



# FARMING & GREENHOUSE GAS EMISSION

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# 1. RESEARCH: UNDERSTANDING THE PROBLEM

## 1.1. FARMING ECOSYSTEM MAP

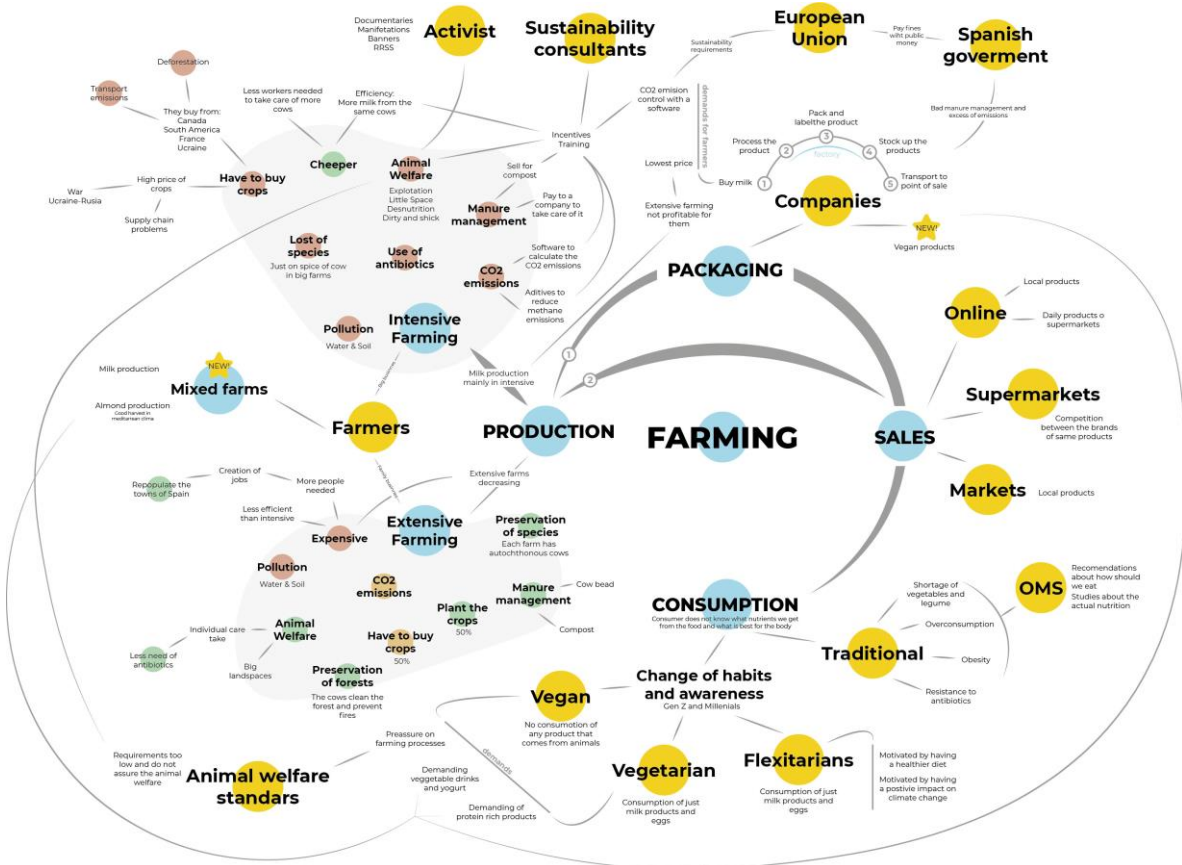


Figure 1: Farming Ecosystem map graph

Figure 1 graphs demonstrates all the various stakeholders in the farming and agriculture industry and how they are interconnected within one another. We will focus on the key stakeholders: Farmers, Producers, Packaging Companies, Consumers.

There are various kinds of farms such as intensive farms, extensive farms, and mixed farms. Intensive farming is maximizing the amount of output the farm can produce given the amount of space given - intensive farming comprises of both crop plants an animal. Extensive farming uses small inputs and labour - low productivity for raising sheep and cattle and high productivity with wheat and barley. Additionally, there are mixed farm which can sustain high productivity between growing crops and livestock.

