THE ECONOMICS OF BAGÒSS CHEESE PRODUCTION IN BAGOLINO, ITALY

by

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ABSTRACT

Many small communities in the Alps are facing the same problem of ensuring a durable economic development, protecting their natural resources and preserving their traditions under the constraints of higher production costs, distance from markets, isolation, severity of climate, a lower level of public services. This is the situation faced by Bagolino, a small town of roughly 4,000 inhabitants located in the Italian Alps. One of the major supporters to the growth of Bagolino, along with tourism, is its cheese Bagòss , whose origin dates back centuries. The Bagòss cheese is a semi-cooked cheese that is produced under strict processing methods that have been practiced for centuries.

The Bagòss industry, with its unique organizational system, challenges researchers to investigate what factors are decisive in explaining its success. It is an example of a common situation in the Alps whose products arise from history, traditions and natural environment. This research aims to explain which factors influence the production of the Bagòss cheese and which factors explain differences among producers.

Various aspects of interest of the Bagòss industry were examined through a literature review: social and economic situation of Bagolino and history of the town helped to get a better understanding of the background of the industry. The review of literature about entrepreneurship and supply chain was aimed to get a better understanding of the Bagòss industry organization; whereas theories about rural development and sustainable development described the social and environmental context of this production. Last the review of the main economic theories helped to analyze the Bagòss industry from the economic perspectives: monopolistic competition and the resource based view of the firm.

Data were collected from multiple sources; the main source of data was a survey of farmers that involved all Bagòss producers. Data from administrative source were important for revision and also furnished data that could not be obtained from farmers. Qualitative interviews with experts were important for checking purposes and for understanding of the social and economic environment in which the Bagòss production takes place.

Analytical tools of this thesis were of three different types: qualitative data used mainly to describe the growth medium of Bagòss and to formulate hypotheses to be tested with an econometric model. Statistical analysis provides a complete description of the industry.

The Bagòss industry is not characterized by highly diversified use of the land: summer pastures, long term meadows and forests are the three main categories of the use of land. Almost all labor force is made up of family members and relatives. There are a total of 657 adult milking cows involved in the Bagòss production, with an average of 24.33 cows per farm; most farmers process all or part of their cow milk. The main product is the Bagòss cheese. We estimated the production at 146.5 tons of Bagòss. 69% of Bagòss is sold after aging for less than a year. In terms of marketing the most important channels are Bagolino's retailers, consumers buying directly and retailers located outside Bagolino. According to our estimates EBITDA equals to 1,388 thousand Euro, an average of more than 55 thousand euro per farm.

Two factors are able to explain most of the variability in the milk production: the number of workdays in the farm and the total cost of purchased feed. The EBITDA / tons of milk ratio is an indicator of the farm efficiency: the explanatory model for this is based on the operator's age and level of education, the percentage of Bagòss sold after aging for one

year or more, the percentage of Bagòss sold by direct sale to consumers and the size of the herd. Finally, a model able to explain the variability of the EBITDA / work days ratio was built; this ratio is considered to be an indicator of the labor productivity. This model is based on the percentage of Bagòss sold after aging for one year or more, the percentage of Bagòss sold to restaurants and hotels, the total milk production and the cost of rent of pastures. The first three have a positive impact on the dependent variable, whereas the fourth has a negative impact. The last two models show that small farms tend to be less efficient in their use of resources, and also less efficient in the use of labor.

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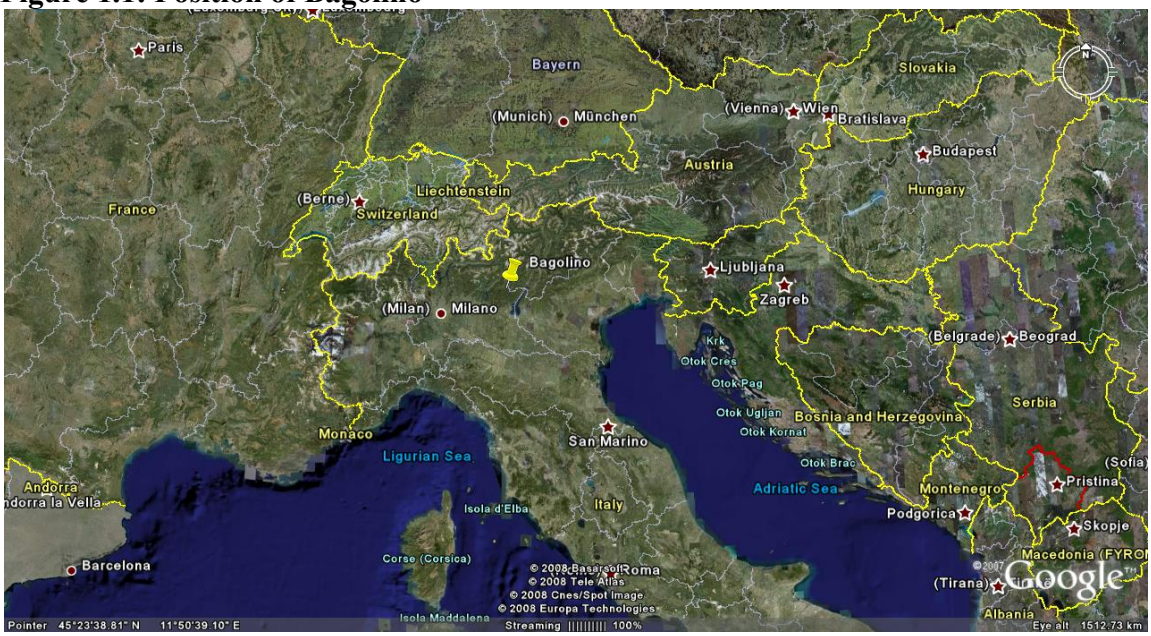
CHAPTER I: INTRODUCTION

1.1 Introduction

Many small communities in the Alpine region of Europe are facing the same problem of ensuring a durable economic development, protecting the environment and their natural resources and preserving their history and traditions under the constraints of higher production costs, distance from markets, isolation, lower soil fertility, severity of climate, a lower level of public services (Prodi, 2002). This is the situation Bagolino, a small town located in the Italian Alps finds itself in at the beginning of the 21st Century.

Figure 1.1: Position of Bagolino

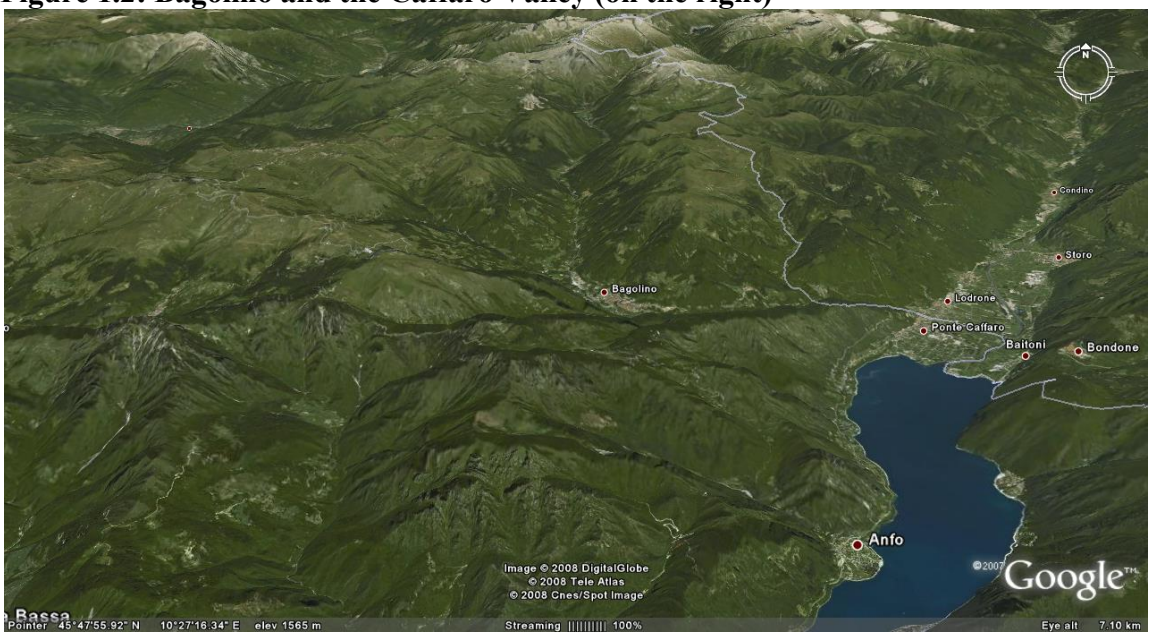


Source: Google Earth

Bagolino is located in the Brescia Province of the Italian Alps. The town is situated at an altitude of roughly 800 m above the sea level but the territory encompasses several mountains (the highest, the Monte Blumone, is 2,830 meters). Bagolino has a continental climate with wide variations according to the altitude. Bagolino is connected to the bottom

of Valle Caffaro by State Road. From Bagolino two other roads connect the town to Valcamonica through the Crocedomini Pass (1,997 meters) and to Valle Trompia through the Maniva Pass (1,664 meters), but the two mountain passes are usually closed in winter because of the snow (Bagolino, 2008).

Figure 1.2: Bagolino and the Caffaro Valley (on the right)



Source: Google Earth

The sustainability of Bagolino's social and economic fabric is due mainly to the sustainable exploitation of its natural and historical resources. One of the major supporters to the sustained growth of Bagolino, along with tourism, is its cheese, Bagòss (Giacomolli, 2008). The origin of Bagòss dates back to centuries ago. It was first cited in 1858, but its origin is much more ancient, probably as far back as the 16th century, when Bagolino was an outpost on the border of the Republic of Venice at the time when Venice dominated the seas. Indeed, Bagolino is famous mainly for its Venetian-style Carnival and for the Bagòss cheese. One of the distinguishing characteristics of Bagòss is the addition of saffron that is

not a local product, but was a common spice in Venice when Venetians traded goods across the world (Paffumi, 2008).

The Bagòss cheese is a semi-cooked cheese that is produced under strict processing methods that have been practiced for centuries. Although most typical cheeses of the Italian Alps have strong ties with their territories, none of them has such a strict identification with a particular town. The original Bagòss can be produced only in the territory of Bagolino. In fact, "Bagòss" is what inhabitants of Bagolino call themselves in the local dialect.

There are currently 28 farmers producing Bagòss with the help of their families. The production of the Bagòss cheese is made under several technical, social, political and economic constraints. First of all, in order to get the Bagòss brand and the original label, the production process must meet strict production specifications (Bagolino, 2008). These demand that all milk used in the production of the cheese must be produced by cows resident in the Bagolino territory, and all cows whose milk is used in the production of the cheese must be fed mostly with local hay, with only minor feed imports from outside the territory allowed (Suttini, 2008).

Based on the requirement for using local feed, farmers must rely mostly on the lands they farm, that are meadows near Bagolino town and mountain pastures in summer. All herds are brought up to the mountain pastures in summer. Indeed Bagolino has a wide territory consisting mainly of high mountains that encompass 22 different pastures used by the farmers. Most of the pasture structures were renovated in the 1990s, reducing the need for labor and improving the quality of the farmers' life in summer. It is important to

underline this because mountain pastures in the Alps are being abandoned in many places, leading to adverse social and environmental consequences (Suttini, 2008).

Despite meadows and access to the 22 pastures, there is not enough feed for the cattle. Thus, farmers have to purchase hay from farmers in the valley. Generally, each farmer buys inputs he needs. That is true for hay as well as for the allowed quantity of concentrated feed and other inputs needed in farming operations and the cheese production (Suttini, 2008).

Sanitary and veterinary checks of structures, cows and milk are made by the public authorities and in some cases by the provincial milk producer association. The general level of checks is adequate and there are no serious sanitary issues; the main problem is that Bagolino has no local veterinarian, which creates risks in cases of emergency (Stagnoli, 2008).

Production specifications require using Brown's milk for the Bagòss production, but most of animals are not listed in the breed register. Then many herds have Holstein or Simmenthal breed along with Brown; most of farms keep a mixed breed cattle. Farmers look for rustic animals, able to cope with the severe climate and to exploit high altitude pastures, rather than high production animals. The average milk production is roughly 3,800 Kg per head. The low cow productivity is the consequence of several factors. First, the small number of pure Brown cows listed in the breed register. Second, the feed system required by the production specification limits the potential production. Last, all cows in

the Bagolino area are brought to mountain pastures and this leads to a lower production in the summer season.

The production system and technical specifications are described in the Appendix, but it is worth mentioning some of the characteristics that make Bagòss a unique product. First of all milk is filtered using conifer branches that also add part of their flavor to the milk during the filtering. Then saffron also adds some special flavor and taste to the cheese and gives it its characteristic yellow color. The production of a single head of fresh cheese (16 – 20 Kg) takes around three hours of work. Taking into account the system of production, to produce two heads would require almost a doubled amount of space, tools and time. We must also consider that the aging phase requires much work: each cheese head is scraped frequently in the first six months, cleaned from its draining and greased with linseed oil.

This constraint determines the maximum size of a herd that allows farmers to produce one head of cheese from the morning milking and one head of cheese from the evening milking. Smaller farmers produce only one head of cheese per day mixing the milk from the two milking. All these farmers have organized their production to have the shortest production / processing chain possible and, usually with the help of their families, take care of the farming operations, milk production and cheese processing, aging and marketing. There are some even smaller farmers that do not have enough cows to produce a head of cheese per day. These small farmers work with the local dairy to produce their cheese, ensuring their participation in the Bagòss production chain (Stagnoli, 2008).

Along with the main product, most farmers produce some byproducts as well as some complementary products. By-products are old cows, calves, butter, and whey. Whey is used to produce a light ricotta cheese in summer, when the demand is high, whereas in winter it is used for feeding calves and hogs. Besides cows several farmers keep goats. This production is complementary to the Bagòss one. Goats eat roughage and are usually fed with poorer feed. They can stay on the alpine pasture longer and utilize even poorer and more disadvantaged areas of pastures, where it is unsafe to take cows. They also exploit the labor force when it is free from the cheese production operations. Goat milk is used to produce cheese from April to October when the demand usually exceeds the supply. In winter goat milk is used to feed kids that are usually sold in the peak demand season that is Easter in Italy (Stagnoli, 2008).

Farmers usually market their cheese through multiple channels selling it to wholesalers, retailers, restaurants and directly to consumers. In contrast smaller farmers are forced to limit their activity to producing milk which they deliver the local dairy.

A company located in the plain, the Brescialat S.p.A., supplies the dairy that uses milk to produce other types of cheese. This company sells all the other cheese produced with its milk along with the Bagòss cheese (Suttini, 2008).

The Bagòss cheese does not hold a DOP (Protection of Denominated Origin). In the past the local authorities thought of supporting the process of obtaining a DOP, but for a larger area. Bagolino's farmers then gave up on this idea. To protect their intellectual property and heritage, the producers established a cooperative which holds ownership of

the Bagòss brand and label, which are registered in the Italian Patent Office and then receive protection within all European Union countries. The cooperative also oversees that all producers follow the production guidelines for Bagòss. However, its activity in aging and marketing Bagòss is yet very limited even though it makes significant promotion and supports the entrenchment of the brand.

Figure 1.3: The label of the original Bagòss

Source: Author

The cooperative Valle di Bagolino is the owner of the Bagòss brand and sets up production specifications. The cooperative has more than 50 associates divided into ordinary associates and supporter associates. Ordinary associates are people, companies or

public bodies involved in the agriculture in the territory of Bagolino or in the territory of the Mountain Council of Valle Sabbia (that encompasses Bagolino). Supporter associates are people, companies or public bodies interested in the achievement of cooperative social objectives and who financially support this achievement. The net income of the cooperative is used in a number of ways: all associates can get a dividend according to the limits set up by law for cooperatives; a certain quota must go to the legal reserve; another quota goes to a fund to promote the cooperation system; a certain quota can be eventually used for the capital increase; another quota is used to remunerate the capital supplied by supporter associates under the condition that the interest rate cannot be more than 2% higher than the interest paid to ordinary associates. The list of the associates comprises all Bagòss producers, the local dairy, the Bagolino town administration, the Mountain Council of Valle Sabbia, the Province of Brescia and the local retirement home (Bagolino, 2008).

The main activity of the cooperative, other than taking care of the brand protection, is promotion through participation in fairs, farms markets and various other PR activities. This is a fundamental activity; the demand for the original Bagòss has increased thanks to the cooperative's effort to increase the customers' awareness of differences between the original and the false Bagòss. The total production accounts for roughly 9,000 heads of cheese per year, but according to the cooperative's estimates, there are also other 10,000 or maybe 20,000 heads of false Bagòss on the market and the enforcement of the law is ineffective. The awareness by potential consumers of the differences between the real and the false Bagòss is believed to be a key factor helping to increase the demand and customer willingness to pay for the original cheese (Suttini, 2008).

While the dairy gives all its production to Brescialat s.p.a that markets it mostly on the North Italian market, farmers who produce cheese by themselves pursue a strategy of marketing their cheese through multiple channels. Each of them can sell his products to wholesalers or retailers; they also sell their cheese to local and non local restaurants who want to have Bagòss on their menu in the cheese section or as an ingredient in their recipes. Finally, farmers can sell their cheese directly to consumers both as whole heads and in smaller quantities.

Given that Bagòss is produced in small quantities, prices on shelves are very different and increase rapidly the farther the Bagòss is from the production area. Twelve months aged Bagòss costs around 30 Euro/Kg in Bagolino shops, 45 Euro in Brescia, the closest city. But it can be sold at 65-70 Euro in Milan and more than at 100 Euro in Rome. It has been priced 50 Pounds/Kg at Harrods in London and was also sold in New York for 200 USD/Kg (Paffumi, 2008).

Bagòss is unlikely to be found on the daily diets: given its characteristics, strong taste, flavor and the price, it is more often associated with a delicacy. On the other hand, it can be consumed in several ways, it can be eaten alone in the simplest way, but it can also be used as an ingredient in many recipes along with pasta, meat, fish, potatoes, eggs, etc. Aged Bagòss is also good as grated cheese. Currently, a greater proportion of Bagòss produced is consumed outside the Bagolino territory than in the territory. Locally the importance of the tourist sector cannot be underestimated. Tourists consume Bagòss in local restaurants and buy Bagòss in local shops; Bagòss is a touristic attraction by itself.

1.2 Research problem

The Bagòss industry, with its unique organizational system, challenges researchers to investigate what factors are decisive in explaining its success. On the other hand it offers an example of a common situation in the Alps whose agricultural products arise from history and traditions and from natural and social environment of the area. In these areas the multifunctionality of the agriculture is evident as for the link between agriculture, environment and society.

The Bagòss production has succeeded among a small number of producers over long time. What are the factors that influence the production of the Bagòss cheese? Additionally, what are the factors that explain differences among producers?

1.3 Objective

The objectives of the thesis are as follows:

1. to describe the Bagòss production and marketing processes with the view to placing producers' performance within the context of the resource based view of the firm;

2. to describe factors that influence the production of the Bagòss cheese and the financial performance of Bagòss farms;

3. to describe factors that explain different performances among producers and describe their relationship;

1.4 Methods

A study of available literature will be conducted to find out other cases of entrepreneurial supply chains and also to get a deeper insight of interrelations among agriculture, environment and society in rural disadvantaged areas.

This study will use statistical methods, both descriptive and inferential, to examine characteristics and economics of Bagòss producers. Data for this study were collected in spring 2009 through a survey questionnaire submitted to Bagolino famers producing Bagòss or supplying the local dairy. The collected data comprise information about farms and farms labor force characteristics, productions and expenses.

This study also used face-to-face interviews to converse with local experts, cooperative representatives, dairy managers and local governors to develop an appreciation of the model in operation.

CHAPTER II: LITERATURE REVIEW

To achieve the objectives stated in the previous chapter requires analyzing the Bagòss industry from different points of view. The Bagòss industry owns much of its characteristics to the tradition and the history of Bagolino, thus the first paragraphs are dedicated to a brief review of Bagolino's history and Bagolino's economy. The Bagòss industry operates in a market economy and it is driven by profitability. In the following paragraphs then it is reviewed the literature about entrepreneurship and supply chain, considered as tools used to organize an industry and to direct it toward profitability; moreover, it is summarized the main economic theories that seem to give a better explanation of the Bagòss industry: monopolistic competition and the resource based view of the firm. Furthermore, given the distinctiveness of the Bagòss production process, it is analyzed the relationship between the industry and the environment: to get a better knowledge of these relations in the last two paragraphs it is reviewed literature about rural development and local food, and then about sustainability.

2.1 History of Bagolino

Mountains around Bagolino have been occupied since the prehistoric age. Near Bruffione Lakes, nine kilometers north of the town, a flint arrow point from the Bronze Age was found, signaling the presence of hunters in the area. At Malga Vacil, seven kilometers north east of the town, at 1,800 m above the sea level, the remains of a Bronze Age (roughly 3,500 years ago) wooden house were discovered. This might have served as shelter for shepherds during the summer. Other findings were discovered near lakes of Dasdana and Ravenole, seven kilometers west of Bagolino and near Lake Vaia, seven kilometer northwest of the town, making evident that all the area around the town was

already inhabited by hunters and shepherds in the Bronze Age season (Dalmeri and Zontini).

The origin of Bagolino is uncertain; it may have originated from two small villages founded by Etruscan shepherds. All the area corresponding to the Brescia province fell under the domain of Gauls in the fourth century BC. Romans conquered Brescia in 170 BC but the resistance of the Gauls ended much later in the Alpine valleys north of Brescia. It was only under the reign of Emperor Augustus in the first century BC that Bagolino became part of the Roman Empire. Under the Roman domain, Bagolino was a relay horse station and an active center of iron extraction and processing (Paffumi, 2008).

In the Middle Age the Bagolino territory was dominated by Longobards, Franks, German Emperors, Trento's Bishops and then the Visconti family, Lords of Milan. Wanting autonomy, Bagolino's people rebelled against Visconti and turned for help to the Serenissima Republic of Venice. Bagolino remained part of the Serenissima Republic from 1433 until its demise in 1797. Bagolino, however, was granted autonomy and always fought against lords attempting to rule over it. Indeed, Bagolino was ruled by three Consuls, partly elected and partly drawn. All goods and land belonged to the town. The land was granted to families by draw and many aspects of the social life showed a strong cooperative spirit with some elements of social security assistance. The main activities were centered round iron metallurgy, dairy activities and trade of products that Venice imported from overseas. The Venetian domination had a deep influence on Bagolino people and some of the traditions that have survived until today. For example, the Bagolino Carnival, despite its unique characteristics, has been clearly inspired by the Venetian

Carnival. Even in the Bagòss cheese we can find a sign of this past, the addition of saffron, an exotic spice, not present in the Alps but traded in large quantities by Venetian merchants (Paffumi, 2008).

