

Linking technological research to different problem definitions, perspectives and interest in countryside: the experience of parmesan cheese

Silvio A., De Roest K.

in

van der Ploeg J. (ed.).
Strengthening endogenous development patterns in European agriculture

Chania : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 23

1993
pages 178-195

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=C1000381>

To cite this article / Pour citer cet article

Silvio A., De Roest K. **Linking technological research to different problem definitions, perspectives and interest in countryside: the experience of parmesan cheese.** In : van der Ploeg J. (ed.). *Strengthening endogenous development patterns in European agriculture*. Chania : CIHEAM, 1993. p. 178-195 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 23)



<http://www.ciheam.org/>
<http://om.ciheam.org/>

LINKING TECHNOLOGICAL RESEARCH TO DIFFERENT PROBLEM DEFINITIONS, PERSPECTIVES AND INTERESTS IN THE COUNTRYSIDE: THE EXPERIENCE OF PARMESAN CHEESE

SILVIO ANTONELLO

CRPA Via Crispi 3, Reggio Emilia

AND KEES DE ROEST

Abstract:

Following Picchi's exposition, Antonello and De Roest show how through the local interaction between research and practice, at least some of the countervailing powers are shaped. Simultaneously they indicate the different menaces, both from outside and from within, that threaten this particular experience of endogenous development.

Keywords:

CHEESE, HARD CHEESE, DIARY INDUSTRY RESEARCH, SMALL FARMS, MILK PRODUCTION, RURAL DEVELOPMENT, PRODUCTION ECONOMICS, ITALY, STANDARDIZING SUPERMARKETS.

Introduction

The way in which technology develops in agriculture is one of the issues which has obtained considerable attention in recent literature. Most interesting is the approach which analyzes the different paths technology takes in relation to specific regional conditions. Such an approach gives special attention to the relationships between the pedological, physical, social and economic conditions of an agricultural region and the characteristics of the technology applied in different agricultural systems.

In this paper we focus on two different milk production systems in Italy: the production of *Parmigiano-Reggiano* (Parmesan cheese) and *Grana Padano* cheese. A milk production system can be considered as the group of interdependent technologies, manpower skills and production structures of both the farm and the milk processing industry. The differences between systems have their origin in the ecological and physical conditions of the production area and in different cost/price relationships. Our attention will be concentrated on the two above types of cheese, because they are similar and used for the same culinary purposes. They are, however, produced in two different ways: the first one on a small artisanal scale, the second on a larger scale with more industrial concepts.

We describe first the different technologies used on the farms and by the milk processing industry and in particular the origins of these differences as these have

created the basis for different social and economic paths of development and for different problem definitions by research centers. We then analyze the economic results of both systems at farm and regional level. Finally, we discuss the threat to the *Parmigiano-Reggiano* cheese production system from the increasing standardization requirements of supermarket chains, which are considered to be incompatible with the system.

Historical background of hard cheese production

The first documents certifying the existence of a hard cheese produced on the right bank of the River Po date back to the mid-1300's. It is therefore possible that the processing of cow's milk into what was much later, in 1934, to be called *Parmigiano-Reggiano* was common practice even in previous centuries.

It is a common opinion that the production of 'Parmigiano cheese' was first carried out by Benedictine monks. This is likely to be true for two reasons: first, the Benedictines were the only ones in 1200 who bred cows in sufficient numbers to produce the amount of milk needed for a whole cheese of 20 kg. second, the innovative technique of double heating the milk at different temperatures and salting to allow cheese conservation, were only possible in elementary laboratories.

As far as the geographic origin of *Parmigiano-Reggiano* is concerned, we can presume that the cheese was born in the area between the Via Emilia (the main road across the Emilia-Romagna region) and the river Enza which still separates the provinces of Parma and Reggio Emilia. Up to the last century, the Parma diocese extended as far as the area under the civil jurisdiction of Reggio Emilia. This is the reason why the cheese produced in that area was called only *Parmigiano* for a long time. A similar hard cheese produced in Lombardia on the left bank of the river Po was also for a long time called *Parmigiano*.

The denomination *Parmigiano-Reggiano* is quite recent. The present trade mark dates back to 1934 after many parochial squabbles between Milan (claiming the denomination of *Parmigiano* only for the cheese produced in the Lodi area), Parma and Reggio Emilia.

A formal Act of the Constitution of the Consorzio determined the *Parmigiano-Reggiano* production area, which corresponds exactly to the present one. At the beginning of the fifties the Consorzio for the production of the Lombardian counterpart (the former *Parmigiano* of the Lodi area in the province of Milan) was founded, which defined the limits of the production area for the second hard cheese of Italy, baptized with a new name - *Grana Padano* (see Map 1).

Technology in Parmigiano-Reggiano and Grano Padano cheese production

The two type of cheeses share almost 30 percent of Italian milk production. Most important is the Parmigiano-Reggiano cheese, occupying about 15 percent, of production followed immediately by Grana Padano which covers about 13 percent of production. In the eighties their production increased significantly (Graphs 1 and 2).

Historically, dairy farms in Lombardy (where 60 percent of Grana Padano cheese is produced) were characterized by large farms and in Emilia-Romagna (the production region of Parmigiano-Reggiano) by small and medium-sized farms. Some of the differences in technology between the two areas can be related directly to these differences in farm structure and size, which in their turn generated a different scale of operation in the milk processing units where cheese production takes place.

