UNIVERSITÀ DEGLI STUDI DI SASSARI

CORSO DI DOTTORATO DI RICERCA
Scienze Agrarie

Curriculum Scienze e tecnologie zootecniche

Ciclo XXIX

EFFECTS OF ANIMAL WELFARE MEASURES ON MILK SHEEP AND GOAT QUALITY AND DOP DAIRY PRODUCTIONS IN SARDINIA

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Anno Accademico 2015- 2016

Acknowledgments

I want warmly thank Prof. Giuseppe Pulina, Dr. Daniela Toccaceli and all the Professors of the Curriculum Zootechnical Science and Technologies for the very useful discussions and the support to my research. Any errors remain, of course, my responsibility alone.

Summary

Research issue

Scope of the research

Sheep grazing in Sardinia is one of the most relevant economic activity, spread over the whole regional area. To present the essential scenario, I need of some statistical data about the branch and the supply-chain to outline the main features. To present the emerging problems, I need of a short story telling starting from 2005.

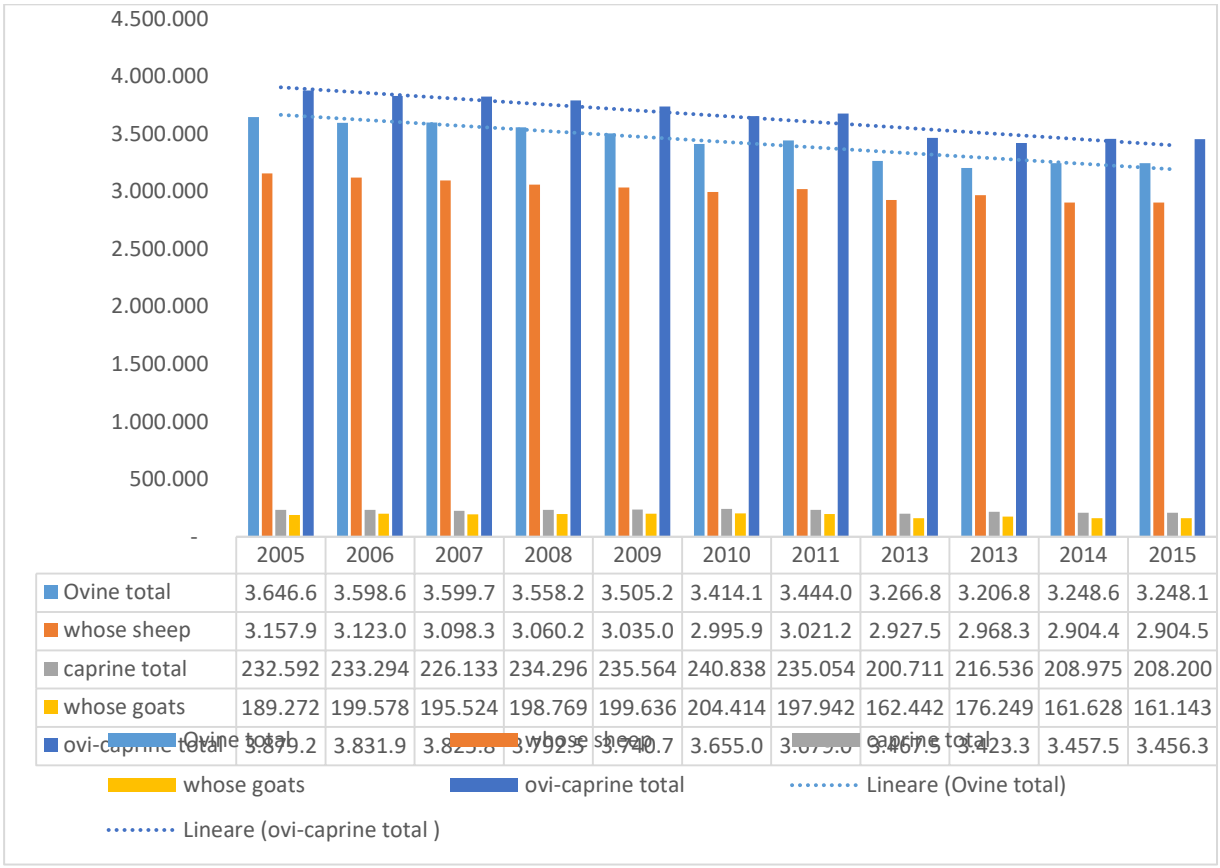
In 2005 in Sardinia there were more than 3,6 million of sheep producing about 300,000 tons of milk and quite 13,000farms (respectively 45% , 68% and 17% of the national amount). Even livestock consistency has been somewhat decreasing in the decade (Graphic 1-1), the one regional rests to date the most important contribution to the national ovi-caprine sector.

The farms have as average 280 sheep of *sarda* breed, usually rested for the night, and practice alternation of pasture. Production is mostly for milk and the productivity is higher than in other Regions. Contrariwise, remuneration of the milk is lower than in other Regions (Graphic 1-2).

Milk is mostly used for the production of POD cheeses, Pecorino Romano, Pecorino Sardo and Fiore Sardo. The first is the most important in the national and international trade as to price and value (Graphic 1-3). Suffice it to consider that in 2006 23,751 tons of that cheese out of 24,470 (97%) has been produced in Sardinia for about 130 million of euro of the wholesale sales. As an example, in 2010 about 15 thousands of tons were for export (corresponding to 1,6 billion of euro), mostly in the USA. Considering the

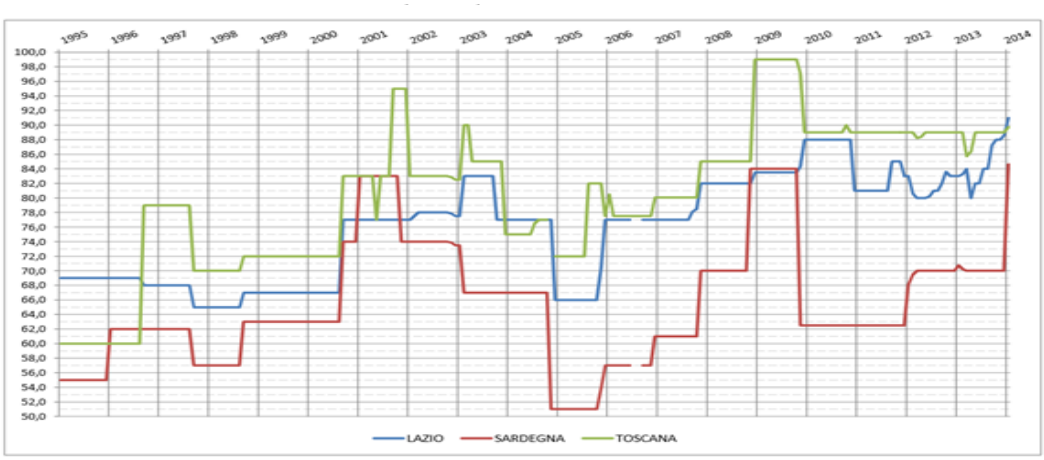
entire supply chain that most develop in the region, it is clear that milk price high volatility is able to trouble very much the stability of the entire Sardinia rural system.

Graphic 1-1 Consistency of ovine, caprine and total in Sardinia Region, at 2015 December 1st. Source: own elaboration on data AGRI-ISTAT



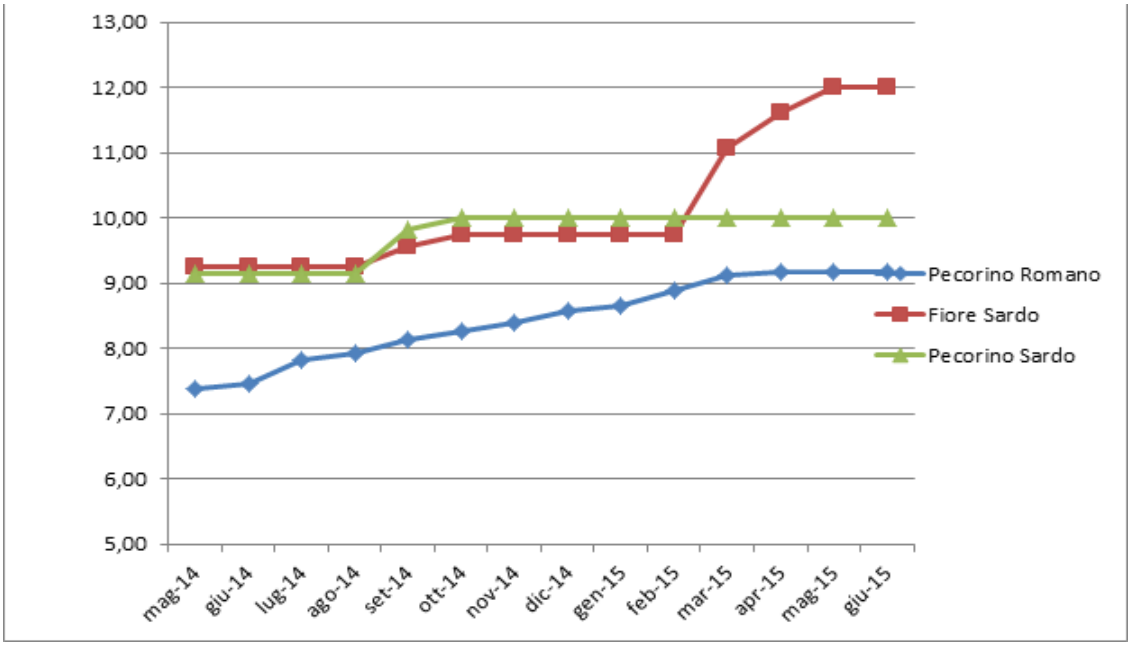
	2005	2006	2007	2008	2009	2010	2011	2013	2013	2014	2015
Ovine total	3.646.6	3.598.6	3.599.7	3.558.2	3.505.2	3.414.1	3.444.0	3.266.8	3.206.8	3.248.6	3.248.1
whose sheep	3.157.9	3.123.0	3.098.3	3.060.2	3.035.0	2.995.9	3.021.2	2.927.5	2.968.3	2.904.4	2.904.5
caprine total	232.592	233.294	226.133	234.296	235.564	240.838	235.054	200.711	216.536	208.975	208.200
whose goats	189.272	199.578	195.524	198.769	199.636	204.414	197.942	162.442	176.249	161.628	161.143
ovi-caprine total	3.879.2	3.831.9	3.825.8	3.792.5	3.740.7	3.655.0	3.679.0	3.467.5	3.423.3	3.457.5	3.456.3

Graphic 1-2 Comparison of ovine milk price in Sardinia, Tuscany and Lazio (€/100 litre TVA included); Source: Laore Sardegna



Laore Sardegna - Dipartimento delle produzioni zootecniche
Servizio produzioni zootecniche - Ufficio dell'Osservatorio della filiera ovi-caprina

Graphic 1-3 Comparison of the prices of the Sardinia POD cheese Pecorino Romano, Pecorino Sardo and Fiore Sardo in 2014-2015



In 2005 the price of milk touched the lowest value at 0,5 euro/litre. The entire dairy sheep system were troubled and social reactions were to explode. In such a peculiar circumstances the regional policy for animal welfare stemmed.

In such a scope I place the doctoral research aiming at shedding a light on the central policy for animal welfare that Sardinia Region has designed and implemented over the last decade and which is still running.

The rationale of the policy intervention was moving from the need to support the sheep farmers in deep crisis. The very problem was – and to date is still – the weak power bargaining of shepherds in the supply chain, because of the system is highly fragmented, not at all organised, and verbal agreement are still broadly used. On this base, the policy for taking care of animal welfare was been designed also for improving milk quality, supporting modernisation of the sector, and trying to link remuneration of milk to its improved quality.

Research questions and their significance

At the end of 2020 about six hundred millions of euro will have been spent from the regional Rural Development Plan (RDP) for enhance animal welfare in Sardinia Region, over the fifteen-year period 2006-2020, mostly for ovi-caprine sector. Much more than a measure it has been a sector policy willing to impact on the entire farming system, and beyond. For financial allocation, it is the most important policy supported by the RDP in the period. Besides, it was a new measure to plan into regional RDP and Sardinia has been one of the earliest to do so in Europe. For all these reasons, it deserve a great attention. Consequently, the research aims to: (1) highlight the characteristic of this complex and significant policy, few changed over the years; (2) deal with the deep and multiple reasons of its starting; (3) verify whether all the ambitious goals have been reached at the end of the second period of implementation in 2015 and (4) highlight if and how the animal welfare measure implementation has been able to push the dairy sheep farming system to modernise and rationalise the management; (5) try to outline some future perspectives stemming from the results achieved. Nonetheless, the current trends of the market will be again take on board to place the new perspectives in a bi-dimension reality of opportunities and weakness to overcome.

Thesis reasoning

As the focus of thesis is more on the animal welfare than on the sheep grazing, most of the thesis has deal with this matter. In the first chapter I introduce the scientific concept

of animal welfare, taking the difficult task of shaping a definition and justifying the choice of a specific anthropocentric approach to develop in the follow.

The perception of animal welfare in consumer, farmer and citizen sensitivity is the argument of the second chapter that try to underline the different approach and range of the actions to put into effect. Especially the ability of citizens to push on policy maker is underlined. That is, in fact the significant crossbar that separates what is to be considered under law provision - so compulsory behaviour to adopt (or not adopt) in favour (or disadvantage) of animals – and what that is to be considered a voluntary choice (e.g. pay a premium price for consumers) or self-commitment (e.g. voluntary adopt higher standards than compulsory for farmers). That distinction turns out to play a crucial role in the economic framework upon which the political construction concerning animal welfare grounds. The third chapter synthetically deals with the most important economic conceptual tools and the consequent policy implications.

On this base, finally the wide room of the European policy for animal welfare is outlined in chapter fourth. Without the ambitious to treat deeply each aspects of the issue – that would go beyond the purpose of this thesis – the macro-arguments are presented and interrelated: the legal basis, the consequent growing *corpus* of regulation and the strategic approach. Special focus is committed to how the Common Agricultural Policy (CAP) has integrated animal welfare into its objectives over the deep changes occurred in its long development. More attention is paid to how animal welfare entered the multifunctional agriculture and how it is received in the regulation of the more recent programming periods, other than in the current.

Built this complex framework were different approaches interrelate (scientific, sociologic, economic and legal) finally the core of the thesis is dealt with. The fifth

chapter develop why, when and how animal welfare has been integrated in the Sardinia RDP. It begins questioning why the problem arose and animal welfare turned out to be the right answer, and close analysing in the maximum detail available the several kind of results and economic effect that the implementation of the measure has sorted until 2015. To outline some perspectives – argument of the sixth chapter – I have tested the opinion of stakeholders, to deepen the supply side, and of consumers, to verify the demand side. Summarize of the results of the research and some conclusive remarks follow in the seventh chapter.

Chapter 1. Introduction to the concept of animal welfare

1.1 The modern origin of the concept

In the current meaning, animal welfare is a modern concept that has followed to the rising of industrial livestock production in the second half of the last century.

A brief history can explain why the issue has been rising in the public sensitivity and how its origin has affected the shaping of various definitions.

Its origin is commonly acknowledged in the seminal book "Animal machines. The new factory farming industry" published in 1964 by Ruth Harrison in United Kingdom. Harrison investigated factory farming by analysing concrete farm systems, both good and bad examples, through a scientific method (van de Weerd and Sandilands, 2009). The public opinion was early time informed about various practices inflicted to animals with the purpose to get the maximum profit, without any respect for animal pain, just as if they were machine instead of living creatures. Rachel Carson - the author of "The silent Spring", the well-known book that raised the lid on the ecological issue linked to the use of chemicals in agriculture – wrote the foreword, emphasising the great influence the book had on public opinion in UK, like in the rest of the world.

Moved by the public opinion, the UK government requested an investigation that resulted in the Brambell report (Brambell, 1965) on intensive livestock husbandry, which traced the basic ethological and biological principles for animal husbandry. That was the milestone of a new science, the "young science" as a formal discipline (Carenzi and Verga, 2010). In 1966 an independent and permanent advisory Committee was established (nowadays it is the Farm Animal Welfare Council FAWC). In 1968, UK adopted a new law on animal welfare. In 1976, the European Community adopted the

European Convention for the Protection of Animals kept for Farming Purposes (Council of Europe, 1976). In 1997, animal welfare safeguard entered the Amsterdam Treaty (European Union, 1997) that establishes the Euopean Community, through the annex protocol on protection and welfare of animals.

From this brief but intense history, one can draw some basic elements that have imprinted the initial concept and affected the subsequent developments in Europe.

The concept rises in a scientific form. From the beginning it was multifaceted (Carenzi and Verga, 2010) requiring biological, ethological and psychological approaches to be defined.

The concept rests also depending on the human point of view, one of the multiple possible, so is changing over the time and "at the interface between natural and social sciences" (Lund, Coleman, Gunnarsson, Appleby, and Karkinen, 2006).

Citizens' opinion played a crucial role as it pushed the consequent action of the policy makers to adopt legal measure. Hence, changes in public opinion have contributed to recast many times the concept broadening and deepening its meaning.

Policy makers have engaged in ulterior actions over last forty years, as far as a specific corpus of policy measures is now committed to the issue in Europe. It aims to state the basic ethical principles to ensure farmed animal welfare, and rule how farmer are to behave. Therefore, the legal approach contributes also to shape the evolving concept.

Besides, it is to notice that the history has begun just when the social demand to agriculture has been beginning to change. From the early one to produce more at the lower cost, to the emerging need to produce in a way able to ensure the reproducibility of natural resources. That was the beginning of a real change of both public policies and ways of production, able to shape the present, as we know it.

1.2 The difficult task of shaping a definition

Over the time, even in its relatively brief history, the concept of animal welfare has joined several basic ideas. According to Carenzi and Verga (2010) the most characterising are:

- **Suffering**. Avoiding pain has been the early focus to which public opinion and legal measures have paid attention. Afterword, the concept widened from the early negative form to the broader of well-being. Especially after BSE crisis, the latter is usually involved in the food safety issue, with the main aim of safeguarding the health of the consumers.
- **Sentient being**. It means that animal are capable of experiencing things through its senses. The Amsterdam Treaty (European Union, 1997) has achieved the acknowledgement of this animal nature in 1997. From that comes some consequences about the definition of the animal welfare because the "subjective experiences" has to be taken into account besides the objective observations concerning biological condition. How to know what animals feel? As Carenzi and Verga refer, "some ethologists, such as Dawkins (1980, 1993) and cognitive psychologists, such as Toates (1986) have carried out studies of perception, decision making, self-awareness or capacity to learn from other, in order to understand the animal minds." (2010, p.23) That open the way to understand "how animals perceive the world and how environmental stimuli may affect their welfare level" resulting by the interaction between genotype and learning capacity. Hence, a basic distinction among species and breed has to be taken into account.
- **Needs**. What needs have to be considered, having regard to both physical and psychological aspects? Stated that they vary according to the species, common

category of needs to fulfil are, first of all, environmental needs, such as housing, handling and breeding, hygiene and transport. There also physiological and behavioural needs which depends on the interaction with human beings and refers to the possibility of expressing biological functions and behaviour. Welfare depends on the possibility to satisfy all needs.

- **Freedoms**. Brambell Report had stated animals need some freedom and in 1979 the FAWC has codified the famous "five freedoms":

1. Freedom from hunger or thirst by ready access to fresh water and a diet to maintain full health and vigour.
2. Freedom from discomfort by providing an appropriate environment including shelter and a comfortable resting area.
3. Freedom from pain, injury or disease by prevention or rapid diagnosis and treatment.
4. Freedom to express (most) normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind.
5. Freedom from fear and distress by ensuring conditions and treatment which avoid mental suffering.

Although rich and composite, the concept is clear; it has been broadly discussed, also scientifically assessed. The scientific literature offers three main approaches; corresponding definitions and methodologies to assess them follow to each one (Macrì, 2004). In a more recent time an all-embracing fourth rose (Carenzi and Verga, 2010) :

a. **Biological functioning.** The definition corresponding to this approach takes into account the biological needs and the capability to express the corresponding biological functioning of organisms (growth or reproduction e.g.). It focuses

most on the relation between stress and welfare, considering both behavioural responses to stimuli, and the absence of distress.

b. **Subjective feelings.** In this approach, beyond the mere stress, the overall psychological conditions have to be observed. First of all, Brambell Report paved the way to this approach with its definition "Welfare is a wide term that embraces both the physical and the mental well-being of the animal. Any attempt to evaluate welfare, therefore, must take into account the scientific evidence available concerning the feelings of animals that can be derived from their structure and functions and also from their behaviour." Even this aspect seems to be very difficult to be measured in a scientific way, linking it to the biological needs that have to be fulfilled and the following response of the organism. A synthesis between the two is reached by scientist in a holistic approach that makes nearer functional and feelings approaches.

c. **Natural living.** This approach is nearer to the sensitivity of biological farmers that aim to ensure the most natural condition of living to animal (Macrì, 2004), anyway this approach is more controversial to apply because farmed animals are domesticated so very far from the wild conspecifics. Therefore, implications for welfare and relative assessment result very difficult to assess.

d. **A more comprehensive approach.** Following Carenzi and Verga (2010), this more recent approach rests on four "definition fields" as listed by Dockès and Kling-Eveillard (2006):

    - The biological and technical approaches, based on the analysis of needs and freedoms.

- The regulation approach that starts from the recognition of animal as sentient beings. Regulations to translate some of the social expectations and scientific definitions into law.
- The philosophical that looks at the role of animals in the human society;
- The communication that put into focus the interaction between farmer and animal, also in the interest of farmer welfare. In this regard, they examine the relationships between farmers and animals within three dimensions: “the animal as a machine”, seen through its productive functions; the “communicating animal”, in relation with men; and the “affective animal”, able to develop a real attached relationship with man.

The growing number of research carried on – and still running - around the world are leading to broad the scope of this young science (Millman, Duncan, Stauffacher, and Stookey, 2004) and enrich the conceptual tools for better understanding what animal welfare is and what human society can do for ensuring it will improve increasingly, while food security is safeguarded.

1.3 From a multifaceted concept to a twofold approach

Despite the complexity of the concept and definition, to set up the thesis reasoning I need a synthetic approach, which require shifting the point of view.

As the more recent approaches state, the interaction man-animal rests at the core of the issue. Also in the regulatory approach, farmers do implement the policy measures. Moreover, policy measures exist because citizens and consumers push on policy makers because they are caring for human health, which is deemed depending on animal welfare too. In fact, after the well-known food crisis in the mid Nineties, the social demand for bettering animal welfare has going up. That has added new and different

motivations to the early ethical ones. One should consider also that citizens and farmers have not always the same opinion about animal welfare (Vanhonacker, Verbeke, Van Poucke, and Tuyttens, 2008).

Therefore, the question is what point of view is actual relevant for the research demands the thesis aims to answer. Those demands start from the point of view of the farmers and policy makers, therefore one could take that approach. Anyway, farmers are not only producers but also sellers. Hence, the market seems to be the more useful point of view, so that one be able to focus on the double phenomena: animals, men and production on one side, producers, consumers and markets on the other side. The literature offers a suggestion that meets this point of view and the need of assuming a synthetic approach, which be unitary at the same time.

Harper and Henson (2001) in their research on *Consumer Concerns about Animal Welfare and the Impact on Food Choice* assess that when consumers express concern about animal welfare, "it is evident that this concern is multidimensional". They have made clear that "consumers are equally motivated by human health (anthropocentric) concerns as they are about animal welfare (zoocentric) concerns". While the overall results of their research will be referred to in paragraph 2.1, what herein matters is the proposed twofold approach - the anthropocentric and the zoocentric. Moreover, they stress that consumers use animal welfare as an indicator of other product attributes such as food safety, quality and healthiness. "Consequently, consumers equate good animal welfare standards with good food standards."

Translating it in the market point of view, one can observe that consumers are caring for human health and – e.g. in the case of BSE crisis - react by changing quickly the market demand. Contrariwise, when consumers are caring only for animal health, protection and welfare, they are moved by ethical reasons, so they act by demanding suitable

regulation, quite without changing their behaviour on the market (Macrì, 2004). Third chapter is dedicated to deep this issue. Herein, this distinction is useful for setting up the thesis reasoning, because allows considering distinctly the different consequences that follow. The one that pushes on the production of appropriate regulation by the EU legislator. The other one that produce immediately effects on the consumers' demand. Both effects are relevant for farmers, especially for the Sardinia shepherds, but in different way.

On the production side, farmers – on voluntary basis – can self-commit to implement policy measures for bettering animal rearing standards. That doing, they are producing a public convenience that answers to the social demand for safeguarding animal welfare and health. Consequently, they will receive a premium per livestock unit, as established by current European rules.

On the market side, farmers knows that whether a crisis will occur, quickly consumers will stop the demand, therefore they will have to support immediate financial loss and lasting damage of their public image.

Both effects are relevant for the thesis herein proposed, but they ask to be analysed trough different appropriate conceptual tools which I tackle in the following chapters.

The zoocentric point of view is worthy to understand how define sheep welfare and how that definition enters European rules mainly in their application through the RDP. Therefore, for the purpose and structure of the thesis, I deal with the scientific concept from this appropriate standpoint in the chapter fifth, while arguing the specific concept – as well as the method for assessing it - that has been placed at the base of the construction of the Sardinia measure for animal welfare.

Chapter 2. Animal welfare for European citizens, consumers and farmers

2.1 Citizens' and consumers' attitude: a fundamental duality

2.1.1. Consumer Concern about Animal Welfare and the Impact on Food Choice

Cleared the scientific concept, it is equally important understand what people feel and think about animal welfare and what concretely would be ready to do to ensure it.

Citizens, consumers and farmers are the relevant subject that have deeply contributed to shape the way the concept become in practice. They have differently pushed on European Commission and National Governments in order to adopt a specific legislation to protect animal welfare as well as health of consumers.

With the Treaty of Amsterdam, come into force on May 1999, animals have been recognised sentient beings and their protection and welfare have become of European interest. Consequently, the European Commission has engaged in investigating the attitude of consumers and citizens as well as in promoting scientific research on the issue. On one side, that was necessary for clarifying many aspects that the young science have not yet cleared and supporting tougher regulation. On the other side, the potential influence of consumer concern about animal welfare on animal-based food product industry within the EU was the main rationale.

To date, Eurobarometer has developed three surveys in 2005, 2007 and 2015. Anyway, the lecture of those results is more interesting after that which was coordinated by Harper and Henson (2001) about Consumer Concern about Animal Welfare and the Impact on Food Choice, that was financed by the European Commission's FAIR programme for the period 1998-2001. The nature and level of consumer concern was

investigated in United Kingdom, Ireland, Italy, France and Germany. The research aimed also to identify potential strategies through which policymakers, producers of animal-based food products and retailers could address consumer concerns about the welfare of animals produced for human consumption.

Main findings are on issues that are similar to those coming from the following and wider survey handled by Eurobarometer.