Figure 2.1: Bagolino's dancers at Carnival

Source: Author

The end of the Venetian rule came with the victory of Napoleon's army in 1797. After the turmoil of the Napoleonic Age, Bagolino became part of the Austrian-Hungarian Empire until 1861 when it was joined to the new Kingdom of Italy (Paffumi, 2008).

2.2 Economic Characteristics of Bagolino

Bagolino is currently a town of 3,916 people with an area of 10,969 hectares (Istat, 2008). Most of the territory is covered with forests, meadows and pastures. The climate is not favorable for wine production, thus all of agriculture and food industry are centered on the dairy industry.

The territory was characterized by a high number of small manufactures that were active in the traditional metallurgy industry and specialized in pewter and brass processing and metal handle production as well as the textile industry. These small manufactures saw a sharp decline in the 1990s, a result of the general process of deindustrialization and manufacturer restructuring that affected the northern Italy. The decline was stronger in the mountain areas due to their peculiar characteristics that exacerbated difficulties in adjusting to the emerging globalization. Today, only few of these firms have survived in the textile and metallurgy industries. There is also a source of mineral water and two ski areas (Giacomolli, 2008).

The service sector has increased in importance; today the biggest enterprise of the town is the retirement home. Tourism is the most important industry of the town. It relies on the well preserved landscape and also on the history of Bagolino with its ancient churches, Carnival and Bagòss (Giacomolli, 2008).

Unlike many other towns in the Italian alpine countryside, Bagolino has not seen sharp declines in either its economic activities or population. The population of the town was 4,009 at the first census after Italy's unification in 1861, increased by 1951 when it reached the maximum of 5,295 inhabitants, then it decreased to 3,916 inhabitants in the

year 2007 (Istat, 2008). Bagolino`s total Labor Force was 1,666 at the last census (2001), the activity rate[1] was 48.63 percent which is lower than the average provincial rate (52.56 percent). This is due to migration of the working part of the population attracted by better opportunities of the plains. However Bagolino's total work force accounts for 1,620 units and there is practically no unemployment (the rate was 2.76%) (Istat, 2001).

2.3 Entrepreneurship

This segment is divided into three sections, each of them attempting to answer several questions about entrepreneurship. The first section answers who an entrepreneur is and explores definitions of the entrepreneur and entrepreneurship. The second looks at the characteristics of entrepreneurs. In the third section, it is pointed out some more details about entrepreneurship in cooperatives.

2.3.1 Definitions of Entrepreneur and Entrepreneurship

Though entrepreneurs are key figures in the market economy, literature about entrepreneurship has begun to develop only recently, and there is no clear and unanimous definition of entrepreneur and entrepreneurship. Entrepreneurship can be defined as the creation of new organizations, which occurs as a context-dependent, social and economic process (Thornton, 1999). Because entrepreneurial environments change over time, entrepreneurship can be viewed most usefully in terms of the proportion of possible choices that are open to the entrepreneur (Harris, 1969).

However, there is no clear definition of the boundaries of entrepreneurial functions to help demarcate where the entrepreneur and entrepreneurship begin and end. Researchers

[1] People belonging to the work force (both employed and unemployed) divided the population older than 15 years old.

agree that entrepreneurship involves discovery of opportunities with uncertain outcomes through alertness to the environment and the effective translations of such discoveries into desired ends. Based on this, we identify two necessary conditions for the boundary specification: innovation and purposeful action (Amanor-Boadu, 2006).

Innovations are opportunities with uncertain outcomes; they are unique, single cases, and not members of a class, thus not insurable. The entrepreneur is the only one who can bear the uncertainties associated with these opportunities. Purposeful action is the employment of means (strategies and resources) for the attainment of ends. It is objective driven, has a clear raison d'être, and involves well-defined strategies and the execution protocols to achieve desired outcomes. The intersection of innovation and purposeful action defines the boundary of entrepreneurship. The term "entrepreneur" is reserved exclusively for the economic agent operating within this boundary; the one who is incessantly spotting and seizing innovations and purposefully transforming them into desired outcomes (Amanor-Boadu, 2006).

2.3.2 Characteristics of Entrepreneur

Characteristics of entrepreneurs have been studied from several points of view. To advance economically, societies need an adequate supply of these individuals. In this perspective, differences in the rate, form and location of entrepreneurs and entrepreneurship are attributed to differences in psychological, social, cultural and ethnic characteristics of individuals (Thornton, 1999). The drive to achieve, the need to control, the nerve to take risks and the ability to deal with uncertainty are the most frequently

mentioned and important personal characteristics of entrepreneurs (Ketelar-de Lauwere et al, 2002).

However, at present the idea that psychological traits alone account for entrepreneurship has been largely abandoned. Works on regional variation have pointed out the importance of economic and social characteristics. For example, the effects of competition are less important than the effects of cooperation and spatial proximity, features that facilitate organizational learning, i.e. the easy transmission of technical and managerial know-how from one generation of entrepreneurs and firms to the next (Thornton, 1999).

Social capital is an important determinant of entrepreneurship. Having contact with other entrepreneurs in networks is one of the elements of this social capital, but other elements such as having other entrepreneurs in the family and getting emotional support from one's spouse are also mentioned. Other determinants of entrepreneurship are human capital (age, education, experience, etc.), financial capital (e.g. own capital, amount of income from sources other than the enterprise) and strategies for keeping up with business demands. The latter determinant is related to the entrepreneur's focus on commercial relations, the branch and direct business relations (customers and suppliers) and on informal contacts with fellow-entrepreneurs. This brings to another important element of entrepreneurship: proper use of the knowledge to help the entrepreneur react effectively to new developments (Ketelar-de Lauwere et al, 2002).

2.3.3 Collective and Cooperative Entrepreneurship

Agricultural cooperatives are becoming very important in some areas and under certain conditions, also in the Bagòss case the cooperative is gaining space and its importance is likely to increase in future. Agricultural cooperatives are often performing part of entrepreneur functions as we defined them above. Entrepreneurship in these types of firms may be called collective entrepreneurship because a producer-owned firm entrepreneurship may be located at the level of the multiple producer-owners and at the level of the jointly-owned firm. In jointly-owned firms entrepreneurial activities take place at different levels of the organization, notably at the level of the individual member-owners and at the level of the jointly-owned firm (Bijman and Doorneweert, 2008).

Entrepreneurship in a cooperative can reside with the farmers (as owners of the cooperative), with the managers of the cooperative, or with both. Traditionally, cooperatives have been established on the basis of the principle that the members are independent entrepreneurs who collectively decide on the activities of the cooperative. The latter has always been treated as a dependent firm that mainly carries out what the members, through the board of directors, have decided. The double-layer organizational form entails also a two-layer system of entrepreneurship. When market conditions for agricultural cooperatives change, the lead in entrepreneurial activities may shift from the member of the cooperative to the cooperative (Bijman and Doorneweert, 2008).

The term ‘collective entrepreneurship’ is used when the decisions about deployment of assets are taken not by an individual but by a group of people. The need to take decisions as a group results from the joint ownership of assets. Joint ownership leads

to joint decision-making. This implies that it is not the judgment of the individual that applies, but the combined judgment of a group of individuals. The intra-group differences in judgment over the proper use of the joint assets bear on the efficiency of the decision-making process (Bijman and Doorneweert, 2008).

Collective entrepreneurship comprises three types of relationship. First, the jointly owned venture, which is an economic entity with economic relations between cofounders who provide resources such as labor, skills, knowledge, experience and capital, in exchange for some share of the return to the enterprise. Second, there is an organizational relationship among cofounders, and between cofounders and the joint venture. Finally, collective entrepreneurship involves interpersonal relationships. Collaboration is often embedded in existing social and personal relationships with friends, neighbors, family or other community members (Bijman and Doorneweert, 2008).

The key characteristic of the system of collective entrepreneurship in producer-owned firms is that the deployment of the individually owned assets of the member firm and the deployment of the jointly-owned assets of the cooperative firm are interdependent. This means that the decisions of the individual member-producers about their on-farm activities and investments have to be aligned with the decisions on the activities and investments of the cooperative firm to obtain the best result. This alignment (or coordination) requires intensive communication between member firms and the cooperative firm as well as joint decision-making. This need for intense coordination between member firms and the cooperative firm makes collective entrepreneurship in

producer-owned firms into a special type of collective entrepreneurship. We may call this cooperative entrepreneurship (Bijman and Doorneweert, 2008).

2.4 Supply chain

A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes the manufacturer or processor and suppliers, and also transporters, warehouses, retailers and customers themselves. Within each organization, the supply chain includes all functions involved in receiving and filling a customer request (Chopra and Meindl, 2004).

In this paragraph, after describing the general characteristics of supply chains, we analyze specific characteristics of supply chains in agriculture and food production and, at last, we describe what an entrepreneurial supply chain is.

2.4.1 Characteristics of supply chain

Supply chains are commonly characterized as all the firms that are embedded within a complex network of horizontal (i.e. strategic alliances, joint ventures) and vertical (buyer and supplier) relationships. Such a supply chain network has a focal company coordinating the network firms in a hierarchical style. In such networks the coexistence of both competitive and co-operative constructs is observable, where power of the focal company coordinating the network coexists alongside with trust, being the basis for cooperation in the network. Most social relationships are based on a mixture of both power and trust. When power is not abused it has the potential to influence the decision to cooperate and helps to develop trustful relationships among actors or it can even serve as the precondition of trust (Belaya and al, 2008).

The objective of every supply chain is to maximize the overall value generated. The value a supply chain generates is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request. For most commercial supply chains value will be strongly correlated with supply chain profitability - the difference between the revenue generated from the customer and the overall cost across the supply chain. Supply chain profitability is the total profit to be shared across all supply chain stages. Supply chain success should be measured in terms of supply chain profitability and not in terms of profits at an individual stage (Chopra and Meindl, 2004).

The four drivers of supply chain performance are facilities, inventory, transportation and information. If we think of inventory as what is being passed along the supply chain and of transportation as how it is passed along, then facilities are the where of the supply chain. Information deeply affects every part of the supply chain. Information indeed serves as the connection between the supply chain various stages, allowing them to coordinate, and it is also crucial for daily operations of each stage in a supply chain (Chopra and Meindl, 2004).

Vertical organization is traditionally considered in the context of vertical integration. However, vertical integration is only one mode of vertical structure. Vertical coordination is a more comprehensive concept, capturing the entire process by which the various functions of a vertical value adding system are brought into harmony. Vertical coordination encompasses all means of harmonizing vertically interdependent production

and distribution activities, ranging from spot markets through various types of contracts to complete integration (Frank and Henderson, 1992).

We can distinguish six different bilateral governance structures:

1. The spot market contract is a contract for the immediate exchange of goods or services at current prices; the identity of the party is irrelevant,

2. The relational bilateral governance (also implicit contract) is a non-written contract that specifies only the general terms and objectives of the relationship; this governance introduces the idea of repeated relations with the same agents,

3. The relational bilateral governance with "qualified partner(s)" is close to the previous one; however, agents are not free to choose their partners, but have to select a "qualified" transactor (accredited for instance by a collective organization),

4. The formal (written) bilateral contract is a legally enforceable set of promises that defines all or part of each party's obligations,

5. The financial participation in the ownership of the partner(s) is realized when the buyer (respectively seller) is a stockholder of the other but stays legally independent from the seller (respectively buyer); joint-venture is a canonical example of this type of governance structure,

6. Vertical integration brings two or more successive stages of the supply chain under common ownership and management (Raynaud and al, 2002).

The general hypothesis is that the governance structures that are designed in the vertical chain try to guarantee the quality to the final consumer. The reputation of the quality signal is a specific asset that procures a quasi rent for its owner (for example, in the form of a price premium for his products). The profitability of this asset depends not only on the behavior of the owner but also on the behavior of the other agents in the vertical chain. It may be necessary to adopt certain governance structures in the vertical chain that offer greater control over agents who strongly influence the final quality. If the suppliers must satisfy certain specifications in order to be the suppliers of the owner of the quality signal, these requirements may increase the degree of asset specificity (Raynaud and al, 2002).

2.4.2 Supply chains in the agri-food sector

There are no theoretical differences in supply chains in the agri-food sector. However, due to the distinctive characteristics and concerns of this sector main characteristics and trends of supply chains in the agri-food sector are briefly review.

Globalization, consumer concerns and increased competition press farmers and food producers to enhance product innovation and to seek more efficient production and distribution structures. In recent years agriculture and the food industry have shown increasing collaboration on issues of product development, quality guarantee systems and improved logistics. Spot markets are being replaced by contract-production and other systems of vertical coordination like strategic alliances, long-term contracts, licensing, subcontracting, joint ventures and franchising (Hendrikse and Bijman, 2002).

Marketing cooperatives are a special type of vertical integration, with farmers owning assets in another tier of the agrifood production and distribution system. Changes in the market for food products raise the question whether cooperatives are still efficient organizations for the processing and marketing of agricultural products. It might be questioned if cooperatives are well suited to make the investments needed in R&D and marketing, given their particular characteristics of democratic decision making and raising equity capital among members (Hendrikse and Bijman, 2002).

Vertical coordination in the agri-food sector often requires aligning activities of agents in more than two tiers of the production and distribution system. Particularly, if specialty agricultural products are produced, processed and marketed (like with identity preservation), vertical contracting is relationship-specific. If these activities require investments which can only be recouped with particular partners in the system, then dependencies exist. Such dependencies provide room for opportunistic behavior in the form of appropriation of a larger share of the surplus than contracted for. If a company participating in a specific agri-food chain has insufficient guarantee that it will be able to recoup its investment, inefficient investment decisions will result (Hendrikse and Bijman, 2002).

2.4.3 Entrepreneurial supply chain

Traditional supply chains have a dominant champion controlling most of the strategic decisions associated with performance. In exchange for their share of the value they create, participants conform to champions' specifications of types of input to use, the quality standards of outputs, production processes and quantities, delivery locations and times, etc.

Because of this uneven power distribution, opportunism tends to be prevalent in traditional supply chains and anonymity becomes valuable. This governance mechanism may also foster moral hazard at points along the supply chain where participants perceive themselves to be powerless. Here, participants in the supply chain who perceive themselves as powerless will find it advantageous to shirk on the necessary but unobservable effort required to minimize potential risks to the whole supply chain. Although these traditional supply chain risks may be addressed with oversight protocols that aim to increase transparency and reduce the value of anonymity, they can be expensive and cumbersome to execute if the partners have competing objectives. Entrepreneurial supply chains offer an effective alternative to traditional supply chains when opportunism or moral hazard risks cannot be otherwise effectively controlled (Amanor-Boadu et al, 2009).

Entrepreneurial supply chains are inter-firm relationships characterized by a mutual recognition of need for, and dependence on, a valuable asset that is inexhaustible in use but easily depreciated with misuse or abuse. Participants in entrepreneurial supply chains, therefore, recognize a shared responsibility in protecting and enhancing the value embedded in the enabling asset through social ties and networks. The enabling asset characteristics define the opportunities that may be exploited and the extent of participants' embeddedness in the governing social ties and networks. These characteristics also define the IP protection methods that may be employed to enforce exclusivity and create tangible value for participants (Amanor-Boadu et al, 2009).

The collective success of entrepreneurial supply chain participants is driven by their independent ability to meet their customers' expectations as well as maintain their collective diversity. Recognizing the foregoing, participants in entrepreneurial supply chains organize

themselves around their shared assets while consciously taking personal ownership in maximizing the assets contribution to their individual performance. Because they are non-linear, entrepreneurial supply chains are usually more extensive and complex than traditional supply chains, encompassing government agencies enforcing use of rights and exclusivities, and businesses in multiple industries that depend on the shared assets. Thus, changes in the nexus of entrepreneurial supply chains can have significant effects in seemingly unrelated segments of the local economy in which they operate (Amanor-Boadu et al, 2009).

Three distinct groups of entrepreneurial supply chains may be delimited based on the types of assets: place assets; place/product assets; and place/product/process assets. Entrepreneurial supply chains based on place assets are organized around the unique characteristics of a location, and are, therefore, commonly found in the tourism industry. Their participants leverage unique characteristics of the location to provide customers with idiosyncratic experiences. Thus, the primary source of the participants' collective competitive advantage is the unique, valuable and unsubstitutable location asset they all share. They incorporate these qualities of the location asset into their individual strategies to achieve their business objective. Immobility and inimitability of the common assets are the primary source of IP protection. As such, the participants' ability to establish and secure a first mover advantage is usually critical to their ability to sustain their competitive advantage (Amanor-Boadu et al, 2009).

Place/product asset-driven entrepreneurial supply chains are organized around products naturally occurring in a particular location. They also cover entrepreneurial supply chains that are organized around products that, while they may not occur exclusively in a particular location, have been there for such a long time that they have come to be literally

associated with the place. They exhibit a natural barrier to competition because of the association of their products with a particular location. Therefore, the place name becomes the embedded IP that separates the product from all others (Amanor-Boadu et al, 2009).

The final type of entrepreneurial supply chains is place/product/process entrepreneurial supply chains. These are organized around a product that is produced in a particular place using a specific process, inputs or production technology. The products produced within this type of entrepreneurial supply chain, therefore, tend to have more controls and standards around them than the other two. They have explicit IP protection protocols that serve to exclude non-conforming products and producers from exploiting the value offered by the supply chain. These protocols may also confer legal protection from suppliers who do not meet the place/product/process characteristics that create value in the marketplace (Amanor-Boadu et al, 2009).

From the foregoing it is clear that the government's role in the place/product/process entrepreneurial supply chains is necessary for providing enforceable intellectual property rights or preventing counterfeits by outsiders and opportunism by participants. The European Community's Council Regulation 1383/2003, for example, focuses on customs actions and measures that may be taken against goods suspected of infringing certain intellectual property rights that have been granted to specific products. Infringements, such as selling products not meeting the location and process qualifications, are treated as counterfeit goods, misleading advertisements, or even public health risks. The regulation is weighed in favor of those who have been granted the rights, and allows for a "a more flexible procedure allowing goods infringing certain intellectual property rights to be destroyed without there being any

obligation to initiate proceedings to establish whether an intellectual property right has been infringed under national law" (Article 9, L 196/7) (Amanor-Boadu et al, 2009).

2.5 Rural development

Rural areas often lag behind in terms of development. This paragraph briefly reviews literature about rural development. A section is also dedicated to explain the concept of "local food", seen as a means for rural development.

2.5.1 Rural development

Mountain locations, confronted with a lagging or unfavorable development, often see their viability become at risk. Population decline and a narrowing economic base not only affect future development perspectives and a decentralized settlement of the country; they also put under threat the fulfillment of the functions rural areas have. Indeed, despite the fact that agriculture is losing its predominant position in rural employment and settlement, there is a growing demand for non-commodity uses of rural lands such as recreation and ecological compensation. Besides these functions that mainly satisfy the needs of external actors, rural areas serve the internal purpose of providing living space and space for economic activities for the rural population. Following the interests of these different groups in society, five main functions of rural areas can be distinguished: 1) housing and socio-cultural activities; 2) economic development; 3) agricultural production; ecological compensation; 4) recreation and 5) leisure. From an economic point of view the goods and services specifying the last two functions are mainly external effects as they are a by-product of agricultural production and other activities within the first and second function. As function fulfillment is closely linked to economic and social activities it is

evident that lasting fulfillment depends on the existence of viable communities (Kopainsky and al, 2003).

Hence, in the mountains agri-food products, the natural environment and the socio-cultural environment are joint products of the same process. The concept of the joint production implies giving up the idea of the economies of scale, embracing the idea of flexibility and, consequently, adopting economic policies other than the standard ones (Gios, 2005).

In the European Union, until the 1980s, rural development was seen as the responsibility of both the Common Agricultural Policy (CAP)[1] and regional policies. Environmental conservation or rural development was seen as a major focus only in mountainous and upland areas. On the incentive side of the equation, the 1992 reforms of the CAP introduced compulsory accompanying measures that boosted expenditure on environmental support and rural development to about 10 per cent of total CAP expenditure by 2000. Agenda 2000 did consolidate and clarify the link between agri-environmental and rural development policy by defining Pillar II of the CAP as focused on the latter. Policies were to include both farm-based and agri-environmental measures, as well as more rural funding, as a way of promoting a multifunctional European model of agriculture. The role of agriculture was no longer seen as providing sufficient jobs to sustain the rural economy,

[1] The Common agricultural policy is an area in which competence is shared between the European Union (EU) and the Member States. Its aims are to ensure reasonable prices for Europe's consumers and fair incomes for farmers. The CAP is one of the most important EU policies (agricultural expenditure accounts for some 45% of the Community budget). The CAP has fulfilled its main objectives, nevertheless, major changes to policy soon proved necessary. Its objectives have changed in the course of time, and the instruments used have also evolved as a result of successive reforms. The CAP is now divided in two, referred to as Pillar 1 and Pillar 2. Originally most agricultural support was provided to the industry indirectly, through market measures. The current Single Farm Payment comes under Pillar 1, replacing the individual payment schemes. Expenditure under the Rural Development Regulation is referred to as Pillar 2. Pillar 2 measures are aimed at supporting rural communities to develop and diversify. The range of measures includes: agri environment, farm adaptation, forestry, processing and marketing of agricultural produce, training and development, and less favored area support.

but as one of supporting a way of life, helping to maintain an attractive and clean environment, and contributing to the development of a higher value-added food chain (McGranahan and Thomson, 2008). Rural development is playing an increasingly important role in the European Union policies. The Rural Development policy 2007-2013 focuses mainly on three areas: improving competitiveness for farming and forestry; environment and countryside; improving quality of life and diversification of the rural economy (Kopainsky and al, 2008).

According to the European Commission mountain areas face specific difficulties:

> It is more difficult to earn a livelihood in mountain regions for six reasons: 1) it costs more to produce there; 2) markets are further away; 3) the soil is less fertile; 4) the climate is more severe; 5) distances are greater; 6) services are harder to access and less profitable to supply. On the other hand, agriculture and economy in mountain regions have their positive sides too. The quality and authenticity of their products are unmatched. Isolation is a handicap, but it can be an advantage — in maintaining organic and traditional production methods and conserving biodiversity. This diversity inevitably comes at a price; the natural heritage of European mountains owes a lot to humans and calls for great efforts by mountain communities to sustain it (European Commission, 2002).

