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DIFFERENTIATED DEVELOPMENT PATTERNS IN BARROSO: SEARCHING FOR SPECIFIC INTERVENTION METHODS

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Abstract:
This paper contains a meticulous analysis of endogenous development patterns in the North of Portugal. It is especially rich in methodological approaches to the issue of diverging development trends. It is concluded that endogenous development implies in no way an isolation from external elements. it contains, on the contrary, a carefully regulated balance between internal and external elements.

Keywords:
PORTUGAL, RURAL DEVELORMENT, RURAL AREAS, AGRICULTURAL DEVELOPMENT, DIVERSITY FARMING SYSTEMS, HOUSEHOLDS, MEAT PRODUCTION, MILK PRODUCTION.

Introduction

Barroso is one of those fascinating rural areas, which on the one hand, seems to be forgotten and anyway as distant as possible from the centres of agrarian policy-making, whilst on the other hand, it contains an amazing, albeit somewhat hidden dynamism. Barroso is a region in the north west of the Portuguese province of Trás-os-Montes. It could and still can be described easily in terms which are usually used for describing marginalized areas. Relatively isolated, a lack of socio-economic infrastructure, a local economy strongly dependent on the agricultural sector, dominated by small-sized, highly-scattered farm holdings. Several studies describe in detail the rural societies and farming practices of Trás-os-Montes in general (O'Neill, 1978; Portela, 1988) or more specifically of Barroso (Pires, 1970; Lema, 1978; Lima Santos, 1992).

In this paper we will present some results of an inquiry into the diversity of farming practices in Barroso. This diversity in farming styles will be analyzed as an outcome of complex socio-economic processes and of the differentiated responses of farmers to recent policy interventions. The empirical diversity in styles of farming reflects, we believe, an important difference in underlying development patterns, some styles being grounded in endogenous patterns whilst others clearly express more exogenous forms of development. From this fundamental difference we will derive some suggestions on new forms of intervention which might contribute to the strengthening of endogenous development.

First, however, we will present a brief overview of the situation characterizing the 1930-1950 period in Trás-os-Montes and Barroso. Historically in these two rural societies, two types of farm-households could be distinguished. First, the *cabaneiros* or the `poor' who were without the means to produce sufficient cereal (rye) to satisfy family demands or to reproduce agricultural activities (cultivation of rye and animal fodder). Their limited access to land made it impossible to maintain a pair of animals for traction, which made them in this respect dependent on the larger farm-holdings. The *cabaneiros* had to employ family labour outside the farm household as servants or as day labourers *(jornaleiros* or *jeirantes)* in the agricultural peak periods, offering some small opportunity for local employment. Also the making and selling of charcoal (*carvoeiro)* and basket making *(cesteiro)* offered some additional income to the *cabaneiros.*

The farm-households of the *lavradores* formed a second group. These farm-households produced larger amounts of cereals, not only for subsistence and reproduction, but also for the market, and the size of their agricultural land allowed the maintenance of more than one pair of animals for traction and also the breeding of suckling calves. Within the stratum of the *lavradores* a smaller group of *lavradores abastados* could be distinguished, the main income source for these families was not the selling of cereals but the rearing of animals. These families gave also permanent employment to one or more servants.

Off-farm income generating activities were in general scarcely available. The afforestation of the mountain areas offered (temporary) employment, as did also the construction of several dams in the region and the wolfram mines. With the recent closing down of the mines, however, industrial employment has been limited to the construction sector. Agricultural activities were unable to offer a reasonable income to Barroso's increasing population and the lack of alternative employment forced people to leave the region. Provided with the opportunity to get out, many people left share-cropping and day-labour to migrate, first to the Portuguese colonies and Brazil, and since the beginning of the sixties mainly to France, Germany, Switzerland and Luxembourg. As a consequence of this process, the population decreased by 53 percent in the period 1960-1991 (PDAR 1992).

The process of emigration, and since the 1970's the return of migrants, have been the crucial factors contributing to social change within Barroso. Migrants sent remittances, returned with savings, built houses and/or invested their savings in land purchase or agricultural investments. At the same time, emigration drained off much of the agricultural labour pool and changed agricultural practices. The importance of arable farming (rye, maize, potatoes) has declined steadily in the last decades, giving way to livestock production (meat, milk) which has become the principle agricultural activity of most farm households. Farming continues, however, to be based on a set of interrelations between arable farming and livestock production, geared to the meat-production.

Research methodology

After studying the available literature on the region, the research started with informal interviews with key-informants, such as agents of the regional office of the Ministry of Agriculture (*zona agraria)* and farmers, in about 20 villages. After this first phase, we decided to limit the research area to two homogenous ecological zones that can be identified in Barroso (PDAR 1992). The zones of Alto Barroso Oriental and Occidental were selected, because of the relative high importance of cattle breeding in agricultural production, and the existence of dairy farming as well as meat production in both zones. Five villages were visited in each zone, based on the following criteria:

- Orientation to livestock production (for meat and milk and the importance of goat and sheep keeping)
- Area of commons *(baldios)*
- Number of farmers who participated in EC-797 programmes

In the ten villages a total of 68 selected farms were studied in depth with the help of a questionnaire, containing open-ended and closed questions. The average interview took about two hours and was partly tape-recorded. In Barroso, the household is undoubtedly the basic unit of local social structure, which was the reason the farm-household formed our unit of analysis. For practical reasons the survey was directed towards the head of the households (mostly male, in some cases female), but other household members often also actively participated during the interviews. Besides information about household composition, agricultural and non-agricultural income sources of members, farm histories, as well as concrete plans concerning the future of farm-holdings (e.g. agricultural investments, succession to the farm, participation in EC-grants etc.) were the object of study.

The data collection on agricultural production included, besides a general inventarisation of animal production and arable farming (crops, crop rotation, production orientation), a more detailed study of specific elements of the farming systems, such as fodder production, the use of chemical and organic fertilizers, and the commercialization of meat production.

The research population is not completely representative of the regional agricultural structure. The study focused on diversity in livestock production and thus excluded farmers without livestock, in most cases farm holdings of limited dimension with retired household members. For this reason, the average farm-size of the research population is considerably higher then the average farm size for the whole region (13 and 5.7 ha respectively). Nevertheless, the farmers interviewed can be considered to be a reliable stratum, reflecting the diversity of farm-households with intention to continue farming over a long period.