- **Definition of animal welfare.** Consumers define animal standards in terms of "natural lives and human death", evidently preferring the criterion of natural condition of life. This seems coherent with the opinion that natural production methods entail safer food quality. Majority of consumers declare to be high concerned about animal welfare, nut claim to need more information. About that need, researchers noticed it was double-edged, in that "consumers engage in voluntary ignorance, in order to abrogate responsibility for animal welfare"
- **Willingness to pay a premium price.** The concern about animal welfare is not a priority in food choice. The willingness to pay a premium price is limited to the case of eggs, which re inexpensive and have a low premium.
- **Barriers to purchasing 'animal-friendly' products**: the report has noticed a list of barrier that make it more difficult to purchase animal friendly products. Consequently, policies should be devised to address: are lack of information about production methods, lack of availability of products, lack of belief in the ability of individual consumers to make a difference to animal welfare standards, disassociating the product from the animal of origin, and the increased cost of 'animal-friendly' products.
- **Imported animal-based food.** The report found that consumers were unaware of World Trade Organization (WTO) rules and the impact they have on animal

welfare standards, therefore, consumers believe that EU standards and labels should apply to all imports.

- **Strategy to address consumer concern: minimum standard, incentives to farmers, compulsory labelling and information campaigns.** From a number of focus groups discussion, researcher synthesised that consumers would like to see their concerns addressed through a combined strategy. This includes establishing acceptable minimum standards and changing agricultural policy to provide farmers with incentives to convert to higher welfare systems. This improvement on the supply side is to be complemented by developments in the demand side including compulsory labelling, which provides consumers with information on animal welfare standards in various systems of production, and a public information campaign to support changes. In devising policies to address consumer concern about animal welfare and the impact on food choice, the EU will need to consider a range of measures. These may include EU-based information campaigns, as well as agricultural reform, legal definitions for labelling and advocacy of farm animal welfare in negotiations on agriculture at the Millenium Round of the WTO.

In some general sociological notes, researchers observe that women are more sensitive especially if have women. Besides, animal welfare sensitivity is more likely in young people having higher level of instruction.

About the reasons of consumers, the research – developed since 1998 until 2001- reveals that BSE crisis has had a widespread influence on consumers' food consumption patterns, as well as on reason to concern animal welfare in any Countries. Comparing that with the following surveys will be very interesting.

2.1.2. Eurobarometer survey 2005

The Directorate General Health and consumers Protection requested Eurobarometer to survey attitudes of consumers (Eurobarometer, 2005), citizens (Eurobarometer, 2007) and Europeans (Eurobarometer, 2016) progressively enlarging the scope and the focus over the time.

The surveys have supported initiatives and programmes developed by the European Union Chapter 4) to address the main topics founded, so the historical lecture herein proposed allows appreciating the results achieved and the new emergent tendencies.

The 2005 Eurobarometer survey has been done by interviewing a representative sample of 24.708 citizens in 25 Member States. It has focused on:

- The welfare of farmed animals;
- Purchasing behaviour and the welfare of animal;
- Animal welfare at European level.

The welfare of farmed animals. Researchers dealt with the first point in a special manner, very different from the following. They segmented welfare of farmed animals in two aspects. The first was the direct and personal knowledge interviewees had of the farms where animals were reared. The second was the opinion on the current protection of farmed animals by species, consequently on those to protect as a priority. Referring to the EU25 average herein and below, resulted that two third of citizens (68%) of the European Union have visited a farm where animals are reared at least once time. This was growing with the educational level, as well as with the awareness and concern for animal welfare. Interestingly, they remarked that the frequency of visits to farms was

positively linked to the acceptance of higher price for food from animal welfare friendly production systems.

The citizens' perception of the current level of protection was focused on laying hens, pigs and dairy cows. The main concern was for laying hens: absolute majority (58%) had a negative view of the welfare of laying hens. Vegetarians and those that had visited more than three times the farms were the more negative. Dairy cows welfare was instead perceived positively in the majority of the Member States (66%). That was more likely in those who had visited frequently the farms. No clear opinion, instead, came about pigs welfare (45% good, 44% bad), again, who had visited farms revealed a more optimistic opinion. Consequently, interviewees (44%) stated that laying hens and broilers were to be improved as a priority. One on five stated the need to improve welfare for all the species of farmed animal proposed. Sheep resulted in the last place with only 6%. This interesting level of detail will be left in the following surveys.

Purchasing behaviour and the welfare of animal has been surveyed through the following four issues.

a) Whether interviewees were taking into account animal welfare when purchasing. The slight majority (52%) stated that they never or very rarely were thinking about the welfare and protection of animal when they purchased meat. In the other group (48%) who take care the issue, there are the major part of those that had visited the farms.

b) Whether they were able to identify animal in the farmed animal products on the shelves. Half of European citizens claimed to have difficulties in identifying animal welfare friendly production and a third deemed that identification never possible. This was especially recurrent in the new Member States, whereas it resulted easier in Germanic and Scandinavian countries. About eggs, 38% were buying eggs from

free-range systems, while only 18% admitted not to pay attention to the rearing system of laying hens. That indirectly support the labelling system already in use and the higher concern about laying hens.

c) Whether they believed to be able to affect animal welfare by their purchasing. The great majority (75%) believed their purchasing power to affect the welfare of farmed animals. This opinion was homogeneous in each country as in the other cross variables.

d) Whether they were ready to pay a premium price for livestyock products originating from systems better respecting the animal welfare. The question was formulated only about eggs, with regard to a scale expressed as a percentage of addition in price: five, ten, twenty-five and more than twenty-five percent. The majority of citizens (57%) were accepting a price increase, but limited to the lower class of 5% (25%) or 10% (21%). Considering that the question was about an cheap product, it seems clear that they consider the issue under the ethical light rather than linked to direct benefit for the consumer, such as health and safety. This interesting change respect the previous survey will be confirmed in the following surveys too.

Animal welfare at European level. The existing legislation on the issue does not resulted so well known by the interviewees, who believed it existed in the fields of transport and slaughter, instead that on conditions under which animal are kept on farms are less known. Absolute majority of consumers (55%) stated that the issue did not receive enough importance in their countries, whereas a slight minority (7%) deemed it too much. It was diffused (45%) the idea that Europe ensured better protection to animals than in other part of the world, the converse one, instead, was stated only by 8%.

Overall, the survey had pointed out the existing gaps within the Union, between both Northern and Southern countries, and Eastern and Western countries. Along with this coordinates the citizen awareness and attitude were changing. It is worthy to notice that the majority of consumers did not take into account the issue when buying food and that it was to refer to the level of knowledge, especially the direct and personal form of knowledge surveyed. Otherwise, the system of labelling did not result enough to allow aware purchasing.

In my opinion, this result should be related to that on eggs buying, where a simple labelling system resulted in more attention paid to the rearing system. So labelling and information campaigns were confirmed to be very important. The willingness to pay increasing price was not so high, so citizens seemed to ask the public Institutions (national and European as well) to care for animal welfare and protection by means of actions that work out of the market.

2.1.3. Eurobarometer survey 2007

After only two years, the same Directorate General asked a new survey that was supported by the findings of the first and comparable with that one. In 2006 European Commission promoted the Community Action Plan 2006-2010, starting from the ascertainment that consumers were becoming increasingly concerned "about the implication of farming for the health and welfare of animal involved" (Commission of the European Communities, 2006a). The themes to investigate were wider than the previous and survey involved a greater sample of European citizens (29.152) in twenty-five Member States. The themes were:

- the importance of animal welfare in the public mind;
- knowledge of animal welfare;

- perceptions of animal welfare standards;
- the impact of higher animal welfare standards on producers;
- consumer shopping habits and labelling.

The importance of animal welfare in the public mind. A general feeling about the importance of the issue was found, "even amongst those possessing little knowledge or who see no need for improvement". In fact, placing the importance of the issue in a scale for 1 to 10 the average was 7.8.

Knowledge of animal welfare. Two out of three feel to know, at least a little (57%), national conditions in which animals were reared (12% a lot). The gap between northern and southern countries again appeared, as Nordic countries exhibited highest level of claimed knowledge. Again, high knowledge levels resulted related to age (negatively), education (positively) and urbanisation (negatively). The majority declared also the willingness to be more informed. Anyway, the majority of citizens (58%) wish to be better informed, more likely if in Mediterranean countries (77% in Italy). Contrariwise, Nordic countries exhibited high level of knowledge and completeness of information. The preferred source of information is the television (51%), amongst young internet prevailed.

Perceptions of animal welfare standards. Most (60%) said that animal welfare has been improved in their country during the last decade. As in the previous survey, positive opinions linked to knowledge. Anyway, the great majority (77%) deemed further improvements were necessary. Farmers (40%) and veterinarians (26%) are perceived as the main responsible to ensure animals welfare, while only for 15% of citizens said that the European Commission represents a subject unable to ensure the animal welfare.

The impact of higher animal welfare standards on producers. the overwhelming majority believed that farmers "should be financially compensated for any higher production costs linked to farming animals under more welfare-friendly conditions." The same great percentage (66%) of citizens said that, also for products of animal origin imported, the standards for animal welfare have to required. One might argues that citizens aimed to ensure the same safety of food to all consumers, instead of concerning the competitive conditions for farmers.

Consumer shopping habits and labelling. Confirming the result of the 2005 survey, 75% of citizens believed that their purchasing habits could influence animal welfare. Majority of them should buy products obtained from animal raised in welfare because they are healthier (51%) or of better quality (48%) or coming from healthier animals (43%). Consistently, the absolute majority (62%) claim they would be prepared to change shopping habits in support of animal welfare-friendly products. Italians resulted above average-willingness to change. Anyway, identify the source of farmed animal-based food resulted again difficult, and the current system of label were not deemed able to allow that, with the exception of the eggs. The survey supported that a proper labelling system is the way that citizens prefer as source of information, as in the form of textual written (39%), as in that of logos on the product wrapping (35%).

In this survey, food safety motivation for citizen turns out to be again more important than in the previous, but just alike in the first FAIR research. Anyway, it is remarkable that consumers have a definite perception of the link going from animal welfare to food safety and food quality. In other words "from farm to fork", that represents a stand upon which build the improvement of animal welfare (Martelli, 2009).

2.1.4. Eurobarometer survey 2015

In the inter-poll period the European Commission engaged a new action, the 2012-2015 Strategy for protection and welfare of animals (European Commission, 2012b), in the following just Strategy. It is following the principle "everyone is responsible". As a part of that Strategy, newly requested by the Directorate General for health and food safety, the new consultation of public opinion (Eurobarometer, 2016) involved 287.672 citizens in the 28 Member States in the last weeks of 2015 about their attitude on three focus areas:

- Knowledge and concern for animal welfare, now adding "companion animals" to the farmed animals, which were representing the sole interest in the previous. This new is worthy to take into account when drawing some final remarks on the findings.
- The key-point of the Strategy in order to assess citizens' awareness about their importance
- Availability and recognition of products sourced from animal welfare-friendly production systems, and willingness to pay more.

Understanding and perceived importance of animal welfare. Quite all (94%) believe it is important to protect the welfare of farmed animals. Anyway, they believe also that it might be improved (82%), alike those of companion animals (78%). About 46% of citizens understandstha that to respect "all" animals is a duty, four out of ten refer to the quality of life for "farmed" animals, quite one out of five think it is mandatory to go beyond animal protection. Moreover, 17% of citizens said that the animal welfare contributes to better quality of their products. Results of this survey suggest that the attention of citizens for the quality of food is going down..

Assessing key Strategies. About information and education finalised to influence attitudes of young people, there are a largely positive response (87%), anyway, the large

majority (64%) needs more information, growing by 11 percentage points respect to the previous poll. About international animal welfare standards, quite all (93%) agree that "is important to establish animal welfare standards that apply to product sourced from within and outside of Europe". Actually, the European union is running in this way, even if for a large portion of citizens (89%) the European institutions have to do more in order to promote a greater awareness about animal welfare internationally. For this the majority of citizens (54%) choice the certification by Europe, instead of certification by public authorities in exporting countries (24%) or by private companies in exporting countries (12%). About regulation, majority of citizens (54%) agree that to care animal used for commercial purposes (so not only farmed animals) have to be imposed by law. That law have to be determined jointly at European and national level in the opinion of quite one out of two citizens (49%). The final question referred to the key elements of the Strategy is full of significance for the discussion herein developed. It was so formulated " Some people believe that the welfare of animals is primarily a matter for consumers when buying a product and should thus be handled by business. Others believe it is a matter for all citizens, which should be regulated be the public authorities. Which of these is closest to your view?" the relative majority (43%) chose the joint solution, that was the prevalent in eighteen member states, business and public authorities together. The 40% of citizens think that is matter for all society and only 12% said that is of consumers' interest.

Animal welfare-friendly products. The same share (35%) of citizens said to be prepared to pay up to 5% more, and conversely to be not ready to pay more. This seems to be consistent with the change of opinion above analysed, on the other hand it could depends also on the different budget capacity that citizens have in different countries, so confirming the gap between western, eastern and southern northern Member States.

Labels are newly into question, as products may carry label about reared systems from which they come. Majority (52%) declares that look for this labels when buying farmed animal-based food. For label containing information about reared systems from which the product come, the 52% of citizens declare to look for this labels when buying food of animal origin. Moreover, the percentage (47%) of citizens which deem as not sufficient the choice of products labelled as "from animal welfare" seems higher (+9%) than in 2006 survey..

Answers to both last questions might show the existence of higher attention and availability to actual buy those products, and that should be unsatisfied demand for them. Nevertheless, in the average, there is not so diffused intention to pay more, so the support to improve the animal welfare rest to in charge of European Union and national governments. It seems to be consistent with the shift of public opinion towards ethical motivations, while the concern for food safety appears less tense. These remarks deserve some deeper reflection that put into question what happened in the last years, such as the change of the PAC, the disappearance of food-safety shock resulting from the BSE, the effect of the information campaigns that probably succeeded in creating greater awareness in public opinion.

Finally, these wide and very representative surveys allow us to understand the duality between consumers and citizens, although those terms are usually used as synonymous such as in the surveys mentioned above. Conversely, it is to notice that buying behaviour does not represent as whole the citizens' attitude for animal welfare. Beyond consumers' (limited) willingness to switch their consumption pattern, citizens feel they are responsible to do more in order to improve animal welfare in farm conditions by pushing policy makers to enact. Moreover, seems relevant that consumers call for a

clear European labelling system useful to identify the level of welfare applied in animal production "and based on a scientific approach" (Martelli, 2009).

2.2 Farmers and citizens: convergent and divergent positions

Respect to the Eurobarometer surveys, something more rests to be investigate about how and why farmers and citizens think and behave. Some surveys have tackled this key issue, by means of qualitative research developed through smaller sample in some member States. The ones herein quoted are not coming from institutional commitment.

Based on a research on Netherlands consumers and farmers, Te Velde et al. (2002) try to obtain some insight about their ambivalent perceptions. They were broking down the concept of perception into a frame of references, which take into account interviewees' convictions (the way the things are), values (the way the things should be), norms (translation of values into rules of conduct), knowledge (constructed from experiences, facts, stories, and impressions) and interests (economic, social and oral). They considered perception as "the result of an (unconscious) process of tuning these aspects". As a result, they stated that farmers have a positive idea about the way in which animal were treated. Welfare in their thinking was closest to health of animal, so corresponding to the fulfilling of biological needs. This think seems to be rooted in "collective tradition … derived from comparable rearing, schooling and daily experience on the farm". Consequently, the values (individual but also widely shared) coincide with to do what is necessary for animal to stay healthy, fed, in high hygiene conditions and growing. Therefore, the norms too are coherent with a "philosophy of production" looking at an optima feed conversion. Their convictions, the same shared with a number of consumers (and may be of farmers), are that animals are expected to serve humans, the meat is for human diet, keeping and killing animal to get meat is

legitimate and farmers are to feed people. Up this point, a consistent system of values, norms and convictions turn around meat production. Contrariwise, interests are not only for financial return, but also for a range of social and personal returns: surviving, supply quality products, having a satisfying job and the "license to produce". The last refers to the legitimacy on society for the way farmers work. It is the most interesting concept because highlight the deep and hidden link between farmers and society on which ethical and market farmers' reasons ground. Societal acceptance is greatly threatened when food crisis and scandal occur, so any farmers have experienced the consequences.

However, it seems not to be enough to push for changing the ways of production. In fact, farmers feel that ensuring animals be able to behave naturally should mean to return to the ancient, so worse, ways of farming, even to leave their activity. In their feeling, it should mean also worsening the conditions under which animals live, e.g. because of increasing diseases, dying from cold. In addition, regulation too should remain as complicated as in the current activity. Researchers remark that opinions in farmer cluster are homogeneous. About farmers, similar results are drawn on in a Belgian research on Flemish livestock production (Vanhonacker et al., 2008) which refers to the same frame of references.

The multidimensional relationship between animal (cow) and farmers results from further investigations in France (Dockès and Kling-Eveillard, 2006). The relationship results to be permanent, professional and complex. Time dedicated by farmers is professional, familiar and personal at the same time. Attitudinal profiles resulted in alternative forms: animal as an important part of farmers' life; their occupation is including communication with animal; animals are felt as a constraint of the occupation; the relationship to the animal is not central in the job, but technologies are essential for handling animals monitored and without risk.

Finally, the relationship turned out to assume a threefold meaning: in the “animal as a machine”, the productive profile prevails; in the “communicating animal”, the relation with men is prevalent; and in the “affective animal”, an relationship is built between man and animal. This synthetic representation reflects multiple variety of farmers as well as typologies of farm. However, it is self-evident that, switching the point of view from animal to farmers, a number of familiar farms are prevailing, so the relationship can take also a more affective nuance, while it is less expected in industrial organised farms.

Likewise, citizens (Vanhonacker et al., 2008) and consumers (Te Velde et al., 2002) has been investigated, even if it is to underline that consumers are questioned only about the attitude toward the animal welfare, not at all about buying habits, so in the follow I refer to citizens. Based upon the same frame of reference for the analysis, both gain similar insights.

Citizens have a worse perception of livestock welfare conditions than farmers do. While farmers ground their perception on direct experience and knowledge, citizens show a lack of concrete knowledge about the circumstances livestock are reared. However, they share with farmers the value of animal health (enough of food, water, hygienic, heating and protection conditions), but stress very much the value of freedom to move and freedom to fulfil natural desire. The lack of concrete knowledge make that they unclearly know how translate values in behaviour.

Another interesting convergence between farmers and citizens is about convictions that animals are to serve human diet, meat is necessary, so keep animals and killing them is legitimate and farmers are to feed people. About interest, citizens-consumers are focusing on healthy, tasteful and cheap meat, easy to buy (supermarket). Besides, they are interested in a “clean conscience”, which is possible thanks to the lack of knowledge

(the ignorance chosen, in other word) that make it possible going beyond the sense of guilty. Researchers compare it with the "licence to produce" of the farmers, arguing the presence of "a tacit pact of *collective non-responsibility* (italic in original)" which is supported by a *"functional ignorance"* (Te Velde et al., 2002 p. 217). That highlight, finally, that communication programmes could be actual effective in rooting deeply animal welfare concern in the "collective" conscience, simply by reducing ignorance. Even if not representative of the general European public opinion, surveys such those examined are consistent with Eurobarometer findings and able to confirm that a wide range of behaviours are possible to be expected from farmers, citizens and consumers.

2.3 Farmers' choices about production

2.3.1. Role and influence of the supply-chain actors

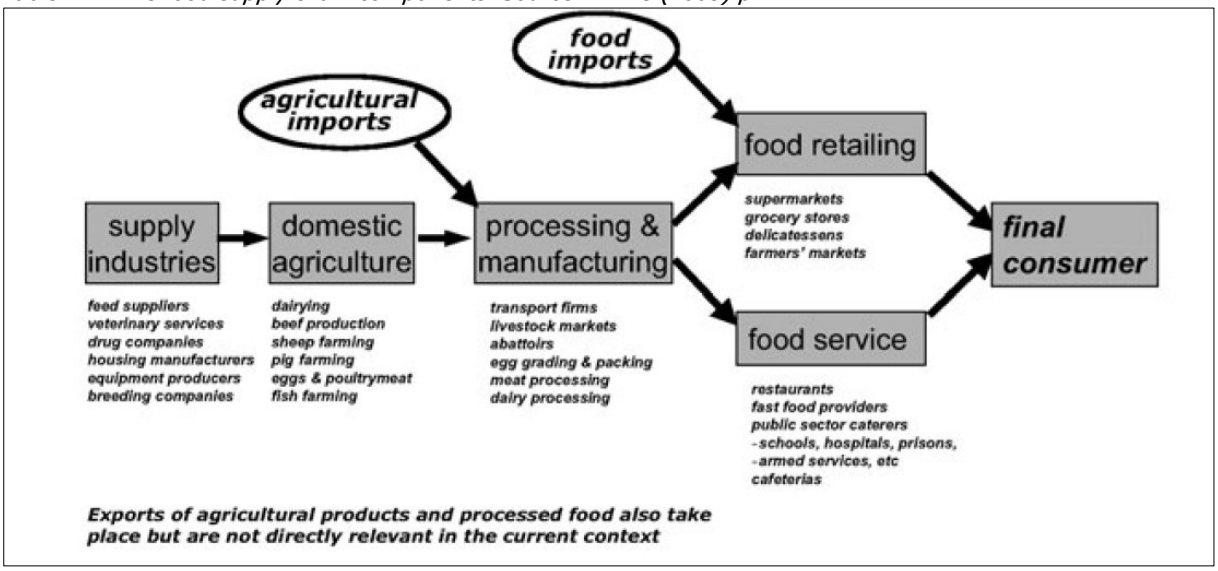
Clarified that ethical and market's reasons are alternatively prevailing and intertwining in order to influence farmers' choice about how, what and for which market to produce, a problem rest to answer. How can they ensure consumers that livestock products are coming from animal welfare-friendly systems? As there are not characteristic appreciable by visual inspection or tasting, third parts are to assess what farmers do for animal welfare.

Assurance schemes and organic farming certification offer alternative possibility. However, it is worthy to consider in this regard not only the farming-phase of the process of production, but also include the other phases of the supply chain (as represented in Fig. 3.1) as well as the subjects involved, namely industry and retailers. Information is to pass from each other up to the final consumer (Farm Animal Welfare Council, 2005). In FAWC position, assurance schemes should "embrace the full length

of the food supply chain if it is to be meaningful" (Farm Animal Welfare Council, 2005 p.1)

Thereby, each subject, pursuing self-interests, may drive the initiative farmers to adopt assurance schemes. The composite mosaic that result makes no clear the relationship between organic and quality assurance schemes and the labels that claim animal welfare standards embedded in the product, because the label is not always the means chosen to communicate to final consumer (Roe, 2006). Otherwise, both organic certification and assurance schemes are not strictly related to animal welfare and may sometimes explicit the nexus, sometimes leave it implicit, sometimes no nexus there is (Farm Animal Welfare Council, 2005; Roe, 2006; Veissier, Butterworth, Bock, and Roe, 2008). Veissier et al. (2008) have collected an interesting review of practical schemes respondent to the shifting range of motivations, which do show the important role that public and private institutions as well as industry play.

Table2-1 - The food supply chain components. Source: FAWC (2005) p. 7



2.3.2. Quality assurance schemes

Quality assurance schemes provide certified information to final consumer about various quality characteristics: e.g. constituents, safety, environmental background location of origin or others. Especially information about what takes place at farm-level production, the farthest from final consumer and the most of citizens. On the other side of the chain, farmers may gain buyer confidence for how they produce, even gain new trustworthy market for farm products. At the same time, they may be animated also by their moral obligation, as argued above and resulting by the research herein mentioned (Farm Animal Welfare Council, 2005).

However, others intermedium in the chain can take advantage from the system that provides also traceability. When farmers adopt assurance scheme, both processors and retailers are enabled to ensure that quality standards they wish to be associated with their products are meeting their legal responsibilities and are demonstrable.

Putting the focus on those European schemes where there is explicit use of marketing of better animal welfare, it is noticeable that they may come from the initiative of governments, non-governmental organisations and industry, even from manufacturers, producers, or a consortium, each ones having different purposes.

The motivation of governments at regional or state level to initiate the use of a logo or label to market quality products is predominantly aimed at protecting a geographically specific market, for example the Agriqualità label in Italy (Roe, 2006; Veissier et al., 2008). It is a collective trade mark process, promoted and ruled by Tuscany region through its own legislation, and following to the Reg. (CE) 2078/1992 having introduced incentives for integrated agriculture. Non-governmental organisations take care for ethical concern, for example the Soil Association in the UK (Compassion in World Farming, 2012) or the Freedom Food scheme in the UK, which was founded in

1994 by the Royal Society for the Prevention of Cruelty to Animals (RSPCA) (Roe, 2006; Veissier et al., 2008).

The history of assurance schemes, indicates that they early started by industry initiative. Industry interest mostly looks at production schemes that deliver higher quality products and are somewhat diffused, for example the Label Rouge in France. In some cases, animal welfare can be a component of the scheme aimed at guaranteeing a certain quality level of production throughout the supply chain. It may or not be communicated to consumer trough labels or claims on food packaging, therefore consumers re made no able to distinguish clear and constant signs claiming what welfare standards products have been produced (Roe, 2006). Industry use these scheme or other market-led initiative to meet European consumer concerns also to react to the tensions between Europe's global lead on animal welfare and the wider global market (Veissier et al., 2008).

However, not everywhere in Europe animal welfare-claims on products is an element of distinction and competitive advantage to gain welfare-friendly market. In Norway and Sweden, for example, the higher animal welfare legislation makes higher the general production standards. In these countries, both consumers and citizens deem that ensure animal welfare was a governmental responsibility (Veissier et al., 2008). In other part of Europe, instead, the development of a growing market for welfare-friendly foodstuffs is likely to rise and growing.

2.3.3. Organic certification schemes

Organic certification schemes does not focus primarily on the animal welfare issue, which however results included in schemes as an obvious part of the organic philosophy. For example, AIAB in Italy, like other in Europe, establishes animal

welfare requirements that goes beyond those fixed by legislation (Veissier et al., 2008). Farmers that engage in organic certification take care for enabling animal to engage natural behaviour more than others do.

Chapter 3. Economic conceptual tools and policy implications

3.1 The need for a synthetic conceptual framework

To introduce correctly the policy choice that European Union has made over time, it need before put the elements up to now collected in the light of economic standpoint, for building a synthetic but rigorous conceptual framework on which policy design are grounding. To linearize the exposition, a basic distinction is to clarify.

On one side, economics provides conceptual tools for analysing economic agents' behaviour (on both demand and supply side) in rapport to the occurrence of livestock disease and the consequent necessity for policy actions to manage the risk (R. Bennett, 2012; Inamura, Rushton, and Antón, 2015; OECD/OIE, 2013).

On the other side, economic theory offers instruments for analysing markets where agents' behaviour involves moral values as well as the rationale and tools for designing the policy intervention. That is the subject of the following explanation.

3.2 The welfare productivity model

To pass under the focus of economic science, the concept of animal welfare must turn from that expressed by animal science, to be reduced to a solely human perception, whose intensity is determined by moral and ethical codes individually and socially accepted (McInerney, 2004).

In these terms, from the utilitarian stance, one must distinguish livestock value in "use value" associated to the goods resulting from the productive process to which livestock has contributed (meat, milk, wool, eggs..), and in "non-use value" associated to the

benefit one may feel from farm animals well-being, notwithstanding their use as resource (Hansson and Lagerkvist, 2015). Likewise, one may feel the loss of value (cost) for animal pain because it is conflicting with the moral responsibility to stay well sentient beings. The consumers' willingness-to-pay-more for livestock reared in respect of animal welfare acceptable standards is usually used like a proxy for evaluating in a monetary form the benefit that consumers gain from animal welfare (McInerney, 2004).

