



## ORGANIC MILK AND SUSTAINABLE DEVELOPMENT: EVIDENCE FROM GALICIA/SPAIN

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### ABSTRACT

**Purpose:** This work aims to present one of the links in the organic milk production chain in Galicia - Spain, in natura production, and to analyze its feasibility as an alternative for sustainable development.

**Theoretical framework:** Dairy activity has a global socioeconomic relevance as it generates employment and income for millions of families and contributes to food security, although it generates significant environmental impacts. In this context, the production of organic milk is presented as an alternative for a more sustainable development.

**Method/design/approach:** Methodologically, this is an exploratory study carried out through field research with properties in the province of Lugo, Galicia/Spain, between April and May/2022.

**Results and conclusion:** The results allow us to infer that the production of organic milk constitutes an alternative for sustainable development, as the producers understand that the activity is economically profitable and allows them to maintain a lifestyle in which social and environmental concerns are seen as priorities along with economic issues.

**Research implications:** The contribution is given by presenting a regional perspective, when contemplating Galicia, which can serve as a motivation for the development of public policies to encourage the growth of organic production in Brazil.

**Originality/value:** The originality comes from the study of the Galician reality and the analysis of the possibility of application in Brazil.

**Keywords:** Agroecology, Dairy Products, Environment, Cow.

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## LEITE ORGÂNICO E DESENVOLVIMENTO SUSTENTÁVEL: EVIDÊNCIAS A PARTIR DA GALÍCIA/ESPANHA

### RESUMO

**Objetivo:** Este trabalho tem como objetivo apresentar um dos elos da cadeia produtiva de leite orgânico na Galícia - Espanha, a produção in natura, e analisar sua viabilidade enquanto alternativa para o desenvolvimento sustentável.

**Referencial teórico:** A atividade leiteira tem uma relevância socioeconômica mundial uma vez que gera emprego e renda para milhões de famílias e contribui para a segurança alimentar, muito embora gere impactos ambientais significativos. Neste contexto, a produção do leite orgânico é apresentada como uma alternativa para um desenvolvimento mais sustentável.

**Método:** Metodologicamente, trata-se de um estudo exploratório realizado através de pesquisa de campo junto às propriedades na província de Lugo, Galícia/Espanha entre abril e maio/2022.

**Resultados e conclusão:** Os resultados permitem inferir que a produção de leite orgânico se constitui numa alternativa para o desenvolvimento sustentável, pois os produtores entendem que a atividade é rentável economicamente e permite manter um estilo de vida em que as preocupações sociais e ambientais estejam presentes.

**Implicações da pesquisa:** A contribuição se dá por apresentar uma perspectiva regional, quando se contempla a Galícia, que pode servir de motivação para o desenvolvimento de políticas públicas de incentivo ao crescimento da produção orgânica no Brasil.

**Originalidade/valor:** A originalidade se dá a partir do estudo da realidade Galega e da análise de possibilidade de aplicação no Brasil.

**Palavras-chave:** Agroecologia, Lácteos, Meio-ambiente, Vaca.

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## 1 INTRODUCTION

Milk is the world's fifth largest calorie food and third largest source of protein, and is rich in carbohydrates, fats and micronutrients such as vitamin A, vitamin B12 and magnesium, and its consumption has been encouraged as a source of healthy life. In addition, the world's dairy industry is of socio-economic importance, since it employs a significant workforce, generates saleable surpluses, guarantees income for producers in a large part of the municipalities, makes it possible to maintain farmers in the countryside, although it also generates a significant environmental impact (FAO, digital text; Vázquez-González, Pérez-Fra, García-Arias, Valdês-Paço & López-Iglesias, 2021).

According to the Food and Agriculture Organization of the United Nations (FAO) (2022), global milk production reached almost 906 million tons in 2020, an increase of 2.0% compared to 2019, driven by increased production in all geographical regions except Africa, where production remained stable. In terms of volume, the main producers of cow's milk are the European Union, the United States, India, China, Russia and Brazil.

The milk production chain is made up of a group of players who establish buying and selling relations among themselves in an articulated manner and which allows value to be added at each new stage. Generally speaking, the milk production chain can be characterized as being composed of four main segments: suppliers (inputs and machines); producers (specialized and



non-specialized); industries and distribution for the domestic and international market. Even if progress has been achieved over the years, the dairy production chain continues to present some difficulties, such as: the disorganization between the different links; the instability of prices paid to the producer; the oligopoly of the retail market (Cyrne, 2016).

