

The Contribution of Cheese Making Factories to Sustainable Local Development: The Case of Elassona

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Abstract: In the present paper we have examined the contribution of the cheese making factories to the sustainable local development, which is to say if the local cheese making factories industries contribute to the development of a certain region. We have chosen the municipality of Elassona, which is a region of a great development in livestock and it has a lot of dairy industries, as a great amount of the “feta” (30%) is produced in this region. In the next part of the dissertation a sampling research of 15 questionnaires for entrepreneurs took place and another one of 238 questionnaires for employees in a number of dairies. The results showed that some of the variables relating to sex, family condition and age correlate to the local sustainable with ($R^2 = 73.4\%$). Moreover, employment in dairies increases their income with ($R^2 = 57.9\%$). A percentage of 97% of the employees believe that the sustainable development contributes to the local development. Moreover, employment in the cheese making factories increases their income. Finally, there is an impact, which is that employment in the dairy endangers employees’ health, which is explained that a rate of 68.90% answered that they are in danger ($R^2 = 19.8$). As a conclusion, the contribution of the cheese making factories in the sustainable agricultural development is of great importance in relation to the promotion of the agricultural products, as well as the use of the local livestock.

Key words: sustainable local development; dairy; cheese making factories; Elassona

JEL code: R11

1. Introduction

Over the last decades there is a wide discussion about the overall development in the areas of environment, economy and society, i.e., the sustainable development. Sustainable Development is supposed to bring prosperity to the whole society. As it is widely known, an important sector of the economy is the primary production sector and a part of the primary production sector is livestock breeding. The existence and development of livestock breeding can significantly boost the local economy and contribute to sustainable local development. Livestock breeding has a lot of derivatives one of which is cheese.

This paper refers to a region of the Greek countryside, Elassona. Elassona is located in Larissa, which is in the

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region of Thessaly. It is an area with a rich cultural heritage and geophysical and production wealth. In recent years the development of livestock breeding in Ellassona is great and some of the products, it manufactures, have got Protected Designation of Origin (PDO) status, such as the “Lamb and Goat of Ellassona”. At the same time Ellassona is famous for the production of dairy products. The specificity of Ellassona dairy products is not only their excellent quality, but also the geomorphological and climatic conditions, under which they are produced. The origin of Ellassona dairy products is mainly the sheep and goats, which exist in the region.

2. The Cheese

Sheep and goats are the first animals to be domesticated (about 9000 BC is the most widely accepted period) on the western outskirts of the Mount Zagros in the current borders between Iran and Iraq (Zygoyiannis, 2006). With the domestication, man began to use and their derivatives, such as meat and milk. Originally man used them for survival and later as trading goods and developed farming as a profession. So, the manufacture of milk products and meat became a profession. A product made from milk is cheese.

One interpretation of the meaning of cheese is that “cheese is the generic name for a group of fermented milk-based products. Cheeses are goods produced in a wide range of tastes and styles around the world” (Sandine & Elliker, 1970).

The roots of cheese is lost in the mists of time and so are many local legends exist “claiming” the “discovery” of it. The probable home of cheese is one of the warmest areas in the Mediterranean Sea.

Regarding Greece, it seems that the cheese which was mainly manufactured was the white cheese, and that cheese making was mainly a task undertaken by milk producers. In this form cheese was widespread in Europe, particularly in the Roman Empire. From the Middle Ages until the discovery of America, cheese was mainly produced in monasteries by monks. Until the tenth century it seems that Italy was the largest cheese manufacturing center in Europe (Zerfyridis, 2001). Cheese has proved an effective way to use milk, especially small from small domestic livestock breeds. As it is known, milk is the most appropriate type for dairy because of its high content of casein and fat. This is especially true for indigenous sheep breeds (Alichanidis & Polychroniadou, 2008).

3. Cheese in Greece

Cheese has a long tradition in Greece. Since antiquity, on the 8th century BC Homer describes in the *Odyssey* that the shepherd Polyphemus manufactured cheese. The Greek historian from Sicily Diodorus Siculus (1st century BC) wrote that Aristaeus, son of Apollo and grandson of Zeus, who had learned the art of cheese making from the nannies, was sent by the gods on Mount Olympus to teach Greeks how to make cheese. Given the nutritional value of cheese, it is no surprise that the ancient Greeks regarded cheese as a divine gift and invention. The cheese described by Homer seems to be the Feta and is the main cheese made in Greece from ancient times to today. Meanwhile, various cheeses evolved through the centuries. Today, every region of the Greek area and almost every island has a unique tradition in the manufacture of cheese (Litopoulou & Tzanetakis, 2011).