The principal differences between the two dairy systems are:

	Grana Padano	Parmigiano-Reggiano
1.main feedstuffs used on the farm	maize silage grass silage concentrates	hay concentrates with limitations
2.milk processing in cheese factory	two times a day with partial skimming	once a day with a mix of skimmed evening milk and whole morning milk
3.treatments	chemical additives (formaline, lysine)	no additives

The Parmigiano-Reggiano cheese is produced in about 800 small-scale processing units with an average working capacity of about 2,000 tons of milk per year. The Grana Padano cheese is produced in larger processing units and in some cases on an industrial scale. On average, 5,400 tons of milk annually are processed in a Grana Padano plant.

A very important difference in feeding practices between the two areas is the prohibition of silage in the Parmigiano-Reggiano cheese area. The fear of microbial contamination of the raw milk is the reason for its ban on the dairy farms delivering milk for Parmigiano-Reggiano cheese. In Lombardy, however, the abundant use of maize silage is characteristic of feeding practices. Drier and more sandy soils in this region create ideal production conditions for this crop.

The composition of concentrates in the Parmigiano-Reggiano cheese area is also bound by limitations. It is forbidden to add a series of byproducts to the compound feed. Hence, local compound feed plants specialize in the production of adapted feed for local dairy farmers who produce milk for Parmigiano-Reggiano cheese.

There are also some differences to be observed in the processing of milk for the two types of cheese. In many respects the process of cheese production is similar. Both put raw milk into small cone-shaped basins from which the two forms of cheese are extracted. In the Grana Padano area, however, productivity is much higher due to a more pronounced division of labour during processing. More parts of the process are

mechanized and cheese processing is carried out twice a day. Another important difference is that in the Grano Padano plants, chemicals are added to milk in order to prevent the development of microbes derived from feeding silage in the stables. Without using additives the long ripening period of Grana Padano cheese (15 months) could be disturbed by the presence of these microbes.

The production process of Parmigiano-Reggiano cheese is based on mixing the morning whole milk with the partially skimmed milk of the previous evening. The product can be considered completely natural as no additives are used and cheese processing takes place only once a day. The dairyman responsible for processing must be endowed with special skills which delimit a pronounced division of labour during processing.

Thanks to substantial documentation, we know that since its origin and until the mid-19th century, Parmigiano-Reggiano underwent no processing innovation. The innovations of the last 150 years can be summarized as follows:

- a) the elimination of saffron as a colouring agent (which gave it in the beginning its yellow colouring)
- b) the use of whey-ferment to increase cheese compactness
- c) the introduction of steam heating instead of wood heating
- d) the replacement of the old small wooden basins with aluminium basins
- e) the use of the Notari curd knife to cut the curd
- f) wet instead of dry salting
- g) the elimination of the final colouring
- h) mechanization and automation of the recircling of the milk in the basins (though still in many dairies these operations are carried out by hand)

Basically, the only changes in production techniques for Parmigiano-Reggiano have been those aimed at improving the productivity of the dairyman.

Economic aspects of production at farm and regional level

Smaller farm size and feed restrictions (forage and concentrates) cause higher milk production costs for the dairy farmers. A comparison of the milk production costs of the two regions confirms that the artisanal way of producing milk generates higher milk production costs on farms (see Tables 1 and 2). Costs are about 15 percent higher. The major difference observed is in the purchase of compound feed. In the Parmigiano-Reggiano cheese area these costs are higher because of the ban on using any type of silage. In Lombardy the use of maize silage significantly reduces the input of concentrates.

However, the high quality of Parmigiano-Reggiano cheese is reflected in its higher - compared to the others - price on the market (about 12 ECU/kg in the shops) and due to a mainly cooperative system of processing, this higher market price is translated into a higher off-farm milk price (Graph 3).

Table 1. Characteristics of the samples

	Lombardy	Parmesan cheese area
Number of farms	426	18
Farm size (ha)	32.2	24.2
Forage area (ha)	25.5	21.2
Milking cows	51.3	45.0
Price of milk (lire/kg)	681	814
Labour input (AWU)	3.3	3.4
Production per cow	6300	5370
(kg)Cows/AWU	15.5	13.4
Cows/ha forage area	2.0	2.1
Milk production /ha forage	10803	13372

Source: Pretolani (1991) and own calculations on ERSA data.

Table 2. Milk production costs 1989

	Lombardy		Parmesan cheese area	
	Lire/kg	%	Lire/kg	%
Purchased feed	172	25.8	239	31.7
Other cattle costs	28	4.1	38	5.0
Forage production costs	72	10.8	53	7.0
General costs	28	4.1	31	4.1
Machinery and buildings	36	5.4	59	7.8
Labour	268	40.2	251	33.3
Interest costs	64	9.6	83	11.0
Total production costs	666	100.0	753	100.0

Source: Pretolani (1991) and own calculations on ERSA data.

The more labour intensive technology used on the farms in the Parmigiano-Reggiano area, causing higher production costs, is offset by a higher off-farm milk price. This higher price also generates a higher income per working unit in the less-favoured mountainous areas¹ (see Map 2). As for the plains, we notice higher incomes in the

¹ The gross income per working unit was calculated at municipality level for the year 1982, relating single gross standard incomes to agricultural census data of 1982. By means of an aggregation of

Lombardian plains than in the plains of, for example, the province of Reggio Emilia. In the plains of Lombardy, characterized by large-scale farms, economies of scale more than offset the lower milk price paid in these areas, whereas in the plains of the Parmigiano-Reggiano cheese area, the smaller farm size, generating higher production costs, results in a lower gross income per working unit.