2.5.2 Local food

The definition of territory implies the concept of a system of players and resources, activities and relationships, which is driven by a system of governance. The competitive capability of a geographical area considered a "territory system" is no longer determined by the quantity of its components but rather by their complementary interactions and their capability of integration. Resources characterizing the "territory system" and determining its attractiveness can be material or immaterial. Material resources are geographical characteristics, infrastructures, artistic and cultural wealth. They are easily found and can

be exploited. Intangible resources are local “esprit”, skills and competences. They characterize the attractiveness of the territory; they are exclusive of it and are very hard to be imitated. Consequently, it is more valuable to exploit intangible resources to create a sustainable competitive advantage and not imitable. (Gatto and Toffanin, 2008).

Local foods might represent a way to exploit both tangible and intangible resources and might then be seen as fruitful in terms of development as they can incorporate and valorize many local assets with special or immobile characteristics linked to the area. The way in which such assets are valorized, however, may vary according to the types of actors involved and strategies they choose to pursue. Two theoretical approaches can be adopted. The first, described as a supply chain strategy, involves the building of a strong network of actors in the production and processing of the regional product, focusing energies on managing production levels, improving the physical product quality and implementing effective marketing. Under this approach, the regional product contributes to the socioeconomic well-being through the existence of a strong producer network, increased employment opportunities within this network and increased revenues from the effective management of the supply chain and marketing of the product. The second approach involves a different conceptualization of regional foods as rural development assets. Here, actors perceive such products as offering a wide range of interlinked resources including physical environmental (e.g. distinctive landscapes, local animal breeds and plant varieties), cultural (e.g. techniques, know-how, myths, stories) and economic (e.g. skilled employment) resources. Thus, regional foods are seen to contribute, potentially, to a wide range of initiatives that encourage diverse activities and novel interactions between

multiple types of actors (e.g. tourist trails, markets, festivals, educational initiatives, community events). This approach to the use of regional products by local actors has been described as a territorial quality or extended territorial strategy. Under this strategy, it is the territorial identity and associations of the product that are the bases of the value generation, rather than the physical outputs of a single production network and supply chain. The identities and associations are seen to be utilizable by a broad range of actors that may apply them to a 'basket' of goods and services, resulting in a wide distribution of economic rent (Tregear and al, 2007).

Hence, regional foods can be conceptualized as a form of cultural capital with the potential to leverage wider social and economic benefits to local rural areas. The key leverage mechanism employed under this approach is often a territorially based qualification or certification scheme, which defines standards of production and supply that are beneficial to the socio-economic status of the area, signaled clearly to buyers by way of a mark or brand (Tregear and al, 2007).

The main point in analyzing local food production systems is the link with the territory. Production of food is contextualized within a particular economic, social, cultural and environmental plot. It is a production where place matters. The place matters as the physical support of the production process and as the geographical space where a common production culture is built in the course of time; the place matters also in terms of culture of consumption when food is attributed a specific meaning tied to social events, festive occasions and religious feasts. Production and consumption are part of a network of

relations that, in their turn, are part of the community social life (Fonte and Agostino, 2006).

In local food production systems there are two types of "quality". The first highlights specific characteristics of the production place and/or production process, because they give food a unique taste and distinctive characteristics. The second one is linked to specific conditions of the production process or trade. To build a product centered on place characteristics means to refer to the value of belonging to a tradition, a story, a culture; whereas to build a product centered on production process or trade conditions means, for example, to refer to the civic value of environment defense and fair trade. Positive externalities of local food production systems come from qualitative characteristics of the production process, products and trade that strengthen social and cultural relationship and enhance environmental and equity values (Fonte and Agostino, 2006).

Generally, there are two main types of the organization of local food production systems: proximity systems centered on local production for local consumers and spatially extended systems centered on local production for distant consumers. Proximity systems have place and time constraints. Goods traded cannot be separated from people; like a craftsman's work, goods are referable to the skill of those producing them. This leads to a weak formalization of social roles, knowledge and relations. In the local space, implied skills are associated with people and trust is firmly tied to personal relationships (Fonte and Agostino, 2006). It is said that "local food has a face". On the other hand, in spatially extended systems product certification becomes important as a means of securing

information about the value of the product and as a means of getting a premium originating from this value (Fonte and Agostino, 2006).

2.6 Sustainability

The development of rural areas must take into account ecological issues. To have a sustainable development of rural areas is not only a necessity, but it also gives the opportunity to optimize the utilization of typical resources of the territory (such as local food). In this paragraph, we analyze the main definitions of sustainable development and then we try to explain what is meant under the terms "sustainable agriculture" and "multifunctionality".

2.6.1 Sustainable Development

Thus far, the conceptual framework encompassing entrepreneurship, supply chains and rural development have been presented. It is important to assess how these come together to support sustainable development within the context of sustainable agriculture and the multifunctionality of agriculture (European Commission, 2002). To cast the framework within the right light, first these concepts are defined and then string them together to explain how they support the Bagòss initiative as a sustainable development initiative.

Sustainable development is a macroeconomic concept. Its central aim is to increase the well-being per inhabitant coupled with the alleviation inequality without depleting the "resource base" of the national and global economies. The concept of sustainable development is based on two pillars: the equity principle (inter- and intra-generational

equity) and the tri-dimensionality principle, the concept involving economic, ecological and social aspects (Jan and al, 2008).

One of the most important definitions of sustainability is contained in the 1987 study released by the World Commission Environment and Development, titled *Our common future*. Defining sustainable development as "development that meets the needs of present without compromising the ability of future generations to meet their own needs," the Commission outlined the three essential components of sustainability: 1) environment: the conservation and enhancement of our environmental and natural resource base; 2) economy: the development of economies that focus on long term economic stability and the wise use of our resources; 3) social component: addressing the basic needs of all people while remaining accountable to the critical needs of future generations (Beaulieu and Jordan, 2007).

The Department of Environment, Food and Rural Affairs of the United Kingdom expanded that study by formulating five key principles of sustainable development: 1) living within our environmental limits and ensuring that the natural resources necessary for life are not impaired; 2) pursuing a strong, healthy and just society by building social cohesion, inclusion and equal opportunity for all; 3) undertaking sustainable economic activities that offer prosperity and opportunities for all while minimizing environmental and social costs; 4) promoting strong governance that engages people's creativity and diverse insights; and 5) employing sound science in the pursuit of sustainable practice while taking into account public attitudes and values (Beaulieu and Jordan, 2007).

2.6.2 Sustainable Agriculture and Multifunctionality

In the context of agricultural production, sustainability can be described as farming systems that are capable of maintaining their productivity and usefulness to the society indefinitely. Such systems must be resource-conserving, socially supportive, commercially competitive and environmentally sound (Rigby and Caceres, 1997).

Another definition of sustainable agriculture was incorporated in the 1990 Farm Bill in the USA and states that:

> . . . the term sustainable agriculture means an integrated system of plant and animal production practices having a site-specific application that will, over the long term: a) satisfy human food and fiber needs; b) enhance environmental quality and the natural resource base upon which the agricultural economy depends; c) make the most efficient use of non-renewable sources and on-farm resources and integrate, where appropriate, natural biological sources and controls; d) sustain the economic viability of farm operations; and e) enhance the quality of life for farmers and society as a whole (Rigby and Caceres, 1997).

Goals of sustainable agriculture include: 1) a more thorough incorporation of natural processes, 2) a reduction in the use of off-farm, external and non-renewable resources, 3) more equitable access to resources, 4) greater productive use of local knowledge and practices, 5) greater self-reliance for farmers and rural populations, 6) a better match between production practices and climate and landscape, 7) profitable and efficient production with an emphasis on conservation of the soil, water, energy and biological resources (Rigby and Caceres, 1997).

The term ‘multifunctionality’ or ‘multifunctional agriculture’ is sometimes confused with sustainable agriculture, but they refer to two different concepts. According to the OECD, multifunctionality is a characteristic of the production process that can have

implications for achieving multiple societal goals. The idea of multifunctional agriculture has been set up by OECD Agriculture Ministers in 1998, recognizing that beyond its primary function of supplying food and fiber, agriculture can also provide a wide range of environmental benefits, such as recreational amenities and aesthetic values of the landscape, non-use values of biodiversity and habitat protection, intrinsic values of ecosystem, watershed and resource functions, and socio-economic benefits, like food security, food safety and animal welfare, rural employment and viability of rural areas, as well as cultural heritage (Hediger, 2008). Therefore, it embraces a set of non-market costs and benefits, and thus constitutes a potential source of market failure (Hediger and Lehmann, 2003).

2.7 Economic theories

According to the North American Industry Classification System (NAICS), the Bagòss industry belongs to the food industry sector and to the dairy products subsector which is the industry group encompassing companies that produce, process, package and/or market dairy products, including fluid, cultured and solid milk products along with fresh eggs and dairy and egg product substitutes such as soy milk. Within this group, the Bagòss industry is clearly part of the cheese industry and is classified in the specialty cheese market.

Specialty markets are characterized by monopolistic competition. Bagòss is a differentiated product whose value is reflected in its price. But the price captures the sensory and geographical attributes as well as reputation of producers and other factors. It is a dynamic environment where competitors are constantly seeking to nullify or capitalize

on these values attributes through, among others, copying Bagòss. In the next two sections, monopolistic competition and the Resource Based View of the Firm to help improve our understanding of the Bagòss market are discussed.

3.1.1 Monopolistic competition

A monopolistic competitive market exhibits some characteristics that can be found both in perfect competition and monopoly. An industry is monopolistically competitive if: there are many buyers and sellers; each firm in the industry produces a differentiated product; there is free entry into and exit from the industry (Baye, 2006).

Usually sellers have some degree of control on the disposal of their resources in the manner associated generally with monopoly. Under these conditions then, the sellers' competition does not depend solely on price. From the analytical point of view, the direct effect of these conditions is to make the elasticity of the demand curve for each firm less than infinity as a result of differentiating their products (White, 1936). Thus, each firm faces a downward sloping demand curve which gives it some power over price. In this sense the firm is like a monopolist, although the demand curve is more elastic than that of the monopolist because the products have substitutes (OECD, 1993).

The basis of differentiation may reside with the product itself or the circumstances surrounding its sale. When either of these conditions is obtained, the sales of one vendor is conditioned by three factors: the vendor's price policy; the characteristics of his product; and his promotion. Thus, monopolistic competition depends on quality and marketing ability as well as price. To maximize profits, the monopolistic competitive firm produces

where marginal revenue equals marginal cost and average revenue either equals or exceeds average cost (White, 1936).

3.1.2 Resource Based View of the Firm

Researchers in the field of strategic management have long understood that competitive advantage depends upon the match between distinctive internal (organizational) capabilities and changing external (environmental) circumstances. There are two important sources of competitive advantage: a low cost position enables a firm to use aggressive pricing to achieve high sales volume, whereas a differentiated product creates brand loyalty and positive reputation, facilitating premium pricing (Hart, 1995).

Indeed, if a firm makes an early or a large scale move, it is sometimes possible to preempt competitors by setting new standards or gaining preferred access to critical raw materials, locations, production capacity or customers. However, a firm must be concerned not only with profitability in the present and growth in the medium term, but also with its future position and source of competitive advantage. The importance of "competing for the future" is often a neglected dimension of competitive advantage (Hart, 1995).

The resource based view takes this thinking one step further: it postulates that competitive advantage can be sustained only if the capabilities creating the advantage are supported by resources that are not easily duplicated by competitors. In other words, firms' resources must be used in a such a way to raise "barriers to imitation". Thus, resources are the basic units of analysis and include physical and financial assets as well as employees' skills and organizational processes (Hart, 1995).

Resources must be valuable (i.e. rent producing) and non substitutable. In other words, for a resource to have enduring value, it must contribute to a firm capability that has competitive significance and is not easily accomplished through alternative means. Next, strategically important resources must be rare and/or specific to a given firm. That is, they must not be widely distributed within an industry and/or must be closely identified with a given organization, making them difficult to transfer or trade (Hart, 1995).

Finally, such resources must be difficult to replicate because they are either tacit or socially complex. Tacit resources are skill based and people intensive. Such resources are "invisible" assets based upon learning by doing that are accumulated through experience and refined by practice. Socially complex resources depend upon large numbers of people engaged in coordinated actions such that few individuals have sufficient breadth of knowledge to grasp the overall phenomenon (Hart, 1995).

For the firm, resources and products are two sides of the same coin. Most products require services of several resources and most resources can be used in several products. By specifying the size of the firm's activity in different product markets, it is possible to infer the minimum necessary resource commitments. Conversely, by specifying a resource profile for a firm, it is possible to find the optimal product-market activities (Wernerfelt, 1984).

By a resource is meant anything which could be thought of as a strength or weakness of a given firm. More formally, a firm's resources at a given time could be defined as those (tangible and intangible) assets which are tied semi permanently to the

firm. Examples of resources are: brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient procedures, capital, etc (Wernerfelt, 1984).

If the production of a resource itself or of one of its critical inputs is controlled by a monopolistic group, it will, ceteris paribus, diminish the returns available to the users of the resource. A patent holder, for example, expropriates part of the profits of his license holders. On a smaller scale, a good advertising agency will be able to take a share of the image builders' (customers') profit. Finally, the availability of substitute resources will tend to depress returns to the holders of a given resource (Wernerfelt, 1984).

It is possible to identify classes of resources for which resource position barriers can be built up. By their nature, these barriers are often self-reproducing; that is a firm which at a given time finds itself in some sense ahead of others may use these barriers to maintain that lead. It is the properties of the resources and their mode of acquisition which allow this to be done. What a firm wants is to create a situation where its own resource position makes it more difficult for others to catch up. To analyze a resource for a general potential for high returns, one has to look at the ways in which a firm with a strong position can influence the acquisition costs or the user revenues of a firm with a weaker position (Wernerfelt, 1984).

Hence, strategy can be viewed as a 'continuing search for rent', where rent is defined as return in excess of a resource owner's opportunity costs. Several types of rents may be usefully distinguished. First, rents may be achieved by owning a valuable resource

that is scarce. This type of rents includes ownership of valuable land, locational advantages, patents and copyrights. Second, monopoly rents may be achieved by government protection or by collusive arrangements when barriers to potential competitors are high. Third, entrepreneurial (Schumpeterian) rent may be achieved by risk taking and entrepreneurial insight in an uncertain/complex environment. Entrepreneurial rents are inherently self destructive due to diffusion of knowledge. Finally, the firm may be able to extract rents when resources are firm specific (Mahoney and Pandian, 1992).

The existence and maintenance of rents depend upon a lack of competition in either acquiring or developing complementary resources. The firm's unique capabilities in terms of technical know-how and managerial ability are important sources of heterogeneity that may result in sustained competitive advantage. In particular, distinctive competence and superior organizational routines in one or more of the firm's value chain functions may enable the firm to generate rents from a resource advantage. Furthermore, a firm may achieve rents not because it has better resources, but rather because the firm's distinctive competence involves making better use of its resources than competitors (Mahoney and Pandian, 1992).

Fundamentally, it is the resources endowment of the firm which limit the choice of markets it may enter and the levels of profits it may expect. Key resource constraints include: 1) shortage of labor or physical inputs, 2) shortage of finance, 3) lack of suitable investment opportunities, and 4) lack of sufficient managerial capacity. The growth of the firm then can be considered limited in the long run only by its internal management resources (Mahoney and Pandian, 1992).

In the future, it appears inevitable that businesses will be constrained by and dependent upon ecosystems. In other words, it is likely that strategy and competitive advantage in the coming years will be rooted in capabilities that facilitate environmentally sustainable economic activity, which is a natural resource based view of the firm (Hart, 1995).

2.8 Conclusion

The purpose of this literature review was to examine various aspects of in the Bagolino economy and most of all in the Bagòss industry. The present social and economic situation of Bagolino is important both to understanding the Bagòss industry performances and the significance of this industry for the life of the community. At the same time history is fundamental to understand why Bagòss cheese is produced only in Bagolino and to gain a better insight of the intangible contents of this unique cheese.

The review of literature about entrepreneurship and supply chains was aimed at a better understanding of the organization of the Bagòss industry whose organizational structure can be defined as entrepreneurial supply chain in which independent farmers, the cooperative, retailers and local government all act as agents involved in managing the Bagòss supply chain.

Theories about rural development and concepts of sustainable development and multifunctional agriculture explain threats that are menacing many rural areas like the Bagolino territory; they also help to define what strategies can be pursued in order to have sustainable development that will ensure satisfaction of the needs of present generation without compromising the ability of future generations to meet their own needs.

At last reviewed main economic theories that seem to explain the Bagòss industry from the economic perspective were reviewed. It must be noted that the resource based view of the firm perfectly explains why the Bagòss production is organized the way it is and why the Bagòss cheese is a unique product. Indeed Bagolino is exploiting its unique and non imitable resources that are its tradition add its farmers' skills. From these resources both Carnival and Bagòss, the two most distinctive traits of Bagolino come. It is also interesting to see how the same ideas are explained from different perspectives in the section dedicated to the concept of local food.

CHAPTER III: DATA, THEORY AND ANALYTICAL TOOLS

In this chapter it is presented and described how the data we used were collected and checked; the main theoretical hypotheses tested and the tools used to test them.

3.1 Survey design and data collection

The source of data was intended to be a survey that aimed to collect a maximum amount of information directly from Bagolino farmers. However, it soon became evident that it was not possible to collect all necessary data only through a survey; moreover, quality problems of data collected by survey emerged. The final approach was then to get data from multiple sources, the main source of data remained the survey of farmers, but data collected from administrative sources and obtained by interviewing experts were important for integration and for checking purposes.

3.1.1 Survey design and execution

The purpose of the survey was to get a maximum amount of information about the Bagòss production and marketing, about Bagòss' farmers and Bagòss' farms, in order to gain insight in the Bagòss industry.

The questionnaire was prepared after some interviews with experts gave us a first idea about the Bagòss industry, in order to have some knowledge about characteristics of production and farms producing Bagòss. The forms used for the US 2007 census of agriculture and for the Italian census of agriculture of the year 2000 provided the general framework, but the content of questions was aimed at getting the maximum data possible, the maximum level of completeness and a set of data necessary to build a model helping to answer our research objectives.

Given the small number of producers we did not sample them, but attempted to interview the entire population, made up of 28 farms. Interviews were carried out from April 17 to May 17, 2009. Questionnaires were handed out to farmers at face-to-face interviews. The English translation of the original Italian questionnaire is attached in Appendix B. Before personal interviews the cooperative Valle di Bagolino had organized for all member farmers a meeting to advise them on the upcoming interview and to explain to them its purpose. In a further attempt to gain farmers' trust almost all interviews were preceded by a phone call in order to get an acceptance of the interview and to agree about the date and the time; only in very few cases it was not possible to reach farmers by phone and in such cases we had to knock at their doors, unexpected. A letter was also given to each farmer just before the interview, the purpose of the letter was twofold, to explain the objective of the interview and to inform the farmer about the respondent's rights in terms of privacy[1].

Twenty six interviews were completed; in most cases they were conducted with the farm operator, in some cases with a family member directly involved in the farm operations, in other cases several family member were present. The list of 28 farms producing Bagòss obtained from the cooperative was formally exact but there were two farms which *de jure* were run by two operators (in one case by the father and the son, in the other case by two brothers), but *de facto* they formed one farm, so only one interview was carried out for each of these cases. There was one more farmer who was not on the list - it was a case of a newly established farm with a young farmer who was just setting up his

[1] In Italy law n. 196 of June 30, 2003 establishes the rights of citizens in terms of privacy and personal data treatment. It also stipulates the right to be informed about how and to what extent collected personal data are treated.

farm and was willing to join the cooperative and to begin to produce Bagòss as soon as possible. Only one farmer refused to participate in the interviewing. Eventually, the rate of respondents appeared to be high, reaching 96% of the population.

However, it soon became evident that the questionnaire was very complicated for Bagolino farmers and it took too long to complete the questionnaires. First interviews lasted more than one hour and the reliability of some data was doubtful, though. In particular, in Bagolino conditions farmers are not fully aware of the quantity of the land they are farming. Thus it was decided to simplify to a maximum the question about surface areas, relying on other sources to complete these data. Furthermore, given the farmers' difficulties in revealing sales data in detail, we decided to ask only for data about the Bagòss production classified by the age of sale, without a further division by winter and summer production (question number 9).

3.1.2 Data revision and other data collection

Taking into account the variability of situations and a different degree of collaboration that farmers were willing to allow, problems to face can be grouped in two categories: lack of knowledge about farm data and difficulties in revealing production data.

The first category refers mainly to the farm land area data. It may seem surprising that a farm operator does not know the exact area of his own farm, but in the mountains, especially in forest and pasture areas, borders and then areas are not easily recognizable and the conformation of the ground made precise area measurements hard. All these data are available because they are all recorded in the land register, but in most cases farmers of

Bagolino do not directly care for the bureaucratic part of their activity; almost always farmers choose to rely on agricultural associations[1] for the bureaucratic part of the job.

Other cases of the lack of knowledge are of minor importance; for example it was difficult to have an idea of expenses for saffron and linseed oil. In the case of saffron, the price varies depending on the season, the seller and the type of saffron (pure or not pure) purchased. Furthermore, the quantity of saffron added to milk is not constant, being generally higher in winter and lower in summer and measured in tea spoons rather than in grams.

The second kind of problems is typical not only for Bagolino and refers to the milk production (and in our case, respectively, to the Bagòss production) and it is due to difficulties faced by farmers in dealing with the milk quota established in the European Union in 1984. Most farms produce above their quota and there is some reticence in declaring the true production volumes, both of milk and Bagòss. In several cases farmers tend to give not completely reliable answers to questions about their milk production and, consequently, to another series of related questions.

Considering these problems it was decided not to rely only on the data collected by our survey and had to look for other sources of data to use for comparison and, in some cases, for revision purposes.

[1] In Italy agricultural associations perform various functions; the most important is to represent farmers with the government and defend their interest in the political area, more or less like unions do for workers. There are several agricultural associations but only three are widespread all around the nation. Almost all Bagoss producers are members of an agricultural association and in all cases this is the Coldiretti, the biggest (in terms of members) agricultural association in Italy.

One of the options was to look for administrative data, collected by various public bodies for administrative purposes. It was possible to have access to the *Sistema Informativo Agricolo della Regione Lombardia*[1] (SIARL) that gathers most of administrative data collected by various administrative authorities. Given that in Italy regions are responsible for European payments to farmers the system is managed with due care.

We utilized SIARL to have reliable information about land, land ownership and land utilization. Data obtained from SIARL have a high degree of reliability, but to use these data instead of the survey data implies losing information about land that is neither owned nor rented but is run by farmers under verbal agreements.

SIARL was also used to check data about the livestock. The check results showed that there was no significant difference between the two types of data. Besides, SIARL was of much help in getting the data that could not be collected by survey: the milk rights and the amount of direct payments from the European Union.

