage of reduction by modulation.
The reduction in the production costs is a consequence of the farm strategy induced by the introduction of the aid decoupling. The orientation to reduce the cost of production harvesting land with crops requiring less input use (like fodder crops) explains the reduction in the level of variable costs. Only the first, where there are not alternative substitutes for cereals, the production costs seem to increase just a little. The substantial negative economic results of the decoupling system is reinforced by the foreseen market scenario. One element that plays an important role in producing this situation is the augmentation of the variable costs if compared with the results portrayed by the scenario S2. The augmentation in variables costs in due to the increasing of the soft wheat and other crops (sugar beet) hectares.

- Table 4-22 - **Gross margin for Centre region (France)**

Class of UAA	Variables	Baseline	S1	S1	S1	S1
		(€uro)			(Var. %)	
20-50	GM/Ha	248	234	247	-5.5	-0.3
	GM/AWU fam	567	536	566		
50-100	GM/Ha	275	269	242	-2.0	-11.9
	GM/AWU fam	5,854	5,734	5,158		
100-300	GM/Ha	322	311	269	-3.2	-16.3
	GM/AWU fam	15,280	14,785	12,792		
>300	GM/Ha	547	531	456	-3.0	-16.6
	GM/AWU fam	56,628	54,949	47,226		

In table 4-22, the levels of gross margin per hectares and per family work unit are showed. The first class is characterized by levels of gross margin per hectares comparable with the other class of size, while the gross margin calculated per family work unit is very far from the other classes. This is because the main production for the first classes is not represented by cereals but by other activities, like vineyards and orchards that produce the level of revenue needed to permit the farm survival. The other three class of size shows level of gross margin per hectare and per AWU very dependent to the dimension of the farm. The biggest classes, more intensive and likely capital based (high level of mechanization), can profit of the highest level of gross margin per family unit.

4.4.4 The labour

The table below presents a situation very interesting: even though the decoupling should induce a modification in the production plan, the labour requirements remains stable at the level observed in the base scenario. How to explain that? Fist of all, the scenario S1, where it is assumed the total decoupling without price interferences, the change in cereals was not relevant and that reduction has activated a large increase in the fodder crops that requires not less labour than cereals. Furthermore, the scenarios S2 has transferred land from the other cereals (in particular barley) to soft wheat, without a variation in the labour requirements for the farms.

- **Table 4-23 - Dynamics in labour organization for Centre region (France)**

Class of UAA	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
20-50	**Family**	**1.1**	**1.1**	**1.1**	**0.0**	**0.0**
	Extra-family	**2.0**	**2.0**	**2.0**	**0.0**	**0.0**
50-100	**Family**	**1.2**	**1.2**	**1.2**	**0.0**	**0.0**
	Extra-family	**2.2**	**2.2**	**2.2**	**0.0**	**0.0**
100-300	**Family**	**1.2**	**1.2**	**1.2**	**0.0**	**0.0**
	Extra-family	**0.3**	**0.3**	**0.3**	**0.0**	**0.0**
>300	**Family**	**1.4**	**1.4**	**1.4**	**0.0**	**0.0**
	Extra-family	**0.5**	**0.5**	**0.5**	**-0.0**	**-0.0**

One can say that the CAP reform for this type of farms doesn't affect the structure of the farm and in particular the organization of the labour inside them. The high level of specialization allows to maintain this kind of production in this farms. A confirmation of that is given by the scenario S2, where notwithstanding a change in the profitability of the cereals crops, the preference was attributed to the soft wheat instead of fodder crops or the best practice area.

4.5 Impact analysis on farms producing soft wheat in UK

4.5.1 Sample description

The sample examined in our analysis on UK is composed by 32 soft wheat producers spread according to UAA farm size.
In the first two classes (0-200ha) are collected the majority of analysed farms (23) while the third and fourth classes represent respectively 2 and 7 farms.
Observing data related to average farm size one notes that farms in the fourth class (>300 ha) are clearly larger than others, with an average surface above 700 ha. This difference is absent in the crops number performed in the farm. All the examined farms show, on the average, an high crops number that, in the first, second and fourth class is equal to 11.
That shows a production mix very articulated in every examined farm. The COP crops represent the most important component of the production mix. The percentage of COP crops on the whole farm surface is higher than 60% in every class. Among COP crops the soft wheat is most important accounting for more than 55% of cultivated surface.

- **Table 4-24 - Description of the data sample for the impact analysis of soft wheat producers in UK**

Classes of UAA	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		Average GSP
							COP	Other arable crops	
0-100	13	48.48	0.72	0.89	1.61	11	29.92	18.56	51,134
100-200	10	168.40	0.74	1.19	1.94	11	123.67	44.73	163,384
200-300	2	270.64	0.76	3.62	4.38	7	180.36	90.28	217,988
>300	7	707.64	0.99	5.26	6.24	11	530.90	176.73	746,388

The use of family labour increases slightly when the farm size increases but is ever lower than one unit even in larger farms. The use of extra-family labour, 0,89 units in the first class, raises much when farm surface increases up to 5 units in larger farms. In these farms mostly specialized in cereal production, the extra-family labour is employed mainly in cereal harvesting and storage activity.

GSP rises when farm size increases. In the fourth class, GSP is very high because the average farm surface is very large(>700 ha).

4.5.2 The land use

By observing data obtained by PMP model one notes that, with total decoupling, both soft wheat and other COP area decrease in every UAA class. The soft wheat decreases mostly in the third class (200-300 ha) with a drop of 23,9%. The other COPs show a lower reduction with respect to soft wheat (no higher than -12%).
In the first scenario, these decreases are balanced by the increment of fodder crops, arable crops and GPA. Particularly, in smaller farms, fodder crops increase more than arable crops that, instead, indicate a higher rise in the bigger farms.
In the third class the total decoupling produces a drop of 9% in fodder crops. By introducing total decoupling, in the cost minimisation process, the cop cultures are substituted by fodder and other arable crops. In the larger farms, these latter crops, and particularly leguminous crops, are the favourite crops, entering in substitution with COP crops. In S1, GPA is present in every class and take up a significant share

of COP surface attesting the grower efforts to minimise the cost after the reform application.

- **Table 4-25 - Land use impact after the reform application on soft wheat producers in UK**

Class of AAU	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
0-100	Soft wheat	20.9	19.1	25.2	-8.4	20.8
	Other COP	9.8	9.1	5.9	-7.5	-40.4
	Fodder crops	9.7	10.2	10.2	5.2	5.2
	Other arables	7.3	7.4	4.5	1.7	-37.7
	GPA	0.0	1.9	1.9		
100-200	Soft wheat	96.6	81.5	103.1	-15.6	6.7
	Other COP	27.4	25.1	7.9	-8.1	-71.2
	Fodder crops	26.3	31.5	31.5	20.0	20.0
	Other arables	18.2	21.8	17.5	19.7	-3.7
	GPA	0.0	8.4	8.4		
200-300	Soft wheat	152.9	116.3	133.3	-23.9	-12.8
	Other COP	27.4	25.3	8.2	-7.9	-70.3
	Fodder crops	83.5	76.0	75.8	-9.0	-9.1
	Other arables	6.8	46.6	46.9	582.8	586.8
	GPA	0.0	6.5	6.5		
>300	Soft wheat	393.2	334.2	363.9	-15.0	-7.5
	Other COP	137.7	121.5	91.9	-11.7	-33.3
	Fodder crops	87.5	91.8	91.8	4.9	4.9
	Other arables	89.2	127.4	127.4	42.8	42.8
	GPA	0.0	32.7	32.7		

Price variations in S2 produce a lower reduction of soft wheat surface in the third and fourth class while in the smaller farms one notes an increment of this crop.
The decrement of other COPs is strong in every farm with percentage higher than 70%.
The weak price rise of soft wheat improves, mostly in smaller farms, the profitability compared to other COP and other arable crops for which is supposed a strong price reduction.
Fodder crops and other arable crops, in larger farms, show the same variations highlighted in S1.

- **Figure 4-5 - Dynamic of land use by class of size in farms producing soft wheat in UK**

Fig. 4-5a: Dynamic of land use of the class of size 20-50 ha

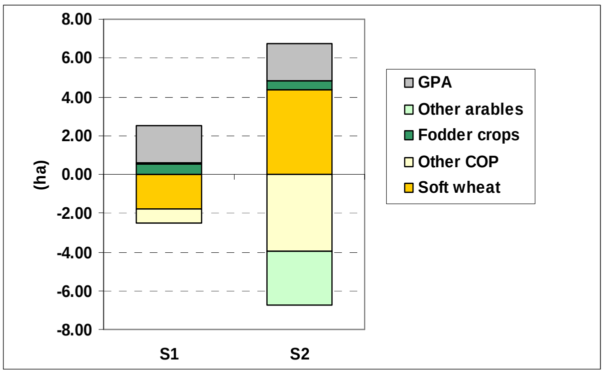


Fig. 4-5b: Dynamic of land use of the class of size 50-100 ha

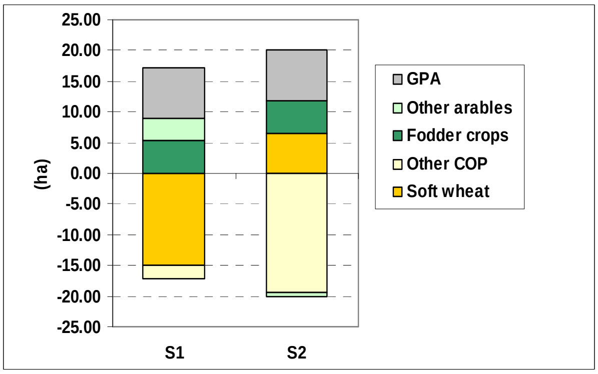


Fig. 4-5c: Dynamic of land use of the class of size 100-300 ha

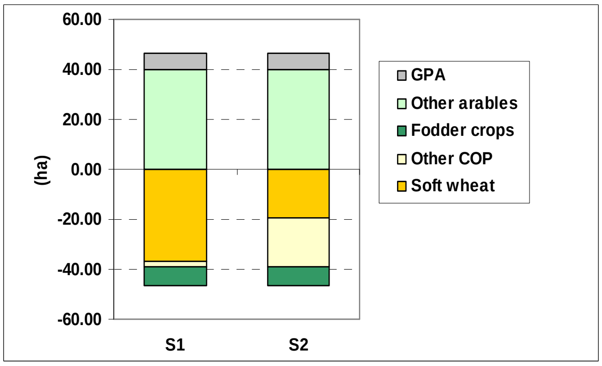
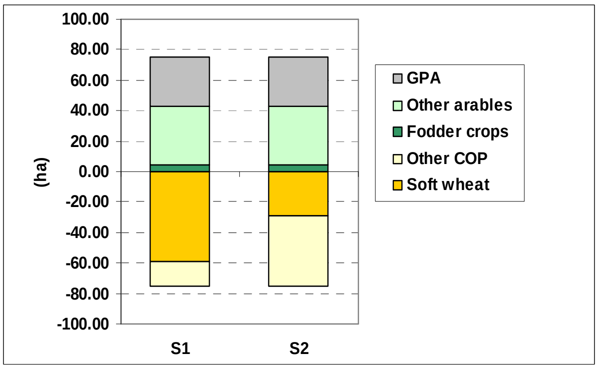


Fig. 4-5d: Dynamic of land use of the class of size > 300 ha



The figures presented above show that with total decoupling, in smaller farms, fodder crops and GPA balance the soft wheat reduction, while in larger farms, the other arable crops, whit GPA, substitutes the soft wheat surface.

The significant increment of GPA and fodder crops, in total decoupling scenario, mostly in smaller classes, proves that this farms prefer to substitute the soft wheat area with crops that ensure a reduction in production costs.

4.5.3 The economic results

Table 4-26 allows same remarks about the variations of economic variables after the application of total decoupling. As stated above, the farms choose to substitute the cereal crops whit GPA and fodder crops to minimize production costs. By observing the table, one notes a cut in production costs with percentage between -12% and -20%. These variations of production mix produce negative effects on GSP that decreases by 12-17%.

- Table 4-26 - Economic results for soft wheat producers in UK

Class of UAA	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
<100	GSP	1071.8	921.3	697.9	-14.0	-34.9
	Net subsidy	226.9	213.8	220.1	-5.8	-3.0
	Variable costs	1235.2	1075.9	896.7	-12.9	-27.4
	Gross margin	59.3	59.1	21.3	-0.4	-64.2
100-200	GSP	970.2	846.6	632.4	-12.7	-34.8
	Net subsidy	262.9	249.7	250.9	-5.0	-4.5
	Variable costs	1165.7	1017.3	821.4	-12.7	-29.5
	Gross margin	65.9	79.0	61.9	20.0	-6.0
200-300	GSP	805.5	668.0	628.3	-17.1	-22.0
	Net subsidy	267.4	254.9	254.9	-4.7	-4.7
	Variable costs	1003.1	806.9	769.1	-19.6	-23.3
	Gross margin	66.8	116.0	114.2	73.7	71.0
>300	GSP	1054.8	875.9	786.4	-17.0	-25.4
	Net subsidy	264.8	252.0	252.0	-4.8	-4.8
	Variable costs	1057.4	902.0	850.5	-14.7	-19.6
	Gross margin	260.6	226.0	187.9	-13.3	-27.9

By introducing price variations, compared to first scenario, GPA and variable costs reductions are more accentuate with negative results on GM/ha share that tends to drop.

- Table 4-27 - Gross margin for soft wheat producers in UK

Class of AAU	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-100	GM/Ha	59	59	21	-0.4	-64.2
	GM/AWU fam	3,930	3,916	1,409		
100-200	GM/Ha	66	79	62	20.0	-6.0
	GM/AWU fam	14,924	17,906	14,026		
200-300	GM/Ha	67	116	114	73.7	71.0
	GMAWU fam	23,668	41,106	40,474		
>300	GM/Ha	261	226	188	-13.3	-27.9
	GM/AWU fam	186,846	161,998	134,744		

The ML/ha value increase with size farm augmentation and is very higher in the third class compared to other classes. The medium size farms (100-300 ha) are the only to show a ML/ha increment in case of total decoupling.
Introducing price variations, the effects on farm economic performances worsen. In S2, indeed, only the third class shows an improvement of GM/ha by 70% with respect to the baseline.

4.5.4 The labour

The labour use drop in every examined class.
The extra-family labour, in S1, decreases by 15-30%, while family labour use shows a low reduction in smaller farms and it is steady in the third and fourth class. In these classes, indeed, the family labour

share in baseline is indispensable for the farm activity.

- Table 4-28 - Dynamics in labour organization for soft wheat producers in UK

Class of AAU	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
0-100	Family	0.72	0.67	0.64	-7.4	-10.6
	Extra-family	0.89	0.70	0.59	-21.0	-33.9
100-200	Family	0.74	0.72	0.69	-3.6	-7.0
	Extra-family	1.19	1.00	0.52	-16.2	-56.4
200-300	Family	0.76	0.76	0.76	0.0	0.0
	Extra-family	3.62	2.64	2.53	-26.9	-30.0
>300	Family	0.99	0.99	0.99	0.0	0.0
	Extra-family	5.26	4.19	3.89	-20.3	-26.1

4.6 *Impact analysis on farms producing rye in Germany*

4.6.1 Sample description

The sample analyzed is composed by 17.550 rye producers in Germany. More than 16.000 farms have a surface lower than 500 ha, 350 farms are collected in the fourth class (500-1000 ha) and more than 1.000 have a surface higher than 1.000 ha. The farms collected in this latter class show an average surface of 1.400 ha that justifies GSP value upper than €1.600.000.

The family labour use is, on the average, equal to 1,74 units in the first class and rises with the increment of farm size up to third class (5,15 units), while it is considerably lower in farms with a surface higher than 500 ha. Contrariwise, the extra-family labour use remains relatively low in the first three classes, below 3 units, while is very high in the third and fourth class with average values of 13,98, and 27,8 units respectively.

- Table 4-29 - Description of the data sample for the impact analysis of rye producers in Germany

Classes of UAA	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		Average GSP
							COP	Other arable crops	
0-50	8233	40.47	1.74	0.19	1.93	24	24.69	15.78	53,242
50-100	5450	97.18	2.25	0.38	2.63	26	59.98	37.20	135,155
100-500	2387	470.03	5.15	2.69	7.83	26	319.55	150.48	585,551
500-1000	350	791.55	0.72	13.98	14.70	24	573.77	217.78	867,798
>1000	1130	1399.79	0.21	27.80	28.01	26	1029.95	369.84	1,628,433

The number of crops is very high in every examined class and that is, partly, due to high number of farms in every class.

By regarding the production mix, in the first class, the COP crops account for 60% of the total farm surface. This rate rises with the farm size increment up to 73% in the farms collected in the fourth class (>1000 ha) indicating a specialization in cereal crops for larger farms.

The rye accounts for 10-13% of total cultivated area. The importance of rye in the production mix is lower compared to other cereal crops. This is due both because the rye is a residual crop cultivated in poor soils and because the rye market is limited (in fact rye production is decreases over the years).

GSP increases with farm size increment too, increasing from €53.000, in smaller farms, to €1.600.000 in the farms with a higher than 1000ha surface.

4.6.2 The land use

Data regarding crops area shows that rye decreases in every class and in every scenario.

Whit total decoupling (S1) the stronger reduction (-30,7%) is present in smaller farms. This decrement becomes less intense with increasing of farm dimension except the fifth class (>1000ha) where rye decreases by 21,3%.

The COP crops decrease much in smaller farms while decrement is lower when farm size increases.

Bigger farms, in fact, thanks to higher efficiency and to return of scale, can maintain more cereal crops that require higher resources. In the smaller farms, instead, total decoupling causes a preference for GPA and fodder crops to minimize the costs.

The only crops that increase in every class are the fodder crops. These crops show an increment of 45-60% in every scenario and class except the fifth class where fodder crops increase by 35-36%.

The other arable area show very variable values in different classes and scenarios. These strong variations are partly caused by low values of areas cultivated with other arable crops. This crop, in total decoupling scenario, decreases by 5% in bigger farms while, in the other classes, there is an increment of other arable crops. This increment is higher than 150% in small (0-50ha) and medium size farms (500-1000ha) while is below 65% in the other classes.

- Table 4-30 - Land use impact after the reform application on rye producers in Germany

Class of AAU	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
0-50	**Rye**	**4.4**	**3.1**	**0.0**	**-30.7**	**-100.0**
	Other COP	**20.3**	**10.1**	**14.1**	**-50.4**	**-30.7**
	Fodder crops	**14.0**	**20.9**	**21.0**	**48.8**	**49.9**
	Other arables	**1.7**	**5.7**	**4.3**	**229.5**	**144.6**
	GPA (GPA/tot)	**0.0**	**0.7**	**1.1**	**1.8**	**2.8**
50-100	**Rye**	**10.6**	**8.5**	**3.0**	**-20.0**	**-71.3**
	Other COP	**49.4**	**29.9**	**41.0**	**-39.4**	**-16.9**
	Fodder crops	**30.2**	**46.0**	**47.8**	**52.3**	**58.2**
	Other arables	**7.0**	**9.0**	**0.5**	**28.2**	**-93.3**
	GPA (GPA/tot)	**0.0**	**3.8**	**4.9**	**3.9**	**5**
100-500	**Rye**	**62.6**	**50.2**	**16.5**	**-19.8**	**-73.6**
	Other COP	**257.0**	**171.1**	**225.8**	**-33.4**	**-12.1**
	Fodder crops	**110.0**	**158.9**	**160.4**	**44.5**	**45.9**
	Other arables	**40.5**	**66.4**	**43.8**	**63.7**	**8.2**
	GPA (GPA/tot)	**0.0**	**23.5**	**23.5**	**5**	**5**
500-1000	**Rye**	**86.9**	**70.8**	**10.1**	**-18.5**	**-88.4**
	Other COP	**486.9**	**333.5**	**418.9**	**-31.5**	**-14.0**
	Fodder crops	**200.4**	**303.9**	**317.4**	**51.6**	**58.4**
	Other arables	**17.4**	**43.7**	**5.5**	**151.7**	**-68.2**
	GPA (GPA/tot)	**0.0**	**39.6**	**39.6**	**5**	**5**
>1000	**Rye**	**154.3**	**121.5**	**104.3**	**-21.3**	**-32.4**
	Other COP	**875.7**	**725.4**	**755.0**	**-17.2**	**-13.8**
	Fodder crops	**326.0**	**441.3**	**445.2**	**35.4**	**36.6**
	Other arables	**43.9**	**41.6**	**25.2**	**-5.1**	**-42.4**
	GPA (GPA/tot)	**0.0**	**70.0**	**70.0**	**5**	**5**

In the second scenario, a reduction of 14% in rye price causes a decrease in the acreage higher than 70% in every farm except the farms belonging to the last class (>1000 ha). Larger farms show, in spite of high price drop a rye area decrement sharply lower than other farms. That is due to higher efficiency achieves in the farm structure.
With price variation the other crops decrease less compared to the first scenario.

Introducing price variations the other arable crops increase of 3 ha in small (0-50ha) and medium size farms while decrease in other classes. In the second class (50-100ha) the other arable crops disappear and also in fourth and fifth class there is a strong reduction of 68,2% and 42,4% respectively.
It is interesting to notice that GPA is present in all classes and scenarios. Particularly GPA accounts for 2-3% of total cultivated area in smaller farms while in other classes the GPA rate is equal to 5%.

- **Figure 4-6 - Dynamic of land use by class of size in farms producing rye in Germany**

Fig. 4-6a: Dynamic of land use of the class of size 0-50 ha

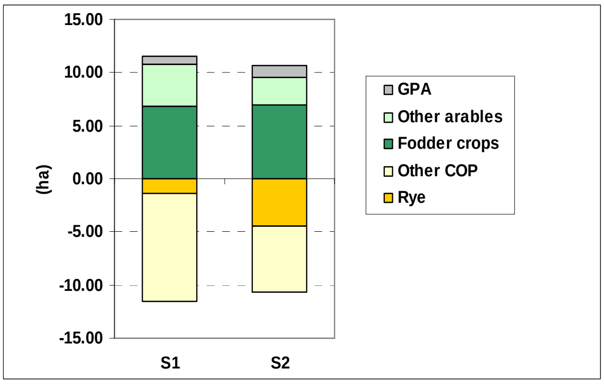


Fig. 4-6b: Dynamic of land use of the class of size 50-100 ha

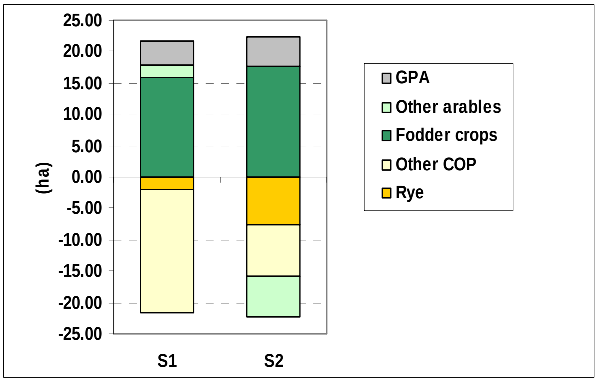


Fig. 4-6c: Dynamic of land use of the class of size 100-500 ha

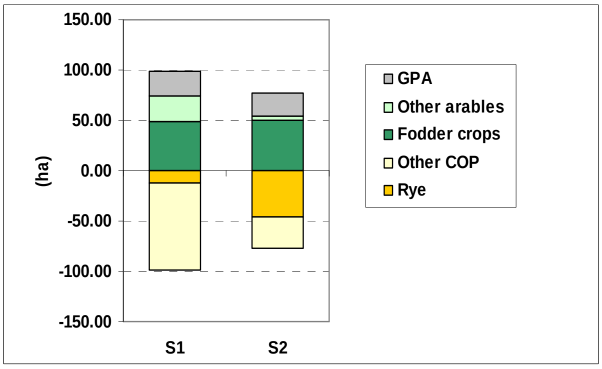


Fig. 4-6d: Dynamic of land use of the class of size 500-1000 ha

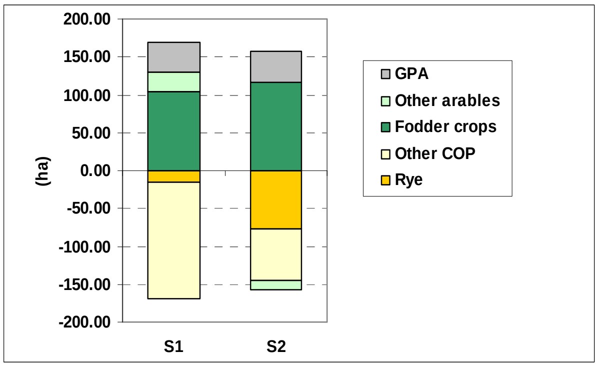
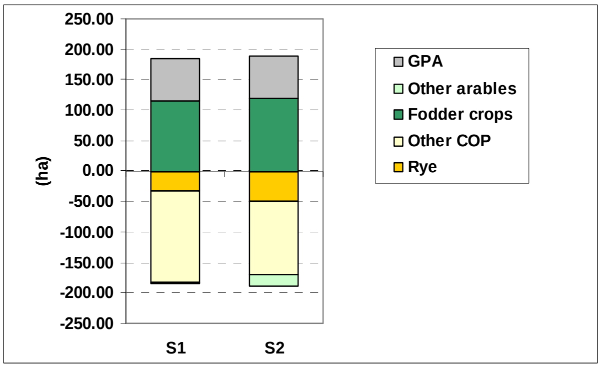


Fig. 4-6e: Dynamic of land use of the class of size >1000 ha



The figures presented above show that the total decoupling produces a higher reduction in the price variation scenario compared to S1. In the total decoupling scenario, indeed, almost the whole reduction can be ascribed to other COPs.

In every class of the first scenario and in the farms with a surface lower than 500 ha in S2, one notes that these reductions are balanced mainly by fodder crops increment and, secondly, by GPA and other arable crops increase. The other arable crops decrease, with rye and other COPs, in the third and fourth class of second scenario and this reduction is balanced by fodder crops and GPA.

4.6.3 The economic results

In the table 4-31 it is possible to analyze the economic variables trend, in the various classes, after the total decoupling application and with respect to the price variation proposed by ESIM model.
In the first scenario one notes that, in the middle classes (2ª, 3ª e 4ª), GSP and variable costs trends are, in percentage, very similar. In these classes, in fact, these variables decrease, on the average, by 24-28%.
In the smaller farms, instead, the GSP and variable costs drop is higher than in S1 with values of -36,2 and -39% respectively. Contrariwise, the farms with a surface higher than 1000 ha, show very low variations. The GSP, in fact, decreases by 7,4% after the total decoupling application, while the cost reduction is lower than 10%. In the larger farms the reduction in production costs is lower compared to smaller farms because of higher efficiency level and use of return of scale in the farms with a bigger surface. Besides, larger farms show a lower decrement of crops, like COP, that entail higher production costs.

- **Table 4-31 - Economic results for rye producer in Germany**

Class of UAA	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
<50	GSP	1315.6	839.2	415.5	-36.2	-68.4
	Net subsidy	267.3	253.9	253.9	-5.0	-5.0
	Variable costs	1531.3	933.4	543.7	-39.0	-64.5
	Gross margin	51.5	159.8	125.7	210.2	144.1
50-100	GSP	1390.8	1047.5	500.1	-24.7	-64.0
	Net subsidy	261.1	248.1	248.1	-5.0	-5.0
	Variable costs	1578.4	1158.9	669.1	-26.6	-57.6
	Gross margin	73.5	136.6	79.1	85.9	7.6
100-500	GSP	1245.8	908.5	477.5	-27.1	-61.7
	Net subsidy	266.4	253.1	253.1	-5.0	-5.0
	Variable costs	1412.1	1022.0	667.9	-27.6	-52.7
	Gross margin	100.0	139.6	62.7	39.5	-37.3
500-1000	GSP	1096.3	848.7	434.6	-22.6	-60.4
	Net subsidy	279.8	265.9	265.9	-5.0	-5.0
	Variable costs	1331.6	1021.7	635.3	-23.3	-52.3
	Gross margin	44.5	92.9	65.2	108.5	46.5
>1000	GSP	1163.3	1077.4	721.3	-7.4	-38.0
	Net subsidy	284.6	270.3	270.3	-5.0	-5.0
	Variable costs	1168.9	1061.8	806.2	-9.2	-31.0
	Gross margin	279.0	286.0	185.4	2.5	-33.5

The 5% subsidy reduction is caused by modulation. In the first scenario (total decoupling), GM/ha rises in every UAA class. This increment is very strong in the smaller farms (+210%) while the augmentation is lower when farm size grows. Actually, in farms with a surface higher than 1000 ha the increase reaches +2,5%. The only exceptions are the farms collected in the third class that show, on the average, a GM/ha rise higher than 100%. This increment is, partly, caused by the low degree of GM/ha in the baseline for these farms.
The price variations cause a further GSP and variable costs reduction in every farms.
It is possible to notice a worsening of the GM/ha. In the farms collected in the third and fifth class this variables decreases by 35% about.

- Table 4-32 - Gross margin for rye producers in Germany

Class of AAU	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-50	GM/Ha	52	160	126	210.2	144.1
	GM/AWU fam	1,198	3,716	2,924		
50-100	GM/Ha	74	137	79	85.9	7.6
	GM/AWU fam	3,175	5,902	3,416		
100-500	GM/Ha	100	140	63	39.5	-37.3
	GM/AWU fam	9,133	12,741	5,724		
500-1000	GM/Ha	45	93	65	108.5	46.5
	GM/AWU fam	48,799	101,760	71,479		
>1000	GM/Ha	279	286	185	2.5	-33.5
	GM/AWU fam	1,821,465	1,866,914	1,210,506		

Observing data regarding gross margin it is interesting to notice that the smaller and big farms show an higher increment of gross margin, compared to other classes, both with total decoupling and with price variations. This high growth is due to low values of gross margin in the Baseline.

In the first scenario the gross margin increases in all classes with very different values. In the forth class the increase is above 100% and in smaller farms is even higher than 200%.

Also in the second class (50-100ha) the GM/ha growth is strong (+85,9%) while in the farms with area between 100 ha and 500 ha the increment is below 40%.

In the bigger farms, introducing total decoupling, the gross margin increases only by 2,5% because of very high GM/ha value in the baseline scenario.

With price variations (S2) GM/ha decreases by 33-37% in the third and fifth class. In the other classes, although GM/ha increases, the growing is lower compared to S1.

Smaller farms show an increment of 140% and also in the forth class (500-1000ha) the GM/ha growing (46,5%) is not so high as in S1. In the farms with area between 50 and 100 ha there is a light GM/ha augmentation (+7,6%).

4.6.4 The labour

By introducing the total decoupling (S1), the family labour use decrease in the first three classes with values of -28,7%, -13,3% and-10,9% respectively, while is steady in the larger farms. In case of intervention of market prices modifications, family labour is steady in the farms with a surface wider than 500 ha, while in the other farms family labour reduction is higher than in the first scenario.

- Table 4-33 - Dynamics in labour organization for rye producers in Germany

Class of AAU	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
0-50	Family	1.74	1.24	0.62	-28.7	-64.3
	Extra-family	0.19	0.00	0.00	-100.0	-100.0
50-100	Family	2.25	1.95	0.96	-13.3	-57.4
	Extra-family	0.38	0.00	0.00	-100.0	-100.0
100-500	Family	5.15	4.59	3.45	-10.9	-33.0
	Extra-family	2.69	1.03	0.00	-61.7	-100.0
500-1000	Family	0.72	0.72	0.72	0.0	0.0
	Extra-family	13.98	10.66	5.20	-23.8	-62.8
>1000	Family	0.21	0.21	0.21	0.0	0.0
	Extra-family	27.80	25.93	18.99	-6.7	-31.7

The extra-family labour disappears in both scenario as regards the smaller farms (<100 ha). In S1 and S2, the extra- family labour reduction is lower with farm size augmentation. However, the price variations produce a higher extra-family labour drop in comparison with S1. In fact, even in the farms of the third class the extra-family labour disappears.

4.7 Impact analysis on dairy farms in IRELAND

4.7.1 Sample description

The data used in the analysis of the impact on farms producing milk in Ireland after the application of the decoupling measure is related to sample collected into the farms databank of TEAGASC. The Irish research institute has composed a group of farms able to represent as better as possible the real agricultural structure of this typology of farms. In term of farm population, the Ireland is characterized by a high number of small dairy farms, almost 80% of the dairy farms doesn't exceed 300 tons of milk per year.
Ten farms representative of the universe of the Irish dairy farms have been selected in order to prepare the sample for evaluating the impact of the CAP reform. This ten farms have been distributed in three classes of acreage size. The physical dimension of the farm can be considered also as a good approximation of the dimension of the breeding, because the extension of the grassland is generally proportional to the dimension of the stable.

- Table 4-34 - Description of the data sample for the impact analysis on farms producing milk in Ireland

Classes of UAA	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		Milk cows	Average GSP
							COP	Other arable crops		
0-50	4	30	1.30	0.10	1.40	4	0.4	29.9	31	196,656
50-100	4	70	1.50	0.30	1.80	4	3.0	67.0	57	326,532
>100	2	125	1.70	0.60	2.30	5	8.2	116.8	65	498,371

The first class is constituted by 4 farms that have and average agricultural surface not higher that 30 hectares, of which only 0.4 hectares are cultivated with cereals, while the rest of the soil is dedicated to grassland and pasture. The cereals for this kind of cereal represents only a residual process harvested to cover marginal land or in order to satisfy consuming need of the rural family. The other arable crops is exclusively represented by fodder crop and in particular by permanent meadows that don't require crop rotation. The general extensive use of this permanent surface is used in order to feed the livestock. For the first class, one hectares of pasture can satisfy one milk cow feed need.
If one considers the second class of size, constituted by four farms, with an average size of 70 hectares, the proportion between the number of hectares of COP crops and other arable, in prevalence grassland, is the same observed for the previous class. Also, in this case, around 1 hectare of permanent pasture can satisfy the needs of one milk cow bred.
The largest class of size includes only 2 farms that are supposed represent the entire typology of farms at national level. The production structure of such farms is very similar to the previous ones. The number of process cultivated are 5, only one more with respect of the other classes. In the same manner, also for this class cereals represent only a marginal activity for the farms that is kept in order to harvest the farm places far from the pasture, for satisfy family self-consumption or in order to respond to an incentive to produce this kind of crop. In particular, it is important to highlight that barley represents the main crop among the cereals cultivated. Barley is likely entirely used to produce traditional beers. The average number of milk cows bred is 65, but for this type of farms the cattle represents an important quota of the total livestock owned.
The average gross saleable product is the expression of the dimension of the farm breeding. The GSP is in its greatest part produced by the milk sold on the market, but there is also a considerable part of the GSP produced by the farm beef production.
On regards labour, independently to the farm size, the farms are all characterized by a prevalence of family work. It is possible that the statistical data underestimates the real contribution of the family and non-family components to the farm work, because a farm with more than 100 ha and a breading with more than 300 heads cannot realistically be led by only 2 full time workers. Although, it is also true that the great part of the acreage is represented by pasture that requires very few managing work during a year. In any case, the total

labour declared by farmers doesn't seem precisely in line with the work generally absorbed by a dairy farm activity.