Agricultural heterogeneity at village and farm level

The premises that a) heterogeneity is one of the overwhelming features of farming and that b) at least a part of this heterogeneity can be related to differential development patterns, have also been confirmed in Barroso. The farm holdings and villages show an often impressive variation over a range of variables. Of the latter, two were selected as a starting point for the analysis of different development trends, that is, orientation to milk production and cattle density per hectare[1]. During the last decades (especially during the 1980s) State and EC-funded interventions in Barroso were strongly oriented to the introduction and stimulation of milk production. Thus, the empirical amount of milk versus (the traditional) meat production, reflects, one way or another, the impact of these interventions. The same goes for cattle density. Modernisation, more often than not, follows the path of an increase in cattle density. Taken together, one might assume that empirical differences in cattle density and/or in the orientation of farm production to milk, will reflect differences in the rhythm as well as in the direction of farm development, the more so since analysis shows that neither of these variables can be considered accidental. In the practice of farming they are, of course, intertwoved with many other variables, as will be shown.

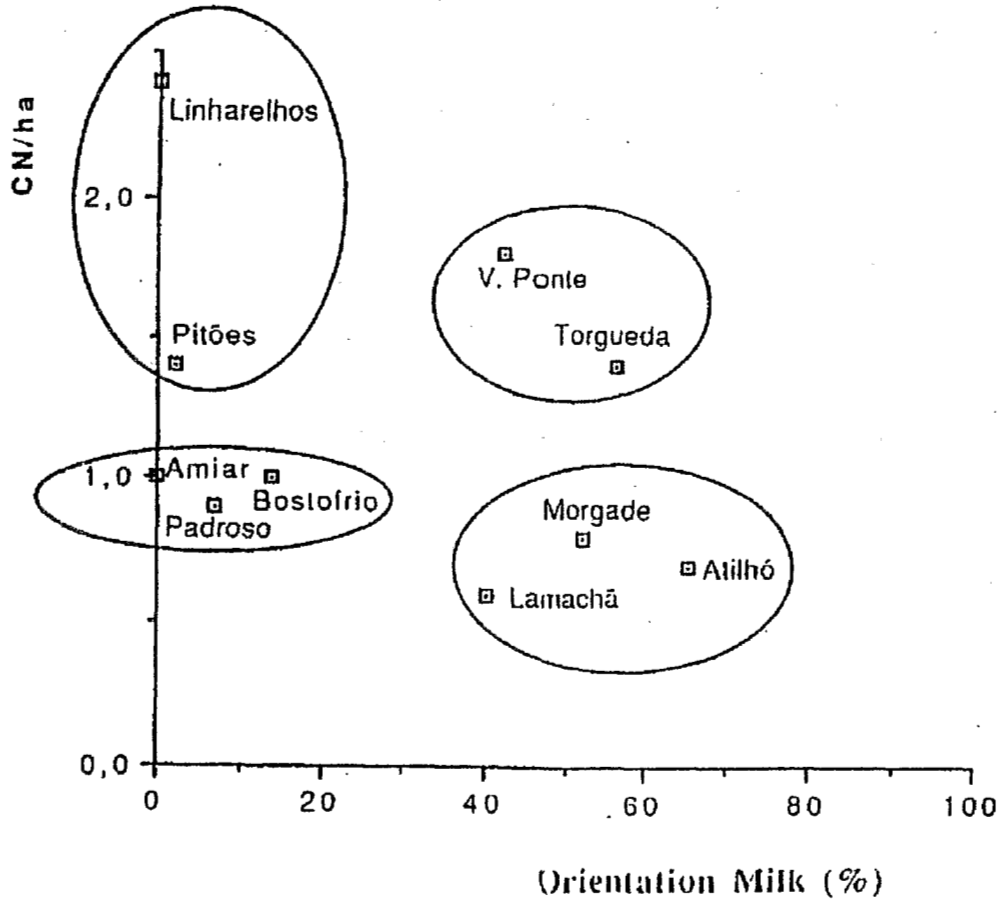
Starting with a projection of the average scores of the above variables at village level, an interesting panorama emerges. There is considerable heterogeneity, but in specific clusters (see Figure 1). The first cluster, consisting of villages such as Padroso, Amial and Bostofrio, is characterized by a strong emphasis on meat production and relative low cattle density. The second cluster, represented especially by the villages of Linharelhos and, to a lesser degree, Pitões, displays a remarkable pattern: traditional meat production with a high cattle density.
In contrast to these clusters we find other villages where farming has been reoriented to milk production. A strategic factor in the creation of this difference was the introduction of SCOM (Salas Colectivas de Ordenha Mecanica), or collective milking parlours at village level (Portela and Baptista, 1991). Significant is the fact that all the concerned villages have such a collective milking parlour whilst those of the first and second clusters do not (anymore) have such a parlour. Between the villages which made (partly) the shift to milk production we can distinguish two different clusters: those such as Morgade, Lamachã and Atilhõ are characterized by low cattle density, and the villages of Vila de Ponte and, to a lesser degree, Torgueda, where cattle density is relatively high. The figure contains also a tentative indication of Barroso's farming system as it existed in the 1930-1950 period. The diversity in farming, as expressed by the four clusters, is to be seen, as we will argue further on, as the result of diverging development trends that took place between the 1950's and 1990's. The creation of the SCOM (as an endogenous answer to new opportunities), the restructuration of agriculture as the effect of EC-interventions, the revitalization of local meat production and an ongoing, albeit not generalized marginalization are all to be seen as specific forms of these diverging trends, each resulting in a specific style of farming. Firstly

[1] We wish to thank J.D. van der Ploeg for his contribution to the analysis of the field data

however, the peculiar interrelations between farming and the commons is to be discussed.

The indicated heterogeneity is partly associated with the differential use of the commons *(baldios)*. Historically these commons were of great importance in Barroso's rural economy, covering three fourths of the total area of the province of Trás-os-Montes. This area was of especial importance as pasture land for goats, sheep and livestock. Moreover, parts of the *monte* were also used for arable farming, which after the harvest were returned to communal pasture land (Bennema, 1989). The commons were furthermore of importance for gathering firewood, and for construction materials such as stones and wood. Poorer families especially used the commons for making charcoal out of the scrub vegetation for additional income.

