Dairy systems in the European regions of the Atlantic area

Vincent Chatellier, André Pflimlin

Green Dairy Seminar, 13 and 14 December 2006

Dairy systems in the European regions of the Atlantic Area:
A discussion of the economic characteristics to complement the « Green Dairy » project

Vincent Chatellier (INRA-SAE2, Nantes) and André Pflimlin (Institut de l'Elevage, Paris)

Summary. The eleven regions participating in the project " Green Dairy [1]» are responsible for about a quarter of the dairy production of the EU-15. Although situated in the same climatic zone under oceanic influence, the diversity of the physical environment, the structures and the production systems remains considerable. To define this internal and external regional diversity and to place the groups of pilot farms of the " Green Dairy" project in perspective, a processing of individual data from the European FADN for the years 1999 to 2003 was realized. This communication is structured around three sections 1) some methodological elements necessary for the understanding of the results; 2) the technical characteristics notably the dynamics of the structures, the productivity of the work and the feeding systems ; 3) the production costs and economic results of the farms as well as the regional dairy dynamic. The final discussion will concern the main assets and constraints of the systems and regions studied compared with the challenge of the future: the probable end of milk quota, a more open European and World market, the increase of the price of energy and more restrictive environmental regulations.

Résumé. Les onze régions participant au projet « Green Dairy » réalisent près du quart de la production laitière de l'UE-15. Bien que situées dans la même zone climatique sous influence océanique, la diversité des milieux, des structures et des systèmes de production reste considérable. Pour mieux cerner cette diversité, rendre compte des écarts internes à chaque région et resituer les groupes d'éleveurs des fermes pilotes du projet « Green Dairy », un traitement des données individuelles du RICA européen des exercices 1999 à 2003 a été réalisé. Cette communication s'articule autour de trois parties 1) quelques éléments méthodologiques nécessaires à la compréhension des résultats ; 2) les caractéristiques techniques notamment la dynamique des structures, la productivité du travail et les systèmes d'alimentation adoptés ; 3) les coûts de production, les résultats économiques des exploitations et la dynamique collective interne à chaque zone. Une discussion finale porte sur les principaux atouts et contraintes des systèmes et des régions étudiés par rapport aux enjeux du futur : fin probable des quotas laitiers, ouverture accentuée du marché, renchérissement du prix de l'énergie, réglementation environnementale plus contraignante.

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[1] The European project " Green Dairy » aims at comparing the environmental impact of the systems milkmen of the European Atlantic Space (Pflimlin and *al*, on 2006). Two networks of exchanges were set up: the one on the environmental evaluation (streams and losses of nitrogen and phosphor) of complete systems led(driven) in experimental stations in the various countries partners; other one on the axes of progress recommended in exploitations dairywomen.

[2] Le projet européen « Green Dairy » vise à comparer l'impact environnemental des systèmes laitiers de l'Espace Atlantique Européen (Pflimlin et *al*, 2006). Deux réseaux d'échanges ont été mis en place : l'un sur l'évaluation environnementale (flux et pertes d'azote et phosphore,...) de systèmes complets conduits en stations expérimentales dans les différents pays partenaires ; l'autre sur les axes de progrès préconisés en exploitations laitières.

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Introduction

The eleven regions participating in the « Green Dairy »[3] project are responsible for about a quarter of the dairy production of the European Union (EU 15). Although situated in the same bio-geographical area facing the Atlantic Ocean, the diversity of environments and, in particular, of climates is still great. The summers are hot and dry in the South justifying irrigation whilst they are mild with a relatively high rainfall in the North and thus favourable to grassland and grazing. The role of dairy production in the total farming production context varies according to regions, going from less than 10% in Aquitaine and in Scotland to more than 30% in Brittany, Galicia and Ireland. This regional diversity of the dairy sector is also to be found at the farm scale, in terms of the level of specialisation, intensification (animal and forage) or special feed systems.

To define this diversity, to account for the variations internal to each region and to place the farmers' groups of the pilot farms of the "Green Dairy" project in perspective, individual data from the European Farm Accounting Data Network (FADN) for the years 1999 to 2003 were processed. This discussion is structured around three sections: the first presents some methodological approaches taken to understand the results presented; the second deals with the dynamics of the structures at the level of work productivity and the feeding systems adopted; and the third centres on the level of production costs, the economic results of the holdings and the collective dynamic internal to each region. The concluding comments discuss the principal strengths and weaknesses of the systems studied compared with the challenges of the future: the probable end of milk quotas, the accelerated expansion of the market, the increase in the price of energy, and more restrictive environmental regulations.

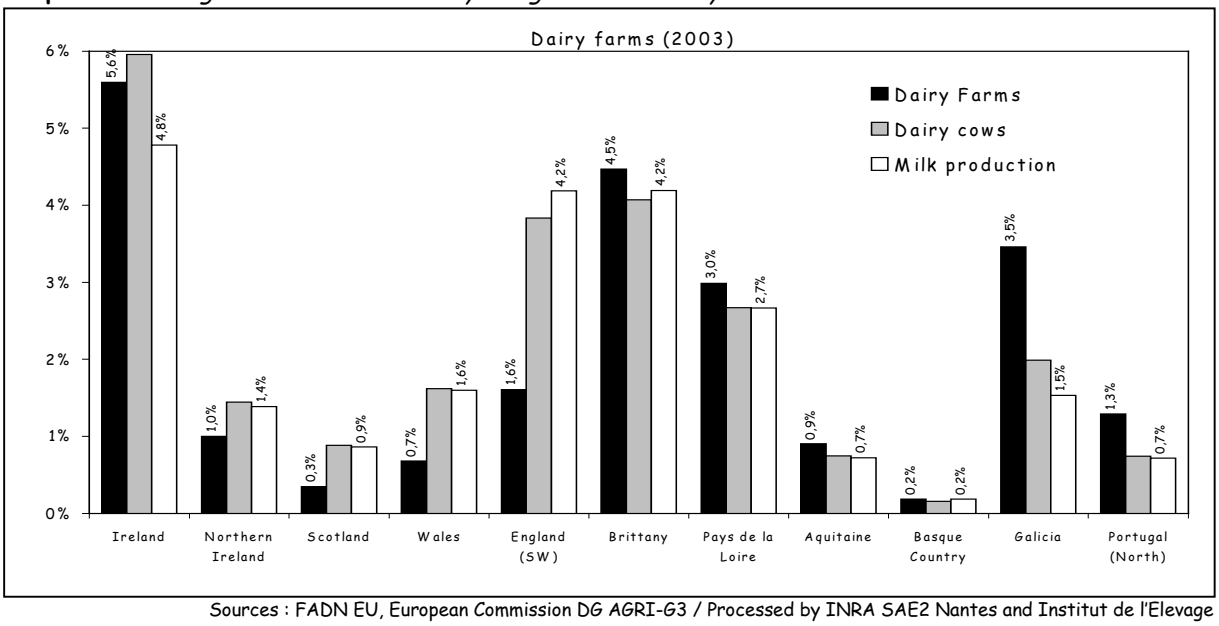
[3] The « Green Dairy » European project compares the environmental impact of dairy systems of the European Atlantic Area (Pflimlin et *al*, 2006). Two networks for information exchanges have been set up: one on the environmental assessment (flows and losses of nitrogen and phosphorus…) of complete systems managed in experimental stations in the different partner countries; the other on the opportunities for progress recommended for dairy holdings.

1– Some method elements

This discussion is based on data of the FADN[4], a harmonized survey carried out each year for over thirty years in all the EU Member States. The FADN is a statistical tool constructed to be representative of fully commercial farms[5] (Chantry, 2003 ; Blogowski, 2003). I provides detailed information on their structure, economic results and financial situation.

A first separation within the data base was applied to isolate "dairy" holdings. In this paper we defined these as all farms which have more than five dairy cows. This definition, which is different from the one that determined Types of Farming (EU classification), makes it possible to regroup the whole of dairy production into a single type but to also take into account those holdings which have associated other farming production systems along with the dairy activity (Chatellier, Jacquerie, 2004). At the EU level, the FADN (2003) groups together 13,586 dairy farms which should represent 457,700 dairy units (numbers after extrapolation) (table 1) As there are very few non-commercial holdings in the dairy sector, those units selected for our survey account for almost all of the Community dairy production. The eleven areas of the Atlantic Area of the "Green Dairy" project group together contain 103,000 dairy holdings, i.e. 23% of the Community total (and representing 24% of dairy cow numbers).

Graph 1. *The weight of the « Green Dairy » regions in the dairy sector of the EU at 15*



Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

[4] Accessibility to the data of the European FADN of 1999 to 2003 lies within the scope of work completed by the Institut de l'Elevage and the INRA on the theme of work productivity in dairy farms in the North of the EU (Chatellier, Perrot, You, 2006).

[5] The farms are regarded as commercial since they employ more than 0.75 Agricultural Work Units (AWU) or their Standard Gross Margin (SGM) exceeds a minimal threshold, fixed by Member States. This threshold is 1 SGM in Portugal, 2 SGM in Spain and Ireland, 4 SGM in Northern Ireland, 8 SGM in France and in the United Kingdom. The introduction of an entry threshold, fixed at more than 5 cows per holding, makes it possible to give more homogeneity between areas.

The relative contribution of each of the eleven regions differs quite markedly: those of Ireland and Brittany are considerably greater than those of the Basque Country, Scotland, Aquitaine or the north of Portugal (Graph 1).

To carry out relevant comparisons between regions, in particular on the question of production costs (costs per ton of milk), we focussed the analysis on specialized farms (i.e. on units whose value of dairy production represents more than 60% of the value of the total agricultural production, subsidies included). At the EU level, the 292,700 specialized units in the Green Dairy region (64% of the total numbers) account for 75% of EU dairy production. For the eleven regions studied, these units cover overall 73% of numbers for 81% of the dairy production. These holdings play a very significant role in the regions of the North and South of the EU, but they are proportionally less well represented in the three French regions (Table 1). A complementary separation was finally operated to identify the specialized dairy holdings with an annual milk production greater than 200,000 kg. At the Community level, this category is made up of 161,300 farms with 63% of the dairy production (compared with, respectively, 44,300 farms and 68% of the dairy production in the eleven "Green Dairy" regions). This last group is more homogeneous and removes the results of small structures from the analysis, some of which will probably not survive in the medium or long term.