Interesting, however, is the fact that in the mountain area of the Parmigiano-Reggiano zone, incomes are definitely higher than in the mountains of the Lombardy region. The mountain areas of the province of Reggio Emilia (RE), Parma (PR) and Modena (MO) reach income levels which are almost double those achieved in the mountain areas of the provinces of the Lombardy region (see Graph 3). Thus, the high quality production of Parmigiano-Reggiano cheese presents an efficacious way of defending agricultural incomes against further marginalisation in mountain areas.

Research activities in the Parmigiano-Reggiano cheese area

The special regulations for the production of Parmigiano-Reggiano cheese laid down by the Consorzio² can be considered as the basis for specific technological developments. The whole system expresses a demand for research on adapted technology which differs considerably from the research questions posed in the Grana Padano area. Some examples will illustrate this statement.

As mentioned earlier, the prohibition of silage in the Parmigiano-Reggiano area has forced the farmers to use more concentrates per cow to satisfy the energy requirements of cows with increased genetic production capacity. It involves high costs to sustain the high milk production levels per cow, which still lag behind those achieved in the Grana Padano area. The only way to lower these costs is to increase hay quality. The specific technology developed to do this is the technique of drying hay twice. The principle of the technique is based on a first short drying of the forage (mainly alfalfa) in the fields, which reduces losses, and a second drying that is done in the hayloft using forced ventilation. Traditional haylofts can easily be converted by inserting special ventilation vans. In spite of the higher energy and investment costs, this technology turned out to be successful, since the higher costs are compensated for by a significant reduction in input of concentrates.

But it is not only a question of developing specific technology. New technology introduced with success in the Grana Padano area was actually prohibited in the

agricultural municipality incomes, sub-regional income were calculated (see Map 2 and Graph 4). The provinces of Reggio Emilia (REm), Modena (MOm) and Parma (PRm) belong to the Parmigiano-Reggiano production area. The remaining provinces of Sondrio (SO), Piacenza (PC), Bergamo (BGm), Brescia (BSm), Como (COm) and Varese (VAm) are areas in which Grana Padano cheese is produced.

² The Consorzio Parmigiano-Reggiano is the official body responsible for the quality control of cheese in the whole area. Production regulations have been adopted by this body and are controlled by its employees. A similar body has been created for Grana Padano cheese, but has much less influence on production practices.

Parmigiano-Reggiano area. Here we refer to the mixing of roughage and concentrates, creating a basic ration for cows better known as unifeed. The Lombardian dairy farms have been very eager to adopt this new technology as it fits well in a maize silage-concentrate ration. The mixing of these two ingredients is easily done and results in a good basic ration. The unifeed technology on the Parmigiano-Reggiano dairy farms would lead to a mixing of hay with concentrates, but in this case water has to be added in order to achieve a successful mixture. The final quality of the product is, however, very doubtful, as moulds can rapidly develop. It is for this reason that the Consorzio has blocked the introduction of this technology on Parmigiano-Reggiano dairy farms.

These two examples illustrate how the strict quality requirements of Parmigiano-Reggiano cheese give rise to specific technological developments. Newly developed technologies that fit well in some milk production areas are not necessarily suited to the milk production system of Parmigiano-Reggiano. On the other hand, the specific needs of Parmigiano-Reggiano farmers results in the creation of new technology for this latter area. Thus the e path of technological development is specifically linked to endogenous resources and follows the special quality requirements which differentiate Parmigiano-Reggiano cheese from its major competitor on the hard cheese market.

The hard cheese market and the dairy industry

The large-scale dairy industry in Italy has never been interested in Parmigiano-Reggiano cheese production, because fresh cheeses like Taleggio and Italico, and a series of other fresh cheeses produced for the major part by large private companies like galbani, invernizzi, kraft and locateli, owned in many cases by multinational enterprises offer higher profits, often resulting in higher value added (see table 3).

Table 3. Valorisation of different types of Italian cheese

	Wholesale price (lire/kg)	Kg cheese per 100 kg milk	Value per 100 kg cheese (lire/kg)
Parmigiano-Reggiano	14.500	6	87.000
Grana Padano	11.400	6	68.400
Gorgonzo	5.975	13	77.675
laltalico	6.525	14	91.350
Taleggio	6.675	14	93.450
Provolone	7.625	8	61.000

Source: Comitato Produttori Parmigiano-Reggiano Montechiarugolo.

As demonstrated above the value added produced by Parmigiano-Reggiano cheese remunerates a higher labour input on the farms and in the processing units. The advantages of cooperative processing units combined with a high quality product are fully exploited. The high value added of fresh cheeses produced in many cases with an industrial quality concept, however, remunerate lower labour input and capital intensive production processes.

In the following scheme, a rough indication of the structure of the production-trading chain of Parmigiano-Reggiano cheese, Grana Padano and fresh cheeses is given.

	Parmigiano-Reggiano	Grana Padano	Fresh cheeses
Dairy farms	small-medium sized labour intensive	medium-large sized labour intensive	medium-large sized capital intensive
Cheese factory	idem	idem	idem
Trading	prev. small retailer	retailers and supermarket	prev. supermarket

Parmigiano-Reggiano cheese is still sold mainly on the market by small retailers. In the last few years a rapid increase of food selling via supermarkets has been noticed in Italy. As a consequence, even a product like Parmigiano-Reggiano cheese, which has traditionally been sold by small retailers, is increasingly directed towards the supermarket chains. The scale enlargement tendencies in the processing and trading sector of Parmigiano-Reggiano cheese are generating a series of new demands on the product which can be considered as an exogenous force threatening the viability of the Parmigiano-Reggiano cheese production system. The last part of this paper highlights these aspects.