The production chain of conventional milk shows: the presence of genetic improvements, in an attempt to achieve greater productivity; the use of automation/mechanization; the use of the intensive production system; the use of a diet based on concentrated and bulky foods, supplemented with vitamins and minerals; the use of medicines and growth hormones, all of this seeking greater economic profit (Brodziak et al., 2021; Clay, Garnett & Lorimer, 2020).

However, livestock farming has been identified as an activity that causes great damage to the environment, and "as a result of intensive dairy cattle systems, there is a high concentration of waste that corresponds to urine, feces, food waste, litter, and waste hygiene and sanitization of the environment" (Orlandini & Tortelly Neto, 2020, pp. 145-146).

On the other hand, livestock can help with ecosystem functions if the activity is managed in a sustainable way (FAO, digital text), as happens in the case of organic production. In 2020, 190 countries declared the practice of organic activities, of which 76 with the activity fully regulated, according to data from The World of Organic Agriculture - Statistics & Emerging Trends (Willer, Trávníček, Meier & Schlatter, 2022), confirming its importance either by the area of occupied land, the number of people involved or the values moved.

In this context, and as a consequence of greater consumer awareness of food safety and quality (Hughner, McDonagh, Prothero, Shultz II & Stanton, 2007), we also have organic, ecological or organic cow's milk, which appears as an alternative to the conventional model, with the aim of obtaining a healthier and higher quality product, and which has been having high growth rates in the number of producers and production volume (Pérez Méndez & Álvarez Pinilla, 2008).

In this context, the work is justified because Galicia is the largest producer of conventional and organic milk in Spain, as well as the tenth dairy basin in Europe and is the important milk production chain in terms of economic, social and environmental sustainability. The generation of knowledge about the local reality is important for the possible elaboration of public policies to encourage the activity, as well as to awaken consumers' awareness of the benefits arising from the consumption of organically produced products.

Thus, the aim is to present one of the links of the organic milk production chain in Galicia - Spain, the production, and to analyze its viability as an alternative for sustainable development.

## **2 SUSTAINABILITY, CONSUMPTION AND ORGANIC PRODUCTION OF COW'S MILK**

Considering that "the theme of sustainability has been widely discussed in the most diverse spheres, given the importance it represents for the development of nations" (Bonamigera, Duarte, Winck & Sehnem, 2017, p. 1250), in order to achieve sustainability, it is necessary to analyze reality from the holistic paradigm, taking into consideration the balance of the environmental, economic and social dimensions, which are the focus of this research. Adjectivation of the concept of development with the term sustainable brings the discussion closer to an idea of environmentally friendly and socially inclusive actions and activities, without necessarily moving it away from the economic question.

Organic production is that which, through the use of techniques for conservation and improvement of soil quality, favors the ecosystem, makes it possible to obtain food of nutritional quality without the use of chemical inputs, respects the environment, allows



environmental sustainability, as well as does not use transgenic organisms, besides having a concern for animal welfare and consumer health (IFOAM, 2008; Rouco, 2004; Duval, Von Keyserlingk & Lecorps, 2020; Matos et al., 2023; Pasqualoto, Menezes and to, 2022), combining tradition, innovation and science to benefit the environment (Cukur, 2015). "Organic livestock is a production model that has in its essence simplicity and harmony with nature without leaving aside productivity and profitability" (Aroeira et al., 2001, p. 437). The organic production system can be understood within the concepts of agroecology considering that the use of agrotoxics, chemical medicines, transgenic products, chemical fertilizers are not allowed, besides demonstrating concern for the conservation of natural resources.

According to Borba Jr, Soares, Ferreira & Sauer (2014), the production of cow's milk, according to agroecological techniques, takes into account the search for balance between the socio-economic and the environmental, as well as has made possible the production of better quality milk, being an alternative for the properties of family farming to face the production of industrial type, large scale, in the logic of agribusiness.

According to Muñoz, Soares, Brisola, Junqueira & Pantoja (2022), considering the increasing demands in product quality, food safety, for the well-being of society and in the sustainability of the environment in general, it is necessary to consider the possibility of implementing production systems other than the traditional/conventional ones. However, some challenges need to be overcome when it comes to the production of organic cow's milk and among them we have to: produce with quality and sanity, which requires redoubled care with handling; produce a milk free of biological and chemical hazards, without the use of artificial inputs; overcome the fall in the productivity of the animals, although they have greater longevity; produce food in quantity and quality required, preferably within the own property; besides improving the logistics of distribution, mainly due to the small scale of production.