In what degree one may feel costs and benefits is changing by individuals. However, general opinion become intolerant when systems of production implies cruelty treatments (the line AWleg in Graph 1). That provides just the first basis for government legislation.

Human reactions are at the core of both behaviours. The one that looks for maximising profit coming from livestock production process (utility linked to use value), under the pressure of demand for goods originated by farmed animals. The other that seek to maximise the utility coming from non-use value, namely the welfare granted to farmed animals reared to serve human diet and life.

As usual, an animal welfare possibility frontier (Graph. 1) describes the relationships between animal welfare and livestock productivity. The outlined lines, which are each one parallel to each axis, indicate respectively the maximum level of animal welfare and the maximum level of productivity without regard for animal welfare.

In the first part, the curve describe how domestication improve live condition of animals, both productivity and welfare are growing.

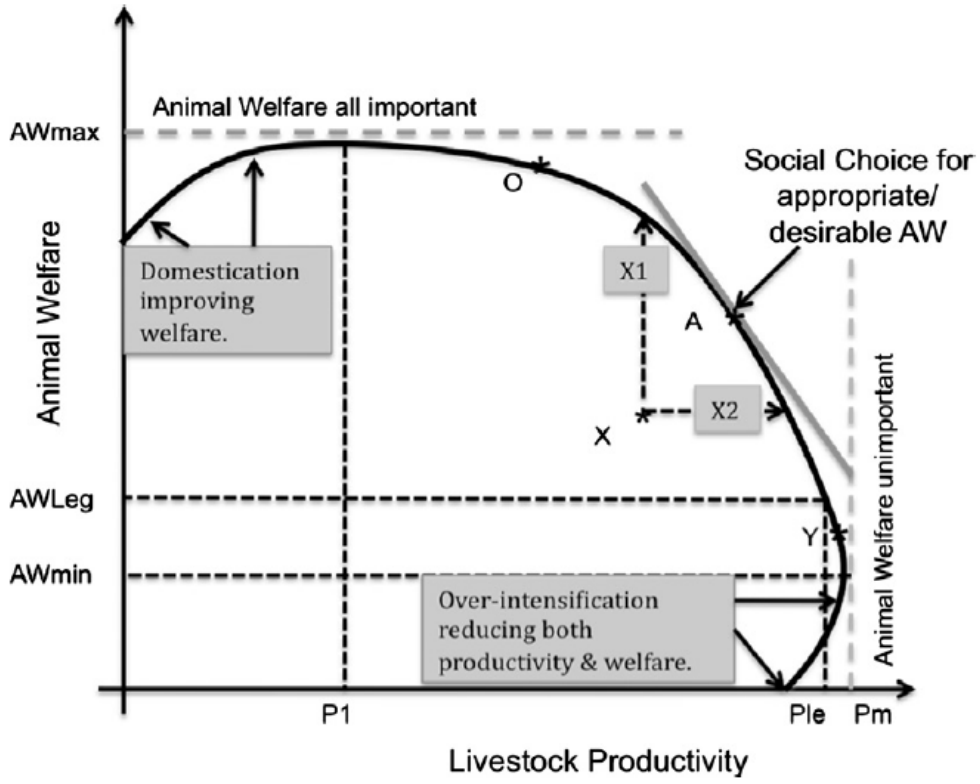
In the final part, it describe how the pressure to produce more and more generates an improvement of productivity worsening greatly the animal conditions. Pushing over-productivity implies reducing productivity too, just because of the worst condition of

animals and disease - just like every production factor, livestock production has decreasing returns.

In the medium, there are the points able to respond to social demand for better animal welfare and satisfy appropriate demand for farmed animal-goods.

The demand for farmed animal-goods and the willingness to pay- more for welfare high-standards livestock production determine the form of the curve, at a given time.

Graphic 3-1 - Animal welfare possibility frontier. Source: Harvey et al. 2013.



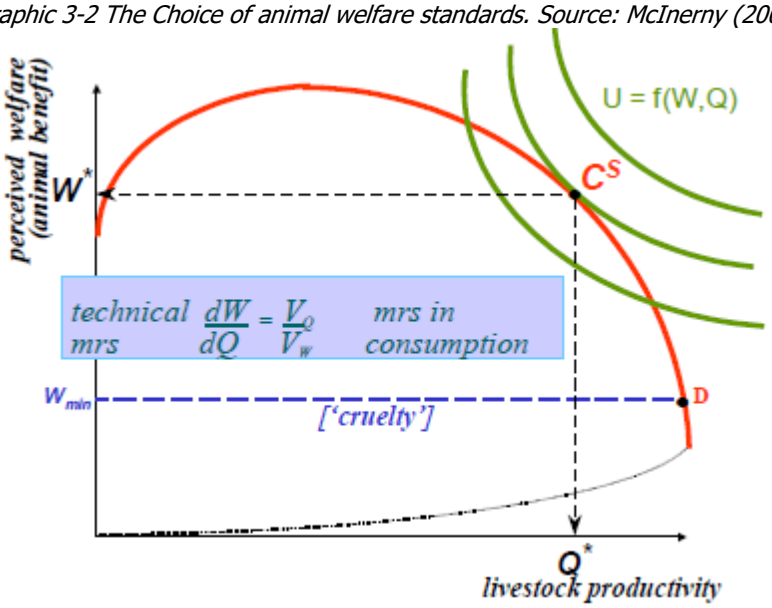
Determining what point in the medium of the curve may correspond to the *social choice* that take together the collective desirable level of animal welfare and the satisfying level of livestock productivity is the problem to face before discuss if and how public policy should intervene.

The general public utility assigned to the enhancement of the animal welfare, is expressed by the *social welfare function,* which is depending on the value attached to animal welfare (W), the value attached to animal productivity (Q) and a variety of other

factors (F). From this utility function, a family of indifference curves (I_1, I_2, I_3 in the Graphic 2) is derived. They are able to express the rate at which society would accepts some reduction in animal welfare, having in return some increasing of livestock productivity. Analytically, as usual, the concept is synthesised in the marginal rate of substitution between W and Q, that is dW/dQ. Moving along the indifference curve toward the low right part, we meet points representing situations in which welfare is lowering so that the additional gain in term of productivity are to be in turn growing. Symmetrically, moving along the welfare-productivity frontier from left to right, we meet points representing situation that *technically* express the possibility to increase livestock productivity by lowering the welfare conditions. Likewise, that is synthesised in the marginal rate of substitution. The optimal choice C^S is that able to maximise social utility. Again as usual, the point is determined by equalizing the two marginal rate of substitution, so that $dW/dQ = V_Q/V_W$, where V_Q/V_W is the inverse ratio of the marginal values of W and Q. In the Graphic 2 the solution point is where the welfare-productivity indifference curve is tangential to the welfare-productivity frontier). The classical economic instruments to explain how market works allow one to determine the punctual solution from a theoretical standpoint. However, in practice, it is not an operational solution, because it is not possible to measure the social function utility, neither determine the exact measure of animal welfare desired by society (McInerney, 2004).

There is room for policy evaluation, at least in the minimal way of determining the lower threshold of cruelty, above which establishing the minimum legal standard to produce.

Graphic 3-2 The Choice of animal welfare standards. Source: McInerny (2004) p.22



3.3 Market failures and policy implications

3.3.1. Externalities

In theory too, the model is not able to provide a solution because of market failures. In fact, the value of livestock product results from decisions of producer and consumers, so by means of market prices. Conversely, the value of welfare has not a price. In the practice, it means that farmers do not receive a payment for the animal welfare produced. What follows, analytically, is that if $P_W = 0$[1], then the ratio P_Q/P_W is infinite and the model solution is not determinable. Ultimately, it means that no solution comes from the spontaneous market mechanisms. In fact, farmers will choice a point alongside the welfare-productivity frontier that will be lower than the socially desirable C^S. In brief, it implies an inefficient allocation of resources, in other words a market failure.

1 McInerney (2004, p.25) suggests that the farmer sensitivity for animal welfare make it possible that the ratio between prices is not infinite but "less than infinite". Substantially that does not change the result of the reasoning.

Again, there is room for government intervention - national as well as sovra-national in Europe - to avoid the loss of efficiency and the social cost attached to animal welfare worsening.

Why animal welfare has not a price is a demand that leads to questioning what kind of good it is, being clear that it fits the general definition of externality. It means that farmed animal-goods production and consumption have an implicit consequence, not programmed, that imposes costs or benefit (in terms of animal welfare worsening or bettering) on others which are not reflected in the prices charged for the goods and services being provided (R. M. Bennett, 1997; Harvey and Hubbard, 2013; McInerney, 2004). This general and wide category does not suffice. Economists have also questioned whether animal welfare is:

- a public good (bad), a specific case of externality, that indicates good that everyone can enjoy freely (non-excludable) without reducing the benefit that another can enjoy(non-rival)
- a merit (or demerit) good, that in the collective social view ought to be, because contributes to the well-being of all members of society, without depending on the individual desire to achieve it (inoculation against contagious disease is an example)
- a moral good (Blandford and Harvey, 2014) because "humane values should dictate the provision of a certain minimum level of animal welfare independent from consumer evaluation". This definition implies that animal welfare value cannot be dependent from willingness to pay evaluation solely.

Scholars have generated a huge of literature about what kind of good animal welfare is, because different policy implication follow to each one. A very short review is herein

useful to show the relevance of the debate that has certainly influenced policy makers' decisions.

Bennett (R. M. Bennett, 1997) treat animal welfare as a public good, and considers justified the legislation because of "the significant negative animal welfare externalities as a result of livestock production and consumption". Further, he considers appropriate the combination of legislation and producer subsidies in that they are able to enhance animal welfare, without constrain food consumption choice.

Harvey and Hubbard (2013) state that animal welfare is a problem of "*consumption externalities"* and that "the specific regulation of animal welfare conditions […] is a public good". Consequently, they consider subsidies to consumption of animal welfare-friendly product the more rational policy to adopt. Again, this position evaluates "potentially misleading" measuring animal welfare through consumers' willingness to pay.

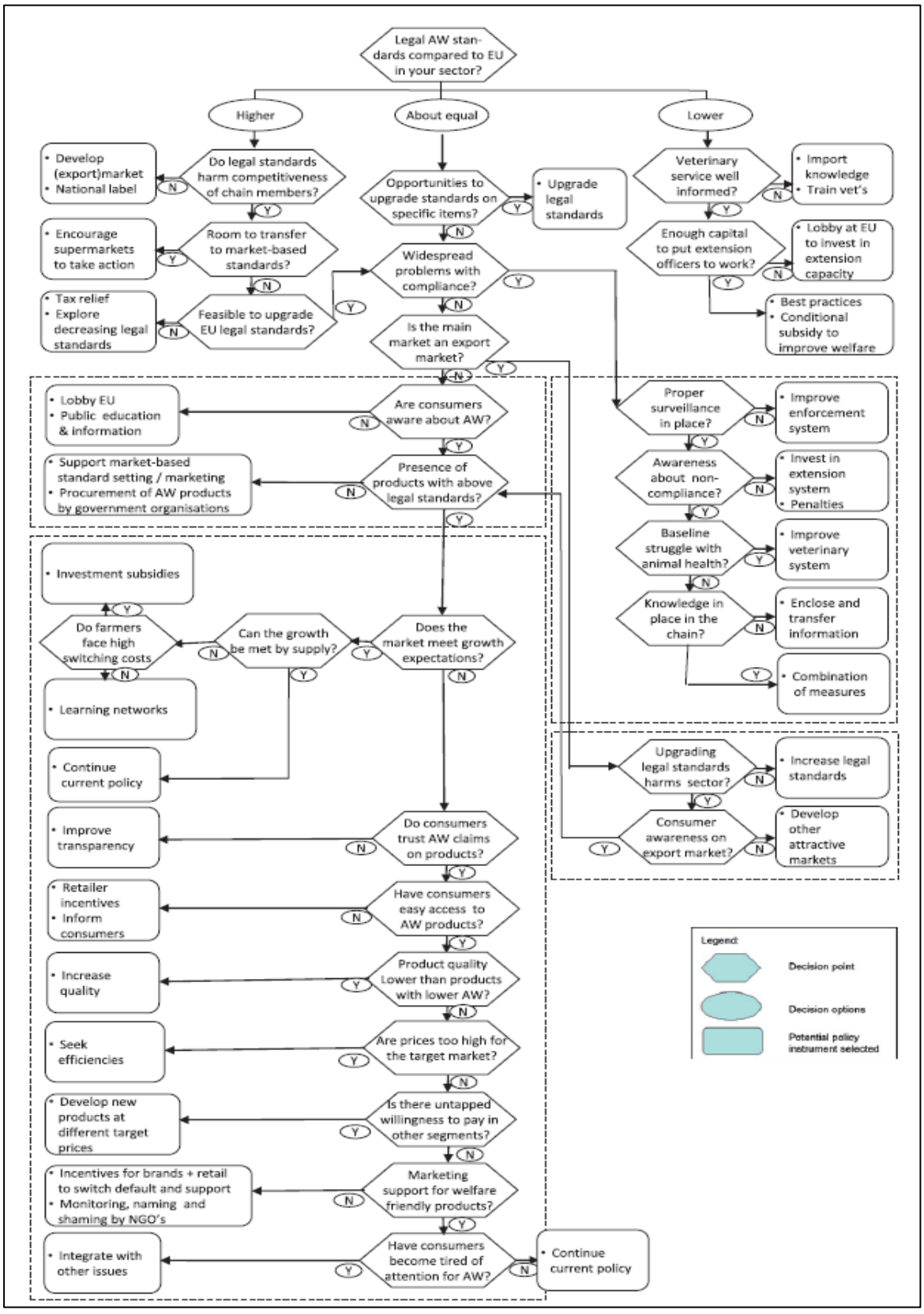
Blandford and Harvey (Blandford and Harvey, 2014), having emphasised the nature of moral good, support a double approach. The one acted by government to establish minimum standards for livestock production, just to satisfy social demand for non-cruel treatment. It is self-evident that this measure results in internalizing a part of the social cost. The other acting through market for satisfying those who feel higher standards should be ensured, therefore available to pay more for welfare-friendly product.

McInerney (McInerney, 2004) proposes a more comprehensive approach, linked to the idea that there is a conceptual scale on which to place various grades of animal welfare intensity. At the lower threshold, there is the cruel treatment that justify considering animal welfare as a public good to be ensured by government. Therefore, legislation intervene to establish the minimum legal standard that is higher than cruelty but not the highest. In the intermedium level of the scale, level of animal welfare higher than

minimum standard are placed that are desirable for many people, not all. However, if they are enough to press on policy maker, so that retain that all the society "ought" – the perceived duty is to underline - to accept a new value, the minimum level may be enhanced up to a "merit level", because this is the case for animal welfare be a merit good. It is possible through the market, by providing consumer subsidies to buy welfare friend product, farm assurance schemes and labelling. Livestock farmer financial support too is evaluable, following a cross-compliance approach. At the upper of the scale, welfare level is very high and only few people retain it so necessary, it is merely a private good, hence out of the good government has to provide. Establishing the exact value to assign to each level (minimum legal, merit, private) rests a purely political issue.

A sort of policy instrument could be put into effect. Ingenbleek and others (Ingenbleek, Immink, Spoolder, Bokma, and Keeling, 2012) offer an interesting review to support the idea that "one fit all" measure are not preferable to more tailored instrument. Their findings about eight European case studies give rise to the policy tree (Fig. 4.1) to help policy makers to adopt the best choice. It is organised in the form of tree, whose branch are questions and answer provided by policy maker analysis of the concrete context where rule are to implement. The question-answer branches are able to guide from the problem to the suitable instrument to implement. That aims to reach a tailored set of policy measure, which takes into account the subject along the entire supply chain as well as the specific sensitivity consumers reveal in a specific area.

Table3-1 - The Ingelbleek policy tree. Source Ingelbleek et al. 2012



3.3.2. Information asymmetry

Another kind of market failure is due to the information asymmetry and the consequent problem of adverse selection and moral hazard. Under perfect market conditions, the market price is able to transmit all information about product, externalities does not exist and government intervention is not necessary. Conversely, under imperfect conditions, there is the case for asymmetric information, as producers have more information than buyers do. Typically, public goods – such as safety - calls for public intervention to correct imperfection.

Farmed animal goods have characteristics concerning animal welfare conditions that are not knowable by consumers neither before purchasing (search attribute), nor after consumption (experience attribute), because they are not embedded in something to perceive by senses, these are credence attributes (A. J. Caswell and Mojduszka, 1996). Sellers have good information, buyers not and quality signalling is ineffective. There is the case for adverse selection, which implies that only lower quality products will be offered. Because of quality cannot be signalled, asymmetric information open the way for producers' moral hazard that is declaring product attributes not really achieved. Therefore, products cannot reach the premium-price, as consumers does not take the risk to purchase products that should not have those attributes, which are declared but not directly verifiable. Consequently, only lower standard welfare products will be sell. This implies an allocative inefficiency and net social lose, which calls for public intervention.

Labelling and information campaign and certification systems – such as those implemented for organic farming - are the most addressed policy instruments to

rebalance the situation as credence attributes are made similar to the search ones (J. A. Caswell, 1998) and allow consumers to be sure of what producers are claiming.

3.4 Some remarks

From all examined up to this point, some remarks are coming that result useful to better understand the nature and the level of the policy intervention that European Union has designed in the last years.

The first point to remark is the special role played by public sensitivity in push up or down the bar of legal guarantees. The level of citizen sensitivity to animal issue - reached through polls such as those of Eurobarometer and examined in the previous paragraphs - is exactly the one referring to which policy makers establish to what extent is to place the level of "legal" minimum standard, or the merit one. Therefore, policy measures are "naturally" subject to change over the time. A hypothetical example is that of a sudden food crisis as critic as BSE has been, which could rapidly enhance citizens' concern for human health and call for new and more guaranteeing measures about animal health and welfare. Policy makers would be to respond to the new demand because the new higher level of animal protection would be to consider as a public good rather than a merit or private one.

The second is the special role played by information in this regard, because it is able to enhance the level of sensitivity. It should be considered referring to both the effect about the minimum standard to take into account as legal level, and the effect on the willingness to pay of the consumers (R. M. Bennett, Anderson, and Blaney, 2002). Otherwise, information toward farmer too is addressed to support their voluntary

implementation of practice with higher animal welfare standards (Hansson and Lagerkvist, 2015).

Chapter 4. European policy for animal welfare

4.1 The legal basis

Before entering how European Union has ruled the protection of farmed animal welfare through a number of specific directives and regulations, it is basic to point out the legal basis laying down.

Even if there is no explicit references to the Brambell report (Veissier et al., 2008), that act paved the way for the following initiatives undertaken in various countries around the world and in the European Union too (Brambell, 1965, see also par.2.1).

In a short historical perspective, three basic legal acts are to notice.

The European Convention for the protection of animals kept for farming purposes, was subscribed at Strasbourg in 1976, "*considering that it is desirable to adopt common provisions for the protection of animals kept for farming purposes, particularly in modern intensive stock-farming systems*" (Council of Europe, 1976). The Member States, which were contracting parties of the Convention, bound themselves over the basic principle that "*animals shall be housed and provided with food, water and care in a manner which – having regard to their species and to their degree of development, adaptation and domestication – is appropriate to their physiological and ethological needs in accordance with established experience and scientific knowledge*" (art.3). It is clear the reference to the fundamental definition of animal welfare. Yet, the following article 4, add to this the reference to the well-known five freedoms, especially the freedom of movement or to have the necessary space.

Avoiding unnecessary suffering and injury is the recurrent rational of the listed principles.

In the article 5 an explicit reference is made to the ethological aspect of the definition, always respecting the differences among the species. The article establish that the environmental conditions – such as lighting, temperature, humidity, air circulation, ventilation, or gas concentration or noise intensity – in the place in which an animal is housed shall "*conform to its physiological and ethological needs in accordance with established experience and scientific knowledge"*.

The Convention established a Standing Committee had to be set up with the aim to provide recommendations to the Contracting Parties containing detailed provisions for the implementation of the principles set out in the Convention, to be based on scientific knowledge concerning the various species of animals. Each Country were able to establish national similar structures to coordinate with the European Standing Committee. Therefore, a first governance structure was established too.

The Convention, to ratify by each Member State subscribing it, make allowance to propose for subscribing other Countries that were not member states (art.15).

The European Community, with Decision 78/923/CEE, ratified the Convention. In 1998, the Council of the European Union translated it into the Directive 98/58/EC. That was to ensure the homogenous implementation in the entire community region. Recommendations can be implemented at a national level through legislative or administrative practice chosen at national level, having regard to recognize as minimum standard the one established at European level.

After the Convention of Strasbourg, animal welfare rooted more and more deeply in the basic laws constituent the European Union.

The Treaty on European Union - or of Maastricht – adopted in 1992 and come into force in 1993, is a milestone in the history of the subsequent Treaties since the treaty of Rome to that of Lisbon, nowadays into force. The Treaty of Maastricht (European

Communities, 1992b) established the European Union and introduced European citizenship. The Treaty attached also, a specific Declaration on protection of animal welfare, which called upon *the European Parliament, the Council and the Commission, as well as the Member States, when drafting and implementing Community legislation on the common agricultural policy, transport, the internal market and research, to pay full regard to the welfare requirements of animals.* It is worthy to notice that the scope of the fields involved in animal welfare resulted extended including also research besides internal market, transport and agriculture.

The Treaty of Amsterdam (European Union, 1997), come into force in 1999, attached a specific Protocol on protection and welfare of animals. Therefore, animal welfare reached a major consideration in European law just because of it was attached to Treaty establishing the European Community. Yet, the issue moved forward because the rational of the law resulted broader and deeper, as it was the desire "*to ensure improved protection and respect for the welfare of animals as sentient beings".* Animals were acknowledged as *sentient beings*, whose legal rights were protected by the law that aimed to *ensure improved protection*, respect to what before done. The short text of the Protocol established:

> *In formulating and implementing the Community's agriculture, transport, internal market and research policies, the Community and the Member States shall pay full regard to the welfare requirements of animals, while respecting the legislative or administrative provisions and customs of the Member States relating in particular to religious rites, cultural traditions and regional heritage.*

The latest major amendment to the constitutional basis of the EU is the Treaty of Lisbon (European Union, 2007b), come into force in 2009, which by subsequent amendments

(European Union, 2012a) leads to the nowadays-in force Treaty on European Union and Treaty on the Functioning of the European Union (TFEU) (European Union, 2016b). The Treaty of Lisbon has transformed the Declaration previously attached to the Amsterdam Treaty in the Article 13 of Title II. It nowadays states:

> *In formulating and implementing the Union's agriculture, fisheries, transport, internal market, research and technological development and space policies, the Union and the Member States shall, since animals are sentient beings, pay full regard to the welfare requirements of animals, while respecting the legislative or administrative provisions and customs of the Member States relating in particular to religious rites, cultural traditions and regional heritage.*

While confirming the sentient-beings as the main rationale of the law, is has further enlarged the scope of fields involved in animal welfare protecting, by adding also technological development and space policy.

4.2 The growing corpus of regulation

4.2.1. The growing corpus of regulation

Europe has been adopting a huge of regulation related to specific aspects of the farming of animals, especially, transport, slaughter and breed. Others followed regarding the connection between health and welfare of animals and food safety.

This wide corpus can be grossly divide into horizontal regulation, to apply to each species, and vertical regulation conceived for specific species. But there are also those

for veterinary controls, traceability, genetically modification, and so on, notwithstanding training of veterinary and farmers.

Drawing the complete picture of the entire corpus is an hard tackle overcomes the aims of the thesis. Suffice to say that a simple query "animal welfare" in the EUR-lex web site (http://eur-lex.europa.eu) does has generated 5.294 correspondences.

In what follows I refer to the some of the main documents of the horizontal regulation, then to the new strategic approach adopted since 2006.

4.2.2. Some reference to the horizontal regulation

Besides the general convention of Strasbourg, there are two others regarding specific matters. In 1968, the committee of Ministers of the Council of Europe adopted the Convention for the protection of animals during international transports. It laid down the requirements to adopt during transport and for loading and unloading, as well as veterinary controls, handling. Furthermore, the same Committee produced specific recommendations for each specific species (for example, that for sheep and goats in 1992). Each recommendation starts from the biological characteristics of the species and provides minimal requirements to ensure that the needs of the animals are fulfilled as to nutrition, health, freedom of movement, physical comfort, social contacts, normal behaviour, and protection against physical and psychological stressors. Special attention is given to appropriate training of people who handle living stock.

The Convention for protection of animals for slaughter (1979) was established to improve the handling, lair, restraint, stunning and slaughter conditions of domestic equids, ruminants, pigs, rabbits and poultry. Several unnecessary suffering to be avoided are, for example, rough handling of animals, striking sensitive parts of the body, and

extensive times in lair. Large animals shall be appropriately stunned, by means of a captive bolt or other mechanical stunning device, electro-narcosis or gas before bleeding-out so that they remain unconscious until death.

The EU Commission has the initiative to create legislative texts; more in particular animal protection is under the responsibility of the General Directorate for the Health and Consumer Protection. The making law activity is supported by the scientific reports which since 2002 are produced by the European Food Safety Authorithy (EFSA) Most of EFSA's work is undertaken in response to requests for scientific advice from the European Commission, the European Parliament and EU Member States, if not for own initiatives. According to Veissier et al. (2008), the main topics of EU Directives for the rearing of farm animals are:

- To increase space allowance per animal.
- To permit interactions between animals, and hence to encourage group housing (e.g. no calf shall be in an individual crate after 8 weeks of age).
- To give more freedom of movement (tethering is limited, muzzling is prohibited).
- To provide animals with an enriched environment (e.g. furnished cages for laying hens, substrate for rooting to pigs).
- To feed animals a regimen consistent with their physiological and behavioural needs (e.g. sows and gilts shall receive foods that are bulky in addition to being high in energy, veal calves shall not be anaemic).
- To limit painful intervention (e.g. tail docking and reduction of eye teeth in piglets is allowed only in cases of overt injury to sows or other pigs and after trying to reduce behavioural vices by other measures; beak trimming of poultry

is allowed to prevent feather pecking and cannibalism only if it is performed by a qualified person and only on pullets less that 10 days of age).

As an example of vertical intervention over time, some directives, in chronological order, are concerning :

- 1974/1993/2009 Stunning and Killing
- 1977/1995 / 2005 Transport
- 1986/ 2008 Animal in experiments
- 1988 / 1999 Laying Hens
- 1991 / 1997 / 2001 Calves – Pigs welfare at farm
- 2007 Council Directive on broiler chickens

Over the time, the directives are usually replaced by new and updated rules in order to better organise the legal framework and fit to changed conditions.

About transport, the Directives 64/432/EEC and 93/119/EC has been amended by the Regulations (EC) No 1/2005, of 22 December 2004 on the protection of animals during transport and related operations.

Likewise, the legislation applicable to slaughterhouses, since the Directive 93/119/EC, has been then after amended by the adoption of:

- the Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on hygiene of foodstuffs;
- the Regulation (EC) No 853/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin

Recently, the Council Regulation (EC) 1099/2009 of 24 September 2009 on the protection of animals at the time of killing has replaced all the previous ones, offering a more rational legal framework.

Those are only two examples. The growing *corpus* of legislative acts is been calling for a more rational set up of the legal framework.

