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THE ECONOMIC CRISIS AND AGRARIAN SUSTAINABILITY: WEAKNESSES AND POTENTIALITIES.

CASE STUDY ON GOAT FARMS

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Abstract — The objective of this work is to identify the effects (economic, environmental and social) of the economic crisis in agrarian activity at the farm level, focused on farms with the goat livestock of Bravia breed, and to identify the mechanisms/actions/innovations developed by these farms, in order to their survival, as the created opportunities that can sustain them. The methodology focuses on surveys to farmers who hold different levels of livestock heads, in order to measure the evolution of economic, social and environmental indicators before the economic crisis and at the current scenario. The aim is also carry out a SWOT analysis of these systems. In a global view is observed none or little impact of the economic crisis in the studied herds. The high mortality rate, the need of constant labor and the dependence of farmers in farmers' cooperative for most of the purposes are the main weaknesses found on these production systems. Effective responses to these situations reveal themselves as the main opportunities of the activity under study.

Key words: Economic crisis; farming sustainability; goat rearing; weaknesses and potencialities.

Résumé — L'objectif de ce travail est d'identifier les effets (économiques, environnementaux et sociaux) de la crise économique dans l'activité agricole au niveau de l'exploitation, axée sur les fermes avec chèvres de la race Bravia, et d'identifier les mécanismes/actions/innovations développées pour ces exploitations, en vue de leur survie, comme les possibilités offertes qui peuvent les soutenir. La méthodologie met l'accent sur des enquêtes aux agriculteurs qui détiennent différents niveaux de têtes de bétail, afin de mesurer l'évolution des indicateurs économiques, sociaux et environnementaux avant la crise économique et au scénario actuel. L'objectif est également d'effectuer une analyse SWOT de ces systèmes. Dans une vision globale on observe aucun ou peu d'impact de la crise économique dans les fermes étudiés. Le taux de mortalité élevé, la nécessité du travail constant et la dépendance des agriculteurs d'une coopérative d'agriculteurs pour la plupart des fins sont les



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principales carences constatées dans ces systèmes de production. Des réponses efficaces à ces situations se révèlent les principales possibilités de l'activité sous étude.

Mots clés: Crise économique; durabilité agricole; élevage de chèvres; faiblesses et potentialités.

INTRODUCTION

In a time of increasing global threats, including pollution and climate change, the scarcity and degradation of natural resources and the unbalanced growth of world population, there are originated consequences of short and long term, which can undermine the sustainability of various sectors, including the agrarian sector. The most recent global economic crisis came to emphasize the lived reality, affecting all sectors of activity. The agrarian sector is not foreign, revealing the vulnerability of farming systems, their inability to resilience and the need for innovation, but also detaching the more capable systems (more sustainable), offering new opportunities and encouraging practices more environmentally friendly, as the reduced use of fossil fuels.

The economic crisis can be considered as a kind of "selection" of more sustainable enterprises/farms, constantly testing and evaluating their economic, social and environmental capabilities. Therefore it's time to question: Which farming systems survived? How have they adjusted the production systems to the new context in which we live? Which innovations are being implemented for the sustainability of production systems?

The answers to all of these questions is the main objective of this work which aims to identify the effects (economic, environmental and social) of the economic crisis in the agrarian activity at the farm level, and to identify the mechanisms/actions/innovations developed by farms in order to their survival, as the created opportunities that can sustain them. This is the time for conducting an assessment of the identified problems and opportunities as well as the weaknesses and strengths found and developed by the farmers, by the occurrence of this economic trend, in order to identify the conditions/factors/situations/practices that can enable the sustainability of farms.

At the present global context, agriculture and food sector is facing an uncertain future. They have to confirm to be capable of dealing with sustainability in order to play a key role in ensuring food sufficiency and well-being of rural populations, present economic viability, prevent social exclusion and promote social equity, preserve natural resources by preventing environmental degradation.

