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# La Serena cheese (Spain), development of an area based on Merino ewe breeding

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**SUMMARY** – La Serena is a large area in Extremadura (the southwest of Spain) where merino ewe cheese is produced. Cheese production has revolutionised the whole ovine sector in this area. This ovine sector is the most important economic factor in La Serena. It contributes decisively to the development of this rural area. Such development is due to the Merino ewe cheese making. In order to contribute to the economic development, guidelines have been carried out by the Farming Regional Institutions together with the European Union: commercial and productive structure; technological updating; adaptation to the EU regulations; quality control, training, investments and marketing financing.

**Key words:** Cheese, merino, rural development.

**RESUME** – "Le fromage La Serena (Espagne), un cas de développement d'une région basé sur l'élevage de brebis Mérinos". La Serena est une zone étendue de l'Estrémadure (Sud-Ouest de l'Espagne) où est élevée la brebis mérinos. La production de fromage a révolutionné tout le secteur ovin de cette zone. Ce secteur est le plus important de la zone de la Serena. Il contribue largement au développement de cette zone rurale. Pour contribuer au développement économique, des orientations prioritaires ont été établies par les institutions régionales de l'agriculture avec l'Union Européenne : structures commerciales et de production, modernisation technologique, adaptation aux normes européennes, contrôle qualité et financement de la formation, de l'investissement et de la commercialisation.

**Mots-clés :** Fromage, mérinos, développement rural.

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## Introduction

In general words, the cheese sector evolution in La Serena has been ruled by the following guidelines: legal regulations, structure of the producing sector and technological transfer.

This sector has traditionally elaborated this cheese, but in the 80s a considerable revolution took place so that this sector could adapt itself to the local social and economic situation as well as to the EU regulations. It is a clear example for rural development, involving all the aspects of the process: production and transformation technologies, sector structuring, financing of investments and adaptation to marketing patterns.

## General description of the area and population

La Serena is a historical region, one of the most relevant and well-known in Extremadura. It is situated in the south-east of the province of Badajoz in the Autonomous Community of Extremadura. It is made up by a total of 19 municipalities.

The estimated area is of about 3200 km<sup>2</sup> with a population of about 48,500 inhabitants in 1998 and a mean population density of 15.23 inhabitants per km<sup>2</sup> (Table 1). This figure is distant enough from the provincial mean which is about 30 inhabitants per km<sup>2</sup> and ever much more distant from the national mean (78.5 inhabitants/km<sup>2</sup>). This shows the effects of emigration present in this area.

From the climatic point of view, La Serena is characterised by a Mediterranean weather with dry and hot summers of continental tendency and with slightly mild winters with scarce rainfall (500 mm).

Regarding unemployment, the total rate of 6% in La Serena differs from the national rate (9%) and from the regional one (11%). The lowest rate of unemployment belongs to the farming sector.

Table 1. Area and population (INEM, 1999)

	La Serena			Extremadura	Spain
	1986	1992	1998	1998	1998
Area (km <sup>2</sup> )			3,187	41,602	504,750
Population	57,589	53,150	50,178	1,070,244	39,669,394
Sex					
Male	28,407	26,313	24,840	530,500	19,399,949
Female	29,182	26,837	25,338	539,744	20,269,845
Density (hab/km <sup>2</sup> )	No data	No data	15.75	25.73	78.5
Unemployment			2,610	119,030	3,540,045
Farming	–	–	98	30,278	314,862
Industry	–	–	308	9,443	487,938
Building	–	–	349	21,472	308,541
Services	–	–	1,157	60,597	1,598,008

The ovine activity employs the 30% of the active population in the area (estimated data) in a direct way (breeding and processing). A further 5% is employed at services connected with the same activity. The cheese production means between 30-40% of the final ovine production in the area. This cheese production employs more than 50% of the total population involved in the ovine sector in La Serena.