As it was written before, farmers usually do not care for the administrative and bureaucratic part of their job; instead they utilize the services performed by agricultural associations. Given that almost all Bagòss producers are members of Coldiretti and that all associates use Coldiretti for dealing with bureaucratic formalities, assistance provided to us by the Coldiretti local representative was precious for revising the data and making them more consistent and reliable.

[1] Agricultural Information System of the Region of Lombardy.

Coldiretti gathers all declarations, applications and claims, which farmers have to do performing their activities, in order to obtain authorizations and permits as well as to get payments from European Union. The information provided by the Coldiretti representative is more than just an expert's knowledge, because it is based upon data of farm's official documents. This information was generally used to get a better insight of the Bagòss industry and Bagolino farmers' conditions, and specifically to revise data about the milk production.

3.1.3 Interviews with experts

This research began in October 2008 with interviewing some experts, to gain a general idea about Bagolino, the Bagòss industry and Bagòss producers. The first interviews were rather open conversations, based on just a generic outline, without questionnaires or a list of questions defined beforehand. Interviews were conducted with the President of the cooperative Valle di Bagolino, the Bagolino town administration councilor in charge of the tourism sector and land affairs, and an agronomist, consultant of the Val Sabbia Mountain Council. They provided the first sketch of the subject to analyze and the first rough data. That information was used to decide on the continuation of the research, its objective, methods and expected results.

The Coldiretti local representative was interviewed in May 2009, the scope and the importance of this interview were referred to in the previous section.

The last two interviews were held in July 2009. One was with the local manager of the dairy. Several farmers do not directly process their milk (or all their milk), instead they

supply the dairy. To get information about the dairy structure, production and marketing was important in order to have a complete picture of the Bagòss production.

The last interview was with representatives of the local bank. Though the Bagolino agriculture is peculiar in many aspects, credit still remains one of the key aspects of the farm development. The bank sector experts' opinions about the credit situation, problems and opportunities for Bagolino farms are very important to have a more detailed scheme of the Bagòss economy.

All interviews with experts were held face to face. The interview with the director of the local bank was held in two separate moments, the first one face to face and then with a series of supplementary questions by email.

3.2 Theoretical framework of the research

As was stated in chapter II, the Bagòss industry is clearly part of the cheese industry and is classified in the specialty cheese market that is characterized by monopolistic competition.

As a result of differentiation each firm faces a downward sloping demand curve which gives it some power over price. To maximize profits, the monopolistic competitive firm produces where marginal revenue equals marginal cost and average revenue either equals or exceeds average cost.

The Bagòss industry and the specialty cheese market are dynamic environments where competitors are constantly seeking to eat away profits of other competitors. Under

these conditions the resource based view of the firm offers a better explanation of firms' behavior and expected results of their behavior.

This theory postulates that competitive advantage can be sustained only if the capabilities creating the advantage are supported by resources that are not easily duplicated by competitors. Hence, firms' resources must raise "barriers to imitation". Thus, resources are the basic units of analysis and include physical and financial assets as well as employees' skills and organizational processes.

Our research moves from this point of view and is aimed at identifying resources that influence the production of Bagòss and the performances of Bagòss farms and industry, defined as sustained competitive advantage upon competitors.

The data collected through the questionnaire, other interviews and other available data, allowed us to estimate the Earning Before Interest, Taxes, Depreciation and Amortization (EBITDA). That can be used as a proxy of profits in the short run. Our basic assumption is that EBITDA is strictly correlated to the Bagòss production whereas it is not so clear what are the effects of selling aged or fresh cheese and of choosing one marketing channel among others. We also assume that the presence of goats has a positive influence on the EBITDA because it exploits resources not useful for cattle and diverts little workforce from its main duty of taking care of cows and producing Bagòss.

The Bagòss production is strictly correlated to the milk production. Hence it was decided to investigate what factors influence the amount of milk produced. Of course the quantity of milk produced is determined by the number of milking cows times the average

production. Yet the purpose was to explain primary factors determining the milk production: what determines the size of the herd and how much effort farmers are ready to make to have high cow productivity. From a theoretical point of view genetics of cows and breeding conditions are very important aspects, but there were no data about that. Also the quantity and type of feed and the quantity of work applied are fundamental to explain the level of production. In spite of the use proxies instead of the required data it was tried to explain factors influencing the amount of milk produced through expenses for feed and the amount of work at a farm.

3.3 Analytical tools

Three different instruments to analyze Bagòss farms and industry were used: analysis of qualitative data, descriptive statistics and inferential statistics.

The main purpose of the descriptive statistics is to describe the collected data by summarizing them, by showing their principal indicators and by displaying them in a clear way with the use of tables and graphs.

Instruments of the inferential statistics used in this research were mainly analysis of correlation among data and regressions. Regressions are used to make quantitative estimates of relationships between a dependent variable as functions of other variables called independent or explanatory (Studenmund, 2006).

When conducting face to face interviews almost all Bagòss farms of Bagolino were visited and often our talks with farmers went beyond the formal interview – thus, this lead

to learn more about farming and living conditions. This amount of non statistical information can be described and can be of much help in answering our research questions.

3.4 Conclusion

In this chapter we describe how we try to answer our research questions: theories tell us how to analyze available data and what tools to use in our analysis.

Grounded in the monopolistic competition and the resources based view of the firm theories, based on our knowledge about zootechnics and principles of farming, some hypotheses to test were developed. The data collected by survey, interviews with experts and from administrative sources along with non statistical information were the raw material to analyze. Descriptive statistics, inferential statistics through regression and description of non statistical information are tools used in the next chapter to perform our analyses.

CHAPTER IV: RESULTS

In this chapter the Bagòss industry, its problems and opportunities are presented and described through the data we collected and through estimation models. We used Microsoft Excel to present data and Minitab 15 to run regressions.

The first paragraph is about the so called descriptive statistics: data are presented and summarized; in the second paragraph it is estimated which factors influence production of milk and EBITDA through inferential statistics and, in particular, through regression; finally, in the third paragraph it is drawn a picture using the non statistical information gathered in our field research; a short conclusion follows.

4.1 Main statistics

In this section main statistics of the data we obtained are present. As mentioned before the data were obtained from various sources. Despite their origin, in order to have a more precise exposition, the data are present grouping them in six sections: land utilization, family and work, livestock, dairy, Bagòss production and production expenses. All the data are as of December 31, 2008, or at the average values of the year 2008.

Figure 4.1: Bagolino summer pasture

Source: Author

4.1.1 Land utilization

The total land managed by Bagòss producers is 2,500 Hectares; the mean is equal to 92.59 Ha per farm. The use of agricultural land is not much diversified. All the agricultural land is shared between long term meadows and pastures, with just one farm cultivating one hectare of forage crops. Long term meadows are equal to 109 Ha, while summer pastures amount to 1,778 Ha. This is not surprising considering the extensive nature of pastures. On average each farm manages 4.04 Ha of long term meadows and 65.85 Ha of pastures. In addition to agricultural land, most of farms also manage some

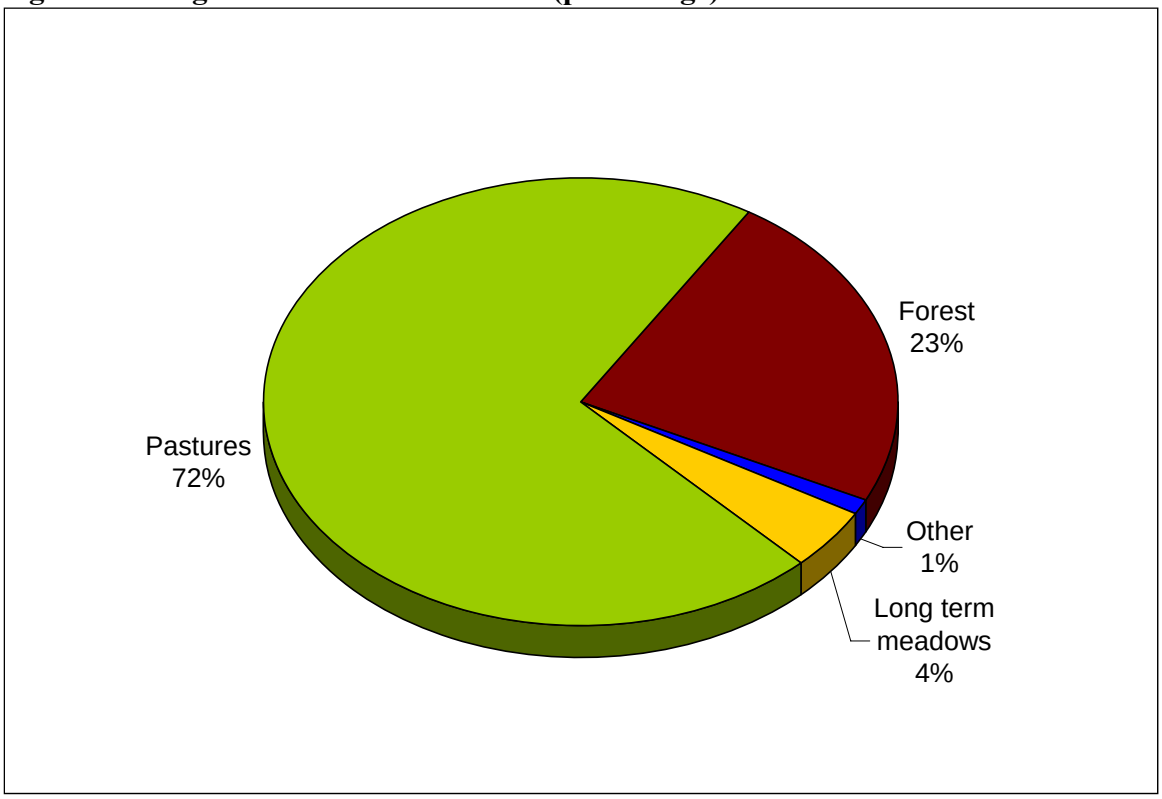
forest areas. The total forest area run by Bagòss farmers is 584 Ha, with a mean of 21.63 Ha per farm.

Table 4.1: Bagòss farms land utilization (Hectares)

Utilization	Number	Sum	Mean	Max	Min	Stdev
Rotated Hay and Forage crops	1	1	0.04	1	-	0.19
Long term meadows	21	109	4.04	12	-	3.31
Pastures	21	1,778	65.85	175	-	53.72
Field crops	0	-	0.00	-	-	-
Fruit and nuts	0	-	0.00	-	-	-
Woodland crops	0	-	0.00	-	-	-
Forest	24	584	21.63	143	-	35.54
Set Aside	0	-	0.00	-	-	-
Other farm land	3	24	0.89	22	-	4.15
Total farm land	27	2,500	92.59	318	5	82.31

Figure 4.4 shows that pastures and forests are significant forms of land utilization. Together they account for 95% of the total land farmed. Long term meadows account only for 4%.

Figure 4.2: Bagòss farms land utilization (percentage)



Land rented is very important for farmers: only 380 Ha (15%) are owned, while 1,838 Ha (74%) are rented and 280 Ha (11%) are used for free. Sometime non farmer who own some land, allow farmers to use it for free, in order to keep the land managed. The importance of rented land does not diminish analyzing agricultural used land: out of 1892 Ha of agricultural land used 219 Ha (12%) are owned, 1,403 Ha (74%) are rented and 270 Ha (14%) are used for free.

Table 4.2: Bagòss farms land ownership (Hectares)

Utilization	Number	Sum	Mean	Max	Min	Stdev
Total farm area owned	15	382	14.15	194	-	41.94
Total farm area rented	23	1,838	68.07	197	-	63.01
Total farm area used for free	7	280	10.37	118	-	26.48
Total farm area	27	2,500	92.59	318	5	82.31
Agricultural used land owned	13	219	8.11	94	-	22.22
Agricultural used land rented	23	1,403	51.96	159	-	47.38
Agricultural used land used for free	5	266	9.85	109	-	25.19
Agricultural used area total	27	1,888	69.93	175	4	52.88
Pastures owned	4	190	7.04	93	-	22.31
Pastures rented	17	1,322	48.96	150	-	47.40
Pastures used for free	5	266	9.85	109	-	25.19
Pastures total	21	1,778	65.85	175	-	53.72

Figure 4.3 shows that also in the analysis of pasture land alone, rent largely prevails over other forms of ownership. It must be also noted that pasture land used for free is not insignificant reaching 11% of the total and it surely gives an important contribution to the

milk production on the one side and to the high mountain landscape preservation on the other side.

Figure 4.3: Bagòss pasture land ownership (percentage)

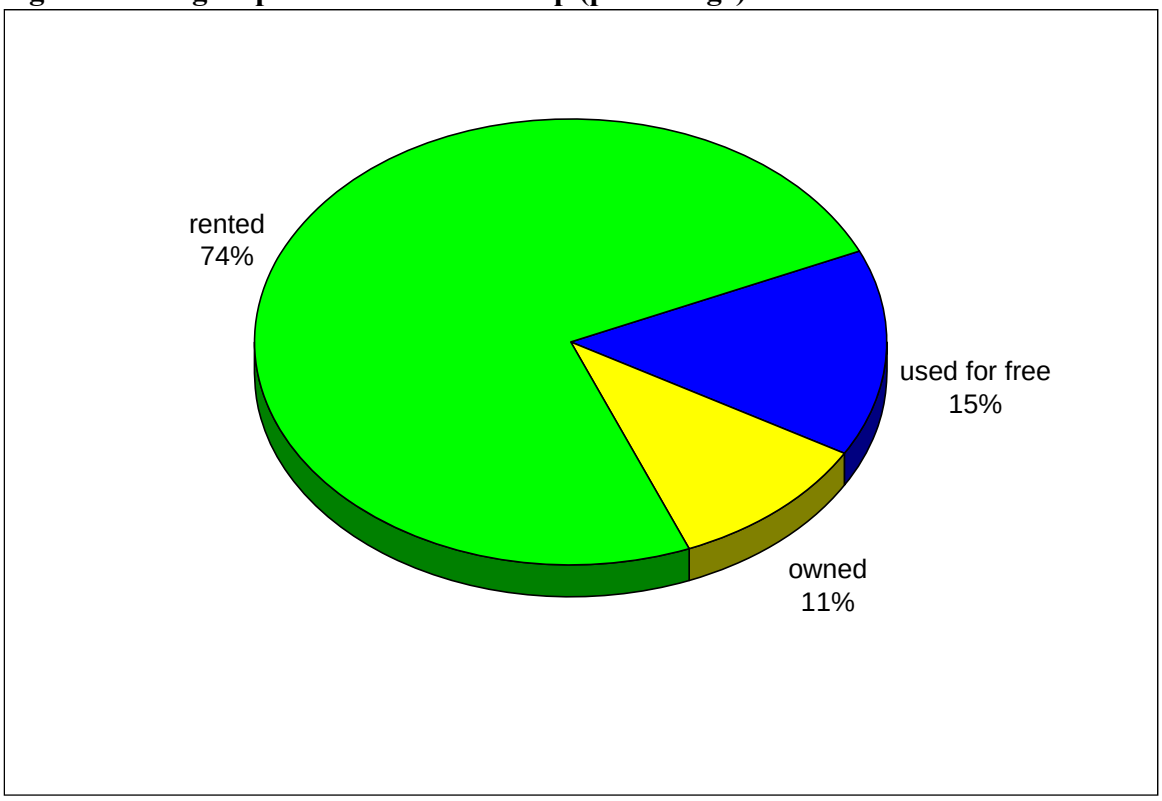


Figure 4.4: Making Bagòss

Source: Author

4.1.2 Family and work

Out of 26 respondents only two operators were female. The average operator age is 45 years old, the youngest is 20 years old and the oldest 68 years old. Operators' average years of school are 7.7. In most cases (20) operators have eight years of schooling[1], none of them have a high school degree, corresponding to 13 years of school. Operators work an average of 346 days, 20 operators declared to work 365 days per year on their farms and nobody declared to work less than 200 days. Thus, farming can be considered a full time activity for almost all the operators. This is consistent with the data about extra farm

[1] Until 1999 the Italian law required eight years of mandatory school education for everybody.

income, which is present only in five cases[1]. All the 26 operators-respondents are from Bagolino, confirming the idea of a closed community.

Table 4.3: Bagòss operators' demographic characteristics

	Number	Mean	Max	Min	Stdev
Operator gender (0/1)	26	0.92	1	0	0.27
Operator age	26	45.23	68	20	10.92
Operator years of schooling	26	7.77	11	5	1.42
Operator work days	26	346.73	365	200	47.82
Operator extra farm income (0/1)	5	0.19	1	0	0.39

Fourteen operators are married. The average spouse age is 42.64 years old and the average years of school are eight; none of the spouses completed the number of years required in order to get a high school degree. Only in two cases spouses earn an extra farm income, vice versa, in 13 cases spouses work on the farm. The average working days of spouses are 243.

[1] In two cases the extra farm income is a pension.

Table 4.4: Bagòss spouses' demographic characteristics

	Number	Mean	Max	Min	Stdev
Spouse gender (0/1)	14	0.07	1	0	0.26
Spouse age	14	42.64	57	30	6.37
Spouse years of schooling	14	8.00	11	5	1.13
Spouse work days	14	243.57	365	-	123.45
Spouse extra farm income (0/1)	14	0.14	1	-	0.35

In twenty three cases there are other family members working on the farm. In 16 cases there is one family member, in seven cases there are two family members, with a total of 30 family members, other than operators and spouses, working on Bagòss farms: nineteen male and 11 female. Their average age is 53.4 years old and the average number of school years is 6.97. Only four cases had family members completed the 13 years of school required to get a high school degree. Twenty one family members out of 30 get an off farm income; this seems to be consistent with the average number of working days on the farm that is equal to 205.

Table 4.5: Bagòss working family members' demographic characteristics

	Number	Sum	Mean	Max	Min	Stdev
Number of working family members	23	30	1.15	2	0	0.60
Working fm gender (0/1)	30	19	0.63	1	0	0.48
Working fm age	30	1,602	53.40	80	18	20.75
Working fm years of schooling	30	209	6.97	13	5	2.82
Working fm work days	30	6,155	205.17	365	50	123.45
Working fm extra farm income (0/1)	30	21	0.70	1	0	0.46

In 11 cases other relatives work on the farm; in nine cases one relative works, in two cases two relatives work. Out of these 13 relatives working on farms, eight are male and five are female; their average age is 38.31 years old; their average number of school years is eight. Almost half of them (six) get an extra farm income; their average number of working days on the farm is equal to 155.38.

Table 4.6: Bagòss working relatives' demographic characteristics

	Number	Sum	Mean	Max	Min	Stdev
Number of working relatives	11	13	0.48	2	0	0.63
Working relatives gender (0/1)	13	8	0.62	1	0	0.49
Working relatives age	13	498	38.31	67	14	13.34
Working relatives years of schooling	13	104	8.00	10	5	1.04
Working relatives work days	13	2,020	155.38	365	50	116.44
Working relatives extra farm income	13	6	0.46	1	0	0.50

The use of external labor force is very limited in Bagòss farms. Only three farms hired external full time workers, one worker for each farm.

Considering all workers there are 86 workers farming Bagòss farms, an average of 3.31 workers per farm, with a max of five workers and a minimum of two workers. Assuming that hired workers work an average of 230 days per year, we can calculate an average number of work days of 247.56 per worker and 818.81 per farm.

Related to land farmed there are 29 hectares farmed for each worker and to farm one hectare requires 8.52 days of work.

Figure 4.5 shows the importance of family: 82% of the workforce belongs to the family; this percentage reaches 97% if we take into account relatives not living with the

operator's family. In terms of work days (figure 4.6) the situation is not much different, but operators alone account for 43% of the total work days worked in Bagòss farms.