Due to the effects of the still very recent global economic crisis, there are no identified studies on this theme for the agrarian sector, mostly in Portugal, and, is also why this work is based, at the moment, on some very specific cases. It begins with the goat livestock, especially with the autochthonous Bravia goat breed, which are raised mainly in mountainous areas of the northern of Portugal (Marão, Alvão and Peneda mountains) (Afonso, 2004). Livestock farming is the main land use in these areas, and economic viability of farmers substantially relies on income coming from agriculture subsidies, specially the agrienvironmental payments. The systems under study were also selected due to its contribution to fight human desertification of mountain areas, by providing added value in economic and socio-environmental terms. However, these systems need revitalization, by improving their profitability and promoting the rejuvenation of the farming population, but also by dealing with a goat breed of high rusticity, transformer of intrinsic natural resources of the mountain zones: a significant regression of herds has been registered (to the current point, where they reached "risk of extinction" status) which can lead to loss of genetic assets.

This study is still under development, starting with a small sample of farmers.

1. METHODOLOGY

The main methodology focused on surveys to farmers who hold different levels of goat heads of Bravia breed, localized in their production area. Approximately 10% of the registered producers in the national association of producers of Bravia goat (ANCABRA) were

contacted. There were distinguished three headage levels: less than 50 heads (little-sized farms); 50 to 150 heads (middle-sized farms); and more than 150 heads (large-sized farms). Three farms were studied for each headage level, during 2010.

The collected information was used to evaluate the evolution of some important parameters of the sustainability of these farms, before the economic crisis and at the current crisis, and carried out a SWOT analysis of the systems. The SWOT analysis identifies the strengths and weaknesses of the farms, in support of the identification to future actions, able to achieve the optimal use of the opportunities and the control of the threats.

2. EVOLUTION OF SOME SUSTAINABILITY INDICATORS OF STUDIED FARMS

In this point there are presented some indicators to characterize the studied farms and assess some aspects of their sustainability. The indicators are presented comparatively for two different realities, before and during the economic crisis.

The figures presented for the selected indicators result from the mean values obtained for individual farms belonging to each level of headage initially distinguished. Then, these values are compared, resulting in a nule (0), positive (+) or negative (-) evolution.

Other indicators, apart from those presented in this paper, are also fundamental to the analysis of farms sustainability. However, the absence of records by the producers turned its measurement impossible.

Simultaneously, and when convenient to a better understanding of the existing reality and the monitoring of the SWOT analysis carried out later, there are introduced some aspects of the rearing system of goats from Bravia breed. The characterization of these aspects is based on obtained information from surveys, complemented with references drawn from the specialized literature.

The Bravia goats have as production area the portuguese mountains of Alvão, Marão and Peneda. They are distributed into zones of altitude above 500 meters, which are demarcated by a sharp topography, dense shrub and difficult agro-climatic conditions (Lourenço, 1999). Depending on geographical location, the size of the herd varies significantly, as shown in Table 1, which contains general indicators that characterize the visited farms. This fact was already noticed by other authors (Lourenço, 1999), showing that in the mountain area of Alvão and Marão, the goats herds are well above of the average found for the Peneda mountain.

Table 1. General indicators of the studied farms and its evolution

	Small farms		Middle farms		Large farms	
	Before crisis	During crisis	Before crisis	During crisis	Before crisis	During crisis
Localization	Peneda	Peneda	Alvão	Alvão	Alvão-Marão	Alvão-Marão
Adult goat heads	26	24.67	112.15	87.5	202.5	202.5
Total Livestock Unit (LU)	8.427	8.753	21.07	30.88	38.49	38.72
Farm area (Ha)	3.5	3.5	33.5	33.5	21.25	21.25
Community pasture area (Ha)	3.9	3.9	25	25	27.5	27.5

During period under analyse it was observed a reduction of the number of goats, for small and middle-sized farms, keeping it constant for large farms. Stands out, however, an increase in the total number of livestock units for all groups under consideration, due to the

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adoption of other species, mainly cattle and pigs, reared, in most cases, for self-consumption.

The areas of farm as well as the community pasture areas used were not changed over the considered period.

It can be identified three types of rearing systems for Bravia goat breed: the traditional, the improved traditional and the collective herd-keeper system (*vezeira*) (Ferreira, 2000).

The *traditional system* is characterized by the almost total absence of the recent production methods. It is based on traditional practices passed between generations. The farmers belong to higher age groups and play all the tasks of management (grazing, management, control, ...). The herds are around 100 animals. The facilities are old and have lack of equipment (Ferreira, 2000).

The *improved traditional system* differs from the previous by incorporating some techniques improvements. The farmers are younger and with technical knowledge acquired outside of the family. The facilities are modern, with some techniques enhancements, such as fences and slatted floor. In this system stands out a greater concern by the farmer to seek new production techniques or to improve the existing ones (Ferreira, 2000).

