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# CONSORTIUM VACCHE ROSSE AND REGGIANA COW BREEDERS NETWORK

## LINSA Case Study Report: Italy

**Claudio Montanari & Kees De Roest**

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# 1 SUMMARY

Consorzio Vacche Rosse (CVR) is a dairy cooperative that produces Parmigiano Reggiano (P-R) cheese from milk of cows belonging to the traditional Reggiana breed delivered by its members. Like most of the local dairy farms and milk processing plants of the territory, CVR belongs to the larger Community of Producers of Parmigiano-Reggiano producers whose geographical coverage and shared repertoire are defined by the code of practice of the PDO cheese “Parmigiano Reggiano”. The mutual engagement and the joint enterprises of the community is established by the membership to the “Consorzio di tutela del formaggio Parmigiano Reggiano” (CFPR) which is the depositary of the PDO collective brand.
The birth of a sub-network of “Reggiana cows P-R” producers in the area is the outcome of an innovation process which started more than 20 years ago thanks to the initiatives promoted by the CVR's founders.
The socio-economic context in which this network developed makes its experience original, considering how knowledge and innovation are usually conveyed in closed and “traditional” communities of agricultural producers. All the major innovations introduced in the P-R productive system had been the results of processes of knowledge sharing supported by formal AKS, aimed at increasing productivity, enhancing efficiency of production processes and reducing labour input within the constraints laid down in the code of practice (COP) of the PDO Parmigiano-Reggiano. Several examples could be cited concerning mechanization, automation systems, feeding techniques, storage and processing facilities that in the past were introduced both on farms and in dairies. Geographical proximity, face-to face interaction and the common specialization are the factors which have enabled processes of social learning and knowledge convergence producing with a certain synchronism the spread of the innovations and the shift of the technical and cultural frontiers of the COP.
Conversely, the development of the network of Reggiana cows breeders took origin from the refusal by a small group of farmers of the on-going technical innovation process that had caused the replacement of the autochthonous breed with more productive breeds. Diverting from the innovation path stimulated by AKS and embraced in that period by the majority of the local community, the Reggiana cows breeders came somehow in conflict with the socio-technical system they were embedded in. The implementation of their project required the mobilisation of resources and knowledge not immediately provided by the formal AKS. A shared drive towards the need of preserving biodiversity worked as a catalyst, able to motivate the members of this new network to mobilise hidden knowledge and expertise among the farmers still raising this traditional breed and to act as a stimulus for research institutes to shift part of their resources to study the strategic advantages of this breed. Collaboration with food technologists offered the opportunity to deepen a new born field of research focused on the interaction between genetic variants of milk and cheese characteristics and it legitimized the scientific basis oriented to rediscovering the local breed. Actors belonging to institutes for the dissemination of innovation in agriculture played voluntarily the role of brokers between this network of farmers, university researchers and local and national administrations. They provided information about the opportunity to find public financial support for carrying out experimental trials on separated milk processing and - subsequently - for the start-up of a farmers Consortium (CVR) for the production and sales of Parmigiano-Reggiano cheese obtained from milk of Reggiana cows. The research results and the growing appreciation of consumers and media for this initiative stimulated the interest of local authorities towards the issue of biodiversity preservation.
The initiative has led to the creation of a sub-network within the local PDO, which now involves other farmers and dairies producing Parmigiano Reggiano cheese from milk of Reggiana Cows. From the initial multistakeholder form - functional to the implementation of the project - the network has assumed all the characteristic of a COP, in terms of

homogeneity of participants, similarity of goals and activity performed. The effects of spill over has required the establishment of a form of network governance suited to ensure both internal and external legitimacy. The process of "institutionalisation of the network" has resulted in the official recognition of the Association of Reggiana Breed (A.Na.Bo.Ra.Re.) that is also the depositary of the collective brand" Razza Reggiana" (Reggiana's breed).

# 2 INTRODUCTION

CVR is a cooperative of dairy farmers for the processing and marketing of Parmigiano Reggiano cheese produced from the milk delivered by its members. Compared to the other dairies in the PDO production area, the distinctive feature of CVR is the specialization in the processing of milk produced from the local Reggiana cow breed.
Its foundation is the result of the successful attempt initiated at the end of the 80s by a small group of farmers, aimed at recovering and valorising the local autochthonous cattle breed that in that period was at risk of extinction being reduced to a few hundred heads. A project for its recovery would have gone in an opposite direction to the innovation path embraced by the local community of farmers, that had started to replace the ancient breed with more productive cows since the early 60's. The fracture and isolation created in the established system of relations urged the group of promoters to seek beyond the boundaries of the COP approval and support for their undertaking. The initiative required the acquisition of knowledge and the mobilization of resources not immediately available inside the local socio-technical system nor provided by formal AKS. In that development stage of the project, an informal organisational arrangement linked together farmers, scientists and components of formal AKS, who acted as brokers of innovation, creating a mutual engagement around a specific sustainability goal (biodiversity preservation).
The first studies on the correlations between genetics variants of milk proteins and cheese characteristics offered the initiators the possibilities to validate their challenge on scientific base while the scientist's team most involved in that period on this field of research found a unique opportunity to test "on the field" the results of their studies. Volunteers belonging to AKS played a fundamental role in mobilizing and conveying on the project the resources needed firstly to finance the experimental trials and subsequently to support the start-up of the economic enterprise and the creation of the current network of red cows breeders.
With the transition 1) from a form of organizational learning similar to a LINSA 2) passing through the subsequent effect of spill-over in the area 3) up to the creation of an institutional framework ruling the use of the brand "Parmigiano Reggiano Vacche Rosse", the sub-network which has originated from that experience has assumed the characteristics of a COP (within the existing productive system also configured as a wider COP). The features of multistakeholders collectivity that in its early stages were functional to the implementation of the innovation are no longer detectable.
The successful experience of the CVR founders has induced in the subsequent years other dairy farms to introduce or maintain the Reggiana cows with the aim of producing Parmigiano Reggiano cheese from their own milk. The spillover effects disclosed the need to establish appropriate form of governance and rules of participation to the network in order to strengthen mutual trust and reinforce both external and internal legitimacy of the group of producers. Its construction was completed a few years later after the founding of the CVR, at the end of a process of "institutionalisation of the network" which led in 1996 to the official recognition of A.Na.Bo.Ra.Re. As a breed association. The other step of reification of the

experience was the registration of a collective brand “Vacche Rosse -Razza Reggiana” (Reggiana breed) for the identification of the P-R produced with Reggiana cow milk. Its use states the participation/membership to the network submitting participants to specific rights and duties. The institutional function of the association is the management of the Herd book, which is the tool for the maintenance of the breed and the improvement of the genetic selection. The Association also plays a key role in coordinating and sustaining the network, since it has been entrusted with the task of verifying the traceability of the product and the compliance with the Code of practice.
The form of governance and participation reproduces on a smaller scale the governance system of the larger local community of producers of Parmigiano Reggiano. Now that the network has reached its maturity stage of development, also the process of learning and innovation inside the group of Reggiana cows’ breeders occurs in similar way as in the broader COP of producers of Parmigiano-Reggiano. Homogeneity of the actors involved, joint enterprises and mutual engagement are the distinguishing characteristics of the network. The tasks the association is charged with are performed through routine activities aimed at ensuring the continuity of the control on member’s production and the sustainability of the network.

# 3 RESULTS OF THE ANALYSIS

## 3.1 Mechanisms of network development, learning and innovation processes and connections with formal AKS systems

The innovation carried out by CVR founders has the features of a retro-innovation. It consists in the recovery and exploitation of a resource already existing in the territory and threatened by the productivistic technical paradigm that had become dominant in that period. It combined recognized elements of product differentiation and sustainability, in terms of local biodiversity preservation, but it did not entail any break of the rules of the given socio-technical context, nor a change in processes (as it is for radical innovations). The strong feeling of belonging to the local community and the willing to maintain a closer link with the territory, with its centenary heritage of traditions and habits, pushed the small group of farmers to challenge “the productivist dogma of the full bucket” (as mentioned by many interviewees), creating at first instance an informal farmers’ network.
The system of relations between the actors of the COP (interaction and practice) have traditionally worked as transmission channels of the innovations, favouring the process of learning and knowledge convergence among farmers. Consequently, their refusal towards the on-going technical innovation process created a fracture with the majority of the community and stimulated the need to find new elements of knowledge and shared visions that could not be met within the established system of relations. Their attempt was judged by other farmers as “nostalgic” and backward and doomed to a rapid failure. It was even scarcely considered if not opposed by the Consortium for the Protection of Parmigiano Reggiano, because it clashed with its promotional policy aimed at enhancing the image of a product with unique and standardized characteristics. Despite the initial hostility they had to struggle with, they never matured the intention of leaving the COP they belong to.
The opportunity to find a new space for implementing the project was favoured by the familiarity of one of the founders of the CVR with the Academia and by his consideration of the contribution the scientific research on milk processing for legitimizing their attempt. A common assessment of the value of biodiversity preservation acted as boundary object able

to link both scientists and producers motivations. In their beliefs local breeds deserved preservation against the on-going process of replacement for 1) the cultural and historical value they embedded; 2) the biological value they had for the scientific research in the fields of genetics and food-technology; and 3) for their potentials in meeting the emergence of new food habits and new requirements in consumers demand. In such socio-technical context an informal collaboration started between researchers of University and the first group of producers, opening the space for the development of the initiative. That linkage gave form to an extension of the initial informal network with the participation of members of a local institute for the dissemination of innovation in agriculture in the role of facilitators and brokers with local and national administrations. Their brokering activity was essential for widening the space of innovation and gave a contribution to the formalization and reification of that experience (Code of practice, collective brans, recognition of the Breed association). The result was the creation of a sub-network of producers whose membership and interactions have been formalized through common rules of participation.