In order to be considered organic, the production process of cow's milk must follow the country-specific rules and must include, among other things, actions that allow animal welfare, respecting the natural behavior of the animals (Unión Europea, 2018; Duval, Von Keyserlingk & Lecorps, 2020); the health of the herd, without the use of antibiotics, giving priority to the use of phytotherapies and homeopathics; food produced with inputs without genetically modified organisms; good management practices; among others.

According to Mougenot, Pamela, and Giuliana (2022), growing social concern about climate change and its diverse environmental regulations motivate consumers worldwide to seek green alternatives. Pasqualoto, Menezes and Souto (2022) state that the consumption of organic foods has been part of the diet of many countries for decades. The growth in organic food consumption is a global trend, in both developed and developing countries (Matos et al., 2023; Meas, Hu, Batte, Woods & Ernst, 2014; Peštek, Agić & Činjarević, 2018), however, despite positive consumer attitudes, this consumption is still below 1% globally and in large population concentrations does not exceed 10% (Willer, Lernound & Kilcher, 2013; Aertsens, Verbeke, Mondelake ers & Van Huylenbroeck, 2009). In 2020, the countries with the largest organic markets were the United States (49.5 billion euros), Germany (15.0 billion euros) and France (12.7 billion euros), while Spain ranks ninth (2.5 billion euros) in organic food and beverage consumption (2.22% of world consumption), accounting for 54.00 euros per inhabitant per year, far below other countries such as Switzerland (313.00 euros), Denmark (312.00 euros) or Sweden (2331.0 euro). The most consumed organic products by Spaniards are meats (15.00%), followed by milk and derivatives (7.5%) (MAPA, 2021). Spain is the fourth largest exporter of organic products (7.60%), behind the United States (23.10%), Italy (15.70%) and the Netherlands (7.80%), out of an estimated total of EUR 15.26 billion.

Over the past decade, organic dairy production has increased rapidly in the United States, where the organic milk consumer market has grown by 1.9 to 5.0% compared to total milk sales (Snider et al. 2021). In this context, the demand for organic cow's milk has recently exceeded



the available supply, unable to keep up with consumer demand, which constitutes an opportunity for producers (Liang, Wattiaux, Cabrera, Hedtck & Silva, 2017). Corroborating Soares, Sousa, Malaquias, Rodrigues & Borba Junior (2015) state that the global organic dairy market is expanding, given society's increased demand for organic milk production and shows that organic dairy products are vital to address consumer concerns about sustainability, as an example is Denmark where it represents more than 30% of the market (Willer et al., 2022). In 2017, organic cow's milk production was approximately 8.1 billion liters, which meant around 0.90% of total milk production. In terms of value, this market has reached the amount of 18 billion dollars, and grows annually 8%, which demonstrates that organic dairy products are trend in consumer development and that the largest segment of the organic dairy market globally is liquid milk, accounting for 24% of total sales (Global Organic Dairy - Market Report, 2019) and is valued at 4.3 billion dollars.

### 3 MATERIAL AND METHODS

The research was carried out under the paradigm of the inductive method, because it observed a set of secondary and primary data obtained from the rural properties and the intention is to generalize the results found. From the point of view of its nature, one is dealing with applied research, since as to the form of approach to the problem of research, it is classified as quantitative.

In order to meet the objectives, the research relied on an exploratory stage, with the purpose of making the research problem more explicit, and in this stage made use, predominantly, of bibliographic surveys; followed by a descriptive stage, which sought to characterize one of the links of the production chain of organic milk, production, with respect to the producer and the properties, without considering the other links downstream and upstream.

As for the technical procedures for the collection of secondary data, in the first instance, it was made use of the bibliographic research, as well as official databases in particular the pages of the Ministry of Agriculture Fisheries and Food - MAPA, of the Regulatory Council of Ecological Agriculture of Galicia - CRAEGA from where it was possible to identify the certified producers in organic production; of the Galician Institute of Statistics - IGE; of the Food and Agriculture Organization of the United Nations - FAO, among others, to characterize the production of organic milk of Spain, with emphasis on the autonomous community of Galicia. Galicia is composed of four provinces: A Coruña, Lugo, Pontevedra and Ourense, according to Figure 1, we have the location of the region under study (adapted from Pequeócio, 2022). Autonomous communities are territorial entities with legislative autonomy and executive powers, as well as the power to administer themselves through their own representatives.