Table 1. *The number of dairy farms according to the « Green Dairy » regions (2003)*

	Dairy farms (together)			Specialised dairy farms			Specialised dairy farms > 200 Tons of milk		
	Sample	All	% of milk	Sample	All	% of milk	Sample	All	% of milk
Ireland	500	25 600	100%	421	21 300	89%	274	11 900	69%
Northern Ireland	139	4 600	100%	120	3 800	92%	101	3 000	86%
Scotland	56	1 600	100%	47	1 300	88%	44	1 200	87%
Wales	161	3 100	100%	140	2 600	93%	132	2 200	91%
England (SW)	181	7 300	100%	149	6 200	87%	138	5 600	85%
Brittany	398	20 500	100%	237	14 200	70%	180	9 600	57%
Pays de la Loire	217	13 700	100%	106	7 700	61%	71	4 800	49%
Aquitaine	72	4 100	100%	44	2 300	64%	23	1 500	53%
Basque Country	200	800	100%	198	800	100%	128	400	80%
Galicia	338	15 800	100%	242	10 300	81%	83	2 500	40%
Portugal (North)	202	5 900	100%	182	5 100	96%	86	1 600	64%
Total 11 regions	2 464	103 000	100%	1 886	75 600	81%	1 260	44 300	68%
Regions North	737	34 500	100%	617	28 800	88%	456	18 700	78%
Regions France	687	38 200	100%	387	24 100	66%	274	15 900	54%
Regions South	740	22 600	100%	622	16 300	87%	297	4 500	50%
EU-15	13 586	457 700	100%	8 673	292 700	75%	1 027	161 300	63%

Sources: FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

The FADN is a tool that is overall representative of dairy holdings, but the data selection requires prudence, especially for those groupings that comprise only a few observations. Thus, results for groups made up of less than 15 individuals are not presented here; this then affects the analysis of the disparity of economic results within each region (Aquitaine and the Basque Country are then excluded).

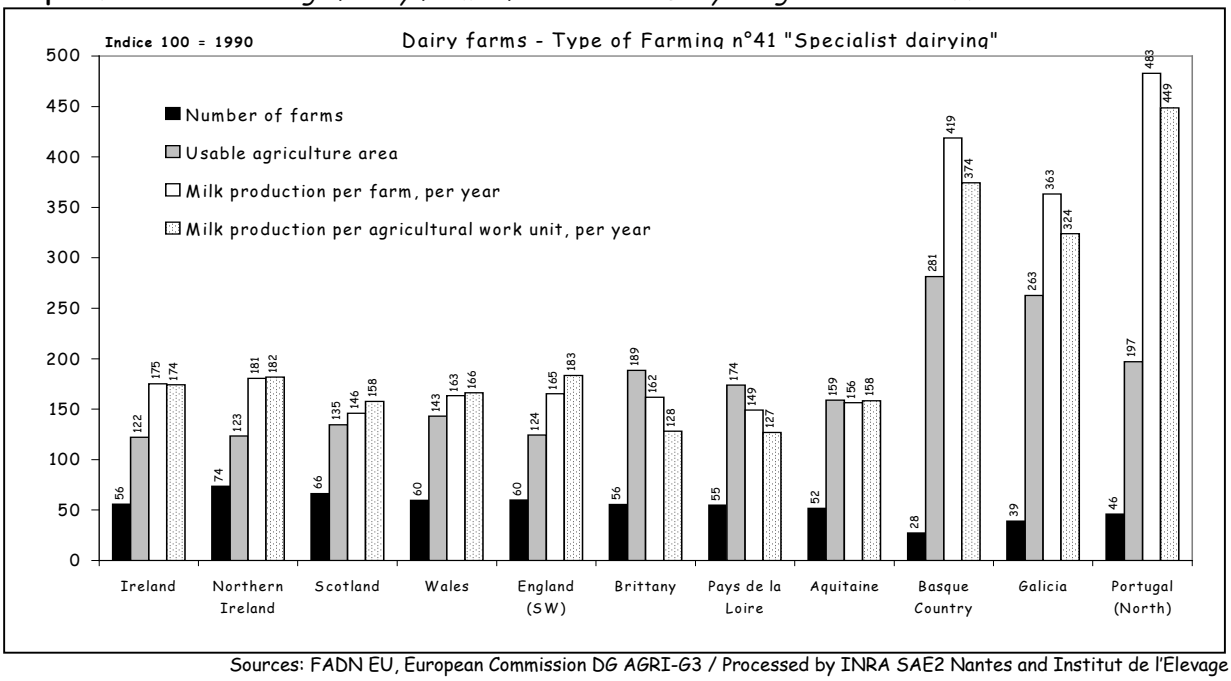
2– The dynamics of the structures, productivity and feeding systems

This second section concerns the structural characteristics of the dairy farms of the eleven regions studied and deals successively with two aspects: i) the reorganisation of the farms between 1990 and 2003 and the variations in work productivity, and ii) technical models and feeding systems.

2-1- The dynamics of the structures and labour productivity

The changes in dairy farms between 1990 and 2003 was analysed from standard FADN results and related to the Type of Farming n°41 "Specialist Dairying" (a very large majority of these farms come under the case of so-called "specialized" holdings).

Graph 2. *The restructuring of dairy farms of the « Green Dairy » regions between 1990 and 2003*



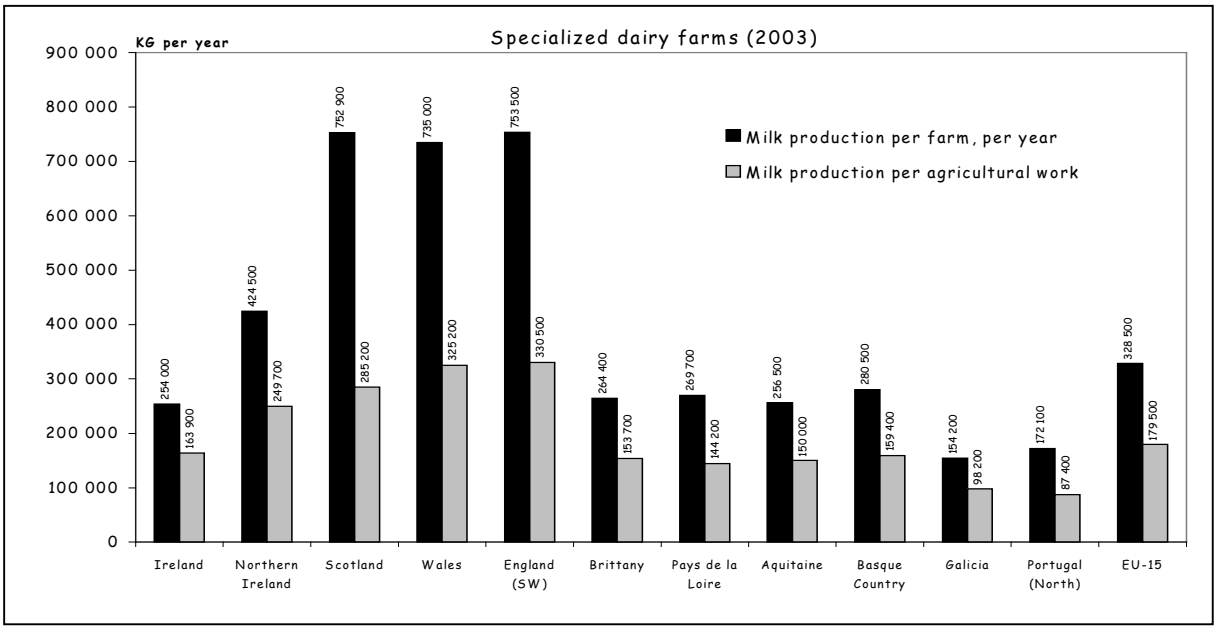
Sources: FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

Between 1990 and 2003, the reduction in the number of dairy farms (based on an index of 100 at the beginning of the period) was significant in all the regions (Graph 2). Particularly strong in the two Spanish regions and in Portugal, it was more moderate in Northern Ireland. The intensity of restructuring of the farms must consider three principal points: the economic dimension of the farms in the south was particularly limited in 1990; the rise of associations of farms, in particular in France, meant that the reduction in employment was not proportional to the drop in farm numbers; the English farms had already benefited from a significant restructuring movement and, from the start, were significantly larger. Work productivity (production of milk per AWU and per year) more than tripled in the regions of the south and by 1.5 to 1.8 times in all the other regions. The average agricultural area of the farms also increased considerably.

The rate of restructuring of dairy holdings was influenced by the age pattern of the farmers, by possible opportunities for agricultural diversification, but also by the intervention methods of the national authorities (Ruas, 2002). This includes the measures taken under the national agricultural policy (subsidies for investments, financial incentives for the encouragement of young farmers, end-of-activity programmes, subsidies for farms located in zones with natural handicaps, etc.) and, in addition, the methods chosen for the application of Community regulations relating to the milk quota system. Unlike the United Kingdom (which prefers a relatively liberal approach), France opted for an administrative and territorial management of milk quotas (Boinon, 2000). This means that the quantities of milk released are not the subject of commercial competition, but are allocated free to farmers considered to be priority cases (Barthelemy et al., 2001). In the same way, production volumes are fixed at the department level, thus slowing down the process of geographical concentration of the supply in regions benefiting from comparative advantages (Daniel, 2002).

In 2003, and in spite of a considerable catching up in recent years, the average size of herds and the level of milk production per cow still remain very different between the dairy holdings of the regions of the South (Institut de l' Elevage, 2001) and those of the North. The average herd size was close to 30 cows in the three regions of the South (Table 3); about 40 in the three French regions, 45 in the Irish Republic, 60 in Northern Ireland and approximately 100 in the three other regions of the UK. Milk production per cow increased considerably in the Basque Country and Portugal. Although in the regions of the south, dairy production per holding is gradually approaching that of the French regions, the gap in production volume per holding remains very great when compared with that of the North (Graph 3).

Graph 3. *Annual milk production per specialised dairy farm and per AWU (2003)*



Sources: FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

The annual production of milk per specialized dairy farm, which is on average 313,400 kg for the eleven regions studied, varied in 2003 from 154,100 kg in Galicia to slightly more than 730,000 kg in SW England, Scotland and Wales. With a production of between 260,000 and 270,000 kg, the French regions occupy an intermediate position, comparable to that of the Basque Country. By comparing milk production to employment, hierarchies remain, but the variations are slightly closer (work productivity in the SW England is twice as great as in Brittany or Pays de Loire, three times more than in Galicia and four times more than in Portugal). The size of the workforce is, indeed, greater in the regions of the north, in particular because of more frequent recourse to paid employment (which represents approximately a third of the total workforce as compared with less than 10% in France). The size of the family workforce is quite stable from one region to another, with approximately 1.4 to 1.8 family Annual Working Unit (family AWU).