Several varieties of cheese are produced in different geographical areas in Greece (Anifantakis, 1998). Some of these are actually the same types of cheese, but have slightly different steps in their manufacturing technique or possibly use the same knowhow, but are known by different local names. Twenty of these were recognized as PDO cheeses and there are others waiting for their recognition (Litopoulou & Tzanetakis, 2011).

The domestic production of dairy products is constantly lower than consumption. One of the major problem in the production of dairy products is the sufficient supply of raw material. Domestic cheese is mainly related to the production of goat milk. This is shown by the historical tradition of Greece on one hand, and by the existing restrictions on domestic livestock, which emerged more recently with the country's accession to the European Union, on the other.

Cheese making in Greece is a traditional economic sector, which in recent years has developed significantly, have been modernized and reorganized and is acquiring an industrial character. This development, has been largely facilitated by the entry of large milk businesses, which have won over a large market share from small and family cheese making units.

Generally, the production of milk and dairy foods is of great economic importance for Greece. In 2009, approximately 1,890,000 tons of milk was produced in Greece. 41% of this production consisted of cow's milk, while 37% and 22% was sheep and goat milk, respectively (Ministry of Rural Development and Food, 2010). Milk production is 100 kg/resident and comes mainly from indigenous breeds. In fact, more than 80% of the milk produced, is used for cheese production in milk companies.

An estimated 2/3 of the total cheese production, estimated at about 185,000 tons in 2009, is made from sheep's or goat's milk and about 50%, or 92,000 tons of it, was feta cheese. Note that 10,500 tons and 310 of yogurt were produced from sheep and cow milk respectively (Moatou & Govaris, 2011).

75% of the goat milk produced is used in cheese production and much of the rest for consumption by the farmers themselves. The number of Greek families involved in dairy sheep and goat breeding, is estimated at about 200,000 and they live by exercising this difficult profession. A proportion of these families live in a nomadic fashion, moving from the plains to the mountains during the summer and vice versa.

The cheese industry in the Greek market has specific characteristics. For the most part it is divided into many small companies, often in small family cheese plants, which produce small amounts of dairy products. The products mainly supply local markets and there are few cases where customers of these small units are specific and remain constant. The big problem is that these small companies cannot compete against big dairy companies, which have made their presence felt at the end of 1992.

The Greek dairy industry consists of 16,124 farms with 207,829 of dairy cows older than 2 years old (according to data obtained from the Ministry of Rural Development and Food, 2011). The vast majority of farms (75.4%) and animals (90.5%) is located in the Greek mainland. The average size of farms is 17.6% cows. 51.2% of the farms have less than or equal to 9 animals, 41.4% have 10-49 cows and only 6.7% of farms have 50 or more cows (Katsoulos & Christodouloupoulos, 2009).

The cheese industry in Greece is characterized by lack of competition. This is because small businesses do not have modern equipment and organized distribution networks, face cash flow problems most of the farms with traditional character have a low level of organization.

In recent years, with the entrance of large dairy industry in cheese making, the industry started to improve. This is mainly due to modern production plants and to scientific staff.