Figure 1. Heterogeneity at village level



The management of the commons was a communal matter and conflicts over their use between neighbouring communities were not unusual. Arrangements had to be made about the internal division of the benefits of the commons. Disputes had to be settled

over damage to the crops or private land bordering the *monte* caused by the animals pasturing on the commons. Permission to gather firewood, the regular burning of heather plants as a form of pasture management had to be arranged and so on.
The continued existence of large areas of *baldio* is one of the main reasons for the relatively high cattle density in Barroso compared to other Portuguese regions (Pires, 1970). Throughout history, Portuguese policy related to the commons has tried to turn them into private or State property, especially through afforestation projects (Brouwer, 1992). Nonetheless, the *baldio* continues to be of great importance as pasture land, although with remarkable differences between villages, reflecting to a certain degree the scarcity of and difference in the quality of the commons as pasture lands. But not only this. It reflects also the utilization of this local resource, which has been maintained and improved by regular pasturing during the centuries. Without pasturing the dominant vegetation of these heathery areas, on shallow soils with mostly grasses and ferns in the more humid parts, would gradually turn to shrub vegetation, unsuitable as a fodder source. This implies that it is only through a continued and well-balanced use, that the commons (or *baldios)* are reproduced over time as valuable local resource. Once the active use diminishes, both the actual and potential value will be reduced as well.
The villages orientated to meat production use the commons much more than the other villages. In Linharelhos, farmers use the *baldios,* on average, 7.4 hours a day (in Pitões as much as 9.9), whilst in the first cluster this is, on average, 4 hours. In the clusters oriented to milk production the commons are hardly used as pasture lands (less than two hours and one hour respectively) (Lima Santos, 1992).

For a better understanding of the differences within and between meat and dairy production, we have to shift the unit of analysis from village to farm level. The physical conditions of the village situation regarding amount and quality of the commons, present, especially in the short run, a more or less fixed set of potentialities and constraints. However, they offer the farm-households concerned a certain room for manoeuvre. Some use local resources such as the commons a lot, whilst others do not use them. In all the concerned villages a particular variation can be found; it is never one, but always more `systems' that are to be encountered at the village level. In Vila de Ponte, for instance we find representatives of three different styles of farming. Simultaneously, it has to be noted that there are specific `centres of gravitation'. In Linharelhos and Atilhõ specific styles are clearly dominant, as shown in Table 1.

Table 1. Division of farming styles at village level

Village	Int. dairy farmers	SCOM farmers (milk parlours)	Int. meat producers	Ext. meat producers
Padroso	-	-	2	4
Lamachã	-	5	-	2
Morgade	2	-	-	2
Bostofrio	1	-	1	4
Torgueda	-	5	1	-
Pitões	-	-	4	4
Atilhõ	-	6	1	-
Vila de Ponte	3	-	1	3
Linharelhos	-	-	4	2
Amiar/Tabuad.	-	-	1	5
Total	6	16	15	26

Until now we referred to cattle density and orientation to milk production as the principle entrances for an exploration of diversity in Barroso's agriculture. When we include other variables it becomes clear that these two variables are not isolated phenomena, but relate to other factors relevant to farming practice. Table 2 presents the wide variety of these other factors. As a whole, and taking the interrelations between them into account, they create a far more complete picture of differentiation in this rural area.

For Table 2 the farm enterprises studied are regrouped according to their individual position on the variables outlined earlier, e.g. cattle-density and orientation to milk-production. That is, the focus on the village-level (ref. Figure 1) has been replaced now by a focus on the farm-enterprise unit. The different styles will now be discussed in greater detail, especially as far as their specific historical constitution is concerned.

Table 2. Characteristics of the farming systems

Characteristics	Intensive diary farmers (n=6)	SCOM farmers (n=15)	Intensive meat producers (n=16)	Extensive meat producers (n=26)
Average:				
Cattle density (gross	1.2	0.7	1.4	0.8
animals/ha)	99%	70%	8%	2%
Orientation milk	22.6	12.2	11.9	11.8
Farm size (ha)	24.0	6.5	13.9	8.3
Number of cattle	0	5.5	22.4	6.3
Number of sheep	0	5.9	28.0	8.7
Number of goats	1.8	3.1	4.3	2.8
Number of pigs	7	14	11	6
% potato in total area	32.3	44.7	48.7	54.6
Age of farmer	3.3	4.7	4.8	4.4
Number of household members				
	67%	73%	82%	96%
Use of:	50%	40%	70%	28%
Labour exchange	33%	6%	6%	4%
Temporal wage labour				
Permanent wage labour	100%	40%	35%	20%
	10.6	6.5	6.9	5.8
Participation in EC-grants	100%	40%	29%	16%
Use of machinery*	50%	29%	47%	20%
Owns sprinkler	83%	43%	18%	4%
Constructed irrigation tanks	100%	50%	6%	12%
Installed temporary meadows				
Introduced silage maize				
	3.5	2.4	2.0	2.3
Use of:	6.0	5.7	-	-
Conc. calves (kg/day)	-	0.5	0.7	0.7
Conc. dairy cows (kg/day)	100%	57%	40%	38%
Conc. suckl. cows (kg/day)	0%	0%	20%	33%
Artificial Insemination				
Barrosã breed	50%	27%	44%	12%
	67%	71%	82%	64%
Fattens calves	33%	43%	77%	52%
Increased meadows in total area	0.7	2.5	6.2	5.1
Renews traditional meadows				
Average pasture time in commons (hours/day)				

* Indicator reflects the use of machinery including renting.