The *vezeira* is a community system of mutual aid in the grazing of animals, giving to individual farmers more freedom to perform other functions/products. In this system the population of a village gathers the animals and the owners take at turns all the animals to the commons, being the number of days allocated to each shepherd, proportional to the number of heads that he have (Lourenço, 1999). The used production techniques are similar to the traditional system. The age structure of farmers using this production system is not rigid. The facilities are generally old and inside of the villages (Ferreira, 2000). This is the system that prevails in the surveyed farms, especially in small and large farms. In middle-sized farms predominate the traditional system.

Table 2 shows the evolution of the economic indicators for the studied farms, among the scenarios before and during the global economic crisis. Its observation reveals some differences in the evolution of the identified indicators among the various groups of farms. This is the case of the total revenues that decreased in small farms under the study. This was due not to the goats activity, but resulted from the reduction of the selling price of calves that are also reared on some goats farms. In middle farms the rise in income was due to the larger number of goat kids sold on them. The sale of goat kids has been the only source of income from the goat activity. The Bravia is the only Portuguese autochthonous breed of goats with capability exclusively for meat.

The level of charges raised in the first two groups of farms, for various reasons for each of the farms under study. Generally it was due to the greater volume of food acquired for goats and mainly for cattle, increasing this way the dependence on external inputs. The increase in the price level of some fertilizers was another reason listed by the farmers.

The lack of organization of the commercialization channels was identified as a factor that has worsened. The current sales of the goat kids are not only to traders and cattle merchants, but also to any person who wishes to purchase the animals.

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Table 2. Evolution of the economic indicators before and during the economical crisis

	Small farms	Middle farms	Large farms
Number of economic activities	0	0	0
Total income	-	+	0
Selling prices of products from the farm	-	0	0
Goat activity income	0	+	0
Selling prices of goat activity products	0	0	0
Production parameters of goats	0	0	0
Total charges	+	+	0
Goat charges	+	0	0
Charges with goat feeding	+	0	0
Prices of inputs	+	0	0
Dependence on external input	+	0	0
Indebtedness	0	0	0
Organization of commercialization channels	0	0	-

Legend: «0» - without alteration; «+» - positive alteration; «-» negative alteration.

The evolution of environmental indicators for farms under study between the periods before and during the context of global economic crisis is in Table 3. In this table there is the increase of the number of animals per agricultural area used (AAS). This is due to the increased rearing of animals of other species, as already mentioned. For the remaining considered indicators it is observed no change of them, between the two periods under analyse. The only exception is the animal welfare, with positive evolution in the group of middle-sized farms, due to the construction of new housing for the animals.

Table 3. Evolution of the environmental indicators before and during the economical crisis

	Small farms	Middle farms	Large farms
Livestock density index	+	+	+
Animal welfare	0	+	0
Application of sanitary products / LU	0	0	0
Application of plant protection products / AAU	0	0	0
Fertilizer application / AAU	0	0	0
Contribution to physical erosion of soil	0	0	0

Legend: «0» - without alteration; «+» - positive alteration; «-» negative alteration.

Table 4 shows the evolution of the social indicators for the studied farms between the two contexts studied. Its analysis indicates that there was no creation of jobs on the studied farms in the considered period. This is due, essentially, to the lack of manpower available. Despite the unfavorable context of global economic crisis, the perspectives about the agricultural sector were not changed by the farmers, as well as the manifested motivation in dedication to goats activity. Only exception is the group of large-sized farms, for which the motivation is decreasing due to declining profit. Really, these farmers perceive that they are more susceptible to large losses, if something runs bad on the activity/sector. The lack of security creates a climate of anxiety.

Potential sustainability of goats activity in the future was measured by three questions: continuing the development of the activity without subsidies; existence of descendants to maintain the same activity; and the inclusion of goats activity in the projects planned for their children. Only on small farms there was an evolution of answers to these factors, since the

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goats activity began, in the current context, to be considered for projects planned for the farmers' children.

In general, there is a certain conformity by the farmers relatively to the practices used on the adopted systems. This reaction is exacerbated when farmers belong to higher age groups. Only on the group of large-sized farms there is disposition to try something new, namely to try the diversification of farm activities and placement of fences in the pastures. In all groups, changes were observed at the level of farm buildings, but without any impact on the system innovation.