4. Area of Ellassona

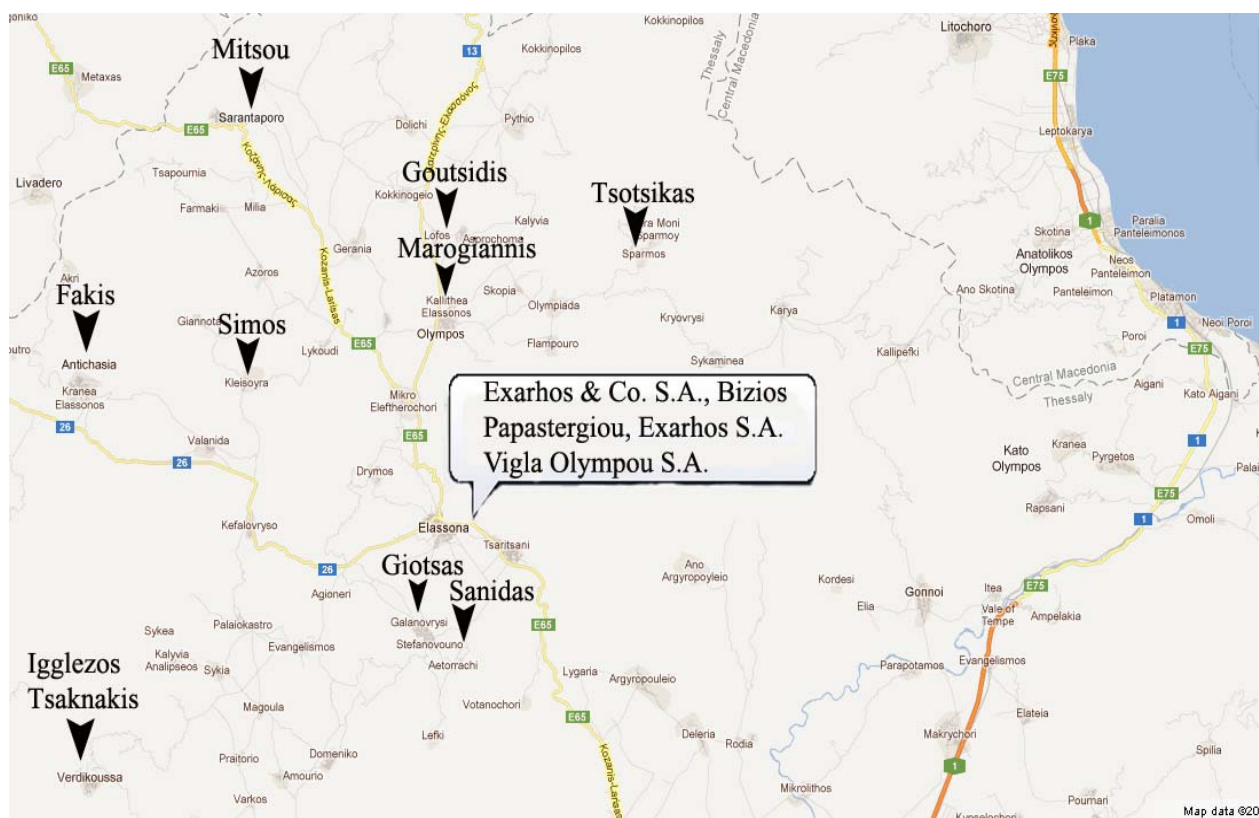
The purpose of this research is to examine whether the cheese industry contributes to sustainable local

development. In order to meet this end, the area of Ellassona is selected, which is a purely rural area with PDO status products, and which holds a large production of dairy products.

Ellassona is the largest district of the prefecture of Larissa. It borders to the north with Kozani Prefecture, to the west with the Prefectures of Grevena and Trikala and to the northeast with the prefecture of Pieria. The total area of Ellassona is 1708 sq.km and the total population according to the Census of 2001 is 37,264 residents.

The most important feature of the geomorphology of Ellassona is its mountainous area. Characterized by high relief, since the majority of (78%) it is characterized as mountainous (38%) is characterized as hilly, and few areas are plains (22%). Mount Olympus, the highest mountain in Greece, and the second highest mountain in the Balkans and even some of the highest peaks (Mitikas 2917 m, Scolio 2911 m, Frank Aloni 2684 m) are located in Ellassona. The area has a natural environment (soil, water, air) of good quality. The climate is continental with cold winters and hot dry summers and relevant types of crops are found.

Ellassona is the largest dairy region of Greece, and it is responsible for 30% of the nation's feta production, or 27,000 tons along with the region of Thessaly. Taking into account the special morphological and climatic conditions of our region, in this case local resources and raw materials—goat's milk—are utilized to the highest degree in the production of feta (Data Ellassona Municipality, 2011). The prefecture of Larissa (and especially the area of Ellassona) produces, 14 out of every 100 pounds of feta produced nationwide, while the country contributes to the global production of sheep milk by particularly important percentage of 17.6%.