Intensive dairy farmers

Let as start with the intensive dairy farmers. One of the most striking characteristics of such farmers is their use of `external' elements. All the farmers concerned have taken advantage of EC-grants, constructed modern cowsheds (vacaria) and built individual milking parlours. They have imported Frisian milk breeds to replace local meat breeds, and the reproduction of cattle has become dependent on the use of artificial insemination. Forage production has been intensified by the introduction of silage maize and temporary meadows. In the ecological setting of Barroso, with its dry and hot summers, this requires a thorough reorganization of irrigation practices.[2] It is not surprising that all the intensive dairy farmers purchased a sprinkler, whilst half of them also constructed irrigation tanks to intensify their fodder production. In synthesis, the introduction of milk production on these farms involves a clear rupture from traditional farm practices, and depends on high capital inputs. Only the young farmers with access to first-time installation grants are able to pay for these capital inputs. The limited availability of family labour in the small households is partly substituted by a high level of mechanisation. Thus these farmers, more than in any other group, employ permanent wage-labour from outside the farm. The importance of traditional labour exchange (*troca or por favor)* between neighbours is relatively low. Instead of the *troca* several farmers started to mobilize labour by exchanging machinery services for labour with smaller farmers.
Though milk production is the main income-source for the farmers concerned, meat production remains of considerable importance. The fattening of calves until the age of one year has often been an integral part of EC-investment grants. In general, however, a process of specialization has been taking place, with a decrease in the average number of goats, sheep and pigs as well as a decline in the importance of potato production.

Although the development of intensive dairy farming has been, until very recently, the main project of EC- and State-interventions, it must be stressed that in the socio-economic and ecological reality of Barroso, the scope of the above described development pattern is very limited. It applies to only between 40 and 50 of the 4,621 farm-households in the whole zone (RAC 1989).

The SCOM-farmers

For most farmers, the investments entailed in developing intensive dairying are impossible to realize. The construction of an individual milking parlour, for instance, is a

[2] For a detailed description of the importance of irrigation in Trás-os-Montes and the diversity in traditional farmer-managed irrigation schemes, see the paper by J. Portela and A. van den Dries.

costly investment, and only possible with a relatively large scale of production. The collective milking parlour at village level, therefore, has been an excellent solution to this problem. The average farm-size of a SCOM-farmer is almost half that of the intensive dairy farmer and for him, the introduction of milk production did not go along with high investments, but with the (gradual) replacement of existing meat-breeds by Frisians. The smaller farmers in particular, did not shift completely to dairy production, but kept some traditional breeds, which are also preferred as traction animals. Furthermore, milk production remained integrated into the farming system as a whole. A part of production is saved for suckling calves. After a lactation period of 5-6 months the cows are released from the twice a day visit to the milking parlour, and the farmer uses them to fatten two or three calves. Other farmers use their less productive dairy cows during the total lactation period for the same purpose. For that reason it is of little value to compare milk production per cow among SCOM-farmers. Average lactation periods vary considerable between farm-holdings, expressing the difference in emphasis on meat or milk production. Nevertheless, to give a general impression about the technical results realized by SCOM farmers, a sample of 650 dairy cows in 31 `SCOMS' verified that 56 percent produced more than 4000 liters, whilst 8 percent produced more than 6000 liters (Portela and Baptista 1991).
It is difficult to compare these technical results to those realized by the intensive dairy farmers. Most of the latter started milk production only one or two years ago, so the dairy stock is still in a phase of development, and differences in fodder production are quite pronounced. The dairy production of the SCOM-farmers does not depend on an intensification of fodder production, which is characteristic of the intensive dairy farmers, and their utilization of the commons as a fodder source, remained furthermore of greater importance. Only some of the larger farmers among them introduced silage maize and /or temporary meadows. Also the purchase of concentrates for their dairy and suckling cows is relatively low. Agricultural activities are more diversified, demonstrated, for instance, by importance of potato production. The participation in EC-grants schemes by the SCOM-farmers is relatively low. Those who did participate mostly invested in machinery related to potato production.

The meat producers

Farmers orientated to meat production are not completely unfamiliar with dairy production[3]. Several had recently purchased Frisians, but have decided since to abandon dairy farming. Sometimes this has been due to external constraints, as in the village of Pitões, where about ten years ago the cooperative dairy industry stopped milk

[3] Dairy production was also of importance in some villages in Barroso at the beginning of this century, when farmers transformed milk at farm level into butter and commercialized this through local markets (Freund 1970).

collection for economic reasons. However, the abandoning of dairy production cannot be explained solely by limitations in commercialization. In several villages in Barroso, the implementation of a SCOM turned out to be unsuccessful. The reasons for these failures are various, but our own field data confirm the dominance of economic motives. Most of the meat producers considered dairy production to be an unattractive alternative source of income. They stress the poor adaptation of the dairy breeds to the local climatic and physical conditions and their low productivity when pasturing on the commons. Unlike milk producers, where the use of the commons decreased with the introduction of dairy farming, the meat producers stress the importance of the commons. As they say, "*O baldio é a nossa força*" (the commons are our strength), making it possible to increase the number of cattle well above the limits of their privately owned land. In Pitões and Linharelhos for instance, some of the farmers pasture their animals (the ones without young) for 6-7 months night and day on the commons. The shift to dairy production would impede such an intensive exploitationion of the fodder system. The latter does not fit with the dominant strategy to redu of the commons, and imply a reduction in the number of cattle, or an intensified production costs. Most farmers prefer to continue with meat production at low costs, which also includes keeping at a minimum the use of industrial concentrates (see Table 2). The geographical division in the production and reproduction of meat between Entre Douro e Minho and Barroso, which existed in the 19th century, is still expressed in the dominance of veal production. The majority of the farmers consider fattening beyond 5-7 months (*vitelos)* as unattractive, because this implies the purchase of extra concentrates. The *vitelos* are mostly sold to local traders or butchers, who differentiate the price by age and not by breed. This makes the birth weight of the calves an important criterion for breed preferences, and is the main reason why the majority of the farmers now cross-breed the traditional Barrosã breed with other breeds. The difference in birth weight between a Barrosa and a Charolais calf for instance, is estimated to be between ten and fifteen percent. Nonetheless, the Barrosã can still be found in the region, especially in the parish of Salto. Here farmers appreciate the Barrosã for its resistance to diseases, its vitality and adaptability to pasturing on the commons. For these reasons the Barrosã has to be considered as a real endogenous resource.