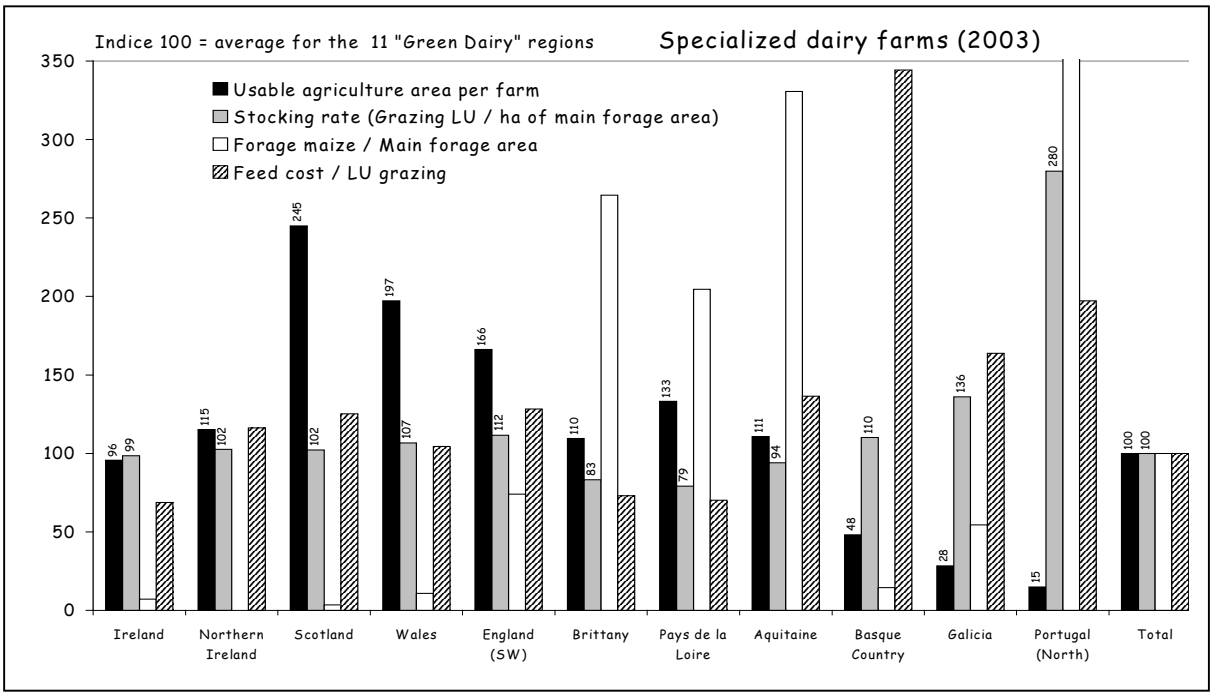
2-2- Feeding systems and land use

The average surface area of the farms in 2003 was about 8 ha in Portugal, 15 ha in Galicia and 25 ha in the Basque Country. In these regions, available land is still scarce and expensive. The fields are often very small and separated and rarely make grazing possible even in Galicia where grassland remains largely predominant. To compensate for the lack of area, livestock farmers buy large quantities of concentrate, and also of forage (alfalfa hay or maize silage). Due to total mixt ration (TMR), the 50% of concentrate in the diet does not seem to pose significant health problems and makes it possible to achieve to production close to 8,000 kg of milk per cow in the larger units. On the basis of irrigated area under maize forage and Italian ryegrass as a catch crop, the forage production can exceed 25 tons of dry matter per ha and per year and thus makes it possible to feed 5 cows per ha (even more in the Oporto region). In Galicia or in the Basque Country, where forage is still based mainly on grass silage, yields are limited and the stocking rates are 2.5 to 3 cows per ha. In the Basque Country, the average quantity of concentrate usually exceeds 3 tons per cow and per year and dairy performances are the highest not only in Spain but also in the whole of the "Green Dairy" regions. The area used for fodder surface is very limited, so opportunity to spread liquid manure is limited too. This is accentuated by the lack of slurry storage capacity, the priority of investments being given to increasing herds and material equipment. However, because of the low density of these modernized holdings and the significant role played by forests in the landscape, water pollution created by phosphorus or nitrogen surpluses does not seem to have resulted in a problem yet.

The situation is very different in the two regions of the West of France. Land is relatively cheap, which often makes it possible to have greater self-sufficiency in feed: forage production is frequently accompanied by a production of cereals for consumption on the farm, and there is and sufficient area for spreading slurry (except for certain holdings that have diversified towards pig production). The forage system is mainly based on maize forage (Graph 4) for the winter and interim periods and on grazed grass in spring and summer when the weather is not too dry. Temporary grassland containing perennial ryegrass is predominant and is integrated into the rotation which, with

relatively low organic fertilisation, provide good maize or wheat yields. With these two good quality fodder crops (maize silage and grazed grass), the quantities of concentrate can be limited to less than one ton per cow and per year for a milk output near to 6,500 kg a year. With these relatively self contained autonomous feeding systems, mineral surpluses are fairly low. This fact is also due to the existence, for about ten years, of strong pressure from regulations (these zones were classified as nitrate vulnerable zones in 1994 in a context where concentrations of nitrate in waters sometimes exceed 40 mg/litre). This is more particularly the case in Brittany, a region which experienced a very significant development of housed pig and poultry units (+/-land less) until 2000 and which, consequently, had to set up a programme for the treatment of liquid manure surpluses.

Graph 4. *Agricultural area, intensification and purchases of feed in specialised holdings (2003)*



Sources: FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

In the regions of the North, it is mainly permanent grassland which supports grazing and silage production. Climate, structures and the land pattern are favourable enough to allow grazing for 6 to 8 months each year, even more in Southern Ireland. In this country, 85% of calvings are grouped at the end of the winter and the bulk of dairy production is during the grazing period with few concentrates required. For the other regions, autumn calvings are the norm and thus require more silage stock and concentrate input. With fertilizer rates of 200-250 kg N/ ha and a consumption of from 1.5 to 2 tons of concentrate per cow, the stocking rates are often more than two cows per ha and the N surpluses greater than 200 kg per ha. However, and in spite of liquid manure storage capacities still being insufficient, the nitrate contents of water remain satisfactory overall, at least in the zones with the most grassland.

Thus, with regard to the feeding systems, three large zones can be distinguished within the "Green Dairy" project: i) the regions of the South which are rapidly changing towards dairy systems that are very intensive in terms of the cow stocking rates in relation to the area involved, but in an overall environment that is not intensive, with a large proportion of forest; ii) regions of the West of France where, in spite of relatively well balanced and self contained systems, the quality of water is still below the required standard, mainly because of intensive pig and poultry units and the sensitivity of the environment; and iii) the rather intensive areas of the North, but with permanent grassland systems that do not have obvious or immediate risks for water quality. This conclusion indicates that dairy farmers of W French, in spite of the efforts already made, have less room for manoeuvre to meet water quality constraints than those of the other zones studied.

3– The costs of milk production and the economic results

In the European context characterized by a fall in the institutional prices of butter and dried milk (compensated by the granting of direct payments per ton of quota), by an accelerated expansion of the markets (*via* the reduction in customs duties) and by the introduction of a system decoupling support measures from farm incomes (Chatellier, 2006), the question of the competitiveness of dairy farms becomes more urgent (Jamet, 2005). The comparative analysis, between zones, of the economic results of farms is therefore useful (IFCN, 2004), because these are located in the same competing zone, and they will be increasingly so in the future as the quota system could disappear. It also proves to be difficult insofar as the Member States do not all come under the same economic constraints (purchasing power parity, unemployment rates, costs of paid employment, etc.) and do not all apply identical rules as regards agricultural policy (management of milk quotas, incentive measures for establishing young farmers, agricultural profit tax rate, environmental regulations, etc). Selected economic indicators (GFI, Family farm Income, etc.) correspond to those traditionally used in analyses made in France from the agricultural accounting plan. If the definitions are harmonized between countries, variations can nevertheless occur: depreciation times are not similar as the tax policies are different and they can influence the producers' investment strategies.

3-1- *A comparative analysis of economic results between regions*

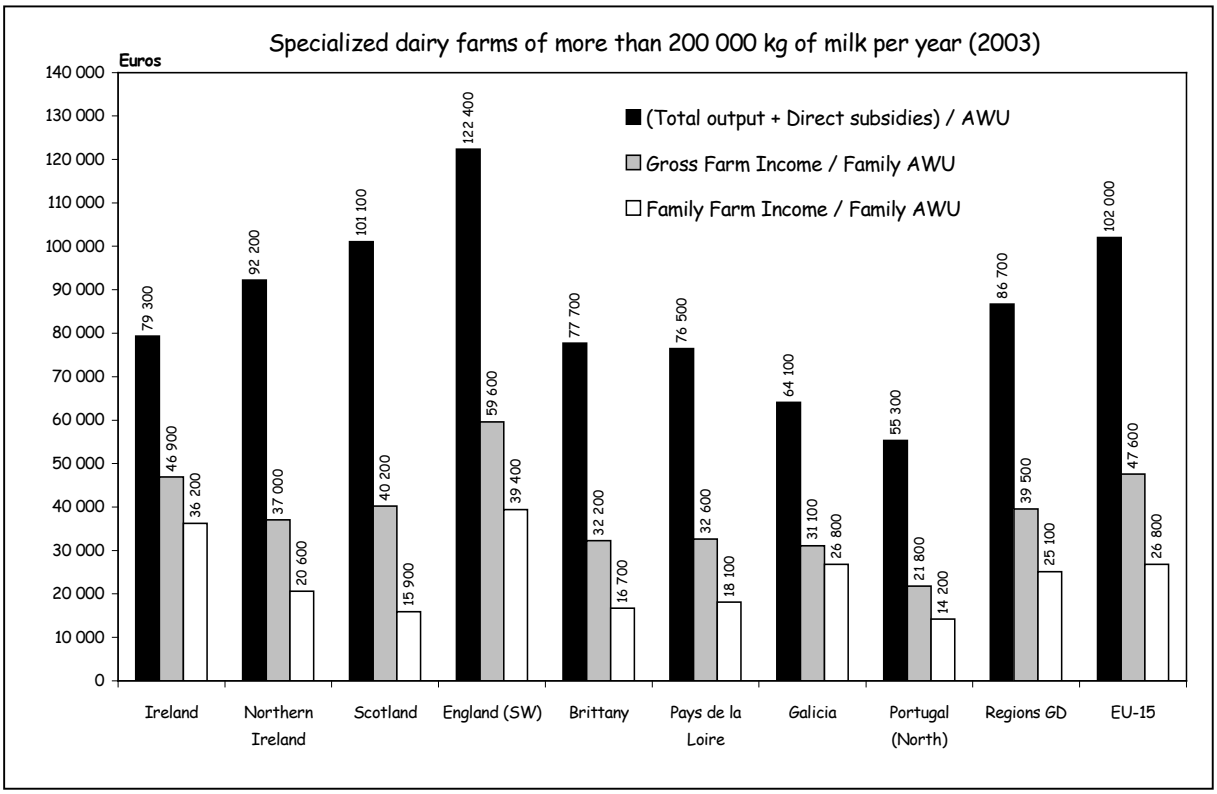
The economic results between regions are compared here for dairy holdings having an annual milk production greater than 200,000 kg and for the financial year 2003 (Table 6). [6]By limiting the discussion to this category, the impact of the "size" effect is partially removed and the calculation of the production cost brought to the ton of milk is not influenced by the costs inherent in other non- dairy activities on the farm.