Map 1 The Area of Ellassona and the Cheese Making Factories

5. Cheese in Europe

The EU is an important producer of milk and one of the two main milk exporters in the world. The European dairy industry has about 135 million tons of fresh milk in a wide range of products, both for consumption and also for use in the production of multiple food products, in animal foods and medicine. Raw milk is delivered by the 1.6 million farmers in EU-25 for dairy products, is processed by the dairy industry and plays a vital role in rural areas. The dairy industry represents about 15% of the turnover of the food and beverage industry in Europe (about 13% of the total workforce). The various types of dairy products from the European dairy industry, such as liquid milk, cheese, fresh dairy products and butter, are an essential contribution to the diet of EU consumers.

In relation to imports, there is a relatively high rate of tax duties on dairy products in order to maintain the EU market price (Milk and the milk products in the European Union, 2006, European Commission Directorate-General for Agriculture and Rural Development).

The EU is an important exporter of cheese and butter. The dairy sector faces three major changes that could have a dramatic impact on the balance of EU markets. These changes are mainly institutional, namely: (1) the Luxembourg reform for the Common Agricultural Policy (CAP), (2) the enlargement of the EU (10 new Member States since 2004 and additional 2 by 2007), and (3) Finally the World Trade Organization (WTO) (International Dairy Federation, 2004).

It is expected that the dairy sector in the EU will expand in the future. The results of the WTO trade negotiations show that it is possible to reduce border protection from imports and also to reduce the role of subsidized exports. The reform of the CAP significantly reduces the support price for butter and milk powder (SMP) and also limits the role of state intervention. In the long term, it is likely that the quota system will be reformed. In fact, the EU is an important factor in the dairy markets in the world, however, it must be noted that 90% of the milk produced is for domestic consumption. Because dairy products are for human consumption and do not have many substitutes, the overall demand for dairy products is considered as price inelastic. Furthermore, because the production is regulated by quota, the milk quota system was extended until 2014. Thus, any change in the overall demand for milk will affect the price of the product (Demand for dairy products in the EU, 2008).

6. The Dairy Products in Areas of Mediterranean

The following table shows the amounts of cheese and milk in the Mediterranean. From the data presented the importance of milk and cheese in the Mediterranean is confirmed. Most of the Mediterranean countries are using cow's milk for the manufacture of liquid milk for consumption and to a lesser extent, fresh or ripe milk for industrial cheeses. Italy and France have a strong dairy industry in line with international standards. The main characteristic of the Mediterranean region, is the importance of sheep and goats for milk production and milk processing products, such as cheese. Once a marginal activity, the production of goat milk has changed since the 1940s, originally in France with the development of a specific goat milk industry, and later in Spain (Dubeuf et al., 2005).

According to the above table France has the highest production of milk and dairy products, followed closely by Turkey and Italy. Greece is well below, but compared to other countries, its production is satisfactory. Palestine has the last position in milk production in the Mediterranean, where the production is 115,000 tones of cow's milk, only 34,000 tons of goat milk and 55,000 tons of sheep's milk. Generally, the Mediterranean is a region with strong growth in milk production and as a result in the dairy and cheese industries.

Table 1 Quantities of Cheese and Milk in the Mediterranean

	Cow's milk	Goat milk	Sheep's milk	cheeses
ALGERIA	1600	230	205	1.54
CYPROS	144	23	16	5.63
FRANCE	24373	579	264	1812.25
GREECE	787	505	727	236.45
EGYPT	2300	15	93	610
ISRAEL	1185	22	19	104.25
ITALY	11.000	105	565	1163.27
LEBANON	180	39	22	18.36
MOROCCO	1600	34	27	35.05
PALESTINE	115	34	55	6.19
PORTUGAL	1924	28	96	73.8
SPAIN	6100	488	414	117.8
TUNISIA	982	13	18	3.85
TURKEY	11.289	237	782	10.06

Source: FAO 2009 Quantity: 1000tons

7. Fieldwork

In order to investigate whether the cheese industry contributes to sustainable development in the region of Ellassona, two questionnaires are formed. The first one is addressed to owners of dairy plants and the second one is addressed to other employees of the cheese plants. The survey is conducted by the method of collecting questionnaires for 100% of the sample of dairy units in the province Ellassona. Thus, 15 questionnaires were collected by the owners, representing their total number. In addition, 238 questionnaires were collected from workers in dairy plants. The process of distribution and collection of these questionnaires took place between July and August 2011 (18/07/2011 to 08/29/2011). The results for the owners, showed that: Most owners of cheese plants are relatively young, between the age of 40-50 years old. Of the 15 questionnaires filled by the owners, 14 were filled by male owners and only one by a woman, i.e., rates (93.3% and 6.7%) respectively (Figure 1).