The factors threatening the ecosystem and possible answers: the negative power of marginal areas

One of the main reasons why Parmigiano-Reggiano cheese (even when named differently from today) has maintained its own identity for about 800 years, is that it is strictly linked to the production area of origin. Actually it is produced in a limited area, and what is more, it is mainly consumed in that same limited area. Moreover, the price does not allow for mass export to countries where consumer habits express no particular demand for this high priced cheese.

This identification with the territory has been threatened on several occasions during the past centuries and always in conjuncture with crises in Parmigiano-Reggiano. For example, during a short period in the first half of 1800, some producers of Bibbiano (at that time the area with production quality supremacy) decided to process milk into Emmenthal with the assistance of Swiss technicians. It was the way local dairies tried to solve the price crisis of that particular period.

What has added to the threat is the extremely rigid processing structure, which leaves no room for diversifying the product. All the cheese factories produce only Parmigiano-Reggiano, with butter as a by-product. An alternative to producing Parmigiano-

Reggiano would be to produce other types of cheeses or other milk by-products, but these do not bring sufficient enough return to cover the higher production costs of producing milk on these farms.

A serious threat is posed by modifications in the final consumer distribution channel, now largely in the hands of strong finance groups which operate on a pluri-regional or national basis. In this increasing mass distribution system, Parmigiano-Reggiano has to compete with lower-priced products characterized by higher flexibility due to a production area as wide as the major part of the Po-Valley.

The economic policy of these trading channels calls for the following requirements:

- 1) High standardization of the product (in time and space);
- 2) Concentration of supply
- 3) Prices that make the markup margin of Parmigiano-Reggiano attractive in comparison with competing products.

The Parmigiano-Reggiano ecosystem has never experienced so great a stress as at present. The reasons are mainly due to the rapid reorganization of the distribution system in Italy, a process which has already largely taken place in the northern countries of the EC.

Here is a short list of some of the consequences for the Parmigiano-Reggiano production process due to the standardization pressures exercised by exogenous forces.

- a) Until 1984, genuine Parmigiano-Reggiano, which was produced from April to November, was distinct from Vernengo which was produced in the winter months. Nowadays, owing to the standardization of the product in time, this old distinction is no longer made, which has also contributed to the slowing down of the market to the unfavourable situation found today.
- b) The standardization of the product in space causes a considerable boost towards so-called dairy 'rationalization'. Owing to the introduction of labour-saving technologies, dairies tend to increase their size through a concentration in space, merging and closing the less cost-efficient ones.
- c) The increased competition among dairies has led to lower off-dairy selling prices for cheese and as a consequence to lower off-farm milk prices.
- d) The defence of incomes leads to scale increases and to the improvement of technical efficiency. As individual milk quotas have been ineffective, scale increases have been possible without difficulty. The most recent agricultural census data on cow numbers for 1990 confirm this statement.
The improvement of technical efficiency leads to an increase in the milk yield per cow. This increase has been fast, not gradual. The result is a growing negative correlation between quantity and quality (casein, proteins, fat) of the milk produced in the area which is entirely used for the production of Parmigiano-Reggiano.

- e) The scale increase of farms is causing an increasing lack of balance in farm structure. This phenomenon could have quite far reaching consequences on the internal balance of those dairies which operate on the traditional cooperative principle of one vote per person. This principle is likely to be replaced by the capitalist one where each member's importance is proportional to their contribution. Formally the situation is not yet quite like that, but the political weight of the large-scale producers is out of all proportion to those who work on a smaller scale.
- f) This is not only a problem of democracy but of milk quality and of the milk premium system too. In fact, a 'quality-based' system has introduced a series of parameters on the basis of which milk quality is measured. The farmers who have increased their productive scale, who have considerably higher milk yields, and who have mechanized and automated their farms are able to produce better milk, especially in hygienic and sanitary terms, but not necessarily better as concerns caseins, proteins and fat, which are essential for the production of Parmigiano-Reggiano. The considerable power of large-scale farmers to influence cooperative decision making has led to the accent being placed on the hygienic characteristics of the milk in the premium system and to the neglect of the importance of the casein content of milk. In this way large farmers obtain higher premiums on milk prices, whereas the dairies are facing growing difficulties in milk processing because of a drop in the casein content of the milk.
- g) The different methods of processing according to the seasons, the artisanal and small size of the structure of processing and the high number of dairies scattered within a wide production area traditionally generated a high variability in the quality of the product and to consequent parochial squabbles about where the 'best cheese' was produced. The corresponding discriminatory consumption patterns led to a different remuneration for the different qualities. First-rate stores were distinct from those selling an inferior quality product to less well-off customers. There used to be a wide range of cheeses from which one could choose for flavour (strong vs. mild); colour (yellow vs. white); seasoning, etc. The standardization required for large distribution leads to the gradual disappearance of all these differences. The aim of the trading chains is to have only one type of Parmigiano-Reggiano in time and space; the same cheese in January and in July, in the province of Modena and Parma; in the Appennines and along the River Po.
- h) For centuries the milk for Parmigiano-Reggiano has been produced by cows called 'Formentina'. This breed originated through selection from many different sub-breeds named after the places where they were reared: Piacentina, Ottonese, Reggiana, Parmigiana. In the same area another breed originated from the Modenese and Carpigiana breed, and in the Appennines of Tuscany and Emilia, from the Montanara. Nowadays, many of these breeds no longer exist. The small number of surviving cows of these breeds (very few reared on small farms) are of concern only to special programs for the survival of ancient breeds.