The group of people involved in cheese making is characterised by being mostly young people and with an increasing amount of women. These two aspects represent a very interesting possibility in terms of rural development patterns. This sector of the population undertakes an important technological adaptation through the necessary training on production (milking, processing, ripening) as well as on negotiations for commercialisation.

## Animal production systems in La Serena

### Characteristics of the animal production systems in La Serena

In Extremadura, the ovine production is one of the most important economic sectors regarding the rural development. Within the regional economy 25.9 thousand million pesetas (i.e. 24.5 of meat, 0.63 milk and 0.7 wool) were generated by the ovine in 1998 (SGT, 1998).

Likewise, due to different European regulations on the productive farming sectors, the ovine systems have been influenced by the provision of compensatory allowances, subsidies for farming, financial help for reforestation, agro-environmental actions, etc. This has contributed to the decrease of the grazing base and the increase of the stockbreeding and in Extremadura from 1995 to 1998 the number of breeding ewes increased a 13% (López Gallego *et al.*, 1999c).

The ovine livestock in the area is of high importance with more than 485,000 breeding ewes in 1258 farms (Table 2).

Table 2. Statistics on the ovine productive systems in La Serena (REAEx, 1998)<sup>†</sup>

	NE	STEP	NE Ovi	NR Ovi	NR/SAU
Serena	6368	136,270	1258	485,733	1.91
Badajoz	30,070	846,572	5577	1,718,510	1.08
Extremadura	52,410	1,989,966	10,338	2,768,330	0.92

<sup>†</sup>NE = No. of farming exploitations registered; STEP = grazing surface; NR = No. of breeding; SAU = useful farming surface; Ovi = Ovine.

The exploitations in La Serena are mostly family-size (65%) renting systems (72%) and of medium-large size (600-800 breeding ewes) in farms of 350-470 ha. The main productive orientations are lamb production in intensive fattening and cheese production (72% of exploitations of the area) milking the 80% of the breeding ewe (Table 3).

Table 3. Typology of exploitations in La Serena (López Gallego *et al.*, 1998)

	Milking	Type
UTH/exploit./year	2.15	1.25
Breeding ewes (No.)	800	600
Milked ewes (No.)	625	–
Grazing surface (ha)	470	345
Stubble (%)	68	60
Ewe/ha grazing	2.1	3.2
Ewe/ha stubble	3.5	6.0
Commercial lamb/ewe/year	1.15	1.16
Kg milk/ewe/year	55	–
Kg wool/ewe/year	2.4	2.5
Kg concentrated/ewe/year	235	160
Kg forage/ewe/year	130	80
Kg by-product/ewe/year	20	17

## Cheese and milk production in La Serena

The Merino ewe milk production is integrated within the productive system as an additional factor of income generation. This aspect has evolved from 1986 to 1990 regarding their legal considerations and regulation. Since 1990 up today the Merino milk production (Table 4) has evolved according to the EU guidelines and applying specific technologies. The milking exploitations have been constant during the period of time 1990/95 (64%), reaching the figure of 75% in 1999.

Table 4. Milking exploitations (López Gallego *et al.*, 1999a,b)

	Farm cheese making	Farm cheese making and milk sales to cooperatives	Milk market sales
% exploitations (1990)	97	2	1
% exploitations (1995)	74	16	10
% exploitations (1999)	16	73	11
No. milked ewe/exploit./year (90 & 95)	615	795	440
No. milked ewe/exploit./year (99)	820	600	670
t cheese/exploit./year (90)	2.7	3.4	–
t cheese/exploit./year (95)	3.2	3.0	–
t cheese/exploit./year (99)	4.2	1.2	–
kg milk/exploit./year(90)	–	4.0	10.6
kg milk/exploit./year(95)	–	4.3	12.0
kg milk/exploit./year (99)	–	8.0	10.0

Apart from this current situation of the merino ewes, in the years 1995, 1996, 1997, specialised breeds devoted to milk production have been integrated in intensive systems dedicated to this type of production. On one hand, this is due to the high cost of the land and the incorporation of young people to the farming activity as young people are trained in more intensive and planned systems). And on

the other hand, it is due to the existing high milk demand derived from the economic breakthrough caused by the processing of La Serena cheese.