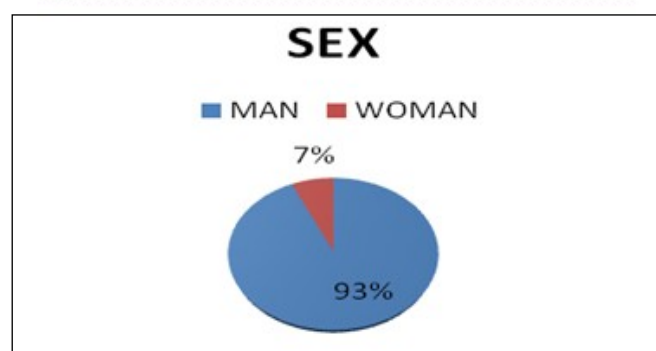


Figure 1 Sex of Owners

Regarding the legal form of the businesses, it is clearly observed that 8 of the 15 dairy plants in the province of

Ellassona are family businesses. In percentage terms, this is 53.3% versus 20%, which stands for all the other legal forms. This component is very encouraging for the region, because it shows that young people choose to stay in their place and engage in the profession of cheese maker, which they inherited from their parents (Figure 2).

The replacement of equipment shows that 26.7% of cheese plants, i.e., 4 out of 15 have made replacement of equipment in 2009 and another 2 very recently in 2011 (Figure 3).

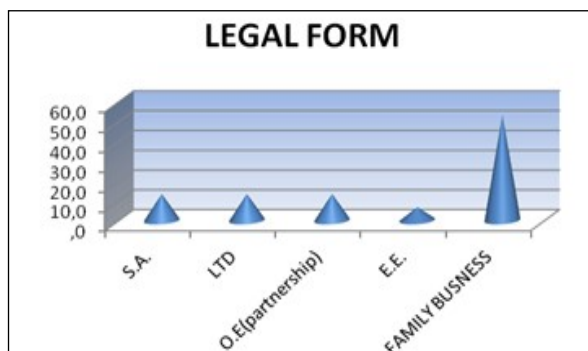


Figure 2 The Legal Form of Business

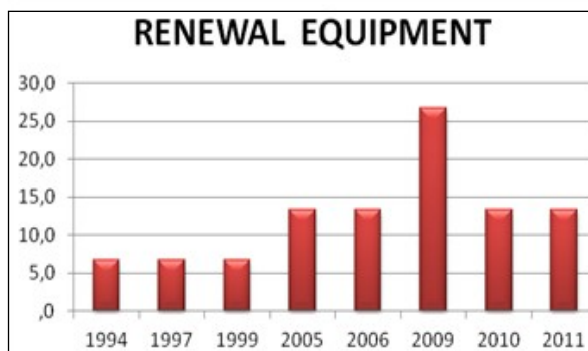


Figure 3 The Replacement of Equipment

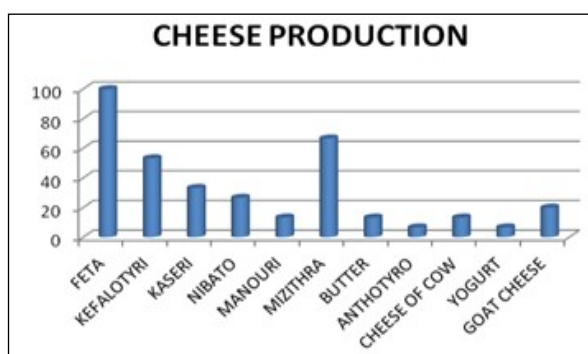


Figure 4 Production of Dairy Products

The raw material used by the cheese comes in majority from the province of Ellassona. This is very important for sustainable rural development, because it helps maintain livestock in the area (Figure 5).

The products of the dairy business, are promoted mainly in the local market. 53.3% of the products is absorbed by the local market, while 46.7% is not. It is important to note that six cheese plants export their products to EU countries and the U.S.A. (Figure 6).