There are two main reasons for their rapid decline. The first is that they produce a smaller quantity of milk (less than Holstein-Friesians), although of an excellent quality. The second reason is that machine milking is not adapted to them, or in other words, they are not compatible with the technological package of the farms.

It has to be stated that the import of Friesian cattle to the Parmigiano-Reggiano area is not a recent phenomenon. On the 23rd of August 1883, Friesian cows were imported from Holland to the province of Reggio Emilia for an actual market value of over 600 million lire.

The replacement of the local livestock breeds with foreign cattle results in some important side effects, especially when its aim is to try to boost the productive performance of the cows. The first is that the fresh grass-based feeding system is gradually replaced by a hay-based one in order to ensure the same feeding to the cattle all year round and to obtain as homogeneous a milk as possible. This standardization of the feeding practices serves the purpose of eliminating Vernengo (a winter cheese less in demand on the market) and favouring the production of the same Parmigiano-Reggiano all year round.

The second consequence is that the increase in average farm production requires an increasing amount of feed from outside the farms and the Parmigiano-Reggiano production area. This is the case not only for compound feed, but also for roughage produced in remote areas, sometimes at 400km distance. In this way the essential relation between fodder production, cattle feeding and milk production has become weaker.

- i) Scientific research and experiments concerning animal production and cheese quality have been the basis of the Parmigiano-Reggiano ecosystem for a very long time. Parma, Modena and Reggio Emilia are the seats of Universities where the agricultural departments have a leading role. Beside these Faculties, there are many Agricultural Schools whose purpose is to strengthen the skills of the producers of Parmigiano-Reggiano. For a long time local scientific research was linked to Parmigiano-Reggiano cheese. Every innovation, or better, the coding of new practices by farmers and dairymen, was subject to the historically acquired characteristics of Parmigiano-Reggiano which were not allowed to undergo alterations.

This relationship between scientific research and the typical Parmigiano-Reggiano production system has recently become weaker. The most worrying tendency is the one which aims to explore the suitability of technologies in use in areas like the Lombardian plains for the Parmigiano-Reggiano cheese production system. Such technologies relate to different cattle feeding systems, the possibility of milk-cooling on the farm (to avoid twice-daily delivery), the possibility of improving the processing of milk through the robotization of the dairies, etc. Such research is nowadays very well accepted in Emilia, and is financed and supported at private and public levels. But research topics such as the analysis of the relationship between dairy size and the quality of Parmigiano-Reggiano, or between the restructuring of dairies and the response capacity of the productive base, especially in the less favoured areas of the

Appennines, are far less attractive. In other words, also in the Parmigiano-Reggiano production system, scientific activity becomes increasingly disconnected from the locality and the specificities contained in it. 'Progress' is understood, at least in most scientific circles, as an *adieu* to the locality and as the simultaneous embracement of more *universal values*.

Now one might wonder what the future of the Parmigiano-Reggiano cheese might be. The conclusion to be drawn from what has been reported so far suggests that it could be pessimistic. The gradual indifference to the ecosystem could lead to a more pronounced standardization of the product along the lines of the strategies of large-scale distribution, and this will have concomitant effects on the quality of the product.

People used to say that "Parmigiano-Reggiano is good when it is good!". Nowadays this could be questionable. Parmigiano-Reggiano might become in future 'fairly good' - with less production discards, fewer kinds of second choice cheeses but also fewer excellent kinds of cheese. Small specialized retailers maintain that, on average, the quality of other hard cheeses like Grana Padano is reaching that of Parmigiano-Reggiano. Yet, if one wants a first-rate cheese, one still has to ask for Parmigiano-Reggiano. This is undoubtedly so because the consumer prices of the best Parmigiano-Reggiano are still far higher than those of the competing Grana Padano.

Although centrifugal forces with highly disintegrating powers prevail in the ecosystem of Parmigiano-Reggiano, there are still a few 'resistance' factors. The main one is the influence that the less favoured areas bring to bear on the entire Parmigiano-Reggiano area. In the Appennines of Emilia modernization meets with greater difficulties.

First of all territorial morphology places many obstacles in the path of scale enlargement of the farms and the merging of dairies. The distinctive features of a mountain environment do not allow the assimilation of a 'universal' development model. Beside natural, geological and climatic factors, the local culture also opposes external innovations.

This social resistance, in the weakest area of one of the strongest ecosystems of Italian agriculture, does not find many political supporters. Actually, in political and scientific regional circles, beyond the usual show of solidarity, the prevailing idea is to help agriculture in the mountain areas in Emilia by favouring tourism, so that agriculture loses any economic interest and becomes a slave to ecology.

The highest quality of Parmigiano-Reggiano can be found in those areas where the milk production per cow and the fodder production per hectare is low, where the dairy size is small and the production and processing costs are high due to less favourable production conditions. But at the same time, because of the more artisanal way of production, a higher percentage of cheese is discarded in these areas. In other words, the variability of quality is still large. Only a small part of the entire production of

Parmigiano-Reggiano is produced in the mountains in Emilia, but their share in total production might decrease as a consequence of the closure of farms and dairies³.

The large distribution chains are not interested in the Parmigiano-Reggiano produced in the mountain areas, because production is too small for their market strategies.

It is significant that a proposal to trade the Parmigiano-Reggiano produced in the mountains with its own recognizable trade mark has met opposition from the Consorzio. Such 'diversity', limited to a very small amount of produce, should not have worried anyone, nor would it have disturbed the larger Parmigiano-Reggiano market. However, it has been considered a threat to the interests of those market agencies aiming for a homogeneous, standardized product, such as the supermarket chains. They are the ones who are less worried about the maintainance of the Parmigiano-Reggiano cheese and its ecosystem as it used to be in the time of Bizzozzero and Zanelli⁴. Only the maintainance of this system, with its high variability, can guarantee the distribution of a conspicuous value added, remunerating the labour of a high number of small- and medium-scale farmers. The private interests of these agencies do not necessarily coincide with the public interest of high, medium remunerated occupation levels in a still declining economic sector like agriculture.

