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Production and processing of cashmere in Spain: guidelines for a socio-economic evaluation

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SUMMARY

From the beginning of 1994, research has been undertaken aiming towards the introduction of a new non-food activity in Spain, cashmere production, within the framework of the Agriculture and Food Research Development Programme of the Spanish Ministry of Agriculture, Fisheries and Food. It is essential to evaluate the impact of the activity on the target enterprises, and the expected benefits for the rural communities. This paper discusses the main guidelines for making a socioeconomic evaluation of the introduction of cashmere production in Spain. As a primary concept, the importance of the stage of development of the technology is outlined.

The first step has been the identification of the existing production systems in which the activity may become established. The integration of cashmere production into sheep or cattle production systems, and its introduction into the traditional goat extensive systems of Spain have been recognised as appropriate objectives.

The introduction of cashmere processing to an existing network of textile artisans, the kid meat market in Spain, the environmental role that cashmere goats can play and the application of EU support schemes are the main opportunities helping the initiative. The lack of experience of fibre marketing, and the conservatism and resistance to innovation of small ruminant producers are seen as the main handicaps.

Budgeting and Programming methods have been identified as analytical approaches able to render quantitative figures (benefits, charges) to help the evaluation. A proposal based on the ongoing research programme is made.

INTRODUCTION

The European Union (EU) has been interested in the development of agricultural enterprises producing non-surplus commodities in the European markets.

Since the recent Common Agricultural Policy (CAP) reform, a growing emphasis has been placed on non-food products. The development of new non-food production (and processing) systems requires extensive research to facilitate the successful take-up of new technology by farmers and processors. In the present political context of the EU, assessing the potential impact of the new activities on target enterprises and the expected benefits for the rural communities, i.e. an ex-ante evaluation, is essential for guiding future research.

Economists have long been successful in ex-post evaluations of technologies, when all the factors affecting the performance of the technology are self-evident. However, this has not been the case when ex-ante evaluations have been attempted. This lack of success has been due to the complexity of the task. As it involves a set of analytical and intuitive tools, future predictions have an inherently artistic nature In particular, there is a lack of reliable data on the performance of the technology at the start of the research. A compromise between the two frameworks, aiming at an on-going evaluation process as research progresses seems to be the most adequate paradigm to evaluate the enterprise as accurately as possible.

At the beginning of 1994, research aiming to introduce cashmere production to Spain, was initiated within the framework of the Agriculture and Food Research Development Programme of the Spanish Ministry of Agriculture, Fisheries and Food (Martínez, 1993). The main aim of the project is to test the economic viability of cashmere goat production and its potential to supply an alternative or complementary income to the rural population using traditional extensive animal production systems.

Two flocks have been established in two different climatic/geographical zones in Spain: Asturias in the north, with a humid climate (10-40 days of frost; 1700-1900 insolation hours; 1000-2000 mm. annual rainfall) and Guadalajara in the central part of Spain, in a semi-arid zone (60-80 days of frost; 2600-3000 insolation hours; and only 400-700mm.annual rainfall). Using advanced reproductive techniques, it is intended rapidly to expand the flocks to form a nucleus herd of 400 does. The breeding strategy is based on evaluation of genetic merits of does and bucks for fibre quality and quantity.

Experiments have been designed to study the grazing behaviour of the goats, the evolution of the vegetation cover when goats are reared with other species, and their susceptibility to disease and parasitism.
A socio-economic evaluation of the role that cashmere production and

processing can play in the extensive animal production systems of Spain and in the rural communities in which they are situated completes the project.

The objective of this paper is to highlight the guidelines: concepts; target production systems; opportunities and restrictions; and the methodological approaches to be taken into account in evaluating the introduction of cashmere production and processing in Spain.

Following this introduction, some basic concepts necessary to understand the task of evaluation will be outlined. The third section offers a brief introductory description of goat production systems of Spain. The fourth section highlights opportunities and restrictions. The fifth section introduces the methodological approaches that we are going to apply. Finally, some proposals are made for a successful socioeconomic evaluation of cashmere production in Spain.