4.7.2 The land use

The PMP model evaluates the reaction of each farm with respect to the different types of policy scenarios hypothesized (total decoupling at farm level and total decoupling with price influence). The results obtained at farm level has been aggregated on the basis of the three different classes of size previously mentioned, so that it is possible to have information about the different reaction in relation to the farm classes.

The effect of the new reform on the farm decision seems to be very different according to the dimension of the farm concerned. The smallest farms react to the decoupling transferring the few hectares invested in cereals to fodder crops that increase their surface of 1.5%. In this case, the reform has the effect to reduce the farm production cost specializing the activity in those crops with the least expenditure in term of input use. The reaction to the price scenario (S2) is opposite to the previous one. In this case, the strong predicted reduction in fodder crops has as conceiquence a very important reduction in term of grassland surface: more than 90% of the fodder crops would not be cultivated with respect the baseline, while the cereals would absorb the reduction increasing very much in relative terms. The almost total transfer from fodder crops and cereals is captured by barley that increases 26 hectares.

- Table 4-35 - Land use impact after the reform application on dairy farms in Ireland

Class of UAA	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
0-50	Barley	0.4	0.0	26.5	-100.0	6792.5
	Other cereals	0.0	0.0	1.3	-100.0	2447.7
	Fodder crops	29.8	30.3	2.5	1.5	-91.7
	Others	0.0	0.0	0.0		
50-100	Barley	2.2	0.0	0.0	-100.0	-100.0
	Other cereals	0.8	0.0	2.5	-100.0	203.7
	Fodder crops	67.2	70.2	67.7	4.4	0.8
	Others	0.0	0.0	0.0		
> 100	Barley	6.0	0.6	0.0	-89.5	-100.0
	Other cereals	2.2	2.3	4.7	2.1	112.4
	Fodder crops	116.0	121.5	119.6	4.7	3.1
	Others	0.9	0.7	0.8	-21.4	-9.6

The second class of size follows the tendency showed by the first class. The total decoupling defined in S1, leads to complete disappearance of cereals with a consequent augmentation of the surface invested in fodder crops. The price influence introduced in the scenario S2 doesn't affect the fodder crops that increase by less than 1%. The modification in prices has a very modest effect on cereals, for which one assists to a reduction of barley and an increase in other cereals.

Also for the last and biggest class of size, the reaction is very similar to the previous one. The only remark concerns the other crops that reduce their presence with respect the base situation both in S1 and S2. the other crops for this class of size are represented almost entirely by sugar beet. The main reason to this behaviour is due to the fact that both scenarios keep in consideration the recent sugar reform that foreseen the total decoupling for the sugar beet producers (keeping coupled a very small part of the total payments received).

- **Figure 4-7 - Dynamic of land use by class of size in farms producing milk in Ireland**

Fig. 4-7a: Dynamic of land use of the class of size 0-50 ha

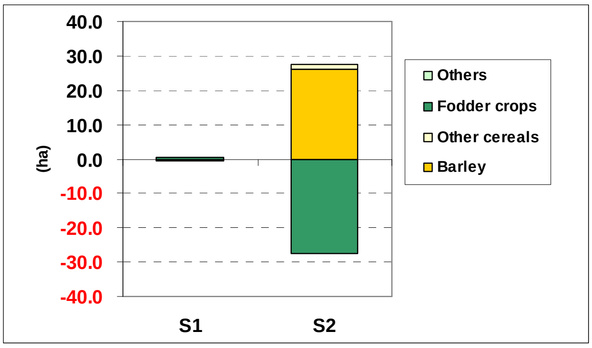


Fig. 4-7b: Dynamic of land use of the class of size 50-100 ha

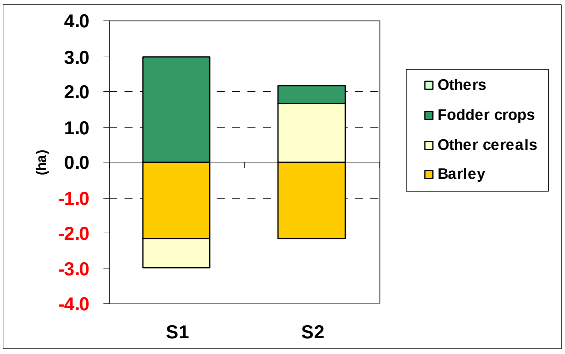
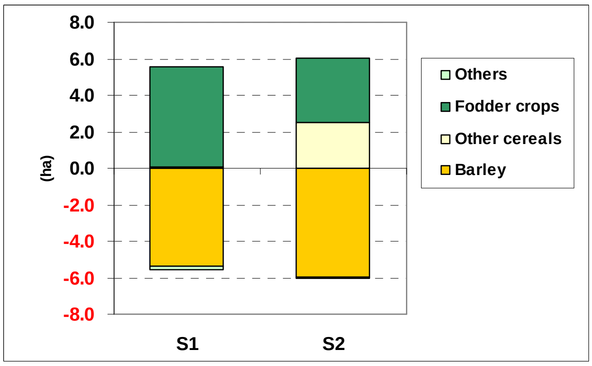


Fig. 4-7c: Dynamic of land use of the class of size > 100 ha



The figures presented above highlight the dynamics of the land under the application the decoupling measure. In the scenario 1, there are only to crops that exchange hectares: barley and fodder crops; while in the scenario S2, the other cereals participate to the new allocation of the land.

4.7.3 The animal production

The analysis of the model results for the animal sector shows dynamics quite similar for all the classes of size and for all the scenarios formulated. The scenario S1 (total decoupling) seems to have very small negative effects on the livestock for all the farms. Actually, the fodder crops show a tendency to increase. The strict linkage between fodder crops and animal processes allows to considers the two activities like one activity that participates entirely to the process of maximization of the farm gross margin.
Scenario 2 portrayed a situation very critical for dairy farms appertaining to the first class. Those farms should deactivate almost completely the breeding activity. The cause of this new negative situation for the smallest class is due on one hand to the reduction of fodder crop prices and, on the other, on the prospected reduction of milk price by 22%.
For the other scenarios the situation for the live stock is worst if compared to the scenario S1, but it doesn't seem to engender worries about the persistence of this typology of farms. Indeed, the reduction of milk cows in the second and third classes is -5% and -35% respectively.
Cattle, by the strict connection with the cow milk breeding show variation very close to the mil k cows behaviour. While the sheep represent an animal activity very marginal for such farms. Even if the second scenarios shows an important reduction of sheep, in absolute terms this result is not significant.

- Table 4-36 - Variation of livestock after the reform application on dairy farms in Ireland

Class of AAU	Activity	Baseline	S1	S2	S1	S2
		(LU)			(Var. %)	
0-50	Milk cows	31	31	4	-0.2	-88.4
	Cattle	61	61	3	-0.3	-94.8
	Sheep	1	1	0	-4.6	-100.0
50-100	Milk cows	57	57	54	-0.2	-5.1
	Cattle	167	167	158	-0.2	-5.5
	Sheep	6	6	3	-2.5	-58.3
> 100	Milk cows	75	75	72	-0.1	-3.3
	Cattle	262	262	255	-0.1	-2.9
	Sheep	12	12	9	-0.6	-26.1

The results achieved by implementing the mathematical model suggest the disappearance of the dairy activity inside the smallest farms. Those farms seem prefer invest in the other crops rather than in animal production. At the same time, the results indicate that the main reason of this drastic reduction is due to the predicted curb in milk market price. The reduction in the milk profitability for this small farms doesn't permit to cover the production costs inducing, thus, the exit from the dairy activity.

4.7.4 The economic results

The analysis of the economic results presented in the table below show with evidence that the market influence has more relevant that the decoupling introduction. The mere application of the total decoupling in scenario S1 induce a generalized improvement of the gross margin for all the farm typologies considered in the analysis. This is mainly due to the new decoupled payment for the milk quota. This new payment is equal to 27 euros per tons of milk quota and it enters in the single farm payment, that is in the value of the single entitlements owned by farmers. The milk decoupled payment produces an increase in the level net subsidy received by farmers with particular reference to the small farms. The small farms can integrate the milk payment into a number of entitlements lower than the other classes of size. Furthermore, the higher proportion of milk cows on COP crops than the other classes participate to create this difference among the classes.

The scenario S1 doesn't provide other interesting variations: the GSP and the production costs don't change their values with respect the baseline. In these farms, decoupling doesn't produce changes in production plan.

The situation changes if one takes in consideration the likely variation in market prices. In this case, the new activity organization of the first class is reflected by the economic value that reduces dramatically the GSP, the variable costs and also the gross margin. The gross margin per hectare reduces by 88% if the price of the milk cows curb by 22%. This means that such reduction cannot be sustained by the structural costs of the smallest dairy farms.

While the other classes that can be count on higher return of scale, reduces the GSP by almost 10% and less the production costs (-5,5% and -3,2%), leading to produce a gross margin per hectares lower than the baseline by around 26% for the second class and 25% in the third class.

- **Table 4-37 - Economic results for dairy farms in Ireland (average values)**

Class of UAA	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
0-50	GSP	6494.1	6518.1	386.7	0.4	-94.0
	Net subsidy	3.7	133.0	133.0	3471.8	3471.8
	Variable costs	5982.1	6002.4	455.7	0.3	-92.4
	Gross margin	515.7	648.7	64.0	25.8	-87.6
50-100	GSP	4649.6	4651.3	4145.4	0.0	-10.8
	Net subsidy	11.1	121.2	121.2	995.0	995.0
	Variable costs	4006.4	3997.7	3787.7	-0.2	-5.5
	Gross margin	654.3	774.8	478.9	18.4	-26.8
> 100	GSP	3982.8	3987.4	3613.5	0.1	-9.3
	Net subsidy	17.0	96.9	96.9	469.3	469.3
	Variable costs	3254.5	3252.8	3151.4	-0.1	-3.2
	Gross margin	745.4	831.5	559.0	11.6	-25.0

The overall results obtained in economic terms portrayed a sector situation where dairy farms don't have other production options to compare with the milk and beef production. If the level profitability of such farms, the alternatives are twofold: the first one, to continue to produce with lower marginal profits; secondary, to exit from the dairy sector keeping the position of farmers in order to obtain the single farm payment.

- **Table 4-38 - Gross margin for dairy farms in Ireland**

Class of UAA	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-50	GM/Ha	516	649	64	25.8	-87.6
	GM/AWU fam	12,036	15,139	1,493		
50-100	GM/Ha	654	775	479	18.4	-26.8
	GM/AWU fam	30,684	36,337	22,459		
> 100	GM/Ha	745	832	559	11.6	-25.0
	GM/AWU fam	54,383	60,671	40,787		

The measurement of the gross margin per ha and per annual work unit confirms the analysis previously depicted. The small farms can benefit the decoupling more than the others in relative terms, but if the market will produce a curb in milk prices, the smallest farms don't have any alternatives, while farms with an extension higher than 50 hectares can continue the animal production but with lower profits.

Another aspect that it is interesting to remark concerns the economic productivity increase with the dimension of the farms. In the baseline, one family component in the first class of size can obtain at the end of the yearly activity a gross margin equal to 12.000 euros, while the same component of the family in the biggest farms can reach 54.000 euros. The dimension allows a better organization of the production inputs and an consequent production costs saving.

4.7.5 The labour

Considering the impact of the decoupling scenarios and the organization of the work in such farms, one can say that decoupling should not influence the work effort in such farms. The first scenario indicates a stability for the family workers and low variation in the number of extra-family workers. As the external workers don't represent an important component inside the farm activity, the variations recorded for the different classes are substantially negligible.

- Table 4-39 - Dynamics in labour organization for dairy farms in Ireland

Class of UAA	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
20-50	Family	1.3	1.3	0.4	0.0	-69.7
	Extra-family	0.1	0.0	0.0	-7.4	-100.0
50-100	Family	1.5	1.5	1.5	0.0	0.0
	Extra-family	0.3	0.3	0.2	-1.2	-28.2
100-300	Family	1.7	1.7	1.7	0.0	0.0
	Extra-family	0.6	0.6	0.5	-0.2	-11.0

The second scenario portrays a situation quite different with respect to the previous one. More specifically, the first class of size, as a consequence of the drastic curb in the milk production, presents a reduction in the level of labour required by the farm activity. Every extra-family workers are not necessary any more and the family contribution to the farm activity reduce its effort by 70%.

The family work in the last two classes is not affected by the market variation, while the extra-family workers should reduce its weight due to the decrease of the livestock engendered by the reduction in milk price.

4.8 Impact analysis on dairy farms in SPAIN

4.8.1 Sample description

In 2003, according to Eurostat data, Spain had 1.096.410 cows owned by around 35.700 farms. The most part of the production is concentrated in three regions of the country: Galicia, Asturias and Cantabria. In particular, Galicia is the most important milk producers representing about 36% of the total national production. While, the regions of Asturias and Cantabria represent 10% and 9% respectively of the national production. In term of holdings, in Galicia there are 18.000 dairy farms that corresponds to 50% of the total dairy farms in Spain, while the other two main regions represents as a whole around 27% of total Spanish farms producing milk.

The data for evaluating the impact of the CAP reform on the dairy sector in Spain has been collected from the Spanish FADN archives by the University of Madrid. The information about the dairy farms has been selected aggregating the individual data according to the region of location, the farm type and the farms class of size. The regions chosen for the present analysis are the most important producers in the country, that is Galicia, Asturias and Cantabria. The farm type selected for the extraction is the one specialized in milk cows breading (FT 41). The classes of size are selected on the basis of the class of farm stable dimension. As the table below shows, the aggregation operated led to define 10 average farms representing the universe of dairy holdings in Galicia (4), Asturias (4) and Cantabria (2). These farms are split into four classes of size according the average number of cows bred. As one can see, the average capacity of the stable in these three regions is rather limited, 6 farms out 10 have a stable that cannot contain more than 60 animals. The average dimension of the dairy farms in Spain is the smallest among the European countries and in particular with respect to UK, Netherlands, France and Italy. The average capacity of the Spanish stables doesn't reach 20 heads per farm, while in UK each diary farms owns 87 heads, in Netherlands 60 heads, in France 38 heads and in Italy the average is equal to 34 heads/farm.

- **Table 4-40 - Description of the data sample for the impact analysis on farms producing milk in Spain**

Class of LU	n. farms	Average UAA	AWU fam	AWU extra	AWU tot	n. crops	UAA		Cows	Average GSP
							COP	Fodder crops		
0-20	2	10	1.20	0.00	1.20	5	0.7	9.4	11	13,824
20-40	3	14	1.10	0.00	1.10	5	1.0	12.5	22	38,705
40-60	3	19	1.40	0.10	1.50	5	1.9	17.3	41	80,558
> 60	2	33	1.20	0.50	1.70	5	6.0	27.4	84	196,587

The first class of size identified for the analysis purposes is constituted by 2 farms located in Galicia and Asturias. These two farms have a stable containing, in average, only 11 cows and a own 10 hectares where they produce almost exclusively fodder crops for feeding their animals. This small farms are also characterized by a management constituted by only the family component contribution. The dimension doesn't permit to take labour on the market. The effort required by the such dairy farms are equal to the family efforts provided in biggest class. There are very few survive perspectives for such farms in this sector: the gross saleable production is very low (13.800 euro) and doesn't permit an adequate satisfaction to the family needs. Furthermore, one cannot think to organize a dairy farm in part-time. The most realistic consequence for such farms is the sector abandonment.

The second class of size contains 3 farms, one located in Asturias and two in Galicia. The farm structure in very similar to the previous class and, in general, one can say that those farms are led by holders that don't have successors available to continue the activity. Also in this case, the farms is organized upon the family work and the turnover generated by the farm activity is very low.

The last two classes are more structured having 41 and 84 heads bred respectively. Regards on labour, the annual work units involved in the farm activity are 1,5 and 1,7, where one can find the participation of hiring work.
In each farm, the fodder crops prevail on all the other crops. For these farms, cereals have a residual role as crops in rotation with other crops or to capture the public subsidy.

4.8.2 The land use

The model applied in this context to evaluate the effect of the CAP reform and, in particular, the decoupling measure, is applied on each average farm inserted in the four classes of size previously described. Each average farm is calibrated in order to obtain the value of the variable cost considered by farmers in defining their production plan and each average farm has been submitted to the simulation process in order to have a response at farm level. Then, the resulting information is aggregated in order to reach a greater synthesis.
The decoupling affects at the same way all the typology of farms but with an impact less strong with the increase of the size dimension. The smallest average farm, including the farms until 20 cows bred, supports in relative terms an important curb in cereal crops, that reduce their hectares by 60% in the first scenario. Although, this relevant reduction has to be read with respect to the importance of the cereals crop inside the farm production plan. Indeed, the observed situation shows a very small incidence of cereal crops inside the farm activity (only 0,68 ha out of 10 ha). The reduction in such crops is entirely transferred to fodder crops, that increase their dimension by +3,9%. If we consider the predicted change in product prices, the situation worsens: maize completely disappears and the other silage crops become even more negligible.
In this class of size and inside the other ones, the entire vegetal production plan is oriented to feed the breading, so that every activity but fodder crops is very marginal.

- **Table 4-41 - Land use impact after the reform application on dairy farms in Spain**

Class of LU	Crops	Baseline	S1	S2	S1	S2
		(ha)			(Var. %)	
0-20	Maize	0.01	0.00	0.00	-60.1	-100.0
	Cereal silage	0.67	0.30	0.01	-54.9	-98.2
	Fodder crops	9.39	9.76	10.05	3.9	7.1
	Others	0.00	0.00	0.00		
20-40	Maize	0.07	0.05	0.01	-31.0	-85.0
	Cereal silage	0.97	0.70	0.15	-27.5	-84.1
	Fodder crops	12.49	12.78	13.36	2.3	7.0
	Others	0.00	0.00	0.00		
40-60	Maize	0.20	0.18	0.04	-9.9	-79.5
	Cereal silage	1.71	1.50	0.58	-12.4	-66.0
	Fodder crops	17.34	17.57	18.63	1.3	7.4
	Others	0.00	0.00	0.00		
> 60	Maize	0.61	0.56	0.52	-8.7	-15.9
	Cereal silage	5.43	5.07	2.79	-6.8	-48.6
	Fodder crops	27.40	27.82	30.13	1.5	10.0
	Others	0.00	0.00	0.00		

The second class of size repeats roughly the reaction arisen in the previous class of size. The market impact reinforces the reduction in cereals, but it doesn’t change the tendency produced by decoupling in S1. Also part of cereal are used as a complement of the animal feed (fodder maize and cereal silage), while maize grain, view the very low hectares invested, is likely used for farm consumption (i.e. for poultry).
The decrease in cereals showed by the third class reaction is not so high as the results obtained for the first two classes. In any case, we have to consider the low level of incidence of the COP on the total farm acreage, so that a low or strong reactions don’t affect concretely the production plan that is constituted in prevalence by grassland.

The fourth class follows the general dynamics showed for the other classes. In this specific case, the reduction in cereals is not so marked as previously indicated. The scenario S1 portrayed a situation where maize and cereal silage reduce by 8,7% and 6,85 respectively and, at the same time, the fodder crops increase by 1,5%. The market influence reinforces the decrease of the cereals, but at lower level than the other classes.

- **Figure 4-8 - Dynamic of land use by class of size in farms producing milk in Spain**

Fig. 4-8a: Dynamic of land use of the class of size 0-20 heads

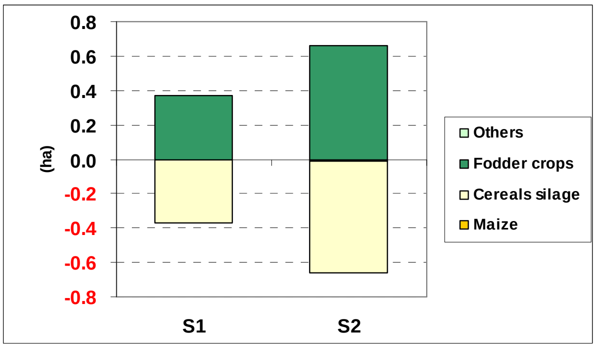


Fig. 4-8b: Dynamic of land use of the class of size 20-40 heads

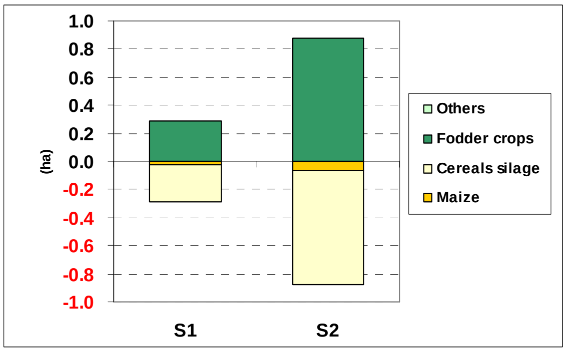
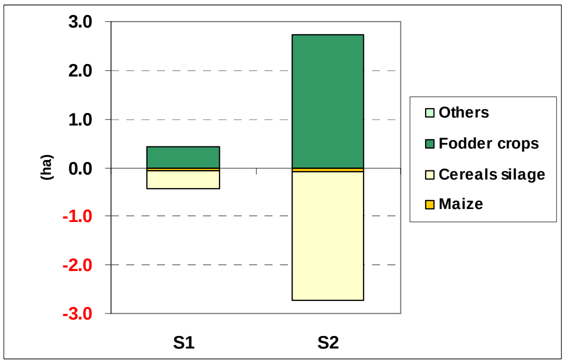


Fig. 4-8c: Dynamic of land use of the class of size 40-60 heads

Fig. 4-8d: Dynamic of land use of the class of size > 60 heads



The figures above portrayed the dynamics among crops resulting by the scenario simulations already described. One can see as the decoupling measure depicted in S1 produce very low variations inside the land allocation, while the second scenario, where the market price predictions are added, the dynamics are more accentuated. In any case, the highest land displacement reaches 3 hectares (in the largest class), signalling the general low impact of the CAP reform at vegetal process level.

4.8.3 The animal production

Reading the results obtained for the animal production, it is evident as the decoupling have a strong negative impact of the small farms, that is the farms with a stable with no more than 20 heads. The decoupling favours, in some way, the abandonment of the dairy activity. Actually, the 27 euros per tons integrated inside the single farm payment that every farmer receives, with respect its milk quota, constitutes an incentive to capitalize the value of the quota and receive an annuity without the obligation to produce milk. In particular, for the smallest farms that should invest for improving their structures and/or without successors, the decoupling represents an opportunity to improve the revenue, reduce the production costs and save labour efforts.

The mere decoupling for the others classes of size should not produce important reduction in the average number of cows bred. In this case, the production of milk remains profitable, but less in the second class,

where milk cows should reduce by 10%. The bigger dimension means larger return of scale and, thus, allows to keep the milk production.
If the decoupling incentives the abandonment, the reduction in milk price represents the break-point, where farms are not capable to produce revenue and, thus, are forced to leave the sector. The scenario S2 shows the total disappearance of the milk livestock in first three classes of size. A curb in price by 22%, without structural adaptation, would produce the stable closure for all those farms.
Only the largest farms, with more than 60 heads, can resist to the prospected decline of milk price, but the results achieved for the scenario S2 depicts, although, a critical situation, where the milk livestock would reduce by 88%.

- **Table 4-42 - Variation of livestock after the reform application on dairy farms in Spain**

Class of LU	Activity	Baseline	S1	S2	S1	S2
		(LU)			(Var. %)	
0-20	Milk cows	11	7	0	-39.4	-100.0
	Cattle	3	2	0	-49.2	-92.7
20-40	Milk cows	22	20	0	-10.2	-100.0
	Cattle	7	3	5	-52.5	-29.8
40-60	Milk cows	41	40	0	-3.8	-100.0
	Cattle	13	10	11	-27.4	-13.1
> 60	Milk cows	84	82	10	-2.4	-88.2
	Cattle	31	26	30	-17.0	-2.9

The Spanish dairy sector reveals a strong sensibility to milk market price. The general small dimension of the farms conducted through extensive techniques doesn't permit to support a curb in price by 22%. The sector will have to improve its level of efficiency in order to reduce the production costs and face the competition originating from the European market.

4.8.4 The economic results

The effect of decoupling is generalized increase in the gross margin for all the class of farms considered in the present study. The improvement in the level of gross margin is manly due to the new premium of milk quota that is integrated into the single farm payment. This means that each farms receive a new payment, corresponding to 27 euros per tonne of milk quota owned, without any restriction in the farm activity decisions. In this sense, farmers can continue receiving the single payment even if they don't produce milk. It is sufficient to declare that each entitlements, for which one requires the payment, is associated to one hectares of eligible land.
The impact of the new payment on the milk quota is reflected by the strong augmentation of the net subsidies received by each farms. The greatest increases corresponds to the farms characterized by lowest incidence of the COP crops, that is the farms with a stable capacity included into 20 and 60 heads. In those farms, the initial subsidy must be multiplied by 16-17 in case of application of the decoupling.
At the same way, the greatest augmentation of the gross margin concerns the farms more intensive in term of use of the soil by the breeding: the last two classes. The increasing in gross margin is not due completely to the new milk quota premium, but it is important to consider the variation int he organization of the farms after the application of the decoupling and the market price modifications. The mere application of decoupling has produced a reduction in the level of GSP, more incisive in the smallest class, that has coincided with a reduction more relevant in the production costs. This kind of strategy oriented to minimize the farm costs was analysed also for other countries and sectors in this report. Farmers seem to organize the allocation of the various farm activities in order to obtain the maximum economic result minimizing the production costs.

- Table 4-43 - Economic results for dairy farms in Spain (average values)

Class of LU	Economic results	Baseline	S1	S2	S1	S2
		(euro/ha)			(Var. %)	
0-20	GSP	1373.5	778.1	6.1	-43.3	-99.6
	Net subsidy	13.8	135.6	135.6	882.0	882.0
	Variable costs	1372.9	773.3	6.3	-43.7	-99.5
	Gross margin	14.4	140.5	135.4	875.5	840.0
20-40	GSP	2861.4	2536.1	99.9	-11.4	-96.5
	Net subsidy	15.8	262.9	262.9	1559.4	1559.4
	Variable costs	2796.6	2469.1	100.1	-11.7	-96.4
	Gross margin	80.6	329.9	262.7	309.3	226.0
40-60	GSP	4184.8	3986.9	153.9	-4.7	-96.3
	Net subsidy	20.4	371.1	371.1	1717.6	1717.6
	Variable costs	3979.2	3780.1	151.1	-5.0	-96.2
	Gross margin	226.0	577.9	373.9	155.7	65.4
> 60	GSP	5877.9	5718.9	858.1	-2.7	-85.4
	Net subsidy	37.3	502.8	502.8	1247.9	1247.9
	Variable costs	5174.5	5014.3	831.5	-3.1	-83.9
	Gross margin	740.7	1207.3	529.3	63.0	-28.5

The variation in price produces the worst situation, both in production and economic terms. For the smallest farms, the scenario S2 represents the deactivation of the agricultural activities. The farms is keeping only with the specific objective to receive the single farm payment. Also in the second and third classes, the dismissing of milk production corresponds to a drastic reduction in GSP. The reduction in variable costs maintains the same level of GSP. The largest dairy farm presents a situation quite different with respect the other ones. The market price influence produces a reduction of GSP that is non compensated nor by the reduction in production costs and by the increase in the subsidies level. This leads to a reduction of the gross margin by 28%.

- Table 4-44 - Gross margin for dairy farms in Spain

Class of LU	Variables	Baseline	S1	S2	S1	S2
		(€uro)			(Var. %)	
0-20	GM/Ha	14	141	135	875.5	840.0
	GM/AWU fam	126	1,230	1,185		
20-40	GM/Ha	81	330	263	309.3	226.0
	GM/AWU fam	962	3,938	3,136		
40-60	GM/Ha	226	578	374	155.7	65.4
	GM/AWU fam	3,184	8,140	5,267		
> 60	GM/Ha	741	1,207	529	63.0	-28.5
	GM/AWU fam	14,156	23,073	10,117		

The measurement of the gross margin per ha and per annual work unit confirms the analysis previously depicted. The small farms can benefit of the decoupling more than the others in relative terms. Although, even tough the decoupling rises the situation for the small farms, the gross margin per family workers is very low and it does not permit in the short-run to continue the activity. In any case, also for the other class of size the gross margin per hectare and per family annual work unit is too low for predicting the survival of such farms. Only the largest farms could have a future in the sector. In this case, the single farm payment can assist those farms in improving their efficiency.

4.8.5 The labour

The decoupling reduces remarkably the work effort due to the drastic decline of the number of milk cows. In particular, the first two classes show a reduction of the family work effort by 31% and 15% in the scenario S1. The application of the market price variations induce a further reduction in family work. In this case, the curb is higher than 50% and it is explained by the abandonment of the milk production. The remaining work required concerns the operations linked to the cultivation of crops.

The third and last class adopted family work units and hiring work units. The decoupling induces the farm to reduce the animal activity, the more demanding activity inside farms, and as a consequence the reduction of the extra-family work. The third class sustains, indeed, the completely reduction of extra family both in case of mere application of the scenario S1 and when the price variation is applied.

- **Table 4-45 - Dynamics in labour organization for dairy farms in Spain**

Class of LU	Labour	Base	S1	S2	S1	S2
		(AWU)			(Var. %)	
0-20	Family	1.2	0.8	0.5	-31.3	-57.2
	Extra-family	0.0	0.0	0.0		
20-40	Family	1.1	1.0	0.5	-15.2	-56.3
	Extra-family	0.0	0.0	0.0		
40-60	Family	1.4	1.3	0.6	-2.9	-56.3
	Extra-family	0.1	0.0	0.0	-100.0	-100.0
> 60	Family	1.2	1.2	0.8	0.0	-30.5
	Extra-family	0.5	0.4	0.0	-17.1	-100.0

The reaction of the last and largest class of size relies on the lower production costs that allow to keep the milk production activity even in the case of reduction in milk price. In S1, the farms with more than 60 heads reduce by 17% the salary work keeping the family contribution to the farms stable. While, in S2, the estimated variation in market prices leads to the deactivation of hiring workers and the reduction of the family annual work unit by 30%.

5 Qualitative analysis of Fischler's Reform on Italian case studies

5.1 *The durum wheat case*

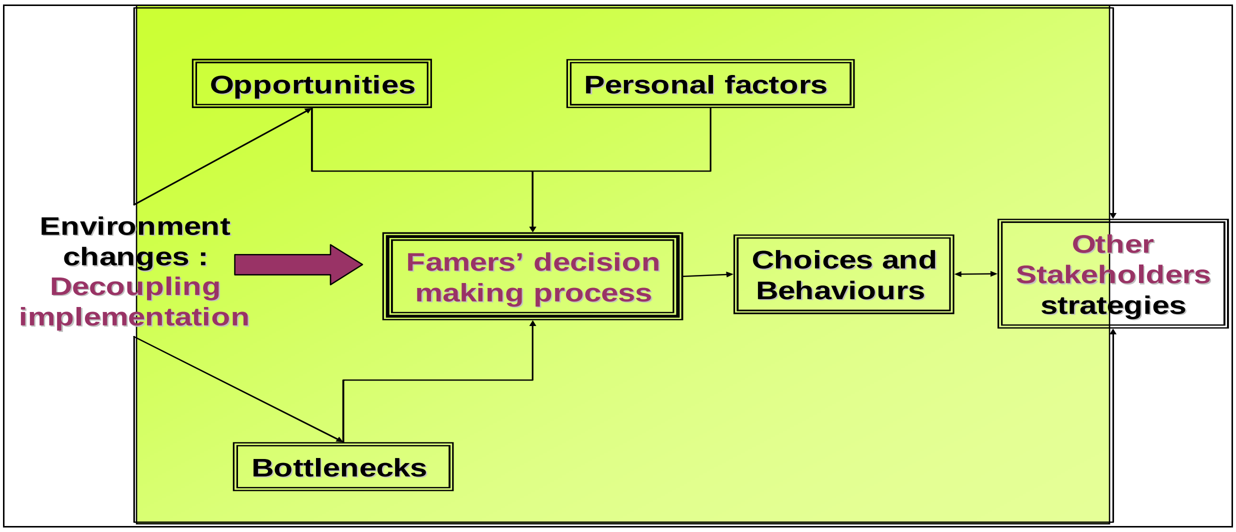
5.1.1 Objectives of the survey

In the second phase of the research (October-December 2005) a field analysis on the durum wheat supply chain in Tuscany was conducted in order to give a contribution to the overall assessment of CAP reform. The main objectives of this report are the followings:

1. identification of the main socio-economical effects on the durum wheat supply chain, occurred after one year of decoupling implementation within the CAP Mid Term Review (MTR)
2. systematisation of the typologies of strategic behaviours and choices of farm households in Tuscany
3. analysis of the main changes in strategic behaviours in relation to all stakeholders involved at each level of the supply chain

To address these specific objectives, the analysis has been focused on the micro level (case study areas), by using sociological methodologies (open semi-structured interviews and focus groups), which are aimed at "capturing" the behaviours of family farm-households in relation to their resources and their relationship with the rural system.
Therefore, to deeply explore the main socio-economic effects of the CAP reform on the durum wheat supply chain, typologies of farm household changes and strategic behaviour have been identified in two case study areas: Pisa and Grosseto provinces. Furthermore, the results of the analysis point out the complex network of actors which may affect the strategic behaviour of those farmers, with special reference on the actors who influence farmers reaction to newly-introduced policy measures. In doing so, changes in strategic behaviours – after one year of CAP reform implementation - have been analysed also in relation to all stakeholders involved at each level of the durum wheat supply chain in the whole territory of Tuscany .
To address the objectives above described, the analysis focused on the process of genesis and development of changes within the food supply chain, resulting from a new policy and marketing context. This process is represented in the figure below.

- **Figure 5-1 - Effects of the decoupling implementation**



According to the neoclassic formulation, the entrepreneur is an economic subject endowed with perfect knowledge and perfect rationality who organises the productive resources in order to maximise profits by means of cost minimisation. Moreover, he has no conditioning power on the market because his offer represents only a very small part of the market itself.

