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Abstract. This study aims to assess the current role of farmers sheep and goats associations in the adaptation, testing and in technology transfer, as well to gather a set of proposals for a forthcoming role redefinition of the organisms, towards the sustainability orientation of farming systems. The used methodology was based on consultation and review of submitted projects by farmers associations and the analysis of recent statistical data relating to animals and farms. There were also conducted surveys to the farmers of sheep and goats associations with a coverage area for the North of Portugal. The results showed the very limited role of these associations around the technologies due to the lack of human and financial resources. The evolution of sustainable sheep and goats production systems in the North of Portugal requires a development support that takes into account the diversity of farms and be able to respond to the needs and expectations of their respective farmers.

Keywords. Associations' role – Small ruminants – Technologies.

Le rôle des associations d'éleveurs dans l'adaptation, l'essai et le transfert de technologies chez les ovins et les caprins. Étude de cas au nord du Portugal

Résumé. *L'objectif de cette étude est d'évaluer le rôle actuel des associations d'éleveurs dans l'adaptation, l'essai et le transfert de technologies chez les ovins et les caprins, ainsi que proposer un ensemble de propositions pour la redéfinition du rôle de ces organismes, pour la durabilité des systèmes de production. La méthodologie utilisée a été basée sur l'analyse critique des projets présentés par les associations d'éleveurs et bien des données statistiques récentes sur les effectifs et les exploitations. Des enquêtes aux associations d'éleveurs qui travaillent dans la région Nord du Portugal on été aussi réalisées. Les résultats ont montré qui le rôle de ces associations autour des technologies est très limité, en raison du manque de ressources. Le développement durable des systèmes de production ovine et caprine dans le Nord du Portugal nécessite d'un dispositif d'appui au développement qui tienne compte la diversité des exploitations et permette de répondre aux besoins et enjeux des éleveurs.*

Mots-clés. *Rôle des associations d'éleveurs – Petits ruminants – Technologies.*

I – Introduction

Sheep and goats are essential to the maintenance of the countryside, particularly in marginal areas of mountains. The vulnerability of the systems, the resilience capacity and the need for innovation are urgent assumptions to integrate in the approaches taken by those who directly contact with these agents of the territory. This is a prerequisite for the overall success of systems in order to make them more capable (more sustainable), holders of new opportunities, by encouraging the adoption of technical, economic, social and institutional procedures better suited to current circumstances and with future.

The technology is an instrument of development. It comprises the techniques, methods and means, that is the know-how, know be, know to manage, and all his material (equipment, tools, materials) and the intangible environment (training, information and decision) (Carrière, 1975).

There is consensus to admit that technology is a mean for man to control their environment in order to produce goods that he found or he needs. However, the "technology transfer" contains several ambiguities (Rölling, 1994; Cristóvão, 1997). First, it suggests that research creates knowledge, which is then transferred to farmers, "customers", "users", "targets" or "consumers", regarded as passive individuals. Also other criticisms are identified to in the process: (i) is reductionist: it ignores the systemic nature of agriculture, focusing on technical recommendations related to one component of a whole, (ii) focuses on technology: it assumes that the conditions for its use exist or can be created; (iii) it assumes that technology has the characteristics of a commodity: it can be distributed to users and does not transform or adapt in the process of use and dissemination.

There is a distinction between adapted and appropriate technology (Collombo, 1975). The first emphasizes the correspondence between a technology and a specific context. It can only be considered appropriate according to the characteristics of the environment, by one side, and on the overall development objectives of the country and the concrete objectives assigned by persons, for the other side. The second is an evolutionary technology, changing constantly, in a state of constant adaptation to the environment evolution and needs. As sustains Carrière (1975), the adapted technique is the common point between two radically different subsystems, but rather unique for not to be confused with any of them. It is the prerequisite for the transfer to be no longer an instrument of uneven development.

This study aims to assess the current role of sheep and goats farmers associations in the adaptation, testing and transfer of technology, as well as to gather a set of proposals for a forthcoming role redefinition of the organisms, towards the sustainability orientation of farming systems.

II – Methodology

The methodology of this study was based on a dual procedure in order to respond to the planned objectives.