SOME BASIC CONCEPTS

Although some distinctions can be made, the task of evaluating the new activity (cashmere production) or product (cashmere fibre) can essentially be undertaken in the same way as the evaluation of a new technology.

Traditionally, evaluating a new activity is a two-step procedure: 1) to assess the changes that the introduction of the new activity originates in the target production systems where it can be accommodated, and 2) to assess the impact at market level.

The first task must be made at different aggregation levels: the farm, regional level and national level. Analytical market-level assessment is made through the use of economic surplus models and market simulation models. The actual absence of a cashmere raw fibre market in Spain makes these analytical assessment meaningless in our case. Instead, a complete socioeconomic assessment of a new agricultural activity must also consider the impact in the rural communities where the target production systems are embedded.

Anderson & Hardaker (1979) have distinguished three types of technologies, according to their level of development: notional, preliminary and developed.

Notional technologies are of hypothetical nature, and data about its real applications are unknown. This type of technology may be analysed intuitively, but the analytical approach is confined to work on models rather than on real

systems. In this sense, evaluating a farm with a formal model can provide useful data and ideas about the introduction in the farm plan of a new animal species or breed. This is the situation for the cashmere production enterprise as local research is beginning, and the data about the behaviour of a herd in production conditions can only be hypothesis, based on known data of different agroclimatic, socioeconomic and geographical areas.

Preliminary new technologies are the gross real products of research. A minimum amount of information on the behaviour of the technology in real conditions is known. This is the situation when data on the behaviour of a herd under local conditions, such as fertility, prolificacy, grazing behaviour, fibre production, etc., has been obtained by the researcher.

Developed technologies have survived the evaluation and are ready to be:

1) effectively communicated to the farmers;
2) implemented (i.e., the set of actions to put the technology key-in-hand to the early-adoption farmers; and
3) effectively adopted by the farmers.

Although the three stages overlap to a certain extent, and additional situations are conceivable, these concepts are useful in order to:

- Understand that evaluation is an on-going process of monitoring useful changes in the production systems as the process of increasing the knowledge about the activity proceeds.

- Judge the results of the evaluation in the light of the stage of development of the technology.

- Take account of the complexity involved in tackling the evaluation in a strictly analytical framework, and consequently, the important role that intuition can play in the evaluation, specially in assessing the impact on rural communities.

IDENTIFICATION OF TARGET PRODUCTION SYSTEMS: THE COMPLEXITY AND VARIETY OF SPANISH EXTENSIVE SYSTEMS

For a long time, extensive animal production has played an important socioeconomic role in Spain. Extensive animal production systems have been based around family households and have used indigenous breeds of sheep, goats and cattle, as the only way to utilize the available vegetation resources.

Recently, due to the diminishing profitability of this type of farm, many have been abandoned, and as consequence, productivity of a great area of grazing resources has been markedly affected by the invasion by shrubs and farms have frequently become unproductive.

The low profitability of the extensive systems and the poor nutritive value of the grazing resources have resulted in a diminished population of indigenous breeds and the emigration of the rural population, shepherds and farmers, although recently there has been a slight recovery in the numbers of shepherds.

The importance of the Spanish extensive livestock subsector is reflected by some figures. Spain is the second largest sheep producer in Europe, after the United Kingdom, with 25 million head. After Greece, Spain has the second largest goat population, with over 23% of the EU total, almost 3 million. Spain is also the third largest producer of beef cattle. In spite of these figures, the contribution of the livestock subsector to Final Agricultural Production is small.

Agroclimatic conditions across Spain are far from homogenous. In broad terms, there is a humid zone in the North, a semiarid zone in the west and centre, and a small arid zone in the South, which define different systems of production from the point of view of the resource availability, the species present and the product orientation.