The relatively large households (see Table 2) supply themselves with the main labour force for the diversified farm activities. Labour exchange, the *troca* is still of great importance for mobilizing extra labour in peak periods. The existence of communal flocks *(vezeiras)* is another example of a social arrangement, which reduces the monetary costs of labour required. Farm households supply a shepherd with a number of days wages, in proportion to the size of their share of the flock.
For the feeding of the livestock, not only the pastures of the commons are essential, but also privately owned meadows. Farmers distinguish three types of natural meadow;

haylands (*lameiros de feno),* pasture lands *(lameiros de pasto),* and grass *(lameiros de erva),* on small plots (some hundreds of square meters) situated near the village, grown with irrigation water in abundance. The use of these plots is limited to the fresh cutting of grass for additional feeding in the stables. In general, haylands are also found in locations with a relative high availability of irrigation water, or on soils with a capacity to hold their humidity for a long period *(terra lenta).* These characteristics allow the production of hay; this contrasts with the *lameiros de pasto*, where the availability of irrigation water is limited, or where the soils dry out more rapidly *(terra areneira),* both major constraints for the production of hay.[4]

One of the traditional ways to improve the productivity of natural meadows is to integrate them into arable farming. After some years under cultivation, the fields are allowed to revert again to meadows, sometimes by sowing grass seeds collected from the haybarns, but mostly through the cultivation of rye, and the self-seeding of natural grass vegetation. The purchase of improved grass seeds is highly uncommon, as is the cultivating of temporary meadows. The latter is excluded since it would imply a counter productive change in crop rotation schemes (one of the reasons for the stimulation of temporary meadows is the more frequent inclusion of potato in rotations). Farmers with a limited arable area would in particular consider this to be unattractive. Of the few farmers who did experiment with temporary meadows, several concluded that after two or three years the differences in production between these and the natural meadows were negligent. In their opinion the temporal increase in fodder production did not compensate for the extra costs of the purchase of grass seeds and chemical fertilizers.

The production of silage maize is also rather limited among meat producers. Besides the lack of machinery, farmers often point to local ecological conditions, which impede the growing of silage maize. Some did experiment with hybrid maize but concluded that it needed a longer growing period compared to traditional varieties. Also in villages near the National Park of Geres this led to problems with the wild pigs *(javalis)* destroying the harvest. For that reason they preferred the cultivation of ryegrass *(ferrã)* as an additional fodder source, which is also cheaper and less labour demanding.

So far we have considered the meat producers as a more or less homogeneous group. Differences in cattle density, however, are remarkable. With almost the same average farm-size (11.8 to 11.9 ha respectively), the group of intensive meat producers possess 6.3 more cattle units than those on extensive farms. This difference in cattle density cannot be explained completely by a more intensive use of the commons (respectively 6.3 and 5.1 hours per day). Regional ecological diversity (e.g. availability of irrigation

[4] The characterization of haylands and pasture lands based on soil quality and water availability is in practice not always that clear. Other factors such as the inclination of the fields and accessibility for machinery play a role as well.

water) could also play a role in the explanation of these differences, but Table 2 establishes that there is more at stake. There are several indicators for the differences in dynamics between the two groups. For example: the percentage of farmers who have improved the irrigation system by constructing tanks, or improved the natural meadows by 'renewing', is considerably higher for the intensive meat producers. The higher utilization of machinery, the higher average number of sheep, goats and pigs, as well, that the percentage of farmers who fatten calves to 1 year or more, are other indicators. This brings us to the farm-household typology as mentioned earlier. A considerable number of the extensive meat producers have reduced in the last decades the number of cows (as well as goats and sheep), due to the migration of household members (or, to a lesser degree, their participation in higher education). This decrease in family labour has not been compensated for by the extra mobilization of off-farm labour or utilization of machinery. As a consequence, the farms are in a process of extensification of agricultural activities. One of the ways in which this is expressed is a relatively low cattle density. The same goes for the reduction of potato cultivation and/or abandoning the cultivation of the poorest soils, today extensively used as pasture lands, or left uncultivated (*de luto* which means literally `mourning').
In contrast, an examination of the intensive meat producers establishes that they have often increased the number of livestock, and have invested in the purchase of extra land or machinery often financed from farm savings, or from savings from a period of migration, or from their greater participation in EC grants, though for both groups this is relatively low.

The differences in dynamics between the two farming styles are sometimes quite visible at village level. In Padroso, for instance, a village where extensive meat production is dominant (see Table 1), a large number of the houses have been abandoned. About 80 percent of the total agricultural area belongs to the *Americanos,* a reference to the main destination of the migrants from this village. These *Americanos* sometimes lend out their land, but often just leave it uncultivated, due to the lack of interested farmers. The lack of agricultural dynamism is also expressed in the dependence on animal traction by the large majority of the farm-households and a decrease in the number of livestock. In the period 1972-1992 the total number of cattle-units in the village decreased from 359 to 303 (INE 1972; ADS 1992).
Thus the extensive meat producers reflect to a certain degree the marginalization process of agricultural activities in Barroso. This does not justify the conclusion that these farms are doomed to disappear. Extensification could be seen as a by-product of migration, whereas a reversal could emerge as a consequence of re-migration.
A far more dynamic development pattern can be distinguished in the village of Pitoes, with a relatively high percentage of intensive meat producers. Here migration has slowed down in the last decade, and there is a completely different situation regarding the availability of agricultural land. There is no abundance of land available for farm-

households who want to expand their farm-holding, but the number of livestock in this village increased in the same period (1972-1992) from 831 to 1,198.[5]

Sustainability and reproduction of soil fertility

The two main variables used to distinguish the different farming systems, cattle density and orientation to milk production, are also relevant regarding farming practices related to the reproduction of soil fertility. Table 3 shows the factor loadings of these variables in relation to the use of organic manure and chemical fertilizers. Meat production (factor 1) associates strongly and positively with the use of organic manure and shows a negative association with the use of chemical fertilizers. In turn, factor 2 (representing dairy production) is positively related to the use of chemical fertilizers. Thus, the more farmers are orientated to dairy production, the more the reproduction of soil fertility depends on chemical fertilizers.