**Figure 1** - Location Map of Galicia

**Source:** Adapted by authors from <https://www.pequeocio.com/mapa-comunidades-autonomas-espana/>

According to MAPA (2021), in the Galicia region there were 122 farms with organic milk production in 2020. Seven properties located in the province of Lugo were selected from this population group for the on-site survey of the information. The choice of properties was made by the researchers, for accessibility, from the pre-existing contacts, constituting a non-probabilistic sample, with the limitations that it possesses. The properties were contacted in advance, making it feasible to carry out the collection of primary data by means of a form filled in by the researchers from the producers' replies, each interview taking approximately 60 minutes. Data collection took place between April 23 and May 3, 2022. It is important to note that the form was adapted from a master's dissertation developed by Rojo Pombo (2020) at the University of Santiago de Compostela, which had the objective of identifying the degree of satisfaction of producers in relation to organic milk production.

The first section of the form made it possible to identify the profile of the producers and the properties. In addition, questions were raised about the economic gains generated by organic milk and the existence of other sources of income. Regarding the profile of the herd, questions were raised regarding the total number of animals, the number of lactating cows and the breeding process used. Subsequently, it was sought to identify the position of the producers as to the dynamics of the market, difficulties in producing organic milk, production costs and degree of satisfaction with the activity. In order to answer these questions (see Tables 2, 3 and 4), the producers had to choose within a scale, from zero to ten, which best represented their opinion. One aspect included in the research was the attempt to identify how producers perceive the future, considering a horizon of five years, in view of the dynamism of the dairy sector, mainly in terms of oscillation of the prices paid to the producer, as well as the volatility of the market in terms of demand, being this a period of time that can be considered with some prediction. Motivated by the COVID-19 pandemic, a question was also inserted about the impacts and the changes perceived by producers as a consequence of such a phenomenon.

As a limitation of the research, it is noted that the number of properties that constituted the sample is small, and caution is needed in extrapolating the results. For the tabulation of the data, electronic spreadsheets were used that allowed the calculation of the mean and standard deviation, with the purpose of identifying the variability between the responses.



## 4 RESULTS AND DISCUSSIONS

The number of green operators in Spain in 2020 was around 53,000, among producers (84.33%), industries (10.43%) and traders (4.70%). The area occupied with organic production is evolving and in 2020 was 2.44 million hectares with a growth of 3.5% over 2019 and 23.8% considering the year 2015, which demonstrates the importance that organic activity has conquered. Among the producers, there are 39,382 (88.52%) farmers, those who work in agriculture and livestock at the same time result in 3,168 producers (7.14%) and cattle ranchers add up to 1,943 (4.37%) (MAPA, 2021).

From the analysis of the data, it is possible to perceive the small participation of those who act exclusively in livestock production considering the production of meat and milk, whether bovine, ovine or caprine. This is an aspect worth highlighting, as it can provide an opportunity for producers to increase demand, as demonstrated in the theoretical review and the secondary data collected.

When we analyze by autonomous community, we have in terms of area destined to organic production in first place Andalucía (45.06%), followed by Castilla-La-Mancha (17.35%), Catalonia (10.54%) and Galicia (1.31%). As the largest agricultural producers are the communities of Andalucía (35.10%), followed by Castilla-La-Mancha (19.78%), Murcia (8.50%) and Galicia which has 0.90% of the producers (MAPA, 2021).

When livestock production is observed, the protagonism remains Andalucía (53.57%), followed by Galicia (16.63%), Asturias (9.67%) and Cantabria (5.15%). In this same period, the transformation industries totaled 5,561 plants, of which 1,451 operate with raw material of animal origin. As for the distribution among the autonomous communities, Catalonia appears as the main player (25.04%), followed by Andalucía (16.88%), the Valencian Community (9.74%) and Galicia (4.19%) (MAPA, 2021).

Although Galicia has one of the smallest agricultural and organic areas, it is the second largest producer in Spain when compared to the other autonomous communities. However, low industrialization is a weakness, because even if we know that organic production in natura is, by itself, for value aggregation, "it is in transformation that this occurs most prominently, given the multiplicity of elaborations that raw materials can undergo" (Gazolla, Lima & Brignoni, 2018, p. 245). There is a consensus that there is a need to add value to the raw material and thus achieve greater profitability, as an alternative to large multinational corporations, the operation of family agro-industries may prove interesting, as Spanevello, Duarte, Schneider & Martins (2019). Family rural agro-industries (FRAs) emerge as a complementary income strategy, adding value to products and diversification through multi-activity activities, in the pursuit of higher quality of family life. Moreover, ARFs also contribute directly to local socio-economic development, as they preserve culture and traditions, since their products are marketed in the municipality, such as in supermarkets, schools and fairs.