At the present time, the Parmigiano-Reggiano ecosystem can be better protected, and a development strategy of its weakest sub-areas better established, only if quality is defended and the unreproducibility of the product in space and time is promoted in opposition to a quantity/based strategy aimed at the most homogeneous product possible.

References

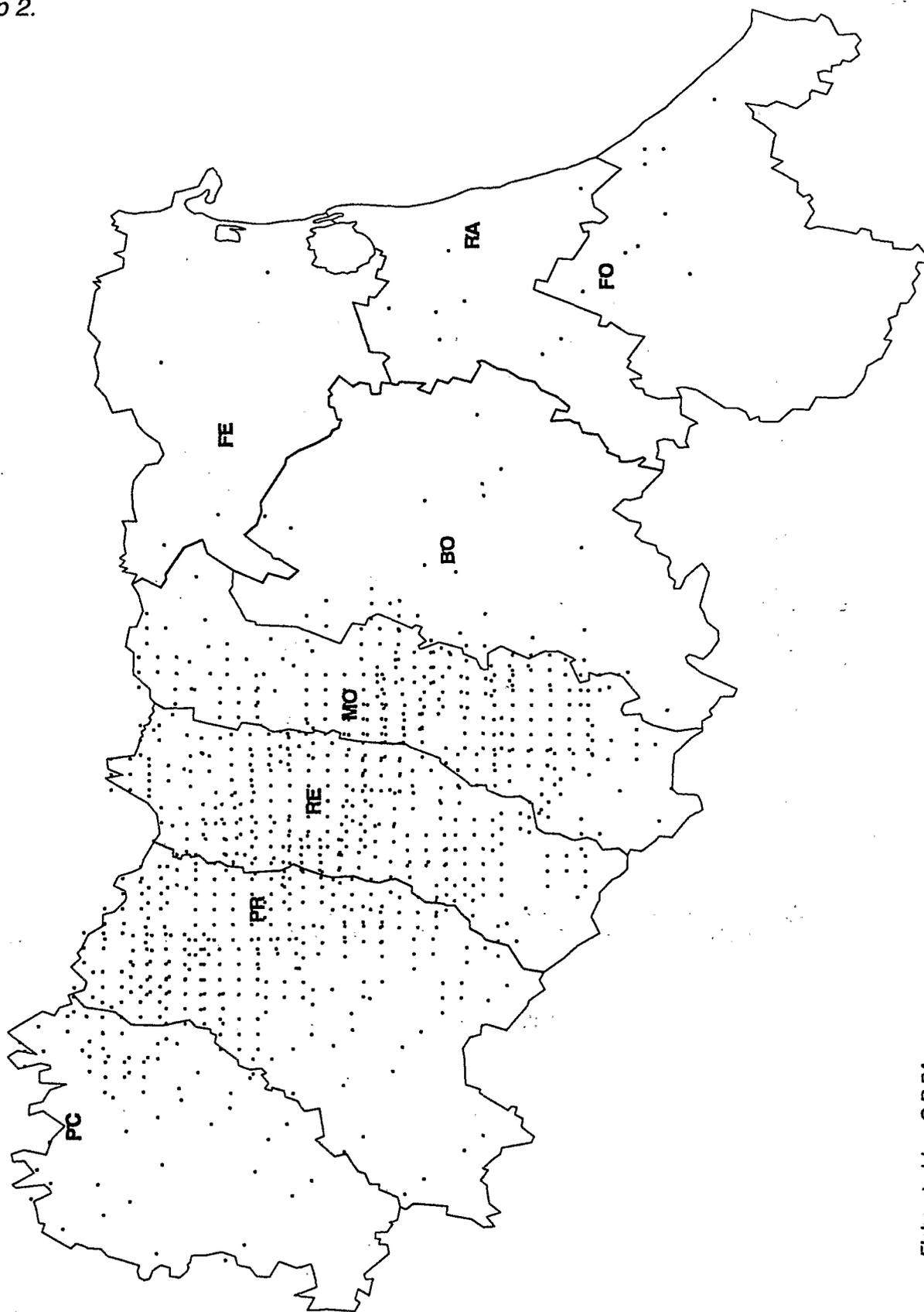
- COMITATO PRODUTTORI PARMIGIANO-REGGIANO MONTECHIARUGOLO,
 Programma di ristrutturazione del comparto lattiero-caseario parmense, Monticelli (PR)
 September 1990
 PRETOLANI, R. (1991), *I costi di produzione del latte in Italia (Lombardia) Cremona*

³ Until now milk production in these areas has resisted fairly well. The last agricultural census data of 1990 indicated with respect to the 1982 figures a small increase in cow numbers in the mountainous part of the Parmigiano-Reggiano production area.

⁴ Well-known researchers and extension officers at the end of the 19th century occupied in research on the quality of the Parmigiano-Reggiano.