Table 3. Factor scores in relation to chemical and organic fertilization

	factor 1	factor 2
Cattle density	0.79	-0.08
Orientation milk	-0.32	0.67
Application of manure	0.71	0.42
Application of chemical fertilizer	-0.79	0.28

Traditionally, farmers in Barroso utilized high quantities of manure, originating from the rearing of livestock on bedding derived from the commons. This transport of nutrients has been crucial in the maintenance and improvement of the soil fertility of privately owned land. For this reason, farmers still cut all kinds of scrub vegetation, mostly at random, but with clear preferences for specific characteristics of this vegetation. Gorse and heather are appreciated for ease in cutting, whilst leguminous shrubs like broom and wing broom are known for producing high quality manure, lasting a long time (*a giesta sete anos presta).* The cutting is labour intensive, the more so if it is done with a scythe, although most farmers now use hand mowers. Manual labour, however, is still an indispensable part of farming practices involved in organic manuring. For cleaning out the stables and spreading the manure on the fields, for instance, most farms totally depend on manual labour. Black (1992), studying the Serra de Alvão in Trás-os-Montes, mentions the decrease in the agricultural labour force as the principle reason for farmers searching for alternatives to shrub vegetation, such as the litter beneath

[5] At this moment it is only possible to compare the development of the number of livestock in the villages which form an administrative parish, the minimal unit of aggregated agricultural data collection.

pine forests and maize straw. Our own field data do not confirm such a shift to alternatives. In Barroso, *o mato* continues to be the major source of animal bedding[6]. However, another process of changing practices relating to the reproduction of soil fertility can be distinguished. As mentioned before, all the intensive dairy farmers have installed modern cow sheds which are equipped with cesspools, thus reducing the labour time spent on the collection of shrubs and the spreading of organic manure. The shrubs for animal bedding have to a large extent been replaced by rye straw, and the spreading of liquid manure has been mechanized by the use of tanker wagons. As a consequence, the quantity of organic manure produced on these farms is rather limited. As Table 4 shows, all the available organic manure is applied in the cultivation of (silage) maize, potatoes, and (less frequently) in establishing temporary meadows. On the hay and pasture land liquid manure has replaced organic manure, and to a certain extent also chemical fertilizers. In general, however, we see that fodder production is obtained by high levels of chemical fertilization, especially of maize fields and temporary meadows, which in the latter is often supplemented with limestone powder for correcting soil acidity.

Table 4. The use of organic and chemical fertilizers per farming system[7]

	Int. dairyfarmer	SCOMfarmers	Int. meatproducers	Ext. meatproducers
Manuring(tons/ha)				
- haylands	0	8.3	9.0	6.2
- pasture lands	0	4.8	1.3	0.9
- temp. meadows	30	24	-	-
- maize	28	23	25	24
- potatoes	27	24	29	27
Chemical fertilizers (kg/ha)				
- haylands	160	266	159	129
- pasture lands	83	237	100	96
- temp. meadows	280	300	-	-
- rye	175	141	84	58
- maize	608	396	127	169
- potatoes	833	857	626	741

Compared to their colleagues, the SCOM farmers apply more organic manure as well as more chemical fertilizer to hay and pasture land, but use much lower quantities of chemical fertilizer in the production of maize. This confirms the relatively limited importance of maize in their overall fodder system, and the dependence on hayland as the main fodder source for the winter period.

[6] For a detailed description of the importance of organic manuring in Barroso's ecological conditions, see also the paper of E. Portela.

[7] The quantities of chemical fertilizers refer to the total amount of fertilizers. In potato and maize cultivation it refers mostly to *Composto (7:14:14). In the pasture lands Nitrato (20.5 percent N) is the most common fertilizer.*

In the case of the meat producers, the application of chemical fertilizers is in general limited (except in the potato cultivation) not only in quantity, but also in frequency. These farmers often emphasize the irregularity in their applications, motivated by specific weather or crop conditions. In their farming practice, the reproduction of soil fertility depends primarily on organic manuring, irregularly supported with relative low quantities of chemical fertilizers.

At first sight one might think that substituting organic manure by chemical fertilizers would be attractive for farmers, because it reduces the labour input. According to a recent study, this would explain the growing importance of chemical fertilizers in Barroso (Lima Santos 1992). But, almost without exception, farmers stress that it is impossible to substitute organic manuring completely for chemical fertilizers, particularly in arable farming. Several farmers had recently experimented with this (mainly in potato production), and had observed that after a few years soil fertility had decreased. *A terra precisa de comer* (the soil needs to eat), an expression often heard among farmers, denotes the importance they attribute to organic manure. It is even more clearly expressed in the popular saying *uma pessoa bem estrumada* (literally a `well-manured person' but meaning a person with abundant financial resources).

In some ways, the use of the term 'man-made soils' is appropriate in Barroso. The application of high quantities of organic manure for centuries has formed a thick organically rich top layer over what, in general, are poor soils and acids. Organic manure has improved the soil structure, and is also of great importance in the climatic conditions, prevailing as it warms the soil, stimulating biological activity, and offering protection against frost. The goat and sheep manure, known as *estrume quente* (hot manure) is especially efficient in this respect. Chemical fertilizers lack these characteristics and are basically considered as supplements to organic manure, able to *puxar a erva ou a cultura,* to stimulate growth during a particular period, but not as a long term fertilization source.

Opinions about the necessity of organic manuring of the meadows are more diverse. The intensive dairy farmer, for instance, considers liquid manure (*chorume)* to be a good substitute, while a lot of meat producers stress the positive influence of regular organic manuring, saying that this not only increases productivity considerably, but also improves vegetal composition. These farmers also consider cowsheds with cesspools to be inappropriate, given the climatic conditions of Barroso. In their opinion, deep litter houses offer the animals better protection against the cold winds during the winter period, and provide the large quantities of manure needed. Despite the labour saving advantages of modern cowsheds, they prefer to stick to the traditional cowsheds, or

build new deep litter houses with larger entrances, making it possible to enter them with a tractor to muck them out mechanically.