[6] Complementary tables (not included here) have the economic results for the specialised dairy farms (together) for the year 2003 (table 3) and for an average for 1999 to 2003 (Table 2).

The average annual milk production per holding is between 300 000 and 360 000 kg for the two regions of the South, the two French regions and Southern Ireland. It rises to slightly more than 500 000 kg in Northern Ireland and slightly more than 800 000 kg in England and Scotland. In terms of work productivity (measured by milk production per worker or by the agricultural production value – including subsidies – per worker), the milk per AWU varies from one to two between the first group and the two regions with large structures in the United Kingdom.

The mean level of economic efficiency, measured by the ratio "Gross Farming Income [7] / Output + Subsidies" varies significantly between the regions studied. These variations are explained by an accumulation of factors (Allan, 1995): the price of milk, the amount of subsidies and, above all, the different costs (feed, fertiliser, rents, cost of paid workforce). It is lower in Scotland (28%) and in SW England (31%) than in the West of France (nearly 40%), Galicia (45%) or Northern Ireland (48%). The English holdings, indeed, are penalised on this criterion by the existence of high labour costs. Because of these distinctly different efficiency levels, the regional variations observed are overall less significant at the level of the Gross Farming Income (GFI) than when they are compared at the level of production value (Graph 5).

Graph 5. *Average economic results per worker (2003)*



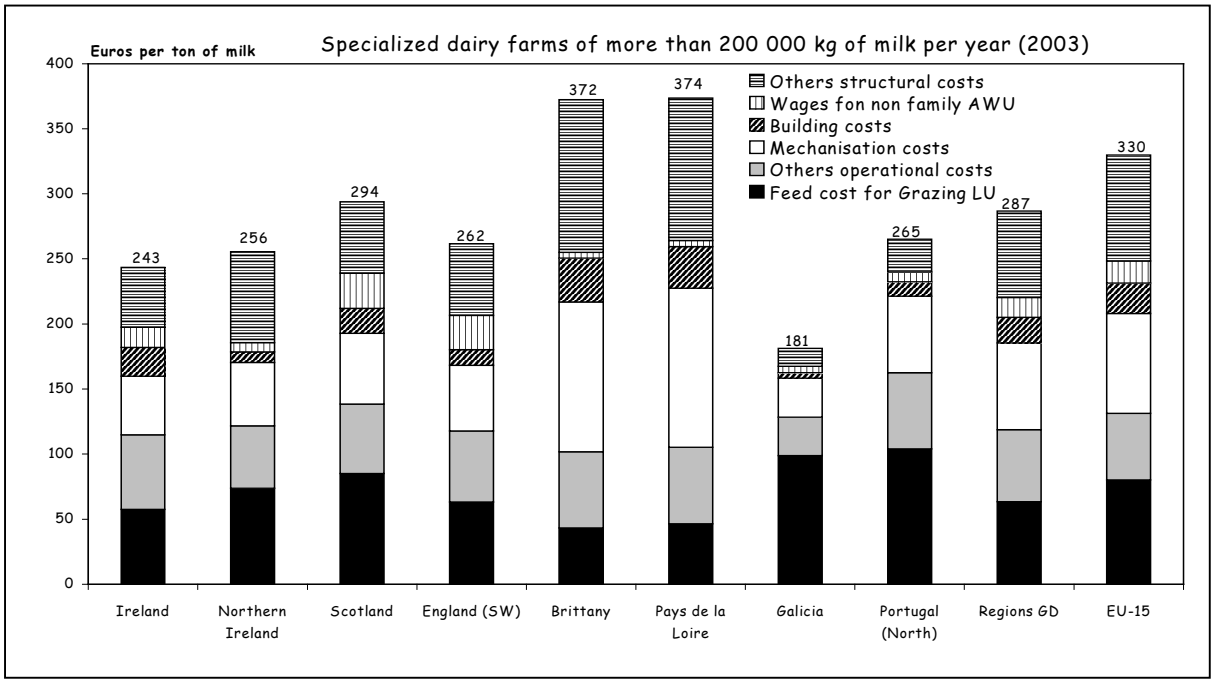
Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

[7] GFI = Production of the financial year (excluding purchases of animals) - Intermediate consumptions (food, seeds, etc.) - Rents and other tenancy costs - Insurance + Reductions and rebates - Taxes - Costs of personnel + Refunding of VAT + farm subsidies + Insurance compensations.

The Family Farm Income (FFI) per family AWU, which is sensitive to the effects of the current situation including price of milk, forage yields, etc., goes beyond the GFI indicator to take into account the costs associated with past and current investments (including depreciations and financial costs). It varies from 14 200 euros in Portugal to 39,400 euros in SW England (where the cost of living is quite higher). The dairy farms from the West of France give a farm income per family AWU similar to that of Scotland, where, however, the units produce twice as much milk (these results are validated by table 2 presenting averages over five years). In contrast, the holdings in England which have a similar herd and system to that of Scotland have twice the income per family worker. The good performance of the farms in the Irish Republic deserves to be underlined. They provide a farm income twice that of the French units, and with a labour productivity which is only slightly higher.

The analysis of production cost per ton of milk provides some figures that are useful to explain the disparity of the average economic results observed between regions (Butault et al., 1991). It must, however, be placed in relation to the price of milk (lower in Ireland and the UK than in France), the proportion of meat (as a dairy by-product) or cash crops and possible subsidies granted (also higher in France than in the UK). The total cost of production is divided into six headings: purchases of feed; other operational costs (fertilisers, seeds…); cost of mechanisation (depreciations in equipment, contract work, maintenance of equipment, fuel); costs of buildings (depreciations in buildings, upkeep); paid labour (wages and contributions); and other structural expenses.

Graph 6. *The amount of costs per ton of milk (euros, in 2003)*



Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

For specialised dairy farms with more than 200,000 kg, the production cost of a ton of milk rises, on average, for the 11 "Green Dairy" regions to 287 euros (Graph 6), i.e. 13% lower than the average calculated for EU 15 (this gap remains close when the calculation relates to the whole of the specialised units). This competitive advantage (Saha et al. , 2003) is still quite modest, however, insofar as the dairy farms in the "Green Dairy" regions receive a lower price for milk than that observed in other partner countries, such as Austria, Denmark, Italy or the Netherlands. With costs equivalent to 181 euros per ton of milk, Galicia has the best position among the eleven regions studied, in spite of high animal feed costs. The total costs are also low in Ireland (Thorne, Fingleton, 2005), namely 243 euros per ton of milk (including 115 euros of operational costs and 129 euros of structural costs). As had been highlighted from the FFI indicator per family AWU, the situation is less favourable for the West of France where the size of the farms is comparable to Ireland. These two French regions are penalized by high mechanisation costs (122 euros per ton of milk in the Pays de Loire or 115 euros in Brittany, compared with 50 euros in the south-west of England and 45 euros in Ireland). On the other hand, they have lower feed costs: the feed costs per grazing LU (except home-produced feed) represents about 45 euros per ton of milk in these two regions as against 57 euros in Ireland and 104 euros in the north of Portugal.

The comparison between regions of the financial situation of dairy holdings is difficult because of the diversity of the national contexts. This diversity relates to the price of land (very high in the British Isles and the regions of the South compared with the French regions), the way companies are financed or taking into account an accounting value for milk quotas (including if these were not bought). Thus, in specialised units with an annual dairy production higher than 200,000 kg, the amount of the recorded assets, when brought to the ton of milk produced, is three times higher in the Irish units than in the West of France. It has to be noted, however, that the financial costs per ton of quota is lower in Ireland than in Brittany (respectively, 11 and 20 euros per ton). This observation shows the existence of a more or less wide separation between countries in the estimated value of the assets (including land and milk quotas) and the financial costs of loans taken to acquire them. In the same way, the question of the method of transferring holdings to new owners or tenants is central to understanding the current financial situation of the farms (i.e. patrimonial *versus* economic approaches).

The farm debt rate is thus strongly influenced by the method of calculating the value of the assets. The amount of the debts per AWU is approximately five times higher in the French West, compared with the two regions of the South, which, as shown by the analysis carried out previously on restructuring between 1990 and 2003, have experienced fast growth in their production rates.

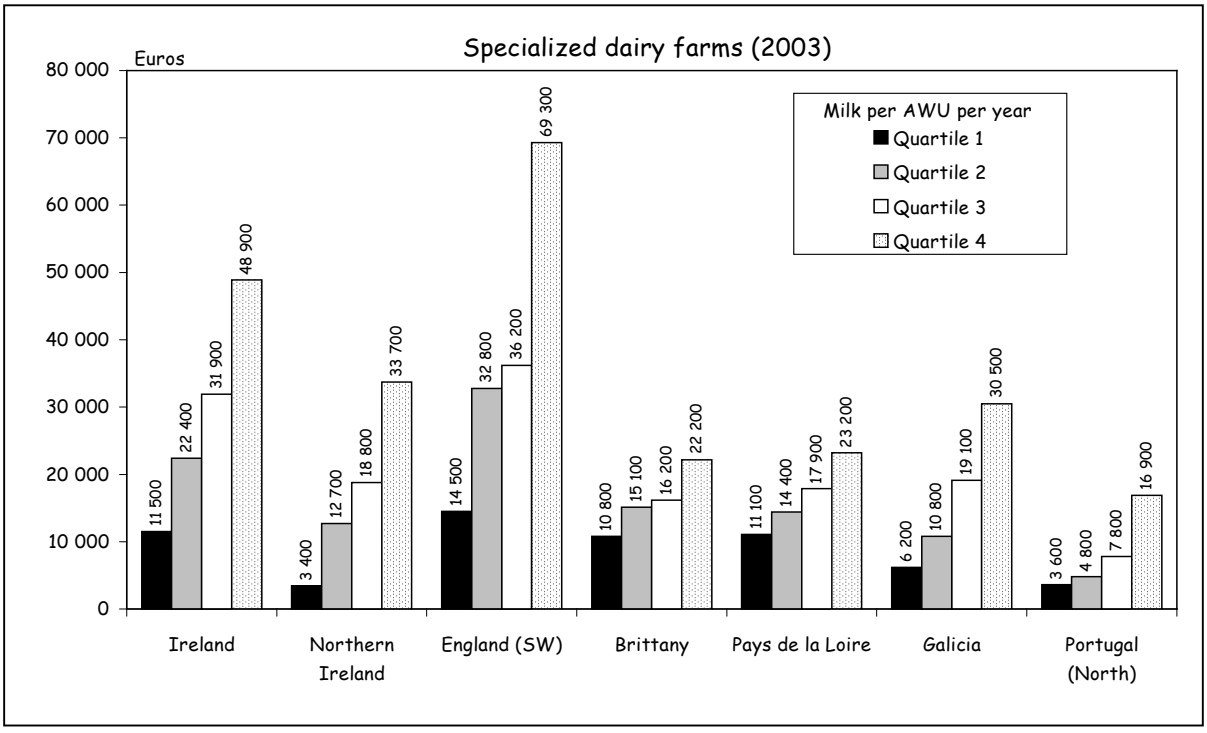
3-2- Significant disparities within each of the regions

The comparison of the results of the dairy holdings between European regions should not make us forget the existence of significant disparities within each region. So, to take account of this, FADN data for the year 2003 were processed in two ways for all the specialised dairy holdings: i) the first divided the farms according to four

classifications determined on the basis of the value of each class of work productivity (measured by the milk production per AWU and per year); the second proceeds in a similar way for an indicator of economic efficiency (GFI/Output + Subsidies). The value of the four classes was then calculated within each zone considered.