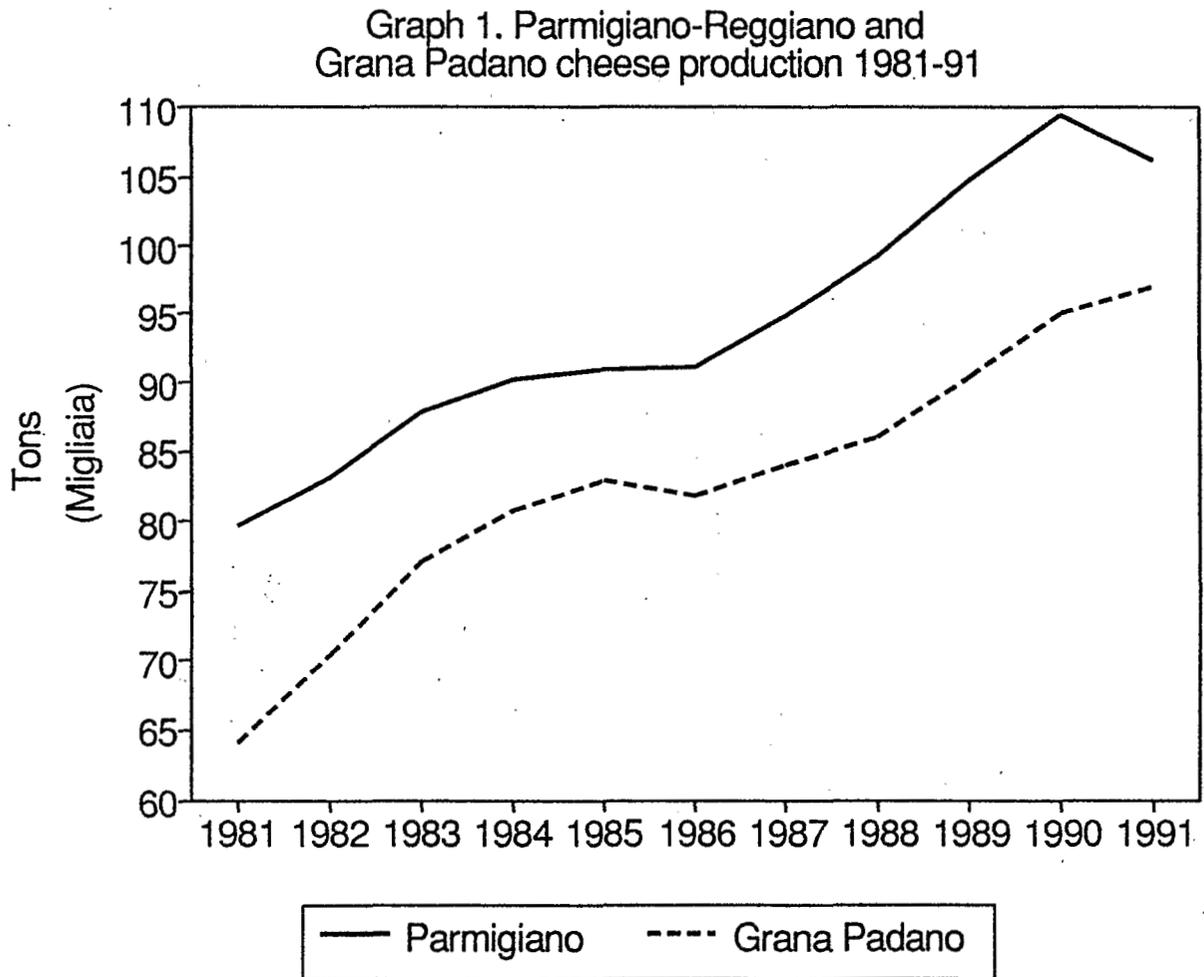
Map 2.

DISTRIBUTION OF CHEESE PROCESSING DAIRIES



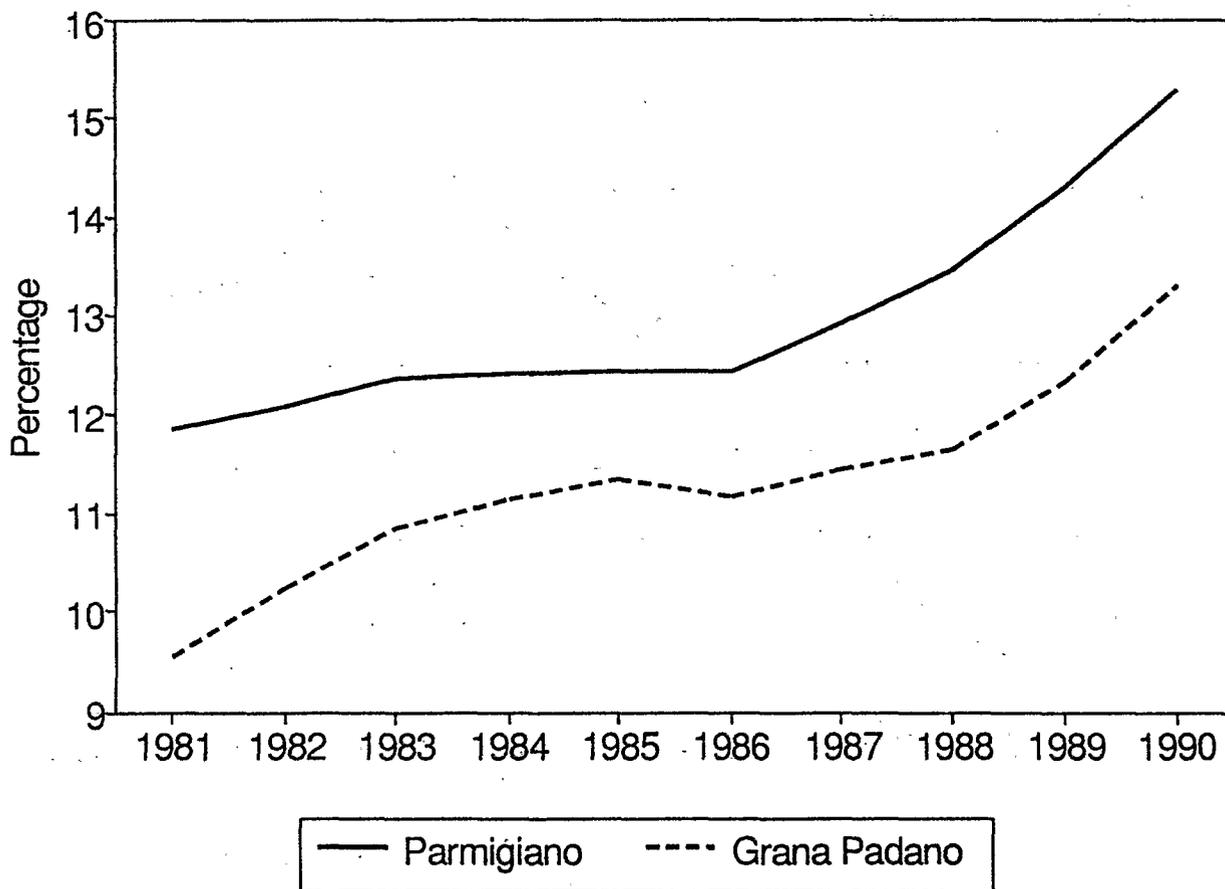
Elaborated by C.R.P.A.