The more recent law adopted on 9th march 2016 by the Co-Decisor is the "Animal Health Law" (European Union, 2016c). Albeit it does not contain provisions which regulate animal welfare, the law states that (whereas 7) *animal health and welfare are linked: better animal health promotes better animal welfare, and vice versa. When disease prevention and control measures are carried out in accordance with this Regulation, their effect on animal welfare, understood in the light of Article 13 of the Treaty on the Functioning of the European Union (TFEU), should be considered in order to spare the animals concerned any avoidable pain, distress or suffering.*

Again aiming at being more rational the legal framework, to ensure the coordination and not overlapping among contiguous legislation, it has been disposed that *animal welfare legislation, such as Council Regulations (EC) No 1/2005 and (EC) No 1099/2009, should necessarily continue to apply and should be properly implemented. The rules laid down in this Regulation should not duplicate, or overlap with, the rules laid down in that legislation.*

4.3 The current strategical approach

4.2.3. The Community Action Plan 2006-2010

The premise of the new strategical approach adopted by the European Commission since 2006 lays on the strong interrelation between several unional policies, namely the environmental policy, agricultural policy as well as that for food safety. It is inspired to the principle that everyone is responsible. In its working document on a Community Action Plan on the protection and welfare of animals 2006-2010, the Commission was

recognising (European Commission, 2006, p.4) "*the links between food safety and animal welfare in its White Paper on Food Safety and by ensuring an integrated approach to animal health, welfare and food safety controls throughout the food chain, notably by Regulation (EC) 882/2004"*(European Community, 2004).

The Plan details five main areas of action (Directorate-General Health and Consumers Protection, 2007):

- Raise existing standards of animal protection and welfare;
- Promote policy-orientated research on animal protection and welfare;
- Introduce standardised animal welfare indicators;
- Raise awareness and involvement by both animal handlers and consumers;
- Continue to support and initiate international initiatives.

To implement the Action Plan on Animal Welfare a series of concrete initiatives were proposed:

- Proposal to protect the welfare of broiler chickens to enhance welfare standards for broilers on farms and to monitor them more effectively;
- Information and tools designed to educate the public and raise awareness of animal welfare issues;
- Research under the 7th Framework, to optimise animal health, production and welfare across many policy areas;
- European Centre for the protection and welfare of animals to support the establishment of the first European label on animal welfare;
- Training programme, after a first international training workshop on "Animal Welfare Standards" was held in September 2006;
- Promoting animal welfare in the EU's multilateral and bilateral relationships.

4.2.4. The European Union Strategy for the Protection and Welfare of Animals 2012-2015

Newly, for the period 2012-2015, the Commission has proposed a strategy on a narrower set of objectives. The premise of the strategy (European Commission, 2012a) is the cogent observation that at union level great financial resources are devoted to objective of animal welfare, despite the fact that, at national level, not all Member States were developing a strong action in the same direction. On one side, the new strategy has been finalised to strengthen the synergy among various subjects involved implement the European policy. On the other side, it has aimed at reinforcing the consumers' capacity to support the production of animal welfare by changing their consumption habits that has been pursued by means of information campaign. As to the European policies, the Commission has focussed on two:

- Simplify the growing corpus of European legislation in force;
- Strengthen the coordination and integration with Common Agricultural policy. The European Commission believes that animal welfare is an essential part of farming practices. To strengthen this link, the EU supports farmers' animal welfare projects with funding from the Common Agricultural Policy (CAP), the EU's main agricultural support programme. The European Commission is studying how animal welfare can be improved by tying it to CAP initiatives and funding, such as subsidies for farmers, rural development programmes and organic farming standards. (European Commission, 2012b)

BOX 1 - Official European web sites on animal welfare

European Commission's website
http://ec.europa.eu/food/animal/welfare
Links to animal welfare research projects
http://ec.europa.eu/food/animal/welfare/research/index_en.htm
Seminars
http://ec.europa.eu/food/animal/welfare/seminars/index_en.htm
Surveys
http://ec.europa.eu/food/animal/welfare/survey/index_en.htm
EU-funded Agricultural research portal

http://ec.europa.eu/research/agriculture/index_en.html
FP7 projects
http://cordis.europa.eu/fp7/home_en.html
Website of the Council of Europe (CoE)
http://www.coe.int/t/e/legal_affairs/legal_co-operation/biological_safety,_use_of_animals
Eurogroup for Animals
http://www.eurogroupforanimals.org
Compassion in World Farming (CIWF)
http://www.ciwf.org.uk/index.shtml
European Animl Welfare Platform (EWAP)
http://www.animalwelfarepaltform.eu
Website of the World Organisation for Animal Health (OIE)
http://www.oie.int/eng/en_index.htm

4.4 Animal welfare in the CAP historical development

Rebuilding a brief historical review of the Common Agricultural Policy (CAP) allows one to understand since, why and through which measures animal welfare entered the CAP. Besides, one can appreciate the contribution this policy may add to the enhancement of animal welfare up to date. Finally, it permits to place rightly the thesis questions in the scope of the rural development policy since 2007 programming period.

In the impressive picture I will rebuild, I point out that the CAP has been becoming over time a much more complex policy:

- by adding continuously several new policy aims;
- by integrating with many other policies and Funds (sectorial, structural, environmental, social and regional, health and security, market competitiveness);
- by articulating in two pillars and financing them through specific Funds.

In the long period, many great changes happened. The original Six Countries subscribing the Treaty of Rome for establishing the European Economic Community in 1957 have been adding in turn more twenty-two. The economic integration process has deepened and the CAP has played a major role in this regard. The political integration process has advanced (albeit very much rests to do) and the principle of subsidiarity now

rules the relationships among the Union, the Member States and the Regions. In our time, the Union prepares to face the more complex scenarios of global competition in time of crisis by pursuing a smart, sustainable and inclusive growth, as the 2020 Strategy has drawn. The CAP history has deeply intertwined that of the European Union.

To place animal welfare in the CAP history, it is useful consider its great steps by decades, as proposed in the figure 5.1 sourced by European Commission[2]. In a rough view, one might consider it in two main periods, one before and the other after the millennium. From the early period devoted to ensure food security to the post-war Six Countries, CAP's purposes have rapidly shifted to contrast the food surplus, pursuing higher competitiveness at the end of the Nineties. At the beginning of the millennium, a new idea of what CAP should be arose, perfectly expressed in the Agenda 2000 vision. The CAP's purposes became to develop from the idea that agricultural activity is multi-functional. Consequently, the policy objectives can pursue multiple effects in the field of environment, cohesion, economic competitiveness, always aiming at environmental, social and economic sustainability. To accomplish the new policy objectives, the policy resulted in two pillars. The first is for the "old" market measure to ensure the new level of competitiveness required by the new global scenario. The second is devoted to the rural development. Both, through different measures, must aim at the threefold sustainability. From Agenda 2000 to date, animal welfare entered the CAP in its threefold dimensions related to environment, production and food safety consumption.

[2] http://ec.europa.eu/agriculture/cap-history/cap-history-large_en.png

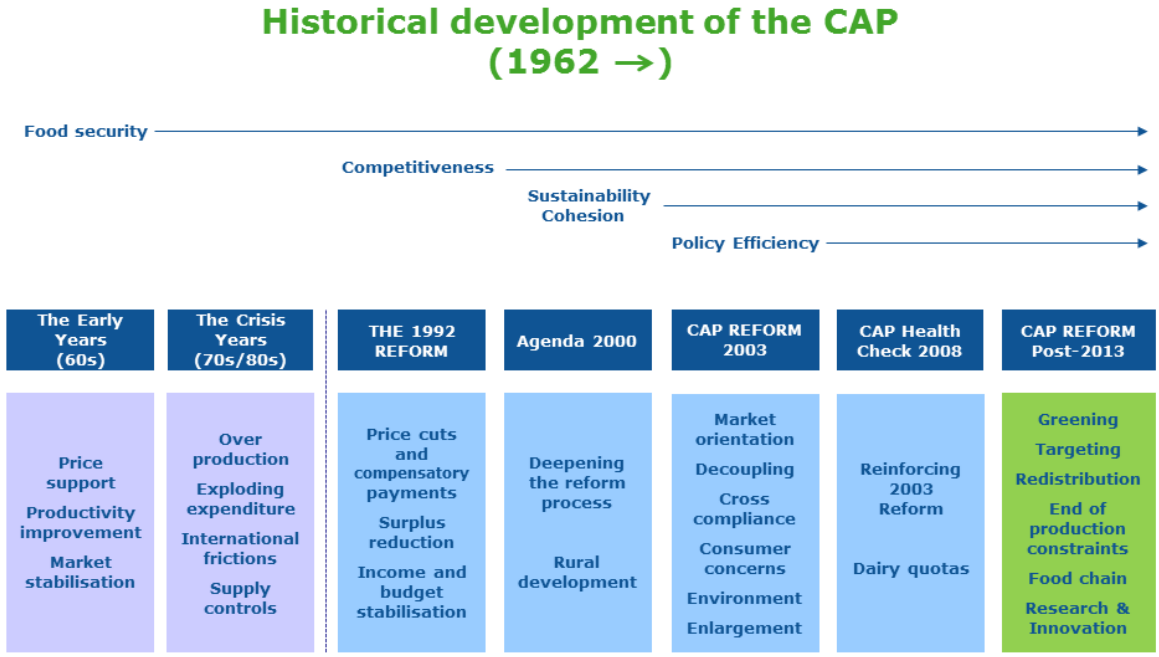


Table 4-1 – The CAP history by decades. Source: European Commission

4.5 CAP's basic outlines from foundation to Mac Sharry reform

4.2.5. The CAP design in the Treaty of Rome

The CAP has its legal basis in the Treaty of Rome and its foundations have remained unchanged since then to date. Otherwise, the rules relating to the decision-making procedure were changing along with the institutional development, articulated by the Treaties that has followed in turn. A reading I omit herein is that which goes along with the institutional advancement of the Community and its run from the Six toward the present Union enlarged to the Twenty-eight. Even if both should be analysed together, because the latter affects deeply the former, it is less concerning the focus of the thesis and I refer to the huge of literature on the issue. Hence, in the following I leave aside the question about the different decision-making procedures of the reforms I mention. From the beginning, the CAP has been a main policy wanted by the Six Countries, to guarantee food supplies after the years of the war. It is worthy understand what make it

possible to leave unchanged its objectives. The Treaty of Rome has assigned five specific objectives, which take into account the social, economic, and technical specificities of the agricultural activities. They have designed a so comprehensive juridical frame that has allowed the European legislator the room to choice different instruments to attend those objectives. Over the time, the legislator has could take into account several change of new market trends, priorities and citizen preferences, as well as the need to widen CAP's scope and integrate it with other policies. For understanding how this complex mechanism could work, it need consider that agriculture is depending on:

- climate imbalances and different geography conditions;
- the length of production cycles and the unchanging nature of some production factors;
- the inelasticity of the demand.

Consequently, an increase in supply automatically pushes prices down, whereas a decrease pushes them up. Substantial fluctuations in prices and incomes of farmers follow. That entails the substantial market instability to which farmers have to submit, but that the Governments wanted to avoid. This main objective rests at the core of the comprehensive design of the policy.

The CAP's objectives (see Box 2 art.39 of TFEU , European Union, 2016b) are articulated in five items, usually distinguished (Pacciani, 2007) in economic (*a, b* and c), social (*e*) and political (*d*). More in particular, one can read together the three economic objectives considering that the *(a)* and *(c)* are put there to achieve the policy strategic objective *(b) - to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture* - through economic mechanisms.

The *(a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour* aims at reducing the costs of production. The section Guidance of the European Agricultural Guidance and Guarantee Fund (EAGGF) were committed to this objective and should had been – in the early intentions – the main measure of the CAP. It has served for balancing the different conditions of productions in the Six Countries, so that the free movement of the agricultural products could not cause damage to any Country. The *(c) to stabilise markets* was to be fulfilled through the section Guarantee of the EAGGF and it is commonly known as price policy. It should had been the less relevant; instead, it has become the most important. It aimed to stabilise markets and give incentives to produce through a system of high price support to farmers, combined with border protection and export support. Actually, it has meet to establish into the Community market stable prices, fixed through the work of the CMO. The fixed prices were able to guarantee the farmers had adequate remuneration of the cost of production, at the level of those were producing in the worst conditions. The protection of the border assured financial entries to the Community budget, early time able to counterbalance the export support, which was guaranteeing the creation of a strong community market.

Consequently – or better "*thus*" as the article recites - both together could assure the objective *(b)* is achieved.

The objective (d) *to assure the availability of supplies* was accomplished in only six years, as OECD (Commission of the European Communities, 1987a) stated that by 1956 to 1968 the index for the volume of agricultural production for the Six founders was rising at an average annual rate of more than 3.9%.

Even if assuring to the farmers highest prices than in the rest of the world is at the core of the CAP's design, the need (e) *to ensure that supplies reach consumers at reasonable prices* was put there to counterbalance the former, though remaining not enough taken into account in CAP's implementation.

Despite the harmonious design, by the implementation of the CAP, just from the beginnings, many other iniquities resulted, such as those among Countries, big and small farmers, continental and Mediterranean productions, farmers and consumers safeguard.

Box 2 –Objectives of the CAP in the Treaty on the Functioning of the EU in force (European Union, 2016b)

Title III Agriculture and Fisheries

Article 39
(ex Article 33 TEC)
1. The objectives of the common agricultural policy shall be:
(a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;
(b) thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;
(c) to stabilise markets;
(d) to assure the availability of supplies;
(e) to ensure that supplies reach consumers at reasonable prices.
2. In working out the common agricultural policy and the special methods for its application, account shall be taken of:
(a) the particular nature of agricultural activity, which results from the social structure of agriculture and from structural and natural disparities between the various agricultural regions;
(b) the need to effect the appropriate adjustments by degrees;
(c) the fact that in the Member States agriculture constitutes a sector closely linked with the economy as a whole.

Some outline to how the CAP was put on. Following the entry into force of the Treaty of Rome, Member States' agricultural policies were replaced by the intervention mechanisms delivered at Community level. In 1960, the Commission proposed the guidelines designing principles, structures and financial tools. Establishing unity of the market based on the free movement of agricultural products, abolishing barriers to trade, and ensuring Community preference were the principles of the policy. Organising

markets by product with prices being progressively unified and guaranteed was the main structure, leaded by the duty to enable common intervention. The EAGGF was the first financial tool, based on the principle of financial solidarity. It was established in a Guarantee Section for price policy and a Guidance Section for structural measures. In 1962 (that is the recognised birth of the CAP) the Council decisions provided the organisation of six Common Organisation of agricultural Markets (CMO, below): cereals, pig meat, eggs, poultry meat, fruit and vegetables, and wine); rules on competition were introduced. It established also a schedule for dairy products, beef and veal, sugar and other measures to assist intra-Community trade. A system of high support prices to farmers, combined with border protection and export support provided incentives to produce.

In 1968 the EEC were already in surplus, which entailed that the early budget balancing crashed and a growing financial crisis rose, enlarging the gap between farmers and citizens-consumers.

A long, and still ongoing, period of criticisms and reforms opened for re-aligning agriculture production with market tendencies and mechanism of functioning. The game of counterbalancing the reforming forces and the lobby of agriculture was starting.

4.2.6. Some relevance from Mansholt Memorandum to MacSharry CAP Reform

Rapidly met its objectives, the CAP has been producing growing budgetary cost and permanent surpluses of the major farm commodities, distorting world markets relations, and becoming unpopular with consumers, taxpayers and farmers too, for the unequal distribution of benefits. This picture will rest quite unchanged over decades up to the current period, despite many efforts to improve the benefit police can provide after the Agenda 2000. Contrariwise, adding new objectives and some correctives to the CAP,

without changing its basic mechanism, is the solution undertaken since the Seventies up to Agenda 2000. In that period, the rising of the rural development policy is the most relevant for the matter herein.

After the Sixties, surplus and structural deficit were the hard tackle to face for the young EEC Commission. The Memorandum Mansholt (Segretariat General of the European Commission, 1969) provided two basic lines. For the surplus, measures intended to restore market equilibrium, by managing the prices; for achieving major structural changes, a set of economic and social measures. They were to limit CAP expenditure on one side, and bear *heavy financial burdens* on the other side. Only the second objective succeeded, as three directives on agricultural reform were approved in 1972 (modernization of agricultural holdings, abandonment of farming and training of farmers), despite the more complex Commission's proposal. Thus the focus of the new directives were to modernise farms; to promote professional training; to renew the agricultural work force by encouraging older farmers to take early retirement.

To ensure assistance to farmers working in difficult conditions, such as mountain and less favoured areas, a new directive, in 1975, provided aids for compensating farmers for natural handicap and incentive the maintain of farm activity in those regions, in order to help the environment.

In 1979, the new principle of co-responsibility introduced a charge requiring farmers to pay a penalty for over-production in the dairy sector, to face the growing CAP expenditure.

The walk for reinforcing socio-structural policy has run more slowly, but a great jump was just in the Eighty.

In 1980, the Council gave the Commission a mandate to bring forward proposals of reform of the common policies for supporting structural changes. Having regard to

socio-structural policy, the Commission Memorandum (Commission of the European Communities, 1981), focused on the need to amplify the measures in favour of deficient farms in less favoured areas, engaging in that a growing part of the Guidance Section of the EAGGF budget. Socio-structural policy were to exploit opportunities coming from *improvement in product quality*, reorienting and diversification of production, more efficient process of production. Promoting development of rural areas was deemed *to be planned in the context of regional development, on the basis of integrate measures* (ibid. p.72). It seems already a first seed of the rural development policy, whose take off is usually placed at the last of the decade (Commission of the European Communities, 1988b)

It is remarkable that in the Guidelines following the Green Paper lunched to open the debate on the future of the CAP, the environmental issue firstly entered the CAP policy (Commission of the European Communities, 1985). In the Commission communication (Commission of the European Communities, 1988a) *Environment and Agriculture* the concept of a multi-functional role of agriculture entered firstly the debate on the CAP. Both are the "pillars" upon which lay the rational of the CAP intervention to support farmed animal welfare, along with other public goods linked to agricultural production.

Following the Commission proposal on *The Future of Rural Society* (Commission of the European Communities, 1988b), in 1988 there was the first reform of structural Funds (Council of the European Communities, 1988). It set a pluriannual, multi-purpose and multi-fund planning. That favoured a more effective strategy for rural and less favoured areas thanks to a closer coordination between the Guidance Section and other Structural Funds. That is recognised also as the embryonal form of the rural development policy, as to matters, tools and financial solutions.

Meanwhile the budget crisis was increasing. In the Commission's *Memoranda* it is clearly said that since 1968, as the problem and its rationale were clear, as the fully awareness to face a difficult task was strong. During the decade, for limiting CAP expenditure and surpluses of production, two main actions rose. In 1984, the introduction of the milk quota resulted as an extension of the quota-system, already in use for sugar production (Commission of the European Communities, 1983a, 1983b, 1984) . In 1988, the introduction of budget stabilisers (Commission of the European Communities, 1986, 1987a, 1987b) seems to be the stronger tool to put a roof to the CAP expenditure.

However, that was not enough, and at the open of the Nineties that crisis was pressing to achieve a more radical reform. Besides and together, several other facts are to be mentioned, though very briefly: the GATT Uruguay Round and the unsustainability of the budget compared with the new citizens and consumers growing sensitivity for the environmental question. In parallel, after the Wall crash, the Schengen Agreement (1990), and the Treaty of Maastricht that established the European Union (EU), the financial resources were to face new emerging needs, but without charging further the budget of Member States.

The MacSharry reform, in an unusual manner, has introduced major changes (Commission of the European Communities, 1991a, 1991b, 1991c; Council of the European Communities, 1991), in spite of hard opposition. For stabilising both agricultural markets and the budget expenditure, measures displaced the object of intervention from product support, through the early price policy, to producer support, through a new direct income support. Therefore, direct payments were introduced in order to compensate for the decrease of the price support (cereal guaranteed prices were lowered by 35%, and beef prices by 15%). A gradual re-orienting toward the market

took off. Accompanying measures were also introduced: compulsory set-aside and other agro-environment programmes, afforestation, early retirement, diversification.

Along with this basic change, the second shift was from structural measure to an organic rural development policy, which began to collect multiple purposes and approaches as well. That was growing along with the developing concept of multifunctional agriculture and rural areas (European Commission DGAgri, 1999; OECD, 1998), which began to shape the Agricultural European Model in that period.

A focus on quality of productions and animal welfare entered the CAP, too. The rural development policy, conceptually grounded in the Commission's *The future of rural society,* took off thanks to the Conference of Cork (European Commission DGAgri, 1996)

The reform aimed to improve the competitiveness of EU agriculture, stabilise the agricultural markets, diversify the production and protect the environment, as well as stabilise the EU budget expenditure.

4.6 Animal Welfare in the scope of multifunctional agriculture

4.2.7. Policy approach to multifunctional agriculture

The debate on multifunctionality of agriculture burst when the intensive production model of agriculture had become almost declining under the pressure of the big fractures created respect to environment, consumers and citizens, as effect of the CAP implemented over forty years (van der Ploeg et al. 2002). While new political objectives were emerging and demanding public resources, the growing expenditure to support agriculture surplus production was no longer justifiable. Yet, international pressure to liberalise the sector were increasing and finally to accomplish. However,

there was awareness that the simple liberalisation of the market (and the consequent output reduction) could have been involving the loose of the non-commodity outputs jointly produced.

In this context, the Agricultural Ministers, at the spring meeting 1998, defined agriculture a multifunctional activity considering that it "can also shape the land scope, provide environmental benefits such as land conservation, the sustainable management of renewable resources and the preservation of biodiversity, and the contribute to the socio-economic viability of many areas"(OECD, 2001).

In terms of policy design, that entailed to include in the CAP new policy goals, beside the most characteristic, as agriculture activity was generally recognised able to ensure benefit having regard to (European Commission DGAgri, 1999):

- Food safety and food security
- Environmental protection
- Viability of rural areas.

On these bases, the Commission put forward the legislative proposal under the label of the European model for agriculture for the years ahead (Commission of the European Communities, 1998). It is characterised by the fact that "for centuries Europe's agriculture has performed many functions in the economy and the environment and has played many roles in society and in caring for the land. That is why it is vital, as the Luxembourg European Council concluded in December 1997, that multifunctional agriculture must develop throughout Europe, including those regions facing particular difficulties" "whence" the need to maintain farming throughout Europe and to safeguard farmers' incomes. Yet, multifunctionality is considered also the distinguish factor respect to the major competitors.

The European model for agriculture relies upon the following basic lines:

- a competitive agriculture sector which can gradually face up to the world market without being over-subsidised, since this is becoming less and less acceptable internationally;
- production methods which are sound and environmentally friendly, able to supply quality products of the kind the public wants;
- diverse forms of agriculture, rich in tradition, which are not just output-oriented but seek to maintain the visual amenity of our countryside as well as vibrant and active rural communities, generating and maintaining employment;
- a simpler, more understandable agricultural policy which establishes a clear dividing line between the decisions that have to be taken jointly and those which should stay in the hands of the Member States;
- an agricultural policy which makes clear that the expenditure it involves is justified by the services which society at large expects farmers to provide.

Few years later, the Organisation for Economic Cooperation and Development (OECD) entered the debate with the aim of clarifying what multifunctionality is and consequently understand how, to what extent and under which conditions policy could support the sector to ensure the production of non-commodity outputs.

OECD study (OECD, 2001) provided a basic analytical framework to understand multifunctionality firstly under the economic view, on that basis set up the discussion about policy implications (OECD, 2003) for the CAP, as well as in the following it has contributed to put forward the reflexion about rural development policy as far as to propose a new rural paradigm (OECD, 2006).

About what multifunctionality of agriculture is, OECD (2001) provided a basic "working" definition which refers to that:

- Multifunctionality is concerning the production phase, being connected to a joint production process.
- Multifunctionality is somewhat specific of agro-forestry sector – referring to the sector as whole – in that there are multiple commodity and non-commodity outputs that are jointly produced, some of which are to consider externalities or public goods. Therefore, multifunctionality refers to goods that are not tradeable and whose value is not established through the market as a case of market failures (see also the discussion on the matter in chapter 4).
- What matters in the economic view is that agriculture implies the use of scarce resources. In that we can see a fundamental link with the concomitant sustainability issue, even though both concepts are to be distinguished. The former concerns the production process. The latter refers to the use of the stock of capital, especially of not-renewable resources, has a long run perspective and involves the global context. Again, the former is to be intended as a characteristic of the production, the latter is an overall (or horizontal) objective to be pursued by several policies.
- What matters in the policy view is twofold:
    - Some externalities (positive or negative) or public good are welfare-enhancing (or reducing);
    - Some externalities or public goods produced by agriculture meet the social demand;
- Hence, policy intervention is necessary to make agriculture able to produce jointly externalities, or produce more of them, considering that are socially demanded and out of the market; also to internalise the externalities.

- The second consequence is that, in this perspective, agriculture is *entrusted* to fulfil some social actions that meets the "normative definition adopted by OECD.

It is self-evident that, by this way, the deep fracture between farmers and citizens-consumers – due to the distortions of the past – tries to correct and gain new public feeling.

To support a more rigorous and economically founded discussion about policy implication of multifunctionlity, the study develops an essential framework based on the main economic conditions that allow recognising the case for a public intervention only if each are verified:

- Connection between commodities and non-commodities (externalities) outputs of production.
- Externalities cause market failure (that is lacking of market).
- Non-governmental options (i.e. market creation or voluntary provision) are not possible.

In all the other cases, public intervention in not justified nor cost effective. This framework is intended to overcome a lack in economic literature (as stated by OECD) and allow Countries to avoid "policy development that are ineffective, inefficient and costly, and that risk to conflict with international obligations" (OECD 2001, p.20).

Some aspect evoked by the Commission as externality as effect of the multifunctional agriculture is explicitly rejected by OECD, especially the rural employment. More in general, OECD paradigm seems to be more stringent and rigorous than the policy approach adopted by the Commission until 2001.

Conversely, after the discussion, it is clear that the welfare animal issue, may represent a positive externality also in the stringent paradigm set out by OECD. I have already

discussed in paragraph 4.2 that, according to major literature, it is certainly an externalities, that may have or not a market depending both on the level of standard to be insured (legal or merit) and on the public estimation in the time which may accord a premium price for products which are animal welfare-friendly. Hence, in the light of this discussion too, some level of policy intervention can ensured in the scope of the multifunctional CAP after 2000 that takes into account agriculture multifunctionality and ability to meet social demand for public goods.

Table 4-2 - The OECD New Rural Paradigm. Soure OECD, 2006

Table 0.1. **The new rural paradigm**

	Old approach	New approach
Objectives	Equalisation, farm income, farm competitiveness	Competitiveness of rural areas, valorisation of local assets, exploitation of unused resources
Key target sector	Agriculture	Various sectors of rural economies (ex. rural tourism, manufacturing, ICT industry, etc.)
Main tools	Subsidies	Investments
Key actors	National governments, farmers	All levels of government (supra-national, national, regional and local), various local stakeholders (public, private, NGOs)

4.2.8. Main relevant points from Agenda 2000 to 2014-2020 CAP reform

Via multifunctionality, CAP achieved new dimensions. Even if environmental issues have entered the CAP in MacSharry reform with the agro-environment measures too (European Communities, 1992a), only since Agenda 2000 reform (Commission of the European Communities, 1999) the CAP clearly relies upon a new set up aiming at ensuring the joint provision of public and private goods through a dyadic orientation: reorienting to the world market the European agricultural trading system, paying major attention to non-trade concerns, such as food security, environment protection and rural areas viability. Therefore, because of the multifunctional approach, the CAP has

become a much more complex and integrated policy, and the main trend is to progressively reinforce the rural development policy.