In the first approach a consultation and a reviewing of a set of documents provided by the *Direção Regional de Agricultura e Pescas do Norte* (DRAPN, Regional Directorate of Agriculture and Fisheries of the North) was done, namely:

(i) projects presented (in 2010) by farmers associations to the conservation and improvement animal breeding program funding established under the compliance of the respective regulations of the zootechnical records/herdbooks (Rural Development Program – PRODER. Conservation/Improvement Program of Genetic Resources. Sub – Action 2.2.3.2 – Animal component);

(ii) investment projects under the Action 1.1.1 (support for agriculture and agro-industry investment) and 1.1.3 (setting up of young farmers) of PRODER (approved in 2009 to April 2013), involving sheep and goats.

The most recent statistical data related to the animals and farms were also consulted (INE, 2011a; INE, 2011b).

Subsequently, in 2013 were conducted personnel surveys to three sheep and goats farmers associations, covering the area of northern Portugal, in order to obtain information that could identify and analyze the role of these organisms in adaptation, testing and technology transfer for sheep and goats, as well to gather information to allow (or not) the development of new demands.

The survey was constituted by fifteen groups of questions systematized in five parts:

(i) Identification and characterization of the farmers' association, in order to know their history, reasons of constitution, missions and also to evaluate the evolution of some data between the date of its creation and the last year of activity (2012);

(ii) Capacity and cooperation learning of the association to evaluate some important data evolution related to farmers and animals, as well as the field of technical interventions that the association develops with its associates, the cooperation with other organisms and the main reasons for the impacts;

(iii) Association activities description, namely the identification of their technical interventions areas, reasons, goals, methods and the existence of diagnostics and evaluation of impacts;

(iv) Ability on adaptation, testing and technology transfer by the respondent, which allowed to assess the role, type and field of activities developed by the associations, the inducing factors and barriers to the development of that kind of initiatives and its adoption by farmers;

(v) General comments to the subject addressed.

III – Results

3.1. Framework of sheep and goats breeding

A. Farms and sheep and goats

According to data of the 2009 Agricultural Census (INE, 2011a), in the North region of Portugal there were 17,157 ovine and 6,504 goats farms. These farms are essentially extensive, with poliCulture and oriented to meat production.

Given the scarce area of many farms, the feeding of the cattle comes only from the daily grazing in the mountains, that is, on silvopastoril and forestry surfaces, under the regime of common lands.

Since 1989 there is a remarkable reduction in the number of farms of sheep and goats. However, this trend has been less pronounced in the North than in the rest of the country. From 1989 to 2009, the number of sheep farms declined by 49% in Portugal and 39% in the Northern region (Fig. 1). In the case of goat farms, the decay was 65% and 57%, respectively (Fig. 2).

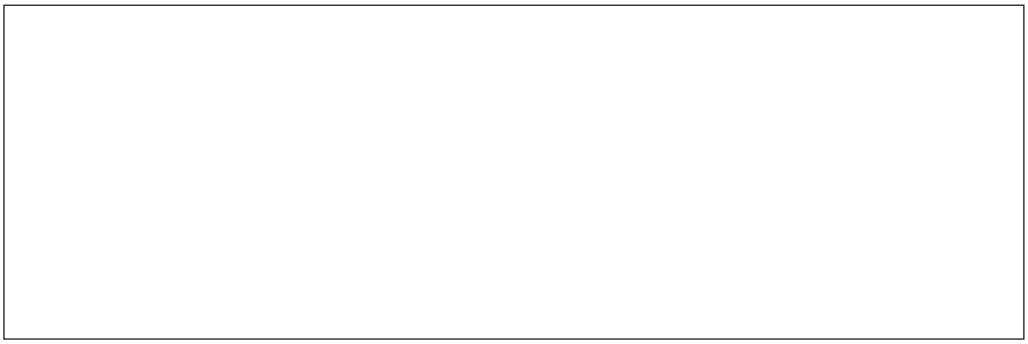

Fig. 1. Number of sheep farms evolution in Northern region (– –) and in Portugal (—). Source: INE (2011b).

Fig. 2. Number of goat farms evolution in Northern region (– –) and in Portugal (—). Source: INE (2011b).