Figure 4.5: Bagòss farms workforce structure (percentage of workers)

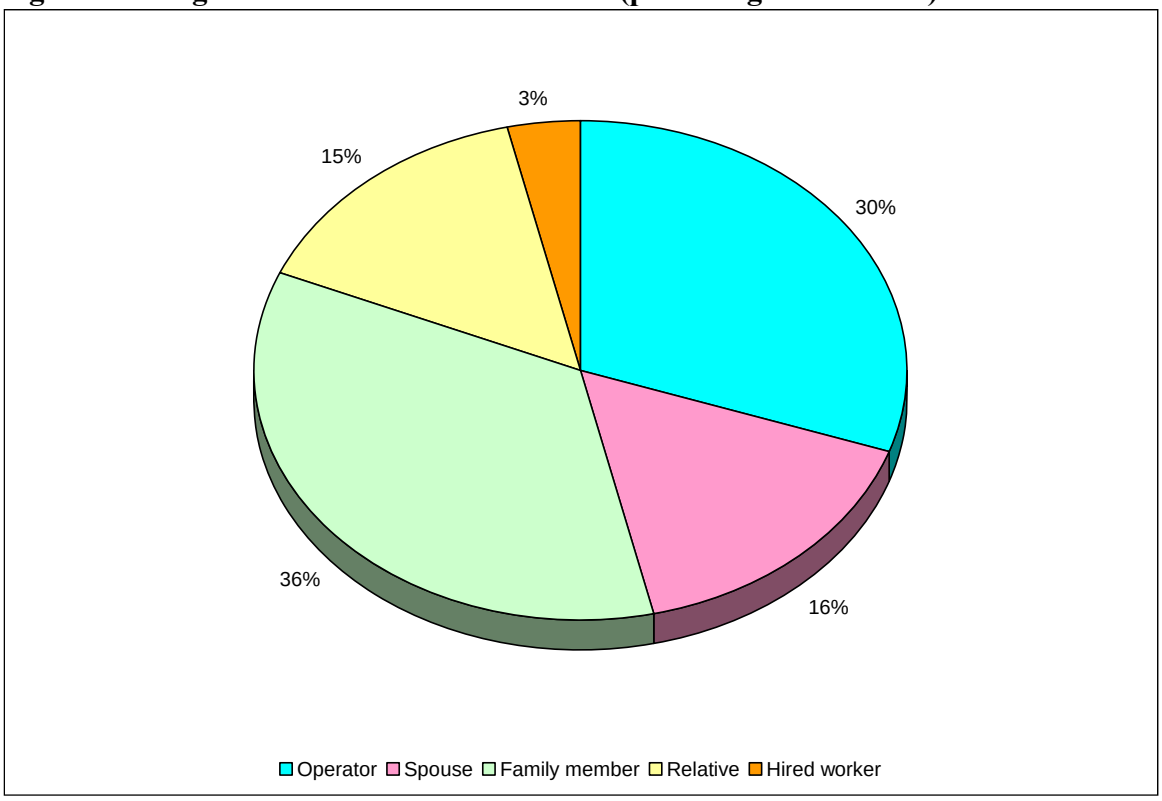
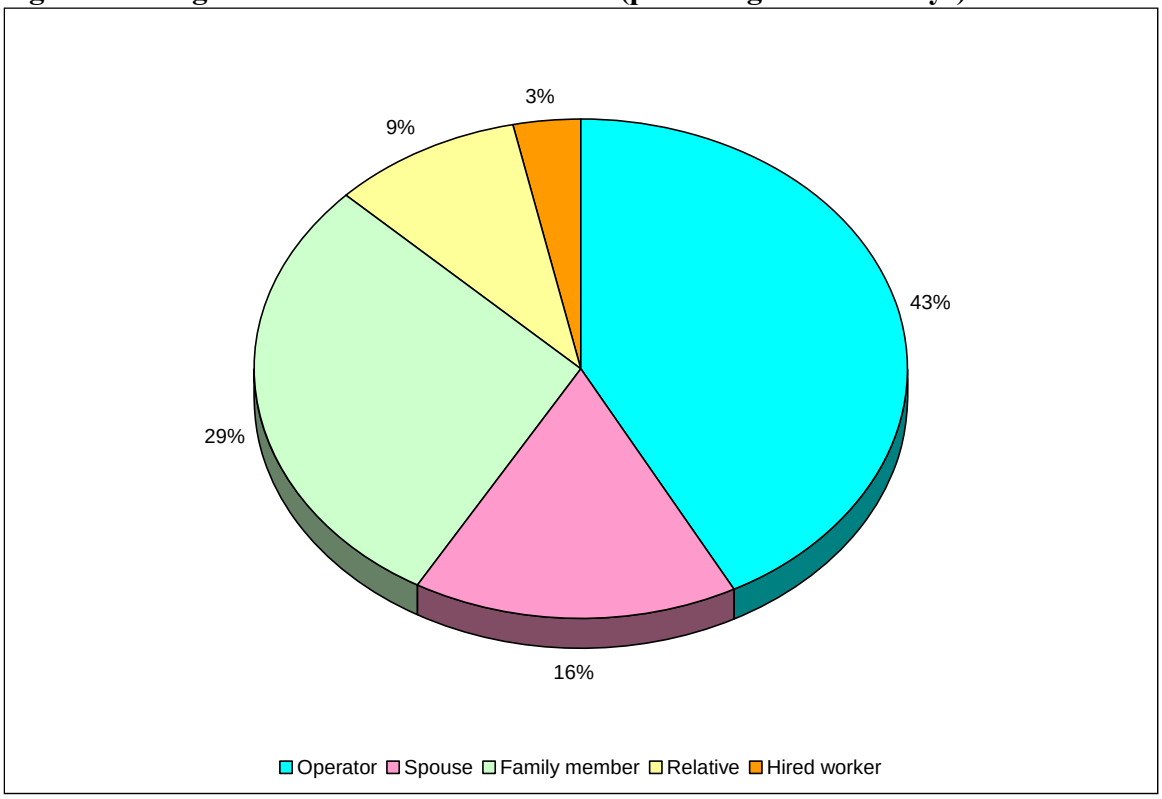


Figure 4.6: Bagòss farms workforce structure (percentage of work days)



On 13 farms there are 24 family members not involved in farming. In four cases there is just one family member living on the farm, in nine cases two members, in one case four. Out of the 24 not farming family members six are male and 18 female. The average age of those family members is 18.92 years, and according to our data, only three of them get an off farm income.

Table 4.7: Bagòss non-farming family members' demographic characteristics

	Number	Sum	Mean	Max	Min	Stdev
Number of non-farming fm	13	26	0.92	4	0	1.07
Not farming fm gender (0/1)	26	6	0.25	1	0	0.43
Not farming fm age	26	454	18.92	81	2	21.28
Not farming fm extra farm income	26	3	0.13	1	0	0.33

Figure 4.7: Bagòss cowshed

Source: Author

4.1.3 Livestock

There are no beef cattle in Bagòss farms, all cattle are bred for milk production. There are a total of 657 adult milking cows involved in the Bagòss production, with an average of 24.33 cows per farm; the smallest farm breeds 8 milking cows, the biggest 42. There are only 0.17 hectares of Bagolino meadows available for each adult cow, it is clear then that the feed bought plays an important role. There are also 2.71 hectares of pasture available for each cow in summer. In terms of work required each worker takes care of 7.64 adult cows on average and an adult cows requires 32.40 days of work.

Some farmers do not use artificial insemination, thus there are 14 bulls used for reproduction. Usually there is only one bull on a farm; some do not have a bull. There are also 212 milk heifers and 148 calves in Bagòss farms, which makes an average of 8.48 milk heifers and 5.92 calves per farm. The total number of cattle involved in the Bagòss production is1,031 head, an average of 38 head per farm, but it must be noted that data on milking cows refer to all the 27 Bagòss farms, the data for other livestock are available only for 25 farms.

Table 4.8: Bagòss farms cattle structure

	Number	Sum	Mean	Max	Min	Stdev
Milking cow	27	657	24.33	42	8	9.88
Bull heads	14	14	0.56	1	0	0.50
Milk heifers older than 1 year old	23	212	8.48	20	0	5.14
Calves younger than 1 year old	22	148	5.92	20	0	4.36

Dairy cattle numbers are quite stable, but there are some fluctuations around the year due to purchases, sales, births and deaths. Usually farmers replace old cows with their own calves, but sometime they purchase calves or, more often, pregnant heifers or young cows, to improve the quality of their herd. At the end of their milking life cows usually are sold to the slaughterhouse; also calves not used for replacing cows are sold. The data show that 114 cows were sold, along with six bulls, nine heifers and 357 calves. In average terms, each farm sold 4.56 cows, 14.28 calves and a fraction of heifer and bull.

Table 4.9: Bagòss farms cattle sold

	Number	Sum	Mean	Max	Min	Stdev
Milking cows sold	24	114	4.56	11	0	3.01
Bulls sold	4	6	0.24	3	0	0.65
Milk heifers older than 1 year old sold	7	9	0.36	2	0	0.62
Calves younger than 1 year old sold	25	357	14.28	25	5	6.09

Fourteen out of 27 farms also breed goats. In all cases, goats are local breeds that have double production, dairy and meat. There are 200 milking goats on Bagòss farms and 59 goats of other types (mainly males for reproduction and goat kids). On average a farm breeding goats has 14.29 milking goats and 4.21 other-type goats. Just as with cows, farmers usually replace old goats with young animals born on the farm. Then old goats and newly-born goat kids exceeding the farm needs are sold. In total terms 17 goats and 194 kids were sold, for an average of 1.21 goat and 13.86 kids per farm.

Table 4.10: Bagòss farms goats

	Number	Sum	Mean	Max	Min	Stdev
Milking goats	14	200	14.29	30	5	7.47
Other goats	13	59	4.21	15	0	4.18
Milking goats sold	6	17	1.21	5	0	1.74
Other goats sold	13	194	13.86	40	0	10.43

Other livestock are of minor importance. 13 farms have pigs. The total number of pigs raised is 78, an average of 6 per farm. 13 farms also raise poultry. The total number of poultry raised is 152, an average of 11.69 per farm. Finally, four farms raise horses for a total of five horses.

Only pigs have a market role. Indeed, eight farms sold a total of 42 pigs, an average of more than 5 pigs per farm. Horses are bred for working on summer pastures, whereas poultry products are used domestically.

Table 4.11: Bagòss farms other livestock

	Number	Sum	Mean	Max	Min	Stdev
Hogs and Pigs	13	78	6.00	12	0	3.59
Hogs and Pigs sold	8	42	5.25	10	0	2.99
Poultry	13	152	11.69	20	0	7.48
Horses, donkeys and mules	4	5	1.25	2	0	0.49

Figure 4.8: Milk resting before Bagòss production

Source: Author

4.1.4 Dairy

Twenty five farms out of 27 farms own some cow milk production rights for a total of 1,782 tons and an average of 66 tons per farm. The total production estimated for cow milk equals 2,511 tons that corresponds to an average of 93 tons per farm and 3.822 tons per cow. Cow milk is used in three ways. All farms utilize part of produced milk internally for the family consumption and to feed animals: 195 tons in total, or 7.2 tons per farm. Then nine farms supply the local dairy with all or part of their cow milk. The local dairy gets 202 tons from Bagòss producers; only one farmer delivers all his milk production to

the dairy produced, whereas the other eight supply only part of their milk production. Finally, 2,114 tons, an average of 78 tons per farm, are directly processed within the farm.

Unlike cow's milk, goat milk has only two possible uses: 49 tons (out of the 81 tons produced) are processed within the farm and 32 tons are consumed on the farms, mainly to feed kids. On average there is a total production of 5.8 tons produced per farm and 407 Kg per goat.

Table 4.12: Bagòss milk production (Kg)

	Number	Sum	Mean	Max	Min	Stdev
Milk production rights	25	1,782,215	66,008	180,251	0	44,115.71
Milking cows average production	27		3,822	5,429	2,235	995.47
Cow milk supplied to the dairy	9	202,000	7,481	55,000	0	13,264.74
Cow milk processed at farms	26	2,113,600	78,281	180,000	0	48,884.01
Cow milk used for other purposes	27	195,350	7,235	23,000	50	5,062.06
Total production cow milk	27	2,510,950	92,998	190,000	18,000	51,100.41
Goats average production	14		407	600	250	89.18
Goat milk processed at farms	13	49,500	3,536	10,000	0	2,879.39
Goat milk used for other purposes	14	31,950	2,282	6,300	500	1,658.81
Total production goat milk	14	81,450	5,818	12,000	1,250	3,443.35

Twenty six out of 27 farms process all or part of their cow milk. The main product is the Bagòss cheese. We estimated the production at 146.5 tons of Bagòss in the year 2008, which is equal to an average of 5.6 tons per farm. Among farms that directly produce Bagòss the smallest produce only 300 Kg of Bagòss per year, whereas the biggest reach a production of 12.6 tons. To produce a ton of Bagòss requires 0.74 hectares of meadows and 12.14 hectares of pasture as well as 4.48 adult cows. Furthermore, it requires 0.59 workers and 145.32 work days.

Along with Bagòss, farmers produce butter that can be considered a side product. Bagòss farmers produce 38.5 tons of butter, an average of 1.48 tons per farm. Another side product, which is not produced so often though, is ricotta cheese. Eight farmers produce ricotta, processing part of their whey, usually seasonally, whereas the others utilize all their whey to feed calves. The production of ricotta accounts for 1.8 tons, an average of 227 Kg per farm. Production of cheese other than Bagòss is of minor importance; five farmers produce a total of 555 Kg of other cheese, an average of 111 Kg per farm.

As mentioned above, 14 farmers also raise goats, only one of them uses all his goat milk to feed kids, whereas the others 13 process part of their goat milk. The total quantity of goat cheese produced is equal to 11.6 tons, 892 Kg per farm; the largest produces 5.4 tons of goat cheese.

Table 4.13: Bagòss milk processing and dairy products (Kg)

	Number	Sum	Mean	Max	Min	Stdev
Butter production	26	38,485	1,480.19	3,400	60	945.36
Butter consumption within the farm	26	1,470	56.54	150	10	31.71
Butter sale	25	37,115	1,484.60	3,350	0	946.80
Ricotta production	8	1,820	227.50	800	0	168.16
Ricotta consumption within the farm	3	145	48.33	100	0	20.18
Ricotta sale	7	1,700	242.86	800	0	168.45
Bagòss production	26	146,500	5,634.62	12,600	300	3,305.00
Bagòss consumption within the farm	26	6,856	263.69	600	36	137.62
Bagòss sale	25	139,644	5,585.76	12,564	0	3,317.29
Other cow cheese production	5	555	111.00	270	0	64.38
Other cow cheese consumption within the farm	4	185	46.25	100	0	21.59
Other cow cheese sale	2	370	185.00	270	0	55.65
Goat cheese production	13	11,600	892.31	5,400	0	1,351.44
Goat cheese consumption within the farm	8	340	42.50	75	0	25.62
Goat cheese sale	13	11,260	866.15	5,400	0	1,359.05

Figure 4.9: Goat cheese heads above a Bagòss head

Source: Author

4.1.5 Product sale

Bagòss farmers' main source of revenues is Bagòss, but along with Bagòss several other products are sold. They are side products or complementary products.

As it is shown in Table 4.9 farmers sells old animals along with calves and goat kids produced in excess of the farm's needs. The average price of sale for these animals is estimated and given the number of animals sold it is possible to estimate revenues from those sales. However, it must be noted that the price is highly variable due to the market conditions and specific characteristics of the animal on sale.

At the end of their career cows are sold at a very low price, we estimated a total revenue of 22,800 Euro and a mean of 950 Euro for the 24 farms that sold old milking cows.

Bull sale might be considered occasionally, bulls are not always present in the farm and even when they are present they might be slaughtered and consumed by the family. Only four farms sold a bull, for total estimated revenue of 3,600 Euro and an average revenue of 900 Euro each.

As far as sale of heifers is concerned, the total revenue from the sale of heifers is equal to 5,400 Euro, an average of 771.43 Euro per farm, for each of the seven farms that sold heifers.

Much more important is the sale of calves that gives a total revenue of 35,700 Euro, an average of 1,428 Euro per farm.

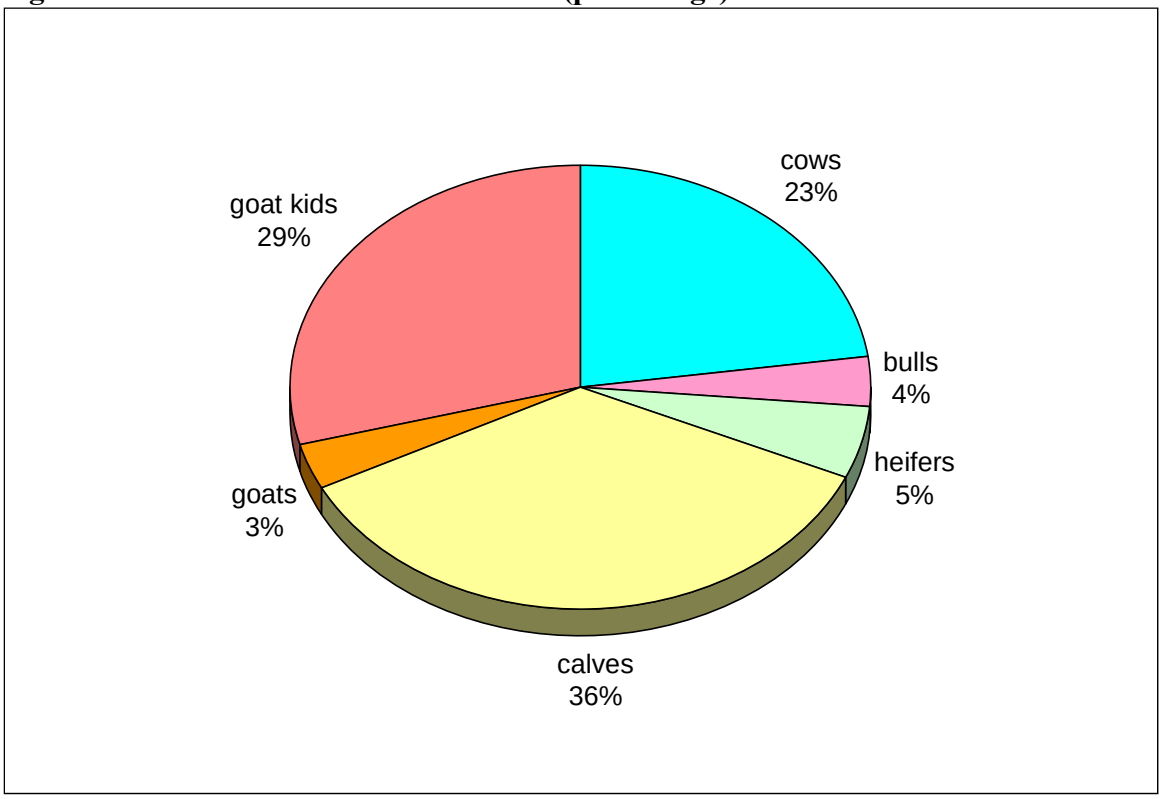
When present, old goats are sold at the end of the career at a low price, whereas goat kids produced in excess of the farm's needs is the main product of this activity along with goat cheese. Six farms sold old goats for total revenue of 3,400 Euro and an average of 566.67 Euro. Much more important is the revenue from the sale of goat kids: it amounts to 29,100 Euro, an average of 2,238.46 for each of the 13 farms that sold goat kids.

Table 4.14: Revenues from livestock sale (Euro)

	Number	Sum	Mean	Max	Min	Stdev
Cows sale	24	22,800	950.00	2,200	0	601.54
Bulls sale	4	3,600	900.00	1,800	0	389.95
Heifers sale	7	5,400	771.43	1,200	0	374.89
Calves sale	25	35,700	1,428.00	2,500	500	608.95
Goats sale	6	3,400	566.67	1,000	0	286.89
Goat kids sale	13	29,100	2,238.46	6,000	0	1,560.16

Figure 4.10 shows that on the industry level only calves, goat kids and old cows sales are significant sources of revenues. On the farm level the situation can be different, especially regarding the importance of goat sales that can be absent, minimal or significant.

Figure 4.10: Revenues from livestock sale (percentage)



In several cases farms also produce dairy products other than Bagòss. First of all we must remember that 8 farmers supply the local dairy with their cow milk. In this case the price is settled at 0.48 Euro per Kg and the revenue can be calculated more precisely. It equals 79,680 Euro, an average of 9,960 Euro per farm.

Butter is a byproduct of Bagòss, because Bagòss is produced from partially skimmed milk. Twenty four farms sell their butter and in spite of the price variability it is possible to estimate total revenue of 162,068 Euro from butter sale, an average of 6,753 Euro per farm. Whey is another by product of milk processing, but only seven farms produce ricotta cheese from their whey and sell it, usually in the summer season. It is not surprising then that the revenue from ricotta sale is equal only to 3,400 Euro, 486 Euro per

farm. The production of cow cheese other than Bagòss is occasional and only two farms sell part of other cheese for total revenue of 1,406 Euro and an average of 703 Euro per farm.

Thirteen out of the 14 farms breeding goats produce and sell goat cheese. The total revenue from this product is equal to 56,300 Euro, an average of 4,331 Euro per farm.

Table 4.15: Revenues from dairy product sale (Euro)

	Number	Sum	Mean	Max	Min	Stdev
Milk sale	8	79,680	9,960.00	26,400	-	5,967.28
Butter sale	24	162,068	6,752.81	15,075	-	4,334.58
Ricotta sale	7	3,400	485.71	1,600	-	336.90
Other cow cheese sale	2	1,406	703.00	1,026	-	211.47
Goat cheese sale	13	56,300	4,330.77	27,000	-	5,462.87

Figure 4.11 shows that on the industry level, butter alone accounts for more than half the revenues from the non Bagòss cheese dairy product sale. This is not surprising because butter is a byproduct of Bagòss always present and almost always sold, whereas other dairy products are present only in some cases. At the same time, on the farm level, the

situation can be different, because farmers may, for example, breed or not breed goats and use whey to feed calves or to produce ricotta.

Figure 4.11: Revenues from dairy product sale (percentage)

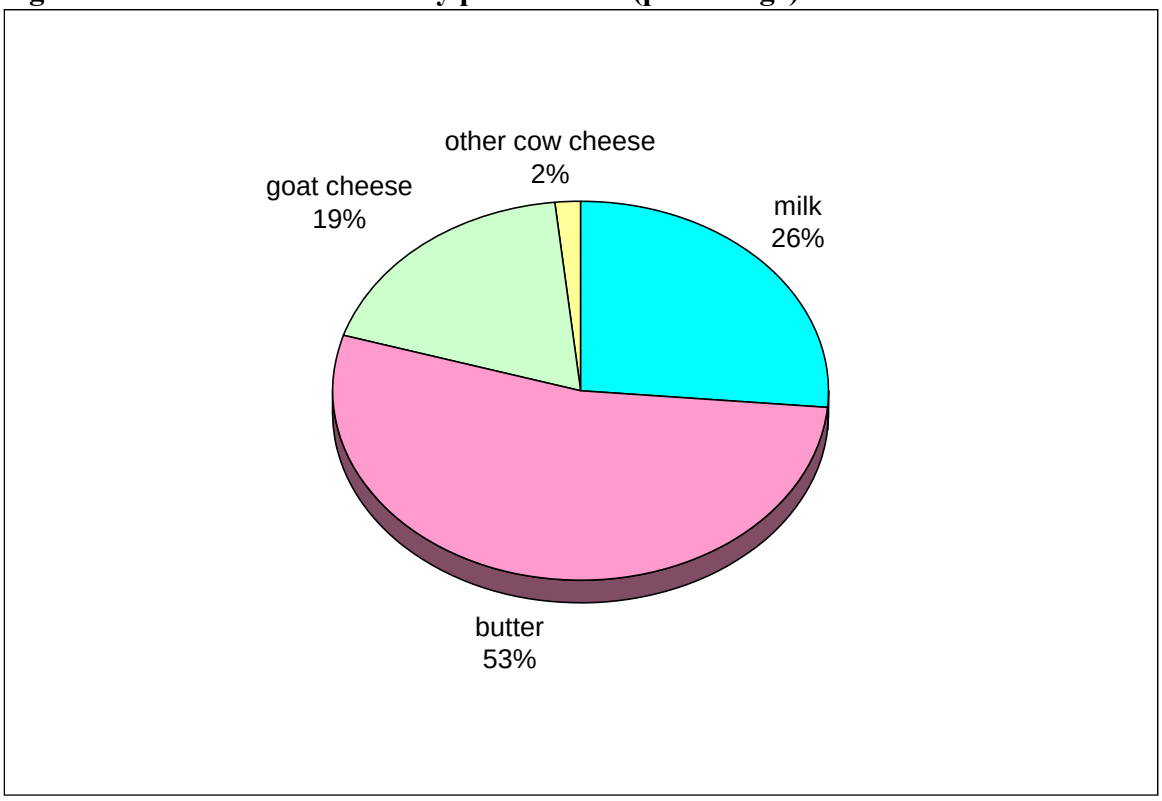


Figure 4.12: Bagòss aging in the cellar

Source: Author

4.1.6 Bagòss sale

The quantity of Bagòss sold is equal to 139.6 tons of Bagòss (95% of the total production), whereas 6.8 tons are consumed inside the farms. On average a farm sells 5.4 tons of Bagòss and consumes 264 Kg of it per year.