Nonetheless, in that early-transition period, multifunctionality has served to justify the inertial take-off of such a change, so deep that is still ongoing and uncompleted.

Furthermore, in the period 2000-2014 the cadence of the reforms sped up thanks to the new habit of mid-term reforms - or health check, like are also named. They took place in 2003 and in 2008. A new health check is likely to take place in 2017, as it has been called on by environmental organizations. Furthermore, the CAP 'Horizontal' regulation (European Union, 2013e) requires the Commission to carry out a comprehensive evaluation of the performance of the policy by the end of 2018, even if there is not obligation. Simplification Acts in 2015 (European Union, 2015a, 2015b, 2016a), discussion on simplification by Commissioner Hogan (Hogan & Cor, 2016), after a commission staff working document on greening (Commission, 2016) are the last documents. A whitepaper on greening is expected by early 2017. European Commission has promoted a broad proposal to revise current regulation about CAP and ESI Funds expressively named "omnibus" (European Commission, 2016a, 2016b, 2016c) because it is firstly not exclusively reserved to agriculture. The subsequent reforms I refer to in the following[3] are, by year:

- 1999 Agenda 2000 (Commission of the European Communities, 1998, 1999)
- 2003 Mid-Term Review (Commission of the European Communities, 2002)
- 2005 Reform for the programming period 2007-2013 (Commission of the European Communities, 2005, 2006b)

3 All the documents that are quoted in the list refer to the Commission proposals that in turn opened the public and political debate. The specific regulations that in turn followed are available at http://www.eur-lex.eu

- 2008 Health Check of the CAP (Commission of the European Communities, 2007, 2008)
- 2010 Reform for the programming period 2014-2020 (European Commission, 2010b).
- 2015-2017 Simplification.

Without entering the specific contribution each reform has given, it is to remark that the flow of subsequent reforms represents a continuum that is the progressive walking towards the high goals posed in 1999, on one side. On the other side, the advancement is articulated not only by the political dialectic between supporters and opponents, but also by some basic historical change occurred in the period, especially the global crisis that appeared since 2008 requiring a special regard in the phase of CAP health check (Commission of the European Communities, 2008). As a consequence, the CAP Health check in 2008 aimed to modernise the sector and make it more market-oriented. The European choice to face the crisis is synthesised in the strategic Commission's Communication *Europe 2020 strategy for a smart, sustainable and inclusive growth* (European Commission, 2010a) that put the CAP too in a new perspective (European Commission, 2010b). Consequently, European policies were to support innovation and research to enhance the competitiveness in every economic sectors; besides, major attention was to support cities, employment and societal issues. Yet, the environmental issues were deepening as far as to result in a more organic and pervasive strategy for an *European bio-based economy* (European Commission, 2012c), also affecting the CAP in the latest reforming period.

Finally, it is to consider that the CAP is the result of an accrual of different visions of what European agriculture should be, and of pressing social demand linked to the emerging challenges. Both are ensuing: its reforms advance very slowly over the

decades; it has conglobated, in various degree, aims referable to competing interests, in an effort to compromise, which does not avoid contradictions. This consideration, other than a common impression, relies upon analytical review of the main European politicians discourses (Erjavec & Erjavec, 2009) showing the compresence of protectionism, liberalising and multifunctional intents, according to the different auditorium.

For my purpose, this premise make it possible to consider synthetically the CAP for the long period from Agenda 2000 to date, willing to point out only the main lines undertaken with continuity, in my effort to rebuild a comprehensive picture. That allows the analysis of the main policy measures linked to animal welfare in both pillars to be well interpreted in the light of the complex frame. More in particular, right the interaction between direct payment to farmers and measures for animal welfare will turn out to be of central focus in the next chapter 5.

Rebuild the main direction CAP has taken after AGENDA 2000 to date is a hard task to tackle. In the start I consider that the main aims of Agenda 2000 included: more market orientation and more competitiveness, food safety and quality, stabilization of agricultural incomes (instead of prices), integration of environmental concerns into agricultural policy (and animal welfare in this group), developing the vitality of rural areas, simplification and strengthened decentralization.

I try to draw an original picture in a schematic way, by identifying the main areas (framework, competitiveness, environment and rural areas) covered by the new set up and linking to each of these the most important keywords (Europen Commission, 2015) that have characterised the subsequent reforms, overall referring to the regulation in force.

CAP framework. Rural Development policy, since Agenda 2000, were to support many rural initiatives by helping farmers to diversify, to improve their product marketing and to otherwise restructure their businesses. Since Agenda 2000, the CAP has assumed a new framework organised through two pillars (European Communities, 1999), the one for the market measures and the other for the rural development and from 2007-2013 reform also two specific funds in the place of the two section Guarantee and Guidance of the European Agricultural Fund (European Union, 2005). After accruing many more goals over the time, nowadays it has turned out to be a great case for all that is neither market measure nor direct payment. However, both pillar concur to achieve the same high objectives, even coming from different histories. In a context of progressive reduction of the CAP's budget, the first keyword linked to the new framework is **transfer from first to second pillar** that is, the States are engaged to progressively transfer resources from the first to the second pillar (or modulation, ex art 10 reg 1782/2003).

Nonetheless, there was a general criticism about the disproportion between the widespread and growing objective attributed to the rural development and the resources effectively available. The second keyword is **simplification** that was emphasised mostly in the 2007-2013 reform (Commission of the European Communities, 2005), for decentralising, streamlining and simplifying programming procedures.

Competitiveness. A first group of keywords ensue to the premise of market-orienting the production and opening to the global market. That has meant **decoupling** every aid from the level of production, and chose to support farmers' income through **basic payment scheme** (European Union, 2013f), to which a **modulation** system of progressive reduction has been applied from the beginning (European Union, 2003a) to second CAP budget reduction and the need for redistribution to other CAP objectives,

under various conditions (European Union, 2003a). Nowadays, **capping** and **degressivity** are the voluntary limit to the basic payment received by farmers that each Member State can chose.

The change ensuing to the CAP objective shifting from market to income stabilisation has been the reform of the Common Market Organisations (CMO) which has been reduced from twenty-two to a **single CMO** for all agricultural products listed in Annex I to the Treaties (European Union, 2007a, 2013e). The "plural" CMOs in the new market oriented approach have loosed the original function of managing the tools for stabilising each market through price mechanism and duty to borders. According to Frascarelli (Frascarelli, 2016b), the season of the CAP like it had been thought of at the Stresa Conference has ended. Nowadays, in the place of direct instrument, the single CMO serves mostly to favour farmers' and their organisations' self-organisation to face demand and price fluctuations, as well as counterbalance the unequal distribution of bargaining power along the supply chain, also through the tools of the contractual economy.

Other new keywords meet correspondent priorities and measures in the second pillar. The horizontal priority is: fostering knowledge transfer and **innovation** in agriculture, forestry and rural areas. Concerning **competitiveness** there are the priorities: enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and the sustainable management; and promoting food chain organization, including processing and marketing of agricultural products, **animal welfare** and risk management agriculture. Therefore animal welfare has gained the honor place to stay in the priority of rural development policy, as to what concerns the way a farm and the supply chain, can become more competitive. Support

for investment can sustain also those marketing action whose importance is been stressed in the previous chapter.

The measures are: knowledge transfer and information actions; advisory services, farm management and farm relief services; restoring agricultural production potential damaged by natural disasters and introduction of appropriate prevention.

Cooperation among farmers in the very various forms (European Union, 2013, art. 35) as one of the utmost measures to support competitiveness, beside that to set up producer groups and organizations, and the other measures to support farm and business development, investments in physical assets and innovation. A new and most specific form of cooperation among different subject among scientist, and supply chain actors, is the **EIP**, European Innovation partnership, to favour scientific innovation delivering. Other specific programmes support innovation, especially the Horizon programme to support research and innovation to underpin smart growth in agriculture too. However, the tools to support **risk management –** insurance schemes and funds - have been considered not enough to counterbalance demand fluctuation and price volatility so as to gain somewhat stabilisation. **Food safety and food quality** are the keyword around which the relationship between farmers and consumers has rebuilt. The second pillar commits a specific measure to the support the adoption of quality schemes for agricultural products and foodstuffs. Food quality scheme for agricultural product and foodstuffs lays down a latest regulation (European Union, 2012b, 2014).

Rural areas. Even apparently less relevant for the core theme of the thesis, the measures to support rural areas are worthy to be mentioned because of the importance to maintain the viability of the region interested in by the study and for the reflexion on the future perspectives. To develop and improve social inclusion in rural areas the rural development policy points out the specific priority *Promoting social inclusion, poverty*

reduction and economic development in rural areas. From Agenda 2000 the policy has supported **diversification** of farming activities, and comprehensive program, **LEADER** to develop according to the Cork principle. In the most recent period, a new approach is adopted (Fig. 5.2) coming from OECD (OECD, 2006) contribution to the debate on rural development policies. The regulation in force has most heavy chosen the local scale to implement ESI Funds in an integrated way, in favour of rural areas development through the scheme of the Community-Led Local Development, **CLLD** (European Parliament and the Council, 2013), which as to rural development is mostly implemented together with Leader approach.

Environment and animal welfare. A great part of CAP regulation is committed to environmental issues. Under the first pillar, **cross compliance** is the first keyword to indicate the link between farmers' activity in the countryside and the right to perceive direct payments.

Animal health is part of the cross compliance condition since the Mid-term Review. The Regulation (CE) 1782/2003 (European Union, 2003a) established that farmers receiving direct payments were to respect the statutory management requirements and the good agricultural and environmental condition, to be ruled at national level. Among the areas in which to establish statutory management requirements, beside to *public, animal and plant health and environment,* firstly *animal welfare* was placed (article 4). The Regulation (CE) 1783/2003(European Union, 2003b) amending the regulation 1257/1999, stated that (whereas 6):

> *Farmers should be encouraged to adopt high standards of animal welfare. The scope of the existing agri-environment Chapter of Regulation (EC) No 1257/1999 should be extended to provide for support to farmers who undertake to adopt standards of animal husbandry which go beyond statutory minima.*

In the current period, animal health and welfare are again part of the standards and requirements under which **cross compliance** is established (European Union, 2013e) referring to:

- the general directive to protect welfare of animals kept for farming (Council of the European Union, 1998) as to (art. 4) the conditions under which animals (other than fish, reptiles or amphibians) are bred or kept, having regard to their species and to their degree of development, adaptation and domestication, and to their physiological and ethological needs in accordance with established experience and scientific knowledge.
- The directive to protect calves welfare (Council of the European Union, 2008) as to the condition they are bred and kept.
- The directive to protect welfare of pigs (Council of the European Union, 2009) as to the conditions under which they are bred and kept.

Over the time the conditional relation has come more rigid as to what it requires. In the current period, the **greening** is a compulsory component of the basic payment scheme. An additional payment is due to farmers that respect agricultural practices able to produce benefit of climate and environment implementing three measures: permanent grassland, crop diversification; maintaining of ecological focus area for example for field margins, trees, landscapes features. Greening equivalency is provided for farmers who already adopted virtuous practice, such as organic farmers, for example.

In the second pillar, environment concerns find a rich articulation of objectives laying down several priorities (European Union, 2013d)- restoring, preserving and enhancing ecosystem related to agriculture and forestry; promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors; - and measures. The measures articulation shows the multiple

facets of environment concern: general agri-environment-climate; forests; Natura 2000 areas and water framework; areas facing natural or other specific constraints, organic farming. Despite previously, a specific measure for **animal welfare** (art. 33) is provided. Farmers who are voluntary committing to improve animal welfare beyond the legal standard will receive a payment for the income foregone or the major cost. In the implementing regulation(European Union, 2013b), the Commission established that Member States, in their programmes, may mix commitments in the field of agri-environment-climate, organic farming, animal welfare, forest-environmental and climate provided that they are complementary and compatible. Besides, with reference to the **quality schemes for agricultural products, and foodstuffs**, Commission (European Union, 2013a) specified that the measure supports also schemes, including farm certification schemes, for agricultural products, recognised by the Member States as complying, among other criteria, the ability to guarantee that the final product under scheme is derived from clear obligation as to the quality of the final product that *goes significantly beyond* the commercial commodity standards as regards public, animal or plant health, animal welfare or environmental protection. Moreover, Commission includes among the eligible actions also those designed to induce consumers to buy the products covered by a quality scheme for agricultural products, drawing attention to the specific features or advantages of the products concerned, notably the high animal welfare standards linked to the quality scheme concerned.

The **advisory system** to support farmer knowledge enhancement, financed by RDP, should aim to help them to become more aware of the relationship between agricultural practices and management of farms on the one hand, and standards relating to the environment, and also animal health and safety, among the others.

Horizon programme may also cover studies on the effects of practices on animal welfare(European Union, 2013, p. 1003).

Chapter 5. Animal welfare in the Sardinia RDP

5.1 Animal welfare and market crises: why the problem arose

The major part of the Sardinia Region is classified as rural, according to the well-known OECD parameters to which European regulation refers. That is not enough to understand the actual characteristics of a region where sheep farming has been able to shape both the land through the need for pasture, and the rural society as well. According to Pulina and Biddau (2015) "If Sardinia left sheep farming, it would lose the deeper part of its own identity". Nowadays just like in the past, with more than three million of sheep and more than twelve thousands of farms (Laore, 2013) sheep farming is the most important productive branch in the regional agriculture and for the region as whole. Thus, by the social and economic points of view, to strength the ovine supply chain may ensure social, economic and territorial cohesion in the rural areas. Contrariwise, its weakening would imply the loss of economic activities, and result in definitive depopulation of many rural zones, losing social and territorial cohesion too.

The force that shepherds are able to press under the regional government, especially in the period of crisis, relies mostly on this basic socio-economic and territorial structure of the Region.

In the last decade of the twentieth century, the ovine supply chain was supported to modernize and mechanize farms' structures and practices (especially milking) by a public policy (Regione Autonoma della Sardegna, 1998). Results were pervasive and achieved two additional outcomes: to improve milk quality with respect to biological parameters (e.g. reduction of bacteria) aligning with European standards; to enhance profitability of sheep farming, consequently attracting young farmers (Pulina & Biddau,

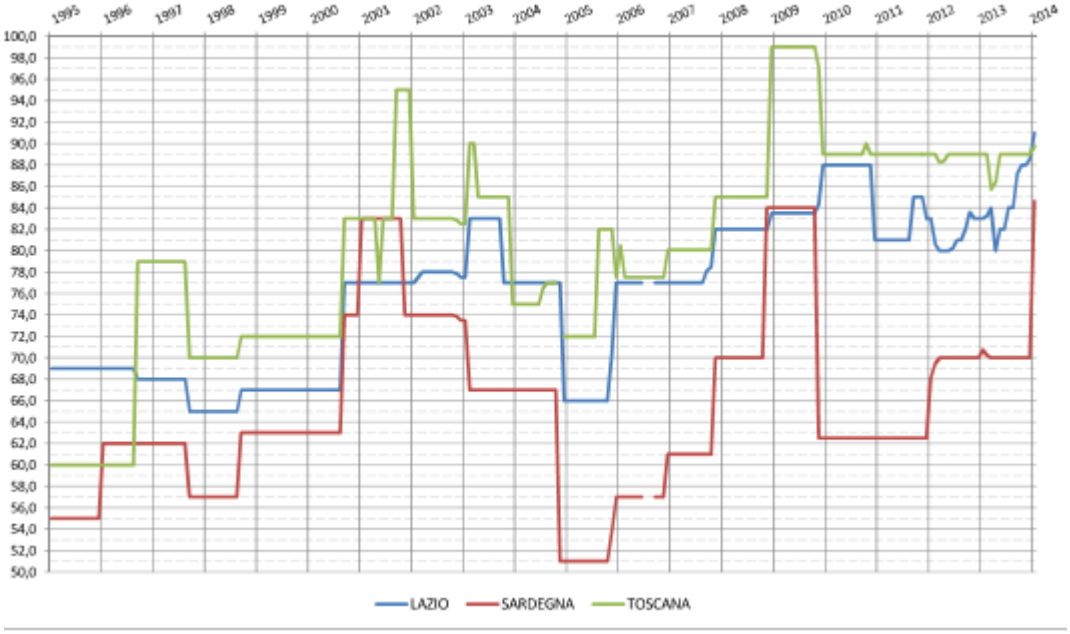
2015). Both were being able to support milk price increased until the initial years of the twenty-first century, as Figure 5.1 shows.

Milk price volatility in this chain relies upon the peculiar characteristics of the supply chain that suffers of two lacks: insufficient raisers' organization in the chain, by means of Organisation of Producer or interbranch organisation; steady contractual relationships, since verbal agreement are still broadly used. Both make raisers have less bargaining power in the chain, because do exposes the shepherds to asymmetric information and moral hazard in terms of speculation on the milk price.

Many causes contributed to drop rapidly down the price of milk in the period 2004-2005 up to touch the lowest threshold of 0.51 euro per litre (Laore Sardegna, 2014). That price were generally unable to meet farmers' costs, a deepest crisis were arisen. As a result, regional government was called into question through broad and vibrant protests. On 15th April 2005, an agreement was reached to add 0.14 euro per litre to the industrial supply, so as to meet raiser demand of 0.65 (Pulina & Biddau, 2015). To ensure such an integration of price by public resources, it was necessary to modify the regional Rural Development Program (RDP) 2000-2006 just in its last year of implementation.

The Regional government prepared the new release including the measure to enhance animal welfare, with the aim to ensure a premium of 19.25 euro per year per livestock unit, able to provide the equivalent of the price integration demanded by raisers. The Commission approved that innovative proposal with decision C (2005) 4581 on November twenty-second.

Table 5-1 -Milk price at origin (E/100lt VAT included) in Lazio, Sardinia and Tuscany, from1995 to 2014. Source: LAORE on ISMEA data (Laore Sardegna, 2014).



5.2 And why animal welfare turned out to be the right answer

There is a deep and complex link between the 2005 market crises of the ovine milk and the idea to find the rescue just in a measure aiming to improve animal welfare.

The first link is rooted on the prevalent "business model" of the sheep farms (Pulina & Biddau, 2015), that was historically oriented to maximize the quantity (to increase the flock and enlarge the grazing) rather than to improve the quality of the milk produced. At the occurrence of milk price depression, joined to the lack of farmer self-organisation, such a kind of "business model" oriented farmer reaction to increase the production. The ensuing effects were perverse: push to maintain price lower; intensify farming systems, which resulted in the worsening of the management condition for sheep and goats. Worsening of the surveyed parameter of stress in the sheep ensued.

The second special link is between sheep and goats welfare situation, health conditions and milk quality as surveyable through biological parameters, especial in terms of

bacteria load. According to by Pulina and Ruiu (Ruiu & Pulina, 1992), based on a survey on Sardinia sheep, there is a strict correlation between the indicator of sheep stress (CCS) and the number of samples resulting positive to bacteria able to cause illness, as showed in Table 1.

Finally a strict relationship is between milk quality and cheese quality: higher level of enzyme are able to alter the process of coagulation and maturation of cheese as far as to lower its quality. That is especially considerable for the case of cheese PDO which have to respect rigid disciplinary.

The strong connection from bettering animal welfare to bettering market valorisation of ovine chain production is clear: improved animal welfare entails higher milk quality that ensure better cheese quality to be appreciated by consumers for its own intrinsic quality. Furthermore, consumers may appreciate the cheese extrinsic quality of food coming from ethical production system, as argued in the second and third chapters.

This peculiar and innovative choice – in fact no other European Regions were implementing a measure for animal welfare before 2007 - allowed shifting the reasoning emerging from the need to counteract a market crisis, to the perspective of deeply enhancing sheep farming management and structures for better facing more competitive markets of the new century.

Therefore, implementing a new measure to support the adoption of standard to enhance animal welfare beyond the compulsory threshold seemed then the right way to underpin a double aim. Raisers were allowed to receive a premium – equivalent in value to the price integration originally required - without interruption for a five-year period. The Sardinia sheep farming system as whole were allowed to gain structural improvement.

In this perspective, it would seem more appropriate to refer to a branch policy hinged into an RDP measure instead of a simple measure implementation.

Pursuing such an ambitious goal, this characteristic policy has had a first quinquennial implementation period from 2006 to 2010, a second from 2011 to 2015 – both crossing the typical programming period - and the third is still running up to 2020.

5.3 The first implementation (2006-2010)

5.3.1. Technical and scientific justification: how to measure sheep destress and fix the target

Before entering the specific of the matter, it is important briefly to hinge what reduce stress of sheep in the concept of sheep welfare from a scientific standpoint (Bertoni, 2009; Morgante & Vallortigara, 2009; Sevi, Casamassima, Pulina, & Pazzona, 2009).

The scientific report initially provided by the University of Sassari to the Sardinia Region starts from claiming the concept of welfare taken into account, the one that consider the ability of the subject *to adapt* to the environment (Broom & Johnson, 1993; Foddis, Rassu, & Pulina, 2005). The concept of adaptation allows to call into question the one of *stress* to be intended as the reaction of the subject to the changing environment. The subject is to recognize the stressor, react to it and bear the consequences (Moberg, 2000). The nature and the intensity of the last are what to see for assessing whether the status of stress coincides with a sufferance or not. Again, this *status* is to be considered in its development over the time, instead of a single reaction observable at a certain moment.

In the sheep farming, several activities can cause stress in the sheep and deserve to be named the activities that:

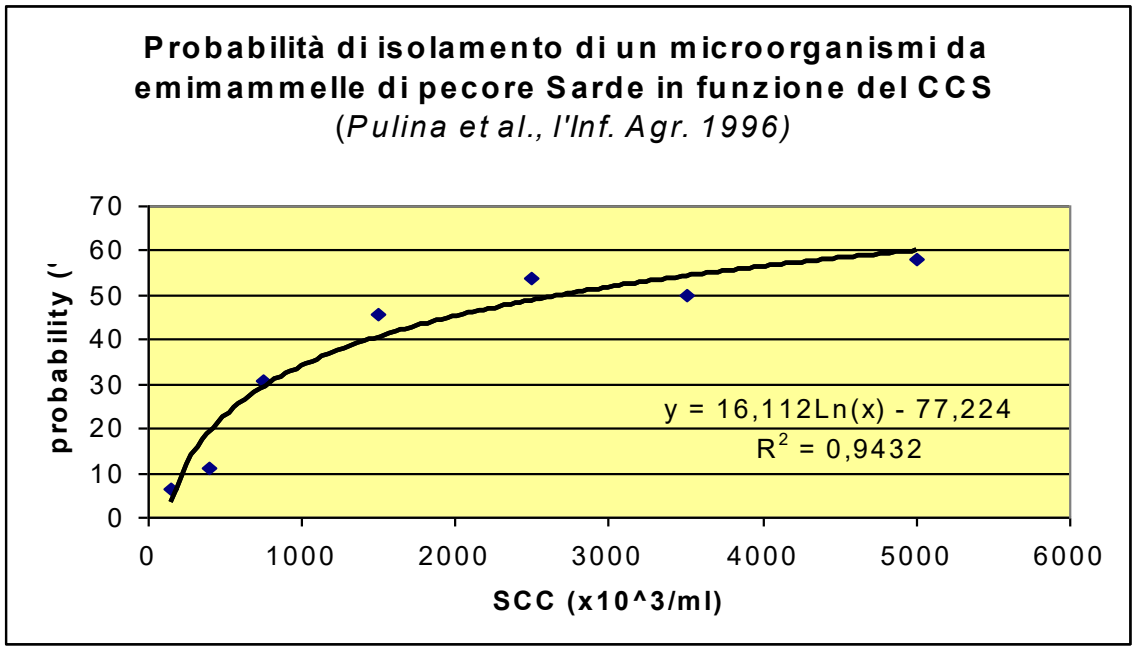
- cause pain (inappropriate flooring, or milking machine e.g.)

- cause fear (dirty bedding, inappropriate handling, dogs, overcrowding e.g.)
- cause hot or cold or warm (out of the range 15°-18°C)
- are out of the routine (change of the hour of milking).

As a result of the stress, reproductive apparatus and udder are mostly suffering for inflammatory status and/or infections (mastitis). That leads to individuate the presence of **somatic cells** in the milk (SCC) as a main indicator.

Therefore the first question is whether SCC is relevant and sufficient to indicate in a synthetic way if high level of SCC means that a subject is reacting to stressor ensuing to farming activity. Contrariwise, low levels of SCC should be interpreted like an absence of stressor in the farming activity.

Table 5-2 - Probability to find microorganisms in udder of Sardinia sheep in function of SCC. (Pulina et al. 1996)



The answer comes from clarifying the linkage between high level of SCC on one hand and mastitis or simple inflammatory state on the other. Grounding on the above mentioned study on sheep udder in Sardinia (Ruiu & Pulina, 1992) the University report

states that there is a significant correlation up to a certain extent. Up to 50% of SCC variability is ensuing to non-pathological causes, which are to be recognized in the environment and way of farming management, especially the techniques of milking and feeding. From this consideration also stems the following: if sheep welfare will improve, also the incidence of infections will reduce, so the other 50% of SCC variability could shrink in some measure. Having regard to these outcomes, SCC is considered to be taken into account as a significant and synthetic indicator of sheep welfare.

The second question is about what is the threshold of SCC to be considered the right target to pursue in that able to ensure the desirable welfare conditions.

The above mentioned study (Ruiu & Pulina, 1992) also pointed out that the critical value is just on the class of 1.000-2.000 CCS, and that under that threshold of 1.000 SCC the probability to find samples positive to bacteria causing illness is drastically decreasing as the table 5.2 shows.

Table 5-3 - Relationship between SCC and results of bacteriological test on ovine milk samples. Source: Pulina and Ruiu, 1992

SCC	n. samples			Pos./tot	Relevance
(n.x 1.000/ml)	Positive	negative	total	(%)	(P) (*)
>300	2	48	50	4,00	<0,001
300-500	20	190	210	9,52	<0,001
500-1.000	93	152	245	37,96	<0,001
1.000-2.000	146	123	269	54,28	0,90-0,75
2.000-3.000	63	58	121	52,07	0,50-0,25
3.000-4.000	43	45	88	48,86	0,25-0,10
>4.000	210	156	366	57,38	
Total	577	772	1.349	42,77	

(*) probability that the value of the class is not different from the upper class.

Finally it was possible to fix the threshold value below the threshold of 1,000,000 SCC/ml. By comparing the chosen threshold with the historical data, a definitive conformation comes. Referring to data surveyed by the regional association of raisers (ARAS) over the period 1999-2005 on a sample of 120,000 observations, the level of SCC geometric average turns out to fall down from the initial 1,79 million/ml to a minimum of 1,7 million/ml in 2001, but to increase rapidly in the next years up to the maximum of 1.860 million/ml, the worst conditions observed in 2004. On this base, the gap to overcome was established too.

5.3.2. Translating the target in an innovative animal welfare-oriented farm management: the need for training and advisory support

The third question were composite: to identify farmer management systems able to reduce stress in the sheep; the unambiguous parameters to verify if they were accomplished or not; the economic value of major time spent and additional cost finalised to pursue the objective in order to quantify the premium to correspond to farmers.

The compulsory requirements farmers were to comply were to be identified on scientific basis too, in order to guide regional government in designing such an innovative measure. Rooted in the scientific concept of adaptation to stress, welfare standards are completely depending on shepherd behaviour and choices. In other words, management and farm structures are able to influence the three basic relationship able to cause stress in sheep: the one among animals in the flock, the one between man and animal, finally the one between animal and farm environment (Pulina & Biddau, 2015).