## A valorisation strategy for traditional cheeses in Extremadura

The cheese sector has a relatively low economic value – 2238 and 630 million of pesetas for goat and sheep milk sectors respectively. Therefore its strategic importance may become relevant. The milk sector in Extremadura is linked to the processing, which is frequently carried out by the producers themselves at their exploitations ("artesanal" small scale cheese farms). This fact is an important aspect of the cheese tradition in the region.

A relevant characteristic of the small scale transformation is the use of raw milk apart from the ripening for more than 60 days; whereas industrial cheeses are characterised by the elaboration of mixed cheeses, pasteurised and within a shorter time span.

This sector is made up by 65 establishments of all sorts (Table 5), ranging from small scale factories to large industries. There is a great profusion of cheese trademarks (105 cheese producers).

Table 5. Cheese farms capacity (González Crespo and Roa Ojalvo, 1999b)

Litres/day	Number	%	Capacity	%
<1000	36	55	14,160	6
1000-10,000	25	39	95,780	47,4
>10,000	4	6	96,000	46,6
TOTAL	65	100	205,940	100

This sector has undergone a considerable change in the last 10-15 years, when large cheese farms have been substituted by the current ones. An important production irregular by small scale units has also emerged. It has been consolidated after overcoming problems due to the European endorsement which came up from the application of the Dir. 92/96.

The traditional products from Extremadura have been consolidated at great extent through the acknowledgement of their peculiarities and typical characteristics, getting their guarantee of origin in some cases and dealing with this procedure in others (Regulation 2081/92) such as La Serena cheese, Ibores and Casar.

The area of La Serena is the most emblematic one. It can be compared to the area of Casar (Cáceres). Its transformation establishments are characterised by:

(i) The predominance of small and medium cheese business; more than 60 cheese factories and only the 10% can be considered big ones.

(ii) The associative transformation has little relevance. There are just 3 cheese factories.

(iii) The areas with the biggest concentration of cheese factories are La Serena and Casar.

The ewe and goat cheese in Extremadura keeps its tradition regarding elaboration as well as special characteristics. This tradition is still present mainly because no large national dairies industries are involved in the Region. As the main feature, we can mention its "purity" since it is produced from raw and generally fresh milk. These breeds are exploited in extensive systems at grazing (dehesa) and in the mountain range of Extremadura. Besides, the fact of having more than 60 days ripening, with a medium size (about 1 kg), lets the cheeses develop flavours and aromas which make them distinctive.

In the case of the traditional ewe cheeses, in this Autonomous Community, the vegetal coagulant "*Cynara cardunculus*" is used for cheese elaboration. This makes the local cheeses different from the rest of the Spanish ones or the ones produced in the Mediterranean Basin, placing them closer to the

Portuguese cheeses such as Serra da Estrella, Serpa or Azeitao (Table 6). These cheeses present the peculiarities of having soft paste, easy to spread, "creamy" as they are known in the region.

Table 6. Distribution and marketing of cheese (González Crespo and Roa Ojalvo, 1999a)

	Zone	Region	National	Foreign	
Distribution (%)	27	45	26	2	
Sale (%)	19	54	25	2	
	Cheese maker	Specialised store	Supermarket	Hypermarket	Buying groups
Commercialisation (%)	9	19	26	17	29
Direct sale (%)	7	15	28	22	28

The following cheeses have been recognised by the European Union as traditional cheeses in Extremadura: La Serena, Casar (ewe sheep) and Ibores, Acehuche, Quesadilla, la Siberia cheese, Gata-Hurdes and la Vera (goat cheese). The most consolidated one, through the European Community Regulation 20<sup>th</sup>/1/92 (Table 7), is La Serena cheese with a Protected Denomination of Origin (PDO). The Ibores cheese has still to be confirmed by the INDO<sup>1</sup> and the Torta del Casar has just started dealing with this procedure.