Although actual figures are not available, one of the main features of these extensive systems is the presence of more than one livestock species on the farm, with cattle/sheep, goat/sheep and cattle/goat combinations in many areas. Combinations of livestock with the Iberian pig are frequently found in the silvopastoral "*dehesa*" system.

A great variety of product orientation is also encountered in these systems. For example, in the sheep sector, there are systems aiming at lamb production,

predominantly lamb with marketable milk production (for large cheese industries), predominantly lamb with farm-made cheese production as well as the reverse options, i.e. predominantly oriented to milk products. This same situation is also the case in goat systems.

Although there are strong benefits to be gained by using mixed grazing with goats and cattle and sequential grazing with goats and sheep (Osoro & Martínez, 1995), in the interests of brevity, only the goat systems will be outlined.

Traditional extensive systems have occupied marginal mountainous areas in the semiarid and humid zones but now are experiencing great changes or disappearing. The systems are orientated towards kid meat or meat/milk production. In the semi-arid zone soils are rocky, and biomass production, primarily shrub, is about 1000 kg. of dry matter per hectare. Hardy breeds are reared, on large farms (more than 500 ha.) and in large herds (more than 500 heads). Stocking rate is between 0.5-1 head/ha. Investment in buildings and technology is low or nil, and the workforce is about 1 unit/500 head. The product of this traditional system has been a 20-30 kg. liveweight kid. Nowadays, this system has almost disappeared, being substituted by hunting estates, or simply abandoned, with evident risks to the environment. Cashmere goats, which well adapted to this type of situation, may offer potential for improving abandoned lands, which are represented in the research programme by the Guadalajara research station.

Kid/milk production oriented systems are practised in less marginal areas and in dehesas. Biomass production reaches 2000 kg./ha. Hardy animals are used, but with a certain capacity for milk production. Farm size is about 100-200 ha. and herd size is about 200 heads, a minimun of equipment is used and the workforce is around 1 unit/200 heads. Milk is marketable in spring. This system is tending to evolve towards a semi-extensive system, defined by the use of feed supplements, a rational management of kidding time and higher milk production, producing kids that meet the strong consumer demand for animals of 10-12 kg. of liveweight. In areas where this type of production system exists, cashmere production may either substitute indigenous herds or complement them.

Finally, the most specialized milk production systems may be called "intensive". Although animals use the natural vegetation at range, this makes a negligible contribution to nutrition which is based on feed supplements such as concentrates and by-products. Many farms do not even have an appropriate base land.

When the price of milk is high, this enterprise is very profitable. However, the milk goat market in Spain is very unstable and the production of cashmere in systems where agroecological conditions allow it can serve as a buffer if strong institutions assure a stable fibre market from the beginning.

OPPORTUNITIES/CONSTRAINTS

One of the necessary tasks for the success of a cashmere industry in Spain is the development of a market for the raw cashmere fibre. A disadvantage of Spain situation is the absence and lack of experience of any class of fibre marketing organisation. As it is the case in other EU countries Spain has not even a market for the collection and grading of wool. Historical reasons have worked out for a depletion of the returns on wool and now the contribution of wool to the economic result of the farm is insignificant. The wool price is very low due to the fact that the market is an oligopoly. But even more, the few existing buyers have parcel out the production geographical zones acting the as monopolies. It is to be noticed than the wool produced in the Pedroches Valley, in the north of Córdoba province, is valued, according to a visual examination of a British wool broker, twice and a half than the price paid to the producers in Spain (Treacher, 1995). This is clearly a situation to be avoided and the existence of a cashmere fibre organisation assuming grading responsibilities and a minimun set of rules aiming at the stabilising of the market is essential for the successful development of cashmere farms. However, an alternative to the development of a national industrial market will be the introduction of cashmere processing in a network of textile artisans.