Given the starting point, the ambitious aim was to achieve permanent (structural) decrease of stress affecting sheep and goats and risk of illness, especially mastitis, lowering. Consequently, the key-activities to be improved to fulfil the objective were: milking, bedding maintain, prevention and early remedy to incipient illness.

Milking. Spreading the correct use of milking machine was the first condition to accomplish for bettering sheep and goats welfare and quality of milk as well. that implies also the correct handling of the machine, gettable thanks to planning serviceman intervention two times per year. Getting 70% of the livestock in lactation (given the 55% starting point) milked by machine was the target. As to reducing behavioural source of sheep stress during milking, building stockyard was compulsory to allow sheep access without sufferance a waiting room before milking. Furthermore, special attention was to be paid to the primiparous sheep. The SCC test on the flock was to be done by a laboratory specialised one time per month and the result was to be archived by the raiser. Maximum concentration of livestock per hectare of SAU was fixed to 2 UBA per hectare in order to contrast the trend to intensify the growing.

Bedding maintain. Maintain dry and healthful the bedding is the objective of the second set of key-activities. Three times per year the complete renewal was needed, together with disinfection and pest control. Weekly, new layers were to be added to ensure bedding be soft and dry.

Prevention and quick rescue of illness, especially mastitis. Identifying, rapidly separating, analysing and mark livestock unit suspected to be ill was the set of key-activities able to: make the flock more safety from infection; put quickly under focus the ill livestock unit; make the surveyed value of SSC a reliable measure of welfare coming only from stressor and not from illness. Diagnostic method were to be applied by shepherds through CMT (California Mastitis Test).

SSC was to be surveyed periodically and registered by raisers.

New behaviour, new procedures, new technicalities, and their importance as well, were to be learned. A new awareness were to be formed. Thus *farmers' training* was needed in the set of compulsory activities to accomplish, being the necessary way to accompany the actual management innovation to introduce in the farmers' habits. To enhance the Sardinia sheep farming system as whole, to make training a compulsory action was unavoidable.

The operational guidelines (Regione Autonom della Sardegna, 2006) -and with much more details the call launched by Sardinia Region on 21st march 2006 (Regione autonoma della Sardegna, 2006a) - translated scientific recommendations in specific rules to regulate raisers' behaviour, make training and advisory programs compulsory, quantify the premium maximum in 127,50 euro per year per UBA, based on the evaluation of major costs and time spent to accomplish the compulsory[4] requirements.

5.3.3. How the measure became possible crossing 2000-2006 and 2007-2013 RDPs

The Mid-term review in 2003 had introduced animal welfare among the statutory management requirements of cross compliance (European Union, 2003a) and had given to farmers the possibility to enjoy the support for adopting standards of animal husbandry beyond statutory minima (European Union, 2003b, see also par. 4.5.2). Furthermore, modulation was introduced to allow resources to shift compulsorily from the first to second pillar in every Member State (European Union, 2003b art. 10).

[4] In the first implementation some kind of requirements were admitted subsidiary, so partly gettable, without imply the loss of the premium but only a proportional decrease.

That paved the way to introduce in the Sardinia RDP a modification to implement a measure aiming at improving the quality of the ovi-caprine production "coherently" with the agreement reached in 2005 (Regione autonoma della Sardegna, 2006b). The new measure F action B was for supporting farmers to enhance animal welfare.

To gain fully the desired goals, the measure was to start quickly in 2006 – without expecting the beginning of the new programming period 2007-2013. Secondly, it should avoid the usual discontinuity that characterises the period between the finishing of the previous and the starting of the following.

Thus the regional government was been designing a measure regarding the animal welfare in sheep and goat growing to be introduced in the current RDP among the "agro-environment measures" and the following fitting of the best practices to apply in the specific branch. Detailed agronomic calculus accounted for the loss of revenue and major cost to be faced to apply the new practices and justified the premium to correspond to raisers. The Commission's approval was achieved in 2005 November (Decision C(2005)4581, not published).

Raising the funds for the new measure was the difficult task to tackle, because the Sardinia region was being "overspending" already in 2005 - that is the regional expenditure for RDP's measure was running more quickly than planned. In other words, Sardinia was a virtuous region very effective to spend European funds, but it turned out to be an obstacle to be overcame to plan the new policy implementation already in 2006.

The Region estimated about twelve thousands shepherds could benefit from the measure, corresponding to the need for quite forty-eight millions of euro to add. Raising the funds was possible thanks to several actions. First of all, through the regional law No 7/2005, 20 millions of euro from regional budget were made available. European

Commission (Decision C(2005)4581, not published) made allowable the aid of State the Region had made available with its law.

Other actions were undertaken to raise funds for the new measure scheduled (the one for disadvantaged areas was planned too):

- Participating to the national distribution of the resources coming from *overbooking* (that is, money not expended by other Regions or other Member States and made available for the most virtuous ones) raised 38,73 millions of euro.
- Demanding a percentage quota of the 68,4 millions of euro, that was the total amount of the Italian Modulation in 2005.
- Demanding a quota of the national fund in anticipation 2007-2013, reserved to the Regions having the merit to implement multi-annual measures.

Planning a multi-annual measure for the five-year period 2006-2010, was the trick that allowed to count on sure funds to budget since 2007 to face the increasing overspending. On 21st march 2006 the first call could count on 47,812 million of euro, farms having more than five UBA could benefit from the measure. To the first year commitment, in the following four the simple confirmation was to follow.

In 2007 the new financial budget for the regional rural development plan 2007-2013 made available 209,158 million of euro for the measure 215 - that was the correspondent of the FB. (Regione autonoma della Sardegna, 2007) The new RDP was approved by the Commission by the Decision C(2007) on 28th November 2007. Only after that date the payments become actually possible. According to the new European regulation on rural development, the regional guidelines were to cope with the new *cross-compliance* rule. Anyway, they were fund coherent with the new regulation too, consequently raisers' commitments were not to be changed, like the premium as well (Regione

autonoma della Sardegna & Sardegna, 2007). In 2008, according to professional organisation request for procedural simplification, the Region stated that the certification of the results of the SCC test - that each raisers were to make monthly, archive and attach to the request of confirmation of the following year – could be electronically archived by the ARAS, in lieu of the single beneficiary (Regione autonoma della Sardegna, 2008).

5.4 The second implementation (2011-2015)

5.4.1. Redesign the measure for animal welfare after 2010

The starting of the second five-year period of implementation was designed taking into account what had been learned during the first period and the new rules in force to regulate the CAP and the rural development policy in the 2007-2013 programming period. First of all, the goal of reducing SCC level under the threshold of 1million/ml was failed, even if data clearly showed appreciable improvement, about 1.3 million/ml is the average value observed at the end of the period. Such a target was newly considered the most desirable, grounding on the same scientific consideration that moved the first implementation (see par. 5.2.1): lowering SCC below the 1million–threshold both disease and stress would reduce. Consequently the quality of milk and cheese would increase, that rested the desired economic effect to produce in the sheep farming chain mostly (the measure in fact was to other animals too, even if less important for socio-economic structure of the region than ovine chain do).

Table 5-4 SCC influence on milk composition and dynamografic (Pirisi et al., 2000) Source: University of Sassari Scientific report, 2011

	CCS*			
	<500	500-1000	1000-2000	P

CCS/ml (x1000)	229	653	1200	
pH	6.52	6.62	6.68	**
Lattosio, g/100 g	4.74	4.54	4.38	**
Grasso, g/100 ml	6.61	6.34	6.36	NS
Proteina, g/100 g	5.25	5.45	5.51	NS
Caseina, g/100 g	4.18	4.26	4.20	NS
SP, g/100 g	1.07	1.19	1.30	**
Ca sol, g/l	0.46	0.38	0.36	*
Na, g/l	0.80	0.95	1.11	**
R, min	19.82	27.21	35.21	**
K20, min	7.89	9.96	13.93	**
A30, mm	25.71	24.43	20.58	**

* valori espressi in migliaia di CS/ml

Evaluating report (ISRI, 2010) had observed some criticalities.

The one named “internal” is the lack of proportionality between the rights to receive the premium and the goal to reduce SCC. Yet, the lack of raiser engagement to improve the general health-conditions of the farm, especially those of water, that are able to cause infections. The table below shows the increasing interrelation between the chosen indicator (SCC) and subclinical mastitis observable in a flock on whose base the study carried out by the University of Sassari in 2011 argued the need to adopt new practice for isolating illness units.

Table 5-5 - Relationship between SCC in milk of the flock and percentage of units affected by sublcinical mastitis in the flock (Berthelot et al. 2006) Source University of Sassari scientific report 2011.

SCC/ml average in the flock	% of livestock units affected by subclinical mastitis
250.000	5
500.000	10
1.000.000	20
1.500.000	30
2.000.000	40

The ones named “external” refer to deficiencies in sampling and monitoring method of SCC, able to weaken result reliability; to the persistence of illness in some areas, without epidemiologic studies and sanitary plans, able to enhance the SCC observed

even if not depending on stressor; the practice to pay milk on the base of its own quality, being able to push raisers to better their practices in order to reduce SCC.

At the end of 2010, the main questions were: what do better or spare to increase sheep and goat welfare and how more strictly tie raiser choices and managerial behaviour to the achievement of the target.

A wider set of actions, which were going clearly beyond the baseline, was to establish to cope with some important questions. Firstly, to reduce much more the SCC level in milk, both clinical and subclinical disease (mastitis) was to be reduced, and a new environmental stressor was identified in the podalic source of sufferance. Consequently, new actions to include in the new raiser five-year engagement was related to two macro-sets: actions to separate animals having milk with high SCC level; actions to reduce sufferance coming from podalic disease.

Separating and discarding milk coming from a number of animals are practices that raisers can carry out thanks to two (relatively) simple test to make themselves sure about the health of the units in the flock: the California Mastitis Test (CMT) and the electrical conductivity test (COND). Based upon a study conducted by the University of Sassari, a relationship was observed among SCC level, CMT and COND (table 5-6) able to provide significant parameters to be observed in order to identify units to be isolated. Given an observed result of CMT or COND, the second degree polynomial function that link the variable allows to recognise the number of units probably affected by subclinical mastitis to be isolated, to get the desired level of SCC in the milk.

Table 5-6 Relationship among CMT, Conductivity and SCC/ml in a flock. Source: University of Sassari 2011.

CMT	COND (mS/cm)	CCS/ml (x1000)
negative	4,1	<500
dubious	4,2	500-1000

1	4,5	1000-1500
2	5,2	1500-4000
3	6,2	>4000

Podalic affections plays a major role in the new activities thought for destressing sheep. Several actions were to be put under focus: grazing rationed; reduction of protein excess, synchronising ruminant fermentation; avoiding pasture in damp areas; avoid mildew in hay; separating suffering animals to stay in sites where bedding is frequently renewed; provide frequent physical examination by veterinary to identify pathogens.

To make raisers able to put into effect these new practices, it is self-evident that training has a major part in this second formulation of the measure too.

The second question implied to redesign the basic causal nexus of the measure: the premium would be given if the target will be achieved and not only if the practices would be implemented by raisers. In other words, the raisers' quinquennial engagement was to reach the goal and not to adopt better practices than in the baseline. Raisers shall provide special care for ovine feet, thanks to new structures such as tank for wash and disinfection.

Beside to these basic choices to plan the measure, other considerations coming from monitoring and evaluation were taken into account, such as the method of sampling and monitoring sampling was considered to improve in order to not fake the results of the analysis. Yet, the ability to isolate sick animals was considered to improve for making results able to describe only the condition (increasing or decreasing) of stress and not also of disease. Not least, the role of training and advisory was considered to improve too, to make raisers more and more aware of the value of action they were engaged to do.

Mainly on the basis of those consideration, the measure 215 designed a new list of commitments on which to engage raisers to enhance animal welfare in the period 2011-2015.

The juridical base of the measure 215 is the article 40 of the Council Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) about animal welfare and stated that:

1. Animal welfare payments provided for in Article 36(a)(v) shall be granted to farmers who make on a voluntary basis animal welfare commitments.

2. Animal welfare payments cover only those commitments going beyond the relevant mandatory standards established pursuant to Article 4 of and Annex III to Regulation (EC) No 1782/2003 and other relevant mandatory requirements established by national legislation and identified in the programme.

3. The payments shall be granted annually and shall cover additional costs and income foregone resulting from the commitment made. Where necessary, they may cover also transaction cost. Support shall be limited to the maximum amount laid down in the Annex I.

The Commission Regulation (EU) No 1974/2006 of 15 December 2006 (European Commission, 2006) laying down detailed rules for the application of Council Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) states (art. 27 par. 7) that: *Any animal welfare commitment as referred to in Article 40 of Regulation (EC) No 1698/2005 shall provide upgraded standards in at least one of the following areas: (a) water and feed closer to their natural needs; (b) housing conditions, such as space allowances, bedding, natural light; (c) outdoor access; (d) absence of systematic mutilations, isolation or permanent*

tethering; (e) prevention of pathologies mainly determined by farming practices or/and keeping conditions.

The measure 215 established to upgrade standards about (b) and (e). Grounding upon scientific justification of the list of new engagements, the new calculus of the premium took into account additional costs and foregone income. The agronomic calculus established a premium of 100 euro per UBA per year for the five-year commitment and 93 in farms practicing manual milking.

5.4.2. Financial resources for 2011-2013 period

For the second implementation period, Sardinia Region was to plan major financial resource than in the previous. In 2009, the sixth committee of surveillance had approved the additional resource coming from the health check of the CAP and the Recovery plan, so that, raising about 40 million of euro plus, the total amount of the RDP budget increased from 1,252.84 to 1,292.53 million of euro. The eleventh Committee of surveillance approved to shift resources from other measures of the first and second axes to activate the five-year measure 215 for animal welfare. Since 2011 the total budget for the measure 215 shifted from 209.15 to 299.89 million of euro. It is noticeable the importance of the measure that is the 40% of the second axis and 23% of the total RDP budget of 2007-2013. The efficiency of the expenditure is also noticeable: in 2012 the expenditure progress of the measure was the highest arriving about 200 million of euro (ISRI, 2013).

5.4.3. Overtaking 2014-2020 RDP

In 2014-2020 RDP. The Sardinia Region has been planning newly a measure to enhance animal welfare. The juridical base is the article 33 of the Council Regulation 1305/2013 Stating that:

1. Animal welfare payments under this measure shall be granted to farmers who undertake, on a voluntary basis, to carry out operations consisting of one or more animal welfare commitments and who are active farmers within the meaning of Article 9 of Regulation (EU) No 1307/2013.

2. Animal welfare payments cover only those commitments going beyond the relevant mandatory standards established pursuant to Chapter I of Title VI of Regulation (EU) No 1306/2013 and other relevant mandatory requirements. These relevant requirements shall be identified in the programme.

Those commitments shall be undertaken for a renewable period of one to seven years.

3. The payments shall be granted annually and shall compensate farmers for all or part of the additional costs and income foregone resulting from the commitment made. Where necessary, they may also cover transaction costs to the value of up to 20 % of the premium paid for the animal welfare commitments. Support shall be limited to the maximum amount laid down in Annex II.

On this base, the measure 14 has been provided by 225.6 million euro for the period, granting continuity to the measure 215 for its fourth and fiftieth year of implementation, and beyond for the third, current period too.

5.5 The current third implementation (2016-2020)

2014-2020 RDP has been adopted by Sardinia Regional Council with deliberation 36/11 of July 14th 2015 and approved by the European Commission with decision

C82015)5893. In its third edition, the measure does not list new kind of activities respect to the previous period that rest, but commitments (and payment as well) is distinguished between farms applying manual or mechanical milking:

- Training to improve farmer knowledge about animal welfare
- Advisory about mechanical milking (if the case)
- CMT test to monitor subclinical mastitis
- Periodical analysis of SCC of the milk of the flock
- Monitoring of podalic affections
- Isolating units with podalic diseases
- Bettering bedding handling
- Handling of the sites of growing.

In the calculus of the premium transaction costs are added. The amount is fixed in 114 euro per UBA per year for the five year period for mechanical milking and in 107 for manual milking.

The target has been fixed at 1.5 million of SCC/ml, thus higher than in the previous.

The measure is running since April 2016.

5.6 Several kinds of results

5.6.1. The logic of the policy intervention and the results

Sheep and goat welfare is only the first level of a more complex building aiming at make the raiser farms more competitive and less exposed to price volatility.

Therefore, the interrelated questions to verify through the evaluation analysis (ISRI, 2010) were about whether:

- Financial support has been able to push farmers to enhance their animal production standards above the legal compulsory;
- Financial support has been able to actually better standards of animal living, welfare and health;
- Milk quality has improved;
- Transformed products of the branch (especially Pecorino Romano cheese) has consequently enhanced.

Other results are concerned with improvement of raiser managerial capability and structure modernizing. Finally the evaluation analysis has highlighted innovation process as joined result of such a complex - and widely applied, as well - measure implementation.

As to the aim of the research, given the continuity of implementation over the last decade, the results are regarded along the period as whole, without underlining distinctions between the two.

5.6.2. Animal welfare enhancement

Two type of profile of analysis are significant: the one non animal-based concerns with the raiser practice, structure, management improvement, and the wideness of measure

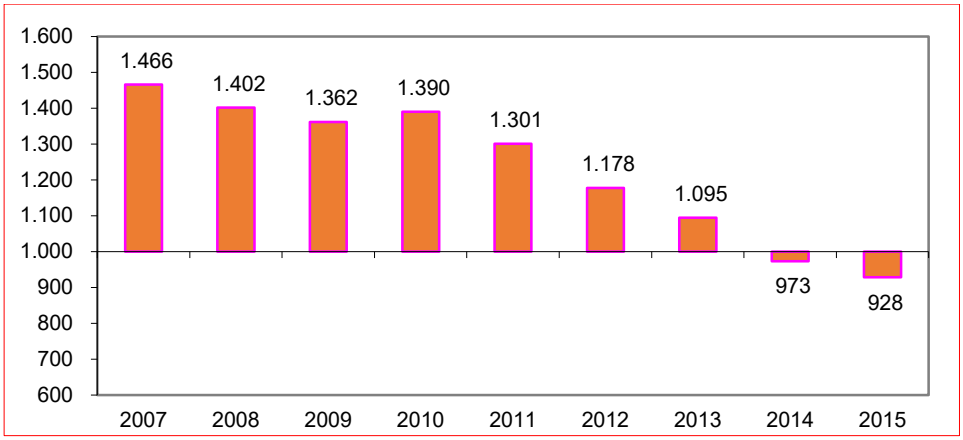
application; the one animal-based which is mostly related to the SCC level, which is also the target variable of the measure.

More than ten thousand of raisers out of the quite twelve thousand (remember that there was exclusion of both the smallest <5UBA and the most intensive >2UBA/ha) have self-committed to implement the multiple engagement the measure stated for the two five-year period. It means that quite 85% of the ovi-caprine units have benefitted from the enhanced conditions provided by farmers. In that perspective, one can appreciate the general effect produced in favour of both animal welfare and quality of milk.

SCC is the indicator on which the success of the measure has been built. After the first quinquennial implementation, the geometric average still ranged above the desired level of 1 million/ml, even if already under 1.4 (remember that the starting level was 1.8).

The new design of the measure 215, imposing more caring standards for feet, exclusion of milk coming from illness animal, better sampling, and engagement to not rise above 1.5 million/ml, rapidly succeeded in shrinking below the 1 million SCC/ml already in 2014 for ovine milk (graphic 5-1) and up to 0.928 at the end of the period. It is noticeable that the decreasing is clearly speeding after 2010. Sheep destress is clearly proved by these data.

Graphic 5-1 – Geometric average CSS in Sardinia ovine milk 2007-2015 (,000/ml). Source: ARAS

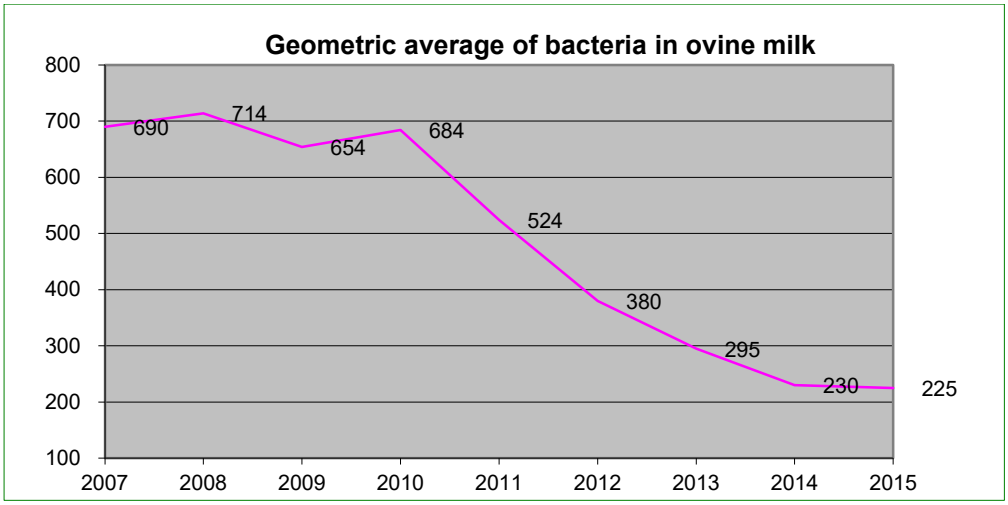


Already in the first five-year the number of animal diagnosed by ISZ mastitis has drastically reduced by 46%, from 48,954 to 26,516. Deaths or suppressions consequent to mastitis are decreased by 55%, from 460 to 205.

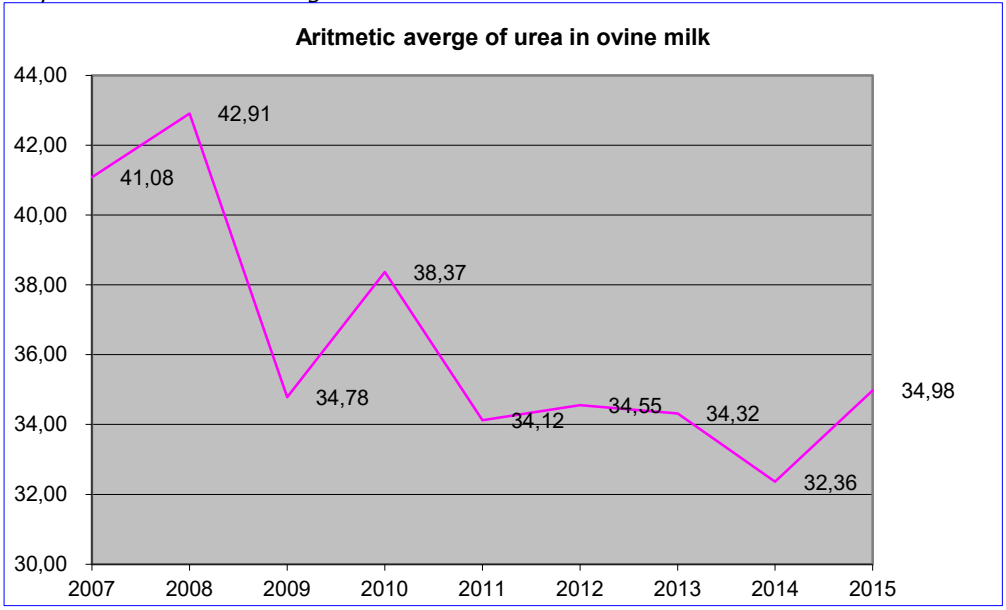
5.6.3. Milk quality improvement

SCC reduction is significant of the improved quality of milk for the cheese making. Other indicators can help to verify if the hygienic condition of farming and milking especially are improved too. The geometric average of bacteria in the milk is drastically reduced by 67% from 690 to 225 in the last year of the decade. It is self-evident in this case that the engagements accepted by raisers in the second period of application has been very effective in reaching the goal, as the graphic 5-2 clearly shows. Arithmetic average of urea also decreased by 15%. Other than major awareness in raisers (issue treated in a next paragraph) the growing number of farms using (and furthermost correctly using) milking machine and refrigerator has had a major role in make this result possible. Safety indicators are proving that the goal of improving the quality of ovine milk has been reached.

Graphic 5-2 Geometric Average C. of bacteria in Sardinia ovi-caprine milk. 2007-2015(,000/ml). Source: ARAS

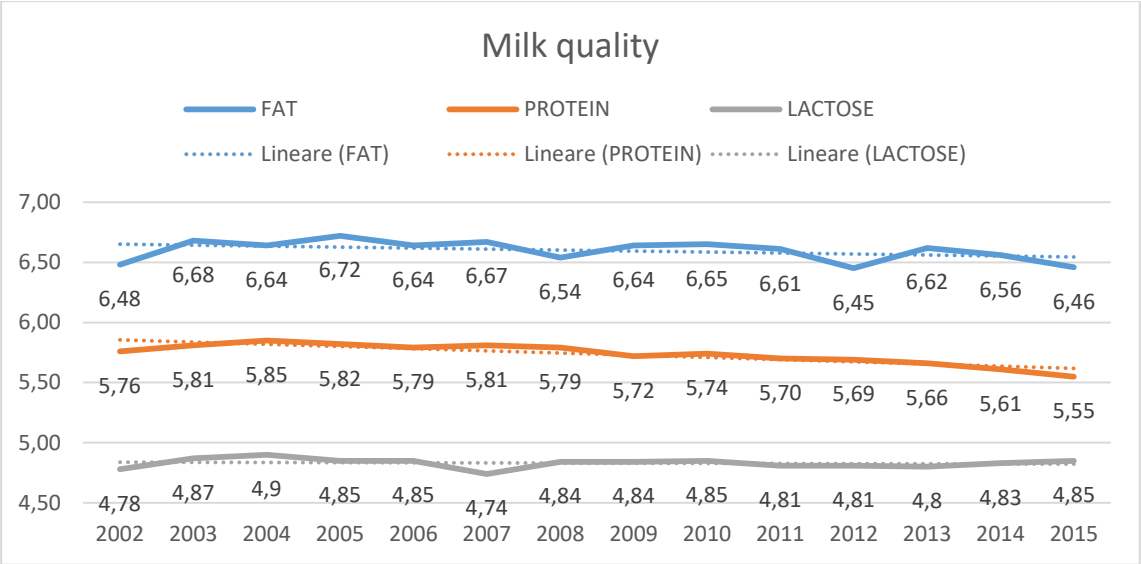


Graphic 5-3 Geometric average % of Urea in Sardinia ovine milk. 2007-2015. Source: ARAS



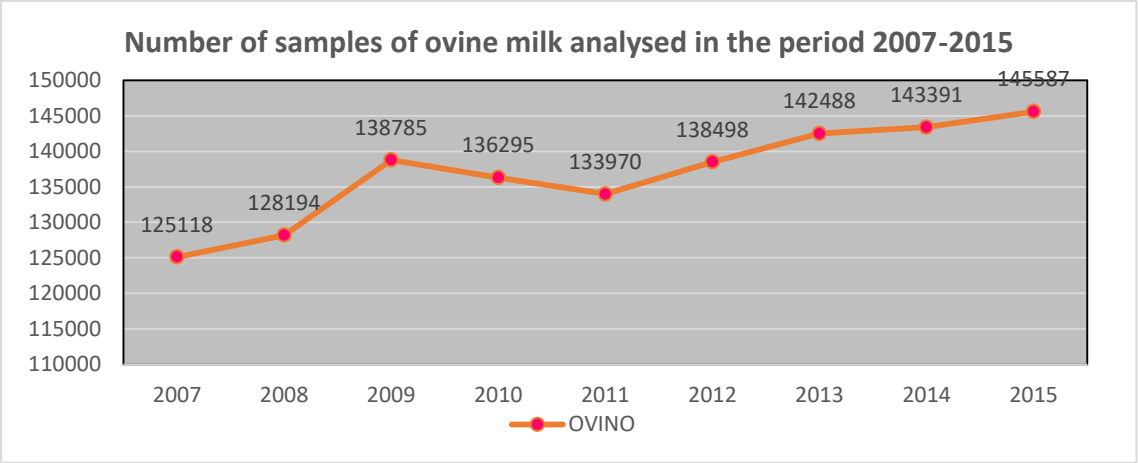
Nonetheless, bromatologic characteristic too are to be observed. Beside to the stability of the values related to fat and lactose, it is to notice that the reduction of protein could prove the reduction of haematic protein in the milk because of the reduction of mastitis and the improvement of the sampling (ISRI, 2016).