The relationships between the stakeholders is also interesting. The pricing models are mainly driven by the corporations (producers) such as Danone - consumers accept the prices and are unaware of the margins or costs burdened on the farmers. Corporations generally are purchasing below the cost price of such good produced by farmers. This is not a fair approach and can have long term implication for the relationships between stakeholders if not addressed soon.

## 1.2. FARMING

### 1.2.1. Types of farming

The types of farming can be classified according to the conditions (extensive or intensive), type of livestock (sheep, cattle, pigs, goats, horses, rabbits, or poultry), and the size (small, medium, big, macro-farms)

The livestock sector is part of the primary sector of the economy. Together with agriculture, it forms the agricultural sector. It is one of the oldest economic activities and deals with animal husbandry. Depending on the geographical area and conditions, one type of livestock is more common than another.

- 1) **Types of farming according to the environment:** The classification of livestock farming according to the environment can be divided into three main types:
  - **Extensive livestock farming:** The livestock is raised in the open air, taking advantage of the surrounding environment. In other words, environmental resources are used for farming. Experts in the field believe that this is the type of livestock farming that produces the highest quality products.
  - **Intensive livestock farming:** Intensive livestock farming is also referred to as stalled livestock farming. This type of livestock farming takes advantage of cost reductions to be more competitive. Of course, it generally produces lower-quality products.
  - **Mixed livestock farming:** Depending on the literature source, this concept can also be found as semi-intensive, semi-extensive, or semi-stabled livestock farming. We refer to a mixed type of farming, This type of farming combines both environments and it tends to make them more stables getting the best out of both.
- 2) **Types of livestock farming according to livestock:** In the same way, we can also make another broad classification according to livestock. Farmers do not all have the same number of animals or the same size of livestock. There are farms that focus exclusively on sheep and others on pigs. Moreover, not all of them are exclusively dedicated to feed. We will get focus exclusively on cow farms
- 3) **Sizes: farms can have different sizes.**
  - Small: <100 animals
  - Medium: between 100 and 250 animals.
  - Big: more than 250 animals
  - Macro-farms: are normally extensive farms that have thousands of animals.

Source: <https://economipedia.com/definiciones/tipos-de-ganaderia.html>

### 1.2.2. Milk farms

The EU dairy sector is the second biggest agricultural sector in the EU, representing more than 12% of total agricultural output.

The main producers of cow milk are Germany, France, the United Kingdom, the Netherlands, Poland, Italy and Ireland, which together account for three quarters of total EU production. The dairy sector is predominantly organized in cooperatives, which hold a 55 % market share. These cooperatives can be as large as a world-leading multinational companies or as small as SMEs or micro-enterprises.

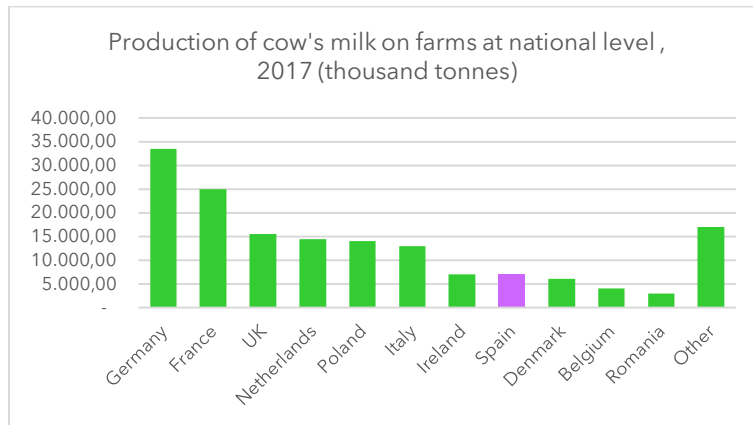


Figure 2: Milk production graph in Spain. Data Source: Eurostat

### 1.2.3. Evolution of the EU Dairy Sector

APRIL 1984

The CAP introduced milk quotas on all countries in the EU to limit the maximum amount of milk delivered to dairies and the number of direct sales on the farm.

2003

It was decided to phase it out by 2015, as the consumption of dairy products had increased considerably, especially on the world market, and EU farmers had to be able to respond to a demand that was expected to keep on growing. Steps were taken to prepare for a 'soft landing' for farmers: from April 2009, quotas were increased by 1 % a year over five years.