Alternative formulations follow models which sometimes largely diverge specifically describe the enterprise as a complex organisation of economic activities and agents, lacking in perfect knowledge and rationality.
Due to the CAP reform implementation, farmers are faced up to new policy and market setting. This new situation could bring different expectations, perceptions or beliefs on the new nature of the environment in which farmers are producing and will be producing in the future. A situation of *uncertainty* may led changes in the common farm management and practices or in the relations between the farm and its environment, as a result of a process of *adaptations* –(as it has been called "breaking of routines") - (Brunori, 2003; Dewey, 1949). As matter of fact, typically the adoption of changes is an outcome of the interaction between the capabilities and mobilisation of resources generated within each firms and broader causes external to the individual firm (Dosi, 1988). For instance, the change in the mechanism of payment may induce farmers to keep decisions of type and level of production, with effects on the allocation of resources and lands and on the degree of intensification of the production process.
Therefore, it is important to explore those enabling and/or limiting factors that could have affected the decision-making process. Of course, the changing strategies adopted by the others food supply chain operators have certainly affected by the choices taken by farmers, while at the same time they are directly influenced by the recent policies.

5.1.2 The durum wheat qualitative analysis

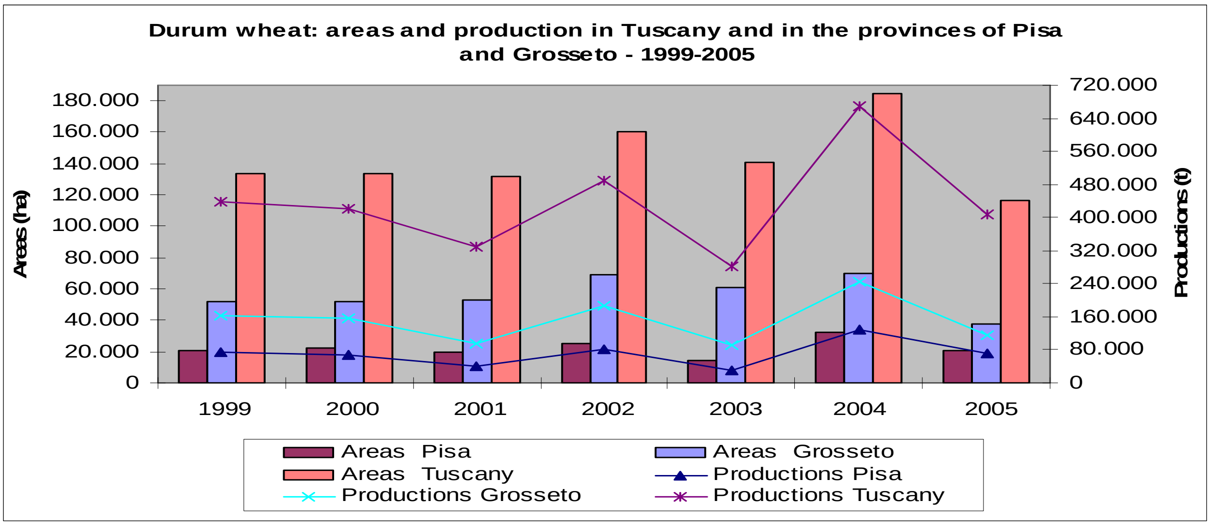
Data collection was carried out through the following tools:

- open interviews to the local key stakeholders – directors or technicians of Consortia and co-operatives – were used to obtained the baseline information concerning the following issues. Firstly, the main concerns and changes arising from the CAP reform implementation. Secondly, a macro-level exploration of the most relevant motivations and decisional factors which could have affected the decisional making processes at each supply chain level. Thirdly, providing an outline of possible future scenarios;
- with respect to the production phase, the semi-structured questionnaire and one focus group farmers to a sample of durum wheat growers (12), in order to understand the main changes and development pathways that has occurred in one year of CAP reform implementation. In particular, the questionnaire provided information about the following aspects:
    - the main choices and development pathways undertaken by farmers in Tuscany after one year of CAP reform implementation
    - the most relevant variables –both internal and external to the farm - which could have affected the decision-making process;
- the analysis have been extended also to the other stakeholders involved in the durum wheat supply chain in Tuscany. At least, 20 operators of the durum supply chain in Tuscany were surveyed. In this case, the questionnaire was based on the following themes:
    - the main activities and the relevant market (and its market share at national or regional level);
    - the level of vertical co-ordination with the other operators, especially among them, farmers;
    - the main changes in the previous years and the main effects on their activities after a year of decoupling implementation.
- A final focus group among farmers and supply chain stakeholders was organised after one year from the field work, in order to check the validity of our main findings

5.1.3 Trends of durum wheat production and market prices in the case study areas

With regards to production phases of the supply chain the survey specifically focuses on two case study areas: the provinces of Pisa and Grosseto. For instance, these two areas, together with the province of Siena, are the most suitable regions for the durum wheat production in Tuscany because of the pedo-climatic characteristics perfectly fit with this crop.
According to the ISTAT data over the past 6 year period the trend of the durum wheat area and production follows the national tendency, recording a significant peak in areas and productions in 2004 (the last year of the coupled payments regime) and a strong downfall in 2005 (the first year of decoupling implementation).

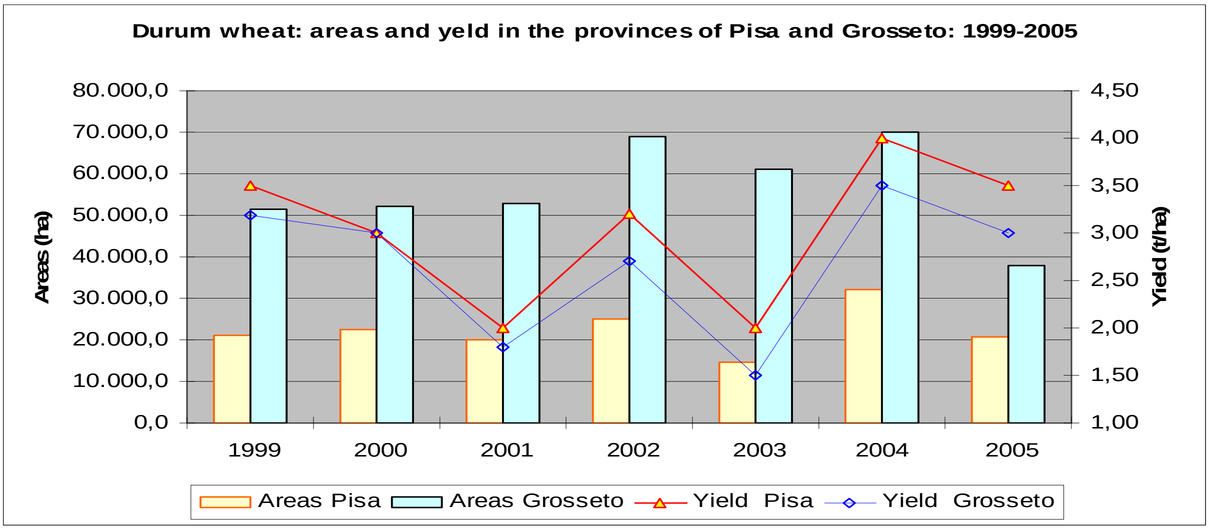
- **Figure 5-2 -** ***Areas and production of durum wheat in Pisa and Grosseto provinces***



Source: ISTAT

As the following graph shows, the average yields in Pisa province have been always higher then in Grosseto area. However, in both the areas the trend in durum wheat yields is extremely variable depending on the weather patterns. As we will better analyze later, productive yield has been found as a crucial factor in affecting farm households behaviours and choices resulting from the decoupling implementation.

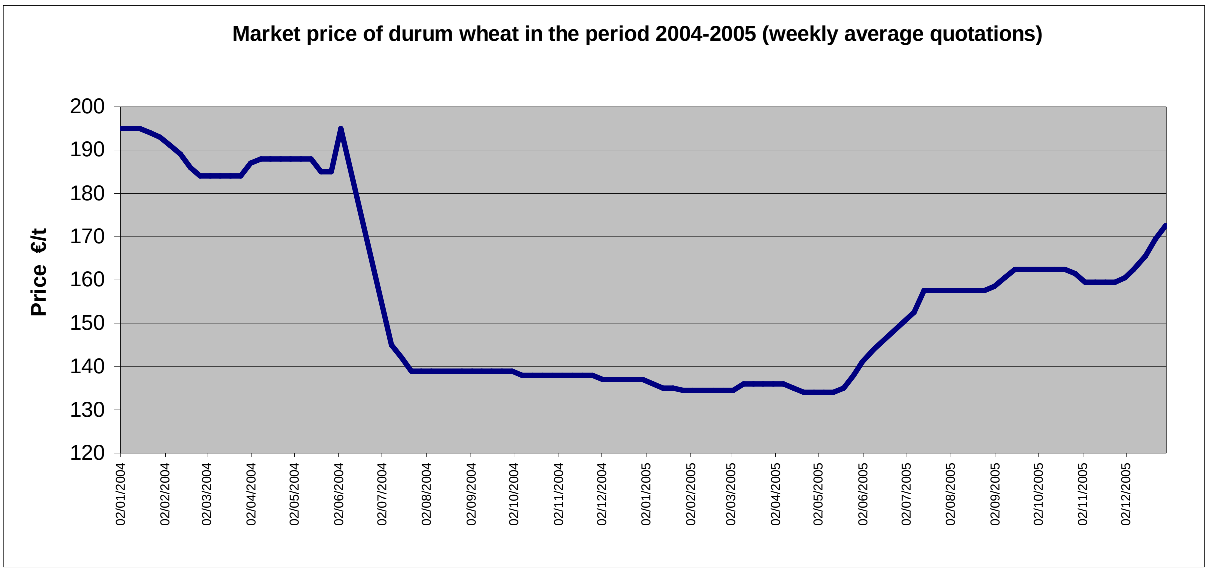
- **Figure 5-3 -** ***Areas and yields of durum wheat in Pisa and Grosseto provinces***



Source: ISTAT

In order to understand farmers' behaviours it is opportune to consider the trend of durum wheat market price in the last two years (2004-2005), because of it is a decisive factor in determining the profitability of the durum wheat cultivation. In fact, the obvious consequence of the overproduction recorded in 2004 was a general decrease in the price of durum wheat. As the following graph shows, the price of durum wheat (weekly quotations) fell down in the summer 2004 (between June and July), moving from 194 €/t to 139 €/t. Then the price remained constant under 140 €/t until June 2005, when it started to rise again, touching 166 €/t in December 2005.

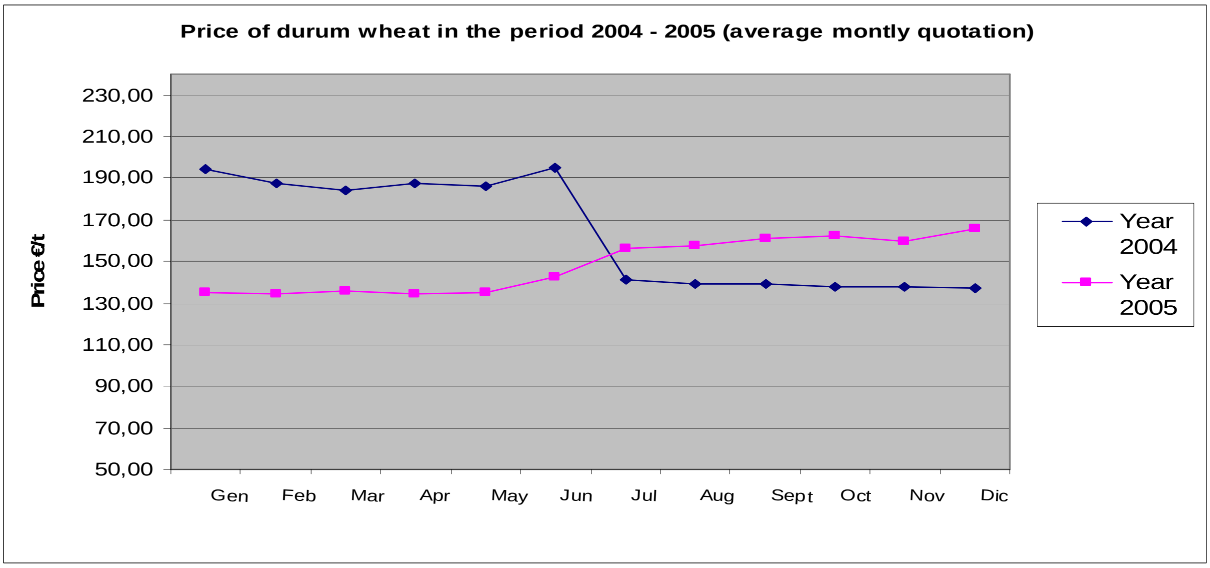
- **Figure 5-4 -** ***Market prices trend of durum wheat***



Source: Borsa merci Bologna

The price market trend in the period 2004-2005 is more evident in the graph 5-5, where the monthly quotations of durum wheat are shown separately. It is interesting to evidence that the change in the trend price happened always in the same period: between June and July both in 2004 and 2005.

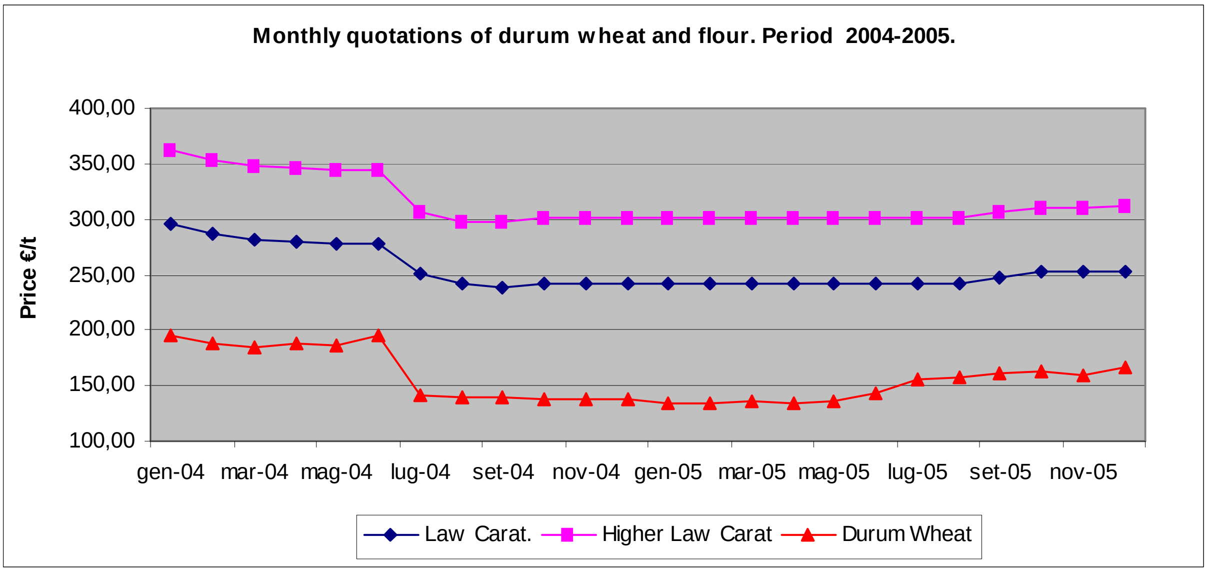
- **Figure 5-5 -** ***Price of durum wheat – 2004-2005***



Source: Borsa merci Bologna

As the following graph (5-6) shows, the price trend of the flour, *distinguished between law characteristics and higher law characteristics*, is aligned with the durum wheat tendency in the period 2004-2005 (monthly quotations). As matter of fact, the market price dropped in the summer of 2004, passing in few months from 277 €/t to 239 €/t for the law characteristics flour, and from 343 €/t to 297 €/t for the higher law characteristics once. Then it remained constant until summer 2005 after which began to rise touching, respectively, 243 €/t and 311 €/t in December 2005.

- **Figure 5-6 -** ***Price of durum wheat and flour (2004-2005)***



Source: Borsa merci Bologna

As we are going to look into later, in the new context determined by the introduction of decoupling, the market price should become one of the main important factor in the farmer's land use decisions. As a matter of fact, as the profitability of durum wheat is no more linked to the UE aids, farmers are forced to consider other factors in their decisions, such as productive yields and market prices.

5.1.4 Selection of respondents

The agricultural phase

The farms were selected from the regional Farm Accountancy Data Network (FADN) sample. The technical and economic data made available has proved very useful in characterising different production systems and in appraising the different effects of the CAP reform presented.

During the period 2000-2003 the FADN farms sample involved in the durum wheat production represented the 39-46% of the total number of crop farms in Tuscany. In this sample of farmers, the durum wheat crop covers the 34-40% of the total farmed land and it contributes to the 16% of the total income. With respect to the economic performance, during the period 200-2003, not relevant variations have been recorded. However, in 2003, a significant reduction in the crop profitability has occurred, mainly due to the yields decrease together with the subsides reduction.

According to FADN sample, the two selected provinces (Pisa and Grosseto) show different characteristic in term of durum wheat crop area, crop profitability, farm production costs and total farm income. In particular, in Pisa province the total durum wheat area is greater, as well as the crop profitability is higher, due to the lower production costs. Conversely, in Grosseto province, the yields are lower, the costs for rent machineries are more significant and so that, the crop shows a lesser profitability. Moreover, farms in Pisa province concentrate mainly on crop production, whereas in Grosseto province farms practice mixed farming, that is, both crop and livestock productions.

The analysis of the subsidies level on crops shows another great difference between the two selected regions: it ranges from 28.000 EUR for the farms located in the Pisa Province to the 10-11.000 EUR for those located in Grosseto Province.

However the two study regions present some analogies too. For instance in both cases we can distinguish two main sub-areas, characterised by similar morphological features and different height above sea-level (hills and plains), each differs in terms of pedo-climatic and farming conditions. In the plain areas (both in Grosseto and Pisa provinces) the soil is fertile and deep (good structure and good level of organic matter), even if the lower temperatures of the early spring limit the land use to durum wheat, sometimes replaced by soft wheat

which resulted to be more resistant. Instead in the hilly areas the soils, both in Pisa province (Volterra) and in Grosseto ones (Colline Amiatine), have high clay content and pose serious problems in the farming ways, besides the higher production costs, due to the use of machineries in slopes.
At least another analogy between the two provinces could be found in the crucial role played by cooperatives and provincial consortia in farm inputs supplying (agriculture services provision) and in marketing activities. As matter of fact, cooperatives and provincial consortia traditionally belong to the agriculture system of Tuscany and only a marginal part of wheat producers in Tuscany negotiate directly with mills or private wholesalers.

According to the objectives of the study, it was decided to select a sample of farms on the basis of the following criteria:

- durum wheat crop should has been cultivated at least one year during the period 2000-2002
- the durum wheat crop area at least should be 5% of the total farmed area
- the sample of farms should represent different typologies of farming: different crop rotation systems, economic and structural sizes, locations (hilly and plan areas), age of the owner, some of them should adopt some forms of income diversification and others sustainable way of farming (i.e low inputs or organic).

The upstream and down stream phases
The others stakeholders representing the upstream phase (inputs suppliers, mechanisation services, and seed industry) and down stream phase (storage and first marketing and the milling and pasta industry), were selected from the whole regional territory.

In the analysis of these phases we looked into the whole territory of Tuscany (and bordering regions), because of the complexity of the networks and market outlets in which are involved, both at national and international level. The durum wheat processing industry has never been a traditional business in the Tuscany, as the existence of only three durum wheat mills and about ten small size pasta industries in the whole the region proves.
With regard the milling phase, we selected three durum wheat mills in Tuscany and two mills in Emilia-Romagna which purchase grain in Tuscany. Concerning the pasta industry we chose two firms: the first one is a small size with a domestic management and oriented to niche markets; the other one is medium size and oriented to local and foreign markets.

5.1.5 Results

5.1.5.1 Decisional factors

A fully decoupled payment could have foreseen to allocate resources differently in agricultural production or could have limited to farm household resources allocation. Each choice undertaken by farmers could be considered as an outcome of the resources which have been mobilised or of the constrains which have limited the resources mobilisation.

Firstly, this section aims at illustrating the most significant factors –both internal and external to the farm-which have directly affected the production decisions, including the choice to not produce at all. As we have already mentioned, the direction and the weigh of these effects has been estimated empirically through some interviews with the farmers; therefore, from the interviews the following aspects emerged:

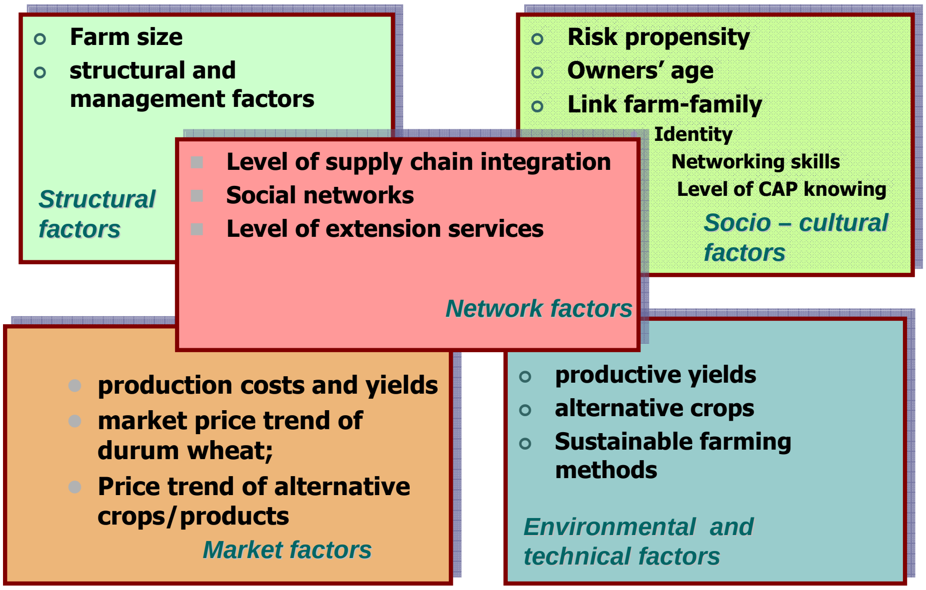
- the most relevant resources and/or constraints which could have affected the decision making process.
- a map of the main choices undertaken by farmers in Tuscany after one year of CAP reform implementation

This section illustrates some of these potential effects without being exhaustive or representative of all the sector, but just in relation to our study areas, Pisa and Grosseto provinces.

Results should be interpreted by considering that some of MTR effects cannot be separated from market setting and climate conditions. As matter of fact, the durum wheat harvest of the campaign 2003-2004 was

very extraordinary in terms of productive yields. This fact led to an overproduction with dramatic consequences on market prices. Moreover, we have take into account that many farmers decided to not produce durum wheat because of the negative climate conditions during the sowing activities of the campaign 2005-2006.
The most relevant resources and/or constrains – which were directly indicated by the respondents - have been classified into five groups:

- **Figure 5-7 - Decisional factors**



I. Structural factors

As might be expected, the farm size determines the possible activities to a large extend, whereas land use influences the structure and the organisation of the farm, such the existence of grain silos or some specific kind of machineries. Therefore, changes in the production systems imply the need to re-examine the organisation and management aspects of the farm. For instance, maintaining durum wheat cultivation or diversifying on farm activities often requires large investments (i.e. new machineries or even the conversion of previous equipments in the case of diversification of agriculture activities) and therefore they are realistic options only for medium and large-sized farms.

II Economic factors

There are some economic factors which can play an important role in the choice of leaving or maintaining the durum wheat cultivation. The interviews especially refer to the production costs and the market price trend of durum wheat. In those areas where yields are low (less than 3 tons/ha), the rising of the production costs (mainly due to the high prices of fuel) together with the downfall of durum wheat market price occurred in the last years have strongly reduced the profitability of this crop. In this case, many farmers have to reconsider the choice of planting durum wheat.

III. Socio-cultural factors

Beyond the economic factors, many socio-cultural issues have played a crucial role in affecting the farmers' decision on the land use, by determining the range of opportunities offered by the new scenario. Among them, respondents mentioned the following aspects:

- the age of farmers
- the level of education
- the presence of off-farm employments or not

The level of education, which often is related with the age of the owner, contribute to create different expectations, perceptions or beliefs about the context in which farmers are producing: some of them, especially the younger, are very well informed about the CAP reform, as indicated by the fact that they regularly read professional journals. On the other hands, the little knowledge of the new policy and market context of some owners, especially those located in the more marginal areas, contribute to create a feeling of general distrust and scarce propensity to adopt propositional behaviours. Furthermore the owners of small sized farms are often characterised by a strong risk adverse attitude to adopt changes. Of course, this passive attitude is recorded also when farmers have already another off-farm employment.

IV. Environmental and technical factors

According to the interviews, the impact of direct payments has been different under the following environmental and technical conditions:

the productive yields

the crops rotation and the possibility of alternative farming

the adoption of sustainable way of farming or not

Climatic and other location factors may influence the choice of what to produce. Furthermore, the adhesion to the agro-environmental measures enables farmers to maintain the durum wheat cultivation at least until they will receive the extra subsidies for sustainable farming.

V. Network factors

From the analysis emerged the importance played by the strength of the networks in which farmer are involved. Thus, in relation to the effect of the CAP reform, both the existence of economic and social relations strongly influenced farmers' decisions and behaviours. Therefore, we explored the effects of such relations on the production decisions and the mechanisms through which they may work. The interviews reveal the following main issues:

the level of supply chain co-ordination (integration into food supply chain initiatives)

the social networks

the role of the extension service and public support

First of all, the existence of strong vertical co-ordination or farmers lead supply chains have be found as crucial factors in mitigating the decoupling effects and foreseeing the choice to maintain the durum wheat crop. The interviews also reveal that belonging to intense social networks is not ubiquitous, and here again, the degree of such more informal relationships in which farmers are embedded can create different expectations, perceptions or beliefs about the context in which farmers are producing. Social network is measured by membership of organisations, or the number of contacts farm families have with other people. As will be demonstrated later, strong social networks are often a key factors for the successful development of new activities in the farm.

The role played by the extension service in the decisional making processes has been crucial. The extension service level led us to examine the integration of farmers into these social networks. An adequate extension service enables farmers to access to professional information and to create and strength new relations and alliances.

However, according to our interviews, often the farmers' associations do not give any specific guidelines about the opportunities after CAP reform implementation. Besides, all the farmers complain about the failed reduction in bureaucratic practices.

5.1.5.2 Main changes at farm level

Based on the case studies analysis, we can distinguish three main changes undertaken at farm level in the two case study areas (Pisa and Grosseto provinces):

- ***Moving from durum wheat cultivation to produce nothing***: land maintenance under cross compliance conditions or ***exit farming***

- ***Reducing the durum wheat cultivation, while diversifying the on farm activities and/or productions***

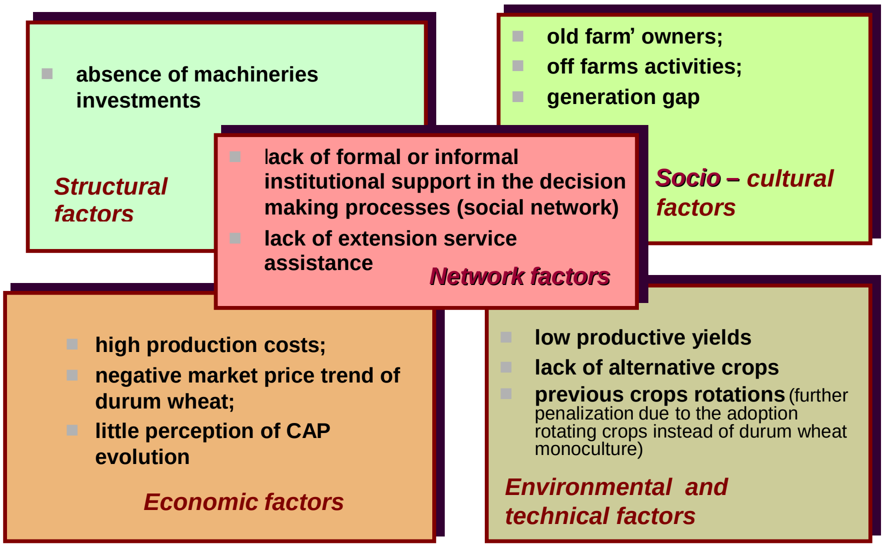
- ***Keeping the durum wheat cultivation***

According to our interviews, each choice could be considered as the outcome of different combinations of resources and/or bottlenecks (decisional factors) which could have affected the decision making process.

(A) Moving from durum wheat cultivation to produce nothing or exit farming

As direct payments have directly reduced the profitability of the durum wheat production, farmers have been forced to maintain their income level by reducing the production costs (labour and capital).
According to our interviews, both the choices of moving from durum wheat cultivation to produce nothing while maintaining land under cross-compliance conditions or exit farming have been mainly driven by a combination of the following factors:

- Figure 5-8 - Moving from durum wheat cultivation to produce nothing or exit farming



The choice of the total cultivation abandonment has been mainly recorded among specialised and small-sized farms, located in the less favoured rural areas (hills areas in the Grosseto province). Our survey shows that many old farm' owners decided to produce nothing or in some cases, even exit farming. Furthermore, the choice to produce nothing is also frequent where owners were already employed in other economic sectors.

> *"In my opinion, this situation could be ok….As I'm a teacher in the agriculture high school, and I have already a salary…and so, I don't need to survive with the income from the farm….You should diversify your activities…for instance I have diversified my income!...This year we have decided to not produce, as we prefer to not risk at all…"*

It is notable that generally the low level of educational attainment of some farmers, especially those located in the more marginal areas, has contributed to create a feeling of general distrust and a scarce propensity to adopt propositional behaviours.
Finally, it emerges that the option of producing nothing has been more frequent in those areas characterised by weak and rarefied networks. The lack of both formal and informal support offered by social networks has emerged above all in the hilly areas, where the choice to not produce has been justified by the farmers themselves as a consequence of feeling isolated and left to one's own resources at the moment of decisions.

> "*In our area, there are not any co-operatives… it's quite a comedown for us to not have any local organisations which may give us some suggestions and guidelines…we are one thousand brains, and each one continues on one's own way*"

As matter of fact, according to our interviews, the abandonment of durum wheat production may be partly ascribable to the lack of an adequate extension service.

> "*I would like to tell you an anecdote. Once, a director of a farmers' organisation asked me about the durum wheat costs production! So, they are rights to say that we are in the wretch's hands*"

More in particular, the mix of following factors has driven this strategic choice:

Structural factors

A crucial characteristic of the farmers interviewed is the presence of a machinery fleet or not. As matter of fact, the absence of the machinery fleet has often provided an incentive to choice of producing nothing while carrying out land maintenance activities in observance with the cross compliance conditions. In this case, the choice of producing nothing resulted to be more profitable than producing durum wheat, as it allowed to eliminate the production costs due to the rent of machineries. However, in some cases, the presence of the machinery fleet has not been determinant in farming decisions: as matter of fact, in some farms (those located in areas characterised by low productive yields) in order to reduce the wages costs, the choice of not producing was more profitable than still producing durum wheat

Economic factors

Discontents with the prices offered by wholesalers together with a pessimistic expectation of the market price trend of durum wheat have led many farmers to produce nothing. Selling directly to private wholesalers increases the economic uncertainty about the future choices, neither represents an incentive for enhancing the wheat productions quality.

> " *we sell our wheat to a private wholesaler, who supply some mills in the North of Italy, but we have not idea about the final destination of our product. Generally private wholesalers are not interested in the quality of the wheat, whereas, I know that mills always require some quality standards*" (a farm in Volterra area)

Socio-cultural factors

Our survey shows that many old farm' owners decided to produce nothing or in some cases, even exit farming, especially those located in the hilly area of Grosseto province. Besides, the decoupling regime has not been perceived as an economically attractiveness for young generations to start or to keep on producing.
Furthermore, the choice to produce nothing is also frequent where owners were already employed in other economic sectors.
It is notable that generally the low level of educational attainment of some farmers, especially those located in the more marginal areas, has contributed to create a feeling of general distrust and a scarce propensity to adopt propositional behaviours.

Environmental and technical factors

The choice to produce nothing appears to be frequently linked with the low productive yields (especially in the hilly areas and in the whole Grosseto Province) and to the impossibility of diversifying on farm crops and activities. For instance, in the Colline Amiatine (the hilly area of the Grosseto province), where there is not the agronomic potential to choice alternative crops instead of durum wheat, the only profitable option for farmers is not producing at all. In Santa Luce (the hilly area of the Pisa province) the impossibility to chose alternatives to cereals is due to the lack of livestock activities, which constrains the development of forage cultivations.

"*Unfortunately, in this area there are not alternative crops able to replace cereals…for instance, the soil is not suitable for the cultivation of sunflowers. But also other cereals such as barley and soft wheat do not ensure enough income as their prices are very low…*" (Colline Amiatine Co-operative, Grosseto)

Moreover, another critical factor has been the penalisation in terms of decoupled farm payments received by some farmers. In fact, beyond the general reduction of the EU payments after the implementation of decoupling, some farmers who during the reference period 2000-2002 had adopted rotating crops instead of durum wheat monoculture were further penalized by the decoupling. So, in these cases the choice of not producing resulted the most profitable land use.

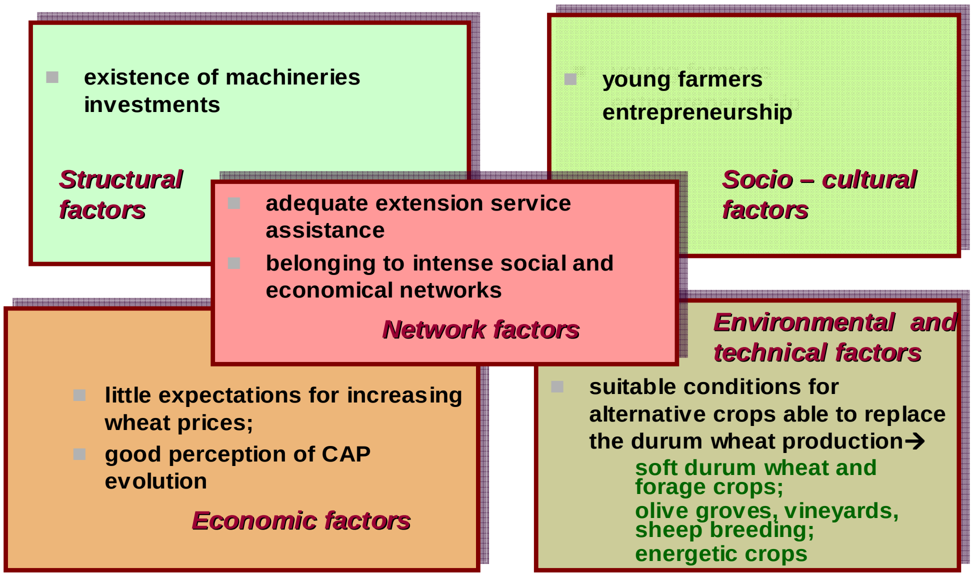
Networks factors

The lack of both formal and informal support offered by social networks has emerged above all in the hilly areas, where the choice to not produce has been justified by the farmers themselves as a consequence of feeling isolated and left to one's own resources at the moment of decisions.
As matter of fact, according to our interviews, the abandonment of durum wheat production may be partly ascribable to the lack of an adequate extension service offered by farmers' organizations.