Based on global conventional milk production, in 2020, according to FAO data, global organic milk production can be estimated at 9.06 million tons (considering all species). In this same period, Spain had 1,904 organic livestock properties (MAPA, 2021), milk producers were 234 (with 122 in Galicia) and the number of head of dairy cows was 13,550 (in Galicia there were 5,500). As with conventional milk, Galicia is Spain's largest organic milk production region, and at European level, it is one of the top 10 dairy basins (López, 2015). In 2020, Spain's organic milk production was 68.57 thousand tons, with 48.54 thousand tons of cow's milk.

The distribution by autonomous community presents the following distribution (the three largest and the remaining percentages are distributed among the other autonomous communities): a) cow's milk production - Galicia (53.20%), Asturias (17.00%), Cantabria (13.26%); b) properties - Galicia (52.13%), Asturias (21.80%), Andalucía (11.53%); c) herd -



Galicia (40.61%), Asturias 1.90%), Cantabria (14.80%); d) industries - Andalucía (21.90%), Cataluña (18.40%), Galicia (9.50%).

From the data it is possible to see the prominent role of Galicia in the production of milk with important participation either in the volume produced or in the number of properties, also highlighting the low participation in industrialization when compared to the percentages of raw milk production.

From an analysis of the data by Galician provinces it is possible to verify the concentration of organic milk production in the provinces of Lugo and A Coruña regardless of the variable considered, as can be seen in Table 1.

**Table 1:** Participation of the Provinces of Galicia in the number of properties, in the herd of dairy cows, in the volume of milk production and in the quantity of ecological processing industries as a percentage in 2020

Province	Property Ownership (%)	Total herd share (cows) (%)	Production volume share (%)	Participation in the greening processing industries (%)
A Coruña	30.32	38.52	35.32	36.80
Lugo	51.78	51.13	54.68	42.20
Ourense	4.	1.52	1.80	10.50
Pontevedra	13.90	8.83	8.20	10.50
Total	100.00	100.00	100.00	100.00

**Source:** prepared by the authors from MAPA (2021).

Considering the context of organic milk production in Galicia, we carried out the collection of primary data that are presented and analyzed in the following text.

Among the producers who took part in the interviews, it was found that organic milk production started in very different periods, the oldest in 1998 and the most recent in 2016. The majority of producers (04) started production in 2005, when the Galician legislation was better structured with the publication of *Ley 2/2005 of 18 February 2005, de promoción y defensa de la calidad alimentaria gallega*, which includes a series of measures to stimulate, promote and promote food products of different quality, giving value to organic farming, and aims to have a positive impact on sustainable development (Spain, 2005). It also establishes the tasks of the Regulatory Councils which are responsible for the certification of organic production. It is important to point out that the rules laid down in the framework of CRAEGA comply with the guidelines issued by the European Community, are constantly being updated and are available on the Council's website.

As for the profile of the producers, it has to be said that: a) the average age is 47.5 years, the youngest is 32 years and the oldest 63 years; b) they have been working in the countryside on average for 23 years; c) four are male and three are female; d) in relation to marital status the "other" prevails with four producers, the others are: one married, one single and one divorced; e) four have university education and three full secondary education; f) five have specific agrarian training through courses; g) six work on the property, of which five are full-time and one is part-time; h) another activity or has another source of remuneration; (i) and with respect to the continuity of the enterprise, four claim to have successors.

From the profile, it can be said that the producers are experienced in view of the time they are developing their activities in the primary sector, as well as acting with the production of organic milk, which occurs on average for 15 years. A strong point is the level of formal education with a prevalence of higher education as well as specific training, which allows one to assume a higher qualification for the exercise of the activity. Another highlight is the care of the activity, since five are dedicated exclusively to milk production. Something to be noted is the question of succession, where only four claim to have who can continue the activity; the remaining three did not answer this question, since they are less than 40 years old. This is not an exclusive difficulty of these producers, there are studies demonstrating the difficulty in the formation of successors, as found Oliveira, Mendes & Vasconcelos (2021). According to the



authors, the lack of succession is one of the factors that influences the non-permanence of young people in the rural environment and arises from conflicts in the late succession process and without planning.

On the other hand, sometimes there has been a movement to return to the rural environment people who sought, at some point, to go to urban centers to exercise their professional activities, a fact verified in the study by Panno & Machado (2014). According to these, cases were analyzed involving young people with higher education and children of small farmers with well-structured properties who decided to return to their parents' properties to undertake; this happened in four properties whose producers have a higher education.