Endogenous versus exogenous development

Looking at the main differences between the farming systems distinguished, it should be clear that the concepts of exogenous and endogenous development cannot be defined by using opposing ideal types, where one is founded mainly or exclusively on so called `external' elements, and the other on `internal' elements. Such a conceptual framework would miss the basic point that development always entails an articulation of both `internal' and `external' elements. What is at stake is the definition (and redefinition), the negotiation (and re-negotiation) as well as the practical elaboration of the required balance and mutual interaction of both internal and external elements. Starting from this consideration, endogenous development may be defined as the preponderance of internal, or local elements; this development combined into a coherent model, constitutes the point of departure for the interpretation, evaluation, and selection of external elements to be integrated, so as to enhance, consolidate and/or strengthen the set of internal elements. In exogenous development patterns it is the other way around. It is the introduced set of external elements (a specific technological model and/or the integrated set of rules as implied in external intervention) that is used as the starting point for a reconsideration of the available local (or `endogenous') resources. It is precisely this point which distinguishes the styles of farming described. The exogenous character of the development pattern of the intensive dairy producers, is especially underlined by the fact that the balance between the `internal' and `external' swings to the latter side of the equation. It is the introduced technological model which functions as a yardstick for a re-evaluation of the utility of internal resources, such as the commons, for example. And since the latter hardly fit, their utilization becomes a marginal phenomenon.

The opposite is to be encountered in the development trends apparent among the intensive meat producers. Their meat production is an illustration *par excellence* of endogenous development, not only because it relies heavily on the utilization of local resources, but because it also functions as the local model against which decisions are filtered on whether or not specific `external' innovation should be adopted (introduction of Frisians, adapted cowsheds, etc.). If they fit, they will be integrated. And vice versa if they do not. The same applies for the farmers who introduced dairy production without increasing cattle density. It is the availability of a local response or mediation (i.e. the SCOM) which allows for the integration of new and initially `external' elements (such as the production of milk) into the existing set of relations and practices (the

correspondence between farming and ecological setting, the interrelations with meat production, etc.).

The more recent `external' elements represented by EC grants, suggest for several reasons the predominance of an exogenous development pattern, in particular because of the selective way in which they are applied. Agronomic and technological innovations such as the introduction of silage maize, temporary meadows, modern cowsheds, etc., can only be implemented by a small minority of farmers. Such innovations are not adapted to the ecological setting, the scale of production, experiences and perspectives of the overwhelming majority of farm-holdings. The `external' character of modern dairy technology is also expressed in its threat to the ecological equilibrium of soil and water resources in the zone.

Furthermore, the socio-economic selectivity of EC-fundings has increased the social differentiation between farm-households. The actual feasibility criteria of investment proposals exclude the majority of farmers, of whom a considerable number have actually invested in farm development, but in a step by step approach, avoiding the risk of indebtness (*coser com as linhas que hã).* EC grants do not fit into this perception of agricultural development, also clearly reflected by the limited number of project proposals within the EC-797 programme. In the period 1986-89 the number did not exceed 230. If we look at the number of accepted investment proposals, it becomes even more obvious. No more than 80 of the 230 proposals were approved according to Isolina and Poeta (1990), who also explain this as being due primarily to the feasibility criteria of the 797-programme. A large percentage of the rejections could be explained by a lack of skill on the part of the `technicos' to elaborate investment proposals fitting with the step-by-step approach as preferred by farmers (see for a more general discussion van der Ploeg 1990 and van der Ploeg, Saccomandi and Roep 1990).

Notwithstanding their limited access, such programmes are highly present and often an important factor in the decision of farm-households concerning the continuity in their agricultural activities. No access to EC grants is often perceived of as `no agricultural future'. In other words, it should seriously be questioned whether or not the overall impact of the way EC-funding is implemented does not actually serve to enforce rather than counterbalance the marginalization process (IRFATA 1992).

Alternative intervention strategies

So far, we have discussed diversity in farming practices and patterns of agricultural development. As shown, there are important differences in the extent to which the various farming systems reflect endogenous development. We take the strengthening

of endogenous development potential as our starting point for an exploration of alternative intervention methods. We will discuss some elements which, in our opinion, are essential for such an alternative intervention strategy.

First, the nature of EC-funding programmes needs to be discussed. We have already mentioned the selectivity of the actual implementation of these programmes and their negative consequences. If small-scale investment projects were to be integrated into such programmes then this would certainly lead to an increase in farmer participation. This would certainly lead to an increase and a more proportional division of the funding between farm-households. This could be stimulated by more flexibility in terms of the content of activities to be subsidised, such as an integration of all kinds of possible agricultural activities and farm diversification into the broad framework of the utilization of local resources. Thus, a rethinking of the dominance of the modernization paradigm (scale enlargement, and the increase of productivity by external inputs), towards a policy which focuses more on the existing comparative advantages of the region. In Barroso's ecological setting it is not only impossible to achieve the production increases that can be realized in the `more favoured areas', but the attempt to do so could signify that the existing comparative advantages of the region are lost. The actual low dependency on external inputs of the majority of the farm-households, for instance, could be the base for an agricultural production in which the environmental benefits are explored in new emerging market segments.

The recent shift in local agricultural policy towards the production of Barrosa quality meat could be seen as a first step in this direction. Until now, however, it is unclear whether the concept of quality will include more than just the breed itself. One must question whether a limited definition of quality will strengthen endogenous development. It is probable that the more intensive and/or large-scale meat producers outside Barroso will be the main beneficiaries. It is noteworthy that local farmers, strongly associate meat quality with the fodder system. More than 80 percent of the interviewed farmers expressed the opinion that feeding is at least as important as the characteristics of the breed for producing quality meat. If the animals are raised by local forage (*produtos caseiros)* like hay, ryegrass, rye and maize grain, the meat is considered superior to meat raised using industrial concentrates. The inclusion of the forage element in the quality definition is essential to guarantee that also, or maybe especially, the smaller farmers are able to produce Barrosã meat. They are the ones who, after all, feed their animals on the natural meadows and pastures of the commons, and furthermore, produce fodder with low inputs of chemical fertilizers.

The idea of regional-specific, high-quality products, can be elaborated to other products such as goat and sheep meat or cheese. In Pitoes, for instance, a group of farmers have already expressed their interest in the production of goat cheese. The smoked

hams (*presuntos)* and other smoked products *(fumeiros)* originating from pork, are other examples of high quality regional-specific products. These home-made products, based on local craftsmanship, are highly appreciated within and outside the region. Such products were traditionally consumed at home and offered to relatives and friends (researchers too), but their commercialization has become steadily more important.