The further structuring of the network of the Reggiana cow breeders and its degree of formalization is the result of a process of institutionalization which took origin from the informal network created around the peer group of the CVR initiators. The development towards the current form of governance was addressed by the inclusion of the peer group around a well-defined Community of Practice, whose participants are all farms and dairies producing the PDO Parmigiano Reggiano.

The system of rules and the organisational structure set up for coordinating and controlling the activity of the members reproduces on a smaller scale the form of governance of the larger community of Parmigiano Reggiano cheese producers (farmers and dairies). As in the larger COP where the Consortium of Parmigiano Reggiano assumes the role of administrative organisation, a separate administrative entity has been delegated to perform some strategic activities that sustains the network and its legitimacy. That was the result of the spillover effects which occurred after the constitution of the CVR and the registration of its own brand. Since then others farmers started to re-introduce Reggiana cows requiring a separate processing of their milk for the direct sale of the cheese.

Consequently, a new collective brand was created in order to allow the other members of the just recognized breed Association to valorize their product with a distinctive mark. A.Na.Bo.Ra.Re was delegated as the organization responsible of the surveillance of its use. An official mandate attributed to a democratically participated organization was considered as the effective solution for the composition of the individual interests of the participants, for the prevention of possible conflicts and for strengthening the mutual trust (considering that network members are also potential competitors, a moderate or even low level of trust density can be supposed to occur across the network). Furthermore individual economic interests and competitive pressures would have been likely to come in conflict with the goal of constructing a clear and consistent image of the collective brand if the form of organization had not been suitable to support a minimum level of cooperation and consensus around this goal.

The network of Reggiana breeders is connected to the formal AKIS that is part of the institutional and organizational framework within which all producers of Parmigiano Reggiano cheese run their activity. As institution responsible for promoting the Designation of Origin, the Consortium of the PDO Parmigiano Reggiano cheese assumes a primary role in the local AKIS system. Its mission includes the provision of financial support to trade activities on new or emerging export markets. It also promotes and coordinates researches on scientific and technical topics concerning farming practices and milk processing, as the assessment of cattle feeding on milk quality or the feasibility evaluation of the introduction of

new technologies and processing techniques in compliance with the standards imposed by the Code of practice. Research activities are often carried out in synergy with external research institutes and universities for the contribution of competences, skills and resources they can provide

## 3.2 Learning approaches, methods and tools used in this LINSA

Nowadays the network shows the traits that are typical of the COP. Relevant in this respect, is the current configuration as a closed group of actors very similar in terms of activity performed, social and cultural background and geographical proximity. Also the processes of learning and innovation occur in a similar way as it is for the COP. The structuring of the network, its institutionalization, homogeneity of participants, similarity of goals and consequently competitive pressure among them, allows for different forms of social learning and also the pressure to change. Members are producers whose shared repertoire is somehow restricted by the productive rules established in the code of practice, but within this room of manoeuvre possibilities for innovation are captured which are less following the productivistic paradigm and more emphasizing the distinct quality of the product. The process of participation/reification and the level of formalization of internal relations also hinder the opportunities to create links with different subject and individuals that would give shape to multistakeholders network. Specialization leads to face restricted number of problems and reduce the range of learning.
Next to the learning process within the established network, also formal approaches to AKS are undertaken individually. The request of technical assistance or financial support for new investments is usually addressed by single farmers to institutional subjects belonging to AKS, as regional services for rural development, agricultural professional organisation or the Consortium of Parmigiano Reggiano (especially as marketing and trading activities are concerned: export support, participation to fairs, farmers markets and national exhibition, advise concerning fiscal, food safety and sanitary norms in force in particular foreign countries). If the approach to AKS occurs individually, the system of neighbour relations works anyhow as powerful vehicle for the transmission of innovation demand from the first innovators to the followers contributing to their spread throughout the area. The innovation spreading process typically occurs through an effect of imitation due to the geographical proximity of producers and the common productive specialization. It might be stimulated by the need to comply with compulsory rules or regulations (concerning environmental, sanitary and food safety or animal welfare issues) which entail new obligations of technical and/or bureaucratic nature and the acquisition of new knowledge not yet available inside the COP. Often, new processes and technologies initially introduced by a few farmers begin to spread in the area for an effect of emulation by the others members of the COP.
When not driven by the need to cope with rules and regulations, more frequently connections with AKIS take place within the framework of the wide range of measures of rural development policy. In particular, some specific measures of the regional rural development plan are specifically targeted to transfer knowledge and innovations to farms at the aim of increasing their competitiveness, promoting their modernization and the improvement of farmers entrepreneurial and professional skills (investments for reducing the environmental impact, improving productivity, animal welfare or the products quality)

## 3.3 Tasks, roles and emerging quality needs for the knowledge and skills of actors and institutions

Being a relatively closed network, where the experience and practice of the participants are very close, actually there is less expression of need of new expertise and skills which could be provided from outside the borders of the consolidated relational system. Productive specialization and joint enterprise gives the community the capability to re-produces the entrepreneurial roles through the absorption and transmission of the knowledge, expertise and know-how that represent the immaterial resources sedimented during centuries in the territory. Farmers are usually aware of their capability in managing farming activities, at least until changes do not occur that can somehow break and alter the routine of their work. Otherwise they are more likely to seek advice from AKS as professional agricultural organization for reasons concerning administrative and bureaucratic issues.
In such a context, expressed demand of new knowledge emerges in the wake of endogenous or exogenous forces that push towards a change, stimulating the demand for advice and knowledge that can be provided by AKS. When this is the case, the support of AKS fits the particular interests of farmers and the opportunities to meet the needs of the potential users increase considerably. Even if the change affects a single aspect of the production processes or farming activity it may implies further adjustments and changes. The prerequisites for approaching professional advisory system is the awareness of the "value" of the innovation, that depends on the benefits perceived whether they are of economic nature or based on a different vision of their own role of agricultural entrepreneur (alternative system of value and motivations). At least in its very early stage, a similar dynamic is detectable looking at the story of the CVR, whose founders sought outside the formal link with the AKS the resources for the start-up of their initiative.

## 3.4 Support measures which are most effective and cost efficient

The support of the network of Reggiana cow farmer's network relies in part on public financial support granted to the breed Association (A.Na.Bo.Ra.Re.) for performing its institutional activities. Currently A.Na.Bo.Ra.Re staff consists of only two employees. Public support is essential for carrying out the genetic improvement of the breed and for providing farmers with insemination plans aimed at reducing consanguinity degree of the cattle herd. Other specific funds of the Ministry of Agriculture gives the Association the possibility to participate to events like food fairs and livestock exhibitions for promoting the collective brand among a larger audience of consumers. As depositary of the brand and responsible for the control on production, the association receives a fee from farmers and wholesalers for each Parmigiano Reggiano wheel marked with the collective mark "Vacche Rosse Razza Reggiana".
The activity of A.Na.Bo.Ra.Re has become actually effective only with the official recognition as breed association. Otherwise, the Reggiana breed would have been destined to the extinction as only the establishment of a genealogic herd book provided the effective instrument for its rescue and for its valorization. Before its recognition the existing association had no tools and means to intervene on the preservation of the breed.
It took about 6 years to complete the innovation process that from the experimental tests designed to demonstrate the opportunity to save the breed led finally to the official

recognition of the association. During this period the contribution of soft support can be detected in the form of facilitation and brokering activity. It was provided by brokers of local institutes for the dissemination of innovation in agriculture which gathered around the project knowledge, skills and resources not immediately available within the institutional context in that particular period. They facilitated the links with local administrations and universities, giving the opportunities of exploiting “hard support measures” for the development of the initiative.
In particular some single actors of AKIS played the role of “mentors” providing information on the possibility of finding support from local and regional institutions and ultimately obtaining the funds needed to start a project aimed at the recovery of the local breed. The growing interest by local authorities towards the issue of biodiversity also allowed the first attempt of producing and preserving the semen of breeding bulls, that was necessary for not to lose the remaining genetic asset. The validation and dissemination of the research results supported the process of recognition of the breed association.

## 3.5 Evaluation criteria used for assessing the effectiveness and cost-efficiency of support measures that are exploited by LINSA

Even if the support received is not currently evaluated explicitly - by means of specific indicators designed at this purpose - the financial supports that sustain the network governance activities has until now ensured the survival and preservation of the local breed. From 2002 to 2012 the herd increased by 76%, reaching a total of 3,450 heads. In the same period, the number of milking cows rose from 1,090 to 2,279. The processed milk passed from 1,650 up to 7,000 tons corresponding to 530 tons of cheese (less than 1% of total Parmigiano Reggiano annual production). There are still constraining factors for a further development of the herd. The actual commitment to preserve the breed started when the survived cattle herd counted for few hundreds heads. The embryo transfer could had speeded the process, but this technique has never been used due to its cost and the technical skills and competence required to perform it.
The economic incentive for farmers to introduce Reggiana cows in their farms is also due to the higher price of the milk which can offset the lower productivity. Reggiana cow breeders are less affected by the market crisis that occur during the periods of overproduction, since the product is destined to a niche market. However, when the price of Parmigiano Reggiano is particularly high the price difference reduces and the farmers incentive to introduce Reggiana cows become lower. Furthermore Reggiana cows farms have to comply with stricter norms concerning animal feeding, such as the prohibition of GM feedstuffs and uni-feed technique, that entail higher production costs. Benefits are not only of economic nature so that supports is not beneficial only for a restricted group of producers. Indirect social benefits, not easy to measure, are related to the valorization of the territory and local traditions that derived from the achieved goal of preserving biodiversity. The defense of local identity was one of the reasons motivating the first group of producers. Furthermore, the case of the Reggiana breed preservation was forerunner of other similar initiatives in the territory, carried out locally by group of breeders of other ancient cattle breeds who benefited from that experience. (in terms of practical and organizational knowledge: how to established a breed association, how to manage a collective brand).