Table 7. PDO cheese production in Spain (MAPA, 1999)

	Tons	No. DOP
France	174,000	34
Italy	415,000	30
Portugal	1,000	13
Germany	60,000	4
Spain	10,000	11
Zamorano	193	Ewe
Manchego	4,300	Ewe
Idiazabal	830	Ewe
Roncal	387	Ewe
Serena	123	Ewe
Tetilla	371	Ewe
Mahón	2,300	Ewe
Cantabria	275	Ewe
Picón	22	Mixture
Liébana	98	Mixture
Cabrales	412	Mixture

La Serena cheese is a pure ewe cheese, from fatty to extra fatty. It is elaborated with raw merino ewe milk that is milked in the area established by the regulations of the PDO. Its elaboration is carried out with rennet obtained out of the *Cynara cardunculus* flowers, following the traditional uses and with a minimum ripening period of about 60 days. At the end of ripening must show the following features:

- (i) Discoid shape with slightly flat sides and convex perimeter surface.
- (ii) Height from 4 to 8 cm.

<sup>1</sup>National Institute of Denominations of Origin.

(iii) Weight from 750 g to 2 kg.

(iv) A half-hard rind, with a waxen yellow to ochre colour. Smooth sides and smooth perimetral surface or with the mould drawing.

(v) From soft to half hard paste, from ivory white colour to waxen yellow. It might present small holes unequally distributed.

(vi) Minimum fat of 50% over the dry matter, total protein (35%) and dry matter (50%).

## "La Serena" cheese characteristics

The production area of La Serena cheese (DOP) is made up by 21 municipalities in the area with the same name in Badajoz. Currently there are about 121 livestock registered and 14 cheese factories registered and a stockbreeding register of about 120,000 heads in 1999, reaching in the same year a registered cheese production of 151,000 with Guarantee of Origin (Table 8).

Table 8. Evolution of PDO "La Serena" certified cheeses (CRDO Queso La Serena, 2000)

No. of members	Livestock	Cheese maker
	121	14
Year	Registered production (kg)	
93	14,400	
94	63,600	
95	144,000	
96	107,050	
97	107,694	
98	145,770	
99	151,000	

The milk destined to cheese processing must be merino ewe milk and it must be produced by the flocks registered within the Denomination of Origin Area. The production systems and stockbreeding management have to follow the traditional patterns and they will be mainly based on grazing. The milk composition will show a minimum richness of 5% in proteins, 7% of fat and 18% of dry matter (González Crespo and Roa Ojalvo, 1999b).

The cheese production has its place within the set of national cheeses with Denomination of Origin and its registration follows the proper evolution according to its productive potential.

## Actions within the rural development programme (Leader I and II) in relating to La Serena cheese sector

In "La Serena", the European Union initiatives, Leader I and II, started in 1990, after the crisis in the farming activity (rising unemployment rates, decreasing and ageing of population, services withdrawal, etc.). The European Commission agreed to initiate programmes to improve this activity.

These programmes have fostered activities focused on rural tourism, non-agrofood small and medium enterprise and related services, environmental and background preservation, valorisation and commercialisation of farming production. Within these last measures, La Serena Cheese making is one of the most helped sectors from the European Union. The action projects turned into products commercialisation, improvement and adaptation of processing units, transformation and by-products use, investments in improvement plans, and creation of technological services to improve the quality and the management of the cheese innovation.

Consequently, the Leader programmes fostered the spread and improvement of the ovine exploitation for milk production as well as the processing units and cheese marketing (Table 9). The Leader I programme supported the standardisation of cheese factories and improvement ripening centres. With Leader II, the processing and commercialisation of the ewe cheese, as well as the creation of mechanical milking rooms supplemented these improvements. Both programmes have also financed quality control projects, technological studies and training activities.