One opportunity for the introduction of cashmere in Spain is that goat meat is very appreciated. There is a long tradition in the consumption of kid meat, although in many areas kid production is a by-product of milk production (20-30% of farm income). More than two million kids are annually slaughtered in Spain. Local consumption is important, the kids being sold to the butcher's shop directly by the farmer, but the great volume of supply is marketed through traders to the markets of Madrid, Barcelona and Valencia. A factor to consider is that abattoirs demand an homogenous standardized product in carcass quality and weight. This imply the definition of management system aiming at obtaining the required kids. However, alternative options may exist due to different preferences of local markets.

Another opportunity is the great concern originated in Spain about the increasing number of brush fires in recent years. The role that cashmere goats can play in managing the inflammable layer vegetation have been treated in a previous workshop of the European Fine Fibre Network. However, an economic evaluation of the role of goats in relation to alternative choices for fire prevention needs to be done.

But the major opportunities arise in the possibility of applying to cashmere production the EU actual support schemes applied to goats: the Sheep and Goat Regime premiums and Less-favoured Areas Compensatory Allowances. The 81.04% of the total surface of Spain is considered Less Favoured Area, with nearly all the goats and sheep being farming in these areas. Also, it is interesting to consider the possibility of developing cashmere enterprises with the help of structural funds. In the framework of the structural policy of the EU, the 89% of the surface area and the 58% of the population of Spain are included in the regional objectives 1 (aiming at the promotion of development and structural adjustment) and 5b (aiming at the promotion of agricultural restructuring and development in rural areas).

Finally, the main handicap is the poor dynamism of small ruminant livestock producers in Spain. The rate of adoption of innovations is very low, and recent studies promoting improvements at farm and cooperative levels have demonstrated this issue (Grupo de Investigación Zootecnia, 1989).

ANALYTICAL METHODOLOGICAL APPROACHES

All the analytical approaches for the evaluation of new activities are based in the concept of the activity vector. An activity vector is an ordered list of the technical coefficients of a defined production system. The activity represent the amount of outputs produced and the amount of inputs employed for a unit level of the activity. These activities can be selected and combined in various ways, the set of possible activity mixes (feasible farm plans) being defined by the resource constraints of the farm. For selecting a plan, the different methods operating under the umbrella of this concept try to assess the relative economic efficiency of the activities involved in the analysis. This is accomplished attaching financial values to the physical data of the management systems.

The relevance of the economic efficiency concept is obvious in the context of a market oriented agriculture. New technologies are designed to raise the level

of production and the economic result of the farm. But in the context of the new EU agriculture, with social and environmental issues involved, the objectives of sustainability, diversification, and environmental protection must be considered in the analysis of efficiency.

The impact of new technologies or activities at farm level have been assessed by the economists using budgeting and mathematical programming methods. A more recent tools, helping in the evaluation of new activities, are the simulation models of production systems (Dent & Thornton, 1988). These models can be used to evaluate biomass and animal production responses to a range of alternative management systems, and the outputs of this models can be introduced in the economic analysis.

Budgeting methods are account procedures to determine the profitability of the proposed improvement. When real data does not exist, the use of reasonable information by simple modelling as budget calculations is the most adequate first step for beginning to evaluate. Several types of budgeting methods exist.

The partial budget analysis accounts for the extra and foregone returns and costs from the intended improvement. The aim is to compare the proposed activity with a current farm activity «vis-a-vis». Partial budgets of cashmere production systems can be made versus the actual performance of each target production systems. Analysis can be carry out calculating indicators as gross margins.

Two main disadvantages present the partial budget analysis. It assumes steady state equilibrium by considering only the before and after situations and it does not account for changes in input usage and relative profitability of the whole-farm activities. Temporal impacts of the introduction of the activity can be assess with a development budget. This budget matches the need to evaluate the general profitability of a particular way of introducing the activity and compare returns and costs of alternative ways. Through this analysis indexes as cash flow break-even point, internal rate of return and net present value can be calculated.