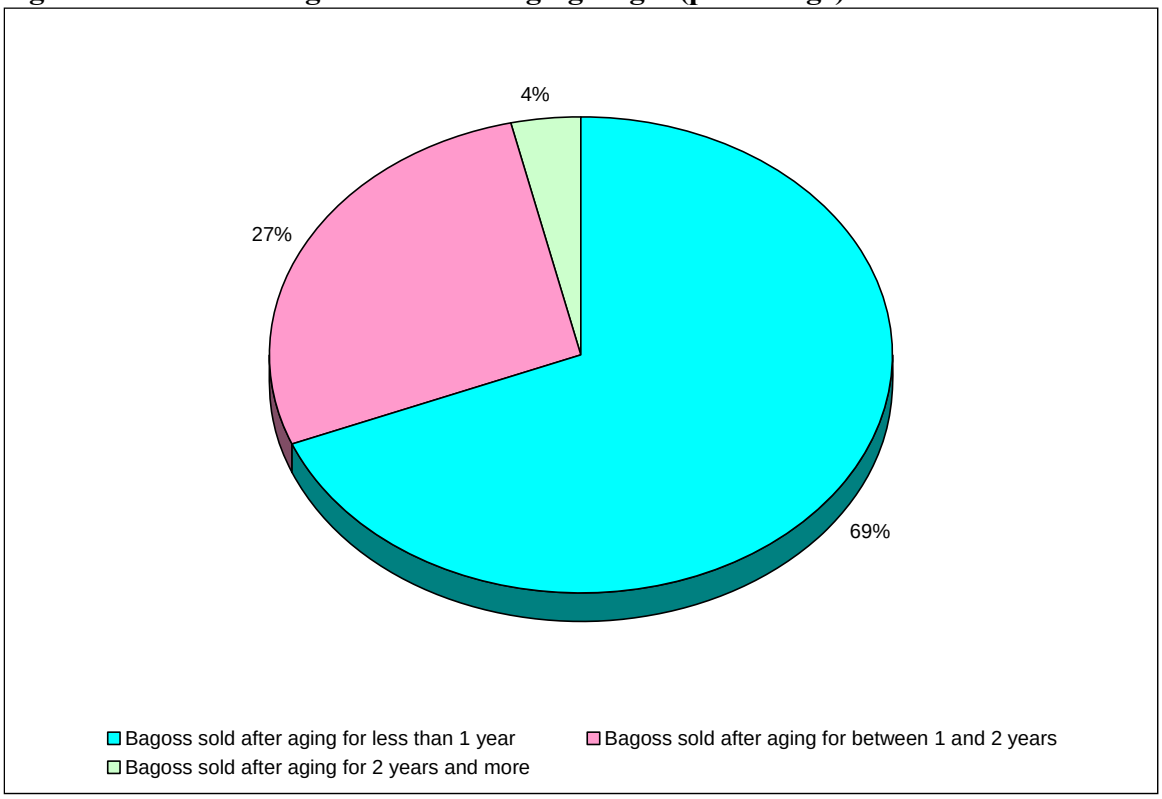
Twenty three Bagòss farmers answered questions about Bagòss sale. Ninety five tons (69%) are sold after aging for less than a year, 37.8 tons (27%) are sold after aging for one - two years and 4.9 tons (4%) are sold after aging for two years and more. In terms of farms, all 23 farms sell all or part of their Bagòss younger than one year, on the other hand,

only five farms sell Bagòss older than two years, and in four out of five cases the Bagòss sold after aging for two years and more is only a small fraction of the total Bagòss sold.

Table 4.16: Sale of Bagòss at various aging stages (Kg)

	Number	Sum	Mean	Max	Min	Stdev
Bagòss sold after aging for less than 1 year	23	95,016	4,131.13	8,900	0	2,973.68
Bagòss sold after aging for between 1 and 2 years	15	37,824	2,521.60	11,150	0	2,449.46
Bagòss sold after aging for 2 years and more	5	4,924	984.80	3,100	0	668.45

Figure 4.13: Sale of Bagòss at various aging stages (percentage)



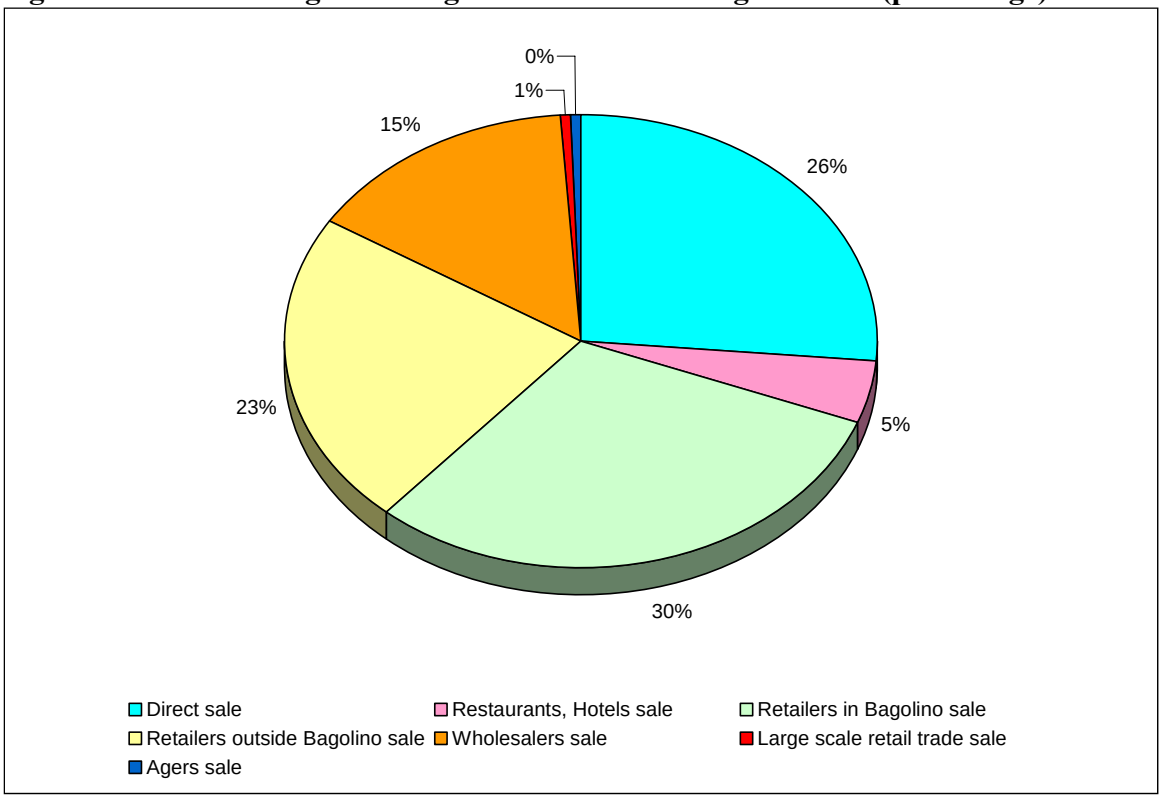
Bagòss producers choose among several alternatives to sell their cheese. Eighteen farmers supply Bagolino's retailers, 16 sell part of their products directly to consumers, 12 supply retailers located outside Bagolino, 10 farmers supply hotels and restaurants, 10 supply wholesalers, two farmers supply large scale trade retailers and only one farm supplies a professional ager. Only three farmers supply all their cheese to the same type of buyers, the others are involved in a multiple supply chain, comprising up to five elements.

Table 4.17: Sale of Bagòss through different marketing channels (Kg)

	Number	Sum	Mean	Max	Min	Stdev
Direct sale	16	36,174	2,260.90	7,538	0	1,941.86
Sale to restaurants, hotels	10	6,454	645.44	1,256	0	360.61
Sale to retailers in Bagolino	18	41,793	2,321.83	8,184	0	2,036.69
Sale to retailers outside Bagolino	12	31,020	2,584.98	6,880	0	1,976.21
Sale to wholesalers	10	20,880	2,088.02	7,224	0	1,653.91
Sale to large scale trade retailers	2	814	407.00	588	0	121.71
Sale to agers	1	628	628.20	628.2	0	123.10

In terms of importance Bagolino's retailers purchase 30% of all Bagòss sold; whereas consumers buy directly 26% of all Bagòss and 23% of the cheese is supplied to retailers located outside Bagolino; wholesalers get 15% of Bagòss sold. Other types of purchasers are of less relevance: hotels and restaurants buy 5% of the cheese and large scale trade retailers and agers get an insignificant fraction of Bagòss.

Figure 4.14: Sale of Bagòss through different marketing channels (percentage)

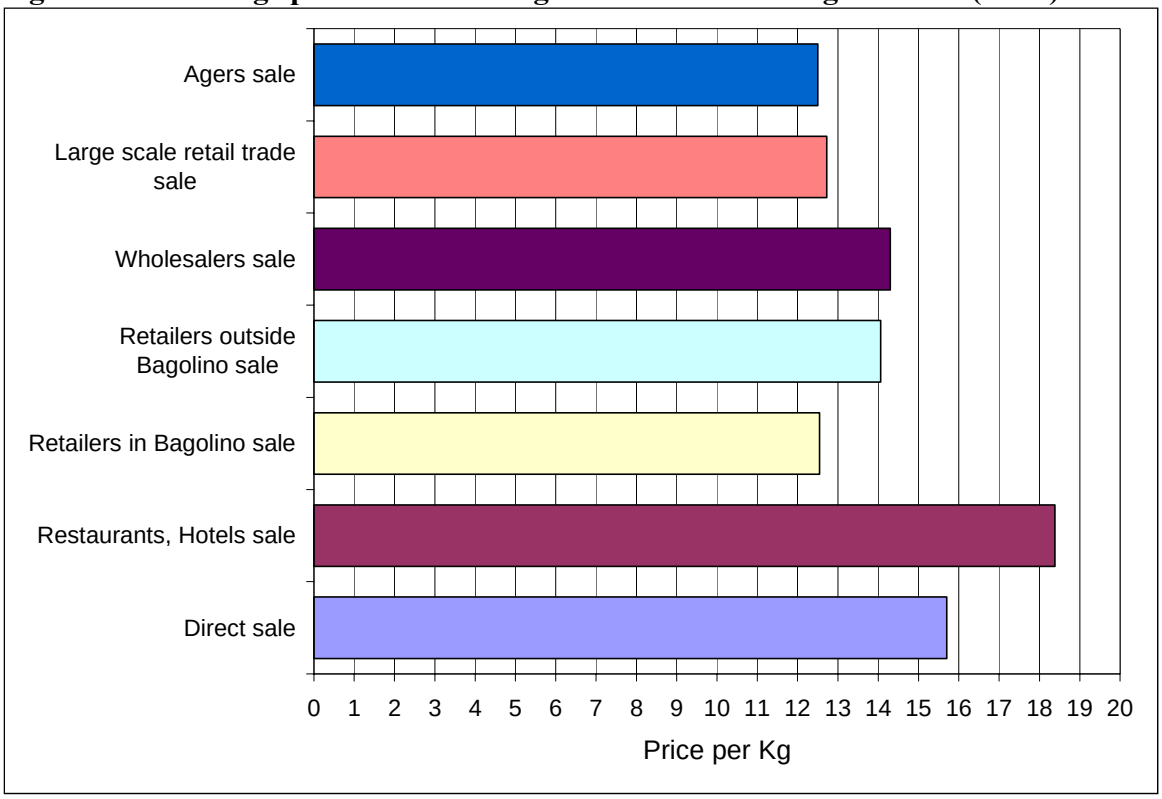


The selling price varies according to the age of the cheese and to the type of purchasers. Hotels and restaurants require the best quality cheese and pay an average price of 18.38 euro/Kg; the direct consumer pays an average price of 15.70 euro/Kg whereas retailers can obtain a lower price: 14.30 euro/Kg for wholesalers, 14.06 euro/kg for retailers located outside Bagolino, and 12.55 for Bagolino's retailers.

Table 4.18: Average price and revenues from sale of Bagòss (Euro)

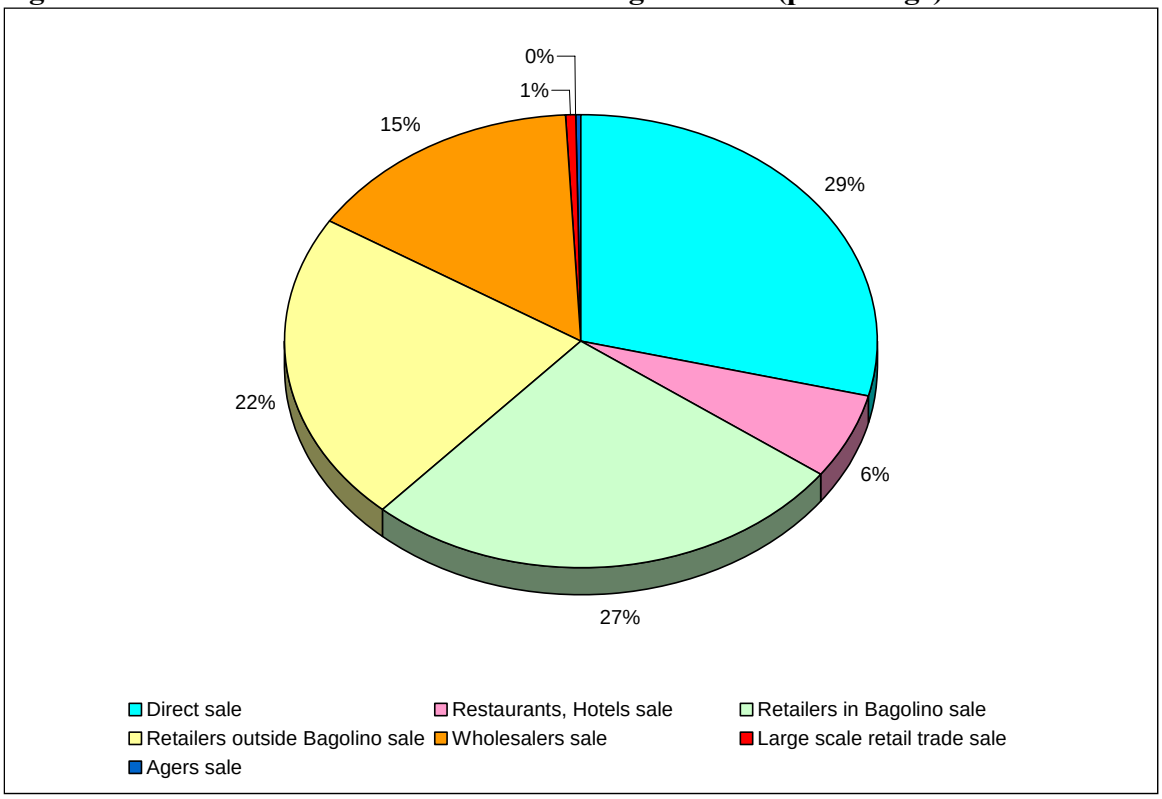
	Average price	Total revenue	Average revenue	Max revenue	Min revenue	Stdev
Direct sale	15.70	567,774	35,485.88	169,614	0	36,237.74
Sale to restaurants, hotels	18.38	118,649	11,864.90	31,410	0	7,669.82
Sale to retailers in Bagolino	12.55	524,383	30,846.03	98,208	0	25,719.24
Sale to retailers outside Bagolino	14.06	436,140	39,649.13	103,200	0	27,481.57
Sale to wholesalers	14.30	298,517	29,851.65	93,912	0	23,517.39
Sale to large scale trade retailers	12.72	10,356	5,178.00	7,644	0	1,568.39
Sale to agers	12.50	7,853	7,852.50	7,853	0	1,538.77

Figure 4.15: Average price of sale through different marketing channels (Euro)



According to different average prices and different quantities sold through marketing channels, revenues obtained by the industry from different channels are different. However, there are no significant differences comparing figure 4.16 to figure 4.14 that depicted the importance of marketing channels in quantity. Direct sales and sales to restaurants and hotels increase their importance due the high price, whereas sales to retailers within and beyond Bagolino slightly decrease their importance because of relatively low prices.

Figure 4.16: Revenues from different marketing channels (percentage)



4.1.7 Sources of revenue of Bagòss farms

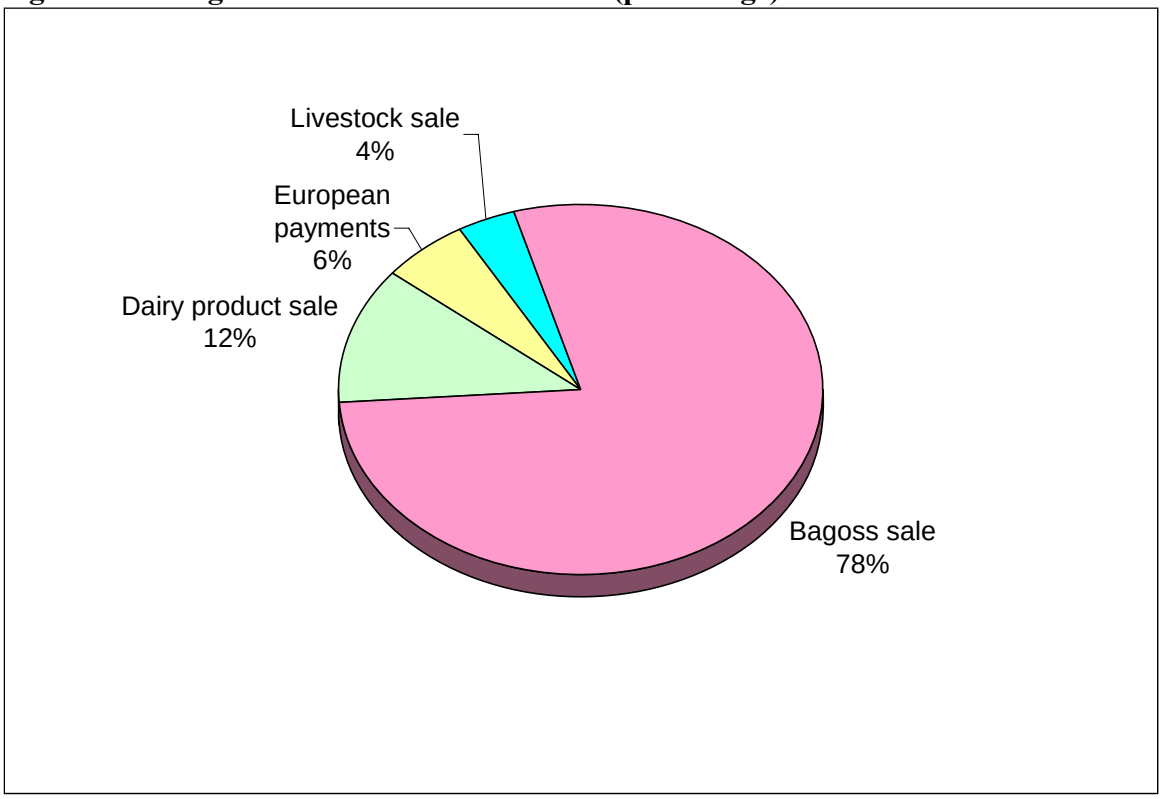
To sum up it is evident that the Bagòss sale is a prevailing source of revenue for Bagòss farms. Other sources of revenues that can be sometime significant on the farm level seem to be marginal on the industry level.

Table 4.19: Bagòss farms sources of revenue (Euro)

	Sum	Mean	Max	Min	Stdev
Revenues from livestock sale	100,000	4000.00	11,200	900	2,701.96
Revenues from Bagòss sale	1,963,671	78546.84	26,1959	0	57,464.51
Revenues from other dairy product sale	302,854	12,114.14	35,300	1,125	8,994.48
European payments	145,895	5835.80	14,822	1,063	3,243.59

Bagòss sale alone accounts for 78% of the total revenue. Revenue from other dairy products accounts for 12%, but it must be remembered that the two most important components of this category are butter sale (a byproduct of Bagòss) and milk sale of those farms that supply the dairy with all or part of their milk (milk that dairy processes in order to get Bagòss).

Figure 4.17: Bagòss farms sources of revenue (percentage)



4.1.8 Production expenses

Twenty five farmers answered the questionnaire's section about their expenses. Twenty four of them declared to purchase some feed, showing that Bagolino is not self sufficient in feeding its cattle. Purchase of feed (hay and concentrated feed) is the most important item of expenses we considered, with 601 thousand euro, an average of 25 thousand euro per farm.

Purchase of cattle is the second largest item of expenses; Bagòss producers invested a 96,000 euro to buy cattle, an average of 7,377 euro per farm. The rent of pastures is also important in the expense balance, paying rents costs 71 thousand euro, 3,530 per farm.

Other expenses are less relevant on the Bagòss producers' balance: purchase of fuel costs 30 thousand euro, an average of 1,353 euro per farm; purchase of other animals but cattle costs 14.6 thousand euro, an average of 1,460 euro per farm; expenses for animal healthcare equal 12 thousand euro, an average of 634 euro per farm; and finally the rent of buildings and land, excluding pastures, amounts to six thousand euro, an average of 871 euro per farm.

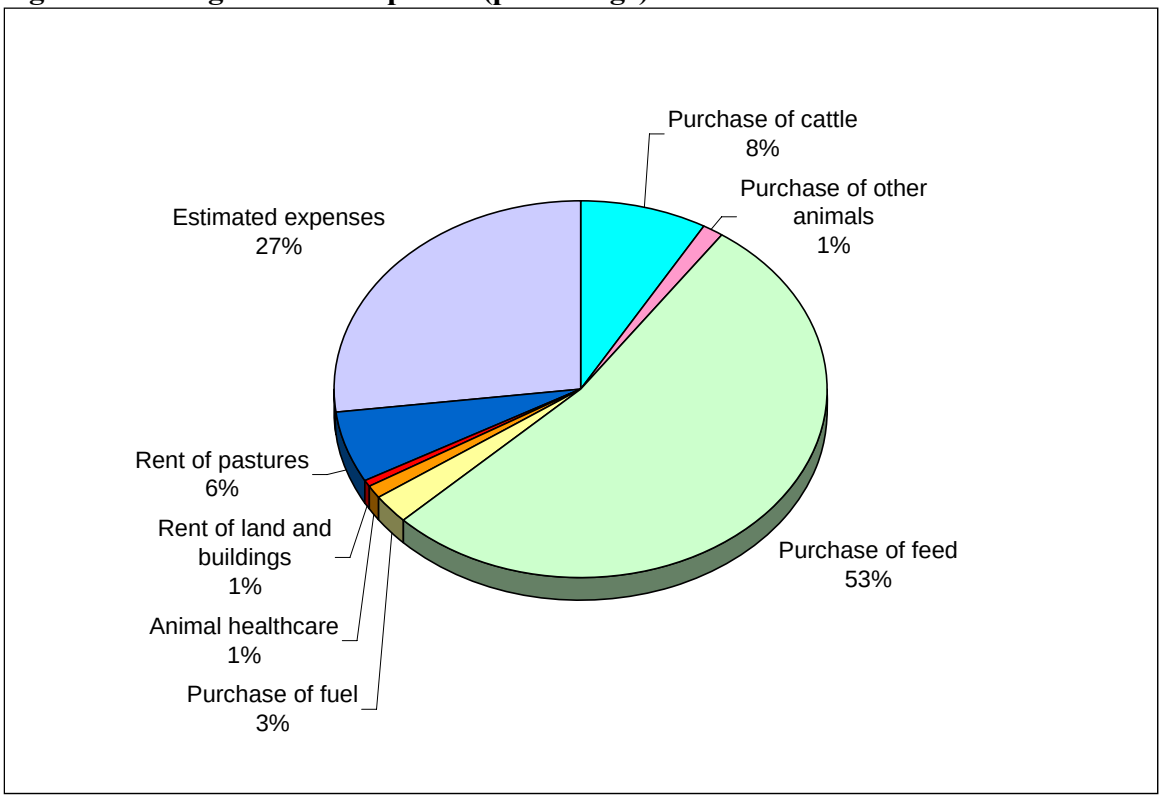
It must be noted that the part of the survey about expenses did not aim to gather data about all farm expenses. Thus, when managing their enterprises, the Bagòss producers come across several other expenses were not surveyed. However it was estimated that other expenses may account for 305 thousand Euro, an average of 12 thousand Euro per farm.