(B) Reducing the durum wheat cultivation, while diversifying the on farm activities

Direct payments have induced farmers to produce something they would not have otherwise produced with the previous regime. The farmer can choose between different crop cultivations with different costs involved in each activity (market led choices). In this case, the new activities encompass the introduction of new (or at least non-traditional for the specific farming environment) and alternative crops and animals on the farm.
Furthermore, the issue of non food productions is becoming a topic of interest. As matter of fact, there is a growing consensus over the importance and opportunities linked to the energy crops (mainly oilseed rape and sunflowers), as in the future, they will play an important role in delivering a more sustainable energy supply. At the present, some farmers' unions (i.e. AEMA Pisa) and some co-operatives push for the development of non-food production and quickly recognise that this development can work in the interests of their members. Firstly, farmers, who are looking for new crops able to service new markets, have the opportunities to diversify their production and to gain additional income. Second, renewable resources are an opportunity for farmers or other agents who carried out the rent service machineries, as they can develop and market innovative products (biodiesel, lubrificant….).
According to our interviews, the choice of diversifying the on farm activities has been mainly driven by the following factors:

- **Figure 5-9 -** ***Reducing the durum wheat cultivation, while diversifying the on farm activities***



The option of <u>reducing the durum wheat cultivation, while diversifying the on farm activities</u> and productions has been the response generally which was adopted by those farmers generally managed by young entrepreneurs, with a good knowledge of the market evolutions and policy dynamics. They decided to include productions with high value added (olive oil, wine), energetic crops, and sometimes even breeding or new on farm-activities which will be strengthened through new patterns of co-operations. In this context, the decoupling implementation has fostering the multifunctional role of farming.
This pattern has been mainly driven by socio-cultural factors, such as the willingness to follow an alternative model of farming, but also, the network factors, such as belonging to dense networks (i.e. agri-tourim circuits, eno-gastronomic routes…). Therefore, it is possible to state that strong networks are often a key factor for the successful development of new activities in the farm households. Many farmers stated that the interaction with other farmers was a crucial factor in their decision to “start something new”. For instance, the awareness of the strong potentialities covered by energy crops emerged from networks characterised by intense relations among all the operators.

More in particular, the mix of following factors has driven this strategic choice:

Structural factors	In this case the presence of a machinery fleet have been found as a determinant factor in the decision to diversifying the on farm activities and productions.
Economic factors	The farmers who decided to diversifying the on farm activities and productions showed a more “professional” approach to their businesses. In fact most of them were very well informed about the new policy context but they show a negative expectation for the future trend of durum wheat market prices.
Socio-cultural factors	According to our interviews, the creation of a range of new responses has been mainly developed by young farmers. They decided to include animals (e.g. extensive livestock breeding of local breeds, such as Chianina) and new on farm-activities which will be strengthened through new patterns of co-operations. A good

example is offered by the initiative carried out by an organic farmer who undertook the project to create a short food supply chain for on farm bread production, by recollecting soft wheat from the neighbour farms.

Environmental and technical factors

In the areas with suitable pedo-climatic conditions or with reference market outlets, a remarkable growth in *soft* wheat surface and in *forage crops* as well has occurred. For instance, according to the Consortium of the province of Grosseto an increase of 600% in soft wheat area has been recorded, together with a lesser increase in forage crops cultivation, as in that area the livestock sector plays an important role. In fact, in many cases forage is often used in the same farms where it is grown.
In other situations, the presence within the farms of other activities (as olive groves, vineyards or sheep breeding), encouraged farmers to concentrate on these activities all the available resources, significantly reducing the durum wheat cultivation

> "*We have always produced durum wheat…but nowadays, with this situation….we have decided to strongly reduce the wheat cultivation in favour of increasing our efforts on the wine and olive oil productions and on the sheep breeding*" (8331 Luigi Innocenti, Castel del Piano, Grosseto)

Otherwise, sometimes the presence of cattle livestock has not affected the land use choices, persuading farmers to keep the traditional crops rotation.

Networks factors

On the basis of our interviews, it is possible to state that strong social networks are often a key factor for the successful development of new activities in the farm households. Many farmers stated that the interaction with other farmers was a crucial factor in their decision to "start something new". For instance, the awareness of the strong potentialities covered by energy crops emerged from networks characterised by intense relations among all the operators.

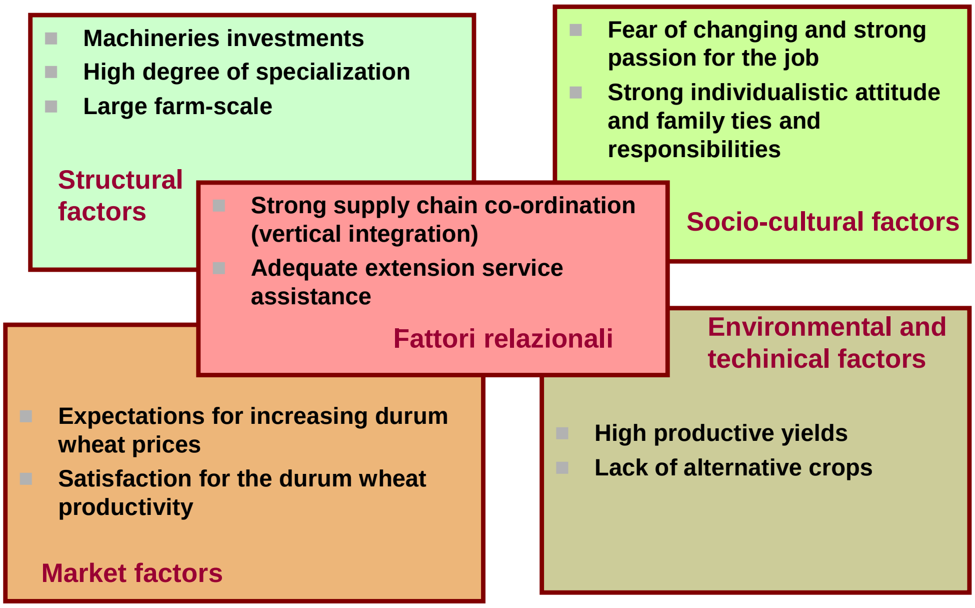
In some cases, an adequate extension service has simulated the adoption of alternative farming, such as suggesting introduction of energy crops.

> "*The director of co-operative that we supply suggests us to start the rape cultivation for an energetic use. I have not problems to experiment something new…*" (8022 Franceso Di Renzo, Pisa)

C) Keeping the durum wheat cultivation

The strategy of keeping the durum wheat cultivation has been mainly adopted in professional farms, with a machinery fleet and high productive yields. Nerveless, among those producers who decided to keep the durum wheat cultivation, two different behaviours have been distinguished: the "non problematic choice" and the "innovative" option.
The "non-problematic" behaviour has been mainly followed by those farmers located in the flat areas, where the productive yields are quite high (about 35-40 q/ha), who decided to keep durum wheat regardless the low wheat market price and the decoupling regime. Also the adoption of no-tillage practices, by allowing to cut down on spending, has contribute to the choice of maintaining the durum wheat cultivation. Furthermore, the adhesion to the rural development subsidies foreseen farmers to not change. Organic or low inputs farming are not be directly affected by the reform: the farmers get the same commodity mark-ups for organic production to those observed in the past. In these circumstances farmers have still an economic advantage in producing durum wheat, as a premium price of above 20% (17 euros/quintals) is still guaranteed.
In all these cases, the choice to keep the durum wheat has been motivated by socio-cultural factors (individualistic attitude), whereas the network factors have played a less relevant role.

- **Figure 5-10 - The non-problematic choice**



Structural factors

The presence of a machinery fleet – condition recorded in the farms located in the Pisa flat areas - have been found as a determinant factor in the decision to keep the durum wheat production.

> "Its not my intention to stop the durum wheat production. I have already invested a lot of money in machineries: four tractors, one harvester-thresher…we spent a lot of money…now it's impossible to change!" (8118 Roberto Baccarella, Volterra)

Economic factors

Another fact shown by the survey is the more "professional" approach towards farming among farmers who decided to keep the durum wheat cultivation. Most of them were very well informed about the new policy context and they show a positive expectation for the future increasing of durum wheat market prices.

Socio-cultural

factors

In some cases, the decision to keep the wheat cultivation has been motivated by personal reasons which go beyond the pure economic rationality. For instance, the fear of changing, the strong passion for the agricultural job, the wish to follow the father's foot steps have had a significant weigh in the decision making and have foreseen even young farmers to not change.

> "*Our situation is a drama…because of the high age of farmers. But, in spite of this, the abandonment phenomenon did not occurred in a significant way, why? Because generally farmers own small size farms and they are very attached to the land…they want to keep the farm in a well conditions, as they do not make a poor impression compared to the neighbours* (Valle Bruna, Co-operative Grosseto).

Moreover, in some cases, family conditions have affected the decisional making process; for example, the responsibility to have children has in some cases reduced the propensity to risk for adopting changes

> "*I work in this farm since I was a child. It's impossible to re-invent myself from one day to the next. I'm already 40 years old…I have to support a family…two children…"* (8118 Roberto Baccarella, Volterra)

According to our interviews, many farmers especially those located in the flat areas of Pisa province, where the productive yields are quite high (about 35-40 q/ha), decided to keep durum wheat regardless the low wheat market price and the decoupling regime.

Also the adoption of no-tillage practices, by allowing to cut dawn on spending, has contribute to the choice of maintaining the durum wheat cultivation.

Environmental and technical factors

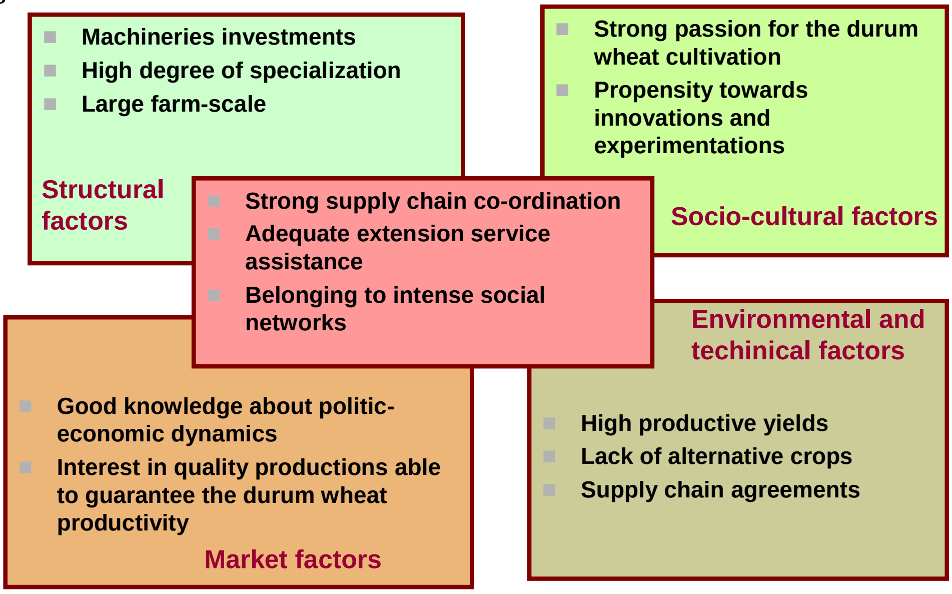
Furthermore, the adhesion to the rural development subsidies foreseen farmers to not change. Organic or low inputs farming are not be directly affected by the reform: the farmers get the same commodity mark-ups for organic production to those observed in the past. In these circumstances farmers have still an economic advantage in producing durum wheat, as a premium price of above 20% (17 euros/quintals) is still guaranteed.

Moreover, joining to food supply chain initiatives represented another factor which foreseen to produce durum wheat anyway besides the fact that regulation constrains to keep the wheat production for minimum five years. For instance, those farmers who join to the *Agriquality*[62] collective brand receive a higher price for their wheat compared to the conventional price (1-2 euro/q more). However, some of these farmers do not perceive that premium price as a fair incentive for producing in a sustainable way.

Within this class of farms, we can distinguish some of them which have introduced innovations in the way of durum wheat production (*innovative choice*). The awareness of the strong potentialities covered high quality durum wheat productions emerged from those networks characterised by intense relations among all the operators. In some cases, an adequate extension service offered by co-operatives or farmers' unions has fostered the implementation of strategies addressed towards high quality durum wheat production.

[62] Agriqualità (*Agriquality*) is a collective label created by the Regional Government of Tuscany and regulated by the Regional law n. 25/1999. The **Regional Law 25/99** concerns the rules for the valorisation and promotion of agricultural products which are obtained through integrated methods of farming. Thanks this it is possible to use a collective label, called "*Agriquality*" (a white butterfly as symbol), synonym of healthy and cleaned nature. To use this label it is necessary that every agent of the supply chain adheres to two *Code of Practices*: the fist one concerns the ways of cultivation by means of integrated methods of farming, while the second one is for the storage and the processing of the products. Therefore, this collective brand aims at closing the gap between farmers and consumers by introducing an efficient system of traceability because of all raw material has to come from Tuscany, and to obtain a fair distribution of added value within the food supply chain, especially by supporting the most fragile producers.

- **Figure 5-11 - The *innovative* choice**



Networks factors

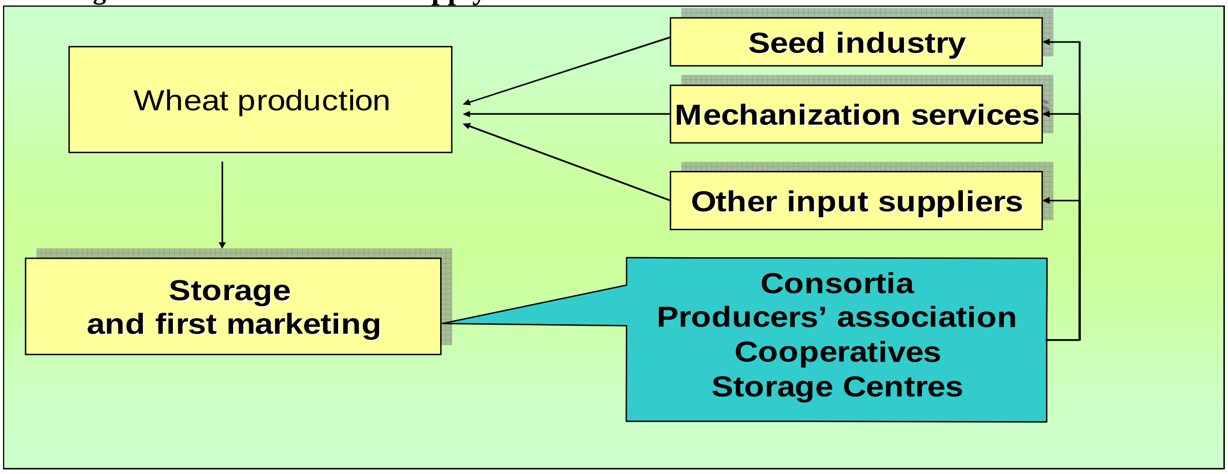
On the basis of our interviews, it is possible to state that belonging to well-established social and economical networks may reduce the uncertainty about the future and enable farmers to face with new market opportunities and challenges. As matter of fact, being embedded into dense networks put farmers at an advantage in gaining knowledge and pieces of information by dropping the transaction costs. For example, the awareness of the strong potentialities covered high quality durum wheat productions emerged from those networks characterised by intense relations among all the operators. In some cases, an adequate extension service offered by co-operatives or farmers' unions has fostered the implementation of strategies addressed towards quality durum wheat production.

The presence of high degrees of integration among all operators of the wheat supply chain or farmers lead short supply chains have be found as crucial factors in mitigating the decoupling effects and foreseeing the choice to maintain the durum wheat production. The most remarkable example in this way is the Floriddia farm, in the hills of Peccioli (Pisa province) (8365). This farmer receives a premium price from organic durum wheat sold directly to a co-operative (which is located in the Marche region) where the raw materials are processed into high quality pasta.

5.1.5.3 Main changes at supply chain level

- **<u>Storage facilities and services provision level: changes and strategies</u>**

- **Figure 5-12 - Durum wheat supply chain scheme**



These operators have been negatively affected by the CAP reform, in terms of general reduction in volume of business, as their activities are closely tied with the local agriculture phase. Nevertheless, these firms have still not substantially changed their activities under the new policy and market setting. The survey concluded that these operators generally continue to hold a cautious view of the agricultural economy for the near future and prefer to adopt a policy of '*wait and see*' as regards the prospects that the de-coupled market place may hold for them. Furthermore, it is necessary to take into account that a strong adjustment of this phase already occurred after the CAP reform of '92, with the implementation of the set-aside measure.
However, over the last year, some farmers' cooperatives or producers' associations or other private services provision companies have concentrated their efforts on the implementation and promotion of some activities that now play a crucial importance within the new policy context. Among them the following activities have been identified:

- *implementation of the grain storage differentiation based upon the proteins level*
- *implementation of supply chain agreements*
- *differentiation of services and marketing activities*
- *maintaining the income level by reducing the labour costs;*

I. Implementation of grain storage differentiation based upon the proteins level and implementation of supply chain agreement

Starting from the last year, the importance of differentiating the durum wheat production on the basis of the proteins level, besides the previous criterion based on the specific weigh, is becoming a topic of interest. This new approach is mainly aiming at increasing the add value to a commodity good and consequently it enables farmers to get better returns. Yet it is important to consider the very poor quality levels achieved by the national durum wheat production during the campaign 2003-2004, which led to a strong reduction in the market prices, and at the same time, fostered the milling and pasta industry to increase the importation of durum wheat mainly from Canada and France.
As a result, some cooperatives – especially in the Grosseto province – promoted some marketing agreements with the biggest Italian pasta companies (among them, *Barilla*) in order to reach higher quality wheat levels. These agreements guarantee to farmers a premium price, calculated on the basis of the proteins level reached by the wheat lot, as it will be better explained in the chapter 4.3. In order to achieve the pasta industry requirements, these cooperatives started to adopt specific machineries to measure the proteins contents of each wheat lot they received from the producers. Unfortunately, up to now the premium of high level of

proteins is perceived as not enough to remunerate the higher production costs due to the adoption of new farming practices and techniques. As matter of fact, at co-operative level this change implies the necessity to already have or to build different grain silos. At farm level, the shift from conventional to high quality wheat production implies deep efforts on the way of farming, such as the use of specific and more expensive varieties of durum wheat (the research is studying and developing new varieties which are able to guarantee better performances than the traditional ones), an adequate quantity of seeds and a different fertilisation plan (*2 times during the vegetative period*), even it is still unknown which of the mentioned factors played a crucial role in enhancing the proteins level as the climatic conditions may have the most important effects. This fact, together with the higher production costs required prevents many farmers from adopting this way of producing.
The seed industry sector has been strongly penalized by CAP reform, since it supplies seeds to farms and farmers' cooperatives and associations. Indeed, they have a seed overproduction, as a consequence of the fact that a large part of farmers partners decided to reduce the durum wheat production.
Moreover, starting from the last year, both the interviewed seed industries have diversified the durum wheat storage on the basis of the proteins level.

II. Differentiation of services and marketing activities

Starting from the last year, some cooperatives and consortia – especially in the Grosseto area - have started to include new marketing and services activities. This behaviour has been recorded mainly in those co-operatives which faced a remarkable income reduction as a result of the downscaling of all services linked with the durum wheat production (e.g. the strong cutback in selling the wheat seeds, fertilisers, pesticides and in renting the machineries).
The new activities include opening garden and irrigation services, selling points for plant nurseries and even the management of supermarkets.
In addition, with respect to the rent machineries firms, according to the AEMA[63] association of Pisa, the issue of non food productions (biomass) is becoming a topic of general interest among the operators, who are facing a strong reduction in their mechanization service activities. It is possible that some productive effort might be switched to the processing of biomass products or bio-ethanol, but presently, markets are relatively undeveloped for these products.

III. Maintaining the income level by reducing the labour costs

The only example of this strategy aims at maintaining reducing the labour costs is offered by a co-operative located in the sloped area of Grosseto (Colline Amiatine): they decided to reduce the number of employers.

Milling and pasta industry

This phase has been affected by the CAP reform in a lesser direct way then the downstream phase. This is due to the fact that up to now the operators have a low level of co-ordination with the local wheat supply chain and producers. Therefore, the milling and pasta companies in Tuscany have not substantially changed their activities under the new policy and market setting. As matter of fact, the strategies were carried out even before the CAP reform. Generally, a degree of vertical integration seems therefore inevitable even should this be merely a strengthening of existing customer-supplier links rather than a more formal business amalgamation.

Implementation of the diversification of storage (differentiation based upon the proteins level)

Implementation of the supply chain agreements (mainly Agriquality agreement)

Increase in organic production

Starting up market niches

I. Implementation of the diversification of storage (differentiation based upon the proteins level)

[63] Associazione Esercenti Macchine Agricole

The main purpose of mills is to obtain a product (flour) which should be able to satisfy the requirements of the pasta industry, especially in term of proteins level and index of gluten. As a matter of fact a strategy already carried out even before the CAP reform implementation is the grain storage diversification in term of proteins level. Moreover, the milling industries in Tuscany are interested in maintaining a certain level of high quality durum wheat production in the region, because of the lower transport costs of raw materials respect to the importations.

II. Implementation of the supply chain agreements (mainly Agriquality agreement)

Some milling industries (Molini Borgioli and Maionchi) have joined in some supply chain agreements at regional level, such as the already mentioned *Agriquality*. Conversely, others (such as Grandi Molini Italiani) are still evaluating to join to this initiative.
However, the main changes we have observed involve the biggest pasta companies at national levels, which have been the promoters for the developing of some supply chain initiatives, even with the operators of the wheat supply chain in Tuscany. As matter of fact, we recorded that the CAP reform implementation together with the effects of the national wheat market crisis during the 2003-2004 campaign have fostered the establishment of new and stronger relations and contracts between the milling and pasta industry with the primary production phases. This new approach aiming at better integrating all stages of the wheat supply chain and reaching higher quality wheat levels has been manly driven and promoted by the biggest Italian pasta companies (Barilla was the pioneer); they sign specific marketing agreements with producers at the beginning of the campaign, through which they establish the different premium prices farmers can get depending on the different proteins levels of the wheat lot.
On the basis of these agreements farmers have to comply with the farming methods defined within Codes of Practices required by the milling and pasta industry, and include the use of specific wheat varieties (e.g. Svevo and Normanno are promoted as varieties which allow to achieve the highest proteins content), the quantity of seeds (no more than 190 kg/ha), the typology of fertilisers and the frequency of fertilisation. At the end of the campaign, farmers who do not succeed in reaching the proteins levels cannot sell their wheat.

III. Increase in organic production

It is recorded a continued slow growth in the processing of organic wheat in parallel with increasing demand for organically produced flour, especially from Germany.

IV. Starting up market niches

Now they are increased in order to capture new profitable market niches.
One of the pasta industry which is a very small size firm (Pastificio Martelli) traditionally carries out a strategy based on supplying market niches with very high quality and specific kind of pasta.

5.1.6 Checking the results: the final focus group

5.1.6.1 Aims

The final focus group was held in October 2006 in "*Rinnovamento agricolo*" co-operative, at Pisa, after one year from the interviews carried out. The participants to the final focus group were 10: farmers (durum wheat growers), the board of two cooperatives operating in the durum wheat sector, representatives of farmers' unions.
The focus group was organised as follows. The researchers team briefly reminded the main aims and contents of the GENEDEC project to the participants and showed them the main findings, as resulting from both the quantitative (WP4.2) and qualitative approach (WP4.1). Then to begin the discussion participants were requested to answer some key research questions:

- ✓ What were the main choices you undertook after the decoupling implementation?
- ✓ On the basis of your experience, which have been the main enabling/limiting factors for adopting new strategies?

Then in order to check the validity of the main findings of the survey, participants expressed their opinions according to a questionnaire (closed-interview) previously prepared.

5.1.6.2 Some relevant outcomes of the discussion

General validation of the main results of the survey (qualitative and quantitative analysis):

- ✓ The most common choice is given by the reduction of the durum wheat surfaces ("reducing durum wheat cultivation while diversifying farm activities")
- ✓ The relevance of the "network factors" was confirmed (supply chain coordination, extension services, social networks). In particular the importance covered by socio-cultural factors, such as the willingness to follow an alternative model of farming, but also, the network factors, such as belonging/not belonging to dense networks (i.e. agri-tourim circuits, eno-gastronomic routes…). Therefore, it is possible to state that strong networks are often a key factor for the successful development of new activities in the farm households, or for innovative patterns of durum wheat cultivations.

According to the participants the durum wheat production has been mainly replaced by soft wheat and forage crops thanks to the suitable pedo-climatic conditions. This choice allowed to obtain a production costs squeeze.
The final findings confirm the crucial role played by the "quality" level of the relationships web in which farms are involved in driving the farmers' reactions to the new policy and economic scenario.
The existence of intense relations between farmers and cooperatives has represented the privileged way to foster the enhancement of the quality level in the durum wheat productions (innovative keeping), or to incentive differentiations strategies (i.e. adoption of energy crops). On the other hand, a "disaggregated (vertical and/or horizontal) network" has been the main factor which has led to the choice of Moving from durum wheat cultivation to produce nothing or exit farming.

5.2 *Focus Group on Milk sector for Parmigiano Reggiano.*

According with the "integrated methodology" the qualitative research for Parmigiano Reggiano is divided in two different step. The first, concerned milk farmers and the main stakeholders of the Parmigiano Reggiano system, is dedicated to the analysis of the system at the introduction of the milk subsidies in the specific contest of a PDO cheese product. The second Focus is dedicated only to milk farmers and concern their production strategy when the decoupled system will be fully implemented.

5.2.1 First focus group and interviews

The aim of the first part of the qualitative research was to understand the farmers level of acknowledgment of CAP reform and decoupling and, in particular, the impact on milk and diary sectors. Moreover, the operative objective consisted in having a confrontation on farmers behaviour as a consequence of the applying of CAP reform and on the changes in farm management or the likely changes for the future.

5.2.1.1 Methodology

The qualitative analysis approach consisted in organizing a focus group in which 8 independent farmers participated and 6 interviews with 2 independent farmers, 1 dairy worker, 1 producer association technician, 1 technician from the APA (Provincial Breeders Association), the president of the Parmigiano Reggiano Consortium, 1 operator from the Provincial Agricultural Consortium (feedstuff and seeds).
The focus group and interviews main issues were:
- the acknowledgement process about CAP reform implementation and their thought about the changes arising from the decoupling system
- need of help/confrontation in taking decisions
- main changes undertaken or decisions in program, due to the introduction of decoupling
- most relevant factors leading behaviors/decisions
- possible scenarios of the Parmesan cheese sector
- effects on their activity attended by the reform

5.2.1.2 Main characteristics of the farms interviewed

To better understand the answers coming from the focus group and interviews, obviously involving not a representative sample, here there is a description of the typology of farms participating (table 5-1):

- family farms: in half of them the work is carried out by members of the family only, represented by 3-4 people (father and children or whole family); in the other half at most 2 subordinate workers (units) are hired to work with the family; 1/3 of the wage-earning units are hired under temporary contracts while 2/3 are hired under permanent contracts.
- the majority of the farms has an exclusive vocation for the production of Parmesan cheese (Parmigiano Reggiano) with the only growth being fodder crops. Others are livestock farms combined with agri-tourism activities.
- the farm lifetime goes from 10 to 37 years
- UAA is between 30 and 280 hectares; 5 out of 8 farms have a rented percentage of UAA which goes from 37.5% to 100% of the total UAA
- number of cows is between 50 and 350 heads
- entitlements are between 850 and 31,000 euros.

- **Table 5-1 -** ***Farm characteristics***

	Fam_1	Fam_2	Fam_3	Fam_4	Fam_5	Fam_6	Fam_7	Fam_8
UAA (ha)								
Total UAA	75	170	280	80	30	90	45	75
Rented UAA	45	170		30		60	18	50
Nr. Heads								
Total heads	160	300	750	400	50	200	280	230
Dairy cows	80	160	350	200	35	100	140	130
Entitlements								
Euros	5000	12470	31000	18500	2200	9500	1258	850
Working units								
Nr. of wage earners permanent contract		2		1			2	1
Nr. Of wage earners temporary contracts			1					1
Family workers								
Full time	2	5	2	4	2	4	2	1
Part time	1	2	1					1
Retired	1	4		2	1		1	1

5.2.1.3 Main results

<u>Knowledge and understanding of the contents of the decoupling system</u>

There is a scarce knowledge and understanding of decoupling system in both the independent farmers and the association of technicians: the general principles of decoupling were understood, but the mechanisms and specific implications were not, above all by the older, less dynamic farmers. The perception is that the reform was created by subjects who are too distant from the productive reality, who do not know the needs of the producers well enough, therefore it seems to "*come from above*". Even the language used in the documents is complex and the farmers would need a translation of the law sources into a simpler language that is closer to the one they use. The most recurrent concepts that come from the direct consultation of farmers are:

- on their opinion the reform answers to the need to control and manage the increase in competition in the global market and even in the primary sector caused by the entry of new Eastern European countries and China. This competition cannot be challenged at a cost level because these countries have lower production costs due to economic, social and cultural reasons. The competition should therefore be resisted by raising quality and the ability to sustain quality with a suitable sales price.
- the perception about how the new rules set by the reform work is of a general increased orientation towards the market, leaving farmers more independent in taking decisions about their activities. The feeling is that there is a lack of orientation and directives regarding production systems choice and it's difficult for them understand which is the real demand coming from the market.

Technicians gain their information from sector magazines, while independent farmers are informed by the professional organisations or associations they belong to. Technicians, however, tend not to give advice about production systems because they do not feel able to direct the farmer in such a complex scenario.
Because of this scarcity of information, choices about the farm are made autonomously by the farmer or at most inside the family in the majority of cases. For these choices, farmers don't request support to the association technicians, consultants or other advisors, who instead are expected to give information about regulations, laws and policies. The role of entrepreneur is defined as being a person who has to make company choices autonomously.

Only one interviewed subject recognised the need for technical advice when making microeconomic type choices to evaluate the possibility of selling or investing.

Farmers choices and changes in farm management

In this context, farmers foresee three main scenarios that they can choose:

- stopping activity and selling the ground and the entitlement or closing business without selling the ground (i.e. selling only the entitlement) producing nothing and maintaining the ground under the GAP conditions
- waiting to see how the market and prices evolve, maintaining the same production system
- moving towards the most convenient solution that could mean investing for example buying other ground or diversifying production or specialising production.

Motivations underlying the choices

It is possible to analyze the motivations underlying the different choices, considering only two different categories of behaviour, that we could call "*the positive reaction*" and "*the negative reaction*" according to what farmers expressed in the interviews and in the focus group. The first one stands for a positive approach to changes and it means a trust in the future, an optimistic view about new policy effects and an aptitude to risk, so that the following behaviours are those described before as moving towards most convenient solution or waiting to see what it will happen.

Which are the main decisional factors affecting this choice?
There are some factors strictly connected to the farmer and the farm management, that we can call as "*internal farm factors*":

- *social factors* such as a choice of life due to an inherited family business, the passion for this work, the role of agricultural activity that gives food to the community , the impossibility of changing job and life, the pride and tenacity especially by female farmers who show better preparation and attention regarding management aspects, the more flexible approach shown by young entrepreneurs who accept change more, who can evaluate the extent of the new bonds and adapt themselves to them;
- *structural factors* such as the desire to pursue the company aim, which is quality; the product can then become a niche quality product, or sold at a high price within the large-scale retail trade middle/big sized farm, allowing the farmer to carry out strategies

Some other factors depend on the context in which the farm works, a wider context as the international/european one or a closer context as the national/regional one. In this case, the decisional factors are called "*external farm factors*" and they are:

- *market factors* at a global level such as political and regulation frame still uncertain, the evolution that the market will undergo is still not clear, but there is faith in the possibility of resisting and overcoming this moment while waiting for better times
- *network factors* or the possibility of associating with other producers to create scale economies, for example for the dairy phase

The "*negative reaction*" indicates behaviours leading the farmer to exit from the market and abandon the activity and this means the choice of selling the farm and ground or closing down.
Even for this approach it is possible to distinguish among internal factors and external factors affecting the decision. The "*internal farm factors*" are:

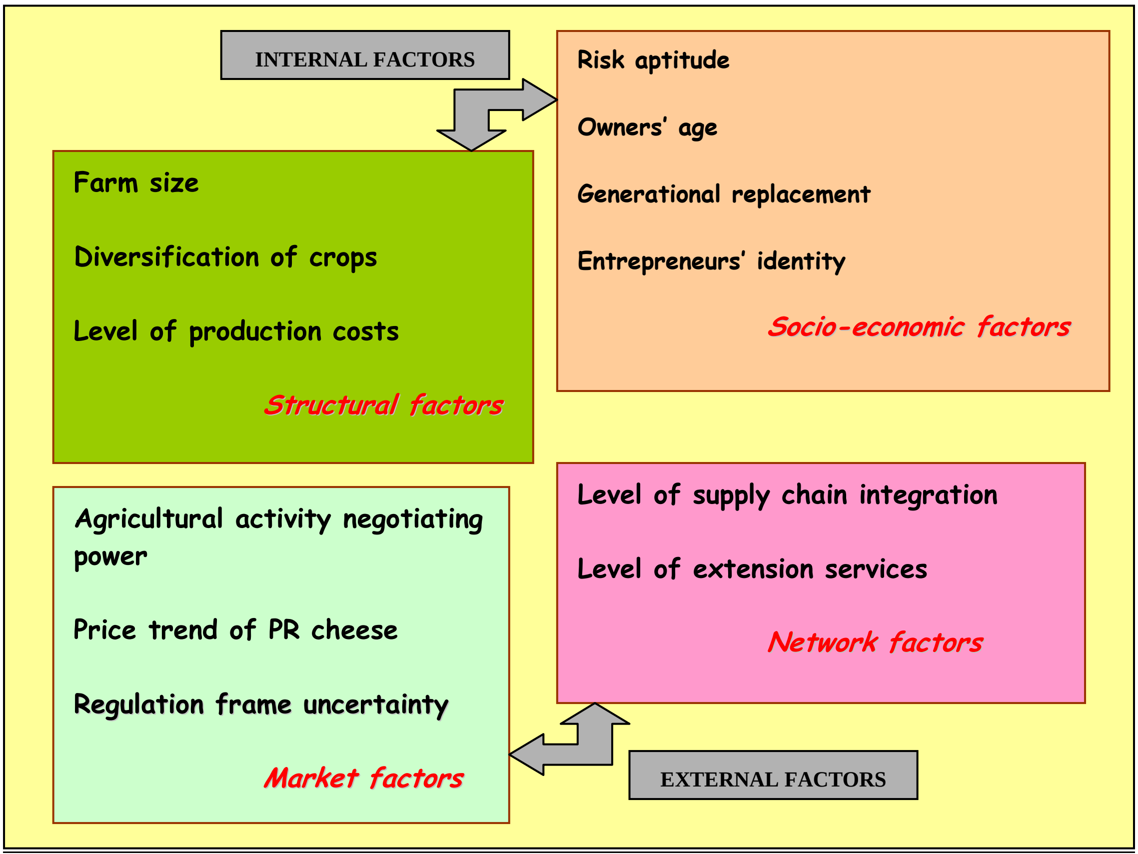
- *social factors,* closed mentality towards innovation and change, refusal of new bonds and restrictions, the farmer's tiredness and the lack of generational replacement, the extreme difficulty in understanding the evolution of the scenarios and the right choices to be made;
- *structural factors,* production costs are too high, even with the "bonus" the activity does not improve, expense is more likely than return; moreover it's difficult to reconvert production to other types of cultivation.