## 3.6 Operational tools that AKS actors could use to improve support for LINSA and to enhance the capacity of involved actors, in order to foster successful LINSAs

As the case study demonstrates, even in the traditional PDO system the objectives of achieving environmental sustainability and biodiversity conservation - as tools for territory and product valorization – may create frictions with the established social learning processes, even when they could prove compatibility with economic sustainability goal (capability to compete on the market). The initial difficulty during the first steps of the CVR project was sharing their vision with part of AKS in opposition with the innovation stream that was crossing the rest of local community in that period. The help they found from actors belonging to AKS was initially provided voluntarily and outside the formal patterns of the innovation supporting services

In such a situation, AKS may be proven to be conservative and not ready to support initiatives that divert from the prevailing technological paradigm, because more ready to adopt standardized approach, routines and established methodologies and less prone to support different models, vision and ideas.

Today the fracture with the institutional and social context is completely recomposed. Even the policy of the Consortium of Parmigiano Reggiano cheese has changed due to a greater consideration for the initiatives of product differentiation of the PDO managed by the producers. This is also demonstrated by the emergence of initiatives similar to the CVR and by the support given to the direct sales of the dairies (participation in fairs, days dedicated to open farms). Nevertheless it took time before the attempt carried out by the early promoters of the CVR was accepted and understood.

This happened thanks to an actual welding of interests between farmers and scientific research on a relevant topic as the quality of milk and its genetic determinants. In that particular stage the technical service has been able to create a till then missing link between the findings of basic research and the end users of the research results. Using an original approach for that period, the basic and applied research was transferred directly to the level of individual operators making them an active part in the implementation phase of the experimental tests. This type approach is today more common than in the past. For example specific measures of the regional rural development plan offer the opportunity for joint activities and partnership with AKS, since the explicitly require the collaboration between farmers and research institutes for the skills and knowledge they can provide for the realization of specific projects or investments.

# 4 CONCLUSIONS

The innovations that have affected the system of production of the Parmigiano Reggiano cheese over the past decades have changed milk production processes acting at farm level and on the territory, (systems of fertilization, forage cropping, feed administration, farms organization, adoption of mechanical milking). Each new technology and productive technique has been evaluated on the impact on the quality of the milk and consequently validated by The Consortium of Parmigiano Reggiano as guarantor of the characteristics of the product. In some case their introduction was the result of a compromise between the goal of preserving the PDO quality standards and the farmers demand for increasing productivity and improving working conditions. The replacement of local breeds was a

widespread phenomenon that starting from the early 60s did not spare even the area of production of the Parmigiano Reggiano cheese.
The case of the Consortium of Red Cows (CVR) proves that the model of linear transfer of innovations and the processes of social learning typical of the COP are not always adequate for achieving the objective of sustainability in its economic, social and environmental meanings, requiring a particular approach by AKS.
In communities of producers where the relational system is strong enough to act as engine for the transmission of learning and values (cultural and professional), the divergence from the dominant path of innovation (and vision) may provoke a fracture with the existing social technical environment.
The innovators who deviate do no longer find in the traditional context of reference (support of AKS and interaction with the other actors) the elements of knowledge, evaluation criteria and practical action needed for developing their initiative. New form of relationships and a different approach by AKS may be required to meet the challenge of sustainability.
The initial difficulty was sharing their vision with AKS, more ready to adopt standardized approach, routines and established methodologies. The successful attempt to save the local breed from extinction and to implement a strategy of product differentiation was possible thanks to a mutual engagement around sustainability goals permitting to link the interests of different actors.
In that particular step brokering activity was fundamental for connecting resources, expertise and visions not yet networked with each other, in order to overcome the gap of the established innovation supporting system.
The CVR is now part of a consolidated network, which is the outcome of the experience that led to its foundation. The participants are all breeders who have decided to maintain or re-introduce in their farms the Reggiana cattle breed. As a result of a long process of institutionalization ended in 1996, it has now the features of a Network Administrative Organization (NAO) model, where the association of Reggiana Breed is the separate administrative entity set up for managing strategic activities that are essential for the maintenance and continuity of the network. The strong commitment of the members, its mission and the strength and the level of formalization of internal relations limit the possibilities to create links with external subjects and individuals, so that the process of social learning occurs in the typical way of the community of producers.
Its development has, however, helped to change the prevalent top down vision of AKS concerning the role of individual farmers relegated to a mere producers receiving knowledge from above, oriented around a one directional productivistic paradigm. The recognition of bottom up knowledge generation within the farmer's community beneficial to AKS gives the opportunity for a significant change in policy concerning the promotion of a territory and distinctiveness of a local product.

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# APPENDIX 1: ANALYTICAL CHARACTERISTICS REPORTS

# DEGREE OF INTEGRATION REPORT

## Mechanisms of network development

The development of the initiative that brought to the creation of the Consorzio Vacche Rosse (CVR) was in counter tendency with the path which typically characterizes innovation processes in traditional agricultural system, as many PDO systems may be considered. In its early stages the realization of the project required the acquisition of knowledge and the mobilisation of resources not available inside the local socio-technical system nor provided by formal AKS. Its development was driven by the interaction at the boundaries of the local community of producers between the first promoters and several actors belonging to different communities (Universities, research organisation, local institutions), that were able to meet their demand and willing to share their vision (frame).

## Processes of innovation and learning

Motivation to undertake the initiative was the refusal of the dominant technical paradigm within the local community of producers, mainly focused at increasing productivity. Process of innovation and learning occurred at the boundary of the COP when the promoters felt the need to gain support and new knowledge for implementing their project. They were stimulated by the need of both material and immaterial resources that could be provided by actors and organization engaged in different roles and practices: Where to find resources for a separated processing of the Reggiana cow milk produced by the first members of the new-born CVR? How to mobilise scientific support for assessing on objective bases the diverse quality of the milk obtained from local breed cow? How to make effective the activity of the already existing Reggiana cow breed association? How to overcome the conflict that were arising with the Consortium of Parmigiano Reggiano, and the rest of the local community of producers?

The process of learning took place through the exchange of information and knowledge with subjects that did not formally belong to the local COP.

At this stage of the case study analysis, it can be supposed that the value of the defense of biodiversity has worked as a boundary object, able to link motivations, experiences and skills from different social and institutional spheres: the new frame of the CVR promoters was shared by part of agricultural policy makers with a fundamental support provided by research organisations and also information media.

The mutual engagement of the peer group translated into the definition of the activities and practices of the members, as the result of the coordination within the group which enforced the level of cohesion of the community (joint enterprise).

Participation gave origin to the current Consortium whose membership implies for farmers duties and rights and the formal acceptance of the mutual engagement.

The process of reification continued through the adoption of an additional set of product specifications, stricter than the productive standard of the PDO “Parmigiano Reggiano”, and

it was completed with the registration of a mark which still today identifies cheese obtained from Reggiana Cow's milk, representing the "congealed form" of the shared repertoire. The Code of Practice of the "Red Cows Parmigiano Reggiano" regulates milk production standards (it forbids the use of GMO and the unifeed technique, etc.), and lays down cheese products specifications (minimum ripening period of 24 months).

## Should the LINSA be considered as a COP, NOP, constellation of practice, innovation network?

Nowadays CVR presents all the features the conceptual framework refers to be distinctive of a COP: 1) a stable community between members working in close proximity and sharing common mission and goal; 2) common productive activities (all the CVR members are dairy farmers) and repertoire that are the heritage of the local tradition now codified into a code of practice as result of the process of negotiation between the first members of the Consortium. The internal relations are formally ruled by the Statute of the Consortium which indicates duties and rights of the members; the tasks associated to the different administrative roles and the forms/processes of the participation to the Consortium management.

Current form of the organisation can't be assimilated to a network of practice nor to a constellation of practice for the homogeneity of the actors involved, for the stability of the relations and the strong organisational framework. At the current stage of maturity of the initiative also the relations within and outside the socio-technical system are consolidated and formalised, so that a typical feature of the open networks is no longer detectable. As all the dairies producing "Parmigiano Reggiano" the CVR is associated to Consortium of Parmigiano Reggiano, which is the recognized authority carrying out functions of protection, promotion and valorisation of the PDO, among other important governance activities. The Association of the Breed Rossa Reggiana (AnaBoRaRe) is charged with the genetic selection of the cows herd and it manages the specific herd-book. AnaBoRaRe is also the owner of the collective mark which any farmers who are not members of the CVR may use after the approval of the Association for distinguishing cheese produced from Reggiana cow's milk. These links with external organisation are now institutionalised and formally ruled.