Table 9. The Leader programmes actions, projects (No.) and investments (Pesetas, ptas) (CEDER, 1999)

Actions	Leader I		Leader II		Total	
	No.	Ptas	No.	Ptas	No.	Ptas (10 <sup>6</sup> )
Mechanical milking	5	26,597,439	1	5,105,450	6	32
Processing and ripening	5	102,628,287	10	135,111,104	15	238
Quality control			1	8,468,920	1	8
Technical studies	1	1,000,000	2	13,100,000	3	14
Training activities	1	1,500,000	1	1,944,482	2	3
Total cheese sector	12	131,725,726	15	163,729,956	27	295
Rural tourism	21	242,228,264	37	373,218,175	58	615
Handcraft and services	15	203,122,326	20	191,089,672	35	394
Valorisation and marketing	17	219,900,937	50	703,912,668	67	924
Environment preservation	6	23,995,750	21	133,603,749	27	158
Total leader programmes	59	689,247,277	128	1,401,824,264	187	2091

Within the cheese factories projects different types can be found:

(i) Farm cheese making units. The exploitations were provided with useful cheese equipment to build small scale units where the stockbreeders now make cheese. Then it is sold directly or through their co-operatives.

(ii) Formal co-operative cheese factories. A group of stockbreeders linked under certain association to make and/or commercialise their cheeses together. This lets the sector improve the sources and so it is possible the valorisation of milk produced in the factories belonging to the members within the associations.

These projects undertook the collection and storing of milk, processing, ripening and marketing. At the same time, laboratory equipment was provided to the farmers to carry out product quality control.

The Control Council was provided with a laboratory in order to carry out direct controls in the exploitations as well as in the processing rooms and ripening cold stores.

The technical studies financed by the Leader programmes were aimed at determining the adaptability of the merino ewe to the mechanical milking and exploring the possibilities of the dairy by-products (whey and "nazurón" or "requesón"); and turning them into commercial products in order to generate incomes.

Finally, different training activities were carried out. The purpose of these activities was, on one hand, to qualify and update workers and stockbreeders. On the other hand, to train new investors and encourage them to initiate innovating projects or to diversify the farming activity. The economic appraisal of these programmes shows that the level of investments in the cheese sector is considerable, the 19% and the 12% of the total investments in Leader I and II respectively.

## Discussion and conclusion

The population in "La Serena" area has traditionally made Merino ewes cheeses for centuries. In

the last 20 years, cheese production has revolutionised the whole ovine sector in the area and today the estimated amount of ewes in the area is 500,000 heads in about 1300 farms.

This ovine sector is the main economic factor in the area. It contributes decisively to the development of this rural area, being one of the most underdeveloped areas in Extremadura (60% of the national average income). Besides it is an area with few inhabitants (16 inhabitant per km<sup>2</sup>). The ovine sector generates a direct income of 6000 million of pesetas annually without taking into account the subsidies. This sector employs directly to the 30% of the active population.

This development has been possible thanks to the valorisation of extensive livestock systems through cheese making. This sector produces 1000 t of cheeses annually. From this total amount, 151 t are registered under PDO. To carry out this process of development, all the population involved in cheese making had to adapt themselves to considerable changes. The people involved in this sector were producers, private and public workers. The producers were mainly full-time farmers (70% of the total farmers in the area), and at the same time, they were integrated within associations (60% of the total farmers in the area). The Leader programmes dedicated about 19/12% of their budget to finance the 60% out of the 3900 million pesetas. The average financial help was of about the 40% of the total investment.

The guidelines to adapt the cheese sector were the following ones: (i) organisation of the commercial and productive structures; (ii) technological adaptation; (iii) adaptation to the EU regulations; (iv) quality control; and (v) training, investment and marketing financing. Currently a 72% of this cheese is distributed at a regional level, already reaching a product standardisation and structural adaptation (i.e. infrastructure, marketing, taxes and financial help).

The general conclusion is summed up in Fig. 1. It can be noticed the sequence of the past and future evolution; the agents involved in this process of development and the way in which all these elements have interacted among them. The further development will require actions on production cost adaptation; social integration.