With reference to "*external farm factors*" we find:

- *market factors*: tempting offers from small industrialists from other regions to purchase the land, the crisis in the Parmigiano Reggiano sector, the excessive negotiating power of the large-scale retail trade or more in general of the marketing phase, the Parmigiano Reggiano level of price to the public is too low. More in general, policy and regulation frame is still unsure, the market evolution is not clear and there is mistrust in the possibility of resisting and overcoming this moment;
- *network factors* such as the inefficient consortium management or the scarce level of trust in extension services help.

Another kind of resuming factors affecting farmers decision is showed in table 5-2.

- **Table 5-2 -** ***Most relevant factors affecting farmers decisions***



Orientation and indications for the sector

The analysis of farmers behaviour and motivations puts in evidence some indications useful to improve sector cohesion and efficiency, such as:

- to modify the Parmigiano Reggiano QAS while maintaining the quality criteria. Actually, the Code of practice seems to be too rigid and a good solution could be creating a more flexible system in which it quality of final product keeps be guaranteed at lower production cost.
- to promote horizontal associations between the supply chain operators to favour offer aggregation. This is a structural problem, strongly felt among consortium different operators and they think that if there could be a common effort to organize and create structures to collect all production this could allow a significant effect on costs.
- to pay greater attention to how the whole supply chain operates and in particular to the sales phase. The most important point should be avoid to be subjected to the trade phase (large scale retail) management and direct the products increasingly towards more suitable channels.

- to improve the marketing strategies to obtain correct product positioning on the market, above all by the consortium which represents the main instrument of product promotion and communication.

5.2.1.4 CAP reform impact evaluation from farmers point of view

More general indications referring to the decoupling impact comes from the farmers behavior evaluation. Through the focus group and the interviews it was clear how difficult was for them to deeply understand the mechanism and all the consequences of the reform and to connect it to the new strategies for the sector. They have no instruments to make such a complex choice or it would need an effort in looking for information and asking help to technical assistance operators which should keep themselves up to date. In a situation of lack of information, time available to understand the reform implication and to react is not so long, because in the meantime policies and markets go towards another direction.
The main point still remain that decoupling is not a priority in farmers' concern; on the contrary, actually priority means solving the market crisis of the parmesan cheese sector that is something directly affecting their production and their incomes.
Farmers are not so worried about the future or the consequences for them in applying new CAP because they have problems to survive apart from decoupling system, but in general the reform could help who is producing to gain entitlements and who is not producing to abandon. In other words, it could mean that decoupling is seen as a process in which some changes could be facilitated or accelerated. A kind of process of "natural selection" within the productive system so that who is able to buy new entitlements and to enlarge production can grow and stay in the market, while who have more uncertainty between producing or not, can survive without any activity.
Farming profitability is very low, therefore for example older farmers tend to abandon the activity and young people are not interested in it; even though they can inherit the family farm, young people see no possibility of producing in a profitable manner.
In addition, perception is that decoupling system doesn't permit to control the market; if formerly farmers could change from one crop to another following their relative convenience, but having in some way guaranteed their own space in the market, now they could have no convenience at all and this means more extreme market rules and a more competitive context. From a social point of view farmers are also worried about the future of agricultural sector, about which will be the leaders playing the main role and what will be the future for landscape and our natural resources in a more competitive and global context.

5.2.2 Second focus group and interviews

The second Focus Group aims to present to farmers and *stakeholders* the results of the quantitative analysis and, on the basis of that results, to propose a comparison and thinking to establish the degree of agreement and of common ground between the protagonists in the sector.
The sample of farmers interviewed is small and is therefore not statistically representative, but the qualitative approach aims to provide a different contribution to the research to that provided by the quantitative approach. Indeed, in this second phase the point of departure is the results of the quantitative analysis which provide simulations of probable scenarios, and the work then moves on to the application of decoupling in the parmigiano reggiano cheese sector, under specific hypotheses and with specific restraints.
Through the qualitative analysis, and in this specific case, through verifying the aforementioned results with the real players working in the sector it is possible to consider various components of the decision-making process. Firstly, the employers' perception of reform and its effects on a number of aspects (productive organisation, income, work) is analysed and the framework of the way in which a company's decisions are carried out is supplemented with elements which are not included in and not taken into account by a mathematical model.
More specifically, 6 people participated in the organisation of the second Focus Group, including 4 farmers, the president of a dairy and the president of the CIA (Italian Farmers' Confederation) of Parma.
As far as sociological characteristics are concerned, the group comprises 2 women and 4 men; of the 6 members, 2 are young (one woman and one man) and the remaining 4 are middle-aged.

Main aspects of reflection

From the quantitative analysis carried out, a few general phenomena can be established, which describe the probable impact of decoupling on the dairy sector in the province of Parma: these phenomena can serve as a basis on which other types of variables can be created - variables which, like those of quantitative analysis, influence the behaviour of farmers. The main effects of the reform impinge on three areas:

a) productive organisation within the farm
b) farm income
c) organisation of work

As far as the first aspect is concerned, it was suggested that a farm's decision to use an area following decoupling was guided by the aim of finding more convenient solutions as far as costs to be borne were concerned. These solutions could be:
- switching to less expensive crops, so a switch could be made from cereal crops to fodder;
- ensuring established use of the area for those farms whose distribution of crops is excellent or if it is impossible to switch crops (for example for limited-size farms in mountainous areas);
- giving up less profitable crops and maintaining the freed-up area following the principles of Good Agricultural Practices.

As far as the impact of the new reform on farm income is concerned, the hypothesis is that, given the same market prices for crops, the level of income will rise for all farms, and in particular for small farms. This prospect opens the way for a number of other things which must be taken into consideration, such as for example whether decoupling represents a protection/guarantee of profitability and, if there were to be a real impact on income in the long-term, whether this should be considered as income for the farmer or a new investment opportunity.

The final aspect is related to the organisation of work and, from the results of the quantitative analysis, it emerges that, following crop changes in particular, the effect on employment is that the workforce is used less. On the one hand this leads to a fall in the need for a family workforce in the day-to-day work of the farm, freeing up time which could be used for activities other than strictly agricultural ones; on the other hand, the wage-earning workforce disappears.

Results

Productive organisation

With regard to these three hypotheses, farms the companies indicated that they favoured the first two, as solutions which they had either chosen or would probably choose. The lack of behaviour modifying the productive structure of the farm is linked to the farms structural limitations (its position or economic size), whilst the progressive passage from cereal crops to fodder is seen as an opportunity to cover a demand for fodder in the market which is currently not satisfied and to create opportunities for making a profit, given that the current price of cereal crops would allow production costs alone to be covered. Although it is convenient from an economic point of view, the hypothesis of getting rid of crops is not taken into consideration since it represents an exit from the market and giving up a profession or career which is recognised as being vocational.

Income

As far as the experience of the farms is concerned, during this first application period of the reform the farms received the same amount of income, or less income.
Farmers stress the fact that income is closely linked to the price of parmigiano reggiano and therefore to the price of the final product, hence the rigidity of costs (there are high fixed costs, in particular) does not enable a profit to be made if the price of the product is not adequate. Considerable work should be carried out by the parmigiano reggiano consortium on this issue – it should implement marketing and promotion policies to promote the product to end-consumers.

As far as the bonus received by manufacturers is concerned, this is used to:

- cover the greatest costs linked to complying with the regulation
- buy new milk quotas
- make improvements in some cases or at the expense of structural investments in other cases.

Organisation of work

With regard to the hypotheses suggested by the quantitative forecasting instruments, farmers fully agree that in order to contain costs or following a real reduction in demand for the workforce, the company faces the need to reduce or eliminate the wage-earning workforce from outside the family. The quantity of family labour which is strictly dedicated to productive activity also tends to fall, even if the entry into force of new regulations and the carrying out of an ever-growing number of bureaucratic practices seems to absorb the hours "freed up" from farming activity. With regard to the possibility of using part of the time not taken up by work on the fields, integrating into the company other functions such as tourist hospitality or the hiring of disabled staff, farmers react in a closed manner. The general refusal to bring farming activity closer to the concept of multi-functionality which is so greatly promoted in the European sphere is motivated by the belief that farming activity and the role of the farmer would be distorted by this.

Conclusions and points to bear in mind

In trying to outline the results of this second Focus Group, when comparing them in particular to the results of the mathematical model, it emerges that the qualitative and quantitative approaches share more common ground in terms of the impact of reforms on internal productive organisation of the farm company and the organisation of work, whilst the two methodologies tend to diverge, in terms of their impact on income.
The interpretation of these results is conditioned, on the one hand by several approaches stemming from to the mathematical model, which used income estimations created on the basis of income for 2003 and, on the other hand, by the fact that the assessment of the impact of the reform applied to income creates more difficulties when we come to measure it objectively than may be the case for work units or for the combination of crops. Indeed, the perception of the level of income and the relative increase or decrease in wellbeing depends more on categories of personal assessment. Other than the results stemming from the comparison between the two approaches to research, it is interesting to highlight several other aspects which emerged thanks to the use of qualitative instruments.
The choice of solutions which maintain the current productive structure or which adapt it following economical criteria could reveal that a farmer does not like taking risks or has a conservative attitude, both of which factors lead him/her to prefer to continue his/her activity rather than stopping it and re-entering the employment market. However, alongside this, other reasons emerged which could explain similar choices: the growing difficulty of maintaining a level of income which is deemed acceptable and the absence of handing over between the generations are, in the opinion of the farmers, threatening ever more the continuation of a profession and the future of an activity which is fundamental for the survival of the human race. The farmer therefore also has the role of acting as guarantor for an activity, guaranteeing it against abandonment and marginalisation. Furthermore, still on the issue of defending the territory, the hypothesis of abandoning agricultural activity and applying only the criteria of Good Agricultural Practices, would not guarantee effective protection of the environmental heritage and adequate monitoring of the territory.
Another element which enriches the interpretation through behavioural analysis is the difficulty that farmers have in continually adjusting to the new regulations and the continual time lag between the phase in which a policy comes to light, is learned about and adjustments are made to comply with it and the approving of a new policy reforming the previous one. That will have an influence, in particular, on the perception that the time freed up by reducing work in the field is not in effect time which is available to the farmer, but rather involves only a different distribution between activities in the fields and study activities.

5.3 Interview on Beef sector in Veneto

5.3.1 Main characteristics of the farms interviewed

To study the impacts of the decoupling on the beef meat supply chain, we interviewed some farms in Veneto region. Here there is a description of the typology of the 8 farms participating (Table 5-3) where

- in half of them the farms have adopted product specifications (CONAZO, OGM Free, Coop Italia, Carrefour, labelling) to improve the position on the market;
- the farm lifetime goes from 4 to 42 years;
- Most of the farm are vertically integraed
- the family plays a central role but in most of the farm there are employs for the breeding activity and for the fieldwork;
- one farm is run by two women;
- Most of them are localized in Veneto and only few are in Emilia Romagna.

- **Table 5-3 -** ***Farm characteristics***

Beef farms	N. of heads	Role of the family	Family workers	Extra Family workers	Year of starting activity	Level of specialization	Type of investment
1	195	F T	2	2	1991	high specialization	Qualitative
2	290	P T	3	1	1964	low	None
3	400	F T	3	8	1960	high specialization	Structural
4	615	F T	2	3	2002	high specialization	Qualitative and managerial
5	800	F T	3	0	1976	high specialization	Managerial
6	1500	F T	1	4	1960	high specialization	Structural
7	1600	F T	2	5	1998	high specialization	Qualitative
8	3200	F T	1	8	1985	high specialization	Structural and qualitative

5.3.2 Main results

Given the characteristics of the sample was no possible organise a focus group. Instead, deep interview with each farmer has given the possibility to understand their position in respect the decoupling system applied to the cereals and to beef production.

5.3.2.1 Knowledge and understanding of the contents of the decoupling system

There is a superficial knowledge and understanding of the decoupling system. The farmers caught information about the reform through newspapers and farmers or associations meetings. Their opinions is apparently negative, except for two cases that consider the reform positive. More in details:

- the general opinion is that the CAP reform doesn't influence future decision on the farm strategy. In the past most of them have take the decision in respect strategy and investments on the basis of beef market situation. Only recently the most active and innovative farmers has discovered quality and management innovation adopting new quality assurance scheme and vertical marketing integration strategy. In sum farmers are more scared about market evolution than CAP evolution.
- farmers think that the mechanism to pay the CAP contributions is too much complicated and are also afraid that modulation will cut in the future their entitlements reducing their economic sustainability.

Farmers that have positive opinion on CAP reform are the most innovative one and they managed bigger farms. One interviewed subject considers positive the Reform because it could simplify the mechanism of payment and correct the market distortion brought by the "coupling" system. Another interviewed farm thinks that the beef market "have to go with own leg": this reform will help the market to become more transparent and efficient.

5.3.2.2 Farmers choices and changes in farm management and their motivations

The greater part of interviewed are not going to introduce changes in their farm; in any case, the change doesn't depend on the CAP reform, but on the market. In this context, farmers foresee three main scenarios that they can choose:

- stopping activity. Only one farmers will close beef production but for his incapacity to adopt quality assurance scheme and to be better integrated in the chain. Another farmer has the economic interest to close the activity in and maximise the entitlements, but he is scared about alternative work and activities. So he will continue.
- maintaining the same production system. Most of the farmer will adopt this strategy because they consider their farm well equipped and consider the beef breeding profitable at the actual market conditions.
- expanding or diversifying production. Only few farmers will adopt this strategy in the sense they will continue beef production but will start to sell directly they beef in the farm while other will close the beef production but will increase milk production already existing in the farm.

6 SWOT ANALYSIS ON ITALIAN SUPPLY CHAIN CASE STUDIES

6.1 SWOT analysis of the durum wheat supply chain in Tuscany

The case study analysis shows that the Mid Term Review has foreseen a complex process of reorganization of the whole durum wheat supply chain in Tuscany. In fact the MTR pointed out many structural problems which affected each level of the supply chain, especially the farming and upstream phases. Therefore this process of reorganization looks inevitable for the survival of the local supply chain, particularly within this new decoupled regime where it is no more possible to hide these structural problems behind the specific aid for the durum wheat.

- **Figure 6-1 - SWOT analysis of the durum wheat supply chain in Tuscany**

STRENGHTS	WEAKNESSES
▪ Long tradition of cereals production ▪ Co-operation system strongly embedded in the territory ▪ Quite good marketing co-ordination levels ▪ Relevance of Network support ▪ Strategic geographic position	▪ Prevalence of small - size farms and old aged owners ▪ Low yields and high production costs ▪ Difficulties in keeping separate cereals production according to quality parameters due to higher costs and lack of appropriate storage facilities ▪ Heterogeneous growing techniques and quality standards ▪ High costs for concentrating supplies ▪ Lacks in the infrastructural system ▪ Low integration between agriculture and the milling industry, especially based on quality requirements ▪ Very low willingness to adopt innovations by farmers
OPPORTUNITIES	**THREATS**
▪ Addressing farming to the market ▪ Selection of the most efficient farms ▪ Supply chain agreements and territorial collective brands ▪ Re-positioning the durum wheat on high quality levels and more profitable prices ▪ Direct processing (short supply chains) and territorial valorisation of the final products (i.e. pasta made in Tuscany) ▪ Likely development of alternative crops instead of durum wheat ▪ Likely development of "multifunctional farm strategies"	▪ Growing competition from the new Member States ▪ Strong fall in the availability of durum wheat and increase in imports for the milling and pasta industry ▪ Abandonment of many durum wheat traditional areas - social and environmental problems ? ▪ Negative effects on supply chain local economic activities (input supply, machineries services, …)

On the basis of the survey, we use the SWOT analysis in order to investigate the main strengths and weaknesses of the durum wheat supply chain in Tuscany and at the same time to evaluate the opportunities and the threats emerging from the decoupling implementation.
Key points are summarised in the previous table, and discussed more fully below.

6.1.1 Strengths

The long tradition production together with the presence of a cooperation system strongly embedded in the territory certainly represent the strengths of the durum wheat supply chain in Tuscany.
A long tradition provides the necessary know-how for enhancing the quality standards of durum wheat production. On the other hands, a well developed, co-operation system, as it is well demonstrated, can represent the basis for the creation and consolidation of strong social networks, thereby promoting innovation and enhancing local skills acquisition. Therefore, the combination of successful supply chain integration with established social networks is often a key factor for both the maintenance of the wheat cultivation and for development of new activities in the farm.

6.1.2 Weaknesses

The main weak points of the durum wheat supply chain especially concern the farming phase, the storage facilities and the services provision level. The farm size is generally very small and farms have a fragmented structure. Especially in the hilly areas, the significant prevalence of small-size farms, with low productive yields and the high unitary production costs, which are managed by old farmers/owners may create serious obstacles to development and to adopt innovations. Moreover, the prevalence of small size farms represents a constraint for the supply concentration. At the same time, the presence of heterogeneous cultivation systems does not allow to reach homogenous quality standards of the durum wheat. As a result of that the storage system finds many difficulties to implement the diversification of the storage based upon qualitative parameters. Moreover the storage system appears too much fragmented on the territory causing an increase in the transport costs because of an inadequate infrastructural system.
The low level of the supply chain coordination together with structural and logistical difficulties related to the storage diversification represent at the light of the decoupling implementation a serious weakness for the whole durum wheat supply chain
Finally, the remoteness of certain areas may create other obstacles to development, for instance by limiting the opportunities for gaining information through networking. Inefficient extension services provided by the farmers' unions and/or other institutions promulgated of lack of information especially about market opportunities linked to the new scenarios.

6.1.3 Opportunities

The decoupling regime may give the opportunities to carry out some changes within the supply chain. First of all, a selection of the most efficient and high specialized farms. Secondly, the new context contributes to strengthen the supply chain co-ordination through a further promotion of territorial collective brands and of the supply chain agreements between the upstream phases and the industry sector (up to now only a few contracts have been recorded). In the same way the CAP reform could represents a challenge for re-positioning the durum wheat production on high quality level (especially in terms of protein level and index of gluten). For instance, all these supply chain initiatives are aimed at raising the value added of the final product.

6.1.4 Threats

The reduction in the availability of durum wheat resulting from the decoupling implementation might bring to an increase in imports for the local milling and pasta industry. Furthermore potential social environmental problems (i.e. further marginalation of rural areas and lack landscape management) resulting from the abandonment of durum wheat traditional areas should not be underestimate.
Another threat is related to the negative effects on the local economic system. Some upstream operators, such as inputs supply and machineries services, have been negatively affected by the CAP reform, in terms of general reduction in volume of business, as their activities are closely tied with the local agriculture phase.

Finally, the increasing competition from other countries, in particular eastern European states may erode the competitiveness of the national durum wheat.

6.2 The SWOT analysis of the Parmigiano Reggiano supply chain

6.2.1 Introduction

One of the main aspect that nowadays are characterizing the Parmigiano Reggiano (PR) food chain is the negative profits in the last four year for PR farmers. Negative profits that come from this situation do not necessarily imply dangers for the farms involved, since family farms still provide most of the labour needed for milk production. Negative profits simply imply that this labour is paid at a lower rate as compared to the standard salaries.

Onother important aspect is related to the the increasing bargaining power of modern retailers that is really who benefit from the PR Quality Assurance Schemes. These considerations are of course based on the fact that a highly concentrated retail sector can exert its oligopsony power on a highly fragmented supply chain, with 5000 PR farmers, more than 500 PR processors and 70-90 traders/wholesalers that act in the PR and Grana Padano chains. Moreover, in a situation in which very few firms are able to implement their own brand policies in the final market, retailers become also the main players in the grana cheese marketing strategies, both in terms of product differentiation (thorough different types of products like vacuum packed pieces, snacks and grated cheese, but also thorough their own Private Label brand policies) and in terms of pricing and promotions (big discounts, below-cost sales,…).

In the following section is described the SWOT analysis referred to the PR considering also the implication due to the decoupling to milk production.

6.2.2 The SWOT analysis

The analysis of the PR food chain have to take in consideration also the market of PR, Grana Padano (GP) and other grana cheeses for grating. These cheeses, especially the two PDO cheeses, are substitute products in terms of use as ingredients in preparing dishes, they are often traded together and in some cases they cannot be distinguished by consumers, since they are increasingly sold ready grated. This means that an analysis of competition on the PR market has to include all grana cheeses used for the same purpose, as these products tend to constitute a single production and marketing system, both in the same phase and across different phases of the supply chain.

Another aspect of the "grana cheese system" is that we need to consider the whole supply chains of PR and GP, rather than each product and/or a single firm. In fact, the two PDO cheese supply chains intersect in the ripening/wholesale phase, while the other grana cheeses for grating can be considered a sort of product (and price) differentiation strategy carried out by some specific firms.

The role of the respective Consortia also shows that competition takes place at the level of supply chains, not at the product and /or firm level. It could even be said that PR and GP would not exist if their Consortia had not been set up. In fact, the Consortia have become the depository of collective experience in production technology, and are delegated by the community to ensure that regulations are followed. The distinctive identity of the product, and its public recognition and prestige, all derive from the PDO brands (PR and GP), and the related advertising and promotion activities carried out by the Consortia.

Thus, in order to evaluate the efficiency of the chain, it is necessary to evaluate both the efficiency of firms and the efficiency of the vertical and horizontal relationship along the chain, since company and chain profits depend on these relationships.

To summarise the main results of our study, we adopt SWOT analysis (Strengths Weaknesses Opportunities and Threats) focusing on the whole system of grana cheeses and on competition between the two PDO chains. The main points discussed below are resumed in Figure 6-2.

6.2.2.1 Strengths and weaknesses

The first factor in PR success is the fact that consumers perceive it as the highest quality product among grana cheeses. Thus, the Consortium strategy must be based on this reputation, both in laying down production regulations and in consumer communication by producers and traders. Only this high quality reputation can explain the retail price differential of +40% compared to GP, since these two cheeses can easily be substituted by other cheaper cheeses in their main function in preparing meals. A decline in the level of (effective and perceived) quality is thus a danger for PR, especially as GP has made great efforts in recent years to enhance quality. Moreover, this perceived high quality refers only to PR in general and not to the different PR quality categories established by the Consortium. In this respect, the policy of product segmentation carried out by the Consortium has failed in making consumers aware of the related quality classification.

Another key success factor is the reputation of the PR Consortium brand, which various surveys have shown to be one of the best known by consumers. As the producer's or wholesaler's label is usually absent at the sales point, the Consortium brand is essential to distinguish PR from other grana cheeses, especially in modern retailing. But on the weakness side, the strength of the Consortium brand has become an obstacle to the development of company brands. These are practically nonexistent in PR, even though large firms exist.

Again, among the strengths of the PR chain, we have to consider its contribution to rural development. The Consortium collaborates with the local communities to sustain milk production and processing activities in the poorer parts of the production area (i.e the mountain areas), where few alternative activities are actually feasible. The PR system, thanks to its very strong tradition but also to its national and international dimension, is actually a powerful way for maintaining "high quality" business activities in poor rural areas, since milk producers and processors, especially when they are organised in cooperatives carrying out the ripening phase, have to adopt adequate strategies to face modern retailers and/or export markets. This helps to maintain social structure and income levels in the poor areas and encourages young people to stay in the areas.

Under the productive point of view, one important point of strength is due to the strong role of the family in the organization process and in the management of the field work and the breeding too. The dominance of family workers allow to farm to be "elastic" in respect to the variation of supply and demand of labour but, more important, in respect to variation of family income. In others words farm holders can accept reduction of income without reducing their production level. This situation is very important in front to the cyclical market crisis that characterize the whole chain.

This condition allow family farm to react positively to variation in policy and variation in market condition. The model applied to a selection of PR producers shows clearly how at the introduction of SPS doesn't change milk production in all the farm category analysed, while there is a strong reduction in milk production if decrease by 20% milk price. At the same time from the focus group appear very clearly as farmer don't change their milk production level under decoupling but some of these will have some problems if milk price will fall.

On the weaknesses side, the fragmentation of the production phase is certainly one of the main weaknesses of the PR supply chain. The number of processors has fallen to 500, but the average size is still very small (around 3,000 tons of milk processed) and this makes very difficult to lower average processing costs. The small average size is also the main reason that forces most processors to transfer the ripening and trading phases to specialised ripeners/wholesalers.

Another element of weakness is that dairies in the PR chain are not only small, but they are typically mono-product.

The high cost of production of the milk at farm level is a very critical point and this put farmers in a very bad shape if milk price will continue to fall during the time. This problem became critical if it is associated with the high presence of small milk producers that have higher cost of production in respect to bigger milk farm.

The issue of the high cost of production is also associate with another point: the high price of PR since it can create serious problems for both retail and wholesale sales. For example, supermarket buying and selling policies is to sell the 70-80% of PR in promotion.

Finally, a further weakness of the PR system is in the management of the marketing strategies, which are divided up among the Consortium and the producers/wholesalers. Product characteristics and advertising on the PDO brand are managed by the Consortium, while pricing and retailing strategies are in the hands of individual traders. As these agents often follow different objectives, the marketing strategies are somewhat uncoordinated. For example, advertising focuses on the Consortium brand, making very difficult for

individual firms to promote their own brands. Moreover, as for many other PDO products, the rigidities implied by the product specification rules that guarantee the PDO recognition tend to hamper product and process innovation activities.
Linked to the production system another weak point is the rigidity of the farm organization respect the milk production system. If farmer don't reduce production even if decrease milk price, they contribute to generate surplus and cause cyclical price trend that strongly reduce farm sustainability and farm capacity to be efficient in respect market price condition.

6.2.2.2 Opportunities and Threats

Focusing now on opportunities and threats coming from the economic environment, the biggest opportunity appears to be the increasing popularity of the Mediterranean diet and the Italian food style all around the world. The most recent figures show that in the years 2000 – 2005 exports rose by 55% for PR, which is clearly a signal that the export markets may become one of the biggest opportunity to increase sales for PR producers.
The PR brand is famous all over the world, and has been the object of fraudulent imitation by "Italian sounding" products, which have been recently the subject of both national and international trials. In the current round of WTO talks, the European Commission is trying to obtain an international property right protection for specialty product brands, which could be an important opportunity for all PDO products. In the meantime, the Consortium will have to continue to fight fraudulent imitations on both the international and the Italian markets.
In Italy, the increasing public awareness of what PDO entails could help PR in competing against other grating cheeses. Other cheeses are sold at a cheaper price and their satisfactory quality implies that they are increasingly penetrating the market for catering and food industry use. This can be fight only through increasing consumer awareness of the PDO quality characteristics, which requires a considerable effort in terms of further consumer information.
A further opportunity for the PR chain is the possibility for the Consortium of adopting production plans (i.e. production quotas for processors) to avoid over-production in periods of market crisis, in order to re-establish normal market conditions. This is allowed by a recent sentence of the Italian Antitrust Authority (January 2006), which has been adopted by the Italian Ministry of Agriculture. Before this sentence, there have been many attempts by the Consortium to avoid overproduction through vertical and horizontal integration strategies, typically stimulating the creation of second level cooperatives of processors carrying out the aging and trading phases, or through the signature of vertical contracts between association of processors and agers/traders (the so-called "inter-professional contracts"). Unfortunately, these attempts were not successful: there were in fact several big failures in this respect which had negative consequences on the tendency of producers to adopt any type of vertical and horizontal integration strategy. This is one of the reason because in the PR sector we still have 500 active dairies, many of them producing very small amount of output.
On the Common Agricultural Policy (CAP) side, the short-term problem is to assess the impact of decoupling, since in Italy the recently introduced compensatory payments for milk producers has been decoupled from the beginning of the 2006/07 milk campaign. The available studies do not foresee any dramatic change in the trends characterising the structure of the Italian dairy farms. This should be even more likely in the PR producing area, where the price of milk is mainly determined by the dynamic of the PR wholesale price rather than from the international markets of bulk dairy products such as butter or skimmed milk powder.
In this direction direct payment can help farmers who decide to continue milk production to reduce their debt or to invest in technical innovation or again to diversify their production or adopting the "wait and see" strategy waiting that price will start to raise again.
Focusing on the threats, there are several threats to the PR chain.
One is the increasing concentration of modern retailers and the related increase in their bargaining power, which is affecting the whole agri-food system. In Italy the percentage of food products sold in supermarkets stands at 56%, less than in other EU countries. But about 75% of PR is sold in super/hypermarkets, superettes and hard discounts, while the share of traditional and specialty shops, where the highest quality products are normally sold, is declining. This increasing share of modern retailers in the PR market has led most of the retail chains operating in the Italian market to create their own PR Private Label (PL) in the market for new products (vacuum packed pieces, snacks and ready grated cheese), the only products that can

carry an additional brand together with that of the Consortium. The PL share has reached 25% of the new product market (10% of the total) and this strong PL penetration is an additional reason that make extremely difficult for PR producers/traders to establish their own brand.
The persistence of the current economic crisis in Italy is yet another threat for PR as a high price product.
Finally, while PR and GP certainly constitute a single system for many aspects, competition between them remains a strong threat for PR. In fact, GP is almost a mirror image of strengths and opportunities lacking for PR: higher concentration in the production and trading phases, better organisation of the chain thanks to a better use of the Consortium strategies, Consortium and firm investments in quality enhancement, and last but not least, a lower price. This of course creates a strong threat.
One of the most important threat remain the reorganization of dairy in respect the concentration of milk farm. Probably many cheese dairy will be reduced in the next years as consequences of the reduction of number of milk producers. In fact milk production don't decrease, but, instead, decrease the number of producers. This situation has as consequences the reduction of the economic convenience to transform milk in small dairy.

In conclusion specific CAP provisions addressing the PR market (i.e. export refunds and cheese ripening payment) cannot be considered crucial elements for the performances of the chain. Also further scenarios of dairy policy reform may not play a key role, since the dynamics of the milk price is mainly driven by the trends in the PR final market and not by the international dairy markets.

- **Figure 6-2 - SWOT analysis of the Parmigiano Reggiano supply chain**

<table>
<tr>
<td>
STRENGTHS
1. consumer perception of high quality;
2. reputation of Consortium label;
3. protection from imitation through PDO recognition and Consortium measures;
4. product differentiation in terms of presentation and packaging and (vacuum packed pieces, snacks and ready grated cheese);
5. presence of cooperatives in the processing and (in a few cases) ripening phase
6. contribution to rural development, thanks to “high quality” business activities
7. role of the family accepting internal salary lower than market salary
8. stability in production under the decoupling scheme
</td>
<td>
WEAKNESSES
1. fragmentation in the production phase (500 dairies and 5,000 farms);
2. few processors carrying out the ripening phase
3. rigidity of dairies producing only one product and high specialization level by milk farm;
4. failure of horizontal and vertical integration strategies for controlling excess supply (i.e. second-level cooperatives for ripening; inter-professional contracts);
5. lack of own-brand strategies by producers/wholesalers;
6. failure in communicating quality differences established by the Consortium to consumers
7. significantly higher prices for PR, which stimulates massive promotions by both wholesalers and retailers that penalise PR
8. marketing strategies divided up among Consortium and traders/wholesalers
9. high production cost at farm level
10. presence of cyclical milk price crisis
</td>
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OPPORTUNITIES
1. increasing international popularity of Mediterranean diet and Italian food style;
2. reputation of the PR brand all over the world
3. potential international property right protection of speciality products in the current WTO round;
4. Increasing efficiency of the Consortium in preventing fraudulent imitation both on the Italian and the international markets
5. increasing consumer awareness of PDO recognition and PDO product characteristics;
6. possibility (previously excluded) of adopting production plans to fight excess supply;
7. further dairy policy reforms increasing the difference in the price of milk going to PDO and non-PDO products
8. greater market transparency through the setting up of auctions
9. diversify production activities at farm level
10. reducing the presence of small producers and more efficiency of the system
</td>
<td>
THREATS
1. increasing concentration and bargaining power of modern retailers;
2. development of Private Labels at the expense of producers’ brands;
3. better chain organisation of GP
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6.3 *The SWOT analysis of the Beef supply chain in Veneto*

The review of the food chain description and the results achieved by assessing the impact of the decoupling measures on the reaction of the beef producers in Veneto region, leads to define the following SWOT, that will be detailed below.

- **Figure 6-3 - SWOT analysis of the Beef supply chain in Veneto**

Strengths	**Weakness**
• Specialized chain • Beef quality • High professionalism • Regional specialization • Large average farm size • Integrated food chain • Market and innovation oriented farms • Low cost of production • High specialization of slaughterhouse plants • Role of return of scale to face decoupling	• Strong dependence on market price • High reliance on the cattle import • High animal density on the territory • Structural rigidity and high fixed costs • High financial risk • Reliance on coupled premium
Opportunities	**Threats**
• New investments due to decoupling • Improvement of the environmental impact • Improvement of the sector efficiency • Increase in economic sustainability of big farms • Technical assistance	• Small and medium farms risk to disappear • Rigidity on activity diversification • Loss in labour force • Direct import of beef by slaughterhouse and beef industry

6.3.1 Strengths and Weakness

The beef production in Italy is mainly concentrated in three regions: Veneto, Lombardia and Emilia-Romagna. The first two regions represent almost 50% of the national production. The regional concentration of the breading is associated with a very high concentration of big slaughterhouses that supply transformed meat to the national industry and distribution. The strict territorial linkage between beef breading and slaughterhouse plants has favoured a process of integration among farms and among farms and meat industries. In the first case, farms have instituted form of cooperation, mainly in order to slaughter beef oriented animals. This has permitted to totally integrate the phase of abatement and preparation of the meat, with relevant advantages in the management of the beef supply and in term of farm economic results. This kind of approach to the transformation phase has permitted to the small and medium farms to eliminate the costs of transaction with respect of the market of beef oriented cattle. Furthermore, the cooperative form increase the market power of the breeder.