## Analytical summary of the main findings:

- Refusal of the dominant socio-technical paradigm in the given context as motivation to change,
- Innovation as results of interactions at the boundary of the local community of producers (PDO)
- Sustainability as boundary object able to link knowledge and resources not available in the existing context,
- Process of participation and reification gave form to the current formally ruled COP ( stability of the relations and strong organisational framework)

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# LEVEL OF INNOVATION REPORT

## Characteristics of innovation (incremental or radical?)

The implementation of a differentiation strategy able to combine elements of economic and agricultural sustainability is the distinctive innovative feature of the CVR's activities. CVR is the result of a pioneering experience, considering that till then no dairy had attempted to promote an own private brand in the sector of Parmigiano Reggiano. The success of the initiative has permitted the promoters to undertake a different approach to the final market, if compared with the role that commonly dairies play within the supply chain of Parmigiano Reggiano. The large share of direct sales performed by the CVR and the higher sale price of the product proves the success of this innovative initiative.

Being the product a PDO, innovation did not entail changes in processes or a change of the rules of the local PDO socio-technical system. A radical innovation would have probably meant leaving the PDO system, while actors' past history and their ties with local tradition, knowledge and routines represented a natural/cultural constraint which locked-in them into the existing context. Instead, the innovation carried out by the CVR had the features of a retro-innovation, consisting in the successful attempt of recovering a resource already existing in the area and at risk of extinction. It developed through the mobilisation and adaptation to a new emerging societal demand of the practices given in the socio-technical context, which led to the desired sustainability outcome.

## Socio-technical transition to sustainability

The new frame pursued by promoters came soon in conflict with the vision of the rest of the local community of producers. The use of a private mark beside the PDO one overturned an assumption strongly rooted in the perception of local community: the PDO product had to be offered to consumers like a standardized product. Any attempt of differentiation would have been perceived as a threat for the solidity and consistency of the system. Promoters found approval outside the socio-technical regime. Preservation of local biodiversity and collective farmers marketing initiatives had already been a field of interest of local universities and research organisation and began to be included in the agenda of the national agricultural policy. This offered to the initial promoters a fundamental opportunity for the start-up of the project. In the same period a growing appreciation and interest by the public opinion for the value of sustainability in agricultural production began to attract the interest of the specialised press towards the initiative.

## Is the LINSA a novelty, a niche or a change in the regime?

CVR is a niche that now shows a high level of coordination between the farmers involved, with a mode of operation that doesn't challenge the broader set of rules governing the local PDO socio-technical system. CVR is still part of the larger community of practice (COP) represented by all the dairies producing Parmigiano Reggiano, whose representative organisation is the designated Protection Consortium. The Consorzio del Formaggio Parmigiano Reggiano provides the general frame for the coordination of the activities within the system, being the depositary of the PDO Code of Practice and the owner of the PDO mark. Due to the solidity of the regime governing the local productive system the innovation brought by the CVR has been of incremental type (retro-innovation). This pre-cursive experience has produced spillover effects in the area of production: following the CVR's

example other farmers have undertaken differentiation strategies based on the preservation of other autochthonous breeds (I.e Bianca Modenese), and many others who aren't members of the CVR has been induced to maintain Reggiana cows, not replacing them with more productive breeds . Despite their success, this experience has remained of small-scale.

## Analytical summary of the main findings:

- Incremental innovation that didn't break the rules of the existing socio-technical system but created conflicts with the dominant frame
- Retro-innovation as recovery of resources already existing in the area and at risk of extinction
- Mobilization and adaptation to a new emerging societal demand (biodiversity, sustainability) of the knowledge and practices of the given socio-technical context.
- The result of the innovation consists in the product differentiation able to combine elements of economic and agricultural sustainability (preservation of biodiversity)
- The strong ties to the local tradition, knowledge and routines (PDO system) represented natural/cultural constraints for radical innovations

# SCALE REPORT

## Degree of formality and complexity and diversity of actors involved (types and role in the network; approximate number of nodes; geographical coverage; diversity of activities performed)

CVR is a stable community of milk producers formally organised in a joint enterprise which took the form of a cooperative since its foundation. From the point of view of the degree of formality (strong), diversity of actors involved (low) and activity performed non substantial differences can be detected nowadays compared to the other dairy enterprises which populate the delimited area of production of Parmigiano Reggiano. Being part of a PDO productive system also the geographical coverage is limited at local level.

The pattern of relations of the CVR with external subjects cannot be assimilated to an open multi-stakeholder network: the links with other actors and institutions which are external to the peer group are all included within the same Community of Practice and formally ruled.

Now that the path of innovation brought by the peer group is concluded, CVR has the feature of a hierarchical and formally structured organisation, rather than an informal network connecting a diversity of actors belonging to different areas of activities.

However, links with actors placed at the edge or outside of the local COP can be identified looking at the implementation phases of the initiative: they permitted the mobilization of tangible and intangible resources needed to develop the innovation.

## Structure of the LINSA

CVR is a simple market-based network, created for the production and commercialization of a typical cheese (PDO) obtained from the milk of the autochthonous cows breed “Reggiana”. The core network has assumed the formal shape of a cooperative of dairy farmers, whose memberships is formally ruled by the Statute of the cooperative. Farmers are called to deliver the milk they produce to the dairy owned by the cooperative for the production of the PDO cheese “Parmigiano Reggiano”. The largest part of the cheese produced is sold in the

two sale points managed by the cooperative (direct sale) and the members' milk is rewarded according to the revenue gained from the cheese sales.

The institutional links with other subjects which today complete the patterns of relations of the core group are included within the boundary of local community of dairies and milk farms. The geographical boundaries and the shared productive repertoire of the local COP are strictly defined by the Code of practice of the PDO “Parmigiano Reggiano”, whose depositary is the Consortium of Parmigiano Reggiano (CFP-R). The Consortium is the owner of the PDO mark and manages important functions of governance within the COP, establishing the common rules of production and performing activities of control and promotion of the product on the market.

The cheese produced with the Reggiana’s breed cows can be recognized by an additional brand that is added to the one applied on the Parmigiano Reggiano Cheese wheels by the CFP-R. The brand "Razza Reggiana”, was created by the founders of the CVR, and now is property of AnaBoRaRe. It is conferred in use to all the dairy farms that ask for it, always respecting the production code. Only farmers whose herd is registered in the genealogic book of the Reggiana's Breed herd can get access to the use of the brand. AnaBoRare is the recognized breed association whose aim is to promote the improvement, the exploitation and the diffusion of the Reggiana’s Breed cattle. It particularly takes care of carrying out the selection work through the Genealogical book instituted in 1996, thanks to the fundamental contribution of the promoters of the initiative which has led to the creation of the CVR.

## Analytical summary of the main findings:

- Group of milk producers formally organised in a joint enterprise which took the form of a cooperative
- the relations patterns of the network at the actual stage of maturity is characterized by strong degree of formality and low diversity of actors involved
- The external links of the core group are included within the boundary of local community of dairies and milk farms (PDO system)
- Spill over effects carried by the CVR created within the PDO community the need of ruling the use of the “Razza Reggiana” brand through institutional links between breeder and regulating bodies

# TEMPORALITY REPORT

## The story of LINSA: events that describe the weaving of the LINSAs and evolution of conflicts and alignments.

General context of the starting up of the initiative:

- During the 60s in the production area of Parmigiano Reggiano a fast process of replacemnte of the native cattle population had already taken root, driven by the growth in consumption. Large parts of local community of farmers were choosing this innovation path for increasing productivity.
- In the same years chemical and food technologist initiated studies on the characteristics of the milk of Reggiana cows. The line of research resumed by the staff of the department of animal husbandry at the University of Bologna and Parma was focused on the study of genetic variants of milk proteins, trying to assess their influence on dairy products quality.
- In the 70s the group of researchers started the first experimental tests on this topic. The CRPA (Center of Research on Animal Production) was founded a few years before with the mission of conducting research related to agricultural and agri-food production for the development of innovations. CRPA accepted the request of collaboration to perform the experimental trial which could have demonstrated how genetic variants of Reggiana cow's milk affect the quality of the processed product.
- Despite the demonstration of the different characteristics of the cheese obtained from milk of Reggiana cows. Most of farmers continued to show no interest in the recovery of the breed, also due to the absence within the local COP of a payment system able to reward higher quality of the milk delivered to the dairies.
- The interest of the research team to the preservation of the breed continued, even if the dissemination of the results of the trial had not avoid the risk of extinction of the "Reggiana" breed.
- The opportunity to bring together the interests for the preservation of the local biodiversity came in the 1990. It was offered by a program promoted by the Italian Ministry of Agriculture aimed at preserving the products of the breeds in danger of extinction. CRPA reported the case of Reggiana red cows at the ministerial offices and gave his contribution to the preparation of the grant application. The program provided a local breeder of Reggiana cows the opportunity to carry out his plan: creating a consortium for the valorization of products of the ancient Reggiana breed. In his original intention the consortium would have represented a presidium of the breed through the direct marketing of the product.
- The funds obtained made possible the separate processing of a very small part of the milk of the six farmers who had decided to participate to the initiative. The structure was identified in a dairy-type experimental restored in the late 80's, attached to a vocational school farm and used exclusively for educational purposes. Close to the dairy, a stable experimental had been built owned by the local government and designed by engineers CRPA as the first example of a free stall.
- In the 1991and 1992, 800 Parmigiano Reggiano wheels were produced through a separate processing in the experimental dairy. In the same year, a distinctive brand was registered that still today identifies the Parmigiano Reggiano cheese made with

milk of Reggiana cows. The commercialization of the product achieved an unexpected success among consumers.