When asked about participation in class entities or social organizations: all producers have shown that they are part of some business trade association; six producers have also reported that they are part of a cooperative, and five producers participate in unions or producer association. The presence of an associative spirit is present with the producers, which can be considered positive, because according to Begnis, Arend & Estivaleta (2014), the man discovered the importance of cooperating for the fulfillment of his needs from an early age.

In this context, cooperatives emerge as an alternative and are characterized by being organizations that have people as their center, joint ownership of assets and democratic conduct, by and for their members, with the purpose of meeting common economic, social and cultural needs (ICA, 1995; OCB, 2017; Molle, 2014; Bayas & Noriega, 2019).

However, the milk is marketed by the processing industries, notably Lactalis, as the Galician cooperatives are not yet organic milk applicants. In parallel, some producers (04) do direct marketing. Linking to a large customer is a threat to business continuity, because if the corporate strategy is modified, the implications can be damaging. Thus, the challenge is to develop new manufacturing companies, and for this purpose it is important to have public policies that foster the participation of producers in cooperative industrial processing groups, such as Friesland Campina in the Netherlands (FrieslandCampina, 2022).

In relation to the annual sales of the properties, for four producers it was more than 240,000 euros, for two between 120,000 and 140,000 euros, and for one between 60,000 and 80,000 euros. In addition, in six properties, the income from organic milk corresponds to more than 75% of the tickets, which points to a high degree of specialization, and only one of the properties adds value to the product in its natural state by means of the industrialization of cheeses, yogurt and pasteurized milk.

As regards the properties, they have an average area of 65 ha, with 50 ha of own cultivated area, 15 ha of rented area at an average cost of EUR 196 ha/year. On average, 5.6 ha of wooded area is maintained. According to Pérez Méndez & Álvarez Pinilla (2008), the size of the farms is one of the obstacles to the production of organic milk in Galicia, due to the need to take into account the level of crowding required by European legislation (not to exceed 170 kg of organic nitrogen per year per hectare of agricultural area) and the size of the farms being considered small. The existence of the practice of land leasing has been the alternative, although it incurs an increase in costs.

In relation to labor, quantified in Annual Work Units (AWU), the average number of AWU per property is 2.11 of wage type and 1.90 of family type, which means four (04) persons employed full-time per year (Table 2).

**Table 2:** Number of AWUs and persons employed

Property	AWU			People		
	Employee	Family	Total	Employee	Family	Total
1.	1.00	2.33	3.33	1.00	3.	4.



2.	2.	2.	4.50	2.	3.	5.
3.	0.25	2.	2.75	3.	1.00	4.
4.	2.	2.	4.50	2.	3.	5.
5	2.	2.	4.	2.	2.	4.
6	3.50	1.00	4.50	4.	1.00	5.
7	4.	0.50	4.50	4.	1.00	5.
Medium	2.11	1.	4.01	2.57	2.	4.57

**Source:** prepared by researchers

The family labor force is characteristic of milk production, regardless of whether it is conventional or organic, but the organic activity requires greater attention from the producers as to the handling of the animals, which justifies the use of employees, even if in a complementary manner in activities of processing and marketing the products. In this sense, there is unanimity among producers that organic milk production needs more labor than conventional production, however, when asked about the need to be a more skilled labor force, opinion is divided, four believing that it is and three manifesting that there is no such requirement. However, a CEPEA study (2019) highlights the importance of qualifying the workforce for the profitability of dairy farming. According to him, in properties where the workforce is familiar and unskilled, productivity is lower than in relation to properties with formal contracted labor (CEPEA, 2019).

The herd has an average of 72.5 cows; the average lactating cow is 55.29 The average production in 2021 was 373,545 liters per property, having been remunerated on average EUR 0.49 per liter and having an average production cost of EUR 0.40. The composition of the herd in terms of the quantity of animals is limited to the area available, since, as mentioned, it is necessary to observe the rate of stocking recommended in the regulations, consisting of a question limiting the volume of production. Also, due to the food issues, cows in the organic system have a lower productivity than in the conventional system (Pérez Méndez & Álvarez Pinilla, 2008), although they have a longer life span. These issues have a direct impact on the realization of revenues and production costs, implying profitability, but the producers surveyed have nevertheless expressed satisfaction with the activity.

In terms of management, cows are milked once or twice a day, the time of each milking being dependent on the number of lactating cows, with a variation between 60 min and 180 min. For reproduction, the majority of producers make use of artificial insemination, being that a property is only worth a natural amount and one of the two techniques.