Graph 1.

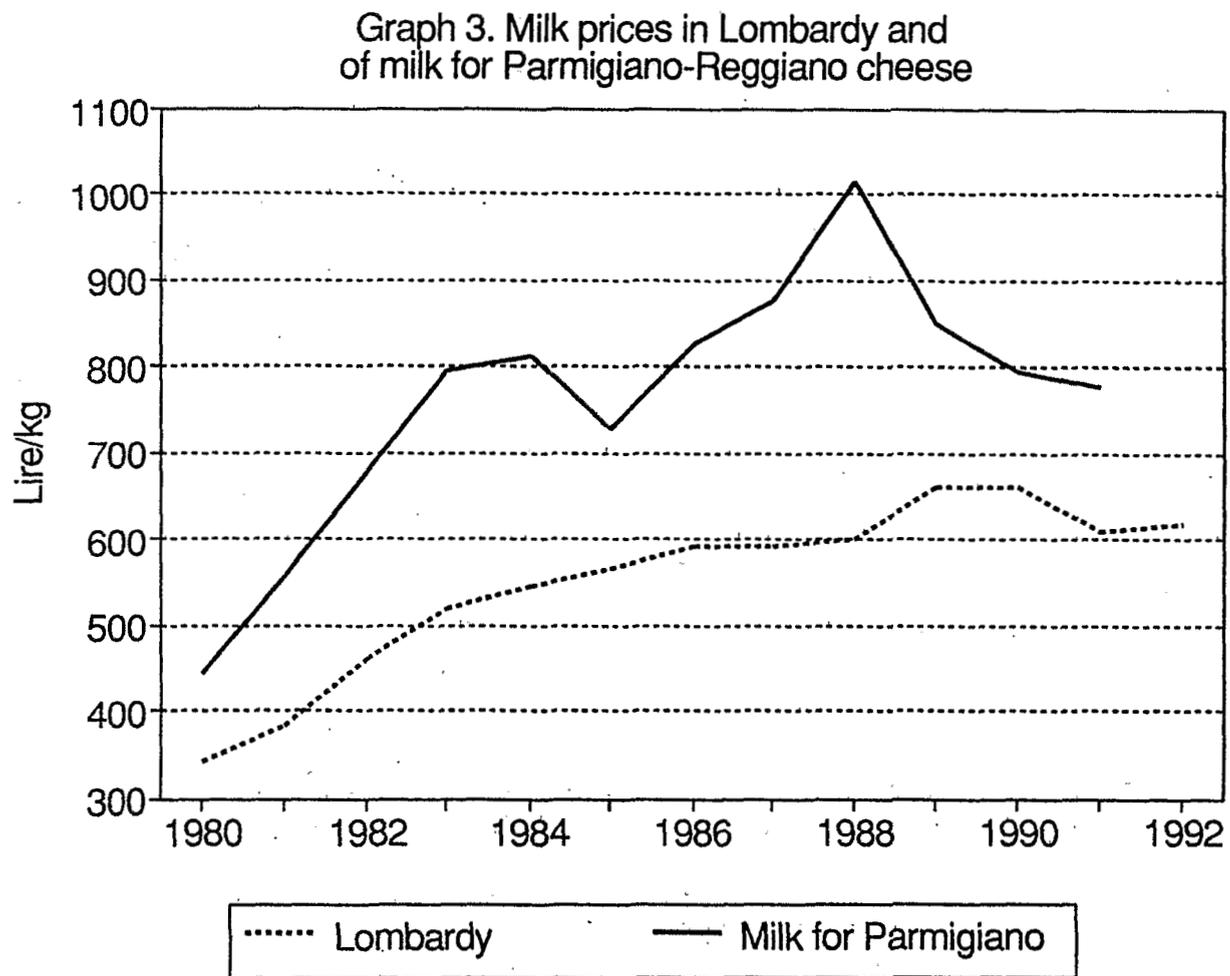


Graph 2.

Graph 2. Share in total milk Italian milk production 1981-90



Graph 3.



Graph 4.

Graph 4. Labour intensity and income per working unit in mountain sub-areas