APRIL 2015

Milk quotas were abolished.

Source: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/630345/EPRS\\_BRI\(2018\)630345\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/630345/EPRS_BRI(2018)630345_EN.pdf)

### 1.2.4. Sustainability in farms

Nowadays, farming needs to be more sustainable. However, what does sustainability on a farm mean? When defining ecological farming, the words organic tend to appear repeatedly. However, when it comes to farming ecological farming is not the same as Organic farming.

#### ORGANIC

The word 'organic' is protected and can only describe products that carry the European organic trademark, the EKO trademark, or the Ecocert label.

Growing organically entails compliance with the following regulations:

- No use of chemical pesticides.
- No use of artificial fertiliser.
- No use of genetically modified seeds.
- Responsible use of energy and natural resources.

The EKO trademark is more demanding than the European organic trademark. The latter emphasizes environmental friendliness and animal welfare. The former also imposes energy use, packaging, social aspects, and fair trade requirements.

## ECOLOGICAL

On the other hand, ecological farming resembles organic farming but takes things further by considering the entire ecosystem, acting only in accordance with the natural life cycle. For instance, an ecological farmer will use compost originating from waste. Among the examples of measures taken by ecological farmers are:

- The minimization of waste production.
- The recycling of any waste produced (organic waste is placed on the compost pile).
- Planting vegetation around crops increases the welfare of bees, woodland birds, et cetera.

Source: <https://www.bacfertilizers.com/knowledge-centre/blog/3776-what-is-the-difference-between-organic-and-ecological-farming>

### 1.2.5. Insights on Previous Research in Sustainability

Sustainability in the farm has already been targeted by different European associations and companies such as the eio-agri (Agriculture & Innovation). They are targeting different focuses such as the Mixed farming systems, the Organic Farming optimization, protein crops, and the Sustainable High Nature Value farming, among others.

The main insights of the previous research in farming are that to achieve sustainability in the farming sector, collaboration with other parts of the food and non-food supply chain is necessary to develop effective, new, and creative solutions and business models, especially for radical eco-innovations. Moreover, long-term experiments and an appropriate research infrastructure need to be developed to meet the specific needs of ecological approaches in relation to -in particular- landscape levels and their evolution over long periods of time.

The best strategies to follow when building a solution for sustainability in farming are the following:

- Keep in mind that ONE SOLUTION DOES NOT FIT ALL. A poor land will be facing completely different problems than a richer one. The same goes with the size of the farm or its livestock of it.
- Try to make the best use of resources (energy, nutrients, land), so there is an efficient use of purchased inputs and the use of the natural resource as the soil and water, among others.
- Diversifying the crop in a large number of potential combinations of crops and livestock and their interaction with the pedoclimatic conditions. An example could be:
  - o notations both for sale and animal feeding sources while limiting external inputs recycling animal manure to fertilize crops
  - o alternative crop in the crop rotation
  - o potential combinations of crops and livestock, etc
- **Mixed Farms Systems (MFS)** are the ones that are more sustainable as they manage to find the stability between both types of Systems (extensive and intensive), taking the best part of each.

The major opportunities for the development of MFS in EU-countries are the ones shown in the following table:






Dimension of sustainability	Opportunities
<b>Environmental</b> 	Increase self-sufficiency in animal feeding through multiple use of local resources/ efficient use of nutrients
	Recouple nitrogen and carbon cycle through legumes/grasslands in arable rotations
	Improve soil quality through organic manure and crop diversification
<b>Economic</b> 	Added-value for local/sustainable quality branded products
	Valuing ecosystem services (landscape mosaic, PES...)
	Creating a market for a diversity of alternative crops
<b>Social</b> 	Promote rural development (diversified jobs; link farming, food, tourism)
	Social and knowledge exchange between farmers at the regional level

Table 1 major opportunities for the development of MFS in EU-countries

However, MFS also have some barriers in the EU. The main ones are the ones shown in the following table:




Dimension of sustainability	Barriers
<b>Environmental</b> 	Lack of knowledge on innovative use of local resources and managing alternative crops
	Lack of technical and economic references to make use of locally-adapted practices in combining livestock and crops
<b>Economic</b> 	Low short-term profitability at MFS farm level, low remuneration of labour in particular
	High cost and lack of logistics to transport and store feed and manure between farms
<b>Social</b> 	Labour organisation and skills to manage both crops and livestock
	Farmers' willingness to cooperate to establish direct exchanges of feed and manure
	"Vertical" organisation of advising and education (top-down knowledge transfer)