Table 4.20: Bagòss farms expenses (Euro)

	Number	Sum	Mean	Max	Min	Stdev
Expenses for purchase of cattle	13	95,900	7,376.92	18,000	-	5,361.41
Expenses for purchase of other animals	10	14,600	1,460.00	2,500	-	800.34
Expenses for purchase of feed	24	601,400	25,058.33	48,000	-	14,609.97
Expenses for purchase of fuel	22	29,850	1,356.82	4,000	-	989.98
Expenses for animal healthcare	19	12,050	634.21	2,000	-	498.57
Expenses for rent of land and buildings	7	6,100	871.43	3,000	-	643.79
Expenses for rent of pastures	20	70,600	3,530.00	7,000	-	2,193.68
Estimated expenses	25	305,352	12,214.06	34,325	5,600	7,739.20

Figure 4.18 shows that the cow feeding expenses alone account for more than half the total Bagòss farms costs.

Figure 4.18: Bagòss farms expenses (percentage)



4.1.9 Financial performance of Bagòss farms

The data collected through the survey and from other sources allow us to estimate the Earning Before Taxes, Depreciation and Amortization (EBITDA) that we use as proxy of financial performance. According to our estimates EBITDA equals to 1,388,000 euro, an average of more than 55,000 euro per farm. The maximum reaches 205 thousand Euro, the minimum is equal to -9 thousand Euro. It must be noted that the EBITDA is negative only in two out of 25 farms.

Table 4.21: Bagòss farms estimated EBITDA (Euro)

	Sum	Mean	Max	Min	Stdev
Costs	1,135,852	45,434.06	91,790	11,320	24,425.78
Revenues	2,523,596	100,943.82	284,159	14,337	63,730.56
EBITDA	1,387,744	55,509.76	205,072	(9,187)	46,306.89

4.2 Estimation models

In this paragraph it is tried to answer the research questions by means of inferential statistics and more precisely with the use of several different regression models. In the first section factors that influence production of the Bagòss cheese are analyzed by looking for variables that influence the production of milk. As seen in the previous paragraph the Bagòss cheese is the main source of revenue for farms, accounting alone for 78% of the total revenue. Moreover, it was saw that most of the milk produced is processed on-farm. Hence, understanding which factors are significant in influencing the production of milk is fundamental to understanding the Bagòss industry economy. In the second and third sections we look directly at financial performance of Bagòss farms, searching for factors that influence the Earning Before Interests, Taxes, Depreciation and Amortizations (EBITDA). EBITDA is used as a proxy of the financial performance in the short run. We analyze EBITDA as a ratio of milk produced and as a ratio of work days.

4.2.1 Factors that influence production of cow milk

The data about the production of cow milk were collected during our survey and then were checked and revised utilizing multiple sources of information. It is obvious that the total milk production of a farm or of the industry can be also easily calculated if the

number of adult cows and the average production per cow (cow productivity) value are known.

Both values were available, but the purpose was to understand which factors determine the production of milk by affecting simultaneously both the size of the herd and its productivity. In spite of many available data the search of primary factors influencing the milk production was not simple. Some data influence more than one aspect of the Bagòss industry. The labor force, for example, is applied to many activities within the farm, not only to milk production operations. Statistical problems was also encountered, the most serious of which is the multicollinearity caused due to a high correlation among several variables.

However, a simple model can show that two factors alone are able to explain much of the variability in milk production: these two factors are the number of workdays in the farm and the total cost of purchased feed:

Table 4.21: Explanatory model for milk production

Predictor	Linear	Double log	Semilog (lnY)	Semilog (lnX)	Quadratic
Constant	-7,496	2.30	10.014	-600,681	-8,620
t	-0.43*	2.39	41.09	-6.03	-0.19*
Number of workdays	64.77	0.45	0.001	44,431	109.1
t	2.65	2.58	2.37	2.45	1.01*
Number of workdays squared	XX	XX	XX	XX	-0.029
t					-0.46*
Cost of feed	2.11	0.60	0.00003	40,588	0.267
t	4.64	7.53	4.07	4.89	0.17*
Cost of feed squared	XX	XX	XX	XX	0.00004
t					1.21*
R-Sq(adj)	72.6%	84.6%	67.2%	73.4%	72.2%

* Not significant at 10% level.

Despite its simplicity the model shows the importance of two variables affecting the level of milk production: the number of work days in Bagòss farms and the amount of feed purchased. They are significant in all functional forms we tested, whit the exception of the quadratic form. From Table 4.21, it is observed that the best model to describe milk production of Bagolino producers is the double log model; it exhibits the highest R-square,

expected signs and the best t-statistics. Furthermore, it fits the economic law of diminishing marginal returns.

In the double log model the regression coefficients can be interpreted as elasticity. In the double model then the elasticities are constant and the slopes are not. When coefficients are between zero and one it depicts a situation in which the impact of X on Y is expected to increase at a decreasing rate as X gets bigger (Studenmund, 2006). In our double log model the coefficients estimated are 0.45 for the number of work days and 0.60 for the expenses for purchased feed. When the number of work days in the farm increases by 1%, the production of milk increases by 0.45%, while the other factors are held constant. Similarly, when the expenses for purchased feed increase by 1%, the production of milk increases by 0.60%, while the other factors are held constant.

In spite of good statistical indicators we believe that problems of omitted variables still exist. However, thanks to its simplicity this model clearly shows the importance of labor and of purchased feed for the Bagòss cow milk production.

An objection to this model might be that it takes into account only the feed purchased and neglects the feed produced within the farm. The main problem is that there are no available data about feed production. The most important source of the farm's feed is pastures whose production is neither known nor estimated. Long term meadows account only for 109 hectares. All available proxies (total farm land, agricultural used land, long term meadows area, pasture area) turned out to be of low relevance.

An explanatory model, which takes into account internally-produced feed and expenses for the rent of pastures, gave the following results:

Milk production=566+49.84*workdays+1.445*cost of feed+7.262*cost of pastures

t	0.03	2.05	2.61	1.92

R-Sq(adj): 75.6%

Only the cost of feed is significant at 5% level, whereas the number of work days and expenses for the rent of pastures are significant at 10% level.

Multicollinearity is a statistical problem that affects this model due to a high correlation of variables with the size of the herd. There is also a theoretical problem, because despite the fact that ¾ of Bagolino's pastures are on rent there is still a significant part of pastures owned by farmers that is not included in this model.

According to the resource based view of the firm it possible to conclude that the critic resource of Bagolino is the work of the operator, his family and his relatives. However, it was analyzed only the qualitative aspect of the milk production and natural resources of Bagolino might give an important contribution to explain the qualitative aspect of the milk production rather the quantitative one.

4.2.2 Factors that influence the EBITDA / milk production ratio

As seen in the previous paragraph that Bagòss alone accounts for 78% of the total revenue. It is the main determinant for the financial performance of Bagòss farms. A very

simple model to predict EBITDA could take into account only one variable, the Bagòss production:

EBITDA = -15,781 + 12.343 * Bagòss production

t -1.69 8.78

R-Sq(adj): 76%

However, this does not answer any of our research questions, it is known that Bagòss farms depend almost entirely on their Bagòss cheese.

We pursued a different approach that instead of taking into account EBITDA as a dependent variable applies EBITDA divided by the milk production. This ratio (EBITDA / ton of milk) might be seen as an indicator of the farm efficiency: how good farmers are in transforming their milk into income.

This model is based on two demographic characteristics of the operator (age and level of education), two marketing characteristics of the farm (percentage of Bagòss sold after aging for one year or more and percentage of Bagòss sold by direct sale to consumers) and the size of the herd.

Table 4.22: Explanatory model for EBITDA/milk production

Predictor	Linear	Double log	Semilog (lnY)	Semilog (lnX)
Constant	-1,450.6	-15.719	-3.932	-3,326
t	-3.76	2.51	-1.38*	-3.02
Operator age	11.359	2.788	0.067	447
t	2.71	2.44	2.17	2.22
Operator years of school	93.57	1.560	0.324	534.4
t	3.13	1.09*	1.47*	2.12
Milking cows	16.780	1.993	0.114	232.8
t	4.07	3.40	3.73	2.26
% of Bagòss sold after aging for 1-2 years	5.279	0.192	0.012	79.56
t	4.31	1.23*	1.28*	2.90
% of Bagòss on direct sale	4.392	0.430	0.026	64.69
t	3.66	2.68	2.93	2.30
R-Sq(adj)	74.2%	55.0%	51.4%	59.6%

* Not significant at 10% level.

It is observed that the best model to describe the EBITDA / milk production ratio for Bagolino producers is the linear model; it exhibits the highest R-square, expected signs, the best t-statistics and it is aligned with theoretical expectations.

Unlike the previous model this one depicts a situation where slopes are constant and elasticities are not. Demographic characteristics of the operator have a deep impact on the dependent variable. If the operator age goes up by one year, the EBITDA \ milk production ratio will increase by 11.359 units. Similarly if the operator schooling increases by one year, the EBITDA \ milk production ratio will increase by 93.57 units.

In the same way, also the size of the herd has a deep positive impact on the ratio. If the number of milking cows increases by one cow, the EBITDA \ milk production ratio will increase by 16.78 units.

At last also marketing characteristics are considered and show a significant positive impact on the dependent variable. If the percentage of Bagòss sold after aging for 1-2 years goes up by one point percentage, the EBITDA \ milk production ratio will increase by 5.279 units. And if the percentage of Bagòss on direct sale goes up by one point percentage, the EBITDA \ milk cows ratio will increase by 4.392 units.

Moreover, this model seems to act in accordance with the resource based view of the firm. Age can be seen as a proxy for experience and, along with the years of school, must be seen as the indicator of the operator's skill. Skill is one of the intangible resources that are unique and non imitable. In this light the importance of the operator demographic characteristics is perfectly understandable. Aged Bagòss is sold at a higher price. The

process of aging requires much care, much work and supplementary costs, partly as direct costs, partly as losses of the product during the process of aging. This variable then signals the importance of the farm organization and of marketing channels, because to decide to sell the product fresh or aged often implies to choose a different marketing channel.

Also the variability of the marketing channel implies a different farm organization: selling Bagòss to direct consumer is a time consuming activity. It is not surprising then that the two variables belong to the model.

It might seem surprising that the size of the herd is embedded in the model. However, in Bagòss farms there is a positive correlation between the number of cows and the average milk production. Small farms tend to be less efficient in their use of resources, whereas bigger farms are usually better organized to exploit their resources in a more efficient way.

4.2.3 Factors that influence the EBITDA / work days ratio

A similar approach takes into account EBITDA divided by the number of work days in the farm. This ratio (EBITDA / work days) might be seen as an indicator of the labor productivity: how efficiently farmers work? Is the organization form of their activities the most efficient possible?

This model is based on two marketing characteristics of the farm (percentage of Bagòss sold after aging for one year or more and percentage of Bagòss sold to restaurants and hotels), the total milk production and the cost of rent of pastures. The first three have a positive impact on the dependent variable, whereas the fourth has a negative impact.

Table 4.23: Explanatory model for EBITDA/work days

Predictor	Linear	Double log	Semilog (lnY)	Semilog (lnX)
Constant	-20.49	-15.095	1.460	-578.0
t	-1.89*	-3.24	3.53	-3.50
Cow milk production	0.001	1.662	0.00002	57.48
t	5.81	3.69	3.69	3.59
% of Bagòss sold after aging for 1-2 years	0.456	0.243	0.011	6.250
t	2.68	2.25	1.75*	1.63**
% of Bagòss sold to restaurants and hotels	2.379	0.038	0.031	10.205
t	1.73*	0.17**	0.58**	1.27**
Expenses for rent of pastures	-0.012	-0.097	-0.0002	-4.894
t	-3.38	-1.22**	-1.56	-1.74
R-Sq(adj)	79.1%	59.7%	58.7%	62.7%

** Not significant at 10% level. * Significant at 10% level but not significant at 5% level.

From a statistical point of view the linear model has the best performance among different functional forms: it exhibits the best R-square, the best t-statistics and it is

consistent with the economics theories. Also this model, as the previous one, depicts a situation where slopes are constant and elasticities are not.

According to the expectation the milk production has a deep impact on the ratio. If the milk production goes up by one Kg, the EBITDA \ work days ratio will increase by 0.001 units. In this model also marketing characteristics seem to be very important even if the percentage of Bagòss sold at restaurants and hotel is significant only at 10%. If the percentage of Bagòss sold after aging for one - two years goes up by one unit, the EBITDA \ work days ratio will increase by 0.456 units. The amount of work farmers have to do to sell their cheese through a more profitable channel or to exploit at its best the chosen channel seems to give a good return in terms of EBITDA. Even the amount of work used to take care of aging Bagòss seems to give back a good return. Indeed if the percentage of Bagòss sold to restaurants and hotels goes up by one unit, the EBITDA \ work days ratio will increase by 2.379 units. On the contrary, if expenses for rent of pastures go up by one Euro, the EBITDA \ work days ratio will decrease by 0.012 units.

In the previous model it was noted that small farms tend to be less efficient in their use of resources, we can now add that they seem to be less efficient in the use of their main resource: labor. The impact of the cow milk production on the EBITDA /work days ratio appears to imply that the higher is the production, the more efficient is the use of work time.

The presence in the model of the cost of rent of pastures might seem surprising. And more surprising is that it has a negative impact on the EBITDA / work days ratio.

Summer pastures is a very traditional and a very strong point of the Bagòss industry. However, if we admit that high rent is associated with larger pastures, we might conclude that the amount of work spent on pastures does not give back a good return in terms of EBITDA.

4.3 Bagòss non-statistical information

In this statistical analysis it was seen that some farmers supply part or all of their milk to a local dairy that uses it to produce Bagòss. In the first section the objective is to supplement the description of the Bagòss industry with some facts about the Bagolino dairy.

To perform this research all Bagòss farmers were contacted. All but one were interviewed face to face. Some of them kindly agreed to show the Bagòss making process and this implied a second visit to their farm, a visit that lasted several hours. Besides, some farmers were also visited in summer in their alpine summer houses. This allowed us to gather much information that cannot be turned into statistical data, but is an important source of knowledge. This information is summarized in the second section of this paragraph.

4.3.1 The Bagolino local dairy

The dairy belongs to a private enterprise, the Brescialat S.p.A. with several dairies in the northern Italy. Brescialat produces many types of cheese, both fresh (like, for example, mozzarella) and aged (like Gorgonzola and Parmigiano Reggiano). The Bagolino dairy also produces other cheese besides Bagòss. However, there are separate production

lines: Bagolino milk is used only for Bagòss, while other cheeses are produced with milk supplied from outside Bagolino.

Bagòss is not produced all the year round but only from December 20th to May 31st. Bagòss farmers supply their milk also in June but this is not used to produce Bagòss. In summer cows are brought up to the summer pastures whereas in fall the production of milk is usually low.

Nine farmers supply the dairy with 202 tons of milk; the dairy's production of Bagòss is roughly 16 tons. Bagòss produced is also aged in the dairy and sent to the Brescialat main factory only at the end of the aging process. Brescialat sells its Bagòss mostly on the market of the northern Italian plain and not in proximity of Bagolino.

Recently the local dairy has made an agreement with the Cooperativa Valle di Bagolino and under this agreement the cooperative will use part of the dairy's cellar to age some Bagòss it is going to buy from farmers.

4.3.2 Non statistical information

In this section are described some of the insight gained through meetings with Bagòss farmers that cannot be described in statistical terms. This information is summarized by describing only some aspects that can help understanding the data; this information concerns the role of family, season and isolation; finally, we say a few words about how tradition and innovation combine in Bagolino.

Family always plays a crucial role. First of all most of Bagòss farmers inherited their skills and farms from their parents. Often two, or in few cases three generations of

farmers work in the farm. Sometimes it is not easy to make a clear distinction between familiar (people who live with the operator) and relatives (who have family ties but live outside the family). The way the operator looks at his farm and its future perspectives are often influenced by his age, the size of his family, the presence and age of children and the probability of keeping the farm business and making Bagòss.

Family ties are important also in a broader sense. The community of Bagolino is a closed one and very often farmers working operating separate farms and other members of the Bagòss supply chain have the same surnames. It would be hard to draw a clear scheme of all family ties among farmers, retailers and other people involved in the supply chain. It is a story of mutual help but also of quarrel and broken relationship. Sometimes the entrepreneur does not act rationally but follows his emotions and this is more likely to happen when relatives might be affected by his decision.

The importance of season cannot be understood only by data. Life of farmers radically changes approximately at mid June, when they move to summer pastures. In most cases all farmers and their work force move to the summer pasture and Bagolino farms are closed till September. Sometimes there is more than one Alpine summer house and farmers move from the lower one to the upper one searching for fresher and not yet grazed grass. Some pastures are far from cart roads and are near paths walked only by tourists. In these cases neighbor (that is the farmer who runs the closest pasture) is the first person to turn to for help and this relationship is often very important. In other cases pastures are not too far from the two roads that go up to two mountain passes. The proximity to roads gives farmers not only a chance to socialize and communicate with others. In some cases it also

gives them an opportunity to exploit for marketing the traffic of tourists and travelers who travel along these roads.

The degree of isolation varies not only in summer according to the pasture location, but also in other seasons. Most farms are in or very close to the town. Some farmers live in an apartment in the town whereas the farm is located just outside. But some farmers live on their farms, which are quite isolated from the town. This might be a problem in winter when sometimes it becomes impossible to travel a few kilometers to take, for example, children to school. Farmers who do not live near the town and are located in disadvantaged areas have a somewhat limited social life. Usually these farmers tend to rely even more on their farms and most of social life is with their families.

Tradition versus innovation. Even a traditional product like Bagòss cannot but be affected by innovation. One of the challenges farmers face is the need to re-consider the concept of their product and modify the product specifications. The main question to answer is which traditions must be preserved and which ones need to be innovated? An example of this is the very process of Bagòss making. According to the product specifications, Bagòss must be produced on an open fire stoked by wood (figure 4.4 shows the traditional way of making Bagòss). When the big pot full of milk is placed on the fireplace, the chimney stops working properly and soon the upper part of the room gets full of smoke. This means spending much time each day in an uncomfortable and unhealthy place. But Bagòss can be also made by using gas. In this case there is no smoke, the working environment is more comfortable and given that there is no need for a fireplace even two pots can be placed side by side, enabling the farmer to make two Bagòss heads

almost simultaneously. In this way one of constraints to increase the production volume is eliminated. Here there are two different approaches: one is more respectful of tradition, the other takes into account rather the result. First we should look at the organoleptic characteristics of the two heads. But independently from that a question arises: what does the fireplace give to the consumer? Does it add value to the consumer? Is this the tradition we are looking for when buying Bagòss? Other similar examples can be found.

4.4 Conclusion

This chapter shows the results of our research: the use of both descriptive and inferential statistics and reference to non statistical information allowed a in depth analysis of the information and data collected about the Bagòss industry.

The use of land for Bagòss farms is not much diversified: summer pastures, long term meadows and forests are the three main categories of the use of land. In Bagolino land rented is very important for farmers, indeed 74% of the farm land is rented.

Almost all labor force is made up of family members and relatives, only three hired workers are present. Considering all labor force there are 86 workers farming Bagòss farms, an average of 3.31 workers per farm. The estimated number of work days is equal to 247.56 per worker and to 818.81 per farm.

There are a total of 657 adult milking cows involved in the Bagòss production, with an average of 24.33 cows per farm. Fourteen out of 27 farms breed also goats, there are then also 200 milking goats. The total production estimated for cow milk equals 2,511 tons, which corresponds to an average of 93 tons per farm and 3.822 Kg per cow. Most farmers

process all or part of their cow milk. The main product is the Bagòss cheese. It is estimated a production of 146.5 tons of Bagòss, which is equal to an average of 5.6 tons per farm.

Sixty-nine percent of Bagòss is sold after aging for less than a year. In terms of marketing channels Bagòss producers can choose among several alternatives to sell their cheese. The most important channels are Bagolino's retailers, consumers buying directly and retailers located outside Bagolino.

Sale of Bagòss, that alone accounts for 78 percent of the total revenue, is the prevailing source of revenue for Bagòss farms. Other sources of revenues that can be sometimes significant on the farm level seem to be marginal on the industry level. Purchase of feed is the most important cost for farmers, with 601 thousand euro, an average of 25 thousand euro per farm. According to our estimates EBITDA equals to 1,388 thousand Euro, an average of more than 55 thousand euro per farm.

Cow milk production and EBITDA are used to answer our research questions by means of estimations. Understanding which factors are significant in influencing the production of milk is fundamental to understand the Bagòss industry economy. However, two factors are able to explain most of the variability in milk production: the number of workdays in the farm and the total cost of purchased feed, especially when they are used as logarithms to build a semi-log model.

The EBITDA / tons of milk ratio is an indicator of the farm efficiency: how good farmers are in transforming their milk into income. The explanatory model for this is based on the operator's age and level of education, the percentage of Bagòss sold after aging for

one year or more, the percentage of Bagòss sold by direct sale to consumers and the size of the herd.

A similar approach was pursued to build a model able to explain the variability of the EBITDA/work days' ratio, considered to be an indicator of the labor productivity. This model is based on the percentage of Bagòss sold after aging for one year or more, the percentage of Bagòss sold to restaurants and hotels, the total milk production and the cost of rent of pastures. The first three have a positive impact on the dependent variable, whereas the fourth has a negative impact. The last two models show that small farms tend to be less efficient in their use of resources, and also less efficient in the use of labor.