Table 4. Evolution of the social indicators before and during the economical crisis

	Small farms	Middle farms	Large farms
Manpower on the farm	0	0	0
Perspectives of the agrarian sector	0	0	0
Motivation on dedication to activity	0	0	-
Sustainability of goats activity	+	0	0
Willingness to change	0	0	+
Changes on the system	+	+	+
Innovation	0	0	0
Alternative activities	0	-	0

Legend: «0» - without alteration; «+» - positive alteration; «-» negative alteration.

Finally, regard to the activities considered as alternatives to goat rearing or to agriculture in general, there were no new developments. Only the emigration, in the current context, was eliminated from the alternative activities in the group of middle-sized farms. This is because the farmers prefer to live precariously in Portugal, in their land with their animals, than abroad with equal or better conditions. Agriculture more than a profession is a way of living.

3. SWOT ANALYSIS OF THE STUDIED FARMS

In this section are presented the Strengths, Weaknesses, Opportunities and Threats of the Bravia goat system developed in the studied farms. The Strengths and Weaknesses are internal to the system. The Opportunities and Threats correspond to the external environment of the farms. The aim of this SWOT analysis is to identify the key internal and external factors that are important to achieving the sustainability of the goat farms.

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Table 5. Strengths of the Bravia goat production system

Economic	Environmental	Social
<ul style="list-style-type: none"> Final products of the farm are, in some cases, the main source of income of farm families, by selling the kids increased with monetary support In other cases, animal products consist of an additional source of income Production of a kid with a unique flavor, benefiting of the combination of the characteristics of the breed with the soil and climatic conditions, the flora of pastures and scrubland and the extensive rearing system Low production costs Minimal or no additional expenditure with food Low dependence on external inputs to the activity Low initial investment Breed supported by Community measures No difficulty in outflow of animal products 	<ul style="list-style-type: none"> Preservation of an autochthonous animal breed at risk of extinction Extraordinary hardiness and ability to adapt to the most harsh regions and facility of movement in rugged and harsher terrains High use of available resources by goats Control of weeds through grazing animal Low animal stocking Agro-forestry system is a carbon sink 	<ul style="list-style-type: none"> Enables the creation of self-employment Allows to produce food for own consumption With the adoption of <i>vezeira</i> there is greater willingness of farmers to other tasks/products The adoption of <i>vezeira</i> contributes to the social cohesion Farmers motivated to continue goat activity, even without financial support

Table 6. Weaknesses of the Bravia goat production system

Economic	Environmental	Social
<ul style="list-style-type: none"> Low profitability of the system Low income/productivity/production efficiency High mortality rate of goat kids System financial support - dependent Absence of a fixed monthly salary High prices of inputs Lack of accounting records Low productivity of land (low land quality) Non-regular out-flow of goat kids, but concentrated in 2/3 times on year 	<ul style="list-style-type: none"> Villages soiled with animal droppings No paths or inaccessible paths to the shepherd Behaviours few environmentally responsible, due to the lack of livestock husbandry (sleeves, tanks, pediluviums) 	<ul style="list-style-type: none"> Lack of manpower in the traditional system Requirement of manpower everyday Hard work as a result of steep slopes and the degraded or inaccessible paths High degree of aging of farmers Low levels of schooling Poor land structure (small areas with high fragmentation and steep slopes) Poor conditions of animal welfare

Table 7. Opportunities of the Bravia goat production system

Economic	Environmental	Social
<ul style="list-style-type: none"> • Contributes to the maintenance and valorization of abandoned areas • Collection of food for own-farm households • Low production costs compared to other breeds and animal species (food, manpower, veterinary ...) • Low initial investment per animal compared with other breeds and animals species (buildings and equipment, ...) • Single portuguese goat breed with exclusive production of meat (marketing opportunity) • Existence of a National Association (ANCABRA) giving technical support • Production area near to the border with Galicia, where the portuguese products are highly valued • Goats of Bravia breed are 'almost' wild - opportunity for wild agritourism 	<ul style="list-style-type: none"> • Contributes to the maintenance and valorization of abandoned areas • Rational agricultural and livestock planning (better adaptation of activities - use of land and livestock – to the soil and climate skills) • Natural clean of woods and fallow land by grazing animals, reducing fire risk • Conservation of biodiversity, ecosystem and landscape • Opening paths by the implantation of wind turbines • Single portuguese goat breed with exclusive production of meat, which reduced udder gives him access to extremely rugged terrain where the shrub would cause damage to other breeds less adapted • Less demanding in terms of energy (without milking), compared with other breeds or species 	<ul style="list-style-type: none"> • Combating human depopulation • Increased consumer confidence in the final product • Lack of alternatives to agricultural activity • High unemployment rate • "Healthy" way of life