In all the regions studied, the holdings benefiting from the best work productivity (class 4) are also those which provided the best FFI per family AWU (Graph 7). The effect of work productivity on the level of income is more marked in Ireland and in the United Kingdom than in the regions of the south or in France. This is due to two principal reasons: i) the gaps in productivity between the two extreme classes are more accentuated in these zones where the national agricultural policy is less interventionist (in France, the control of structures leads to limiting the size of the largest holdings and thus in reducing differences between the two extreme classes); ii) the British and Irish holdings of class 4 are favoured by obtaining a better production cost per ton of milk than units of the other classes (this situation suggests the existence of a slight phenomenon of economy of scale is not found in the other regions studied). The holdings of class 4 are also, in all the regions, those which have most recourse to investments, whether in absolute value per year or *pro rata* of agricultural production (Table 4).

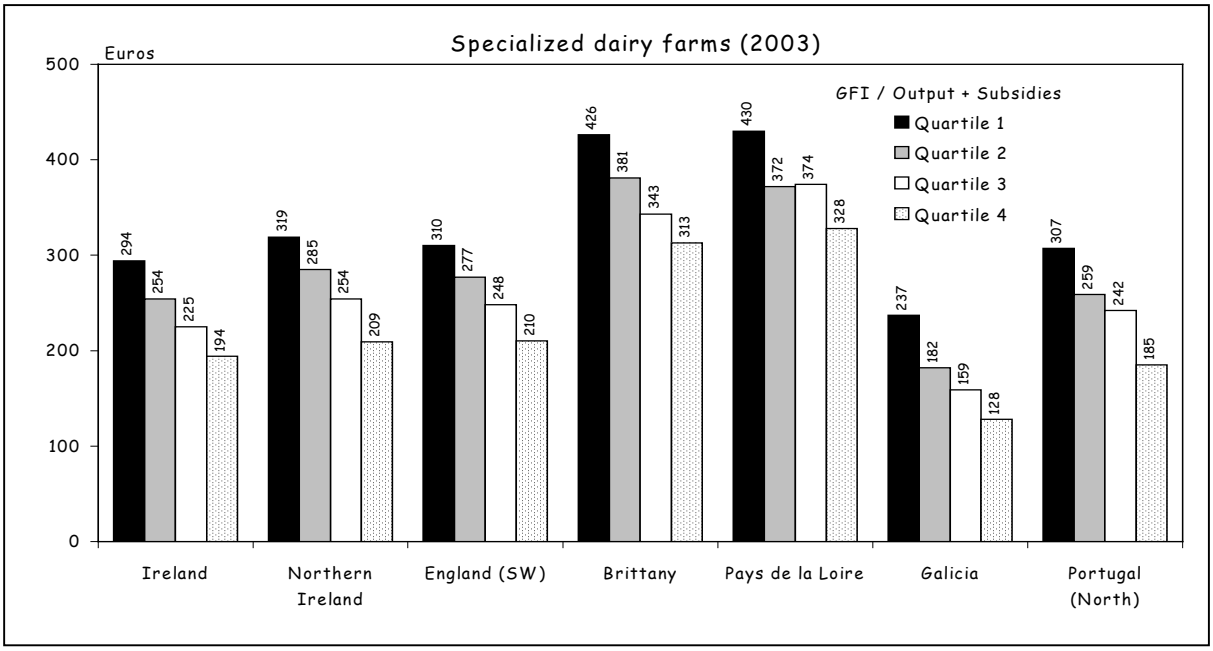
Graph 7. *The farm income per family AWU according to the quartiles of work productivity*



Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

This analysis, based on average results per class, does not mean that all the average size holdings are necessarily less profitable than the larger units. Some of them indeed manage to have better incomes because of increased economic efficiency. Obtaining better efficiency includes the cumulated effect of an overlapping set of factors: the technical skill of the farmer; the degree of autonomy of the feeding system; the price of milk (linked to its quality or its method of use) and the method of acquiring the means of production (individual purchases or in groups, externalisation of tasks, etc).

Graph 8. *The production cost per ton of milk according to the quartiles of economic efficiency*



Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

In each region, significant differences in production costs are observed between dairy holdings (Graph 8 and Table 5). The differential is, in the various zones studied, nearly 100 euros per ton of milk between the two extreme classes (classes 1 and 4). The farms of Brittany or Pays de Loire in the best class of economic efficiency have a production cost higher than the lowest Irish class.

3-3- « The dairy environment » and the collective dynamic of the farmers

The analysis of the economic situation of milk producers must not be limited only to the observation of statistical data. These data do not always take account of "local dairy environments", namely the context (e.g. sociological, economic and political) on which these results depend. On the basis of work recently published by Institut de l'Elevage (2006) and information discussed with local experts, in particular those engaged in the "Green Dairy" project, several priority findings deserve to be emphasized for the principal zones studied.

In this analysis, English milk producers apparently have comfortable incomes compared with other regions, but their morale still seems to be fragile, especially after a difficult decade marked by several serious health crises (BSE, foot-and-mouth disease). For several years, the United Kingdom has not achieved the milk quota to which it is entitled, with an under-achievement of approximately 2% of the volume. This situation comes under a national context where the price of milk for producers is amongst the lowest in the EU (along with Ireland) and where the returns from the sale of beef and veal by-products have regularly decreased. In the same way, the right-to-produce or quota market does not seem very dynamic (contrary, for example, to that of Denmark), and this phenomenon has been accentuated since the application of total decoupling since 2005.

Unlike the situation in the two regions of the West of France, milk production in the UK and Ireland is not fixed within territories by the milk quota distributions. The effect of this is to discourage the least efficient producers and accelerate the process of geographical concentrations of the supply. Thus, considerable volumes of milk (4% of the quota of the United Kingdom) have left the East and South of England to go to Northern Ireland (McCluggage, 2005) (where production increased by almost a third between 1995 and 2005) and to a lesser extent Scotland and Wales (Livestock Institute, 2006). It is important, above all, to place the income of English milk producers in perspective in the economic context of the country: the average income of the working population is, on average, higher than in most of the other European regions (because of economic growth); prices are expressed here in euros whereas it is the pound sterling[8] which is applied; many holdings have limited their investments, which raises questions about the prospects for the long-term survival of farm structures that have not modernised their production methods, in particular to face up to the stricter application of the Nitrates Directive and the Water Framework Directive. This last remark is also true for the Irish Republic.

In spite of obtaining an excellent economic efficiency ratio and a high income per family AWU (compared with the other regions), it seems that many Irish milk producers hesitate to make the investments (e.g. slurry storage) required because of the classification in 2005 of the whole of the country as a nitrate vulnerable zone. Ireland, which produces approximately five times more milk than its domestic consumption, is very dependent on its competitiveness for export. The suppression of export subsidies and the drop in the institutional price of 'industrial' dairy products (butter and dried skimmed milk) are two facts that could have a negative effect on future prospects. As the economic situation in Ireland is very dynamic, with one of the lowest unemployment rates in the EU, this could have a negative influence on encouraging young people to remain in agriculture with other opportunities being available in trades considered to be less demanding. This evolution could, in addition, be reinforced by the fact that the price of land is very high thus, and in spite of historical cultural resistance to this, encouraging some farmers to sell their land.

The milk producers of the West of France, compared with the other regions of the Atlantic Arc, have had a slower increase in their work productivity [9] and have currently higher production costs (per ton of milk). These can be partly explained by the modernisation of production systems (e.g. bringing livestock buildings up to standard) and by changing to agricultural contractors for harvesting maize forage. In this zone,

[8] Expressed in pounds sterling, the price of milk dropped by 30% between 1995 and 2000; since then it has more or less stabilized.

[9] In the analyses concerning the productivity (production of milk by AWU) and the remuneration of labour (FFI by family AWU), the unit of work must be interpreted with care. It often represents some 60 hours a week in Irish farms (with very few vacations) whereas in France the farmers expect a higher quality of life even if it means financing a replacement service. By way of illustration, the milk producers of the Pays de Loire, have noted that their incomes were similar to those of other animal producers whose routine work pattern very different, and consider that the priority must from now on be given to simplification, mechanisation and the organisation of work.

tenant farming remains predominant and the principle of compensating the brothers and sisters applies when the working farm asset is taken over by one of the children. This mode of transfer is different from that practised in Ireland and Galicia where more than 80% of areas are in ownership and where the transfer of the land as an inheritance is carried out almost cost free to whoever takes over the succession: encouragement of the young is thus favoured and the take-over cost is minimal. The dairy sector in the West of France is, as in Ireland, weakened by the recent change in the Common Market Organisation (CMO) of milk and dairy products, insofar as nearly a third of its local production is used in the form of industrial products (Institut de l'Elevage, 2005). To face the challenges of tomorrow, the milk producers of Brittany and the Pays de Loire, however, benefit from several factors: the price paid for milk is higher than in the other zones studied; probably more room for manoeuvre to contract the level of costs; a high density of farms and processing companies (which makes it possible to limit collecting costs and stimulate a collective environment favourable to the organisation of livestock activities); a high single payment (which is explained by taking into account part of the subsidies to land under maize forage).

In the southern regions, mainly in Galicia (Maseda et al. , 2004), and taking into account the very fast rate of restructuring, the size of dairy farms could soon join those observed in the West of France and Ireland. This change should continue on the basis of family farms having a limited need for paid labour. In the Basque Country, the catching-up has been particularly spectacular in the past decade: the size of the herds has increased at the rate of two cows per year and the output per cow has progressed, each year, by 220 kg (as against only 80 kg per annum in the West of France, i.e. a considerably lower rate than the British situation). In Galicia, the production cost par ton of milk is low (Graph 6) and milk remains a major economic activity because the unemployment rate is high and has been accentuated by the reduction in fishing activities. As a result, installations are maintained and this area is even buying up quota from other regions or autonomies.