As far as food is concerned, the base is in the pasture for 9.15 months/year, and in the others there is supplementation with concentrates, even if they go out to pasture in the 12 months of the year. The use of a feeding plan is reported by four producers, while the existence of a pasture management plan is present in five properties and all the properties make use of rotary grazing. In addition to the food produced on the property, the purchase of cereals, concentrates, hay is carried out, and only one producer stated not to make purchases of feed for the cattle. One of the biggest challenges in organic production is the availability of organic food (Pérez Méndez & Álvarez Pinilla, 2008), with few certified suppliers, so the property has to seek to be self-sufficient, which is not always possible due to the size of the properties. Corroborating with this perception are the studies by Brito, Aragão, Souza-Esquerdo & Pereira (2023) and Honorato, Silveira & Machado Filho (2014), which identified scarcity of organic



feed and the absence of practices such as green manuring to maintain the fertility of the soils destined to pasture, as well as difficulties in acquiring organic supplements.

When asked whether organic production brings higher quality of life, six producers believe that it does and they say that they stimulate other producers to carry out the conversion from conventional to organic. The conviction that the activity is an alternative seems to be proven when they say, six producers, that they would not return to the production of conventional milk even if it was more profitable or that they had access to a job in the city with a salary above the average of earnings obtained in the production of milk.

During the interviews it was noted that, beyond the economic dimension, there is a social and environmental concern, and some producers claim that it is an ideal, a lifestyle, corroborating Maas, Malvestiti, Vergara & Gontijo (2018, p.88) who state: "besides the suppression of the use of agrotoxics in agriculture, such as, for example, the recognition, satisfaction and group vision that strengthens with the exchange of experiences, contributing to the improvement of the quality of life of farmers".

One of the categories of analysis in this study aimed to identify the producers' opinion of the market. Respondents showed the degree of agreement or disagreement on a scale of 0 (maximum disagreement) and 10 (maximum agreement) with the statements, and the following results were identified (see Table 3).

**Table 3:** Producers' market views

Issue	Medium	Standard deviation
There is a demand for organic milk	6.29	2.14
Increased number of consumers	7.14	1.68
Consumers are willing to pay more for organic milk	6.57	2.23
The price paid for organic milk is rewarding	5.	3.06
It is economically interesting to produce organic milk compared to conventional milk	6.	2.58
There is optimism about organic milk production	5.71	2.69

**Source:** elaborated by the authors from the data collected in the field

Consideration of organic milk production as an economic alternative to conventional milk necessarily requires an assessment of the consumer market as consumers seek to buy products with little or no impact on the environment, even if they are more expensive (Mougenot, Pamela and Giuliana; 2022). In order to identify the perception of the producers, it was asked if there is demand for organic milk and if they believe in the growth of the number of consumers, the answers complement each other, with the first showing the third highest average (6.29) and the second lowest dispersion (2.14), while the second question obtained the highest average (7.14) and the lowest dispersion (1.68) demonstrating the convergence in the perception of the producers in relation to the market.

However, when asked about the willingness of consumers to pay more for organic milk, although it has the second highest average (6.57), there is greater divergence (2.23) between the responses of producers. According to Willer et al. (2022), Spain has one of the lowest organic food expenditures per inhabitant in Europe, which may explain, at least in part, the low willingness to pay more for organic milk.

It was also questioned whether the price paid for organic milk is rewarding, the answer was the most negative among the six with the lowest average (5.00) and the highest dispersion (3.06), demonstrating, once again, the lack of uniqueness in the perception of the phenomenon. However, although they consider the price not to be rewarding, when questioned about the economic viability of producing organic milk, the average is higher (6.00) and the dispersion



in the answers is lower (2.58), and when this result is associated with the questioning of whether or not there is optimism in relation to production, the evaluation can be considered positive.

Another category of analysis concerns the difficulties encountered by producers in producing organic milk. The results can be viewed in Table 4.

**Table 4:** Difficulties encountered in the production of organic milk

Issue	Medium	Standard deviation
Size of properties	6.43	2.94
Production costs	7.43	1.72
Availability of skilled labor	7.14	2.79
Market Size	5.86	2.34
Few suppliers of inputs	4.57	2.07
Few industries	7.86	1.46
Available Installations	5.43	2.94
Regulatory Requirements	5.14	1.72

**Source:** drafted by the authors

Urged to express on the difficulties encountered to undertake in organic milk production, producers have demonstrated greater cohesion, with the least dispersion (1.46) and highest average (7.86), the existence of few processing industries that constitute the main customer of producers, even if, as described above, they express optimism and believe that consumption tends to grow in the coming years.