Secondary, the beef sector is generally characterized by a strong relationship between breeding and transformation industry defined trough contracts specifying the supply of calves by the industry and the engagement of the breeder to supply the cattle at the end of the fattening process. This kind of contract can be signed between farmers and meat industry or between farmers and food stuff industry. The contract permits to decrease the risk of market both for farmers, that in certain cases defines at the beginning the selling price, and for meat industry that has a source of meat guaranteed.

Although there are certain disadvantages that it is important to highlight as well:

- The management autonomy of farmers is constrained by the contract commitments;
- High financial risk for farmers produced by more market favourable conditions if the contract specify a fixed selling price or a selling price lower than the costs sustained to purchase and fatten the calves.

This particular relationship along the food chain, very typical for this kind of product, has created a very specialized chain organized on the cycle calve-fattening process. The function of the breeding is to fatten the calves, generally purchased by French calves traders. In this sense, the specialization process exceed the national food chain, including the very specialized breeding in France, where the meat oriented races are selected. The Italian breeders purchase such meat specialized calves and feed the animals until they have reached a weight adapted to be sell to the slaughterhouses. This specialized work process contribute to keep low the production costs for the entire food chain. This is the reason why the different phases of the beef food chain are considered as a unique production cycle. The high dependency on the French calves supply induce the Italian beef producer to be in a position of price taker: the price of the so-called “brutards” is defined on the French market. At the same time, the incertitude on the level of quantity available on the French market leads the national operator to do risky previsions on the calves provision.

On the level of production costs, the size of the different food chain operators plays a fundamental role. Both the beef breeding and the slaughterhouse industries are characterized by large dimension. In particular, the meat industry constitutes a oligopoly market where there are only few huge holdings specialized in such activity. Farms can also count on important return on scale due to the average high dimension of the breeding. These farms are not big in the sense of acreage extension, but they are big in term of animal breeding capacity. The very intensive use of the stable by adopting the method of multiple cycle of breeding by year. A given breeding can carry out until 2 production cycles by year. This allows to reduce the fixed associated with farm structure and increase the farm turnover. Furthermore, the costs of feeding can cut down on spending by using silage crops at low cost obtained by the farm land or purchased on the market. The short term production cycle (6-8 months) and the low cost feed favour the big dimension and, thus, the return of scale.

The large dimension of the stable doesn’t correspond, generally, to a large size of the farm land. This produces a strong impact of such breeding on the environment, that in certain case is solved by rent land outside the farm. The environmental issues, where the application of the Nitrate Directive represents the most relevant one, increase the farm costs.

Despite of the generality of the agricultural activities, the beef breeding is an activity market oriented, that is the production choices and the strategy are adopted keeping into account the real demand on the industry phase. In this sector, the farmers are generally characterized by high skills and management capacity, so that breeding has, in average, high level of efficiency.

The decoupling effects estimated by the PMP model on such farms shows that the largest farms can better react to the new framework than the smaller breeding. The big farms can benefit of high return to scale and in this case they are not affected by the type of subsidy system. Although the same farms are more sensible to the variation in beef market price, confirming the strong reliance on market price of such farms. Actually, the variation of the price engenders important changes inside the breeding. The small and middle-big farms would reduce almost completely the beef livestock. For the smallest farms, in particular, it can be observed an important dependency on coupled aid per head bred. The mere application of the decoupling would lead such farms to abandon the beef production.

6.3.2 Opportunities and Threats

The decoupling of subsidies leads farms closer the market and the decisions concerning the production plan should respond to the effective convenience of each activity provided by the markets instead of by the coupled payments. In this sense, the financial resources realized by decoupling should be used in three main directions. First of all, the single farm payment could be used in order to improve the farm structures with the specific objective to increase the farm efficiency. In this specific context, the breading could be equipped by new technologies concerning the logistic aspects of the stable (i.e. software to control the livestock, the feed managing, etc.).

The single payment could still used as an annuity received for a certain number of years. This case occurs when farms have small size and very dependent on the coupled subsidy. Small farms have generally high cost of production and in a sector where the return of scale is fundamental in order to keep a certain profitability, the decoupling could favour the abandon of beef production. The results achieved by using the PMP model confirm the consideration: the application of decoupling into the beef sector leads small farms to exit from the sector, so that can continue to receive the public contribution and reduce substantially the farming system costs. Small farms should improve their efficiency increasing the size or trying to reduce the production costs. For this purpose, the farms should be supported by a technical assistance provided by the territorial public institutions.

The same farms could, moreover, be boosted to use the single farm payment to diversify their agricultural activity. The scarce economic sustainability of the small and medium size farms with respect to decoupling and beef price tensions could induce farms to invest in alternative activities in order to give continuity to the farm. Although, it is important to remark that the farms involved in such activity are strongly constrained by the nature of the fixed factors used in the farming system. The breading is oversized with respect its extension in hectares and the vegetal activities are always oriented to the feed need of the livestock. The production plan foresees almost exclusively fodder crops for silage. Furthermore, the breading activity is frequently based on the production of beef. The farm is only interested in the cattle fattening. Other productions, like milk, are marginal or interconnected with the beef production. The most practicable diversification for such farms is the milk production where they have structures and sufficient skills.

One of the most critical aspects of the beef breeding is the negative impact on the environment produced by the farms. In this sense, decoupling could relax the pressure of the breeding wastes on the land. Actually, the predicted reduction of livestock can contribute to make available more acreages to use for responding to this issue.

The results obtained by the quantitative models predict a fall of the livestock consistence in the region, both with the mere application of decoupling and with the introduction of a price variation. This important decrease in the number of meat oriented animals could be produce negative consequences on the meat industry, in term of local provisions in beef. In order to keep the continuity of the transformation process, industries could require cattle from French or from the other neighbouring countries, with evident consequence on the entire national food chain. So, the fattening phase should increase its level of competitiveness, investing in order to reduce the cost of production, both regards on the fixed costs and the production variable costs.

The likely important reduction of beef production could produce a decrease of the working efforts required by the farm activities. More specifically, as the model estimates, the decoupling leads to loss an important quota of extra-family workers.

7 SWOT ANALYSIS OF THE SUPPLY CHAIN CASE STUDIES IN EU

7.1 SWOT analysis of the soft wheat supply chain in Centre region (FRANCE)

The review of the food chain description and the results achieved by assessing the impact of the decoupling measures on the reaction of the soft wheat producers in Centre region, leads to define the following SWOT, that will be detailed below.

- **Figure 7-1 - SWOT analysis of the Soft Wheat supply chain in Center region (France)**

Strength • Very integrated food chain with high specialized firms • High yields per ha • Efficiency in production system (low production costs) • High quality product	**Weakeness** • High number of non-professional farms • Tendency for reduction in the number of farm • High logistic costs • The cost per ha remains high if compared to the costs of other other competitor like Argentina
Oppurtunity • Tendency to increase the farm dimension • Role of quality to win the competition with the other important wheat producers • Reform protect the small farms • Transgenic seeds can help to reduce cost of productions • New form of organization among farmers in order to reduce the labour, machinery and input costs • New using form for wheat (energy)	**Threat** • Environmental problem due to the possible abandonment of agricultural production in the marginal areas of the region • The low cost of other Countries, like Ukraine, can create difficulties for the trade competition of France in external and internal markets

7.1.1 Strengths

Very integrated food chain with high specialized firms

According the last Census on Agriculture in France, the Centre region produces more than the 50% of the total soft wheat produced at national level. The farms producing this crop own very large structures: only almost 2.700 farms harvests 270.000 hectares of soft wheat that represent the 30% of the total acreage dedicate to this crop in the region. The historical analysis shows a process of concentration very accentuated that is continuing under the objective to improve the return to scale and the farm productivity. If we consider the plan of production in this farm, more than 56% of the total acreage is constituted by soft wheat, while the other part of the soil is seeded by other cereals (durum wheat) and oilseeds (colza). The specialization of the farms is allowed by an integration with the stock plants, frequently constituted by the direct intervention of the farms of the region. Those farms have, indeed, constituted cooperatives with the specific objective to stock the grain before to sell it on the market to the milling industry. The integration among farms is also favorita by the existence of a professional organization, the ONIC, strongly engaged in improving the quality of the soft wheat by the seed selection and by a technical assistance addressed to farmer producers.

The sector overview provided by the food chain description is confirmed by the FADN data used in evaluating the impact of the decoupling measure. The biggest farms produce the greatest quota of soft wheat in the region.

High yields per hectare

The high level of concentration of farms producing soft wheat in Centre region and the presence of large farming system reveals a yields per hectares very high. In the last decade, the yields in the region has increased due to the investment on the quality of the seeds and on the improvement of the production methods. Although, there are yet increasing possibilities. The likely reduction of small farms in the next future with enlargement of the average farms size will be a factor will produce an improvement in the yields.

Efficiency in production system

Despite the large number of small farms composing the soft wheat chain in Centre region, the producing system is very efficient and productive. This is due to the presence of large farms very productive that can count on high return to scale. Furthermore, the interaction of the farms with ONIC has produced an improvement of the efficiency of the production system and it has promoted form of cooperation between farmers in order to reduce the production costs and to manage the relation between the milling system.

High quality product

The increasing of the quality of the soft wheat in the region is signalled by the efforts made by ONIC and the Agriculture Department of the Region. The level of proteins of the soft wheat is very high with respect to the national average. This property can guarantee a very good workability of the flours and an excellent quality of the product obtained with. Furthermore, the public authorities have contributed to developed the so-called label rouge, a mark of distinction of those products characterized by a certain origin and by a production system certified by a public authority. In particular, breads and products originate by using the flour produced by soft wheat produced in the region can adopt, under some restrictions, the label of quality recognized at regional level.

7.1.2 Weakness

High number of non professional farms

The Census data shows that a large number of farms in the region are non-professional. In other words, the farms with an engagement of labour less than 75% of the full time labour represent almost 60% of the total number of farms in the region. Furthermore, if one considers the small farms producing soft wheat in the region, around 53% of the farms has a farm size less than 30 hectares. Although, the small farms represents only the 18% of the total surface with soft wheat in the region. The small farms are characterized by the presence an individual farmer that manages the farm activity with the exclusive support of his family. In most cases, the farmer has not a successor and he is not supported by extra-family workers. It is frequent, also, as the FADN data shows, that the farm activity in small farms is composed by different kind of products out off cereals. Indeed, for example, in the sample considered in the framework of CAP evaluation, farms with a surface until 30 hectares are characterized by a crop mix composed by cereals, horticulture, vineyards and orchards. This last three crops even though cultivated on a small surface allows a high revenue per ha.

Tendency to reduction in the number of farms

The statistical data inform us that the small farms tend to reduce in favour to an increase in the number of big farms. This results can be read in two senses. On the one hand, the augmentation of large farming system can permit an improvement of the overall efficiency for the entire food chain and more intensive return to scale for the farm so that can be reach higher profits. On the other, the reduction of small farms can hide a structural deficiency of a part of the regional territory. For example the marginal area with structural problems could not compete with the lowest cost of the larger farms. This leads to a public problem to keeping the vitality of such rural areas and to producing adequate development measures for those areas.

The mathematical model shows a limited reduction of farms producing soft wheat after having applied the decoupling measure. This results is in part influenced by the presence in the sample of professional farms for every class of size.

High logistic costs

The food chain is well integrated within the phases of agricultural production and the stock of the soft wheat, but is not well integrated between the stock station and the milling industry. The Centre region is equipped by several mills that produce flour for the regional bread demand. Although, the great part of the production is transferred to the national market where the mills are localized rather near the place of four demand than near the soft wheat production areas. This leads to important cost of transportation of the soft wheat from the stock station to the milling industries. Furthermore, the plants of milling are not localized near the ports where arrive the soft wheat shipped from overseas. So, once the commodity arrive in the port, it should be transported to the place of milling transformation. This intermediate steps increase the costs of the entire food chain structure and produce a gap of competitivity with respect to other Countries.

High costs per hectares with respect to other Countries

Notwithstanding the high efficiency of the soft wheat chain, with particular respect to the agricultural and stock phases, the costs per hectare for producing such crop is yet higher that the cost sustained by the correspondent farmers in Argentina, Brazil and Ukraine. The main characteristics of the sector in those countries is that the labour cost is lower than in France, the use of production inputs is not so intensive as in France and the production of soft wheat is more extensive.

7.1.3 Opportunities

Tendency to increase the farm size

The decoupling measure should in principle lead the part-timing farms and the small farms to progressively abandon the sector. This process can be also activated by the predicted generalized reduction of the commodity prices on the internal market. The reduction of the small farms can lead to an enlargement of the average size of the farms with particular reference for the farms specialized on the arable crops. In this manner, the soft wheat chain can receive a good effect in term of improvement of the farm efficiency and , so, a reduction of the total farm costs (return to scale). The reduction of the production costs can be a response to the overseas farm system competition.

Role of the quality

The strong and menacing competition of the East Europe producers and form the overseas can be faced by adopting a new organization of the food chain in such a way to obtain an improvements in the entire cost sustained by the different operator and by a serious investment on the quality of the soft wheat. This last one can be reached by important investment on the selection of the seeds to use in harvesting the arable surface and by improving the managing skills of the farmers. To do that it needs that a professional representative, like ONIC, sustain and drive the action of the farmers. The quality is obtained also by stocking the grain in adequate structures. The efforts made by farmers until now have been very important and they have highlighted the important role of the cooperation in this phase of the chain. Another important role should be played by the local governments and by the farmers representative in order to make value starting from the origin of the commodity. The “label rouge” already used to indicate the product the are made following a certain standard of production have to be reinforced by increasing the number of farmers producing soft wheat under this public label. To achieve a significant improvement of the soft wheat quality, the government has to drive towards this objective and sustain the investments by public resources. In particular, the rural development measure can be useful in order to facilitate the activity of farmers.

The reform protects the small farms

The results obtained by the mathematical model seem to keep the production off soft wheat by the small farms. These results that can be read in contradiction with the general expectation of abandonment of the sector induced by decoupling is, on the contrary, the logic responses of the farmers in managing the single farm payment. Actually, in the small farms considered in the model, the soft wheat is a marginal product, inserted in the production plan for rotating purposes rather than market objective. The production plan for this farms is composed by crops that are not eligible in order to obtain the single farm payment. So, the decoupling measure introduces an incentive to continue in producing soft wheat in order to receive the payment. Furthermore, the cost for producing soft wheat are comparable to the cost for producing fodder crops. For this reason, the soft wheat is in certain areas, like Centre region, preferred as a convenient crops on which allocate the entitlements to receive the public aid.

Transgenic seeds

France is probably the country with the highest soft wheat yield in the world. The important investments on the improvement of the productivity and the quality of the grain have produced visible results that are described in the section dedicate to the analysis of the soft wheat food chain. At the moment, the real issue is represented the reduction of the cost of production. Actually, to reach the performances of yields previously indicated, farmers have to use a lot of inputs, like fertilizers and pesticides. These kind of costs can be reduced by adopting seeds more productive and resistant to diseases. The transgenic product can represent a way to fight the competition on the costs coming from overseas.

New form of organization among farmers

The association among farmers in order to cooperate in stocking the grain is one example of synergy in agriculture that has allow to obtain a consistent reduction in costs and a better managing of the soft wheat before to sell it on the market. In France, there are two main form of association between farmers in order to conduce the farm activity in partnership: the GAEC (Groupement Agricole d'Exploitation en Commun) and the EARL (Entreprise Agricole à Responsabilité Limitée). This last one is going to increase its weight on the agricultural sector. The form of grouping among farmers can produce real advantages in term of costs and, so, in term of competition.

Alternative uses of soft wheat

One of the nowadays most important agricultural opportunity, sustained also by the European commission, is the alternative energy produced by agriculture. The bio-energy produced by the agriculture are going to be supported by the new CAP reform and by new form of support that the European Commission should early define. The production of bio-energy represents an alternative use of cereals that should be evaluated as an opportunity for the farm revenue.

7.1.4 Threats

Possible environmental problems

The mathematical model has highlighted that the decoupling measure should not influence in strong manner the production of soft wheat. The small farms and the bigger farms as well show a very modest reduction in the level of surface cultivated with wheat. Although, the model has keep in account only the professional farms, because the FADN sample is only composed by such farms. So, it is important to consider the possible reaction of the non-professional farms and for farm placed in the lagging areas. For such farms, it is possible to predict a progressive abandonment of the productive agricultural activity and a cultivation of the land with fodder crops (pasture and grassland) or for non-productive objectives (good practice area). This reaction to the decoupling can produce at a multifunctional point of view a loss in cultural heritage and in the function of environmental preservation led by farmers on the territory.

Trade competition

A real challenge that has to be played on the entire soft wheat food chain is to conquer the competition advantage with respect the other soft wheat producers at European and World level. The relevant difference of production costs between the French farm system and the other systems can be menace the sector at medium term. Indeed, if the quality of the product is quite similar but the price out of French borders is cheaper, the milling and industry flour users will demand external product. Furthermore, the possibilities to export the product overseas can be jeopardized. So the sector has to improve the quality and the security standards of the product in such a way that this adavantage can be kept over the time. Furthermore, more investment in reducing the cost of production at farm level and the cost of interfacing between producers and milling industry.

7.2 The SWOT analysis of the Soft Wheat supply chain in UK

The review of the food chain description and the results achieved by assessing the impact of the decoupling measures on the reaction of the soft wheat producers in UK, leads to define the following SWOT, that will be detailed below.

- **Figure 7-2 - SWOT analysis of the Soft Wheat supply chain in UK**

Strengths • High production concentration in few areas • Off-farm wheat storage organized by cooperatives of producers • Self-sufficiency in term of flour • Organic production	**Weakness** • Presence of large number of small farms • High cost of production • The milling system is not well integrated with the farm storage system • Financial risk • High cost of logistic • Weak agricultural activity alternatives
Opportunities • New form of organization between farmers in order to reduce the cost of production • Improve the degree of integration between farmer and milling industries • Improve the quality of the product • Improve the degree of efficiency • Organic production • New crop utilizations (energy crops)	**Threats** • The decoupling can lead many farmers to withdraw wheat production • Decoupling and reduction in market prices can damage the entire UKJ chain in favour to the overseas less expensive productions

7.2.1 Strengths

<u>High production concentration in few areas</u>
The soft wheat production in UK is concentrated in England that represents more than 90% of the entire national production. The high territorial concentration has contributed to improve the degree of specialization of the sector with important consequence on the relationships among chain operators. Indeed, farmers has constituted cooperative in order to integrate one of the most important phase of the wheat chain, that is the storage. In this way, wheat producer have benefit of the return of scale provided by the size of the storage plants.

<u>Home production of soft wheat</u>
In UK, the area cultivated to wheat at approximately 44% of the cropped area (3.1m ha of 4.6m ha in 2004), constitutes a significant proportion of the total. The significant majority of wheat milled within the UK, is home produced by the home and, in part, this result can be ascribed to British farmers increasingly growing appropriate wheat varieties.

<u>Organic production</u>
These last years, organic sector is going to increase. From 2002 to 2004 arable organic production is increased from 26400 to 48494 ha, while organic wheat production showed an increasing of 10000 ha, starting from 6850 ha. These figures are very important if we consider that the organic wheat yield can be estimated to be in the region of 3-4 t/ha, which should be compared to the average UK yield obtained from conventionally grown crops of around 7-8 t/ha. Nevertheless, in 2004, the organic wheat represents only about 0,09% of UK agricultural land, the stable increase of this typology of products is a positive signal.

<u>Imports and exports</u>
Even if UK is quite self-sufficient in term of wheat, UK imports wheat for milling and exports wheat for animal feeding. The percentage of home grown wheat used by its members has increased from 62% in crop year 1985/86 to an estimated 84% in 2004/05 while the proportion of wheat milled in the UK that is not home grown but produced in other EU Member States, has fallen from 21% to 8.3%. In addition, the volume of imported wheat from non-EU producers has fallen from 17% to 7% over the same period. This tendency shows the efforts of producers in improving the quality and varieties of soft wheat and, in particular, the soft wheat for bread-making.

7.2.2 Weakness

<u>Presence of large number of small farms</u>
Even though the larger farms contribute more than small farms to the national wheat production (63% of farms is placed below 8 ESU), there is a consistent number of small farms producing soft wheat in England. The presence of this large number of small farms contributes to keep low the degree of efficiency of the sector. The official statistical data says that a process of rationalization of the sector is in progress. The small farms are reducing according to a natural process of agriculture abandonment by those farms less efficient and without successors. Furthermore, decoupling should speed this process improving the average competitiveness of the sector.
The strong impact of decoupling, as highlighted by the results achieved by applying the PMP models, shows also a certain rigidity of the farms in allocating the surface in alternative crops. Actually, the number of agriculture alternative choices is very constrained. This the reason why, in many cases, farmers decide to activate the surface conducted following the good agronomic operations.

<u>Farmer controlled business (FCB)</u>
The financial risk of non-sale of produce and the risk of grain spoiling for want of appropriate storage conditions have lead to the development of off-farm storage and marketing facilities to which additional services, such as the financial factoring of produce and thereby producing an income stream, are often added. The off-farm stores are often owned by a local farmer co-operative, a so-called farmer controlled business

(FCB). The low diffusion of this kind of producers organization contributes to increase the costs for the entire food chain and, thus, the sector competitiveness.

Low level of integration between milling system and farm storage system

The analysis of the chain shows a very low level of integration between the farm storage system and the milling industry. The interface between the wheat storage centre and the milling industry is not organized by partnerships, throughout mere provisional contracts. This engender an increase in logistic costs and also problem in the product quality requirements. So, it frequently happens that soft wheat food chain is rejected by milling industry, since the grain delivered to the millers did not meet the quality specification or allocated delivery time. Such situations imply increasing costs (transports and delay on provisions) for the entire food chain.

7.2.3 Opportunities

New forms of organization among farmers

The objective of reducing the production cost has to be a must for the entire food chain in order to increase the level of competitiveness of the sector, in order to keep profitable the agricultural production and avoid a dependence from overseas markets. New forms of organizations between farmers, by improving of farms return to scale, could respond to this objective. Institution of new cooperatives for producing wheat or in order to provide service for working the land could be useful for achieving an improvement of the efficiency along the chain.

In this perspective, it will be very important to reinforce the integration between wheat producers and milling industry. Indeed, the phase of off-farm storage is well organized by cooperative of producers, while the milling industries is quite fragmented and there are not common strategies between producers and industries. A better relationship between these two chain actors could contribute to enhance the food chain system, in term information channels, logistic flux and product quality.

Efficiency improvement

The Single Farm Payment in the UK may encourage some cereal growers, presumably the most efficient or entrepreneurial, to expand operations whereas other smaller producers may decide to withdraw from cereals in suitable areas, switching to other crops or perhaps in some instances to retire from farming completely. This might lead the remaining farms to invest in improving the degree of efficiency and the soft wheat quality.

Cost reduction

Along with continuing to seek economic efficiencies within their own businesses, many producers may be forced to amalgamate with others either by way of a formal sale of their business or by the less radical means of, for example, joining a so-called machinery circle with other farmers in order to share costs with them and thus seek to capture the economies of scale that larger business units bring. The building of strong and effective FCBs can be seen, therefore, to be of significant benefit to farmers.

Organic wheat production

As we have see previously, the organic wheat production is in going to increase. In term of opportunity, mainly for farms in lagging regions, the organic wheat might contribute to improve the farm economic sustainability. The organic wheat sector, as a consequence of total decoupling, might show a positive trend compensating the predicted reduction for the conventional wheat.

Bio-ethanol

Decoupling induce a reduction of the specific profitability of the cereals, so that many farmers, not very specialized on the sector, might choose to abandon the sector to produce something else or invest in good practice area. Another solution that can realistically represent an alternative, mainly in view to the further public incentives foreseen, is the agro-energy production. Wheat could be grown for the production of bio-ethanol and thereby make a positive contribution to the UK's renewable fuels obligation.

7.2.4 Threats

Reduction of soft wheat production

The predicted reduction on soft wheat portrayed by the quantitative model could affect the situation of positive provisional balance on soft wheat reached by UK in these last years. In this sense, decoupling can harm the UK chain in favour to the overseas productions less expensive (i.e. Ukraine). A further risk linked to the extra-market dependence is the decrease in the average quality level of the product. The efforts produced during these last decade improving the quality of the flour oriented to producing bread could be lost.

The reduction in soft wheat can implies the abandon of the agricultural production for those farms placed in lagging regions on the multifunctionality point of view, the reduction in soft wheat can lead farms to abandon the land with negative effects on the environment and on the rural development vitality.

Reduction of labour use

The tendency to reduce the number of farms observed in these last years, which has led to a rationalization of the sector, should be accentuated by the decoupling. This can contribute to a further reduction of the agricultural labour demand.

7.3 The SWOT analysis of the Rye supply chain in Germany

The review of the food chain description and the results achieved by assessing the impact of the decoupling measures on the reaction of the Rye producers in Germany, leads to define the following SWOT, that will be detailed below.

- **Figure 7-3 - SWOT analysis of the Rye supply chain in Germany**

Strengths • Rye is the only cereal which can be grow on poor sandy soils • Use of rye in bread making • Hybrid variety	**Weakness** • Low yield • Tendency to reduce the rye production • Low gross margin
Opportunities • Feed use of rye • Ethanol	**Threats** • Production reduction • Labour reduction

7.3.1 Strengths

Rye is the only cereal which can be grow on poor sandy soils

One of the main rye strength is that it is the only cereal that can be cultivated on poor sandy soils. This crop, indeed, is suitable for poor sandy soils with low rainfall. For this reason the rye crop is an important resource in such areas where it is quite difficult to find alternative crops.

Use of rye in bread making

Rye is an important compound of 'traditional' German brown bread. Brown bread has dietary advantages like lower digestibility, lower energy, higher fibre content, etc. The use of rye in bread making can represent a guarantee for a part of rye demand. Actually, the traditional consumption of brown bread in specific German areas can contribute to keep a local food chain system based on rye production.

Hybrid variety

The yield potential of hybrid varieties on average soil quality is not much below that of wheat. However, the great costs invested in purchasing rye hybrid varieties with high yield potentiality could provide productive results very similar to the non-hybrid rye variety yield. Indeed, the lower market price of rye induces to cultivate marginal land with low fertility.

7.3.2 Weakness

Low yield

Rye yield is sharply lower than soft wheat yield. Generally, the rye yield is lower than 20qn/ha compared to soft wheat yield and that is a strong disincentive to rye culture on good soils.
The lower degree of rye yield is due to both lower degree of technical progress (fewer breeding efforts due to the small seed market for rye) and weak natural conditions, especially sandy soil and low rainfall, in a large portion of the typical rye areas.

Tendency to reduce the rye production

Over the years the rye-growing area is decreased. In the 1950s this culture covered, in the West Germany, more than 30% of cereal area. Over the last years, instead, the rye-growing area, in the whole Germany is lower than 10% of cereal area. From 1990 to 2004 the share of wheat out of total cereals increased from 33 % to 43 % while the share of rye decreased from 15 % to less than 10%. That show a tendency, over the years, to reduce the rye production.

Low gross margin

Another weakness element for the rye with respect to soft wheat is the low degree of GM/ha.

The rye GM/ha is lower, on good soils, than soft wheat GM/ha. That obstructs the rye growing spread and puts this culture in poor sandy soils where is almost impossible to find an alternative culture in the production mix.

7.3.3 Opportunities

Feed use of rye

The significant price drop under the 2003 CAP reform gives an incentive for feed use of rye. A lower rye price compared to other feed cereals can represent an opportunity for this culture enlarging an important market outlet.

Ethanol

A lower rye price, after the CAP reform application, can facilitate the use of rye in the ethanol industry. National regulations and additional subsidies can give a support for development of a rye market outlet. In Germany, since many years, the agro-energy chain is base on cereals (mainly grain maize) and oilseeds (i.e. colza). The technology implemented is the most efficient in Europe and it could be enlarged to the less important cereals with less performances in term of energy produced, like rye. In this sense, in the future, the rye could count on an alternative market that could give an incentive to maintain such crop in lagging regions.

7.3.4 Threats

Production reduction

The total decoupling application can produce a strong reduction of rye production. On the basis of model results, the total decoupling can produce a rye-growing area decrement of 20% that, in smaller farms, can reach the 30%.

With a rye price reduction, in our model -14%, the negative effects of CAP reform on rye production are further strengthen. Specially in the smaller farms, a lower price can produce the rye lands abandonment. That is more worrying because the rye-growing disappears from poor soils where there are not other alternative crops.

Labour reduction

Another threats related to rye and cereal area reduction is the labour use decrease. The cereal-growing lands, after decoupling application, drop or are abandoned and replaced with less expensive and demanding crops. That produces a fall of extra-family labour that, in the smaller farms, shows a tendency to disappear.

The price variations produce a further aggravation of labour use demand.

7.4 The SWOT analysis of the Milk supply chain in Ireland

The review of the food chain description and the results achieved by assessing the impact of the decoupling measures on the reaction of the dairy producers in Ireland, leads to define the following SWOT, that will be detailed below.

- **Figure 7-4 - SWOT analysis of the Milk supply chain in Ireland**

Strength • Stability of milk production • Strong role of Cooperation • The importance of the rough grazing (low production cost) • Environmental and landscape appreciation	**Weakness** • Milk price dependent of intervention price • High volume of milk transformed in skim milk powder • Small farm still are less competitive of bigger farms
Opportunities • Economic sustainability of small producers • Big producers have more opportunity to buy milk quota • Possibility to reduce transportation cost in collecting milk phase	**Threats** • Increase the role of the milk quality • Reduce seasonality system • Increase value added in dairy product • Increase economic diversification for small producers

7.4.1 Strengths

Stability of milk production

In 2003, milk producers in Ireland were 25000.

Strong role of cooperation

The milk food chain in Ireland is a very integrated chain. All the producers are associated in cooperatives, where the milk is collected and transformed. Nowadays, the entire production of milk is collected by cooperatives and almost 97% of the milk production is transformed inside cooperative structures. These numbers demonstrates the importance of this form of farmers association in the food chain. In most part, the cooperative form is motivated by the large dispersion of the milk producers over the Irish territory and by the large number of small farms inside the sector. The cooperatives allow the farms localized in lagging Irish regions to have a market gate for their production and in consequence permit the survival of those farms, generally characterized by small dimension.

Cooperatives permits also and advantage in term of milk price. Generally, the price paid by a cooperatives to its own members is higher that the price that they would have obtained by the market. Although, a part the advantages deriving to the participation to a cooperative, this kind of structure tends to overlap the specific interest of the firm with specific interest of its members. This can produce an undercapitalization of the cooperatives leading to difficulties in facing the market competition with the others private firms.

The importance of the rough grazing

Farms producing milk in Ireland can benefit of the climatic conditions that permit the growing of the grass for a long period along the year (around 300 days). The wide grassland at disposal of the farms guarantee the needed feed for the animals bred. The rough grazing represents also a feed input at low cost, supporting the small farms to receive a profit that can satisfy the family needs. In this sense, the rough grazing is an essential element to permit to farms placed in lagging regions to continue one of the few activities that can permit yet a adequate revenue.

The result of the PMP models confirms the low costs of maintenance of the grassland: the decoupling induce an increase of this kind of farm process instead of an investment in good practice area (eligible for obtaining the single farm payment).

Environmental and landscape appreciation

The ricreative value of the Irish land characterized by large green meadows can contribute to maintaining the farmers on territory. The vocation of this territory to rural tourism can represent a real opportunity for the farms, even if they are localized in lagging regions. For instance, the agritourism is a complementary revenue for the farms. This multifunctional value of the grassland should be considered also by the rural development plan, because meadows represent an amenity resource and an important farm input.

7.4.2 Weakness

Milk price dependent to intervention price

The milk production in Ireland is characterized by a high seasonality that leads to increase the processors' production costs. Hence industries and cooperatives prefer to transform milk in butter and milk powder in order to keep low the holding costs. Only a very small part of the entire production of milk is used for cheese and liquid milk (30%), while the rest is used to produce low added value products. This situation contribute to the reliance of the milk market price on the intervention price. Butter and powder milk are the products mainly affected by variation in intervention price and this dependence is reflected by the internal market. This is confirmed also by the tendency of the Irish milk price to be lower than the European average milk price.

High volume of milk transformed in skim and powder milk

Milk price dependence is motivated by the high quota of milk production processed in butter and powder milks, that is two product with a low valued and also low quality. The high incidence of these products influence the internal market price. The explanation of this kind of product orientation is twofold. First of all, the high seasonality of the milk production makes difficult for the processors to keep low the cost of production for profiting of the return of scale. There are also important logistic costs to face. The high dispersion of the farms over territory associated with the low daily average production per farm permits to collect the milk only in certain day in a week. This doesn't permit to produce drinking milk or quality cheese. Furthermore, in order to minimize the costs of production, farmers tends to feed animals only with grass over an entire year. Only in period out of lactation, cows are fed with silage. The result is a milk with low nutrient property and of low quality that is not adequate for producing drinking milk and, in particular, cheese.

Small farms still are less competitive than big farms

Dairy sector in Ireland is characterized by a high number of small farms that continue the breeding activity thank to the grassland resource that allows them to produce grass for feeding farm animals. These farms could not survive with the low internal price without the wide availability of grass along almost the entire year. The low cost maintenance associated of this kind of land associated with a large disposal of grass represent two main reason of the survival of the small farms in these regions.

Although, these small farms suffer of a certain economic fragility. This is confirmed by the results of the quantitative model that shows a strong reduction in milk production for the smallest farms in case of reduction of the market price of the milk by 22%. The last decade was characterized by a significant reduction of small farms and an increasing in the number of large farms. This tendency should continue in the future leading to a further reduction of small farm with a consequent reinforcement of the average dimension of the dairy farms. In this process, it will be a strong role the future rural development measures.