CHAPTER V: CONCLUSION

In this last chapter it is summarized the paths of development of our thesis. After summarizing it we conclude our thesis with the main lessons learned by making this research and finally with some suggestions to the Bagòss industry community.

5.1 Summary

Many small communities in the Alpine region of Europe are facing the problem of ensuring a sustainable economic development, protecting the environment and their natural resources and preserving their history and traditions under the constraints of higher production costs, distance from markets, isolation, lower soil fertility, severity of climate, a lower level of public services. This is the situation faced by Bagolino, a small town of roughly 4,000 inhabitants, located in the Italian Alps. One of the major supporters to the growth of Bagolino, along with tourism, is its cheese, Bagòss, whose origin dates back to centuries ago when Bagolino was an outpost on the border of the Republic of Venice. The Bagòss cheese is a semi-cooked cheese, which is produced under strict processing methods that have been practiced for centuries.

The Bagòss industry, with its unique organizational system, challenges researchers to investigate what factors are decisive in explaining its success. It is an example of a common situation in the Alps whose agricultural products arise from history and traditions and from the natural and social environment of the area. Our research is aimed to explain what are the factors that influence the production of the Bagòss cheese and what are the factors that explain differences among producers.

Various aspects of interest of the Bagolino economy and of the Bagòss industry were examined through a literature review. The present social and economic situation of Bagolino is important both to understand the Bagòss industry performances and the significance of this industry in the life of the community. At the same time history is fundamental to understand why Bagòss is produced only in Bagolino and to get a better insight of the intangible contents of this unique cheese.

The review of literature about entrepreneurship and supply chains was aimed to get a better understanding of the organization of the Bagòss industry whose organizational structure can be defined as an entrepreneurial supply chain in which independent farmers, the cooperative, retailers and the local government act as agents involved in managing the Bagòss supply chain.

Theories about rural development and concepts of sustainable development and multifunctional agriculture explain threats that are menacing many rural areas like the Bagolino territory; they also help to understand what strategies can be pursued in order to have sustainable development that will ensure satisfaction of the needs of the present generation without compromising the ability of future generations to meet their own needs.

At last the main economic theories that seem to explain the Bagòss industry from the economic perspective are reviewed. It must be noted that the resource based view of the firm offers a good explanation why the Bagòss production is organized the way it is and why the Bagòss cheese is a unique product. It is also interesting to see how the same ideas

are explained from different perspectives in the section dedicated to the concept of local food.

Starting from economic theories of the monopolistic competition and of the resources based view of the firm theories, based on the knowledge about zootechnics and principles of farming, some hypotheses to test are developed. The data collected by survey, interviews with experts and data from administrative sources along with non statistical information were our raw material to analyze. Descriptive statistics, inferential statistics through regression and description of non statistical information were our tools used to perform analyses.

The use of both descriptive and inferential statistics and reference to non statistical information allowed a deep analysis of the information and data collected about the Bagòss industry; results of these analyses were various and interesting.

The use of land for Bagòss farms is not much diversified: summer pastures, long term meadows and forests are the three main categories of the use of land. Field crops are not present as for fruits and nuts. Neither grapes are farmed in Bagòss farms. In Bagolino land rented is very important for farmers, indeed 74% of the farm land is rented. This is true both for long term meadows located around the town and for pastures.

Almost all labor force is made up of family members and relatives, only three hired workers are present. Considering all labor force there are 86 workers farming Bagòss farms, an average of 3.31 workers per farm. The estimated number of work days is equal to 247.56 per worker and to 818.81 per farm. However, the operator and his or her spouse

(when present) represent 46% of the total labor force and work 69% of all worked days in Bagòss farms. These data confirm the fundamental role of family work in the Bagòss industry.

There are a total of 657 adult milking cows involved in the Bagòss production, with an average of 24.33 cows per farm. 14 out of 27 farms breed also goats, there are then also 200 milking goats. Other livestock, when present, are of no relevance from the economic point of view.

The total production estimated for cow milk equals 2,511 tons, which corresponds to an average of 93 tons per farm and 3.822 Kg per cow. Most farmers process all or part of their cow milk. The main product is the Bagòss cheese. We estimated the production at 146.5 tons of Bagòss, which is equal to an average of 5.6 tons per farm. Along with Bagòss there are several byproducts and complementary products. Cows and goats at the end of their career are sold, along with calves and goat kids produced in excess of farm needs. Butter, goat cheese and ricotta cheese are other dairy products sold. However, 78% of revenues are from sales of Bagòss cheese. Other sources of revenues that can be sometimes significant on the farm level seem to be marginal on the industry level.

Sixty nine percent of Bagòss is sold after aging for less than a year. In terms of marketing channels Bagòss producers can choose among several alternatives to sell their cheese. The most important channels are Bagolino's retailers, consumers buying directly and retailers located outside Bagolino.

Purchase of feed is the most important cost for farmers, with 601 thousand euro, an average of 25 thousand euro per farm. According to our estimates EBITDA equals to 1,388 thousand Euro, an average of more than 55 thousand euro per farm.

Cow milk production and EBITDA are used to answer our research questions by means of estimations. Understanding which factors are significant in influencing the production of milk is fundamental to understand the Bagòss industry economy. However, two factors are able to explain most of the variability in the milk production: the number of workdays in the farm and the total cost of purchased feed, especially when they are used as logarithms to build a semi-log model.

The EBITDA/tons of milk ratio is an indicator of the farm efficiency: how good farmers are in transforming their milk into income. The explanatory model for this is based on the operator's age and level of education, the percentage of Bagòss sold after aging for one year or more, the percentage of Bagòss sold by direct sale to consumers and the size of the herd.

A similar approach is pursued to build a model able to explain the variability of the EBITDA / work days ratio, considered to be an indicator of the labor productivity. This model is based on the percentage of Bagòss sold after aging for one year or more, the percentage of Bagòss sold to restaurants and hotels, the total milk production and the cost of rent of pastures. The first three have a positive impact on the dependent variable, whereas the fourth has a negative impact.

The last two models show that small farms tend to be less efficient in their use of resources, and also less efficient in the use of labor.

5.2 Lessons learned

In the literature review were taken into account several different aspects that were believe to be interesting and relevant to our research. In the end these aspects were reviewed to see if performing the field research and analyzing the data was learned something that may be related to what was learned through literature.

Non statistical information gathered seems to confirm the importance of history and traditions in the Bagòss production. The seasonal scheme of going to summer pastures and coming back and the daily routines of making Bagòss changed very little in the course of years and farmers' lives are still centered round them. Moreover, all operators were born in Bagolino; so far there is no space for producers coming from outside. More than that, Bagòss belongs to the community and along with the local carnival is one of the identification elements of the community.

In the literature review the importance of the Bagòss industry for the entire economy of Bagolino was pointed out. It was also stated that the total labor force of Bagolino was equal to 1,666 units in the year 2001. A total of 86 people working in Bagòss farms were estimated; assuming that the labor force has not changed, more than five percent of the Bagolino labor force works in Bagòss farms. These data do not consider all other members of the supply chain, which are fully or partially involved in the Bagòss industry. Linked activities, especially tourism, are not taken into account either.

Entrepreneurship is regarded as one of the main concepts able to explain characteristics of the Bagòss industry. The data did not allow a thorough analysis of this concept. However, some interesting facts emerged. First of all, unlike in many other cases, the cooperative does not perform most of the entrepreneurial functions. Farmers still have control on almost all decisions they have to take performing their activity. Constraints of the entrepreneurial freedom to choose are physical, legal and, to a certain degree, moral. Indeed the product specifications are not followed very strictly and are not considered "much" mandatory. The importance of purchased feed is an example of that. It is rather traditions and the opinion of other farmers (peer pressure) that keep the farm operator stay aligned with other entrepreneurs.

Our data highlighted that much of the work in the farm is performed by the operator. Hence, he performs much manual work and makes Bagòss with his hands. Success of his activity largely depends on his ability as a craftsman to make good Bagòss and also depends on his ability as an entrepreneur to take the right decisions to transform his cheese into revenue. The importance of the latter is evident in the estimation ran in sections 4.2.2 and 4.2.3 where both the marketing and demographic characteristics (as proxy of experience) exhibit that just to be a good craftsman is not enough.

Supply chain is another aspect that is worth considering. First of all it might be said that farmers try to have the shortest supply chain possible. But this statement risks to be too general and not consistent with the data. The main constraint (but not the only one) seems to be the labor force because farmers are not always able to take care of all functions of the supply chain. Some of them must be outsourced. The importance of purchased feed for

example is surely a signal of the shortage of meadows near Bagolino, but it might also signal the shortage of labor. Similarly, the quantity of Bagòss sold fresh might signal the shortage of suitable cellars but also signals the shortage of work force. Farmers decide what activities they can perform based on the amount of the work force they have. On the other hand, integration of functions within the farm (or better within the family) can be larger than it seems. When relatives or members of the family take care of marketing the product through their shops, it is created a kind of a "family" strategic alliance.

Another aspect that was reviewed is how many farms use different distribution channels. Generally, Bagòss farmers look for flexibility, ideally they would like to be free to decide at the very last moment if to sell Bagòss fresh or aged and which channel to use. On the other hand, they are aware of the importance of establishing relationships and creating a stable network. It is also important that two of the biggest farms supply part of their milk to the local dairy. Operators of these farms stated that they do that even if at present they can process all their milk because they want to keep this channel open to them.

Our data did not help much in getting more knowledge about the importance of Bagòss for the rural and sustainable development. It can be just repeated what was said a few lines above when speaking about the importance of Bagòss for the economy of Bagolino. It must also be noted that the literature review pointed out the importance of local food as strategic for the rural development. It is evident that Bagòss, with its strict identification with Bagolino, offers an excellent example of local food.

The monopolistic competition model and the resources based view of the firm theory were used to describe the Bagòss industry and to explain its performances. The second theory appeared to be more effective. Were the resources underlying the Bagòss production identified? They were partially identified. On the one hand, the role of physical assets, especially the environment was not identified. On the other hand, the importance of the operator, his work and his family work were established. Demographic characteristics are significant in explaining the farm's financial performances. This is aligned with the theoretical expectation, according to which it should be looked for intangible assets, unique and hard to be copied. According to this research such assets might be the Bagòss farmers themselves.

Is it possible now to answer our research questions? it was seen that two variables are able to explain much of the variability in the milk production (and consequently in the Bagòss production): work and purchased feed. The second might seem unexpected because theoretically Bagòss should be produced mainly relying on Bagolino hay, but results show that at present Bagòss cannot rely only on the local resources. But then it was also pointed out that performance depends on characteristics such as the operator's age (as proxy of experience) and school years (as proxy of education). Furthermore, the ability to sell cheese at a higher price, which implies selling a higher percentage of Bagòss aged and a higher percentage of Bagòss to restaurant, hotels and direct consumers, turned out to be significant.

5.3 Recommendations and further research

To conclude this research some recommendations might be useful for Bagòss farmers and for other members of the Bagòss industry.

According to the farmers and experts, the main problem of the Bagòss industry is imitation, the presence on the market of false Bagòss. Analysis of this problem was not among the objectives of this thesis. However, the analysis of the Bagòss production and its marketing characteristics revealed that there is uncertainty about the level of production of the true cheese and that the labels put on cheese heads do not allow identifying a specific head, which means there can be several heads of Bagòss with the same labels. These are the two weaknesses that surely make it harder to fight against the problem of false Bagòss.

The cheese head is labeled during production. It is not possible then to keep control of the aging place. Given that a large amount of cheese is sold before the process of aging is completed, the consumer is not guaranteed that the cheese he buys was aged in Bagolino's cellars, as required by the product specification. A double label system could give consumers more guarantees.

The Bagòss production largely depends on purchased feed (hay and concentrate feed). This might seem to contradict the image of Bagòss as a local product in all phases of production. Bagòss producers and local authorities should survey the situation of long term meadows around Bagolino: in order to know which ones are utilized in a rational way and which ones are under exploited or even abandoned. It might also help them to identify which meadows need improvement works. Bagòss will still remain largely dependent on

external feed but it is important to keep producing local feed, for the image and for the quality of Bagòss, as well as for the landscape and environment of Bagolino.

This research established the fundamental role of work force in the Bagòss production and helped to assess the role of work of operators and their families. Work force appears to be a constraint that determines the size of the herd and, consequently, of the production volume. It is likely that in the future hired work will assume a more relevant role or, in the alternative, more production phases will be outsourced. Productivity of work should be studied in order to understand possibilities of expanding production or to internalize more phases of production and expected returns.

Through this research it was found out that the operator combines performing tasks of a craftsman and of an entrepreneur. But none of the operators had studied disciplines related to agribusiness. Some of them developed managerial skill thanks to their experience. However, training and education in agribusiness subjects might be useful both for today's operators and for their younger relatives and children who will be operators of tomorrow.

This research was not exhaustive and implies the possibility of further study and research of the Bagòss cheese.

For example this research did not highlight differences in prices and costs between Bagòss produced in winter and Bagòss produced during the summer season on pastures. This information might be useful in terms of the Bagòss economy. Neither were collected

data about average prices of Bagòss sold fresh or aged, and given the importance of aged cheese sales, exhibited by our estimation, this information might be significant.

It would be also very important to study the economy of Bagòss by production phases, such as farming, breeding, processing, ageing and marketing. Such studies would help farmers to understand which phases require more effort and eventually work force and which ones might be eventually outsourced.

The unit of analysis of our research was Bagòss farms. The focus then was on the production of Bagòss. Other members of the supply chain were considered only marginally in this research. But other members of the supply chain participate in the economy of Bagòss cheese and in some cases also in the economy of Bagolino. However, the objective of the Bagòss industry should be maximizing overall profits of the supply chain. This is especially important for a product like Bagòss and a place like Bagolino where members of the supply chain often have strong ties. A research focused on the analysis of the supply chain would be then very important for the industry and for the community.

Last, most of answers to the questions that can explain success of Bagòss are in the consumer's mind. Why are consumers willing to pay a high price for Bagòss? How do consumers see the quality and tradition? Why do some of them look for Bagòss but then buy to the false Bagòss cheese? Answers to these and other questions might help the Bagòss industry to be profitable and thrive in the next decade too.

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APPENDIX A: BAGÒSS PRODUCTION SPECIFICATIONS

The milk is filtered using conifer branches placed at the bottom of a bucket with holes in it immediately after milking and put in 40-liter vats for a day. Depending on the number of milking cows, a head or two heads of cheese a day can be produced. In the first case the milk from the morning milking and the one from the evening milking are worked together. In the second case the milk from each milking is worked separately and the dairyman makes one head of cheese in the morning and one in the evening.

After that the milk is creamed and the cream that rises to the surface naturally is used for making butter.

The next stage is pouring the skimmed milk into a copper recipient hanging on a mobile device and then cooking it on a wood-built fire at a temperature of 37-39C for about 20 minutes before adding the powder curd. After adding the curd the dairyman brings the temperature up to 48-50C and when the mass reaches the right consistency he cuts it to the final dimension of a rice grain. At this phase some saffron is added to the mass too.

The copper recipient allows producing only one head of Bagòss. After the curd and the whey are separated the curd is extracted and put on a plain surface and then pressed with a double fascera (a mould for making cheese), one plastic and one wooden.

The cheese is then dry salted twice a week for around 5 weeks and put in storage to age for a minimum of 1 year up to a maximum of 3 years. During this period, heads of cheese are periodically turned over, scraped, cleaned and greased with linseed oil.

A cylindrical head has a diameter of 40 cm, is 12-15 cm high and weighs about 16 - 18 Kg.

There are three different EU labels for three different kinds of Bagòss : tenero (tender), aged 14-18 months; stagionato (aged) at least 24 months old; estivo (summer), produced in summer in the alpine pasture.

APPENDIX B: BAGÒSS SURVEY QUESTIONNAIRE (ENGLISH VERSION)

SECTION I: GENERALFARM INFORMATION

1. TYPE OF LAND OWNERSHIP (as of December 31, 2008)

	TOTAL FARM AREA			AGRICULTURAL USED FARM LAND			of which: PASTURES	
	Hectares	Aras		Hectares	Aras		Hectares	Aras
Land owned								
Land rented								
Land used for free								
TOTAL								

SECTION II: FAMILY AND WORK INFORMATION

2. WORK (as of December 31, 2008)

	SEX	YEAR OF BIRTH	FARM WORK DAYS IN 2008	INCOME FOR EXTRA FARM ACTIVITIES (from pensions or works)	SCHOOLING
Operator	M□ F□			Yes□ No□	
Spouse	M□ F□			Yes□ No□	
Other family members working in the farm					
1)	M□ F□			Yes□ No□	
2)	M□ F□			Yes□ No□	
3)	M□ F□			Yes□ No□	
4)	M□ F□			Yes□ No□	
5)	M□ F□			Yes□ No□	
Other relatives working on the farm					
1)	M□ F□			Yes□ No□	
2)	M□ F□			Yes□ No□	
3)	M□ F□			Yes□ No□	
4)	M□ F□			Yes□ No□	
5)	M□ F□			Yes□ No□	
Other family members NOT working on the farm					
1)	M□ F□			Yes□ No□	
2)	M□ F□			Yes□ No□	
3)	M□ F□			Yes□ No□	
4)	M□ F□			Yes□ No□	

5)	M□ F□			Yes□ No□	

3. ORIGIN

a. Have you been living in Bagolino since your birth?

Yes ___□ (*go to question 4)*

No _____ □

b. How long have you been living in Bagolino?

5 years or less _____ □

Between 5 and 10 years ___ □

Between 10 and 20 years _____ □

More than 20 years _____ □

4. OTHER LABOR FORCE

a. Does any hired worker other than family members and relatives work on the farm?

Yes ___□ (*fill the table below)*

No _____ □ (*go to question 5)*

b. if Yes, please indicate how many and the type of contract:

	All year	For the summer season only
One	□	□
More than one	□	□

SECTION III: LIVESTOCK

5. CATTLE

	HEADS as of 12/31/2008	HEADS SOLD during 2008	ANNUAL AVERAGE MILK PRODUCTION
Beef cattle			
Milk cattle			
Milk cows that had calved			
Bulls			
Milk heifers that had not calved			
Heifers older than 1 year old, not pregnant			
Calves younger than 1 year old			

6. GOATS

a. Do you keep goats on the farm?

Yes ___□ (*fill the table below)*

No _____ □ (*go to question 7)*

b. if Yes, please indicate how many and their average milk production:

	HEADS as of 12/31/2008	HEADS SOLD during	YEAR 2008 AVERAGE MILK

		2008	PRODUCTION
Milk goats that had calved			
Other goats			

SECTION IV: DAIRY PRODUCTS

7. MILK UTILIZATION (during 2008)

	Cow milk Kg	Goat milk Kg
Dairy supply		
Farm processing		
Other uses (farm human feeding, farm livestock feeding, direct sale)		

8. PRODUCTS FROM FARM PROCESSING

a. Have you processed milk within the farm in 2009?

Yes ___ □ (*fill the table below)*

No _____ □ (*go to question 9)*

b. if Yes, please indicate what and how many products did you get:

	PRODUCTION Kg	FARM CONSUMPTION Kg	SOLD Kg
Butter			
Ricotta Cheese			
Yoghurt			
Cheese			
Bagòss			
Other cow milk cheese			
Goat milk cheese			

If you produce Bagòss within the farm, answer questions 9, 10 and 11, otherwise skip to question 12.

9. FARM BAGÒSS SALE (during 2008)

	FARM PRODUCTION Kg	SUMMER ALPINE PRODUCTION Kg
Total Bagòss sold		
Bagòss sold after aging for less than 1 year		
Bagòss sold after aging for between 1 and 2 years		

Bagòss sold after aging for 2 years and more		

10. TYPES OF BAGÒSS SALE (during 2008)

	Sale to	% of the total Bagòss sold	Average price of sale
Direct sale to consumers	□		
Restaurants, Hotels	□		
Retailers in Bagolino	□		
Retailers outside Bagolino	□		
Wholesalers	□		
Large scale retail trade	□		
Agers	□		

SECTION V: PRODUCTION EXPENSES

11. PRODUCTION EXPENSES (during 2008)

State expenses for:

	COST FOR Euro
Livestock: purchase of cattle	
Livestock: purchase of other animals	
Purchase of feed	
Animal healthcare expenses (vets, drugs, etc)	
Land and buildings rent for farm activities (excluding pasture activity)	
Land and buildings rent for pasture	

SECTION VI: LAND UTILIZATION

12. MEADOWS AND PASTURES

	AREA as of 12/31/2008			PRODUCTION year 2008		PRODUCT UTILIZATION year 2008		
	Hectares	Are		Kg		Farm utilization	Sold	Both
Rotated Hay and Forage crops						□	□	□
Long term meadows						□	□	□
Pastures						□	□	□
TOTAL MEADOWS AND PASTURES								

13. FIELD CROPS

	AREA as of 12/31/2008			PRODUCTION year 2008		PRODUCT UTILIZATION year 2008		
	Hectares	Aras		Kg		Farm utilization	Sold	Both
Cereals for grain								
Wheat						□	□	□
Barley						□	□	□
Oat						□	□	□
Rye						□	□	□
Corn						□	□	□
Other cereals for grain						□	□	□
Pulses, Potatoes, beets						□	□	□
Hoed crops for fodder						□	□	□
Crops for oil and proteins						□	□	□
Vegetables (Family Vegetable Garden included), Nursery, Greenhouses, Floriculture, Seeds						□	□	□
TOTAL FIELD CROPS								

14. FRUIT, NUTS AND FOREST

	AREA as of 12/31/2008			PRODUCTION year 2008		PRODUCT UTILIZATION year 2008		
	Hectares	Aras		Kg		Farm utilization	Sold	Both
Fruit and nuts						□	□	□
Woodland crops						□	□	□
Forest						□	□	□
TOTAL FRUIT, NUTS AND FOREST								

15. OTHER AREA

	AREA as of 12/31/2008	
	Hectares	Are
Set Aside		
Other farm area		
TOTAL OTHER AREA		

16. FARM TOTAL AREA

	AREA as of 12/31/2008	
	Hectares	Are
TOTAL FARM AREA		

SECTION VI: OTHER LIVESTOCK

17. OTHER LIVESTOCK

	HEADS as of 12/31/2008	HEADS SOLD during 2008
Hogs and Pigs		
Poultry		
Sheep		
Horses, donkeys and mules		
Bee colonies		
Other animals		

18. EGGS AND HONEY (during 2008)
Indicate if your farm produced eggs and honey

		PRODUCTION year 2008		PRODUCT UTILIZATION year 2008		
				Farm utilization	Sold	Both
Eggs		□		□	□	□
Honey		□		□	□	□