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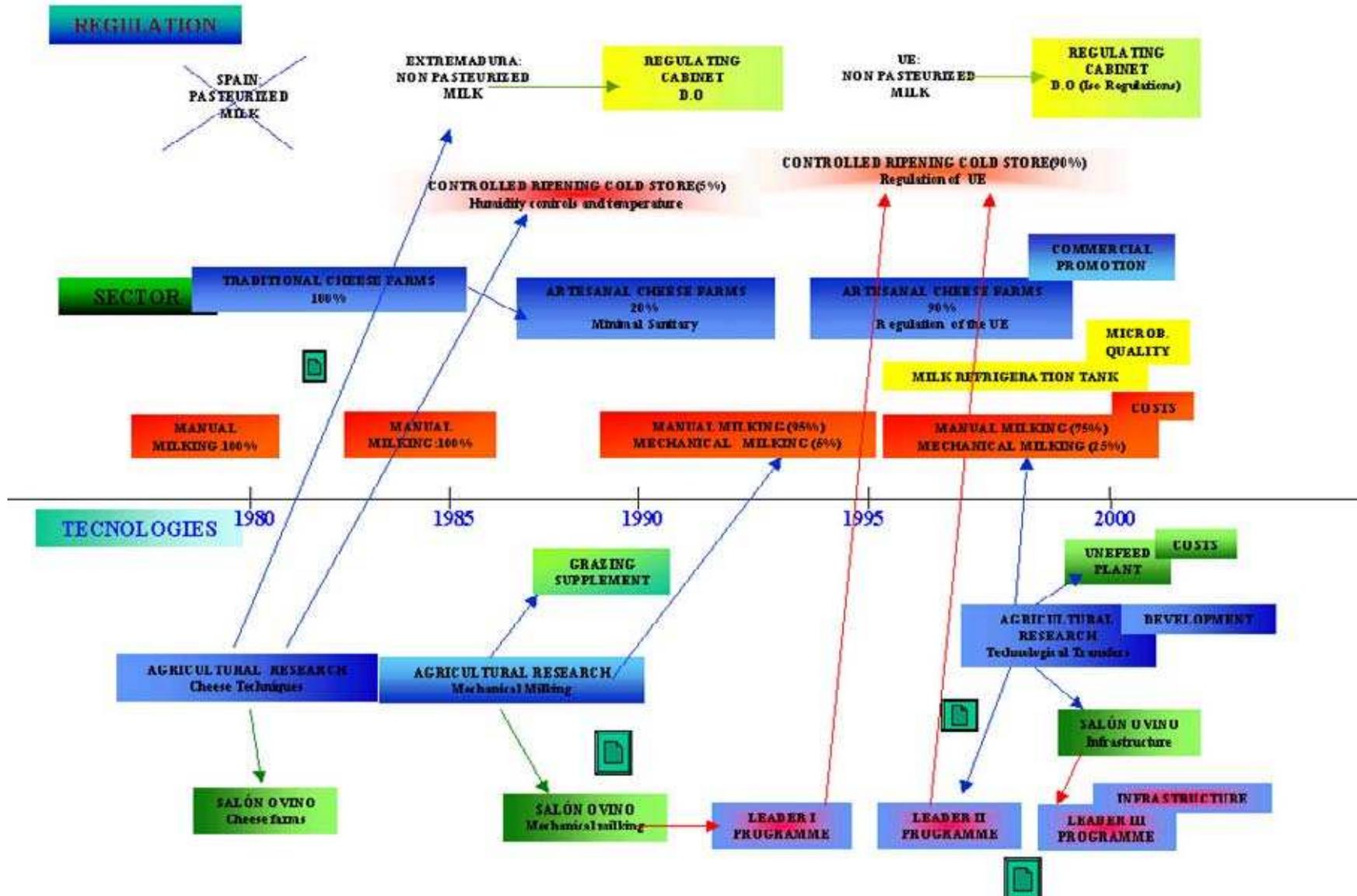


Fig. 1. Evolution of cheese production systems in the area of La Serena.