Graphic 5-4 - Ovine milk % bromatologic indicators. 2002-2015. Source: ARAS



The values observed are more significant because of the number of sample picked for analysis by ARAS is also risen by 14% in the period, but mostly after 2010, meaning that technical assistance has been actually most used by farmers, thanks to the new rules adopted by the measure.

Graphic 5-5 Number of samples of ovi-caprine milk in Sardinia. 2007-2015. Source: ARAS



Bettering the milk quality under the bromatologic and safety point of view has been a reached. A noticeable effect of such a general milk quality improvement has been the stimulus for a regional law (Regione Autonoma della Sardegna, 2010) to incentive

farmers' organisation in PO or cooperatives and the adoption of a payment system of the milk according to its quality. Incentives for the years 2011, 2012 and 2013 ranged around 3000-2500 euro maximum for farms, engaging 36 million of the regional budget. Unfortunately, what rests unapplied is just the ability of raisers to be paid in function of the milk quality. But this is not a question so strictly linked to the policy for animal welfare, as I can argue in the last chapter.

5.6.4. Farmers training and technical assistance

The twofold five-year contracts reached by raisers included necessaries supports to make them able to know what served to correctly implement new practices and machines.

First of all training courses had to cover multiple scientific, technological and practice aspects of the new animal welfare-oriented management. They has been held by ARAS, LAORE and Veterinary services of the ASLs (the local health agencies) to satisfy multiple skills to be provided.

Training courses have been designed to meet all beneficiaries. In fact, they have been held in about 170 places equally distributed in every districts of the Region. *Per* year, about 250-260 courses (230 in the first period) has been held, each one for ten hours articulated in three lessons, involving more than ten thousand of raisers or workers in growing farms. As to the liking of the participants, based upon a survey, the evaluation reports refers that they deemed useful the training course. For the next edition they suggest to increase time for practical exercise, didactic supports to be held by

participants and the lesson about how to improve and monitor the milk quality by reducing SSC and bacteria.

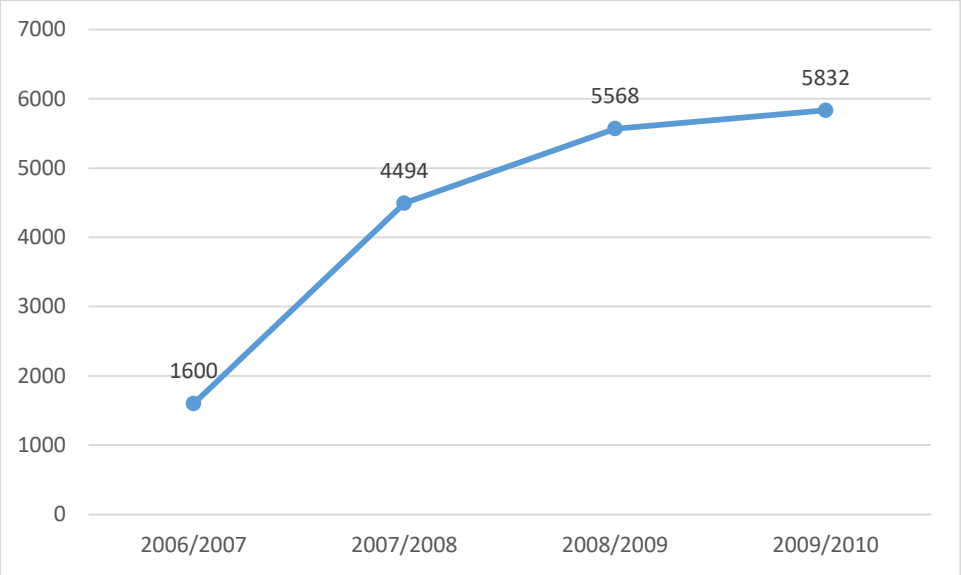
Good liking has been expressed also for the technical assistance and advisory service that has accompanied the measure, especially for milk analysis and data collecting and management by ARAS and Zoo-prophylaxis Institute.

Besides, actions to enhance information have been supported through the measure 111 of the 2007-2013 RDP for allowing 16 meeting were organised by LAORE in 2014, involving 500 raisers. In 2015 study visit to know ARAS and CNR Laboratories took place and – most important – to know Piedmont method to pay milk on the base of quality, involving 300 raisers.

Nearby the farms 16 hours of technical assistance per year were by provided zoo-technical assistant and veterinary concerning with: prevention of clinical and subclinical mastitis, podalic affections, optimisation of food rations and grazing technics.

Technical assistance has also been about maintaining of milking machine whose use is directly related to the implementation of the measure, mostly in the first period. Indirectly the number of technical interventions required by farmers indicates – in lacking of data source - how much the wideness of such machines has developed because of the measure FB implementation, as observed by evaluators (ISRI, 2010): the increasing rate has been 181% already in the second year of implementation, 24% in the next and rose to 265% in 2010. It is concerned also with the start of using machines already purchased but not still put in use without the wright motivation, training and assistance. In the second period the trend has held.

Graphic 5-6 Number of interventions for maintenance on milking machine by technical assistants. Source: ISRI 2016



Finally, technical assistance has been concerned with the mandatory analysis for verify monthly SCC and bacteria presence in the milk. As just observed above, the number of samples examined by laboratory ARAS in Oristano has been increasing (Graphic 5-5), just like the number of farms. The Zoo-prophylactic Experimental Institute (IZS) has increased the number of sample analysed to survey bacteria having negative results (from 54% in 2005 to 64,9% in 2009) as well as the number of samples not fitting for the analysis has decreased (from 0.4% in 2005 to 0.01% in 2009). This is accounted for by the improved ability of raisers to make samples. At once it also proves the positive and wide effects raised by the training and information activity developed in the period. (ISRI, 2016).

Technical assistance has moved together accompanying and monitoring of the measure.

5.6.5. Joined effects of innovation

Never underlined until now, the very existence of a "knowledge-chain" (Pulina & Biddau, 2015) is one of the premises of the animal welfare policy design and starting, a

driver of its implementation and finally it results reinforced at the end of the second implementation period. Thus, the various subjects who have had a key role in making the animal welfare measure a very policy to innovate the sheep farming under several point of view, deserve some attention. Several department of the University of Sassari, the Zoo-prophylactic Experimental Institute, the Zootecnic and dairy Institute of Sardinia, on one hand; the ARAS and LAORE (before 2009 ERSAT, that is regional agency for development and technical assistance in agriculture), on the other hand, together represent "the highest concentration of technical-scientific knowledge about ovine dairy chain in the world"(Pulina & Biddau, 2015, p.88). Again according to Pulina and Biddau, raisers, technic assistants, producers and researcher together represent a "knowledge-chain" that hardly supports the sheep growing branch. That system - thanks to different type of contribution to different phases, from design to implementation and monitoring - has made a broad innovation process possible and broadly diffused. Suffice it to remember that trainers and educators have been educated by the academic and scientific "system" before educating farmers and workers.

Several types of innovations have been observed (ISRI, 2016; Pulina & Biddau, 2015):

- The cultural innovation, in that the same idea of animal is deeply changed thanks to the animal welfare approach.
- The operational innovation as to the more complex and cooperative network of relationships among public and private players.
- The managerial innovation as to regards the internal procedure of the farms and new technics adopted.

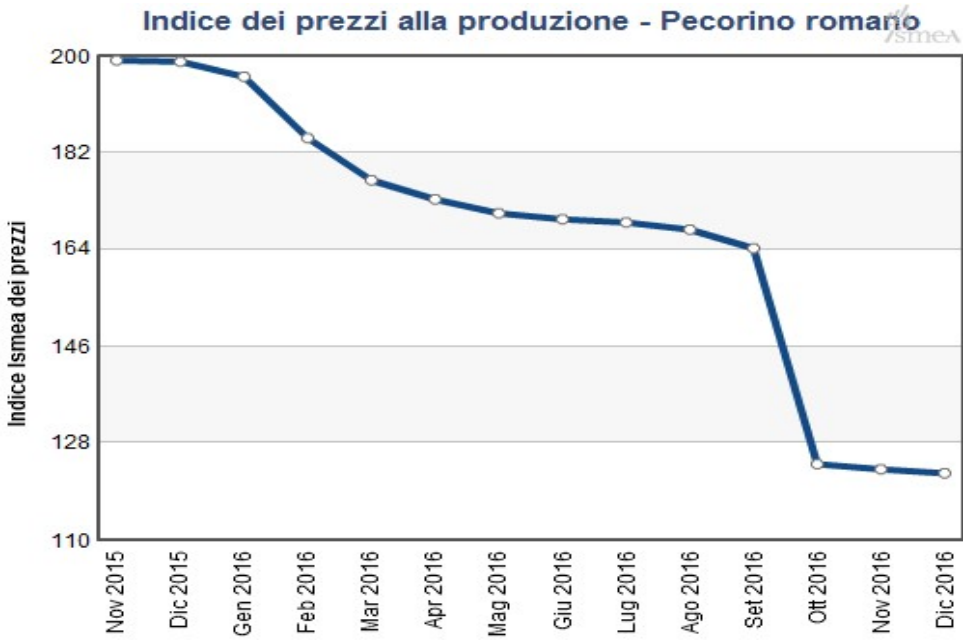
5.6.6. About competition enhancement

At the beginning of 2017, while the thesis writing is finishing, a new crisis is hitting the branch. In the recent months the price of Pecorino Romano cheese is about halved from 9,50 to 5,50 €/kg (Graphic 5-7) and milk price has also fallen down to about 0.6 €/litre, a level unable to remunerate the costs of the most of the farms (graph 5-8). A deep crisis is newly open. Ministry, Regional Government and Professional Organizations of farms are looking for solution that ought to be both rapid to support farm crisis and structural to make the branch able to be resilient to market volatility.

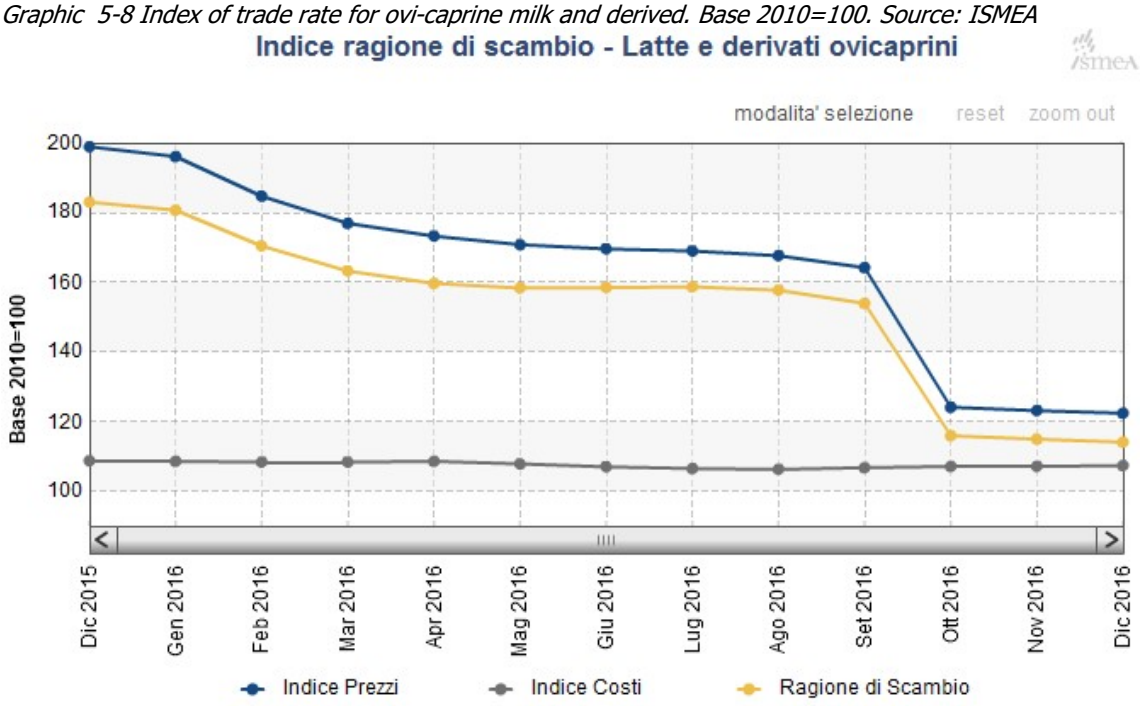
The neglected part of the problem arisen in 2005 turn out to be again unresolved. To make twelve thousands of farms able to increase their bargaining power in the market turn out to be that neglected part. The expected result, among others relevant for market, should be to distribute future market shocks along all the chain, without threaten the very existence of the sheep growing in the Region – or without threaten the economic stability and the social peace, if the political lens is preferred.

At the origin of the crisis – on which much more has to be deepened in the next months – seems to be the lack of transparency of the market and asymmetry information, as the crisis originated from the unfounded suspect of milk over-production in winter 2016, caused by a worm winter. That in turn caused the milk price fall down. But the reasons of Pecorino Romano cheese price reduction are to be searched elsewhere and in asynchrony time.

Graphic 5-7 Index of production prices of Pecorino Romano Cheese. Base 2010=100. Source:ISMEA



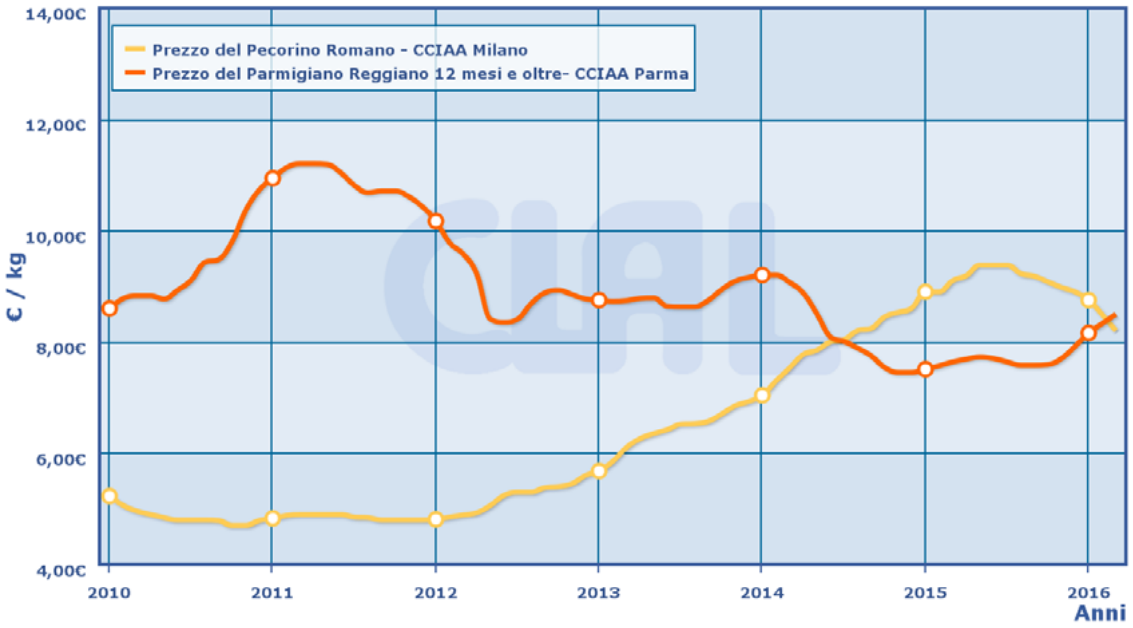
Graphic 5-8 Index of trade rate for ovi-caprine milk and derived. Base 2010=100. Source: ISMEA



The recent facts contradict the evaluator's hypothesis that transformed products, and the Pecorino Romano cheese especially has enhanced its trade value as a consequence of the better quality of the milk (ISRI, 2016). In any case, data collected to prove how the trend of production and price developed in the period deserves to be examined. Like referred to by evaluators, quantity of production in the period has not increased in the average of

the decade, but price has very augmented in the year 2011-2015, marking an historical overtaking of the one of Parmigiano Reggiano cheese in 2014.

Graphic 5-9 Comparison of Pecorino Romano and Parmigiano Reggiano cheeses years 2010-2016. Source: ISRI 2016



In the conclusive chapter I try to draw some elements for outline future perspectives. Data examined can argue how the market moved but that movement is not linked to the variables influenced by the complex policy to better animal welfare. It is self-evident that there is a missed link between the enhanced sheep farming system and the market. That link roots into market and organisational mechanism.

Chapter 6. Sardinia stakeholder and consumer opinions about taking into account animal welfare in the ovine supply chain

6.1 Why to question Sardinia stakeholder and consumer opinion

As argued in chapter 2, farmers, citizens and consumers have very different attitudes, sensitiveness and choice set to behave having regard to animal welfare. To test their respective opinions in Sardinia was essential to correctly enrich the research contribute. Nevertheless, citizens, if focussed at regional level, loss their main choice - that is the ability to influence policy maker about more stringent rules to safeguard animal welfare, since those rules are mainly at European and national level adopted. Otherwise, a deep survey of such a kind, would result too much expensive for the purpose and possibility of this doctoral thesis research. So my focus is on stakeholders and consumers.

The direct survey –trough a deep interview (par.6.4) - on the opinion of 28 stakeholders aims to deeply comprehend the perception of the dynamic that were interesting the market and production dynamic until 2015. It is clear that the most recent crisis is out of the perspective of those interviewees. Nonetheless in this special "retrospective" dimension, to highlight the mechanisms that rule the game when all get right does not loss significance.

In summer 2016 Another direct survey has been directed to 373 Sardinian consumers, who lived in Sassari, Alghero, Olbia, Nuoro, Oristano, Cagliari, Quartu S.elena, Carbonia, through a questionnaire (par.6.5) to verify their concern about sheep welfare, their sensitivity and their eventual willing to pay more to purchase ovine milk products coming from farms adopting rearing standard beyond the compulsory level.

The questions are conceived for investigating the several aspects presented in the previous chapters, especially some of the ones dealt with by Eurobarometer: definition, sensitivity, range of premium price accepted. Even if limited to the regional market that is not the most important for the Sardinia POD cheeses, some significant considerations can stem from the results.

Together, the surveys allow to draw on some final consideration about future perspectives concerning with sheep welfare, on one hand, and strength and weakness point of sheep grazing and after this special decade.

6.2 How stakeholder understand animal welfare measure and dairy market dynamics

The need to test stakeholders stemmed from the peculiar trend assumed by the main variables descriptive of the branch in the period 2014-2015.

The price of the milk was constantly arising (see Graph. 1-2), consequently the Pecorino Romano (bearing in mind that it represents 60% of the transformed product in Sardinia, correspondent in 2015 to about 50 thousand tons) too sudden rises (Graph 1-3), by about 4 euro per kg in two years (up to 9.50 euro in 2015, according to ISMEA) as far as to overcome the price of Parmigiano Reggiano (Graph. 5-9). As showed by Graph 1-2, in the long period the alternation of high and low levels of milk price shows a typical cyclical trend, furthermore very similar among the three main Region of origin, Sardinia, Tuscany and Lazio, having always Sardinia at the lowest level. That evidence seemed not enough for the developing thesis. A chosen number of 28 opinion leader among scientists, researchers, practitioners, farmers and transformers and representatives of professional organisations.

The very aim of the interview was to insight the deep reasons of the positive trend so that can design policy intervention able to better support the branch against price volatility.

A coherent picture rises from the interviews.

About the reason of the 2015 price rising, most recognised a first cause on the sick *blue tong* that caused 100 thousand animal death and 350 thousand sick. That caused the reduction of milk production, rising milk and cheese prices. Furthermore, the exchange rate euro/dollar was positive (question 1).

The reached price of 1.1 euro per litre was judged by the majority actual able to remunerate the cost born by farmers (question 2).

The quantity of milk produced in the period was about 300 million of litres. Such a quantity was deemed right by the majority, nonetheless one out of four think it is not enough (question 4).

For better planning the production and stabilising the prices, about all the interviewees were thinking of interbranch accord as a good or optimum tool to implement for make the chain more efficient, especially taking into account the way it has been considered by the current European and national regulation, especial the one for CMO (1305/2013), (question 9).

Anyway, about what are the mechanisms able to regulate dairy market the answers were somewhat surprising. Among the choices two answers were possible. Only 2 have chosen “regulating the quantity of milk produced”, 9 “regulating the quantity of Pecorino Romano”, 7 “regulating both”. The large majority (21) think that the better way to ensure stable level of price and farmers revenue (that is the consequence of regulate the market) should be to diversify the production so as to break the unique link between milk and Pecorino Romano.

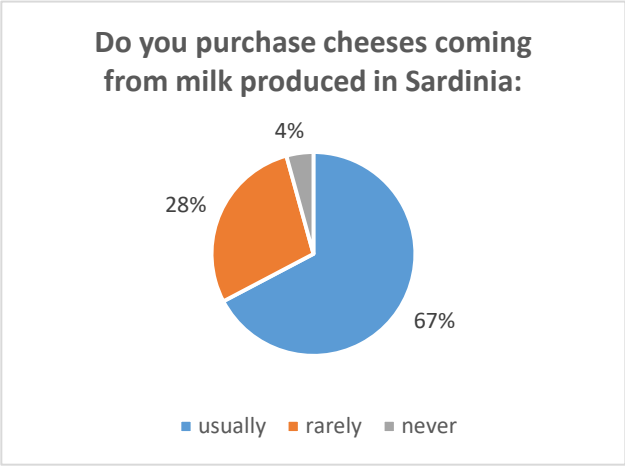
The main role played by Pecorino Romano among the others in Sardinia, so that it represents 60% of the production, is believed the best by the majority, even if a minor rate of 40% would be agreed by one out of four (question 5). That is coherent with the opinion about what chees should increase the production consequently to the reduction of Pecorino Romano. In fact no idea is dominant: half choose Pecorino Sardo and Fiore Sardo, a minor number prefer soft cheeses and Grana of sheep, someone the blue-cheeses and four does not answer (question 6).

Coming to animal welfare measure, opinion leaders were questioned to judge the effect produced after ten-year implementation period. The large majority believed the measure satisfying or more. Only 4 deemed it was not enough (question 7).

Finally their opinion about the possibility that the market could appreciate cheeses coming from milk certified is quite totally positive (question 8).

6.3 How consumers understand animal welfare and would change their consumption habits

Consumers have been questioned in August, September and October 2016 in several market place of Cagliari, Sassari, Oristano, Nuoro, Olbia, Alghero, Carbonia and Quartu S.Elena. Given the period and the place where consumers were met, we can consider that a certain number of tourists were responding, even if the datum has not be surveyed. 373 were been answering to thirteen questions about their consumption habits, their awareness and knowledge about sheep welfare in Sardinia farms, their knowledge about the engagement for bettering the way sheep are farmed and finally their availability to change their habits and pay something more for cheese coming from milk produced with major respect for animals.

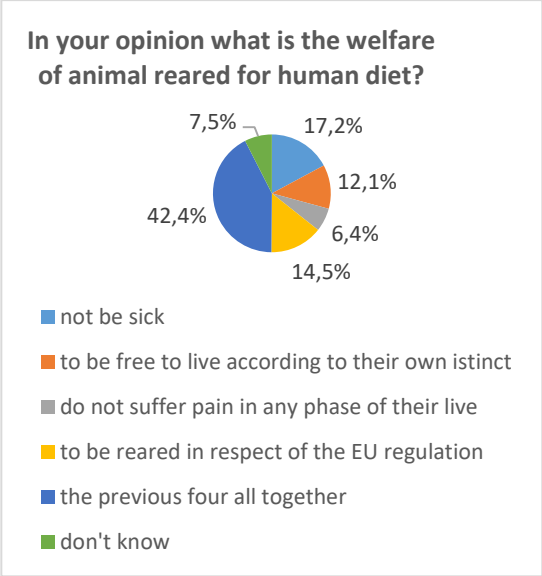


Grounding on considerations developed in the second chapter, no question has been directed to deepen if consumers motivation were more linked to ethical or safety reasons, in that safety reasons are fully pushing when some emergency occur, like you can learn by from the BSE disease effect on consumption over the time.

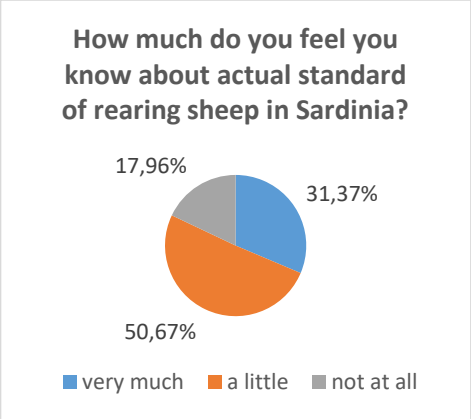
The 373 consumers interviewed (in the follow only consumers) are by two third habitual consumers of Sardinia cheese, especially the three POD: Pecorino Romano, Pecorino Sardo, Fiore Sardo, and also Grana di pecora, and blue-cheese. Only (16) 4% never consume and (106) one out four rarely.

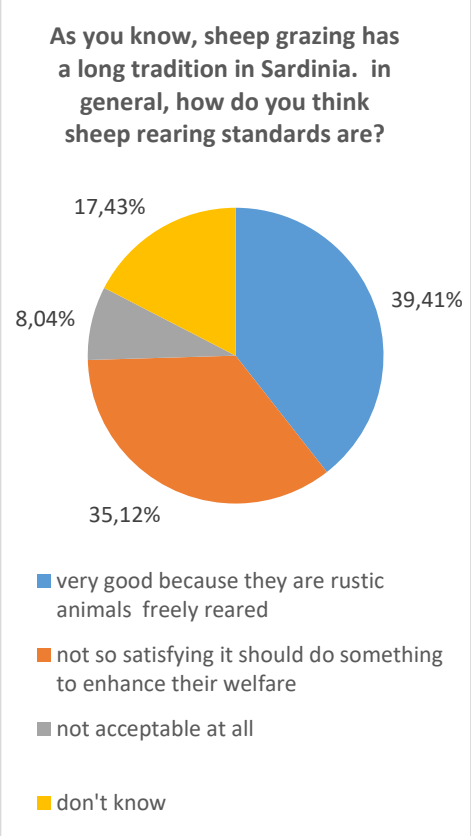
Among the cheese consumers there are the group of fan (51) who does not take into account the price at all. The most populous group is the one of very habitual cheese consumer who regard the price just “a little”, while the group of “discretional” counts 149 people.