- The other initiators of the project began to mature the idea of leaving the dairies where they continued to deliver most of their milk due to the contractual obligations that bound them to the processors. Their aim was to process all the milk in the experimental dairy in order to initiate the activity on a larger scale
- From the second half of the 90s with the growing success of the initiative. the conflicts between the founders of the CVR and the rest of the community of producers exacerbated. Inside the Consorzio Parmigiano Reggiano the opinion that no other brands should have been applied beside the mark PDO was prevailing.
- In **1996** the Herd Book of the Reggiana breed was approved by the Italian Ministry of Agriculture, providing the already existing Reggiana Breed Association (ANaBoRaRe) with the operational tools for carrying out the activity of genetic improvement and increase of the herd of the survivor Reggiana cows. The initiators found the support of the local breeders association in order to maintain the headquarter of AnaBoRaRe on the territory, as the original intention of the Ministry was to move it far from the area where it should have operated.
- The success of the initiative started to produce spillover effects on the territory, as other farmers autonomously started to re-introduce Reggiana Cows, requiring a separate processing of their milk
- After the approval of Genealogic herd book, the problem arose of the brand use by farmers who were not members of the CVR, that was the owner of the brand “Vacche Rosse”. These farmers began to claim the creation of a new brand owned by ANaBoRaRe in order to allow its use for those producers who did not belong to the CVR.
- The topic of the use of the mark created a conflict between the founders of CVR and the other members of AnaBoRaRe. The “brokers” who participated to the start up of the initiative tried to mediate between the two positions. They attempted to convince AnaBoRaRe and CVR to keep only one brand in order to bring under a single organization and direction all the initiatives that were meanwhile rising in the territory. The settlement of the conflict did not lead to the establishment of a single collective brand. CVR has kept its original brand while ANaBoRaBe has created a new one. However the code of practices underlying the right to use both brands is the same.

## Analytical summary of the main findings:

- Innovative initiative developed through networking arrangements able to bridge formal organisation, mobilize resources and create opportunities.
- Hybrid form that developed through a progressive institutionalization and formalization till to formal network (CVR) we can observe today.
- The different meanings (cultural, biological and zootechnical) attributed to the value of biodiversity created the communion of intent among the peer group of producers, the world of scientific research and AKS, acting as boundary object

- Spillover effects of the initiative which created conflict within the Communities of producers: 1) between the vision of the innovators and the dominant technical paradigm pursued by the rest of local COP 2) Between the first innovators and the followers. Conflict were settled thanks the mediation of brokers and through the process of institutionalisation and formalization (collective brand, code of practice, product control plans)

# GOVERNANCE REPORT

## How the LINSA is governed and managed

The initiative that resulted in the foundation of the CVR also led to the creation of a sub-network within the local PDO COP, which involves other dairies producing Parmigiano Reggiano cheese from milk of Reggiana Red Cows. The effects of spillover created by CVR, brought out the need of establishing a form of governance suited to ensure internal legitimacy of the network and reinforce mutual trust between the producers, who are also competitors. This has been done through a process of “institutionalisation of the network”, which has resulted in the registration of the collective brand ”Razza Reggiana”(Reggiana’s breed), given in use to the producers who are eligible to apply for it. A.Na.Bo.Ra.Re plays the formal role of NAO granting to dairies the right to use the mark and controlling the compliance with the rules of production. As outcome of the experience carried out by the initiators of the CVR, A.Na.Bo.Ra.Re was also officially recognized as the association for the improvement of the genetic selection of the local Reggiana breeds. It is responsive to both internal and external legitimacy needs. In the specific case internal legitimacy is referred to the balance between the interests of individual dairies, that are competitors, and to the capacity of establishing common rules in order to prevent conflicts due to possible opportunistic behavior in the use of the brand. External legitimacy is related to the constructions of a clear and consistent image of the network as a whole.

A.Na.Bo.Ra.Re. is a formal organisation, consisting of a President, who legally represents the associations and an Executive Board of six members. The administrative structure provides the necessary balance between the need for inclusive decision making and administrative efficiency. Members of the executive board are mostly the “historical” producers who were the first to keep Reggiana cows in their farms or “volunteers” who have time, willingness and energy to take on this task.

The Executive Committee determines the fee for the use of the collective mark, it approves the use of private logos and brand to be used in the packaging of Parmigiano Reggiano produced and deliberates the withdrawal of the right to use the mark in the event that irregularities are detected through the controls in the farms and dairies.

Actors probably do not have particular skills or consciousness about governance of a network: At present their work is limited to the daily routines of production, contacts with the outside are mediated in the name and on behalf of cooperative by the current President. Rules governing the operation of the cooperative reflect a model of productive organisation very common in the local PDO Community. Most of dairy farms of the PDO area are organized in cooperatives.

Even the form of governance of the sub-network - which includes breeders of Reggiana Cows - reproduces on a smaller scale the governance system of the larger local community of producers of Parmigiano Reggiano. As in the reference model where the Consortium assumes the role and functions of a NAO, this sub-network has appointed a coordinating

body specifically established for the institutional functions that couldn't be performed efficiently by other forms of government (shared-governed system).

The development of the network has nowadays reached its maturity stage, so that the functions performed by ANaBoRaRe at present are based on routine activities, aimed at ensuring the continuity of the control system on production and thus the sustainability of the network. The association must also take into account the limited financial resources to undertake promotional initiatives on a large scale since the number of producer members that contribute the budget of the organization is still relatively limited. Furthermore, no need or demand for greater participation or involvement has emerged. Besides, similarity of goals (members are also competitors) may create conflicts and difficulties in dealing with other issues. Competitive pressures would make some members reluctant to agree a shared solution on specific issues which somehow could bring any advantage to other producers.

## Authority and control: power relations inside and outside the LINSA and levels of governance

The network is open to all producers who wish to valorize their production through the collective brand that identifies the cheese made from the milk of Reggina red cows. The registration in the cattle herd book managed by A.Na.Bo.Ra.Re, the submission to the control plan, the formal commitment to respect the rules of production and the payment of the fee for the use of the mark are the requirements which attest the belonging to the network. Even access to key administrative roles of both A.NaBo.Ra.Re and CVR is formally open to all network members, since they are elective offices. However, the turnover in the administrative roles was very limited over time: as tacit agreement shared by the community these offices have been assigned to those people who have given the greatest contribution to the development and to the success of the initiative that led to the birth of the network.

This inevitably creates conditions for the presence of a group of leader within the network. At the same time, similarity of goals, homogeneity and common background – that make participants potential competitors - and the differences in size and economic performance (production volumes, marketing activities), as well as the scarce availability of financial resources, limit the capability to take collective action other than the functional and routine activities.

## Efficiency and effectiveness of the governance approach

The analysis of consistency between critical contingency factors and the form of governance - considered by Provan and Kenis (2007) relevant for the effectiveness in achieving network goals - cannot be only focused on CVR - as it cannot be considered a network according to the definition suggested by the authors.. Actually CVR's members are part of the network of farmers engaged in the production of Parmigiano Reggiano cheese made from the milk of Reggiana cows. The network has gradually developed within the area of production of the PDO Parmigiano Reggiano, taking the form of governance that Provan and Kenis identify as NAO model.

**Key predictors of effectiveness of NAO Governance Form -(Provan and Kenis, 2007)**

| Governance form | Trust | Number of participants | Goal consensus | Need for Network-level competencies |
|---|---|---|---|---|
| Network administrative organization | Moderate density | Moderate to many | Moderately high | High |

Shared rules of participation of representatives in the administrative offices of the Administrative Organisation (A.Na.Bo.Ra.Re) ensure a better balance between the interests at stake and greater capacity for conflict resolution. Due the fact participants are also competitors; moderate level of trust density can be supposed to occur across the network. Shared governance would not be an effective form of decision making as brokered form of governance could be for some strategic network-level issues, due to the higher risk that individual interests prevail on collective goal.

Since the network is open to anyone who meets the requirements of the Code of Practice, the NAO form seems to be more efficient also from the point of view of the number of participants. Despite the relatively small number of participants shared governance would be ineffective to handle the tasks necessary for the functioning of the network. Participants do not have to interact with each other but with the NAO.

The aim of the individual members of the network is to differentiate their product for increasing its added value. Individual economic interests are not necessarily in conflict with the collective goal but they are likely to become source of conflict or to lead to unsatisfactory results if the form of organization is not suitable to support a minimum level of cooperation and consensus. This was achieved by assigning strategic functions such as the management of collective brand and the production control plan to a separate and representative organisation.

The NAO model chosen served to create both internal legitimacy (perception of the benefits of belonging to the network via the neutralization of opportunistic behaviors and unfair competition, while maintaining the necessary level of mutual trust) and external legitimacy, (building credibility and guarantees for the outsiders: collective mark, product certification system).

# LEVEL OF LEARNING REPORT

## Approach to learning

The primary process of learning in the broader local COP (which the network of Reggiana cow's milk producers belongs to) consists in the transfer and absorption of the knowledge already existing within the local community (farmers and dairies), that passed on from generation to generation over the centuries. Skills and competences are widespread in the area, as heritage of a specific Know-how rooted in the territory. Process of innovation has been traditionally supported by AKS according with a technological paradigm aimed at increasing productivity of dairy farms, enhancing efficiency of production processes and improving working conditions, always in compliance with the PDO qualitative standards. All innovations (mechanization, automation systems introduced in dairies, new milking technologies, storage and processing facilities) have been adopted gradually but with a certain synchronism inside the COP. The local system, strictly defined in its geographical boundaries and shared repertories, has maintained its capacity to function as engine of transmission of new knowledge and technical innovations. Routines, homogeneity of the

actors and common cultural and professional background has limited the space for different form of organizational learning.