The reorientation of agricultural output markets could also include the valorization of the local nature and landscape. These, and all kinds of other local resources could be explored for agro-tourism and initiate a process of diversification of the rural economy (Cristóvão and Tiberio 1992; Slee 1992). Farm-households could perhaps also benefit from the stimulation of agro-tourism, although opinions on this differ. An essential element of this discussion is the preservation of local nature and landscape, which is developed and preserved to a considerable extent by farming practices. Until now farmers have not been rewarded for these activities and, furthermore, are excluded from the discussion on how to preserve nature and landscape values. A discussion, together with the farmers, could be initiated to develop programmes which remunerate practices related to the maintenance of specific landscape values like, for instance, the typical stone walls between fields (*muros).* Again, some farming systems are better able to integrate this in their farming practices than others. For example, this would be more difficult in a development pattern as represented by the intensive dairy farmers which represent much more an ongoing process of scale enlargement and therefore a `reshaping' of the small-scale landscape.

Institutional support

The alternative interventions outlined above, ask for specific conditions at the institutional level, for local organizations and institutions play a crucial role in creating favourable conditions for endogenous development. Three major actions can be suggested; (1) local organization development; (2) articulation between research-extension-training and information; and (3) development of appropriate support mechanisms and programmes.

In Barroso, farmers' associations, cooperatives, and other local groups, represent an important human resource potential. In fact, endogenous development requires the predominance of local actors, in local democratic decision-making, local control of resources, and in the sharing of local benefits.

An example of such a local organization is the Association of Barrosã Breeders, created in 1988, with the objective to define and implement strategies to preserve this local breed, and to add extra value to meat production. The Association, as a clear example of an endogenous initiative, needs to be assisted and promoted. In general, local organizations have to be strengthened, through leadership development, technical

training, and the facilitation of networking at different levels, from local to international. At the same time, such processes require, in many instances, new styles of intervention from state services and agents, who were trained and socialized under a modernization framework, in which strengthening of endogenous development, the building of local organization and participation are elements that are mostly absent.

Actual agronomic research needs to be reorientated to the specific technological and agronomic problems and requirements of the endogenous styles of farming. Thus, the setting of the research agenda needs to be done with farmers, and not for farmers as is more common in current research programmes. The results of our research point to several topics which can be used as a guide. Topics which could be discussed and elaborated with farmers might be:

- The improvement of the Barrosã breed. Until now little research has been done about the improvement of this breed, whilst in the opinion of the farmers this is essential to the eventual success of its rehabilitation. The initiatives that have been taken in this direction tend to isolate the breed from its fodder system. In improving the breed, adaptation to local conditions (pastures in the commons) should play an essential role.
- Redefinition of selection criteria for milking breeds. The dairy breeds in Barroso are specifically geared to milk production, while for most dairy farmers meat production continues to be an important criterion in breed preference. The practices of crossbreeding some of the dairy cows with the Charolais breed often lead to birth problems. Research related to `double-purpose breeds' could alleviate this problem.
- Improvement of sheep and goat keeping. In the opinion of farmers, goat and sheep keeping is at the present one of the most attractive agricultural activities. Nonetheless, little research has examined the possibility of, for instance, improving the local breeds.
- Improvement of the natural meadows and pasture lands of the commons. Instead of the intensification of the fodder system by creating temporary meadows and introducing silage maize, research attention should be reorientated to the natural meadows and pastures of the commons. To what extent is it possible, for example, to improve the productivity of these local resources, based on low external inputs?
- Development of labour saving technology related to organic manuring. Instead of cowsheds with cesspools, alternatives that are in tune with the traditional, but labour intensive, deep litter houses could be developed, along with appropriate technology for reducing the drudgery of farm-practices related to organic manuring.
- Broadening the concept of high quality meat. The initiation of a discussion of a broader definition of the concept of quality could be supported by agronomic research into the relation between meat quality and the forage system such as the influence of industrial fodder and fermentated products like silage maize; or the influence of the vegetation of the natural meadows and the commons; and the relation between chemical and organic fertilization on the vegetation of the natural meadows.

- Characterization of other high quality products, goat and sheep cheese, smoked hams, mountain honey, etc. The production and processing of these potential high-quality products should be studied, to guarantee quality and to arrive at quality definitions and `labelling', which offers protection against (industrial) imitations.
- Support for local initiatives orientated to the production of local high-quality products. Groups of farmers who have expressed an interest, for instance, in the production of goat cheese, or mountain honey, could be supported by research and function as a pilot study.
- Market strategies for quality products. For the commercialization of regionally specific high-quality products, transformed at the farm or local level, and with the potential for a high added value per unit, so-called market `niches' have to be explored. An example of such a market `niche' could be the communities of regional migrants in France or Luxembourg, eager to consume such local products like rye bread, smoked ham and sausage. Further research is needed on market strategies to create alternative commercialization channels that are able to provide higher returns.
- Farm diversification, and experimentation at farm level of alternative products such as mushrooms, aromatic plants, horticulture, etc. Farm diversification could be stimulated by on-farm research related to alternative products, adopted to small scale production and the local ecological setting.

In addition to the necessity for a reorientation of agricultural research agendas, the fields of extension and training also need reorientating away from the dominant technology transfer paradigm of modernization theory. The training and extension programmes primarily reached a particular group of farmers (large scale, and orientated to milk production) and promoted an agricultural intensification strategy. Other farming systems have been noticeably neglected, and new clientele and fields of training should be envisaged.

Information is another critical ingredient, namely, information regarding markets, appropriate technology, forms of organization and management, experiences elsewhere, funding and other support instruments. The use of local media could and should be increased, as well as the exploration of technologies and involvement in new networks, such as the ones found in the LEADER programme.

Finally, endogenous development implies appropriate support mechanisms and programmes. As stated above, policy instruments such as EC funds, are not adjusted to local conditions. In this area, it is not only important to take advantage of existing mechanisms, looking for synergic effects, but also to fight for more appropriate measures. Action in this area leads, once more, to the importance of local institution building. In fact, the capacity to influence decisions, in Lisbon, Porto or Brussels,

requires local and regional institutions and the participation in networks and other forms of organization, at national and European levels.

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