In 2009, there were in the North of Portugal 398,874 sheep (333,323 ewes and mated ewes) and 111,820 goats (93,293 goats and mated goats) representing 18% and 27%, respectively, of the national census. The sheep and goats for milk were, respectively, 51,595 and 16,910 heads (INE, 2011a).

Over the past 20 years, the sheep livestock showed a more favourable development in the Northern region than in the country. Indeed, while in the country, from 1989 to 1999, the census was practically unchanged, in the North there was an increase of 10%. On the contrary, in the following decade, the number of animals decreased 24% in the country, but only 14% in the North (Fig. 3).

Since 1989, the development of goats number shows a continuing marked regression, both in the country and in the area of intervention of DRAPN. In 20 years, the livestock decreased 42% and 43%, respectively, in the country and in the study area (Fig. 4).

Fig. 3. Sheep census evolution in Northern region (– –) and in Portugal (—). Source: INE (2001b).

Fig. 4. Goats census evolution in Northern region (– –) and in Portugal (—). Source: INE (2001b).

Farms with less than 100 heads prevail, representing 52% for sheep (Fig. 5) and 55% for goats (Fig. 6).

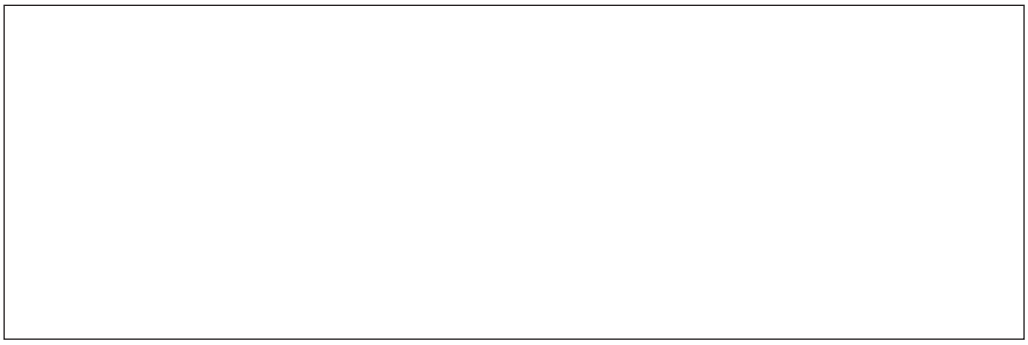

Fig. 5. Sheep distribution in the North, by size classes of the cattle. Source: INE (2011a).

Fig. 6. Goat distribution in the North, by size classes of the cattle. Source: INE (2011a).

B. The breeds of sheep and goats and their products

Most sheep raised in the North is from *Bordaleira de Entre Douro e Minho*, *Churra do Minho*, *Churra Badana*, *Churra Galega Mirandesa*, *Churra Galega Bragançana* and *Churra da Terra Quente* breeds. In the case of goats, the breeds with the highest expression are *Serrana* and *Bravia*. On farms specialized in milk production, there is an option to Lacaune, Awassi, Alpina, Saanen and Murciana-Granadina breeds.

There are five farmers associations of sheep and two of goats in the North of Portugal (Table 1):

(i) AMIBA – *Associação de criadores de bovinos de raça Barrosã* (Farmers association of the *Barrosã* bovine breed), with both situations besides bovine cattle;

(ii) ANCOTEQ – *Associação nacional de criadores da raça Churra da Terra Quente* (National association of the *Churra da Terra Quente* breed);

(iii) BADANA – *Associação nacional de criadores de ovinos da Raça Churra Badana* (National farmers association of the *Churra Badana* sheep breed);

(iv) ACOB – *Associação nacional de criadores de ovinos da Raça Churra Galega Bragançana* (National farmers association of the *Churra Galega Bragançana* sheep breed);

(v) ACOM – *Associação nacional de criadores de ovinos da Raça Churra Galega Mirandesa* (Nacional farmers association of *Churra Galega Mirandesa* sheep breed);

(vi) ANCRAS – *Associação nacional de caprinicultores de raça Serrana* (National association of the *Serrana* goat breed);

(vii) ANCABRA – *Associação de criadores de cabra Bravia* (Farmers association of the *Bravia* goat breed).