Even the production practices adopted by the members of CVR are basically the same of the whole community of local PDO producers. The “sub-network” of Reggiana cow’s farmers took origin from the motivation of a very small group of farmers to maintain a closer link with the territory and the local tradition. The different assessment of the ongoing technical innovation process constituted an element of fracture with the rest of the community and stimulated the need to gain new element of knowledge that could not be immediately met locally.

But innovation - focused on the recovery and valorization of an ancient local breed - did not break the rules nor changed practices that until today have made up the know-how of the local community.

The result of this experience was the creation of a sub-network of producers whose memberships and interactions have been formalized at the end of a process of institutionalization, laying down common rules of participation (collective brand, rules underlying the right of using it, production code etc.).

Now that the network development has reached its maturity stage and the framework of rules has been formally codified the approach to learning has re-gained the typical traits of the COP. Relevant in this respect, is the current configuration of the network as a closed group of actors very similar in terms of activity performed, social and cultural background. Furthermore, farmers are members of cooperative dairies or process their milk individually, inevitably taking the role of competitors.

Learning processes mainly occur according to codified and formal approaches, mostly undertaken individually by the single participants. They are mainly based on the “conventional” method of the linear transfer of technology and knowledge, at the aim of reducing workloads; rationalize the organization of work in farms, improving the animal welfare, or help farmers to meet the requirements of the environmental, food safety or traceability regulations.

## Individual, social and organisational learning

With the transition 1) from a form of organisational learning similar to a LINSA in the first step of development of CVR experience 2) passing through the subsequent effect of spill-over in the area 3) till to the creation of an institutional framework ruling the use of the brand “Parmigiano Reggiano Vacche Rosse”, the sub-network which originated has assumed the characteristics of a COP (within the existing productive system also configured as wider COP). The structuring of the network, its institutionalisation, homogeneity of participants, similarity of goals and consequently competitive pressure among them, currently limit the space for different organisational forms of social learning.

The first phase of experimental validation of the initiative - involving the first small group of producers, researchers and institutions - represented an original form of acquisition of knowledge and learning, different from the way innovations had been traditionally introduced and disseminated in the area. Being in contrast with the dominant technical paradigm, the first promoters were regarded as deviant individuals, retrograde and doomed to failure. They were urged to seek partners who could help them in their initiative outside the boundary of

the local COP, turning to actors belonging to the service of development and scientific research community willing to share their vision.

Nowadays the processes of learning and innovation occur in a similar way as it is for the rest of the PDO community of producers. The request for technical assistance or financial support for marketing activities is addressed by individual producers to institutional subjects belonging to AKS, as regional services for rural development, agricultural professional organizations, or the Consortium for the Protection of the origin denomination “Parmigiano Reggiano” (exports support, participation in fairs, participation in farmers' markets or national exhibition). These requests are handled individually, also because each member of the network - whether they are organized in cooperatives or in individual enterprises - runs his own economic business and competes on the same niche market with the others.

For the same reason ANaBoRaRe (the Network Administration Organisation) has not until now shown capability to be a carrier/vector of the learning demand for the participants of the network nor the latters have never explicitly asked the association to assume this role.

## Emerging needs for knowledge and skills in the LINSA

Being in a closed network where experience and practice coincide, there is no expressed need of any further assistance, new skills or abilities which are perceived could be provided outside the borders of the consolidated relational system. Members are producers whose activity is characterized by a strong routine, congealed by the compliance with a specific code of practice which limited possibilities of innovation. As it is typical in closed networks, there is currently a strong tendency to maintain roles and functions within the community. The strong commitment of the members of the cooperative, its mission and the strength and the level of formalization of internal relations limit the opportunities and the needs to create links with external subjects and individuals.

Specialization leads to face restricted number of problems and reduce the range of learning that could not be satisfied by formal AKS. Individual farmers are aware of their technical skills in performing their main activities. They are more likely to turn to AKS as professional agricultural organizations, with regard to administrative procedures and bureaucratic issues linked, for instance, at the compliance with regulations and norms related to environmental protection, food safety or public health.

## Linsa connections with the formal AKIS system

The network of Reggiana cows-breeders is connected to the formal AKIS that is part of the institutional and organisational framework within which all producers of Parmigiano Reggiano cheese run their activity.As institution responsible for promotion of the Designation of Origin, the Consortium of the PDO Parmigiano Reggiano cheese assumes a primary role in the local AKIS system. Its mission includes the provision of financial support to trade activities on new or emerging export markets. It also promotes and coordinates researches on scientific and technical topics relating to farming practices; production of milk and its processing (assessment of the qualitative characteristics of milk, effects of cattle feeding on milk quality, possibility of introducing new technologies and techniques in the dairies within the limits of the code of practice). Research activities are carried out not under specific requests of individual farmers but on issues deemed relevant for the community of producers for encouraging the adoption of good agricultural and productive practices (e.g. fodder production of good quality) or techniques that increase productivity and cheese quality. The results are disseminated, through seminars or other public initiatives aimed at the whole COP, including the sub-network of Reggiana cow’s breeders. The consortium usually relies

on the assistance of external research institutes or universities in order to exploit synergies with the competences, skills and resources they can provide.

The innovations validated by this kind of activity do not always find an ACTUAL application on farms or in dairies. Innovation spreading process typically occurs through an effect of imitation due to the geographical proximity of producers (an example in the past was the adoption of the unifeed technique in cattle feeding). It might be stimulated by the need to comply with compulsory rules or regulations concerning, for example, environmental or sanitary and food safety issues, which entail obligations of technical and/or bureaucratic nature (e.g. the Nitrates Directive has led to the adoption of good agricultural practices in order to reduce water pollution and to maximize the efficiency of fertilization of organic fertilizers).

## Opportunities for connection to the AKIS

When not driven by the need to cope with rules and regulations, more frequently connections with AKIS take place within the framework of the wide range of measures of rural development policy.

In particular, some specific measures of the regional rural development plan are specifically targeted to transfer knowledge and innovations to farms at the aim of increasing their competitiveness, promoting their modernization and the improvement of farmers entrepreneurial and professional skills (investments for reducing the environmental impact, improving productivity, animal welfare or the characteristics of the products)

In some case, these forms of support create the opportunity for joint activities and partnership with AKIS, since they explicitly require the collaboration between farmers and research institutes for the specific skills and knowledge they can provide for the realization of specific projects or investments (an example is shown in the summary report related to the level of learning ).

The start-up and the establishment of the CVR, and the process of institutionalization of the Reggiana Cows breeders network - that dates back to several years ago - was a forerunner example of this type of approach to innovation, despite it occurred outside the formal schemes of the rural development policy. The first group of farmers at that time acted as active component and not as mere users of services provided by AKS. They expressed a specific demand for resources and knowledge that they wouldn't have been able to find for implementing their project.

Brokers belonging to institutes of research were able to connect resources (public administration) and competences (University) functional to the development of innovation (retro-innovation) and to their concrete application.

The origin of CVR demonstrates how the results of basic and applied scientific research reach more easily and effectively the producers who can be benefited when there is a direct or mediated connection between scientific world and the potential beneficiaries. In the specific case farmers have been directly involved in the experimental stages designed to validate on scientific base their initiative.

## The barriers for connection to the AKIS

In the Communities of practice the system of neighborly relations is the main vehicle for the transmission and preservation of local culture and somehow hinders the formation of a specific request for assistance and new knowledge.

Innovation processes usually take place in the wake of endogenous or exogenous forces that push towards change (e.g. adjustment to new legislation), stimulating the demand for advice, knowledge and support that can be provided by AKIS and not found inside the community. The prerequisite for approaching AKS fails if there is no awareness or perception by farmers of the value of an innovation. The degree of awareness and sharing depends on the benefits perceived, whether they are of economic nature (e.g. productivity increase) or based on a different ethic -cultural vision of “making agriculture”. The change may also directly affect a single aspect of the production process but sometimes it implies additional adjustments on farm management and production techniques.

The introduction of Holstein cattle breeds in the Parmigiano Reggiano area of production and the fast replacement of indigenous local breeds involved other changes in the farm management: different food rations, feed distribution techniques and introduction of new housing and milking systems. In such a situation the role of AKIS fits the private interests/needs of farmers and the opportunities for AKIS to meet the needs of potential users increased considerably.

The same dynamic is detectable looking at the history of the creation of the CVR, when a small group of breeders has sought “outside” resources and expertise to complete their projects. The success of the initiative was due to the possibility to share their "vision" not exclusively focused on productivist targets with part of AKIS, in opposition to the innovation path undertaken by the rest of the local community.

## Significance and relevance of AKIS and how conventional AKIS meet the needs of the LINSA

Subjects belonging to AKS gave a fundamental contribution to the innovation process that resulted in the establishment of the Reggiana cows breeders network. Members of local research institute assumed the role of brokers, filling a gap of information and knowledge concerning the possibilities of obtaining appropriate financial resources tailored to that particular project. The other major contribution was given by scientist belonging to the academia who had the opportunity to verify the results of their researches, proving the interest in biodiversity conservation also from the economic point of view (higher yield of the milk, different quality, better aptitude to long ripening periods, etc.). This type of request went beyond the simple provision of technical assistance that was prevalent at that time (based on the linear transfer of innovation). It entailed a different and unconventional approach by some members of the AKS, which assumed the role of mediator or facilitator between research universities and local institutions.