7.4.3 Opportunities

Economic sustainability of small milk producers

In term of rural development, small farms represents an important issues of the Irish agriculture. If one recognizes that the multifunctionality is referred to an agriculture that produces at the same time food and fibre goods and services addressed to the society, like the culture heritage, the safeguard of the environment and the natural resources, the vitality of the rural areas, the employment in rural areas, we can say that Irish agriculture has a high multifunctionality value. In this sense, small farms generally localized in lagging regions of the country have to find sustains in rural development plan, in order to reinforce their competitiveness with respect to the bigger farms. Such reinforcement can be provided sustaining the farms structures but also improving the quality of the products in order to obtain high value added transformed products (cheese, drinking milk). The PMP models has showed the drastic impact of a reduction in milk price on the dairy activity in the small farms. These farms are characterized by higher production costs than the bigger farms and their activity is very dependent to the variation of milk price on the market. The reduction of costs in likely unrealistic, so that these farms should to invest in improving the quality of the milk in view to obtain a higher remuneration for their efforts.

Buy milk quota

The negative trend highlighted for the small dairy farms by the Department of Agricultural Food and Rural Development of TEAGASC should tend to favour the average size of the dairy farms in the country. This can lead to an improvement in the holding return to scale and, thus, in the level of competitiveness of the sector. The augmentation of the farm dimension is achieved by buying extra milk quota into the market. The farms more efficient or bigger could invest in purchasing milk quota in order to maximize their production capacity. Hence, it is necessary to abolish the restriction concerning the milk quota trade, both on farm size and on geographical areas. Such restrictions make difficult to bigger farms in access to milk quota government allocation and they prevents transfer of milk quota through different geographical areas (i.e. farmers in South-west cannot sell milk quota to farmers in North-west).

Reducing transportation costs

One of the most important issues arising inside the milk chain in Ireland is the wide dispersion of farms over the territory. This situation leads to increase enormously the costs for the entire chain. This means that for producing cheese it its necessary to collect milk every day and for very little quantity of product. While in order to sustain lower costs, the milk is collected twice by week, but this milk will be used for producing low added value products, like butter and powder milk. So, for the little farms located in marginal regions of the country it is absolutely necessary to increase the quality of the milk produced, while for the others it is necessary as well to stabilize the production. Indeed, the production seasonality is a fundamental factor that prevent the cooperatives and industries to invest in drinking milk or cheese. If farms will invest in farms in order to break the production seasonality behaviour, the transportation costs will be reduced and the transformation phase will invest on high added value products.

7.4.4 Threats

Quality of the milk

The quality is an important objective to achieve for the Irish dairy sector, for several reasons. First, the strict dependence of the internal milk price on the intervention price on butter and powder milk doesn't permit the sector to make strategies capable to face the competition originating from the other member states. Furthermore, the strong reliance on the intervention price doesn't permit a protection for the small farms located inside lagging region and with highest production costs. For this farms a reduction in the variation of price means a reduction in the level of farm revenue, without any protections provided by the quality of the milk produced. This means that the small farms seriously risk to be obliged to exit from the sector. But also if a farmer has invested in improving the farm structure and on the quality of his milk, the market will not respond to this efforts. It is important that it is defined a common strategy at central level in order to allow all farmers to invest in the quality of the milk. The increasing of the quota of high value added dairy products can be important in order to decrease the linkage of the internal price to the intervention price.

Production seasonality

As we have already highlighted, the seasonality in production level during the year is one of the most important problem for the dairy sector in Ireland. Actually, the seasonality tends to produce high logistic costs and to specialize the industrial component on the low added value products. The agricultural national strategy should be addressed to eliminate such annual fluctuations in production level in order to stabilize the supply and, as a consequence, to increase the interest of industries towards high value added products.

Increase value added of dairy products

The Irish dairy sector needs to increase the quality of its product and, thus, the economic values produced by them. This objective can create the conditions for keeping the small farms in lagging regions and improve the vitality of the Irish rural areas. The milk production is one of the few agriculture activity that allow still rural family to survive, that means to have a revenue capable to satisfy the family needs. Actually, in some European country, like Italy, the dairy production has permitted to maintain farmers in some remote regions (i.e. mountain area), while farms specialized in other sector, like cereals, have abandoned the sector and, thus, the territory as well. But it is not sufficient to produce milk in order to prevent the abandonment of the land, it is necessary to increase the value of the products milk-based investing in quality and in trading. In other words, farms should improve the quality of the milk in order to permits cheese production, drinking milk and other dairy products out of butterfat and powder milk. To create value, it is necessary to invest in quality and in diversifying the dairy products supplied. Although, to segment the market and to propose different dairy products satisfying different needs, farmers should produce a real effort in restructuring their farms and reorganize the production system.

Diversification for small producers

The PMP model indicates as the small farms are very sensible to the variation of the milk price. This happen because such farms are specialized on this kind of sector and there are not other activities than can permit a compensation of the reduction of revenue due to a milk market crisis. This would mean that for the small dairy farms, the predicted structural decline of the milk price will induce them to abandon the sector. In this situation, the new rural development regulation can play a strong role in reinforcing the competitiveness of the rural areas supporting farmers to diversifying their activities. Diversification in a context characterized by small farms and poor rural areas improves the multifunctionality content expressed by those areas.

7.5 The SWOT analysis of the Milk supply chain in Spain

The review of the food chain description and the results achieved by assessing the impact of the decoupling measures on the reaction of the dairy producers in Spain, leads to define the following SWOT, that will be detailed below.

- **Figure 7-5 - SWOT analysis of the Milk supply chain in Spain**

Strengths • Increase in national production • Increase in yields • Price stability • Regional specialization • Production specialization of small dairy firms • Positive environmental aspects	**Weakness** • Low cheese production • Withdrawing of big and not specialized farms • Increase in milk import level • Work unit reduction
Opportunities • Small farm revenue stability • Milk quotas distribution • Specialization improvement	**Threats** • Keeping small dairy factory • Territory management • Production diversification

7.5.1 Strengths

Increase in national production and increase in yields

The study of the Eurostat time series form 1998 to 2004 highlights an increasing trend for milk collection and a curb in dairy cows bred in Spain. This is likely due to two main reasons. First of all, the process of dairy farm size growth has led to an improvement in productivity of milk cows, so that the average milk production per cow is increased during the period concerned. Secondary, the restrictions in production enlargement of milk quotas has induced to abandon part of the cows bred in favour to an improvement of the milk yields. Although, the average milk production remains still lower with respect the other European milk producers. The process of restructuring should sustain the improvement of the competitiveness of the sector and further augmentations of the sector productivity.

Price stability

Notwithstanding the curb in intervention prices for butter and milk powder the internal milk price in Spain during the period 1998-2004 has been characterized by substantial stability. The reliance on intervention price of internal milk price is not so interconnected as in Ireland, because the dairy sector in Spain is composed by a large quota of milk use for producing cheese and drinking milk. In other words, the orientation towards high added value products has allowed to react at the variation in intervention price.

Furthermore, the stability of the milk price is also due to the effective barrier of entrance provided by the milk quota. In Spain, the accession to milk quota is almost difficult due to the low market price (not higher than 30 euro/tonne) and the small average size of dairy farms.

Regional specialization

The milk production is mainly concentrated in three regions than represent more than 50% of the national production. The territorial specialization can incentive the constitution of relationship among the firms along the food chain. In particular, the wide dairy farm fragmentation could be organized in cooperative in order to create return to scale in the phase of milk collecting, in the phase of transformation and in trading.

Production specialization of small dairy firms

During the last decade, the sector had been submitted to a relevant restructuring activity. Initially, the incentive to abandon the milk production has convinced many small farms without successors to withdraw. Furthermore, the curb in profitability due to an augmentation of the production cost has lead small farmer to exit from the sector. The remaining holdings have been capable to invest in improving their structure in such a way that they have obtained real reduction in production costs.

Positive environmental aspects

In consequence to a dairy sector texture represented by small farms, the method of farming management is not so intensive as in big farms. This is confirmed by the value of yields, that is quite low and by the land allocation, in great part cultivated with fodder crops. Such farming system has positive effects on the environment and on the use of natural resources. The low small dairy farm can add further multifunctional elements to the farm activity, like the envinromental control, the preservation of the family rural dimension with its contribution to the vitality of the rural areas and the preservation of the cultural heritage.

7.5.2 Weakness

Low cheese production

Eurostat data about the utilization of milk highlights that, in 2004, only 20% of the entire production of milk in Spain was dedicated to produce cheese. This low proportion of milk used for producing cheese explains in part the low average price of milk in Spain. Indeed, the internal price of milk is lower than in France and in Italy where the cheese production is much more important. The low farm dimension associated to low differentiation of milk products determine the sector fragility. The PMP models used to evaluate the impact of the CAP reform on dairy farms in Spain has shown a high sensibility of the dairy farms with less then 60 heads towards a reduction in milk price by 22%. Those farms abandon completely the milk production.

Withdrawing of big and not specialized farms

The analysis of the milk food chain in Spain describes a sector characterized by small farms that are going to improve their productivity and their own level of specialization. Inside the sector, there are also big farms not specialized in milk production that risk to withdraw without investments in the production structure.

Increase in milk import level

The substantial stability in production level associated with a curb in the number of dairy farmers risk to increase the level of the quantity of mil imported form Portugal and France. Those two external milk producer can become more competitive in relation with the reduction of intervention price on diary products. The Spanish sector is at the moment very dependent from the external market for milk: the internal demand cannot be satisfied by the own production.

The process of restructuring of the sector should reach a great level of competitiveness in order to face the European competition. In order to achieve this objective, it fundamental that a strategy defined by the Spanish government be oriented to develop the sector in order to obtain more quality dairy products and more efficiency inside the dairy farms. In this sense, it can be promote aggregation initiatives (i.e. cooperatives) among farms. Another important element that could sustain this actions is the new rural development measures that have to be oriented to the objectives previously indicated.

Work unit reduction

The impact analysis developed by using the PMP model demonstrates that the reduction in pricel level can seriously menace the dairy sector in the area most specialized of the country. The strong reduction in the level of milk production is observed for every farm classes of size. Such sector exits could produce effect at socio-economic level. Indeed, the renouncement to continue producing milk can affect the number of annual workers involved in the farm activity, both family workers and external workers.

7.5.3 Opportunities

Small farm revenue stability

The CAP reform can produce favourable effects for the dairy farms in term of gross margin. Actually, the results of the model portrays a situation very dramatic for the sector, but at the same time shows an economic farm situation that improves for all the farms considered in the sample. The substantial stability of the single payment unit associated with a reduction in production costs more intense than the value of GSP lead to general increase in the gross margin level. For those farms the decisions to abandon the dairy sector doesn’t mean a farm withdraw but a more likely new organization of the farm activity with a new production plan composition. It’s true that the single farm payment can be perceived by certain farms (those without successors and with old holders) like an annuity, but for the younger and more dynamic farms the single farm payment can be viewed like a sustain for new investments in the farms activity. Those financial efforts could be oriented to support the milk production or to diversify the farm activity (i.e. rural tourism). In a certain sense, the decoupling represents a factor for the farm economic sustainability.

Milk quotas distribution

The reduction in the number of holdings could permits to increase the production capacity in the more efficient farms, contributing to ameliorate the return of scale degree and, thus, the profitability of the sector.

Specialization improvement

The average milk yield recorded by Eurostat and presented in the section concerning the food chain is the expression of the low level of productivity of such farms and also it demonstrates that the investments are still not sufficient. The degree of specialization in this sector should be evaluated with respect to the efforts made by farmers in improving the performances of their farms. The statistical data says us that the process of farm restructuring is very slow but it is in progress. The natural exit of small farms without successors can contribute to improve the competitiveness of the sector, but the government should contribute by a national agrarian policy to sustain the increase in the degree of specialization of dairy farms. In this context, as we have already highlighted, the next rural development course will represent a advantageous opportunity to create the condition development of the dairy sector potentialities.

7.5.4 Threats

Keeping small dairy factory

The fragmentation of the sector is due to both several small dairy farms and the small dairy factories that produce cheese inside the three specialized Spanish regions (Galicia, Asturias and Cantabria). The small structure of dairy factories lead generally to some difficulties in saving in production costs and in trading the dairy products. Aggregations among dairy factories should be sustained in order to improve the competitiveness of the first transformation phase of milk. The small dimension of dairy factory engenders dependency with respect to the trader. In this case, the small dairy factories can only play a role of price takers without possibilities to influence the market.

Although the small dimension allows to keep the traditional methods of production that represent a component to define a typical product. Actually, the small dimension can help to maintain and continue the so-called “savoir-faire” of the person the work with the milk along several generations.

Environment management

One of the risk due to the augmentation of the farm size is a greater use of input by the farming system. Increasing in specialization degree means also a more intensive use of territory and its resources. In this sense, there is a particular risk to worsening the environmental. In this context, rules and measures have to defined in order to permit a sustainable development for such farms. Instruments of rural development able to restructuring the dairy farms and at the same time to protect the environment should be defined. A very important and effective instruments of rural development with relevant multifunctional contents has been applied in France. This instruments called farm territory contract (Contrat Territorial d’Exploitation) is a particular measure contained inside the French rural development plan. Is objective is to create the condition for investment in farm processes and at the same time responsabilize the farmers in order to take care of the environment. This kind of rural development tool could represent an effective tool for improving the environmental protection and at the same time the dairy sector competitiveness.

Production diversification

The dairy sector in Spain has many opportunities to develop but it is constrained by a low level of specialization of the dairy farms and by an production oriented to produce few product typologies. In particular, only 20% of the milk is dedicated to the production of cheese, the remaining is use to produce liquid milk. This situation has produced an important reliance of Spain towards the external market of Portugal and France. The Spanish dairy sector should increase the production in cheese and diversifying the production in more products. This can contribute to create value for the entire food chain.

8 Policy indications, recommendations and conclusions

8.1 Introduction

The objective of this deliverable is to assess some relevant food chain case studies in term of reactions and strategies towards the new CAP reform, with particular accent on the total subsidy decoupling mechanism. The food chains examined are 8: 3 in Italy (durum wheat in Tuscany, Milk for Parmigiano-Reggiano and Beef in Venetian region) and other 5 European cases (Soft wheat in France and UK, Rye in Germany and Milk in Spain and Ireland). The evaluation of each food chain is carried out adopting an integrated methodology based on a food chain analysis approach. Actually, the analysis has captured the reaction originating by the agricultural context, the farms, and the likely consequences in term of expectations, adaptations and strategies for the main agricultural product users (i.e. Consortium, Cooperatives, dairy factories, milling industries).
For the Italian food chains, the study was planned according to 4 different phases: 1) food chain analysis by product; 2) prediction of the likely productive reaction of farmers, estimation of the farm economic results and new labour organization; 3) focus groups with farmers in order to asses their knowledge about the CAP reform and their expectations in relation to the future of their farms; 4) synthesis of the general results obtained by applying the SWOT analysis approach.
Regards on the other European cases, the methodology was based on the evaluation of the agricultural production with respect to the scenario of mere application of decoupling scheme and a second scenario in which a variation in price market was considered. The results achieved was read according to the support of a description of the food chain concerned and the feedbacks received by the project partners, considered in this context as privileged observers of the food chain dynamics.
The results achieved have been investigated in relation to the strategies adopted by the different food chain operators. The attention is concentrated on the choices of farmers and how these choices can act on the behaviour of food chain stakeholders, but vice-versa also how the strategies of relevant food chain stakeholders would contribute to modify the strategy of farmers.
In the process of research of each food chain quantitative results were obtained but also strategic indications on the effect of decoupling and, more in general, on future food chain performances. From this indication, we can obtain policy indications on the decoupling effects on specific food chains and related regions. More specifically, we can distinguish between general policy indications and specific policy indications, one for each agricultural sector investigated.

8.2 General policy indications

8.2.1 Farm level

By the horizontal analysis of the food chain case studies, it is possible to observe two different situations with respect to the farm behaviour. In some cases, farmers agree with the strategy indicated by the models, but in other cases it exists a discrepancy between the model strategy and their future production plan. The reason of this two different situations is due to the fact that some farmers participate to economic and social networks and have the strategic support by the network in the process decision plan, while others farmers are alone and take their decisions on the basis of their own set of information.
It is clear for every farmer that nowadays they have to take decisions on their future strategies with the constraints of economic efficiency, quality management and technological innovation. The difference by the previous CAP concerns market price instability and related incertitude, and the relevant role of the quality.
From these considerations become crucial a technical economical information activity finalized to support farmers in the process of making decision system.
The activity of technical economical assistance, after many years, become crucial for two category of

farmers: the first category concerns those farmers who will continue their farm organization maintaining own production strategy but with a great attention to: market quality requirements, marketing innovation, marketing integration, economic efficiency. The second category of farmers concerns those farmers who will diversify changing their production orientation towards the production of new typologies of goods (i.e. energy crops) and services (i.e. rural tourism).

8.2.2 Food chain level

The food chain represents the reference market for many farmers and the distinction between the "organized food chain" and "non organized food chain" is crucial for the sustainability of the food chain and farmers too. The organization of food chain in respect to strategic, economic and marketing objectives represents the tools useful for guarantee sustainability to farmers and to provide them information related to marketing conditions, technical improvements and qualitative requirements. In other words, when the food chain is organized it is possible to better define a common strategy for all the chain stakeholders, reaching a better market efficiency.
In this perspective, it is important to sustain the process of integration inside the food chain, in order to constitute strategic network able to transfer the information along the various phases of the food chain in view to reach synergies that can improve the level of competitiveness of the agri-food system. This can obtained by renewing the professional representatives of food chain stakeholders with new skills oriented to create greater value for the chain products. It seems crucial that farmers reinforce the form of aggregation at the first phase of the chain, in order to improve the level of efficiency of the agricultural sector and to improve the relational interface with the trade market and food industry.

8.3 Specific policy indications

8.3.1 Cereal food chain

The most evident effect of decoupling is a reduction in the area dedicated to cereals. Only in the largest specialized farms, the return to scale level associated with a better organization of the farm inputs can permit a low reduction in the level of cereal production. In many farms, cereals (i.e. rye) are considered as a residual process with the specific function to enter in rotation with other main crops or used to cultivate marginal poor soils.
The main problems characterizing the food chain and, in particular cereal producers, concern the high costs of production that in some cases are difficult to reduce, the low market prices, more and more relied on world market, and the related incertitude in market. Those elements prevent small farms to produce in a profitable way the cereals. This is the reason why only bigger farms can concentrate own agricultural activity on this sector. Small farms that concentrate the activity on cereals have, generally, the objective to capture subsidies (mainly in part-time farms) or oriented to progressively abandon the agricultural activity.
It is evident that a process of rationalization should be promoted, in order to increase the average size of cereal specialized farms. This process is already in progress. The statistical data shows that the agricultural sector is characterized by a quick process of concentration. In other words, small farms withdraw in favour to an enlargement of the farm sector average size. The increasing of size in their sector is important in order to obtain sufficient return to scale to face the low market prices an their variability.
In this context, it is important to promote the diversification of farms with cereals, in the sense of different destinations of cereals and to add further economic alternatives to the farm activities. First of all, one of the most viable alternative is represented by the energy crops that can benefit of the public support in the framework of the energy strategy of the EU. Cereals can find in the energy chain a new outlet that can sustain the market prices.
Small farms producing cereals could produce new goods and services for the market, in such a way that they can continue the agricultural activity profiting of new economic alternatives (i.e. rural tourism in

marginal areas).
The quality is another important issue for the chain that should be considered for all the food chain stakeholder. Invest to improve the quality of the cereal means to face the competition coming from world markets, that can generally count on more favourable price condition. The quality of the raw material and the quality of the transformation process can improve the profitability of the sector with high value added product and, thus, favour the reinforcement of the entire food chain. This means also to create value also for the territory, when investment in such direction concerns a so-called localized food chain system. The entire area can profit from the value created by the specific agricultural product throughout a process of activation that involves other sector and, in general, the socio-economic environment.
To improve the quality of the cereals it is important to sustain farmers with technical suggestions and orientations. The promotion of quality inside the food chain should be executed by adopting a strategy of technical assistance for the entire food chain in order to develop the level of skills and knowledge inside the chain and with particular attention for the agricultural phase. The technical assistance can be originated by the local government and/or by the main commodity users (milling industry). The milling industry should reinforce the degree of integration with the agricultural phase, so that it can actively participate to the quality improvement efforts keeping, at the same time, the raw material provision.
The reinforcement of the quality can be promoted throughout collective or territorial brands. This strategy can be useful in the localized food chain, where the linkage with the commodity origin is very close. Example of such brands can be found in France with the so-called “label rouge” and in Tuscany in durum wheat food chain with the regional brand “Agriqualità”. These labels can be used only by the products produced following a certain regulation defined at the institution of the label and that guarantee the origin of the raw material and its characteristics.
The quality is surely a crucial element on which the entire food chain should to face in order to improve the level of competitiveness of the entire sector, but it is important as well the role of production costs and the level of integration inside the chain. The analysis conducted on the cereal food chain case studies have demonstrated that chain with high level of integration can reach a greater level of efficiency. While it is difficult to reduce production costs at farm level, it is still possible reduce costs in the other steps or phases of the chain. This is the reason why forms of aggregation among cereal producers should be developed. This producers organization should play an important role not only in the phase of professional representation but in relation to a greater concentration of the supply and in order to reduce the costs of interface between farms and milling industry. In this sense the example provided by UK in storage system promoted by farmers can represent a benchmark of the other cereal European food chains.

8.3.2 Milk food chain

The results obtained by the quantitative models permit to affirm that the milk food chain is one of the few food chains that can contribute to the effective sustainability of the agricultural sector, both for the large farms and for the small farms placed in lagging regions. In particular, the milk when it is transformed in quality cheeses can represent an engine of development for the marginal rural areas. Despite cereal productions, where it is crucial to own adequate return to scale and a high level of specialization to guarantee the survival of the farming system, milk production can guarantee a sufficient revenue also for small farms managed by family holdings.
However, decoupling associated to the likely reduction of milk prices could affect the level of profitability of the milk process and, thus, induce many dairy farms to abandon the sector, especially small producers of PDO/PGI cheese food chain. Indeed, the new payment on the milk quota can be perceived as a good premium for retiring from the milk production. This is the reason why the dairy sector should be supported for reinforcing the structure and degree of competitiveness. More specifically:

1) it is important to improve the quality of the typical products that demonstrated to be an important tool to develop rural areas in order to maintain the agricultural population on the territory. The new rural development plans should be oriented to improve the skills of dairy farmers in order to increase the quality of products and the marketing management.
2) Reinforce the degree of participation of farmers in associations finalized to create synergies in transforming milk and in product trading. Furthermore, it is crucial to renew the existing forms

of aggregation (i.e. cooperatives) in order to ameliorate the management autonomy and the linkage with the market.

3) Diversification should be sustained with particular reference to the small farms in marginal rural areas. In term of multifunctionality perspective, the maintenance of a texture of small dairy farms in such territory can produce positive effects in terms of rural area economic activation (rural vitality) and in term of environmental preservation.
4) The farm efficiency has to be improved by reducing the cost of production, mainly in those farms producing milk for industrial transformation. In such case, it is important to encourage investments in new technology capable to reduce the farming system costs and the work effort required. A better level of efficiency can be reached by the support of technical assistance provided by dairy sector experts in order to improve the human skills inside the farms and to lead the farm decision process towards the real market demand.
5) Reinforce the form of organization among food chain stakeholders with particular reference to the process of interface between the different phases of the chain. In this context, it is likely needed a process of cultural change, in the sense of greater efforts in increasing the level of knowledge and attention with respect to the market dynamics.

8.3.3 Beef food chain

Beef food chain in Venetian region represents an example of high-specialized food chain, where the different operators along the chain are involved in very specific activities. In particular, the breeding phase is spread among the phase of veal growth, generally carried out by specialized breeding in France, and the phase of fattening carried out in Venetian region. When calves have reached the target weight, they are transferred to the slaughterhouse industry. Slaughterhouses are very concentrated, characterized by huge dimension and directly interfaced with breading and distribution phase.

The high degree of specialization corresponds to a high level of integration among the different food chain stakeholders. The average large size of breeding favours processes of aggregation among farmers, with the objective of concentrating the production and/or integrating some important transformation phases. The entire process system is based on the efficiency tendency, both on breeding phase and in subsequent transformation phases.

Despite the high efficiency of the beef sector in Venetian region, the results of the models have showed that such breading is relied on coupled payments and on the market price stability. The decoupling associated with a curb in beef price should induce many farms, mainly the smallest ones, to abandon the beef breeding activity. In order to preserve the sector and create conditions for better economic performances for farms involved in, some strategies can be adopted:

1) The beef oriented farms should invest in quality and quality systems, in order to increase the added value of the meat. The farming system that generally characterizes such farms is based on the minimization of the cost of production. This means that also in the feeding phase, less expensive and more effective in term of calves weight growing (i.e. cereal silage) methods are adopted, but such methods are not always able to respond to a demand requiring a high quality of the meat in term of nutritional properties and sensorial characteristics. Breading more extensive and adopting a feeding method much more traditional can reach group of consumers interested in a product with higher value added. In this sense, the small breeding much more subjected to price volatility and subsidy system could have greater economic advantages. To do that, it is important to develop a system of information towards consumers, able to communicate the characteristics of the meat, both in term of breading technique and about the territorial origin of beef. Collective or food chain brands promoted by group of beef producers could be create a differentiation and recognition property to the product.
2) The dependence to the Venetian beef sector on the French veal breeding creates incertitude about the available quantity and prices. The high dependency on the French veal supply induce the beef producers to be in a position of price taker: the price of the so-called “brutards” is defined on the French market. At the same time, the incertitude on the level of quantity available on the French market leads the national operator to do risky previsions on the veal provision. In order to overcome this kind of dependency, it could be developed a stalls national production. In this sense, the strategy oriented toward the national production of veal to fat should be promoted by the producers

associations.

3) A challenge that the meat oriented farms will have to face in the future concerns the greater attention of the EU with respect to a the animal welfare condition in breading and the environmental preservation. For the high intensive breading of Venetian region these issues can represent a difficult in term of farm management costs. For this reason, the process of adaptation should be sustained by adequate sustains deriving from the new rural development plan. The farm public support is mainly important for such farms characterized by small dimension and localized in marginal areas.
4) The estimated strong reduction on beef livestock in small farms hides difficulties in the process of diversification towards agricultural activities. Actually, the high specialization corresponds to a farm activity based on the beef breading and where the land is almost completely dedicated to fodder crops to use in the feeding breeding process. The rural development plan should consider to support farms that intend to diversify own specialized production, in such a way to obtain greater economic and environmental performances.

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ANNEX

ANNEX I - Identification of specific case study areas

Introduction

The organization of the work package 4 foreseen an analysis on some food chain considered relevant with respect to the evaluation of the new CAP reform impact. In order to respond to the issue concerning the evaluation of the farm behaviour at family labour and production level, some specific case studies have been identified within the country territories of the WP4's partners.
The case studies are defined around two different levels of analysis:

- the first concerns a detailed analysis of three Italian supply chains and their respective agricultural firms along the chain. This level will be carried out entirely by the research team of the Parma unit.
- The second involves an overview analysis of case studies in each of the partner countries. In this case, the analysis will focus on the structure of the food chain describing the role of each economic actor involved in the sector. This level will be carried out by partner country units with the support of Parma team.

Identification of suitable food chains regarding products and geographical area is essential, as this is what gives the opportunity for exchange and comparison of results between partners. Case studies need to be selected geographically so that they are relevant to the issues and are neither too wide nor too narrow.
As the socio-economic analysis will be supported by a quantitative evaluation by using mathematical programming model, the case studies will collect not only information about the food chain system for the various product or family of products, but also some detailed data about the farms composing each food chain. This last information will be keep from the Farm Account Data Network (FADN) available for each country. The farm selected within the FADN database should be representative of the structure of the farms (by dimension, by structure of the work and by production choices).
The following case studies are suggested:

- in Italy
  - hard grain wheat in Tuscany;
  - milk for Parmigiano Reggiano cheese in Emilia-Romagna;
  - Beef in Veneto.

- partner countries
  - Spain – Milk;
  - Germany – Rye;
  - France – Soft wheat;
  - England – Soft wheat;
  - Ireland – Milk.

The following pages present some details about the case studies analysis to be carry out in the framework of the work package 4.

CASE STUDY 1

Partner: University of Firenze (Parma Unit)

Case study: Durum Wheat food-chain in Tuscany (Italy)

Area of interest: Tuscany region.

Source of information: Census, official statistics, FADN, literature, stakeholders consultation

Brief description of the food chain:
The Italian hard wheat production is historically located in the Southern regions, especially Puglia and Sicily. In the past the location of the milling industry has been influenced by the geographical distribution of the raw material. In the last years however the technological progress in the logistic and storage sectors together with the increasing possibilities of gaining access to the international markets and the diversification of the quality standards demanded by the second processing industries enabled the setting up of some important hard wheat mills even in the Centre and Northern regions, as in the case of Tuscany.
The hard wheat supply chain is characterised by a high degree of complexity due to the several contact points with the soft wheat supply chain in the upstream phases (farm inputs supply, farming, stocking and trading). On the contrary, the two supply chains tend to split up in the downstream phases, as the first processing step (milling process) takes place in different and highly specialised industries. Furthermore the final destinations of the processed products differ form each other, as the hard wheat is destined to produce pasta whereas the soft wheat is destined to produce bread and other bakery products.
Tuscany holds a rather marginal position within the national hard wheat sector, although the cultivation of the hard wheat is rather widespread within the region as a high number of farms, especially in the internal hilly areas, find it economically profitable, thanks to the specific EU payments. As a matter of fact the hard wheat cultivation is only a recent practice in the region, whereas the traditional main human food crop has always been the soft wheat.

Expected outputs:
1. Deep overview of the durum wheat food chain with particular accent to the responses provided by sector stakeholders.
2. Structural and production data about a representative group of farms engaged in the foodchain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 2

Partner: University of Parma (Parma Unit)

Case study: Milk for Parmigiano-Reggiano production (Italy)

Area of interest: Parmigiano-Reggiano production area (Parma, Reggio-Emilia, Modena, Bologna, Mantova).

Source of information: Census, official statistics, FADN, literature, stakeholders consultation

Brief description of the foodchain:
The origin of milk for the production of Parmigiano-Reggiano covers the provinces of Parma, Reggio Emilia, Modena and part of Bologna and Mantova; the first four province are in Emilia Romagna, while Mantova is in Lombardy. The link between the production zone of Parmigiano Reggiano and the source of raw material is very strong in Emilia Romagna: about 75% of the milk produced int he region is processed into Parmigiano-Reggiano.
The milk produced in Emilia Romagna comes from many small (less than 20 hectares) family farms, many of them found in localised in the disadvantaged hill and mountain areas: 43% of total amount of cows is in this area. Recent studies pointed out remarkable processes of reorganisation, with a progressive concentration of cows in the largest farms especially in plain areas.
The farms that produce milk are closely linked to the cheese dairies. This is evident from the large amount of milk producers cooperatives (80% of the total). This link between cattle breeding farm and cheese dairy is one of the most particular aspects of the productive food chain and has both advantages and disadvantages.

Expected outputs:
1. Deep overview of the milk-parmesan food chain with particular accent to the responses provided by sector stakeholders.
2. Structural and production data about a representative group of farms engaged in the foodchain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 3

Partner: University of Parma (Parma Unit)

Case study: Beef food chain in Veneto (Italy)

Area of interest: Veneto region

Source of information: Census, official statistics, FADN, literature, stakeholders consultation

Brief description of the food chain:
In the Italian agribusiness, the beef chain has an important role, representing of the final output of agricultural sector and 6% of the final output of the food industry. According to the 2003 report published by ISMEA (Italian Institute of Services for the Agri-food market), on a first analysis, the production and distribution phase involves a considerable number of operators, working in approximately 90,000 farms, in over 2,000 slaughters-houses, and, with reference to tradition retail business, in over 40,000 butcher shops. From the data gathered in the General Agricultural Census (ISTAT, 2001), it emerges that the average dimension of beef in Italy are approximately 35 heads/farm.
Over the last 10 years (from 1990 census data to 2000), the average size of cattle farms have been increased by 48%. This is chiefly due to the disappearance of the small farms, rather than to an enlarging of the existing ones. In fact, it has been calculated that, in the decade from 1990 to 2000, about 460,000 farms closed while, in the same period, the domestic cattle livestock dropped to over 1.6 million head (equivalent to 21% of the national total). Moreover, the sight fragmentation of Italian farms is revealed by the fact that the larger farms (with more than 100 head), representing only 6% of the total number of cattle breeding farms, posses more than half of the entire Italian cattle livestock. The Census shows that Italian farms are structurally behind Germany (42 heads/farm), France (47 heads/farm) and UK (65 heads/farm). A more in-depth analysis, however, reveals this situation to be typical of southern an central Italy, while in the north the figures show a trend in line with the other European countries (47 heads/farm).

Expected outputs:
1. Deep overview of the Veneto beef food chain with particular accent to the responses provided by sector stakeholders.
2. Structural and production data about a representative group of farms engaged in the foodchain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 4

Partner: Universidad de Madrid

Case study: Milk production in Spain

Area of interest: Spanish regions

Source of information: Census, official statistics, literature, FADN.

Brief description of the food chain:
The highest concentration of milk production in Spain occurs in Asturias, which accounts for 54% of national milk sales. Per capita consumption of liquid milk in Spain is estimated to be 113 litres, of which 86% is consumed in the home. In 2002, Spain produced 178,910 tonnes of cheese. It is estimated that Spain has a per capita consumption of 6 kg of cheese.
The dairy industry had grown rapidly. Milk production from cows, sheep, and goats, which had stood at 5.4 million tons in 1974, reached 6.4 million tons in 1986--well over double the production level of the early 1960s. The bulk of milk products came from Galicia, Asturias, and Santander. In 1982 the government launched a program designed to modernize milk production, to improve its quality, and to concentrate it in the northern provinces. The dairy industry was not seriously hurt by Spain's entry into the EC, although the 3 percent quota reduction for each of the years 1987 and 1988 and the 5.5 percent voluntary cutback hampered development.

Expected outputs:

1. Overview of the milk food chain with particular accent on the organisation of the farms with respect to the production plan, return of scale, internal and external labour.
2. Structural and production data about a representative group of farms engaged in the food chain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 5

Partner: FAL

Case study: Rye sector in Germany

Area of interest: German regions

Source of information: Census, official statistics, literature, FADN.

Brief description of the food chain:
Rye once was a primary food and feed source in Germany, however, utilization has been decreasing since the early 1960's. Non-feed consumption (which includes use in food, seed, industrial and waste) decreased 60 percent over the last thirty years. Feed use dropped 24 percent.
Although rye is inferior in many ways to the predominant cereal crops such as wheat, rice, and maize, rye remains the third most important crop in Germany. Planting rye has significant advantages over other crops. It is considerably more winter hardy than wheat and produces economical yields on poor sandy soils where no other useful crop can grow. It is grown in many areas that have no alternative and is a good rotational crop because of its ability to compete effectively with weeds. Rye used as livestock feed has a low feed value compared to other feed grains and is mixed only in small proportions in feed. On occasion, the international market price of rye, generally below milling wheat prices, makes it an attractive feed grain despite its low feed value.
Germany produces an average 4.5 million tons a year with an average yield of 5.5 tons per hectare. The area for rye has been on an increasing trend over the past ten years from a three-year average 0.66 million to a three-year average 0.81 million hectares, with a record area of 0.94 million hectares in 1998. Yield trend has been increasing in the past decade with a record yield in 2001 (6.13 tons per hectare). For 2002, Germany produced 4.5 million tons of rye.