Mathematical programming has been the most fruitful technique to carry out a whole farm analysis and the most attractive form of solving the problem of establishing the relative efficiency of the activities with a given set of resources use restrictions. Linear Programming (Beneke & Winterboer, 1973) has been the traditional programming framework. In this framework, resources

availability are represented as linear functions of the activities. Each coefficient in an equation (technical coefficient) represent the resource use demanded by an unitary level of an activity. The resource use of all the activities is restricted to the resource availability. Each resource is represented in the model by one equation. A solution of the set of resource use equations is feasible mix of activities, that is to say, a farm plan in which resource availability is not surpassed. The economic value of a farm plan is measured by the objective function.

Usually, the evaluation of a new activity is accomplished in a two-step procedure. First, a programming model of the farm without including the new activity is solved. Second, the model is resolved including the new activity within. The performances of the objective function in both cases are compared. If the within model value surpasses the without model the new activity is taken as a real improvement.

One of the pitfalls of linear programming is to measure the performance of the system in an unidimensional way, i.e., with only an objective function, as if this equation was able to mimic the behaviour of the farmer. But the set of preferences and aspirations of the farmer is of a multidimensional character. Economic performance is important, but personal satisfaction and environmental criteria also guide the behaviour of the farmer in relation to the farm. Mathematical programming techniques known as multicriteria programming (Romero & Rehman, 1989) are now available to incorporate more than one measure of the performance of farm plans.

PROPOSAL

After the reflections exposed in the previous paragraphs this is suggested plan, given the actual resources for the research. Nevertheless, the plan is not closed, and, as the results obtained by the research suggest it, and new resources can be incorporated to the research, the plan can be modified. These are the main suggested issues:

1) To make an inventory of activity vectors for the actual activities of the production systems where cashmere goats can be embedded. Each element of the inventory is an activity vector corresponding to the usage of inputs and the resulting output of the exploitation of an animal species, in a given agroecological zone, oriented to a given main production, and with a given sociocultural context.

This inventory will serve to:

a) Compare the activities «vis-a-vis» with cashmere production adapted to the same agroecological, socioeconomic and product oriented conditions, i.e. a partial budget analysis.

b) Develop a programming model of each agroecological zone considering the potential animal species and all the other relevant activities (crop, forages), including criteria not only of economic nature but also environmental and social issues. This model can be used to analyse the impact of policy options .

Suggested advantages of the formal analytical model are: to force a logical, coherent and objective view of the problems involved and the consideration of all relevant data.

On station research both a Asturias (humid zone) and Guadalajara (semiarid zone) produces the data for cashmere activity vectors. Appropriate interpretation of the data will be necessary to cover all the relevant systems.

2) Once the necessary investment for cashmere production will be known for different systems, to make development budgets to proportionate to the farmers a guide of the financial and credit necessities to begin the activity, calculating the relevant indexes.

3) To asses the value of goats in controlling undesired vegetation of grazing land. Past data and data to be obtained in actual research in Asturias research station allow an economic comparison of goat/sheep grazing systems with alternative systems of chemical control. This can be done by a development budget. A simple simulation model of a goat/sheep grazing production system is needed to do proportionate appropriate data.

4) To asses the potential impact of parasite infestation on cashmere goats both in the high pastures of the humid zone (data taken in Asturias) and of the semiarid zone (data taken in Guadalajara. It does not exist knowledge about this issue and it can be a major source of economical losses if it is not adequately managed. Appropriate experiments have been design in both locations to do the task.

5) To study the industry demand of cashmere in Spain and import channels.

6) To make a inventory of textile artisans, and to identify LEADER programs with textile initiatives, as they are probably supported by dynamic groups that are able to hold cashmere production and processing.

7) To analyse the current support schemes applied to meat production and to propose design lines for Fibre Premiums.

8) To prepare and interview for textile artisans, industries actually processing cashmere and potential processors, with the aim of knowing about their subjective assessment of developing cashmere production and processing.

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