Now that the development of network has reached its maturity stage, the search for technical assistance may occur under the push of a contingent need which requires the support of external expertise (see above). More generally in the local production system traditions, productive specialization and joint enterprises are powerful forces able to re-produces the entrepreneurial roles through the know-how transmission among the members of the COP. Specific requests of AKIS' assistance usually take place at individual level, for example when the farmer decides to renew equipment and facilities, or to undertake new activities beside the agricultural ones (a relatively recent example is the production of renewable energy , an area of interest that represented a novelty with respect to the framework of knowledge

spread locally). Also the personal characteristics of producers, such as age and level of education, are variables that can foster or hinder the aptitude to change and to innovate. One of the farmers among the promoters of the CVR was a university student aware of the first studies focused on the influence of genetic variants on the characteristics of the milk. His familiarity with the academia and the higher consideration of the potential of the scientific research facilitated the alliance of goals between scientists and the first peer group of producers.

## Analytical summary of the main findings:

- The network of Reggiana cows-breeders is connected to the formal AKIS that is part of the institutional and organisational framework within which all producers of Parmigiano Reggiano cheese run their activity (Consortium PDO, farmers organizations).
- Neighborly relations, specialization, geographical proximity enable the transmission and preservation of local know how. Specific requests for AKIS' assistance usually take place at individual level, when farmers have to deal with a novelty with respect to the system of knowledge spread locally.
- Use of AKS research, advisory services, education and training usually occurs in the wake of endogenous or exogenous forces that push towards a change (eg adjustment to new legislation, opportunities offered by rural development plan) and require knowledge and resource that cannot be found inside the community.
- The initiative carried out by the founders of CVR initially created a break in the established system of relations with AKS and the other producers. The help from members of local AKS– provided voluntarily and outside the formal patterns of the innovation supporting services - opened the space for a collaboration with experts and researchers able to share their vision and to meet their expectations.
- Now that the development of network has reached its maturity stage, the search for technical assistance may occur under the push of a contingent need which requires the support of external expertise.

# EFFECTIVENESS AND COST EFFICIENCY REPORT

## Type of supports

Reggiana Cows breeder’s network relies mainly on public financial supports for its functioning. They are essential for the maintenance of institutional activities performed by A.Na.Bo.Ra.Re that also assumes the role of Administrative Organisation of the Network.

Direct support consists in the public funds provided to all Associations of cattle breeds officially recognized by the Minister of Agriculture (MIPPAF) in order to carry out their institutional tasks. After the recognition of the genealogic herd book of the Reggiana breed, which occurred in 1996, even A.Na.Bo.Ra.Re (the Network Administrative Organisation) obtained the access to the funding each breed association is provided with. Currently A.Na.Bo.Ra.Re staff consists of only two employees, and it carries out the functions that are typical of all breed associations.

Its main function is keeping the Herd Book and performing the genetic improvement of the breed. At this aim, A.Na.Bo.Ra.Re also controls all male breeding animals to be subjected to genetic evaluation. For the genetic evaluations, the Association uses data collected in farms and data collected in the Genetic Centers, which stores and preserves the purebred bull semen used for suckle cow's insemination. The genetic center is an external institute whose services are paid by the association. The association supplies the semen to farmers according with specific insemination plans aimed at reducing consanguinity degree of the cattle herd.

Through specific funding provided by the Ministry of Agriculture, the Association also has the opportunity to participate to events like food fairs and livestock exhibitions (All Food, Cibus, Bra Cheese, Salone del gusto Hall of taste). These events provide the opportunity to make the public aware of the characteristics of the breed and to promote the brand "Parmigiano Reggiano Vacca Rossa" among consumers.

As depositary of the collective mark that identifies the cheese made from milk of Reggiana cows, the association also runs the control on production, checking the traceability of the product before applying the mark on the cheese wheels. For this services wholesalers or farmers pay the association a 3 € fee for each cheese wheel marked with the association brand.

Seen today, the network appears to be strongly connected and dependent on policy instruments and funding support provided by institutional framework into which it's now embedded. This has been the expected result of a long process of institutionalization of the network, completed with the official recognition of A.Na.Bo.Ra.Re. as breed Association.

The contribution of soft support in the form of facilitation and brokering activity, can be detected in the first stages of the creation of the network. It was provided thank to the contribution of universities and local institutes for the dissemination of innovation in agriculture which gathered around the project envisaged by the first small group of farmers knowledge, skills and resources not immediately available within the institutional context in that particular period. They facilitated the links with formal AKS, looking for the opportunities of exploiting "hard support measures" for the development of the initiative.

The common purpose was the preservation of the local cattle herd and a shared view of the value attributed to biodiversity conservation. In particular some actors (Dr Enrico Bussi and the scientist's prof. Losi and prof. Mariani) played the role of "mentors" providing information on the possibility of finding support from local and regional institutions and ultimately obtaining the funds needed to start a project aimed at the recovery of the local breed. As first step, they were able to find public financial support for carrying out experimental trail of separate processing of Reggiana cow's milk in order to assess different characteristic of the cheese. The growing interest by local authorities towards the issue of biodiversity also allowed to set the first attempt of producing and preserving the semen of breeding bulls, that was necessary for not to lose the remaining genetic asset. The validation and dissemination of the research results supported the process of recognition of the breed association.

## Effectiveness of support

The activity of A.Na.Bo.Ra.Re has become actually effective only with the official recognition as breed association. This was the result of the long process of insitutionalization of the current network of Reggiana cow's breeders. Without the official recognition, the herd survived would have been destined to extinction since only the establishment of a genealogic herd book would have provided the instrument for its rescue. Before recognition, the existing association had no tools and means to intervene on the preservation of the breed, since it managed a simple cattle population register.

The official recognition in 1996 made it possible to hire the staff responsible for carrying out these tasks (breeding herd selection, herd book updating, planning of insemination and sale of bull semen to the members). Also promotional activities such as participation in trade fairs and exhibitions livestock are partly supported by subsidies on the basis of public funds allocated by the Ministry in favor of breeders' associations as measures to support the development of quality products. It took about 6 years to complete the process that from the experimental tests designed to demonstrate the opportunity to intervene to save the breed led to the recognition of the association.

## Benefits and beneficiaries of the different types of support

The first research projects and subsequent interventions aimed at the recovery of the breed seemed to the rest of the COP (local community of PDO producers) exclusively at the benefit of the founders of the CVR, who were the promoters of the initiative. With the recognition of the Herd Book and the creation of a collective brand licensed in use to all producers, the benefits have been extended to the whole community of the Reggiana Cows breeders. The increasing consumer's appreciation for Parmigiano Reggiano cheese made from milk of Reggiana cows has led other farmers not to replace their herd with more productive cows. Others have been induced to introduce them in their farms, driven by the recurrent crisis affecting the market of the product not differentiated by the distinctive brand set up by A.Na.Bo.Ra.Re. Being a network potentially open to all breeders, the benefits of support are non-targeted to a selected group, but to all producers who wish to join the association.

Financial supports that sustain the network governance activities ensure the survival and preservation of the local breed. They also permit to defend the economic interests of Reggiana cow's farmers since A.NaBo.Ra.Re. manages the controls aimed at preventing unfair or improper uses of the collective mark. Furthermore benefits are not only of economic nature so that supports are not beneficial only for local producers. Indirect social benefits, not easy to measure, are related to the valorization of the territory and local traditions that derived from the achieved goal of preserving biodiversity. Biodiversity as public resource is explicitly quoted in written documents left by the first academic scientists involved in the research project from which the experience of the CVR took place.
At that time (mid-80s) autochthonous breeds were mentioned in these documents as heritage of the history and culture of the local rural population "indigenous breeds deserve conservation measures because they enrich the local area and are the visible symbol of its history and its evolution, just like the monuments and buildings of historical value are" (Prof Losi and Russo, unpublished document). The defense of local identity was one of the reasons motivating the first group of producers. ("Despite the exceptional properties of cow's milk Reggiana breed was facing extinction. This was avoided thanks to the passion of a few breeders who with the help of a few scientists urged local authorities and the Ministry of Agriculture to intervene first to save the breed and subsequently for its valorization").

In the area of production of Parmigiano Reggiano, the case of Reggiana cows was the forerunner of other similar initiatives, carried out by breeders of other local cattle breed who benefited from that experience (in terms of practical and organizational knowledge: how to established a breed association, how to manage a collective brand).

## The benefits of the different types of support in terms of outcome and outputs

The outcome of the supports might be measured by the rise of the cattle herd during the last decade. From 2002 to 2012 the herd increased by 76%, reaching a total of 3,450 heads. In the same period, the number of milking cows rose from 1,090 to 2,279. The processed milk passed from 1,650 up to 7,050 tonnes corresponding to 530 tonnes of cheese (less than 1% of total Parmigiano Reggiano annual production).

Without the recovery of the Association of Breed, the survived herd would have destined to extinction, even if it's hard to assess whether the support given to the initiative could have produced more relevant results in term of cattle herd growth.

There are still constraining factors for a faster development of the herd. The activity of preservation and genetic improvement started when the survived cattle herd counted for few hundreds heads. The embryo transfer could had speeded the process, but this technique has never been used due to its cost and the technical skills and competence required to perform it.