Production costs were considered the second largest barrier (with average 7.43) and also with low dispersion (1.72). This position confirms the previous answers when they said that more labor was needed, the need for greater availability of land, which is confirmed by the need for renting of areas, the greater attention with handling and feeding, as well as the fall in the productivity of animals, all variables with a direct impact on the costs. In addition to the statements made by producers, there are also issues relating to animal health and welfare, which also require investment and the consequent cost-reflections. Even if costs are considered a barrier, organic milk production is still considered economically interesting for producers (as presented in Table 1).

Although the manifestation on the need for more skilled labor was not a consensus among producers, availability is considered the third largest barrier with average (7.14) and dispersion (2.79). The two barriers with lower average were: few suppliers of inputs with average (4.57) and dispersion (2.07) and regulatory requirements with average (5.14) and dispersion (1.72). The first of them goes against, to some extent, what is identified in Duda & Tlačbavová (2012) that point to the production of inputs, foods, that meet the standards as an important barrier. On the other hand, with regard to the rules, it is possible to believe that over time the rules become more comprehensible and easier for producers to comply with.

The third category of analysis concerns the degree of satisfaction of the producers in relation to the production of organic milk, having found the results shown in Table 5.

**Table 5:** Degree of satisfaction of producers in relation to organic milk production

Issue	Medium	Standard deviation
Satisfaction with the organic production system in general	8.17	2.79
Satisfaction with land use	7.14	2.34
Satisfaction with animals	8.00	2.07
Satisfaction with profitability	6.43	1.46
Satisfaction with social aspects	6.80	3.05

**Source:** drafted by the authors



In an economic dimension it is possible to state that despite considering that the price paid for organic milk could be better (average 5,00) and that the costs are higher (average 7,43), producers express some satisfaction with the profitability of the activity with average (6,43) and dispersion (1,46). In environmental terms, the degree of satisfaction of the producers is even higher, being the average satisfaction in relation to the use of the land (7,14) and dispersion (2,34) a little lower than the satisfaction with the animals that presents average (8,00) and dispersion (2,07). In the social dimension, the average (6.80) points to a good degree of satisfaction, but the dispersion (3.05) shows that there is no consensus in this assessment. When asked about the degree of general satisfaction, the highest average (8.07) is observed with dispersion (2.79), which allows one to deduce that the activity of organic milk production is an interesting alternative in the opinion of producers.

At the time when they were questioned about the possible modifications to be implemented over the next five years, four producers expressed their intention to increase the hiring of labor, but maintaining the current size of the herd as well as the useful area of land available for milk production. No producer is contemplating abandoning milk production, but one is expressing the intention to switch to conventional milk.

Addressing the impact of the COVID-19 pandemic on organic milk production, the changes took place in the increment of planning actions, where four producers started planning more than before the pandemic period, as well as increasing virtual meetings with other milk producers and producers spent more time at home. The purchase of inputs from local producers, the volumes purchased, the concern with production costs, the level of savings, production volumes, as well as the prices paid for milk have not been changed.

## 5 CONCLUSIONS

This research aimed to present the production of organic milk in Galicia, Spain and analyze its viability as an alternative for sustainable development. According to the results obtained, the Galician Autonomous Community concentrates the largest organic milk production in Spain and the provinces of Lugo and A Coruña stand out in relation to production and the number of producing properties. The producers are all family farmers, certified, experienced, on average 15 years old, and have formal education, which are important elements for the success of the activity.

From the point of view of profitability, most producers infer that the activity is profitable, but could be higher if the product were more industrialized and added value. The added value could be through family rural agribusiness (ARF), this strategy in addition to increasing income would assist in the development of local culture and tradition. However, sometimes, even if profitability is not higher than that of conventional milk production, they prefer to remain in this activity because it allows quality of life and is regarded as a lifestyle, an ideal, given the social and environmental concerns it involves.

The contribution of the research is given for presenting a regional perspective, when one contemplates Galicia, which can serve as a motivation for the development of public policies for encouraging the growth of organic production in Brazil. It is believed that the proposed objective has been achieved and that the importance of this link in the organic milk production chain is evident, and that it is an alternative for sustainable development. As possible limitations, the sample must be non-probabilistic and the results may present some bias.

## THANKS

To the CNPq for the financial support for research by means of the Edital Universal.



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