An important issue that is investigated is whether companies follow environmental rules. The results showed that not all businesses use modern methods of waste removal, but mostly convert the whey to animal feed (73.3%). Most businesses use water and chemical disinfection substances for disinfection. It is noted that methods of waste removal clearly need to improve, since this is the most fundamental problem of the region.

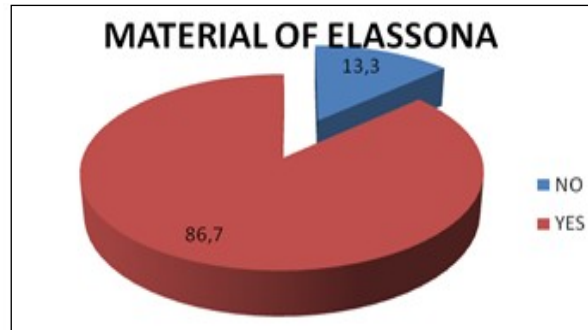


Figure 5 A Material Ellassona

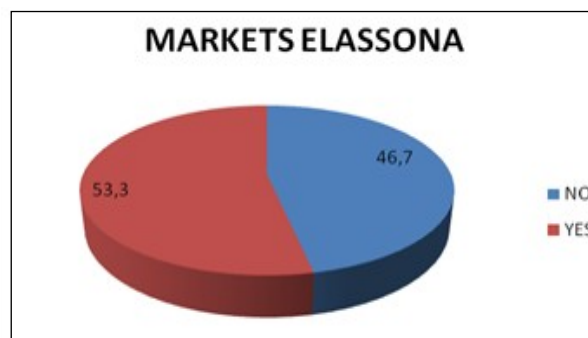


Figure 6 Promoting Products in the Local or Wider Market

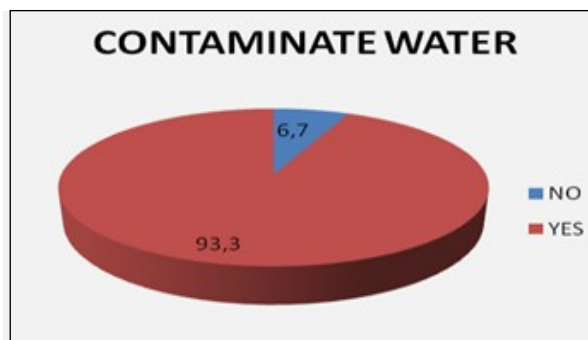


Figure 7 The Dairies Pollute Waters

An additional negative conclusion, not compliant to sustainable development and environmental protection of the area, is that a high percentage (93.3%) of owners responded that cheese plants pollute the waters of the area and that there is an environmental cost to their activities. This conclusion is directly related to the question about the waste of dairy units.

Regarding the positive contribution of cheese to sustainable development, the owners gave positive answers (100%), since we all agree that cheese helps to create new jobs for women and young people and in increasing the income of workers.

The second part of the research focuses on workers in the dairies. The questionnaires were given to 250 employees, 238 of which filled and returned them. The results showed that: Out of the total number of cheese plant employees, 167 are male and 71 are women (70.2% rate in men and 29.8% women). The workers are people who originate from the province and a few of them are not natives or without Greek citizenship. Their educational level is not very high and this is because most people working in cheese plants are employed as laborers. The needs of the cheese plants in labor workforce are high, while there are only a few jobs for scientifically trained people who are employed in the chemistry lab or as administrative staff (Figure 9).