Conclusion: strengths and weaknesses resulting from future issues

To make predictions about the future of the European dairy sector in 2015 remains a difficult exercise as many uncertainties remain, in particular the choices which will be made as regards agricultural policy. Nevertheless, and without making excessive predictions, it appears that several notable developments could take place within ten years: the abandonment of the dairy quota system in the context of an accelerated expansion of the market resulting from reduced customs duties and the suppression of export refunds; the increase in the price of fossil energy; the strengthening of standards and environmental constraints, mainly those relating to water quality. Faced with these potential changes, what are the strengths and weaknesses of the dairy systems of the regions studied?

Suppression of dairy quotas. This could lead to the geographical location of dairy production changing in every country, to either the benefit of the most competitive regions because of their available natural resources, their networks of food-processing enterprises, or their proximity to centres of consumption. The intensity of these movements would then depend primarily on the strategies adopted by the milk processing companies, whose role of directing the supply would be consolidated (to the detriment of the national authorities). The United Kingdom, in freeing the quota market, has already allowed migrations of dairy production from the East and Centre of England (and even from the South West) towards Northern Ireland and, to a lesser extent, towards Wales and Scotland. This geographical shift of production will continue in the next years, with or without the dismantling of milk quotas. The growth of production volumes in Northern Ireland will become more moderate because of the regulatory environmental constraints which will be apply. Southern Ireland could, for its part, accommodate much more milk production. The dairy sector uses only one third of the total grassland area . The other two third are used in extensive systems by beef and sheep production, which show some signs of declining since decoupling was set up in spite of a very favourable beef price. In Spain, the region of Galicia has already benefited from a positive transfer of milk quotas, but this has raised some political reactions from those regions adversely affected. In France, a suppression of milk quotas, which would result in a complete break in the link between land and milk production (Chatellier and Jacquerie, 2005), would have significant repercussions, in the medium term, on historical regional balances. Milk production could decline considerably in zones with a combination of unfavourable factors: low density of dairy cows to the square kilometre; individual small size holdings; modest commercial use of locally produced milk. The regions of the West of France which currently account for 45% of national milk production could then be consolidated in the measure, but where this growth in volume remains compatible with the environmental requirements (at the small agricultural region or catchment scale).

Increasing price of fossil energy. Such a prospect could generate a long-term increase in all energy sources and have a positive impact on the price of cereals. It would be potentially less penalising for dairy systems which are the most economical in mineral fertiliser, concentrate and mechanisation costs. This is in particular the case with the Irish systems, with the exception of the "fertilisation cost" item which could be reduced with further uptake of the use of white clover. Conversely dairy systems in the south of the EU are not so well positioned. As high consumers of concentrates, they could be encouraged (although in a difficult local market) to expand the farm size to increase fodder production and thus gradually become more self-sufficient. In the regions of the West of France, such a change is likely to stimulate collective approaches to reduce mechanisation expenses.

The strengthening of environmental constraints. Faced with the "Nitrates Directive", the dairy holdings of the French regions can take advantage of having a considerable advantage compared with their counterparts in the North and South, in particular with regard to the slurry storage capacities already constructed and depreciating (Le Gall et al., 2005).The situation is different in the Southern and Northern Ireland which have just declared, in 2005, the whole island as a nitrate vulnerable zone. Many Irish producers, for whom the slurry storage capacity is often less than two months, now realise that they must face up to the requirement for making significant investments. In addition, the principle of conditionality of subsidies reinforces the pressure on livestock farmers who are worried about current negotiations with the European Commission relating to obtaining a derogation for the authorized threshold of 170 kg N/ha, in organic manures. Among the regions of the South, only Galicia could accommodate more milk production because it has significant areas under grass, which are still not used very intensively. This would probably suppose a return towards more grazing and a reduction or a slower increase in the performances per cow. But it is the "Water Framework" Directive which is the greatest unknown factor. This will require, between now and 2015, a good ecological status for all waters (surface, ground and coastal). This objective will result in placing greater emphasis on problems of eutrophication that happen at a much lower concentration of nitrate than that required for drinking water. Importantly, the thresholds of phosphorus surpluses could become more limiting that those of nitrogen.

The "Green Dairy" project which stimulated this investigation on the situation of the dairy holdings within the eleven European areas of the Atlantic arc has tried, through exchanges between researchers, company advisers and livestock farmers, to increase knowledge relevant to more sustainable European dairy systems. These systems must not only be adapted to the strengths and weaknesses of the local environments, but they must also be socially attractive and economically profitable.

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Table 2. Average characteristics of specialised dairy farms over 5 years -1999-2003

	Ireland	Northern Ireland	Scotland	Wales	SW England	Brittany	Pays de Loire	Aquitaine	Basque Country	Galicia	North Portugal	Total 11 regions	Regions North	Regions France	Regions South	EU-15 (total)
Number of holdings	22 220	4 220	1 430	2 980	6 710	14 100	8 240	2 220	1 070	12 450	4 860	80 490	30 360	24 560	18 380	323 810
Structural characteristics (jobs, areas, herd and intensification)																
Agricultural Work Unit (AWU)	1,57	1,69	2,69	2,17	2,29	1,64	1,73	1,62	1,68	1,55	2,07	1,74	1,78	1,67	1,70	1,78
AWU non family (paid) / AWU total (%)	12%	8%	32%	25%	37%	4%	3%	8%	3%	2%	14%	12%	20%	4%	6%	11%
Usable Agricultural Area (UAA)	47	58	128	91	85	54	64	52	23	13	8	49	59	57	12	49
Forage surface (FS) /UAA (%)	98%	98%	91%	96%	86%	72%	74%	64%	96%	98%	92%	86%	93%	72%	97%	80%
LU Grazing	84	104	216	180	153	61	73	55	40	32	39	79	106	64	34	72
LU Grazing / FS	1,8	1,8	1,9	2,1	2,1	1,6	1,5	1,7	1,9	2,6	5,2	1,9	1,9	1,6	2,9	1,9
Dairy cows	45	61	108	100	100	38	39	39	30	25	28	47	60	38	26	44
Milk production																
Milk production per holding (kg/year)	228 400	367 300	688 200	621 600	672 700	250 000	253 900	240 100	210 300	132 900	176 800	283 600	347 900	250 300	148 200	287 100
Milk production per AWU (kg per year)	145 500	217 100	255 600	287 000	294 300	152 000	146 800	148 400	124 900	85 600	85 500	163 100	195 700	149 900	87 400	161 300
Milk production per dairy cow (kg/year)	5 100	6 000	6 400	6 200	6 700	6 600	6 500	6 200	7 100	5 200	6 300	6 000	5 800	6 500	5 700	6 500
Milk production per ha of FS (kg/year)	5 000	6 500	5 900	7 100	9 300	6 400	5 400	7 300	9 700	10 700	23 800	6 700	6 300	6 100	12 800	7 300
Costs per ton of milk (euros)																
Total costs	263	276	344	276	295	349	364	401	257	166	270	294	284	359	206	335
Operational costs (not counting home-grown)	120	124	145	125	131	105	116	154	170	114	162	123	127	113	133	127
* Feed for grazing stock except home-grown)	57	71	86	68	69	40	50	69	145	84	106	64	65	46	95	73
Structural costs	143	152	198	151	164	244	248	247	87	53	109	171	157	246	73	208
* Mechanisation costs	51	56	61	56	57	109	117	123	30	29	62	69	55	113	40	85
* Building costs	27	9	16	19	15	27	25	25	14	8	11	20	21	26	9	24
* Tenant farming	16	17	11	12	18	23	28	19	4	1	2	17	17	24	1	20
* Farm taxes	1	2	4	0	0	6	5	6	1	0	0	2	1	6	0	4
* Wages for non family AWU	12	7	32	21	31	4	4	9	4	3	9	14	22	4	5	14
* Financial costs	12	12	16	18	17	18	17	9	5	2	6	14	14	17	3	19
* Other structural costs	24	49	59	25	25	58	52	56	30	10	19	35	28	56	15	41
Economic results																
Operational costs / output + subsidies	29%	35%	37%	35%	35%	22%	24%	33%	50%	28%	41%	30%	32%	24%	33%	28%
Structural costs / output + subsidies	34%	43%	50%	42%	44%	52%	50%	52%	25%	13%	27%	41%	40%	51%	18%	45%
Subsidies (€)	8 400	6 500	15 400	16 100	17 200	12 300	15 000	14 400	3 100	500	3 400	9 400	10 700	13 400	1 400	12 900
Subsidies / FFI (%)	26%	25%	56%	34%	40%	44%	49%	83%	17%	2%	26%	32%	31%	48%	7%	42%
Total output (€)	86 300	123 400	254 700	207 500	233 400	105 200	109 800	99 200	68 800	54 200	66 500	107 500	126 600	106 200	58 100	118 800
Milk production (%)	76%	82%	77%	82%	80%	74%	73%	75%	92%	73%	82%	77%	78%	74%	77%	77%
Gross Farming Income (€)	41 800	48 500	85 100	76 300	73 700	48 000	50 600	36 600	27 200	26 400	22 300	44 900	50 900	47 800	25 300	53 000
GFI / Output + subsidies	44%	37%	32%	34%	29%	41%	41%	32%	38%	48%	32%	38%	37%	40%	43%	40%
Family Farm Income (€)	32 000	26 200	27 700	47 000	43 300	28 200	30 600	17 300	18 100	23 200	13 400	29 100	34 200	28 000	20 200	30 500
FFI / Family AWU (€)	23 100	16 800	15 000	29 000	29 900	17 800	18 300	11 600	11 200	15 300	7 500	19 000	24 100	17 400	12 700	19 300
Assets and investments																
Total assets (€)	723 200	719 000	1 256 500	894 900	937 900	230 800	227 800	227 500	147 800	253 200	113 200	488 700	796 800	229 500	208 400	602 300
Total liabilities (€)	37 200	33 100	164 200	151 200	182 600	97 800	92 500	54 900	18 400	8 000	14 300	66 300	75 200	92 200	10 200	114 300
Gross investment / output + subsidies (%)	11%	15%	14%	15%	12%	15%	13%	14%	13%	9%	12%	13%	12%	14%	10%	17%
Gross investment (€)	10 900	20 000	36 900	32 900	28 800	17 200	16 700	16 100	9 100	4 900	8 200	14 800	16 000	16 900	6 000	21 900
* Agricultural lands, permanent crops (€)	900	0	2 300	5 300	3 200	1 600	1 200	1 000	1 800	200	200	1 200	1 500	1 400	200	3 000
* Quotas and acquisition costs (€)	2 800	4 400	2 100	8 100	7 400	0	100	0	-200	600	300	2 100	3 800	0	500	3 100
* Building (€)	3 400	0	4 600	6 300	5 100	5 600	5 100	4 400	4 000	1 300	1 500	3 600	3 800	5 300	1 400	6 300
* Equipment (€)	3 800	9 000	17 800	11 000	12 500	9 800	9 900	11 000	3 500	2 000	5 800	7 000	6 400	9 900	3 000	9 300