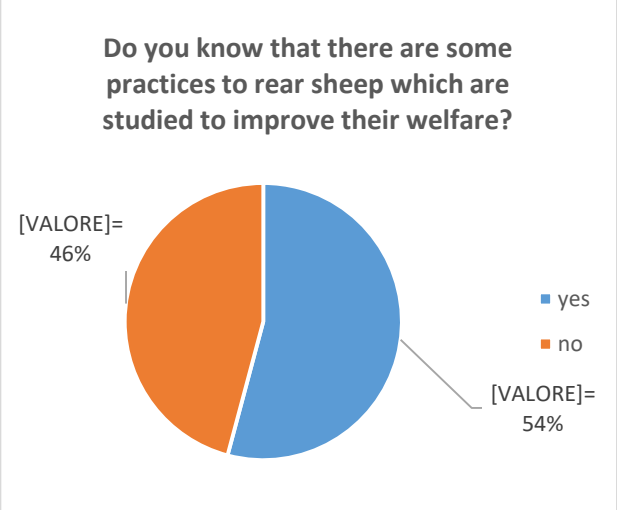
The overwhelming majority (339 out of 373) is sensitive to the welfare of animal reared for human diet. Quite the half part deem it is very important and just a minority deserves a minimum attention to the issue.



A specific and dominant idea of what animal welfare is does not appear from the answers, even if only the minority (28) says to not know. Among the specific alternatives presented by the interviewer, it is noticeable that only the absolute minority (24) has identified welfare with “do not suffer pain”. The notion of freedom, on which great part of the regulation also grounds, is likewise low considered, having only 45 answers “to be free to live according to their instinct”. More consumers link the idea of animal welfare to human health identifying the welfare with “not be sick” (64), or to the normative approach “to be reared in respect of the EU regulation” (54). That means, in some a measure, that there is somewhat trust in European Institutions to be able to grant human and animal health. According to the discussion presented in the first chapter, the anthropocentric approach is clearly predominant. Anyway, the majority (158) feels that animal welfare is a complex concept that would comprehend all the more specific definitions together, and finally the zoocentric dimension together with the anthropocentric.





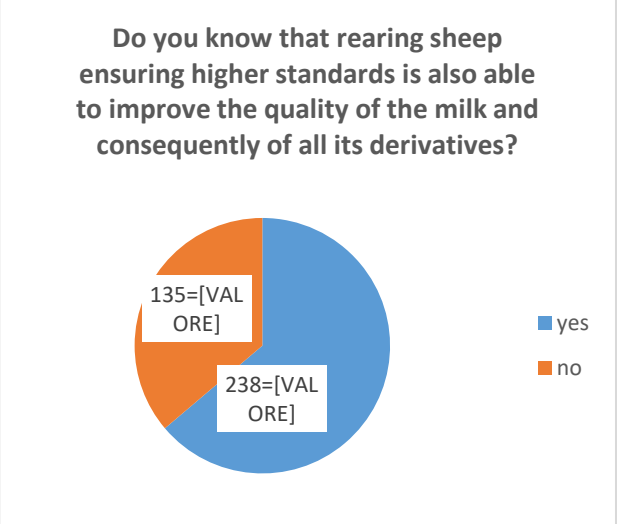


Concerning their own Region, the absolute majority (189) declares to feel to know just a little on the actual standard the sheep are reared, but quite one out of three (117) declares to know very much. Anyway, high rate (18% correspondent to 67 interviewee) feels to know at all the matter.

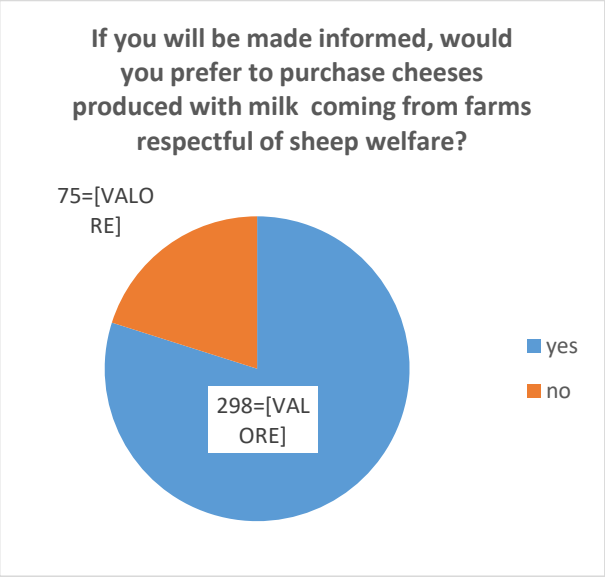
Quite the same rate (65) confirms to not know at all rearing standards adopted in Sardinia farms. A small group (30) thinks they are not acceptable and a significant group (131) thinks that something should be done to better sheep welfare in the farms. The bigger group of not well informed (147) is linked to the ancient idea of the rustic animal that can live freely in the pastures. Since that is not true, I can argue that probably those that feel to be well informed think also that sheep need that something has to be done to improve their standard of living.

More than half (202) of the consumers states to know that there are practices to rear sheep which are just studied to improve their welfare. Such a rate seems to be coherent with the number that calls for bettering sheep welfare

in Sardinia.

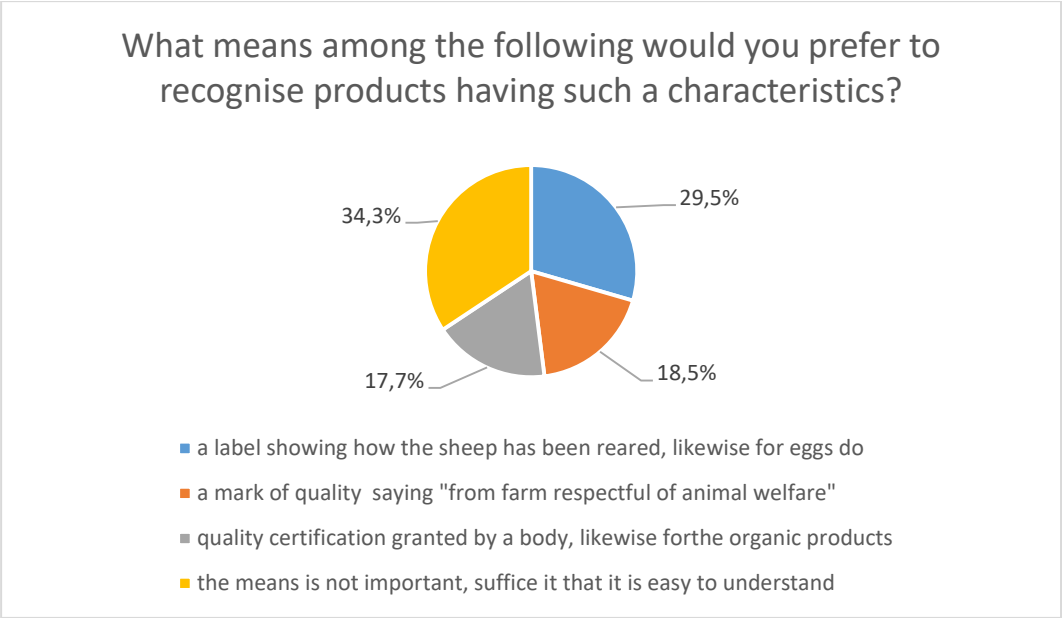


Two out of three consumers state to know that from farms more respectful of sheep welfare come milk and cheeses of higher quality. The number is a little higher than in the previous question, so that seems to be a right insight more than a clear information.



The number of those who would prefer to purchase cheese whose milk were derived from farms respectful of sheep welfare is impressively increased to more than three out four (298).

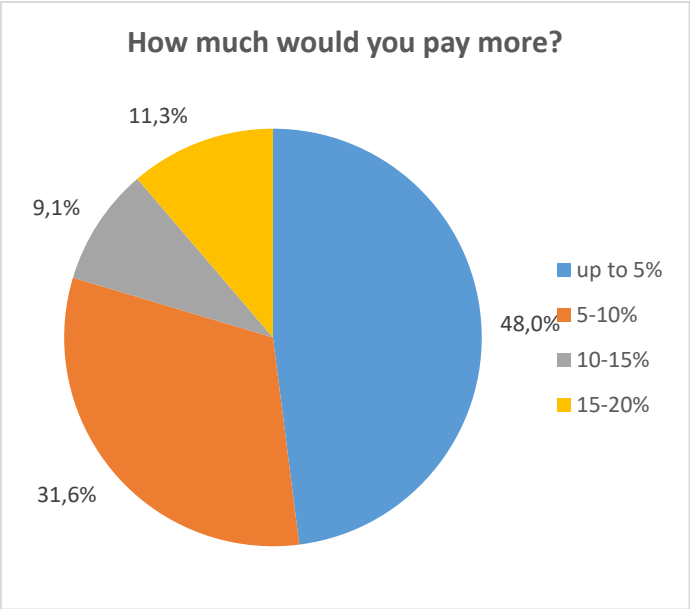
Considered the answers given to the first question about what animal welfare is, it seems arguable that the reason of this choice could be linked to reasons human health concerning.



How to make consumers informed about the standards of rearing actual implemented? Several hypothesis have been proposed to the interviewees, each of which should be well known. Labels, mark of quality and quality certification are widely used by a great number of foodstuff on the shelves. The most known, seems to be the label used for categorise the eggs by their origin (110). Less known are the mark of quality (may be because there are any example proposed by the interviewer) (69) and quality certification used by organic products (66). Quite one out of three have no idea about the better signal to use, but calls for major clarity of the message.

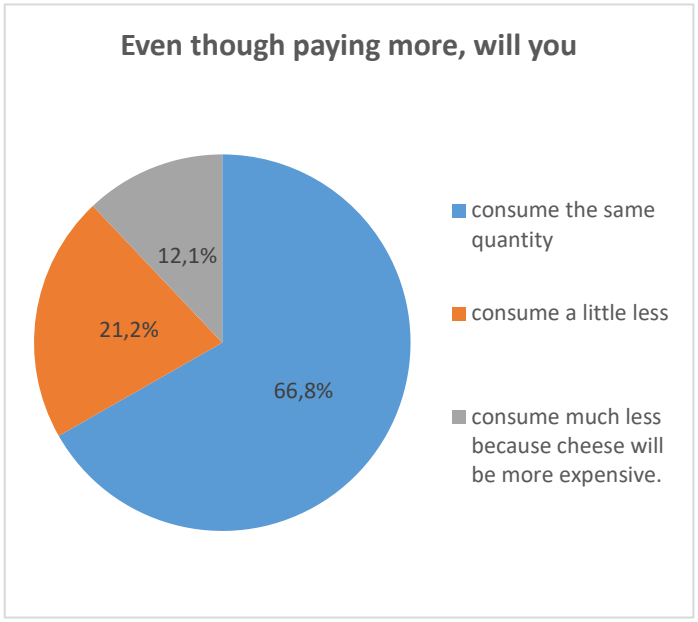
That seems to mean that consumers do not ask to be hardly granted by third body of certification. A remark very significant to deepen, that could be taken into account when undertaking future actions in this field.

Finally the questionnaire comes to test the willingness to pay of the consumers. Again three out of four (276 corresponding to 74%) answer yes to the question: “taking into account that quality of cheeses are improved and farmers bear major costs of production, would you pay more to purchase cheeses produced with milk coming from farms where sheep welfare is respected?”. The final question is obviously how much more.



The majority (179) confirm the same statistics observed in the case of eggs corresponding to 5% more (see second chapter).

One out of three states willing to pay 5-10% more. Even in a small sample the significant rate of four out of five (297 corresponding to 79,6%) would pay at least 5% more for cheeses having a clear indication to come from farm respectful of sheep welfare. A significant minority (quite 20%) would be available to pay up to 10-20% more.



The answers to the final question is totally coherent with the previous. In fact 249 (66,8%) confirm that will not change the quantity usually purchased. It seems coherent because the large majority would pay a little more and it will be no able to push down the quantity bought. Similarly, a little minority would change habits of consumption for the major price they would be available to pay. An intermedium group would reduce a little the quantity bought for have a product more animal welfare-friend. It is remarkable that this results come

without any action of information made by the public authority to underpin private caring for the issue.

6.4 Some quite conclusive remarks

The surveys on stakeholders and consumers allow develop some remark on the two sides of the market, respectively the supply and the demand.

On the supply side, the results of the questionnaire show that a clear idea about the real mechanisms governing prices and profitability are not so clear. In fact the price of the milk is early placed at the core of the mechanism of the price transmission, therefore is recognised able to hardly influence the Pecorino Romano price. In the last answers, nonetheless, to stabilise milk price most think that need loose the hard link between milk and Pecorino Romano, as if the market turbulences could in turn cause instability in milk price, causing the loss of profitability for farmers.

Without entering the core of the matter – that rests beyond the purpose of the thesis - what emerges clearly from this picture is that the business environment is so blurred that no limitations are opposed to opportunistic behaviours. They, in turn, take place easily in the dairy supply chain that – though not analysed herein it is notorious its typical characteristic - has a bottleneck between the plethora of farmers offering milk and the small number of producers that buy milk to make cheese. In this unchanged environment, the measure for animal welfare is believed very satisfying and the possibility to valorise the higher quality milk is deemed valuable.

On the demand side, I try some considerations that seem coherent with the previous ones. Whether confirmed by wider tests, at regional scale the final result of the test to consumers would mean that a result of the regional policy has met consumer/citizen sensitiveness as far as – like discussed in third chapter - to justify to reduce public

support because the large majority is available to pay more for the public good “animal welfare” and adverse selection problem seems to be avoided thanks to the large number.

Is this rigorous affirmation actual fitting the case? It would be right only if the mechanism of price transmission along the chain were perfect. But it is not so, as self-evident through the current milk price crisis too.

Up to when the bottleneck between producers and transformers of the chain will rest, public policy has to pay for this ineffective allocation of resources, because if animal welfare-friend cheese were put on the shelves at major price, the major value would not be redistribute along the chain up to the farmers. Consequently better sheep welfare standards would not be granted and probably adverse section problem would arise.

Finally, the tests support the idea that economic justification to pursue the public support is confirmed and appreciated. Otherwise they make also clear – beside to what results from recent milk price crisis – that it is not enough to grant stability to the dairy market, nor immediate major competitiveness to the productions.

Much more rests to be studied about the supply chain functioning to detect exactly the solutions that fit such a peculiar economic and institutional environment.

6.5 Appendix

Table 6-1 Stakeholders' answers to the questionnaire. Source: own elaboration, 2015

1. Il Pecorino Romano ha recentemente raggiunto la quotazione massima di 9,50 euro/kg all'ingrosso presso il mercato di Milano: secondo Lei questa crescita eccezionale è da imputare (max 3 risposte):		
A	CASUALITA'	2
B	CAMBIO FAVOREVOLE EURO/DOLLARO	19
C	DIMINUZIONE DEL LATTE CAUSA *BLU TONGUE*	13
D	MAGGIORE COORDINAMENTO DELL'OFFERTA PRODUTTIVA TRAMITE IL CONSORZIO DI TUTELA	4
E	AZIONE DI PIU' SOGGETTI NEL MERCATO USA	7
F	ALTRO	10
2. Il prezzo del latte ovino ha recentemente superato la soglia di 1 euro/litro attestandosi su oltre 1,10 euro/litro. Ritiene questa remunerazione per i pastori:		
A	OTTIMA	7
B	BUONA	10
C	SODDISFACENTE	8
D	SUFFICIENTE	1
E	NON SUFFICIENTE	2
3. Il Pecorino Romano ha modificato recentemente il disciplinare diminuendo le quantità di sale del prodotto; ai fini della valorizzazione del prodotto ritiene questo intervento:		
A	OTTIMO	13
B	BUONO	9
C	SODDISFACENTE	4
D	SUFFICIENTE	0
E	NON SUFFICIENTE	1
F	NON RISPONDE	1
4. La Sardegna produce oltre 300 milioni di litri di latte ovino, in considerazione degli effetti del mercato globale dei prodotti ritiene tali quantitativi:		
A	ECCESSIVI	1
B	ADEGUATI	16
C	SUFFICIENTI	3
D	NON SUFFICIENTI	7
E	NON RISPONDE	1

5. Il 60% dei prodotti lattiero caseari ovini è rappresentato dal Pecorino Romano. Quale percentuale dovrebbe avere secondo Lei sull'intera produzione di Formaggi ovini?		
A	100%	0
B	80%	1
C	60%	14
D	40%	8
E	20%	1
F	0	1
G	Non risponde	3
6. Su quale dei seguenti prodotti lattiero caseari ovini investirebbe in sostituzione/diminuzione del Pecorino Romano (max 2 risposte)		
A	PECORINO SARDO	12
B	FIORE SARDO	14
C	GRANA DI PECORA	7
D	ERBORINATI	5
E	MOLLI	9
F	NON RISPONDE	4
7. La misura del Benessere Animale ha portato negli ultimi 10 anni risorse comunitarie per circa 600 milioni di euro migliorando sensibilmente lo stato di salute degli animali e diminuendo di conseguenza la carica di cellule somatiche media degli ovini, come valuta questo risultato?		
A	OTTIMO	5
B	BUONO	11
C	SODDISFACENTE	7
D	SUFFICIENTE	0
E	NON SUFFICIENTE	4
G	NON RISPONDE	1
8. Considerata la possibilità di certificare tutto il latte proveniente da allevamenti sottoposti alla misura del benessere animale, come ritiene che il mercato avrebbe apprezzato una certificazione dei prodotti con la dicitura "proveniente da allevamenti che rispettano il benessere degli animali" ?		
A	CERTAMENTE POSITIVA	20
B	POSITIVA	6
C	SODDISFACENTE	0
D	FUORVIANTE	1
E	INUTILE	1
9. Come valuta la possibilità di un accordo interprofessionale tra produttori e trasformatori per regolare le quantità prodotte ed i prezzi alla produzione?		
A	OTTIMO	18
B	BUONO	6
C	SODDISFACENTE	1
D	INUTILE	0
E	INADEGUATO	0
F	NON RISPONDE	1

10. Secondo lei per consentire una migliore regolazione del mercato lattiero caseario ovi-caprino è più utile (max 2 risposte):		
A	REGOLARE LE QUANTITÀ DI LATTE PRODOTTO	2
B	REGOLARE LA QUANTITÀ DI PECORINO ROMANO PRODOTTO	9
C	REGOLARE QUANTITÀ DI LATTE E DI PECORINO ROMANO PRODOTTO	7
D	DIVERSIFICARE I FORMAGGI	21
E	ALTRO	6

Table 6-2 Consumers' answers to the questionnaire. Source: own elaboration, 2016

1) Lei consuma formaggi provenienti da latte prodotto in Sardegna (Pecorino romano, pecorino sardo, fiore sardo, grana di pecora, erborinati):		
A)	ABITUALMENTE O CON UN'ALTA FREQUENZA	251
B)	RARAMENTE	106
C)	MAI	16
2) Il prezzo del formaggio quanto incide sulla sua decisione di acquisto?		
A)	MOLTO	149
B)	POCO	173
C)	PER NIENTE	51
3) Quanto ritiene sia importante il benessere degli animali allevati per l'alimentazione umana?		
A)	MOLTO	178
B)	ABBASTANZA	161
C)	POCO	33
D)	PER NULLA	1
4) Secondo lei in che cosa consiste il benessere degli animali allevati per l'alimentazione umana?		
A)	NON AVERE MALATTIE	64
B)	POTERSI COMPORTARE SECONDO LA LORO NATURA	45
C)	NON PATIRE SOFFERENZE IN ALCUNA FASE DELLA LORO VITA	24
D)	ESSERE ALLEVATI NEL RISPETTO DELLE NORME STABILITE DALL'UE	54
E)	TUTTE LE QUATTRO PRECEDENTI DEFINIZIONI ALLO STESSO TEMPO	158
F)	NON SO	28
5) Potrebbe dirmi quanto sente di sapere riguardo alle condizioni di benessere in cui vengono allevate le pecore in Sardegna?		
A)	MOLTO	117
B)	POCO	189
C)	PER NULLA	67
6) Come Lei sa in Sardegna vi è una lunga tradizione di allevamento delle pecore. Ritiene che oggi le condizioni di benessere delle pecore negli allevamenti siano mediamente:		
A)	MOLTO BUONE, PERCHÉ SONO ANIMALI RUSTICI E ALLEVATI IN LIBERTÀ	147

B)	NON DEL TUTTO SODDISFACENTI, SI DOVREBBE FARE QUALCOSA PER MIGLIORARE IL LORO BENESSERE	131
C)	PER NULLA SODDISFACENTI	30
D)	NON SO	65
7)	**È a conoscenza del fatto che esistono procedure per l'allevamento ovino che sono studiate apposta per migliorare il benessere animale?**	
A)	SI	202
B)	NO	171
8)	**È a conoscenza del fatto che l'allevamento rispettoso del benessere delle pecore migliora la qualità del latte, e quindi di tutti i suoi derivati, in modo oggettivamente misurabile?**	
A)	SI	238
B)	NO	135
9)	**Avendo la possibilità di scegliere, preferirebbe acquistare formaggi derivati da latte prodotto nel rispetto del benessere delle pecore?**	
A)	SI	298
B)	NO	75
9)	**Quale strumento vorrebbe fosse utilizzato per rendere riconoscibile un prodotto con tali caratteristiche?**	
A)	ETICHETTA CHE INDICHI LE MODALITÀ DI ALLEVAMENTO UTILIZZATE, COME GIÀ ACCADE PER LE UOVA	110
B)	MARCHIO DI QUALITÀ "PROVENIENTE DA ALLEVAMENTI CHE RISPETTANO IL BENESSERE ANIMALE" CHE DISTINGUA SOLO IL PRODOTTO CON QUESTE CARATTERISTICHE	69
C)	CERTIFICAZIONE DI QUALITÀ DELL'ALLEVAMENTO GARANTITA DA UN ENTE CERTIFICATORE COME NEL CASO DEI PRODOTTI BIOLOGICI	66
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Chapter 7. Results and conclusions

7.1 Main results of the research

The research has allowed to highlight the animal welfare policy implemented by the Sardinia Region since 2006 and still running.

The doctoral thesis has pursued the aims of: (1) highlighting the characteristic of this complex and significant policy, few changed over the years; (2) dealing with the deep and multiple reasons of its starting; (3) verifying whether all the ambitious goals have been reached at the end of the second period of implementation in 2015; (4) highlighting if and how the measure implementation has been able to push the rearing system to modernise and rationalise the management; (5) trying to outline some future perspectives stemming from the results achieved. Nonetheless, the current trends of the market will be again take on board to place the new perspectives in a bi-dimension reality of opportunities and weakness to overcome.

About the first and four questions, the research carried out allows summarizing that the measure can rightly be considered a very policy for animal welfare and for the sheep grazing branch modernising. That affirmation can ground on the observation that:

- The number of farmers who benefitted from the measure is the largest: about four out of five. The financial resources committed to the measure is the highest of the Sardinia RDPs in the periods, up to 600 million at the end of 2020. A wide impact is granted by these numbers.
- Commitments farmers assumed are widely involving a number of management activities that have required a continuous training along the period, up to result in

enhanced management capability and demand for additional training from the beneficiaries.

- Farms' structures have been renewed and modernized to accomplish measure commitments and ten-year advisory assistance has been carried out to support farmers in technical and veterinarian issues. A more steady relationship has been linked between the production and the "knowledge" systems. That is a good premise to phase in more innovations in the future. A human capital to not dissipate, because of still fragile.

As to the second question, I can synthetically point out that a complex of reasons brought to the adoption of a new measure on animal welfare.

- The core of the problem was not caring for animal but for shepherds. The high fragmentation of farms, the weak habit to cooperate and use written contracts are the main feature upward the chain. The bottleneck between the huge of framers and the small number of producers is the feature downward the chain. The liberalised, opened and globalised market is the scenario were the players are moving, since 60% of milk become Pecorino Romano POD, which is mostly exported. High price volatility impact mostly on farmers, causing recurrent deep economic crisis, highly impacting on the social and territorial cohesion of the region.
- From the very core of the problem, the design of the measure included a bunch of objectives more or less strictly interrelated. In a sequence, evaluator of the measure listed: i) to enhance zootechnic standards above the legal compulsory; ii) to better the standards of animal living, welfare and health; iii) to improve the general level of the milk quality; iv) consequently improve the quality of the

cheeses (especially Pecorino Romano cheese). The las two were aiming to grant higher prices for farmers and opposite future crisis.

Coming to the third question, main results achieved are:

- Animal welfare has been approached from a scientific standpoint evaluating the zoocentric approach, so that an unambiguous parameter, also low cost to assess, has been recognised in the geometric average of the number of Somatic Cells per *ml* of milk (SCC). On this scientific base it is possible arguing that sheep health and welfare in the period has significantly bettered, sick animal decreased as well as deaths and suppressions caused by mastitis. Hygienic standards are improved and stressors coming from habits of rearing and social dynamic in the flock are also reduced.
- On scientific base one can affirm that better sheep welfare has entailed better quality of both milk and cheeses. That was the stimulus for a regional law to incentive farmers' organisation in PO or cooperatives and the adoption of a payment system of the milk according to its quality (regional law No 15, 2010 November 17, art.1). Optimus but not enough.
- Has that resulted in the hoped stabilization of the branch? No because it cannot be, mostly for the reasons that have been discussed in paragraph 6.4. I can add that even if quality of products had been enhanced, no signal has been provided to communicate it to the market. So the major quality of milk for cheese making could result only in some cost reduction for producers. Yet, the animal welfare-friend nature of the products is not at all communicated to consumers, no information campaign has been carried out, not even in Sardinia. Therefore, even the small test realised shows that actual could be a new market for animal

welfare-friend products, it cannot exist. Even this market were existing, it still would not be the enough condition to grant the market stabilization.

- The measure, albeit very successful, is by definition unable to change the chain organization and to grow the knowledge about the actual mechanism that regulate the market. Only acting on this side some deep changes can allow to broadly benefit from the actual advantages the animal welfare measure has brought.

Finally, results point out the weak the branch has absolutely to be aware and face.

7.2 Some perspectives and final remarks

The animal welfare measure is still running up to 2020. In the light of the new crisis it is actual a good provision to grant animal welfare standards continue. The research has showed on economic basis that the existence of a measure to ensure the public good "sheep welfare" is still completely justified.

While the thesis writing is finishing the Omnibus regulation is discussed in European Parliament. New perspective discussion will start from the next autumn. The future financial framework is the first hard step to face. The amount and the way to access to financial resource by farmers could change drastically, considered the new emergencies Europe has to face and the deep change of the global scenario.

In the good scenario (from the point of view if the farmers in this branch) there will be again the possibility to better the chain organisation, having granted the usual support of the CAP.

In the bad scenario – drastically reduction of resources for farmers - it is believed highly probable that means to grant against excessive price volatility will rest and be improved (Frascarelli, 2016a).

Whatever will be the scenario, the opportunity is to be reached nowadays. Grounding on the CMO new regulation, more organisational innovation are possible to enhance producers' organisation and interbranch organisation and learn to use new tools to plan production and regulate supply, as established particularly for milk sector (art.150 and following). In one scenario the proposed path is granted by the "old CAP", in the other scenario additional threats make the path more risk exposed.

Such remarks do not diminish the high value and results gained through this valuable policy designed and implemented by Sardinia Region.

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