The economic incentive for farmers to introduce Reggiana red cows in their farms is also due to the higher price of the milk which can offset the lower productivity. Reggiana cows breeders are less affected by the market crisis that occur during the periods of overproduction, since P-R produced with their milk is destined to a niche market. But when the price of Parmigiano Reggiano is particularly high the price difference reduces and the farmer's incentive to introduce Reggiana cows become lower. Furthermore Reggiana cow's farms have to comply with strict norms concerning animal feeding, such as the prohibition of GM feedstuffs and uni-feed technique. The particular conformation of the udder makes Reggiana cows not particularly suitable for mechanical milking. In big dairy farms this peculiarity may cause problems to the organization of the work, lengthening the time of milking.

## Costs of seeking support

Now that the process of institutionalization of the network is completed, routine activities managed by the association are regularly supported by public fund and by the fees paid by farmers for the services provided (admission of the farms in the herd book, registration of individual animals, issue of pedigree certificates and other documents).

In the start-up phase, for the first group of farmers getting access to forms of support to the initiative was hard and troubled. They did not have the knowledge and information necessary to obtain the support to the project they wanted to accomplish..

This process took time (see temporality report) and was undertaken thanks to the common interest shown by some academics who had already studied the effects of genetic variants of milk on cheese quality. The first experimental trials based on separate processing of the milk began in 1991 thanks to a research project funded by the Ministry and coordinated by a local research institute with the participation of the same group of scientists as scientific partners. The dissemination of the research results and appreciation of consumers for the product proved the validity of the initiative and increased awareness among the competent authorities on the opportunity to safeguard the local breed. At the end of the two-year project the group of farmers got the availability of an old disused experimental dairy owned by the provincial administration, allowing farmers to continue the activities of milk processing even after the conclusion of the experimental phase. Only in 1996 the breed association was officially recognized.

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## Analytical summary of the main findings:

- Direct support consists in the public funds provided to Reggiana cattle breed Association (A.Na.Bo.Ra.Re) for the institutional tasks which are essential to the governance of the Reggiana cows farmers network (keeping the Herd Book, performing the genetic selection).
- Soft support in the form of facilitation and brokering activity intervened in the first stages of the creation of the network, before the process of istitutionalitation was completed with the official recognition of A.Na.Bo.Ra.Re. as breed Association.
- Brokering activity facilitated the links with formal AKS and created the opportunities of exploiting “hard support measures” for the development of the initiative undertaken by the first group of farmers.
- Financial supports to the breed Association (A.Na.Bo.Ra.Re) ensures the survival and preservation of the local breed. The benefits of support are non-targeted to a selected group, but to all producers who wish to join the association. Indirect social benefits are related to the valorization of the territory and local traditions that derived from the achieved goal of preserving biodiversity.
- The outcome of the supports might be measured by the rise of the cattle herd during the last decade. The economic incentive for farmers to introduce Reggiana cows in their farms is due to the higher price of the milk which can offset the lower productivity.

# APPENDIX 2

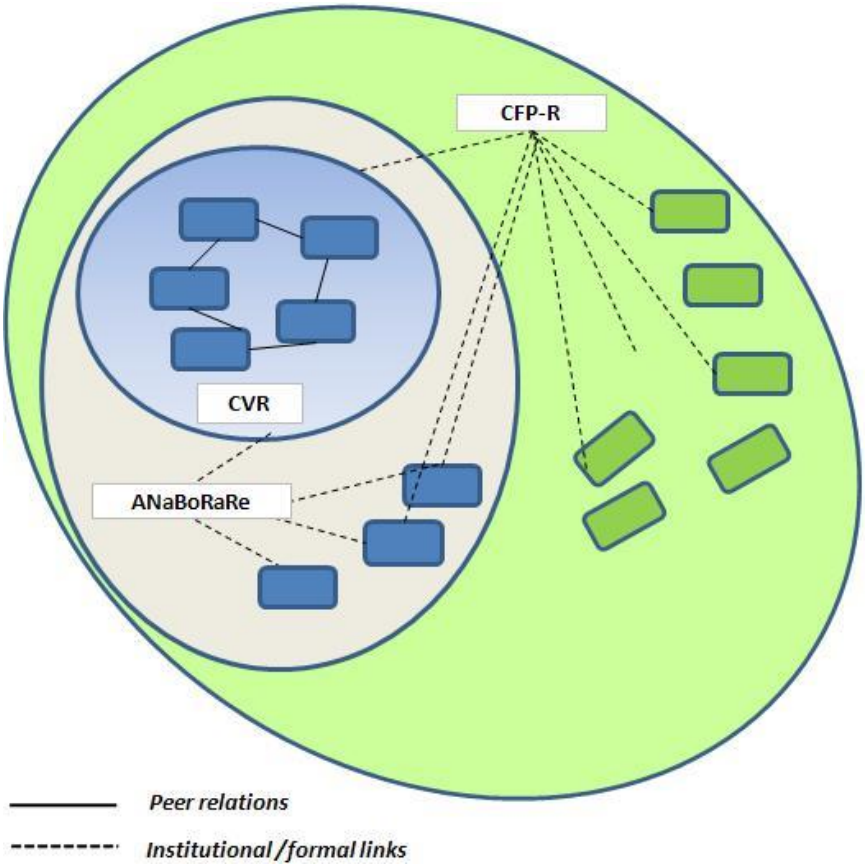
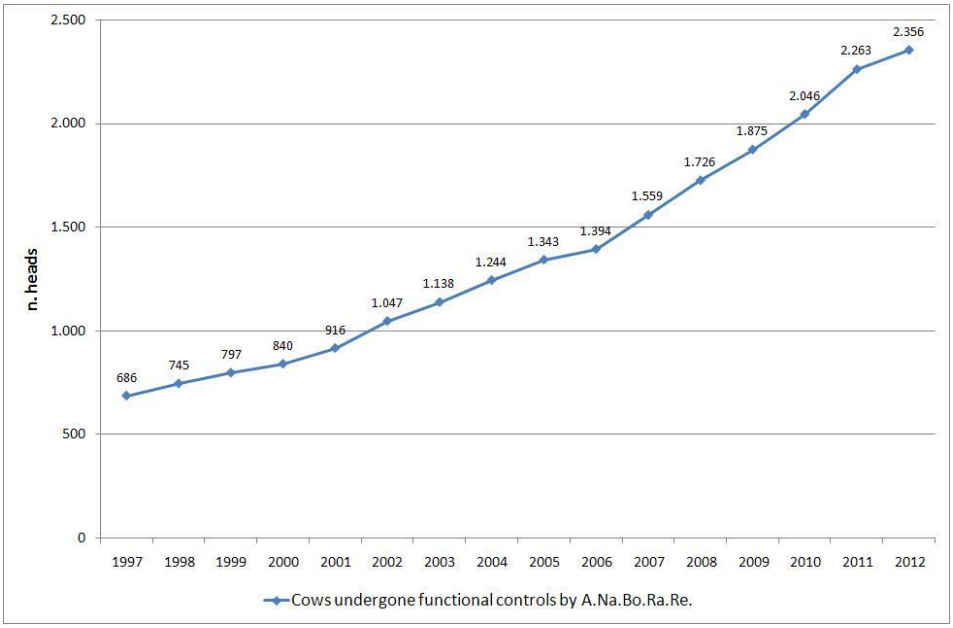



**Fig.1 The current configuration of the network**

**Fig.2 Effectiveness of the support: development of A.Na.Bo.Ra.Re activity**



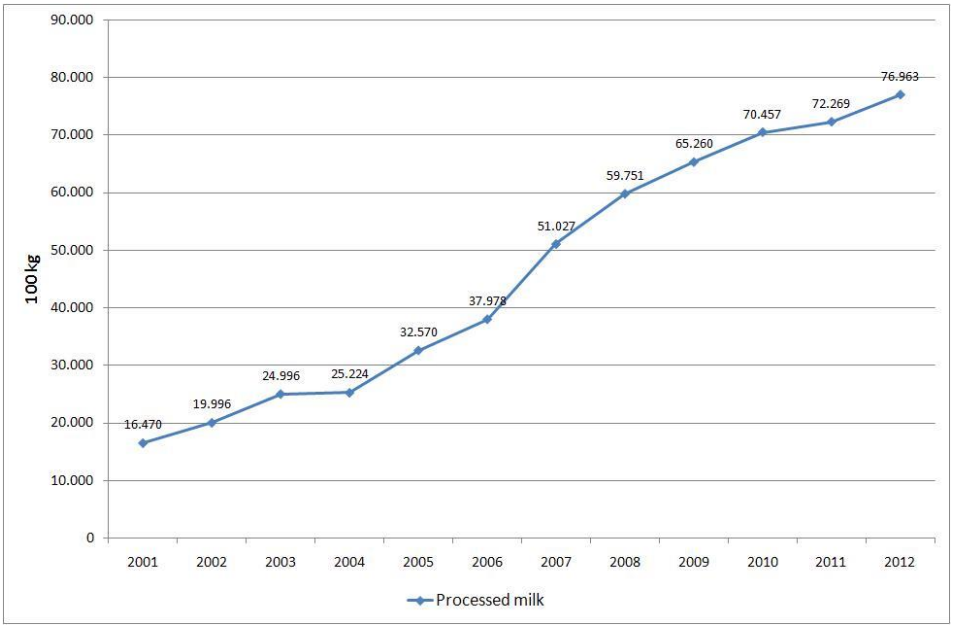




**Fig.3 Effectiveness of the support: growth of "Razza Reggiana" cattle herd**