Sources : FADN UE, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

Table 3. Average characteristics of specialised dairy holdings for 2003

	Ireland	Northern Ireland	Scotland	Wales	SW England	Brittany	Pays de Loire	Aquitaine	Basque Country	Galicia	North Portugal	Total 11 regions	Regions North	Regions France	Regions South	EU-15 (total)
Number of holdings	21 330	3 840	1 280	2 570	6 160	14 170	7 700	2 250	830	10 350	5 120	75 590	28 770	24 120	16 300	292 680
Structural characteristics (jobs, areas, herd and intensification)																
Agricultural Work Unit (AWU)	1,55	1,7	2,65	2,27	2,28	1,71	1,88	1,73	1,76	1,57	1,97	1,76	1,75	1,77	1,71	1,83
AWU non family (paid) / AWU total (%)	13%	8%	29%	29%	35%	4%	3%	13%	3%	3%	10%	12%	20%	5%	6%	14%
Usable Agricultural Area (UAA)	50	60	128	103	87	57	70	58	25	15	8	52	62	61	13	54
FS /UAA (%)	97%	98%	89%	96%	86%	73%	73%	60%	97%	99%	92%	86%	93%	72%	98%	79%
LU Grazing	89	113	217	197	156	64	75	61	50	37	37	84	109	67	38	80
LU Grazing / FS	1,8	1,9	1,9	2,0	2,1	1,5	1,5	1,7	2,0	2,5	5,2	1,9	1,9	1,5	2,9	1,9
Dairy cows	48	67	116	113	106	39	41	41	38	29	27	50	63	40	29	49
Milk production																
Milk production per holding (kg/year)	253 900	425 100	761 600	736 900	754 800	264 100	270 800	261 200	280 300	154 100	172 500	313 400	383 700	266 000	166 300	328 500
Milk production per AWU (kg per year)	163 800	250 100	287 400	324 600	331 100	154 500	144 000	151 000	159 300	98 100	87 500	178 000	219 300	150 300	97 200	179 500
Milk production per dairy cow (kg/year)	5 300	6 300	6 500	6 500	7 100	6 700	6 600	6 400	7 400	5 300	6 300	6 200	6 100	6 700	5 700	6 600
Milk production per ha of FS (kg/year)	5 200	7 200	6 600	7 400	10 000	6 300	5 300	7 500	11 500	10 500	24 100	7 000	6 700	6 000	13 000	7 800
Costs per ton of milk (euros)																
Total costs	244	261	295	261	263	364	370	447	256	176	260	283	256	373	210	333
Operational costs (not counting home-grown)	116	123	139	119	118	101	106	164	173	122	159	118	119	108	139	130
* Feed for grazing stock (except home-grown)	58	74	85	66	63	42	46	75	146	94	101	64	62	47	101	79
Structural costs	128	138	156	142	145	263	264	283	83	54	101	165	138	265	72	203
* Mechanisation costs	46	50	55	51	51	113	120	136	30	29	60	67	49	118	39	81
* Building costs	24	9	19	17	12	31	30	28	15	6	10	20	18	30	8	24
* Tenant farming	14	17	6	12	17	23	27	21	4	1	2	16	15	24	2	20
* Farm taxes	1	1	4	0	1	7	6	6	0	1	0	2	1	7	1	4
* Wages for non family AWU	13	7	27	22	26	4	4	16	3	3	7	13	20	5	4	15
* Financial costs	10	10	12	13	12	19	16	11	5	2	4	12	11	17	3	18
* Other structural costs	20	44	34	25	26	65	61	67	26	11	18	35	24	64	15	41
Economic results																
Operational costs / output + subsidies	29%	37%	41%	35%	33%	22%	22%	33%	52%	30%	40%	30%	32%	23%	34%	29%
Structural costs / output + subsidies	32%	42%	46%	42%	40%	56%	54%	58%	25%	13%	25%	41%	37%	56%	18%	45%
Subsidies (€)	9 900	6 400	16 900	21 500	18 600	14 200	16 300	19 200	4 700	1 000	3 100	11 000	12 100	15 400	1 800	15 100
Subsidies / FFI (%)	27%	23%	60%	42%	33%	55%	55%	177%	20%	4%	19%	35%	30%	60%	8%	46%
Total output (€)	90 200	134 200	242 500	229 900	251 200	108 800	115 700	108 700	89 400	62 500	66 400	114 100	131 400	111 000	65 100	133 500
Milk production (%)	76%	82%	77%	81%	78%	75%	73%	74%	92%	75%	81%	77%	77%	74%	78%	77%
Gross Farming Income (€)	48 400	49 900	71 400	80 200	84 300	48 100	52 300	35 000	34 300	29 200	23 300	48 300	57 100	48 200	27 600	57 400
GFI / Output + subsidies	48%	36%	28%	32%	31%	39%	40%	27%	36%	46%	34%	39%	40%	38%	41%	39%
Family Farm Income (€)	37 300	27 300	28 000	51 200	55 700	25 800	29 400	10 900	22 900	25 700	15 700	31 700	40 900	25 600	22 400	32 900
FFI / Family AWU (€)	27 700	17 500	15 000	31 800	37 400	15 600	16 300	7 200	13 400	16 900	8 800	20 400	29 200	15 100	13 900	20 800
Assets and investments																
Total assets (€)	764 000	712 500	1 369 500	870 900	981 000	249 000	240 900	244 200	182 600	304 300	106 800	513 800	837 300	245 900	236 000	672 300
Total liabilities (€)	40 800	72 300	164 000	169 300	181 400	108 900	99 800	65 100	23 100	10 200	9 800	73 300	76 400	101 900	10 700	134 700
Gross investment / output + subsidies (%)	9%	17%	18%	20%	16%	13%	13%	12%	9%	7%	8%	13%	13%	13%	7%	16%
Gross investment (€)	9 500	24 300	45 800	51 400	43 200	15 800	16 900	14 900	8 800	4 100	5 700	16 100	18 300	16 100	4 900	23 300
* Agricultural lands, permanent crops (€)	-600	0	2 200	5 100	8 300	1 600	900	1 700	1 900	0	200	1 200	1 400	1 400	200	2 400
* Quotas and acquisition costs (€)	2 700	9 600	0	20 000	14 100	0	100	0	-1 100	2 700	600	3 500	5 000	0	1 800	4 200
* Building (€)	3 000	0	13 500	10 800	5 300	4 900	5 100	2 200	4 100	500	700	3 600	4 000	4 700	800	6 900
* Equipment (€)	3 600	9 300	20 900	14 100	13 800	10 100	12 800	11 000	4 000	900	4 400	7 400	6 500	11 000	2 100	9 800

Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

Table 4. Average characteristics of specialised dairy holdings according to the quartiles of milk production per AWU and per year during 2003

	Output / AWU	Ireland	Northern Ireland	SW England	Brittany	Pays de Loire	Galicia	North Portugal	Total 11 regions	Regions North	Regions France	Regions South	EU-15 (total)
Milk production / AWU (kg/year)	Quartile 1	70 600	96 100	143 900	98 000	89 600	38 300	27 300	64 100	79 100	95 700	34 700	59 700
	Quartile 2	131 400	175 100	251 500	135 200	126 400	68 800	46 500	123 100	148 700	131 700	62 500	115 600
	Quartile 3	180 200	257 400	351 700	168 800	160 500	99 400	82 600	175 900	215 600	165 800	96 900	177 200
	Quartile 4	272 800	430 800	558 300	239 000	217 200	177 500	159 200	331 200	384 900	232 800	180 400	347 600
	Together	163 900	249 700	330 500	153 700	144 200	98 200	87 400	178 100	219 400	150 400	97 400	179 500
Total costs / Ton of milk (euros)	Quartile 1	257	342	293	368	361	167	240	258	263	396	219	385
	Quartile 2	248	266	297	356	385	197	255	322	254	372	210	361
	Quartile 3	250	265	281	373	360	168	264	301	263	369	206	351
	Quartile 4	235	241	227	360	373	175	261	265	252	367	211	307
	Together	244	260	263	364	370	176	260	283	256	373	210	333
Operational costs / Ton of milk (euros)	Quartile 1	123	139	124	99	104	110	146	125	123	117	137	142
	Quartile 2	118	124	125	97	116	129	155	119	119	107	132	130
	Quartile 3	117	121	127	105	103	115	157	117	120	107	134	127
	Quartile 4	112	120	107	102	101	126	163	118	117	106	143	130
	Together	116	122	118	101	106	122	159	118	119	108	139	130
Structure costs / Ton of milk (euros)	Quartile 1	134	203	169	270	257	57	94	132	140	279	82	243
	Quartile 2	130	142	172	259	269	68	100	203	135	265	78	232
	Quartile 3	133	144	153	267	257	52	108	184	143	262	72	224
	Quartile 4	122	121	120	258	272	48	99	147	135	261	68	177
	Together	128	138	145	263	264	54	101	165	138	265	72	203
GFI / Output + Subsidies (%)	Quartile 1	49%	26%	30%	37%	38%	40%	39%	40%	46%	34%	37%	42%
	Quartile 2	48%	37%	33%	41%	39%	40%	34%	39%	46%	39%	39%	40%
	Quartile 3	48%	36%	27%	38%	41%	50%	32%	42%	41%	39%	43%	39%
	Quartile 4	49%	37%	33%	40%	40%	47%	34%	36%	35%	39%	42%	37%
	Together	48%	36%	31%	39%	40%	46%	34%	39%	40%	38%	41%	39%
Income / family AWU (euros)	Quartile 1	11 500	3 400	14 500	10 800	11 100	6 200	3 600	9 000	12 200	9 800	4 700	9 300
	Quartile 2	22 400	12 700	32 800	15 100	14 400	10 800	4 800	14 700	23 800	14 000	8 700	14 600
	Quartile 3	31 900	18 800	36 200	16 200	17 900	19 100	7 800	22 100	33 000	16 800	14 800	20 400
	Quartile 4	48 900	33 700	69 300	22 200	23 200	30 500	16 900	37 900	49 400	21 400	25 800	40 600
	Together	27 600	17 400	37 200	15 700	16 200	16 900	8 800	20 400	29 200	15 100	13 900	20 800
Gross investment / Output + Subsidies (%)	Quartile 1	0%	9%	12%	9%	14%	0%	0%	2%	3%	8%	0%	12%
	Quartile 2	8%	15%	16%	10%	7%	3%	3%	9%	11%	10%	4%	13%
	Quartile 3	14%	17%	10%	12%	11%	2%	6%	14%	12%	12%	3%	13%
	Quartile 4	9%	20%	21%	19%	19%	12%	12%	16%	16%	18%	12%	19%
	Together	9%	17%	16%	13%	13%	7%	8%	13%	13%	13%	7%	16%