Table 1. Sheep and goats associations in the North of Portugal (data of 2010)

	Breed	Categories	Number of registered females	Number of farms
AMIBA	*Bordaleira de Entre Douro e Minho*	Meat	6,052	227
	Churra do Minho	Meat	3,195	48
ANCOTEQ	*Churra da Terra Quente*	Meat and milk	26,839	182
BADANA	*Badana*	Meat and milk	3,600	34
ACOB	*Churra Galega Bragançana*	Meat	9,700	77
ACOM	*Churra Galega Mirandesa*	Meat	6,503	59
ANCRAS†	*Serrana*††	Meat and milk	17,577	210
ANCABRA	*Bravia*††	Meat	9,500	94

† Nationwide. †† Goat breed. Source: DRAPN (np).

Meat is the orientation of most ovine and goat farms. The main products are light lambs and kids (up to 9 kg of live weight) and marginally cheese. Milk (with high demand) is processed in the cheese-making farms, in a producer cooperative, but also in dairies of commercial enterprises.

While the meat commercialization is mainly regional, the cheese has a national expression. There are many sheep and goat products with differentiated production (Table 2), but the amount of certified products is modest.

Table 2. Differentiated production of sheep and goats

Product	Product kind	Qualification†
Cabrito das Terras Altas do Minho (Terras Altas do Minho kid)	Goat meat	PGI
Cabrito de Barroso (Barroso kid)	Goat meat	PGI
Cabrito Transmontano (Transmontano kid)	Goat meat	PDO
Borrego Terrincho (Terrincho lamb)	Sheep meat	PDO
Cordeiro Bragançano (Bragançano lamb)	Sheep meat	PDO
Cordeiro de Barroso (Barroso lamb)	Sheep meat	PGI
Queijo de Cabra Transmontano (Transmontano goat cheese)	Cheese	PDO
Queijo Terrincho (Terrincho cheese)	Cheese	PDO

† PDO: Protected Designation of Origin; PGI: Protected Geographical Indication.
Source: DGADR (2013).

3.2. Services provision evolution in the agricultural sector

To understand the farmer's association involvement in the topic under consideration it is important to review the evolution of the role and positioning of the principal implicated entity: the government.

The departments of Public Administration with supervision over the Portuguese agricultural sector services had a key role in supporting its development for more than 70 years. As a result of conjectural adjustments and structural objectives on the reformulations of the sector intervention policies, they had a wide variety of organic arrangements, focused on the following variables: (i) centralization/regionalization level of the providing services entities; (ii) sectorial/territorial nature of its intervention; (iii) predominance of guidance for the technical support services provision, management of hygiene and public health policies; (iv) weight given to the public, associative and private sectors(DRAEDM, 2005).

Three distinct periods can be revealed:

(i) State apparatus consolidation, from 1930 to 1974;

(ii) Services regionalization and the implementation of the Agriculture Regional Directorates, in 1980, (by a Decree-Law No. 223/84[1]) with the creation of the rural extension services. They were responsible, among other functions, by the following:

- To follow the participatory activities of farmers and their families in the elaboration and implementation of rural development programs and projects;
- To study, define, promote and coordinate training of farmers and rural workers;
- To cooperate with the regional commissions for technical and professional education;
- To proceed to the necessary studies for the definition of species and farming systems best suited to the region and to promote their dissemination;
- To collaborate in the definition and monitoring of R&D activities with interest for the region and to promote experimentation, demonstration and adequate dissemination, in particular for the production;

Later, the strengthening and promotion of the Agriculture Regional Directorates was made (Decree-Law No. 190/86[2]), with important responsibilities in the field of technical and professional training, experimentation, vulgarization and promotion of production.

[1] *Diário da República* No. 155, I Série, of 6/7/1984, pp. 2038-2052.
[2] *Diário da República* No. 161, I Série, of 16/7/1986, pp. 1719-1734.

(iii) Implementation of a transfer strategy of the public sector services to the associative and the private sectors, from 1990s, with the Common Agricultural Policy and its reform in 1992, based on collaboration agreements, services concession, transfer of activities, participation in other entities, and still lending and property rental.

In the area of the Agriculture Regional Directorate of Entre Douro e Minho (DRAEDM, dissolved in 2007, becoming part of DRAPN), were also created experimental stations (milk and dairy products, animal breeding, viticulture, horticulture and mechanization) and seven centres of technical and professional training.