Table 8. Threats of the Bravia goat production system

Economic	Environmental	Social
<ul style="list-style-type: none"> • Weak role of the association of producers of Bravia goat meat in outflow this product a good price, ensuring sanitary conditions of food safety • Farmers dependence of a cooperative whose operation is ineffective • Lack of competitiveness of products in the markets • Higher product price (Bravio kid) than other competitors breeds and species • Unfair competition (sale of lamb per kid) • Inability to certify the wild kid, affect trust in the product 	<ul style="list-style-type: none"> • Increase of newly forested areas • Grazing areas of difficult access to the shepherd • Problems relating to the commons management • Existence of roads on grazing course • Lack of monitoring of the measures applied to the conservation of wild species (wolf) 	<ul style="list-style-type: none"> • Absence of descendants to the goat activity • Low social value of farming activity • Social discrimination of the shepherd • Negative perception of agricultural sector by farmers • High abandonment of the activity in recent decades • Poor conditions of quality of life for farmers families

4. FINAL CONSIDERATIONS

This paper presents the evolution of some parameters of sustainability for a group of farms that adopted Bravia goat breed. Its analysis showed that it is nule or reduced the evolution of

the systems in response to the scenario of global economic crisis developed in recent years. Nevertheless, it is worth to note the increase in the stocking animal of farms towards the diversification of animal production, mainly for self-consumption. Also notable, is the inclusion of this activity on projects for the farmers' children, as answer to high unemployment that has been observed in several countries in general.

It was also developed, in this paper, a brief SWOT analysis of the system under study, with the identification of its strengths and weaknesses and its opportunities and threats. Based on these aspects is listed followed some actions/innovations that can be developed to improve the sustainability of surveyed farms.

- *Activity and region revitalization* - According to Miranda (2000), to preserve mountain areas it is not sufficient to solve only the problems of accessibility of villages, its infrastructure or its homes. It is needed actions in terms of other aspects considered essential to its revitalization. This applies to the creation of conditions for establishment of the population, by socio-economic activities that generate jobs and income; by agroecology rejuvenation of the sector, and by promote improved standards of living in these regions.
- *To bet on agro-forestry system* - The focus of development of mountain areas should be pointing to its strengths differentiators in relation to the remaining (Miranda, 2000). It should be based on the main economic system, which is agro-forestry - the livestock of local breeds in extensive manner - betting on the quality of its products, imparting activity and reducing its heavy work.
- *System diversification* - These systems must diversify its production and its economic activities. In the case of goats, not just the kid should be the target of a market transaction, but the manure should be sold in local markets. Other economic activities should be deployed to keep the local population, as indicated by Pacheco (2000), such as tourism, at various levels, and crafts. The food may have a leading role in the development of the systems under consideration. Moreover, from this activity (food) it should be able to disclose any reasons for the continued out flow during all the year of the sale of goats.
- *To increase herds' size* - Another aspect that deserves attention is the increasing size of herds, keeping manpower and land assets. This strategy was already identified by Pacheco (2000), in order to allow improvement of economic performance. It must be increased the size of the flock, to compensate the time spent in driving and guarding the cattle grazing.
- *Vezeira practices* - To reduce working hours, keeping or increasing activities by adopting *vezeira* practices could be another strategy for economic and social development.
- *To implement better management practices* - The decrease of mortality rate of kids will, likewise, to improve the economic performance of the practiced systems. To do this it will be needed to implement management practices on the farm with effective hygienic, sanitary and health standards.
- *Activity organization* - However, it cannot fail to mention that for the sustainability of the activity of farming Bravia goats to be effective, certain measures concerning the organization of activity and its relationship with the organization of producers will have to be started up, for an effective technical support, an adequate flow of product, and availability of inputs at a good price.

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