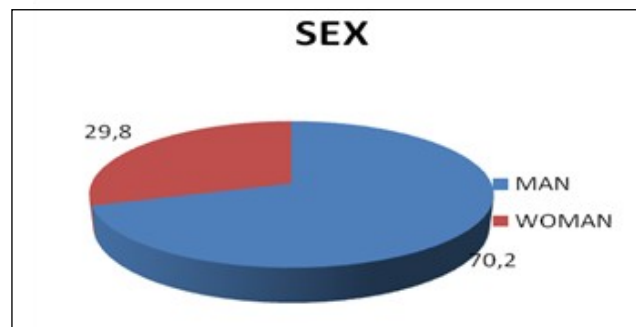


Figure 8 Sex Workers in the Cheese Business

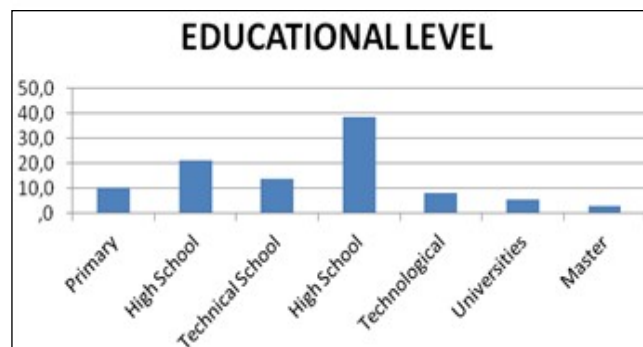


Figure 9 The Educational Level of Workers

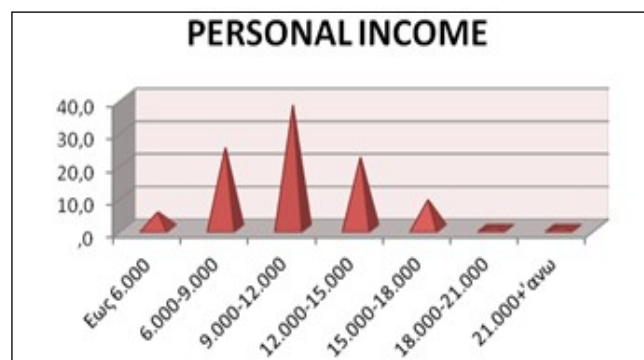


Figure 10 Personal Income

Regarding the personal income of workers in dairy plants, the annual income of the majority ranges between €9.000-€12.000 (37.8%) and (24.8%) between €6.000-€9.000. Few workers are paid at higher salaries (16.4%). The family income ranges again are relatively low, since the average income is between €16.000-€20.000, because generally the population of the province deals with agricultural and livestock farms (Figure 11).

One of the questions that answered was whether workers are at risk when working in dairies. A rate of 68.9% answered yes, that there is danger in their work, and 31.1% said they are not at risk (Figure 12).

Asked on the development of the region in relation to the establishment of cheese dairies in Ellassona, the rates giving the positive view of workers are characteristic. Over 90% believe that the contribution of cheese to the local development is great. Out of 238 workers, only 5 responded negatively, that cheese does not contribute to the local development (Figure 13).

Finally out of the 238 people interviewed on the contribution of cheese to the increasing their income, only 2 responded negatively. A percentage of the 99.2% answered yes, while only 0.8% said that cheese does not help to increase the income of the families in the area (Chart 14).

In short, both groups of respondents, owners and employees, argue that cheese contribute to local development.