3.3. Characterization and description of the sheep and goat farmers associations activities

In this point we expose and analyze, according to the objectives of this work, the information provided by the farmers associations that were object of the enquiries. The farmers associations that were object of enquiries were AMIBA, ANCRAS and ANCABRA. They were constituted in the nineties of the last century and the promotion and dynamics of sheep and goats autochthonous breeds were their main objectives, in some cases also to prevent their extinction. The population of these animals is in a steady decline, mainly due to the agricultural activity abandonment observed throughout the country, according to the latest data of the National Statistics (INE, 2011a).

With the exception of ANCRAS, which has nationwide and establishes protocols with other local associations, the studied associations have the regional territory as area of action, focusing on the characteristic distribution areas of the sheep and goats breeds earlier identified. Those are mainly concentrated on the higher areas of some mountains in the Northwest of Portugal, highlighting only the *Bordaleira de Entre Douro e Minho* that is characteristic of the hillside areas or lowland region of Entre Douro e Minho.

Currently, the main source of funding of these organizations are European Community funds (PRODER), which are estimated to account over than 90% of their budget. The subscriptions of its members and the own revenues generated through the development of services to the farmers has also some importance (Table 3). In this case, there are distinguished the activities of professional training, agricultural and management accounting, preparation for grant applications, awards and the conception of agricultural investment projects.

The summary of the general characteristics of the entities under study are presented in Table 3. The analysis allows to enumerate the following aspects:

(i) The number of employees has increased since the constitution of the associations. The positive evolution in the recent years of the number of their associated and accompanied farmers was also verified and is currently fixed in 585. The technicians and other employees' qualifications are quite diverse, with a predominance of graduates, which has strengthened the technical capacity of the respective association at various levels. To this achievement has contributed also the professional training initiatives developed by these organizations staff in the fields of electronic identification; animal health and production biotechnology and genetic resources management, according to the information provided by them;

(ii) The associations have developed several technical and scientific cooperation relationships with R&D; institutional and associative; and with regional, national and foreign organizations, which has allowed the development of projects and scientific studies to increase knowledge about the practiced farming systems and the adopted animal breeds, with potential effects on the improvement of profitability;

(iii) The activities carried out by the studied associations are confined to the daily operational activities that fall within the conservation and improvement animal breeding program,

approved by the General Directorate of Veterinary and processed by DRAPN under the PRODER. These are technical interventions essentially aimed, according to the respondents, to increase farm income through the animal production parameters improvement and to raise the national herd of the livestock breeds of their action areas. However, the activities have been developed without performing previous diagnosis and without impacts evaluation at the technical, economic and social levels. Only the collection of the farmers concerns and opinions are made through direct and frequent contact by the associations' field teams.

Table 3. General characterization and description of farmers' associations

Farmers associations characterization
Creation date: Nineties.
Main objectives: promotion and dynamics of sheep and goats autochthonous breeds.
Territorial area: National (Portugal).
Funding: Community funds (PRODER); membership fees; revenues generated through services provision to the farmers.
Learning and cooperation capacity
Number of employees' evolution: positive.
Employees' qualifications: diverse, with a predominance of graduates.
Initiatives fields of the technician's professional training: Electronic identification; biotechnology in animal health and production; genetic resources management.
Cooperating organisms: national (4) and (1) regional Portuguese state institutions; Portuguese higher education institutions (2); associative institutions (2); and foreign agricultural research institutions (1).
Type of cooperation: technical-scientific.
Motivation for cooperation: technical and scientific training; technical and scientific support; projects and development studies; projects and product studies.
Activities description
Technical interventions of the associations: animal identification; records; performances tests (weighing); dairy contrast; support to the breeding animals' selection; generalist technical support to the farmer; dissemination and clarification of innovations in the sector.
Reason for intervention: fulfilment of the conservation and improvement animal breeding programs approved by the General Directorate of Veterinary.
Booster initiatives: State and associations.
Objectives of the interventions: increasing farm income through improving animal production parameters; increasing numbers of animals.
Existence of previous diagnoses: no.
Impacts assessment: no.

Concerning activities/services directly related to the adaptation, testing and technologies transfer, are mentioned as following (DRAEDM, 2005).