Sources : FADN EU, European Commission DG AGRI-G3 / processed by INRA SAE2 Nantes and Institut de l'Elevage

Table 5. Average characteristics of specialised dairy farms according to the classes of economic efficiency (GFI / Output + Subsidies) in 2003

	GFI / Output + Subsidies	Ireland	Northern Ireland	SW England	Brittany	Pays de Loire	Galicia	North Portugal	Total 11 regions	Regions North	Regions France	Regions South	EU-15 (total)
Milk production / AWU (kg/year)	Quartile 1	162 700	197 600	295 700	149 000	134 000	81 200	86 900	198 900	269 700	141 300	88 500	194 400
	Quartile 2	166 300	254 700	355 800	156 700	135 800	107 900	99 900	182 300	233 200	147 600	106 700	187 700
	Quartile 3	164 100	264 300	338 200	161 800	156 100	98 600	102 000	170 100	183 400	158 900	105 300	175 900
	Quartile 4	164 500	279 800	333 800	147 800	149 600	107 400	46 500	153 400	163 900	152 900	89 800	155 100
	Together	163 900	249 700	330 500	153 700	144 200	98 200	87 400	178 100	219 400	150 400	97 400	179 500
Total costs / Ton of milk (euros)	Quartile 1	294	319	310	426	430	237	307	323	298	448	274	390
	Quartile 2	254	285	277	381	372	182	259	303	243	374	224	351
	Quartile 3	225	254	248	343	374	159	242	267	236	362	181	312
	Quartile 4	194	209	210	313	328	128	185	209	198	323	135	244
	Together	244	260	263	364	370	176	260	283	256	373	210	333
Operational costs / Ton of milk (euros)	Quartile 1	137	145	130	112	137	161	182	138	133	136	175	160
	Quartile 2	119	131	126	113	108	130	162	120	115	113	149	133
	Quartile 3	110	120	114	98	101	111	148	107	112	104	122	117
	Quartile 4	95	103	98	81	87	89	119	97	96	86	93	96
	Together	116	122	118	101	106	122	159	118	119	108	139	130
Structure costs / Ton of milk (euros)	Quartile 1	157	174	180	313	292	76	125	185	165	312	100	230
	Quartile 2	135	154	151	268	264	52	98	183	128	261	75	219
	Quartile 3	115	133	133	244	272	48	94	160	123	258	59	196
	Quartile 4	100	106	112	232	241	39	66	112	102	237	42	148
	Together	128	138	145	263	264	54	101	165	138	265	72	203
GFI / Output + Subsidies (%)	Quartile 1	34%	20%	15%	27%	28%	23%	21%	23%	24%	24%	22%	20%
	Quartile 2	46%	30%	27%	37%	36%	41%	32%	37%	41%	36%	37%	37%
	Quartile 3	53%	38%	36%	42%	40%	51%	41%	45%	50%	41%	48%	45%
	Quartile 4	62%	48%	48%	49%	49%	64%	53%	57%	60%	49%	63%	59%
	Together	48%	36%	31%	39%	40%	46%	34%	39%	40%	38%	41%	39%
Income / family AWU (euros)	Quartile 1	17 900	1 500	6 500	5 600	7 800	5 000	3 600	9 600	19 800	4 300	4 700	5 800
	Quartile 2	27 000	12 600	42 500	13 700	13 300	16 600	9 500	18 100	30 800	13 100	12 200	18 000
	Quartile 3	29 900	21 800	42 800	17 600	16 100	19 600	13 500	24 000	31 400	17 000	19 000	24 200
	Quartile 4	35 200	31 600	55 300	24 000	24 200	28 700	8 300	30 500	34 500	23 900	22 600	34 000
	Together	27 600	17 400	37 200	15 700	16 200	16 900	8 800	20 400	29 200	15 100	13 900	20 800
Gross investment / Output + Subsidies (%)	Quartile 1	6%	20%	19%	16%	14%	7%	8%	13%	14%	14%	4%	12%
	Quartile 2	9%	9%	12%	12%	10%	7%	7%	14%	15%	11%	11%	18%
	Quartile 3	12%	19%	23%	11%	12%	6%	12%	12%	11%	13%	6%	18%
	Quartile 4	11%	20%	9%	13%	15%	6%	0%	11%	10%	14%	8%	16%
	Together	9%	17%	16%	13%	13%	7%	8%	13%	13%	13%	7%	16%

Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage

Table 6. Average characteristics of specialised dairy holdings of more than 200,000 kg of milk per year during 2003

	Ireland	Northern Ireland	Scotland	SW England	Brittany	Pays de Loire	Galicia	North Portugal	Total 11 regions	Regions North	Regions France	Regions South	EU-15 (total)
Number of holdings	11 880	2 960	1 200	5 610	9 620	4 810	2 480	1 630	44 320	18 690	15 950	4 480	161 310
Structural characteristics (jobs, areas, herd and intensification)													
Agricultural Work Unit (AWU)	1,75	1,82	2,7	2,37	1,92	2,23	1,97	2,59	2,04	2	2,02	2,22	2,15
AWU non family (paid) / AWU total (%)	19%	10%	31%	36%	5%	4%	8%	17%	17%	26%	6%	12%	20%
Usable Agricultural Area (UAA)	62	68	133	92	69	84	23	13	71	75	73	20	73
FS /UAA (%)	96%	98%	89%	86%	72%	71%	100%	96%	85%	92%	70%	99%	77%
LU Grazing	119	133	227	165	76	90	69	74	115	140	80	72	116
LU Grazing / FS	2,0	2,0	1,9	2,1	1,6	1,5	3,0	6,0	1,9	2,0	1,6	3,6	2,0
Dairy cows	65	80	122	113	46	49	53	53	69	83	47	54	71
Milk production													
Milk production per holding (kg/year)	354 700	513 300	802 800	814 300	316 300	346 000	319 000	361 000	448 500	521 400	325 600	349 300	496 700
Milk production per AWU (kg per year)	202 700	282 100	297 300	343 600	164 700	155 200	161 900	139 400	219 800	260 700	161 200	157 400	231 000
Milk production per dairy cow (kg/year)	5 500	6 400	6 600	7 200	6 900	7 100	6 000	6 900	6 500	6 300	6 900	6 500	7 000
Milk production per ha of FS (kg/year)	5 900	7 600	6 800	10 300	6 400	5 800	13 900	29 300	7 500	7 500	6 300	17 500	8 800
Costs per ton of milk (euros)													
Total costs	243	256	294	262	372	374	181	265	287	257	381	222	330
Operational costs (not counting home-grown)	115	122	138	118	102	105	128	163	119	119	109	147	131
* Feed for grazing stock (except home-grown)	57	74	85	63	43	47	99	104	63	63	47	107	80
Structural costs	129	134	156	144	271	268	53	103	168	138	272	75	199
* Mechanisation costs	45	49	55	50	115	122	30	59	67	48	120	41	77
* Building costs	22	8	19	12	34	32	4	11	20	17	33	8	23
* Tenant farming	16	17	6	17	25	28	1	2	17	15	26	1	21
* Farm taxes	1	1	4	1	6	5	0	0	2	1	6	0	4
* Wages for non family AWU	16	7	27	26	4	5	5	8	15	22	6	6	17
* Financial costs	11	10	12	12	20	15	3	5	13	12	18	4	19
* Other structural costs	19	42	33	25	65	60	10	18	35	23	64	15	37
Economic results													
Operational costs / output + subsidies	29%	37%	41%	33%	22%	21%	32%	41%	30%	32%	23%	38%	30%
Structural costs / output + subsidies	33%	41%	46%	40%	57%	54%	13%	26%	43%	37%	56%	19%	45%
Subsidies (€)	12 000	7 300	17 600	19 700	17 200	20 800	1 200	5 200	15 000	14 700	19 000	3 100	19 200
Subsidies / FFI (%)	23%	22%	59%	33%	57%	54%	2%	17%	35%	28%	61%	8%	41%
Total output (€)	126 800	160 600	255 400	270 500	132 000	149 900	125 000	138 100	161 900	178 200	137 700	132 800	200 100
Milk production (%)	76%	83%	77%	78%	74%	72%	79%	83%	77%	77%	73%	82%	78%
Gross Farming Income (€)	66 700	60 700	75 200	90 600	58 600	69 300	56 600	46 600	67 100	74 400	60 400	53 300	82 400
GFI / Output + subsidies	48%	36%	28%	31%	39%	41%	45%	33%	38%	39%	39%	39%	38%
Family Farm Income (€)	51 400	33 700	29 700	60 000	30 400	38 500	48 800	30 400	42 700	52 600	31 100	41 500	46 400
FFI / Family AWU (€)	36 200	20 600	15 900	39 400	16 700	18 100	26 800	14 200	25 100	35 500	16 400	21 200	26 800
Assets and investments													
Total assets (€)	1 002 100	817 300	1 428 800	1 034 700	300 200	305 800	513 100	213 400	689 000	1 039 100	301 300	387 000	974 200
Total liabilities (€)	61 600	90 400	174 800	198 100	141 300	130 800	24 400	27 000	112 700	109 800	132 900	27 200	220 700
Gross investment / output + subsidies (%)	10%	18%	18%	16%	15%	14%	14%	11%	15%	14%	14%	13%	16%
Gross investment (€)	14 500	30 600	48 500	47 100	21 900	23 600	17 400	15 800	25 900	26 400	22 200	17 200	35 900
* Agricultural lands, permanent crops (€)	0	0	2 300	9 100	1 600	1 300	100	0	2 100	2 800	1 600	300	4 000
* Quotas and acquisition costs (€)	4 400	12 200	0	15 700	0	100	11 200	1 700	5 800	7 500	0	6 800	7 500
* Building (€)	3 500	0	14 500	5 800	6 900	6 600	1 100	1 900	5 200	4 900	6 300	2 000	10 000
* Equipment (€)	4 800	11 300	22 200	14 700	14 000	17 900	2 500	11 800	11 400	8 800	15 200	6 400	14 000

Sources : FADN EU, European Commission DG AGRI-G3 / Processed by INRA SAE2 Nantes and Institut de l'Elevage