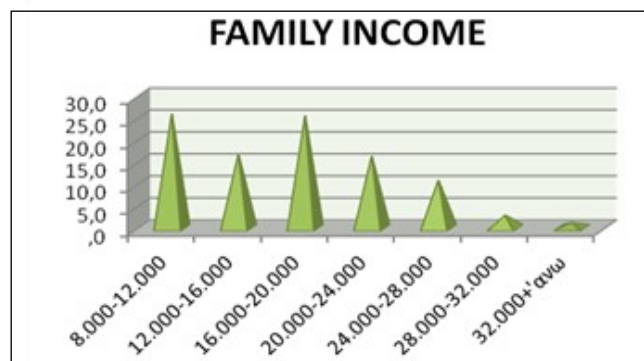


Figure 11 Family Income

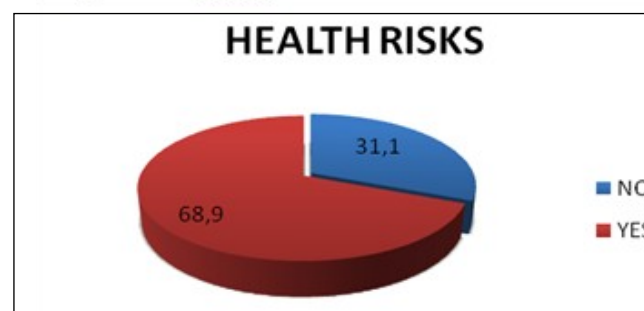


Figure 12 Health Risks

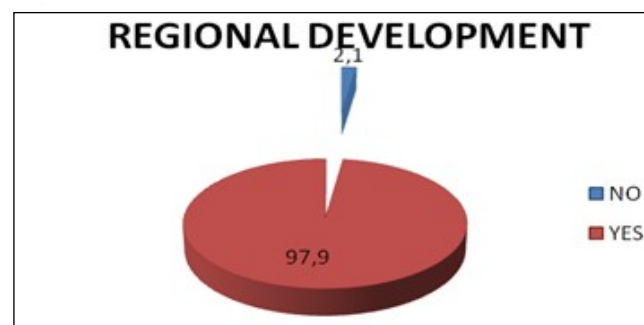


Figure 13 Contributing to the Development of Cheese Making in the Region

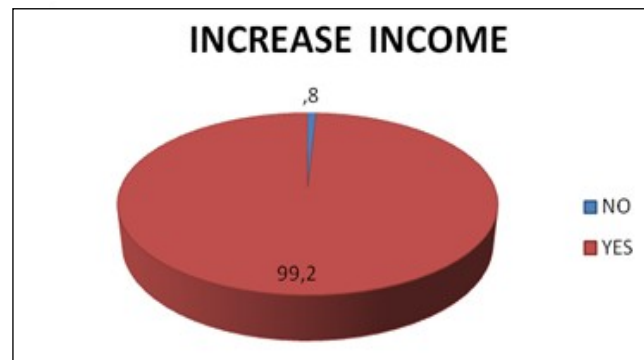


Figure 14 Contribution of Cheese in Income Growth

8. Conclusions

The purpose of this study was to determine if the cheese industry contributes to the sustainable development of Ellassona. To investigate the above issue, a research was carried out through questionnaires sent to dairy plant owners and employees. It is observed that the general conclusions drawn are positive with respect to the local economy. Of course there are some objections to the issues of environmental protection. This is an issue that should be explored in detail in another study. Generally, the cheese industry is one of the areas that can be developed further.

Based on general information, it is noted that with the proper organization and operation of the cheese business, mountainous and disadvantaged areas can be aided and allowed to overcome many of their financial problems. So in the region of Ellassona and elsewhere, measures should be taken, such as:

- utilising all development opportunities
- further support of the primary sector
- informing people engaged in farming and scientific staff to new methods and developments in their field
- support of small businesses (family units cheese)
- advertising of Ellassona's dairy products by participating in workshops - exhibitions, etc.
- mild form of agricultural tourism development.
- protection and enhancement of the natural environment
- motivating young people to engage in organic farming.

In order to achieve the above, support and funding should be ensured. A fairly reliable program that can help the local development of such areas is the National Strategic Development Plan (NSRF). Through the NSRF, municipalities such as Ellassona can be supported by the National Strategic Plan for Agricultural Development (Essene) 2007-2013, which sets the priorities of Greece for the period 2007-2013, according to Article 11 of Regulation (EC) 1698/2005 on support for rural development by the European Agricultural Fund for Rural development (EAFRD). It states that a national rural development strategy will be implemented through the Rural Development Programme (RDP) 2007-2013 (www.espa.gr).

Apart from European programs, which will help implement the above proposals, Non Governmental Organizations (NGOs) that will inform citizens about the benefits of rural development, development of the cheese industry, and the enhancement of the natural wealth can also help.

Regulation 1257/99 (formerly 950/97, 2328/91, 797/85) that established the framework for Community support for sustainable rural development is also important. The Regulation enables account support primarily from

the European Agricultural Guidance and Guarantee Fund (EAGGF) and to a lesser degree by financial contributions from Member States. Out of the main objectives of the Regulation, which came into effect in 1985, one was to improve the structure and efficiency of farms and create additional income in agriculture to promote rural tourism and agro-biotechnical activities (Council of European Union, 1999).

Based on the above, it is clear that there are tools that can be used to further support the cheese industry, both in Ellassona, and in other parts of Greece. Cheese making is an important factor contributing to sustainable development in the area of Ellassona, since it enhances productivity and supports the economy. Protection and growth is considered essential, especially in today's economic crisis experienced by Greece. To this end, the central and local governments along with private citizens should be involved. Their mobilization to promote the positive attributes of the area will contribute to sustainable development.

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