(i) Technical advice. This is an immaterial nature service because it involves the information production related to the production techniques. It's not standardized because it implies the knowledge elaboration according to the specific situation. High qualification is required by those who provides it and may require field work. It's of private interest. Examples: advice on technical standards for housing animals; feeding; reproduction.

(ii) Technical services. These are material nature services because they involve work provision in technical operations. The tasks realization with equipment and/or manual labour of high technical qualifications is included. The provision can occur in physical space

belonging to the farm or in a distinct local. It's possible the procedure standardization and this service type is usually of private interest. Examples: dairy contrast; laboratorial analyses; electronic identification; deworming; veterinary care; artificial insemination.

(iii) Technical and economic project preparation. This is from immaterial nature and consists on information production embodied in a variable format project to submit for investments financial aid (EU funds). It's little standardized and requires high qualification by the person who provides it. Field work may be required and it is of private interest. Examples: preparation of investment projects under PRODER, to agriculture and agro-industry support investment (action 1.1.1) or young farmers setting up (action 1.1.3).

Within these activities/services, the surveyed associations listed the initiatives types that they develop, exposed in Table 4. They have been different according to the breeds' productive vocations. In general, the breeders' associations attempt to improve the farmer's work conditions and they elaborate one or another action/project, in order to increase the farms profitability. However,

Table 4. Adaptation, testing and technologies transfer initiatives developed by farmers' associations

	AMIBA	ANCRAS	ANCABRA
Kind of developed initiatives	• Oestrus synchronization and flock reproductive manipulation (very specific cases); • Proposal preparation for reticularis boluses resizing, for its adaptation to the local breeds morphology; • IT platform herds registration; • Placement of farm branded earrings and date of birth; • Encouraging to animal housing construction in normal Pine, wooden formwork. AMIBA head office has a demonstration building.	• Projects preparation to milking conditions improvement; • Artificial insemination promotion; • Encouraging to the investment projects for farms modernization; • Implementation of prevention programs and veterinary services provision; • Project to increase the market valuation of the culled goats, by the manufacture of sausages, ham and "manta" (a processed meat goat product).	• Identification and genealogical records; • Flocks surveys to ensure the updating of the data; • Breed dissemination.
Initiatives objectives	• Farmers working conditions and efficiency of operations management improvement; • Herds control; • Products commercialization improvement.	• Farmers working conditions improvement; • Farms modernization; • Products quality improvement (milk); • Production increase; • Increase the market valuation of the culled goats.	• Technical efficiency increasing of the Genetic Conservation and Improvement Program implementation; • Autonomy for animal husbandry creation by farmer; • Increase farms economic performance.
Previous diagnosis	• No	• No	• No
Initiatives impacts evaluation	• No	• No	• No

most of their tasks concern the execution of the conservation and improvement animal breeding programs, approved by the Portuguese state (using EU funds). This means a little or null contribution of farmers associations in technology adaptation, testing and transfer in sheep and goats, as confirmed by the absence of previous diagnoses and concrete and systematic procedures for initiatives impact evaluation. Only the listening of needs and aspirations of the farmers is made through direct and frequent contact with the field teams, as previously mentioned.

Regarding the technology adoption by farmers, from the reproductive management practices to the food supplementation, through the technical driving of flocks, there are many different situations between members of each studied associations. It should be noted, however, that the animal identification by reticularis bolus is a general practice in all of the herds. For the various technologies adoption, the associations' technical staff has played essentially the role of educators and caregivers. For example, in cases of oestrus induction and synchronization. In other specific situations, they assume the role of demonstrators and motivators, as on the new housing models development, and are still the executors and regulators with respect to animal identification by reticularis bolus.

The breeders' associations showed interest in the establishment of a technical scientific structure for technologies diffusion and for training on animal identification and filing of records (RED-OC). It can be concluded that the associations intend to improve their role as advisers and trainers to farmers.

Finally, Table 5 shows the inducing factors and obstacles found by the associations to the development of adaptation, testing and technology transfer initiatives, and their adoption by farmers.