Expected outputs:
1. Overview of the rye chain with particular accent on the organisation of the farms with respect to the production plan, return of scale, internal and external labour.
2. Structural and production data about a representative group of farms engaged in the food chain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 6

Partner: University of Reading

Case study: Wheat sector in UK

Area of interest: UK's regions

Source of information: Census, official statistics, literature, FADN.

Brief description of the food chain:

Over 80% of the total UK cereals area is in England. A further 15% is found in Scotland with negligible amounts in Wales and Northern Ireland. Correspondingly, cereals are an important sector in economic terms in England and Scotland only, with cereals output accounting for around 16% of total gross agricultural output in each country.

As with other agricultural commodities, cereals production is concentrated on a relatively small number of farms. Taking those farms classified as 'cereals' farms, around a third of cereals output is produced on only 10% of holdings. Similarly, a quarter of cereals farms account for only 5% of cereals output.

Cereal farming is predominantly found in the Eastern counties of England, with around a quarter of all farms classified as 'cereals' found in just four counties – Lincolnshire, Essex, Cambridgeshire and Suffolk.

Half of all the area sown to cereals is to be found on specialist 'cereals' type farms, with a further 25% found on general cropping farms. A significant proportion of cereals are also found on mixed farms. The total cereals area in England fell by over 10% between 1997 and 1999, reflecting the increase in set-aside rates from 5% to 10% and a large switch into linseed production. Similar reductions in cereals areas were seen on almost all individual farm types.

The age structure of full-time cereal farmers in England is very similar to the structure found across the average of all farm types, with around a quarter of farmers aged 60 and over.

Expected outputs:

1. Overview of the wheat food chain with particular accent on the organisation of the farms with respect to the production plan, return of scale, internal and external labour.
2. Structural and production data about a representative group of farms engaged in the food chain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 7

Partner: INRA-UMR Grignon

Case study: Wheat sector in France

Area of interest: French regions

Source of information: Census, official statistics, literature, FADN.

Brief description of the food chain:
France is a major player in world grain production, and the major crops are wheat, durum, barley and corn. The agricultural sector provides employment for about 2 million people but the number of people directly involved in farming has been in steady decline in recent decades.
France has about 30 million hectares (Mha) of agricultural land suitable for growing field crops and forages, and raising livestock. Agricultural production is concentrated in the northern and western regions which have the largest and most productive farms. Except for certain oilseeds and protein meals, France is essentially self-sufficient in cereals and oilseeds.
France's average farm size is 42 ha, which is more than twice the size of average farm holdings in the EU. About 10% of France's farms are more than 100 ha and account for over 40% of France's total farm holdings.
In France, the amount of land seeded to cereal crops has increased marginally over the past couple of decades and now averages 9 Mha. Seeded area for oilseeds and other protein crops, on the other hand, has increased tenfold during the same period and is now estimated at 2.5 Mha.
France grows primarily soft winter wheat, of which about 20% is used for milling. The wheat milling industry accounts for about 4%, or 5G, of France's 130G food processing sector. The single largest market for French export flour is other EU countries, accounting for 250,000 t, or about 20%, of total exports. The other major export markets for French flour are Cuba, Sudan, and Mauritania, accounting for about 11% of total exports.
A concern for the milling industry is the recent slump in flour exports. Some of the traditional importers such as Egypt and Yemen have built milling facilities and now import grain instead of flour. In response to reduced exports, the domestic milling industry has reduced capacity by about 1.5 million tonnes (Mt) since 2001.
The animal feed processing sector has grown steadily since the Common Agricultural Policy (CAP) reform of 1992. As a result of lower grain prices, in part due to CAP reform, the feed processing sector is now valued at about 10G annually. The Syndicat national des Industriels de la nutrition Animale (SNIA) reports that there are about 350 feed enterprises in France, producing about 21.0 Mt of animal feed annually. Of the cereals used in animal feed rations, wheat is the main ingredient at 28%, followed by corn at 16%. SNIA further reports that 42% of the feed produced is used for poultry, 30% for hogs, and 19% for cattle.

Expected outputs:

1. Overview of the wheat food chain with particular accent on the organisation of the farms with respect to the production plan, return of scale, internal and external labour.
2. Structural and production data about a representative group of farms engaged in the food chain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

CASE STUDY 8

Partner: TEAGASC, Dublin

Case study: Dairy sector in Ireland

Area of interest: Irish region

Source of information: Census, official statistics, literature, FADN.

Brief description of the food chain:
The Irish dairy industry is a very important sector of the Irish economy. It is the single largest contributor to gross agricultural output, over 30 percent in 2003. Ireland has a long tradition and success as a major producer and exporter of quality dairy products. There are approximately 25,000 dairy farmers and the total amount of milk processed is 5.6 billon litres. The processing sector employs 9,000 people. The industry has a total output of €2.9bn. With a large dairy industry relative to domestic population, Ireland exports a much greater proportion of its dairy output that any other EU country, approximately 75% of product was exported in 2003. Six companies process 80% of the milk pool (top 3 process approximately 55% of the milk pool). Kerrygold is a top international food brand.
Ireland has a total land area of just over 7 million hectares. Agriculture utilises approximately 4.4 million hectares. Almost 90 percent of Irish farmland is under grassland and rough grazing. In 2003 the gross value added in the agricultural sector accounted for approximately 2.2% of national gross domestic product compared to over 8% in 1990. While agriculture accounted for approximately 6 percent of total employment in Ireland in 2004. The national milk quota is approximately 6 billion litres of milk supplied by the national herd of dairy cows of 1,176,000 head of animals. Within the agricultural sector, dairy products account for approximately 30 percent of the €4,800 million worth of output in 2003. The evolving value of dairy products is displayed in Figure 1 below, although the variation is quite low due to the constraints of milk quota.
There are two main dairying regions in the Ireland, the south-west and the north-east (which extends into parts of Northern Ireland). The south-west dairying region includes north and east Kerry, almost all of Cork and Limerick and substantial parts of Tipperary, Waterford and Kilkenny, as well as south-east Clare. Almost 70% of the dairy herd is located in the South-West, Mid-West and South-East regions. While both the main dairying regions are important, there are substantial differences between them in terms of scale and intensity of production with dairy farms in the south-west being the larger and more intensive producers (Lafferty et al, 1999).

Expected outputs:

1. Overview of the milk food chain with particular accent on the organisation of the farms with respect to the production plan, return of scale, internal and external labour.
2. Structural and production data about a representative group of farms engaged in the food chain, in order to assess their behaviour with respect to the new CAP reform through a mathematical programming model (PMP model).

ANNEX II – The durum wheat supply chain analysis

II.1 Mapping of durum wheat supply chain in Tuscany

With respect to the supply chain structure the following groups of stakeholders, corresponding to different levels of the *durum* wheat supply chain, can be identified:

- the cultivation phase, where the analysis considers the durum wheat producers;
- the upstream phase of the supply chain, in particular the mechanisation service firms, the storage and services provision, the first trading phase (marketing or commercialization) as well as farmers' cooperatives and producers' associations;
- the upstream phase of seed industry;
- the processing phase of milling industry;
- the processing phase of pasta industry.

In Grosseto data have been collected through a focus-group discussion in which were involved all the farmers. Among the farms identified in Grosseto province only two are located in the flat areas whereas the other six are located in the hilly areas.

Farms are classified according to their productive choice and behaviour after one year of decoupling implementation.

Farms A – Moving from durum wheat cultivation to produce nothing or exit farming

- A1 This farm located near Grosseto is managed by a teacher. He decides to not sow durum wheat because of weather conditions and the low market price of wheat. He explained that this decoupled context is good for him, because he is a teacher and then he has a salary, anyway. He also told that it is necessary to diversify incomes and he is satisfied of his condition. Of course, for these claims he was criticized by the others farmers, who have only farm as only income.
- A2 A farm located in Scansano, which has an extension of 45 hectares, characterized by the main course in wine-producing and the second one in cereal production. 35 hectares are dedicated to sowable crops, while 8 hectares are planted with vines Morellino of Scansano. This is the second year in which the farmer does not produce durum wheat, because of CAP reform, the low market price and the high costs for production. The farmer only sow meadow grass.
- A3 This farm is located in Alberese and it has an extension of 25 hectares and the farmer runs also a farm holidays. Production organization includes cultivation of cereals, corn, vegetables, in addition to olive growing (1,5 hectares) and wine growing. In 2005 they did not sow durum wheat.

Farms B – Reducing the durum wheat cultivation while diversifying the on farm activities

- B1 This is a farm with 35 hectares of extension located in Castel del Piano, an hilly area in the Grosseto province. Until few years ago the farmer produced durum wheat, but now his income comes from cattle livestock, wine and olive growing. on the sowable ground the farmer sow now meadow grass of sainfoin and alfalfa.
- B2 This farm is situated in Roccastrada, and it is composed by 25 hectares of sowable ground and olive growing. In 2005 the farmer decided to sow only 1,5 hectares of durum wheat, just because of a little pig and chicken farm. The remain hectares are sow with *Vicia faba minor*.
- B3 This farm is located near Grosseto and it is composed by 16 hectares in property and 10 hectares in rent. The main course of this farm is sheep breeding: for this reason the farmer decides to not produce durum wheat anymore and to increase number of sheeps. Then, the farmer sow more forages for sheeps.

Farms C – Keeping the durum wheat cultivation

- C1 This farm is located in Montenero d'Orcia and it has an extension of 70 hectares The young farmer who manages the farm produces cereals, wine and olive oil and he has also a cattle livestock.

In 1996 he transformed the farm, devoting investments and energies to quality productions: wine, olive oil and he joined Agriquality label. This farmer have decided to not change the production organization because of the livestock: he needs forage and straw for bovines. In 2005 the farmer sowed 35 hectares with forages and cereals, durum wheat and barley in the other fields.

- C2 This farm, in which the father and the young son work together, is located in Alberese. It is composed by 20 hectares of sowable ground in property and 50 hectares in rent for 15 years. The farmers grow up tomato, sunflower and durum wheat. They plant also olive and wine and wine growing. They decide to produce durum wheat in 2005 because they think and hope something is going to change after MTR, provided in 2007.
- C3 This is an organic farm in Peccioli, a hilly area in Pisa province characterized by clayey lands. The farm is composed by three distinct farms, managed respectively by the elderly father and two young sons, but from a practical point of view, the farm can be considered only one. The farm has an extension of 270 hectares of sowable ground, of which 60 hectares are tilled with durum wheat in 2005 (in 2004, they cultivate 40 hectares with durum wheat). In addition to durum wheat, they crop also spelt, barley and soft wheat. Of course, they make crops rotation and they have most of fields as meadowland. The farm has its own machineries fleet, but they have not livestock and for this reason they do not make any fertilization. They supply the durum wheat production to a processing cooperative in the Marche Region, named "*La Terra e il Cielo*", which they are also member. Starting from the last year, they started to cultivate soft wheat, because they would like to build up a short bread supply chain and to sell bread directly on farm. According to the owner, the MTR has not changed anything, because they adopt organic farming and because the processing cooperative continues to buy their durum wheat.
- C4 This farm is the first of two farms located in Santa Luce, a hilly area of the province characterized by clayey ground. Both of them are managed by the old father and one young son. The farm is characterized by the typical size and production organization of this area: the farm is 25 hectares of sowable ground, of which 18 hectares are addressed to the durum wheat production. The farmers adopt crops rotation, even before the CAP reform: they alternate durum wheat with meadowland of alfalfa, *Hedysarum coronarium*, *trifolium*, *Vicia faba minor*. They are members of the producers' cooperative of the area "*Cooperativa Produttori Agricoli di Pieve di Santa Luce*". They have their own machineries fleet. They have diversified production: in fact, they produce also olive oil, wine and honey. They supply the durum wheat directly to the cooperative. The production organization based on crops rotation has penalized this farm because in the reference period 2000-2002 a great part of the soil was not cropped with durum wheat.
- C5 This is the second farm located in Santa Luce. It is bigger than the medium size of the other farms in the same area, as it is 80 hectares of sowable ground, of which 45 hectares of durum wheat. The production organization is characterized by crops rotation: meadowland of Hedysarum coronarium, sainfoin, oats in the first year and durum wheat in the following two years. For the first year, they start to crop a small field of soft wheat. Last year they became partner of the "Cooperativa Produttori Agricola di Pieve di Santa Luce" and now they supply their durum wheat production there. They have their own machineries fleet. They do not change the production organization and they continue to crop durum wheat.
- C6 A farm located in Volterra, a hilly area of the province. This farm is composed by 51 hectares of sowable ground, of which 34 hectares tilled with durum wheat. The farm is managed by a young farmer, who practices low inputs farming. This kind of agriculture is supported by the premium of the measure 6.2 of Rural Development Scheme of Tuscany Region. In this case the premium is still coupled to the production, at least until 2006. The farmer adopts crops rotation, by alternating durum wheat with Vicia faba minor. This farm has its own car fleet. and the farmer sells durum wheat production to private traders. The MTR does not change anything for this farm, because he adopts integrated farming, but it has brought to a reduction of mechanisation rent service activity.
- C7 This farm is located in Coltano, a flat area close to Pisa characterized by a good texture of the soil. The farm is located within the Natural Park of San Rossore-Massaciuccoli and it is composed by 300 hectares of sowable ground, managed by a conventional production organization: the durum wheat (160 hectares) is alternated with pea, Hedysarum coronarium, oats. The farm has its own machineries fleet and also its own grain storage; the farmer sells durum wheat production directly to

milling industry and to the producers' cooperative of Pisa, as well as to private traders. The production organization based on crops rotation has penalized this farm because in the three-year reference period 2000-2002 a great part of the soil was not cropped with durum wheat, but any way this farmer does not change the production organization.

II.2 The upstream phase

Considering the upstream phase, the mechanisation service industry is the most penalized sector of the durum wheat supply chain. Interviews have been done to an association of mechanisation service firms in Pisa (FRIMAT), to a farmers' cooperative in Coltano (Le Rene), to an agricultural machinery firm (F1) and to a farmer who works also in the mechanisation service as his second activity (F2).

- The mechanisation service firms association is the AEMA (Agricultural Machinery Traders Association): it is partner of FRIMAT (Regional Federation of Agricultural Mechanisation firms of Tuscany) and of UNIMA (national Union of Agricultural Machinery Farms). This association is really critical towards MTR because many partners stopped mechanization service activity, carrying on agricultural activity, if they have also a farm. Association's suggestion is to find alternatives, for example in biogas and biodiesel production.
- (COOPERATIVE C2) The farmers' cooperative offer mechanization service to the partners. They do not have any changes, they are continuing to work for the closer farms.
- F1 The agricultural machinery firm interviewed is located in province of Pisa. The owner does not change anything despite the MTR.
- F2 The young farmer who works in Volterra has also a second job: he practices also mechanisation services, but this last activity has been reduced because of the MTR.

The storage, the services provision and the first trading phase (marketing or commercialization) are activities usually carry on by farmers' cooperatives or producers' associations. Situations that interviews show are really dissimilar between each others because sometimes cooperatives and associations have not alternatives to propose to their partners.
In province of Pisa three farmers' cooperatives have been chosen:

- (COOPERATIVE C1) the provincial farmers' cooperative, which provides storage service and services provision, in addition to the organization of the first trading phase. The cooperative has six storage centres, where it provides for storage differentiation of durum wheat on the quality basis, separating wheats with different proteins percentage. Within the cooperative there are employees who deal in different activities: traders, agronomists, and so on. So, the cooperative offer several advisory services and inputs supply to the partners. They do not think that the total decoupling will bring to a reduction of durum wheat production in the area because they continue to supply this production to milling and pasta firms. The quality of durum wheat produced in this area is high and any way, the total decoupling could hold the potential to bring to higher prices paid to producers thanks to the lower availability and a higher quality of the product.
- (COOPERATIVE C2) An organic farmers' cooperative in Coltano, which is inside the Natural Park of San Rossore-Massaciuccoli. It is characterized by 500 hectares of sowable ground, used for seeds breeding of cereals and forage and 220-240 hectares of forest. They have a storage centre within the farm and offer mechanization services. They supply other farmers' cooperatives and farmers' associations most of all, but also individual farmers. They do not change a lot the production organization, any way they increase forage production.
- (COOPERATIVE C3) A farmers' cooperative in Santa Luce, which is the landowner of the fields that are cropped by partners. The size of the cooperative is 380 hectares of sowable ground, which 240 hectares are used for seeds breeding of durum wheat. They have also others fields planted with vines and olives. Among sowable crops, besides durum wheat and oats, they grow Vicia faba minor, pea and forage, productions which will probably increase after total decoupling. Every partners are

employed in the cooperative and they earn a salary. The MTR does not produce great changes in the production organization of the cooperative because they consider that there are not alternative crops suitable in this area.

In province of Grosseto the cooperatives are:

- (COOPERATIVE C4) a farmers' cooperative in Scansano, a hilly area of the province. Since last year they have increased services to its partners, diversifying a marketing activity: they manage a supermarket. Cooperative' partners are 150 farms. The cooperative provides several services to partners: storage (separating wheats with different proteins percentage), technical advisory and inputs supply (fertilizers, seeds, plant protection products), first trading phase. The MTR and the total decoupling have caused a reduction of 20% of durum wheat production in this area: part of these fields has been abandoned because of farmers' old age, while there is an increase in crops rotation also because of cattle stations and sheep farms. They have optimistic view of durum wheat supply chain in Tuscany because of the good quality of their durum wheat. They think that the MTR has to be best defined, but they consider look at the quality premium as an incentive to grow higher quality durum wheat.
- (COOPERATIVE C5) A farmers' cooperative in Cinigiano. It is a cooperative which offers services to partners, but it is not landowner. They provide to the partners inputs supply (fertilizers, manures), mechanization service, storage of cereals and oil. The farms partners are 450, characterized by different sizes, from 5-6 hectares to 100 hectares, with a medium size of 18-20 hectares. Some farms partners of this cooperative are located in the hilly part of this area and practice stock rearing, while others are placed in the flat part of this area and their prevalent activity is the cereals growing, expecially durum wheat production. The MTR have radically changed the situation in this area: before total decoupling every farmers growed durum wheat without crops roration, after Reform many farmers have chosen not to till because of the old age or because the farm represent only a part-time activity.
- (COOPERATIVE C6) This farmers' cooperative is located in Braccagni, which is a flat area of the province. It numbers 230 farms partners characterized by a medium size of 10-12 hectares. It is a cooperative which provide every services to the farms partners and not partners: mechanization service, first trading phase, inputs supply, storage of sowable crops, technical advisory. The MTR have radically changed the situation in this part of the province: before total decoupling every farmers growed durum wheat without crops roration, now they continue to produce durum wheat, but they alternate it with other crops. There is not the drop out of farmers, despite the old age because people are really binded to land.
- (COOPERATIVE C7) The provincial farmers' cooperative, which provides services provision to partners, that are 2.500, but also to others farms: the cooperative supplies services to 10.000 farms, totally. The cooperative supplies inputs like seeds, fertilizers, plant protection products, machineries, and so on, but also insurance advisor, products return, technical services. The cooperative is seed industry owner and in 2005 it gets half the production of durum wheat compared to 2003. After MTR, selling of soft wheat and barley have increased, while production of durum wheat have reduced. Production of forage too is increased. Generally a reduction in each supplying sector has been occurred, for this reason they are carrying out a diversification in the services supplied: garden service, irrigation service, service supply to nursery industry and so on.

An other step of the upstream phase is the seed industry which supplies seeds to farms and farmers' cooperatives and associations. This sector too has been really penalized by MTR.

- (SEED FIRM S1) A seed industry in province of Grosseto which supply seeds to a great part of that area, has reduced the selling of durum wheat in 2005 and they have 90.000 quintals of seed overproduction. They report disorientation among partners, who have decided to reduce productions.
- (SEED FIRM S2) An other seed industry in province of Livorno, which sorts and supplies cereals seeds, most of all durum wheat seeds, to farms in province of Pisa, Livorno, Grosseto. This industry has drew up a supply chain contract with one of the most important Italian pasta industries, Barilla. In this way they have no problems in supplying production, despite MTR.

II.3 The milling and pasta industry

The processing phase is characterized by milling and pasta industry. Milling industries in Tuscany supply flour to pasta industries in Tuscany and to big industries in the North of Italy (Barilla, Agnesi, Fini). Besides, all of them take part in a supply chain agreement for the production of a particular quality brand of Tuscany, “Agriquality”. Some of them (Maionchi and GMI) mill also soft wheat for bread production.

Characteristics	MILLING FIRM M1	MILLING FIRM M2	MILLING FIRM M3
Production	Durum wheat	Durum and soft wheat	Durum and soft wheat
Import from foreign countries	X	X	X

Industries interviewed are located in province of Pisa, Livorno, Lucca and Florence, and they have different characteristics between each others.

- (MILLING FIRM M1) A milling industry in province of Florence, which uses to mill only durum wheat. They supply flour to pasta industries in Tuscany and in the North of Italy. They have diversified production milling also organic cereals and, as we explained above, they are part of Agriquality, but to sell this product they have drew up a purchasing contract with a retailing chain. They are carrying on in purchasing a great part durum wheat in Tuscany, despite production reduction because of MTR, in addition to the part purchase from Canada.
- (MILLING FIRM M2) A milling industry in province of Lucca which used to mill soft wheat and which since few years has been change for milling durum wheat. It is a small milling industry which mills durum wheat that comes from Tuscany and Lazio. They supply flour to pasta industries in Tuscany and to big industries in the North of Italy. They notice a decline in the durum wheat quality, but despite the MTR they have not change anything in the production organization yet.
- (MILLING FIRM M3) A big milling industry which has five plants in Italy, which one is located in Livorno. This industry mills 1.300.000 ton of wheat, which 30% is durum wheat. They purchase durum wheat from Tuscany, Umbria, Marche in Italy and from Canada, Spain, Greece and Eastern European countries. The MTR does not change anything in industry organization, even if they are going to buy greater quantity of durum wheat from foreign countries if the national production will reduce again.
- (PASTA INDUSTRY P1) A pasta industry in province of Lucca which is characterized by two plants and has in pasta production its main activity, a 25% commercialized with industry brand and the remaining 75% is for other industries. This industry produces 200 different kinds of pasta. The industry purchases the durum wheat flour directly from three milling industries in Tuscany (the three above described) and supplies its products in Italy and abroad in retailing shops, while it produce pasta for other big industries in Italy and for big retailers in foreign countries. Also this industry produces pasta for Agriquality brand, but it is done for an other industry. Until now the MTR has not any effect on production organization, but they are going to reduce durum wheat pasta production, diversifying production in organic pasta, brown pasta and dietary products.
- (PASTA INDUSTRY P2) A small pasta industry which produce high quality pasta for niche. This industry has a limited manufacturing capacity, that are 3.000 quintals per year and it supply only small retailers. They purchase durum wheat flour only from a closer milling industry. Relationships with the milling industry as well as with customers is based on a direct contact, without middlemen. They have a niche space in the market, based on quality, then the MTR does not cause any changes in this small industry

ANNEX III

III.1 Wheat varieties suitable for bread and biscuit making according to the National Association of British & Irish Millers (nabim)

Variety segregation
More and more contracts specify single varieties of wheat, since the variety is the most important element in determining end-use performance. Wherever possible, therefore, different varieties should be separated in growing and storage in order to maintain full value. Even where varieties are of apparently similar value, mixing can reduce their marketability.

Group 1: Varieties likely to gain a full bread making premium from all millers, if requirements of 13% protein, 250 Hagberg and other minimum specifications are met. Lower protein will also be of value, but will attract a lower premium. Group 1 varieties are not interchangeable; some are better suited to specific uses than others. Therefore, it is important to check end-use requirements.
Hereward
Malacca
Xi 19
Paragon (Spring variety)

Group 2: This Group comprises varieties that exhibit bread making potential, but are not suited to all grists. Some are consistent, but not as good as those in Group 1; some perform inconsistently; others are suited to specialist flours. Therefore these varieties are likely to attract varying market prices.
Winter varieties:
Charger
Cordiale
Einstein
Mascot (from 2006)
Option
Soissons
Solstice

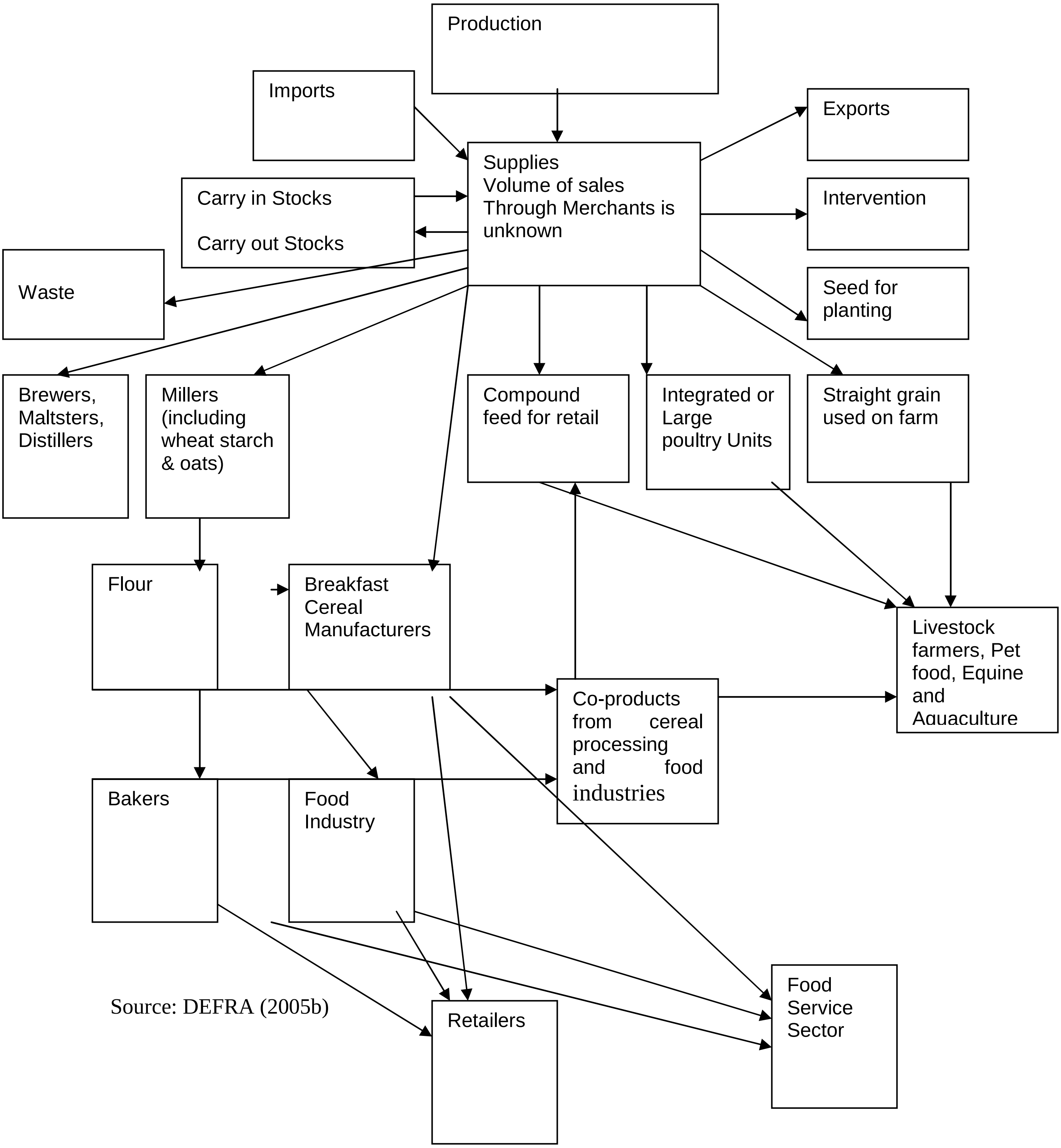
Spring varieties:
Ashby
Chablis
Tybalt
Wallace

Group 3: Soft varieties for biscuit, cake and other flours
Claire
Consort
Deben
Dickson
Nijinsky
Robigus
Wizard

Group 4: Other wheat varieties (such as the examples listed below) may be used by millers in certain grists but are unlikely to attract a premium
Hard: Access, Belvoir, Gladiator, Napier, Richmond, Savannah, Smuggler, Tanker, and Welford
Soft: Buchan, Istabraq and Madrigal. Although soft, these varieties are not generally suitable for biscuit flour

Source: Abridged from National Association of British & Irish Millers (2005b).

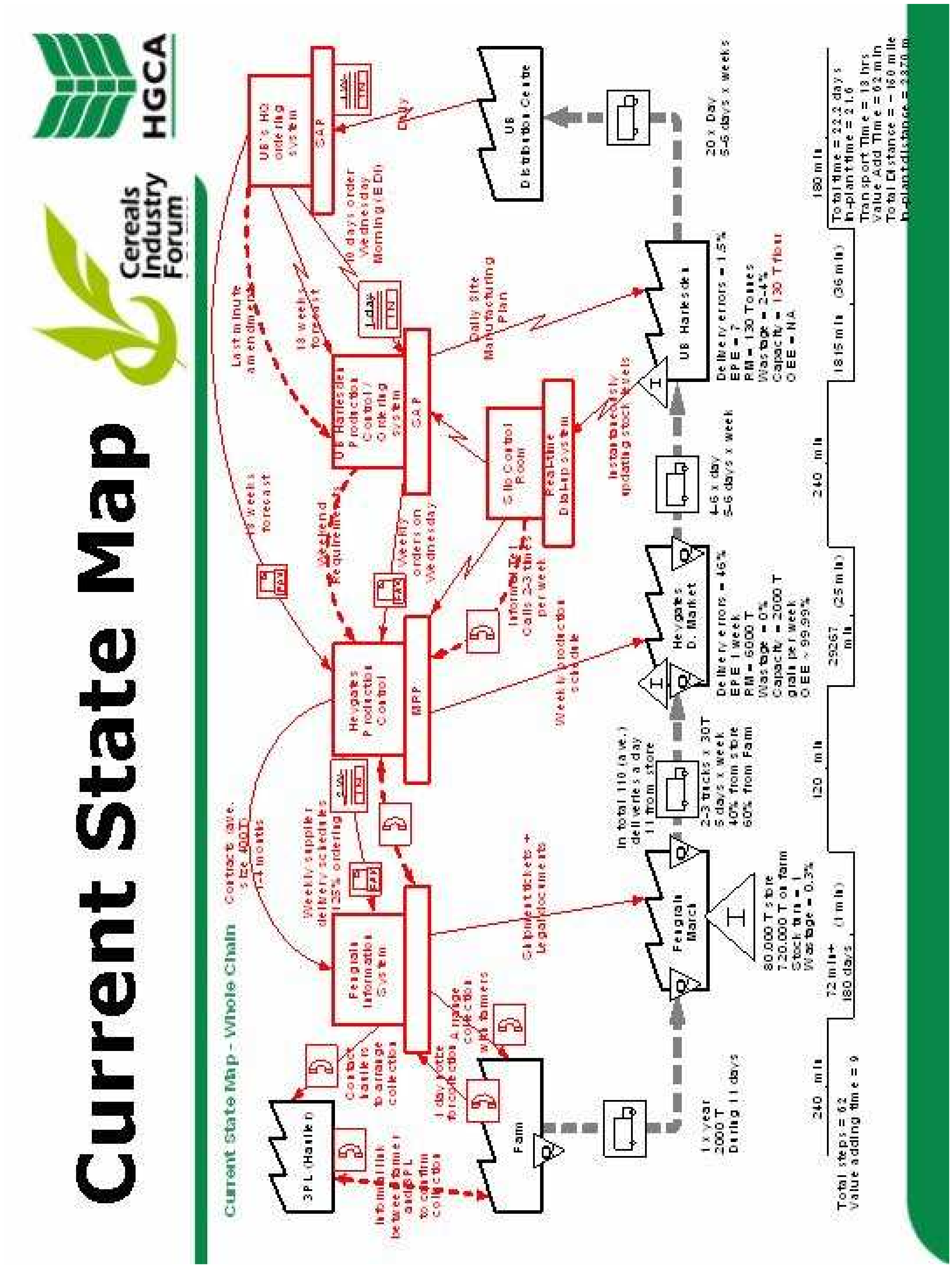
III.2 Wheat Supply Chain Map



Source: DEFRA (2005b)

III.3 Government Office Regions in the UK (NUTS 1)

III.4 Current State Map



ANNEX IV

Table A1: Regional reference yields for cereals

Region		Reference yield ton/ha
Baden-Württemberg		5.29
Bayern		5.61
Brandenburg/Berlin		
Berlin		4.52
Brandenburg	Region 1	5.45
	Region 2	4.52
Hessen		5.50
Mecklenburg-Vorpommern		5.45
Niedersachsen/Bremen		
Bremen		5.34
Niedersachsen	Region 1	5.52
	Region 2	5.98
	Region 3	5.61
	Region 4	5.12
	Region 5	4.93
	Region 6	5.42
	Region 7	5.11
	Region 8	4.94
	Region 9	5.24
	Region 10	5.37
Nordrhein-Westfalen		5.81
Rheinland-Pfalz		4.78
Saarland		4.38
Sachsen		6.23
Sachsen-Anhalt		6.14
Schleswig-Holstein/Hamburg		
Hamburg		6.01
Schleswig-Holstein		6.81
Thüringen		6.13
Germany		5.66

Source: http://www.verbraucherministerium.de/data/00025044D4B013F188A96521C0A8D816.0.PDF

Table A2: Regional area based premia (€/ha)

Region	2005 Grassland	2005 Arable land	2013 UAA [1)]
Baden-Württemberg	56	317	302
Bayern	89	299	340
Brandenburg/Berlin	70	274	293
Hessen	47	327	302
Mecklenburg-Vorpommern	61	316	322
Niedersachsen/Bremen	102	259	326
Nordrhein-Westfalen	111	283	347
Rheinland-Pfalz	50	288	280
Saarland	57	296	265
Sachsen	67	321	349
Sachsen-Anhalt	53	337	341
Schleswig-Holstein/Hamburg	85	324	360
Thüringen	61	338	345
Germany	79	301	328

1) Excluding permanent crops.

Source:BMVEL (2005); Meilensteine in der Agrarpolitik, Ausgabe 2005.