Table 5 shows that the number of obstacles is superior to the inductive factors identified for the development of technology adaptation, testing and transfer initiatives. Furthermore, it appears that both these factors are similar between the associations and farmers. In general, inducing factors include the access to European funding sources, while the obstacles are the herds' characteristics; qualifications, age, mentality and ability of farmers; and the bureaucracy to validate the actions of the conservation and improvement animal breeding program, which limit the action of the associations, as seen throughout this work.

Table 5. Inducing factors and obstacles to the development, by associations, of adaptation, testing and technology transfer initiatives and their adoption by farmers

	To the initiatives development by associations	To the initiatives adoption by the farmers
Inducing factors	• Mobile network coverage has been increasing; • Association access to the Community funds for the preparation and implementation of a genetic conservation and improvement program of of a breed in risk of extinction.	• Milk and kids with increased demand (the price has not been evolving favourably); • Farms access to the European Union funds for rearing a breed in risk of extinction.
Obstacles	• Herds size (unfeasible economically investments); • Education degree and age of farmers; • Mentality, which opposes to the change and to the new technologies use; • Low investment capacity; • Bureaucracy, as the constantly regulations changing for validation of the contemplated actions of the conservation and breeding program.	• Mentality, which opposes to the change and to the new technologies use; • Low investment capacity; • Bureaucracy, as the constantly regulations changing for validation of the contemplated actions of the conservation and breeding program.

3.4. North region investments on sheep and goat farms

Farmers associations in the North are not associated with any sheep or goat investment project, approved under the PRODER (actions 1.1.1 and 1.1.3). This is in line with the data of a study conducted by DRAEDM (2005) for the Entre Douro and Minho region. In this document, it was concluded that farmers emphasize the use of private companies and producer groups to provide services directed to the productive activity: technical services, technical advice and preparation of techno-economic projects. Despite the expertise of producer associations in some types of services, they have a relatively low degree of participation in the provision of general services requested by farmers.

Based on the collected information from the investment projects approved in the last five years, there were defined three kinds of systems: (i) extensive; (ii) dairy; and (iii) cheesemakers (Table 6).

Table 6. Investment characterization in sheep and goat farms with the support of the PRODER (actions 1.1.1 and 1.1.3), from 2009 to April 2013

	Extensive	Dairy	Cheesemakers
Expression	77% of approved projects, being 56% of sheep	20% of approved projects, being 58% of goat	3% of approved projects
Ovine and goat products	Lambs and kids	Milk, lambs and kids	Cheese (with milk of the farm), lambs and kids
Breeds	Autochthonous breeds (100%)	Sheep: mainly *Churra da Terra Quente* breed, but also exotic; Goat: Serrana breed and 1 farm with exotic breed	Sheep: (no); Goat: *Serrana* and exotic breeds
Common lands	Used in 58% of the farms	Residual use (16% of farms)	Not used
Herds size	Sheep: 10 to 600 females; Goat: 40 to 379 females	Sheep: 55 to 350 females; Goat: 100 to 950 females	Sheep: (no); Goat: 350 to 400 females
Products valuation†	PDO or PGI (17% of farms) and BPM (17% of farms)	Sheep: no. Goat: BPM and PDO (25% of farms)	BPM (1 farm)
Associated activities	Sheep farms: More than 50% has chestnut, vineyards, olive groves and almonds plantations There are also local cattle, floriculture, apiculture and pigs. Goat farms: 85% of farms with pastures and forages	Sheep farms: 100% with almonds and more than 50% with olive groves Goat farms: Association with apiculture and olives are the most frequent There are also farms with cattle, chestnut and almond	Specialization in the milk production and processing
Average amount of investment per farm	78,061 €	193,605 €	255,419 €
Investments in specific software	No	Yes	Yes

† PDO: Protected Designation of Origin; PGI: Protected Geographical Indication; BPM: Biological Production Mode. Source: Data of DRAPN (np).

TThe majority of approved applications are concerned to extensive farms, which are also more frequent in the North. All the animals of these systems are autochthonous breeds, which stimulates the associations' activity. The farms are structured to perform its activity by an entrepreneurial mode, but the majority relies on the use of common lands.

Dairy farms, with an average clearly greater investment than extensive farms, also have a direct relationship with the activity of farmers associations, since most of the genetic resources of those farms are the *Serrana* and *Churra da Terra Quente* breeds.

IV – Discussion

Adaptation, testing and technology transfer are closely associated with the operation of support structures to rural development. In this respect, the action of the public administration has been gradually reduced, with services and functions transferred to agricultural organizations. This situation, which is common in many countries of the Mediterranean basin (Couzy *et al.*, 2004) weakens the farmers support.

In current times, rejuvenation, reorientation and the constant adaptation of small ruminants farming systems to the new European and national context, becomes indispensable to enable their survival and reproduction by future generations.

The farmers associations have or should present a truly important role in adaptation, testing and technology transfer in sheep and goats, essential to the redesign, innovation and resilience search of their systems. However, in reality, these associations assume poorly the essential functions to the maintenance and growth of small ruminant farms. Nevertheless these are the main objectives for their existence.

There were several shortcomings highlighted by those entities, particularly regarding the domain and type of their activities, that are developed almost exclusively according to the financial aid earned through the fulfilment of the conservation and improvement animal breeding programs, approved by the General Directorate of Veterinary and processed by DRAPN (PRODER). Despite the reinforcement of the learning and cooperative skills of the studied associations, over time, their support activities to farmers are substantially identical to those existing in the past, mainly due to the limited resources made available to them.

Due to the current sustainability paradigm of territory, animal breeds, farms and associations, it is urgent a redefinition of the role and new functions to these organisms. The reorientation of the farming systems, the adaptation, testing and technology transfer, the promotion and dynamics of autochthonous sheep and goats breeds may be more easily achieved if a new attitude towards the role of these organizations is adopted. For this circumstances the identification of new ways of get financial support for their activities, in addition to the support received by the state authorities and Community can be useful.

The current model of service provided by the breeders' associations do not seem to be viable in the long term, because the financial support by the Portuguese State is getting lower. The breeders´ associations have to find new ways to farm's sustainability, to ensure their own sustainability. Among the previously defined activities/services, the technical advisory services may be the most suited for those organizations. The farmers and their practices should be the centre of the associations' actions, which must have the decision making support towards to the farms sustainability as their main objective.

V – Conclusions

The role of farmers sheep and goats associations around the technologies is very limited due to the lack of resources. The sustainable sheep and goats production systems development in the North of Portugal requires a supporting structure to the development that takes into account the farms diversity and that allows to answer to the respective farmers' needs and expectations.

References

Carrière D., 1975. Une erreur à dénoncer: le transfert pour l'acquisition des techniques. Transferts de technologie. In : *Options Méditerranéennes*, 27, pp. 29-32.

Collombo J.M., 1975. Le processus d'appropriation technologique. Transferts de technologie. In : *Options Méditerranéennes*, 27, pp. 104-115.

Couzy C., Dubeuf J.P. and Ligios S., 2004. L'organisation du développement pour l'élevage laitier ovin et caprin: Etude dans quelques régions de l 'Europe du sud. In: Dubeuf J.-P. (ed.). L'évolution des systèmes de production ovine et caprine: avenir des systèmes extensifs face aux changements de la société. In: *Options Méditerranéennes*, Série A. Séminaires Méditerranéens, 61, pp. 41-48.

Cristóvão A., 1997. Mudam-se os tempos… Mudam-se os modelos! Para a criação de novas formas de interação entre investigadores, extensionistas e agricultores. In: *Separata da Revista Vida Rural*, 3 (162), pp. 6-10.

DGADR – Direção-Geral de Agricultura e Desenvolvimento Rural (General Directorate of Agriculture and Rural Development), 2013. DOP/IGP/ETG. http://www.dgadr.pt/val-qual/dop-igp-etg

DRAEDM, 2005. Agricultores, Entidades e Serviços. Relatório final do projeto "Diagnóstico prospetivo dos serviços em meio rural no Entre Douro e Minho".

DRAPN, np. Projetos de Investimento realizados na região Norte em explorações de ovinos e caprinos.

INE – Instituto Nacional de Estatística (National Institute of Statistics), 2011a. Recenseamento Agrícola 2009 – Análise dos principiais resultados.

INE, 2011b. Recenseamento Agrícola – séries históricas. http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_base_dados

Röling N., 1994. Extension and the Sustainable Management of Natural Resources. In: *European Journal of Agriculture Education and Extension*, Vol. 1, pp. 23-44.