Table 2 Major barriers to the development of MFS in the EU

Source: [https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/factsheet-agri-research-ecological-approaches\\_en.pdf](https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/factsheet-agri-research-ecological-approaches_en.pdf)

## 1.3.PRODUCTION AND PACKAGING

### 1.3.1. Production

According to the study carried out by the Ministry of Agriculture, Fisheries and Food called Reference the document as: "STRUCTURE OF THE DAIRY BEEF SECTOR IN SPAIN AND IN THE UNIÓN EUROPEAN 2015-2018" The average number of dairy cattle farmers in 2018 was 15,032 troops, of which 14,860 (the 99% of the total) corresponds to ranchers with deliveries (146 of which also have sale directly) and 172 (barely 1%) with ranchers who. They only have direct sales. When comparing the data from 2018 with those of 2015 shows a decrease of 2,939 farmers (-16%).

The average number of farmers with deliveries during the year 2018 amounted to 14,860, while that in 2015 17,796 ranchers were registered with deliveries. With these data, between 2015 and 2018 produced a decrease of 2,936 ranchers, which represents a reduction of 17%. To facilitate analysis of the results, responding to regional and productive criteria (censuses, deliveries, etc.) have been established following groups, represented in Figure 3:



Figure 3: Graph that represents the average number of farmers in Spain

#### **GROUP 1: Local food production farming**

Represents the 85% of the milk farming (cows that eat grass or the production on the food is made locally. Generates the 68% of the milk production.

#### **GROUP 2: Mainly intensive farming**

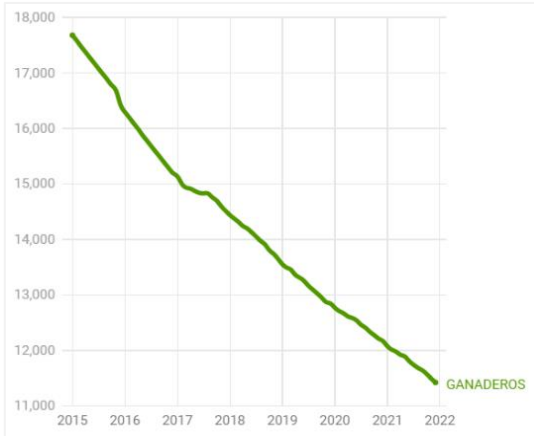
Represents the 10% of the milk farming (by food from the outside). Generates the 29% of the milk production.

#### **GROUP 3: Very low milk production**

On the other hand, according to AGAPROL Association of Milk Producers, losses per liter on Spanish farms already exceed 6.9 cents per liter while industries and distribution resist raising

purchase and sale prices. We are the sixth country in Europe where prices have grown the least since the crisis in raw materials broke out worldwide.

**NUMBER OF CATTLE FARMERS IN SPAIN**



**DIFFERENCE BETWEEN COST & PROFIT**

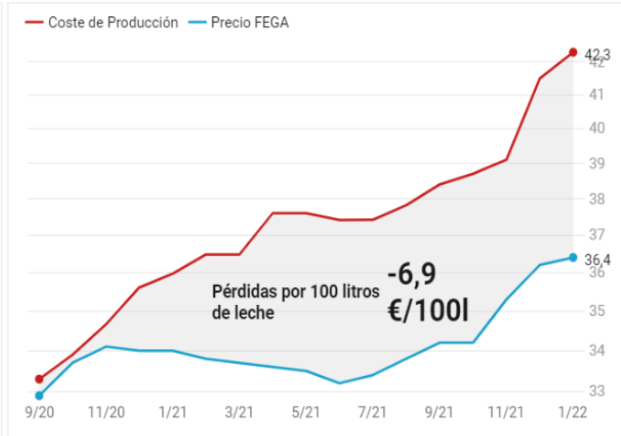


Figure 4: Graphs source: AGAPROL COMUNIACIÓN

**MILK PRICE COMPARISON: Europe 27, España UE, INLAC A2, FEGA & Estandarizado**

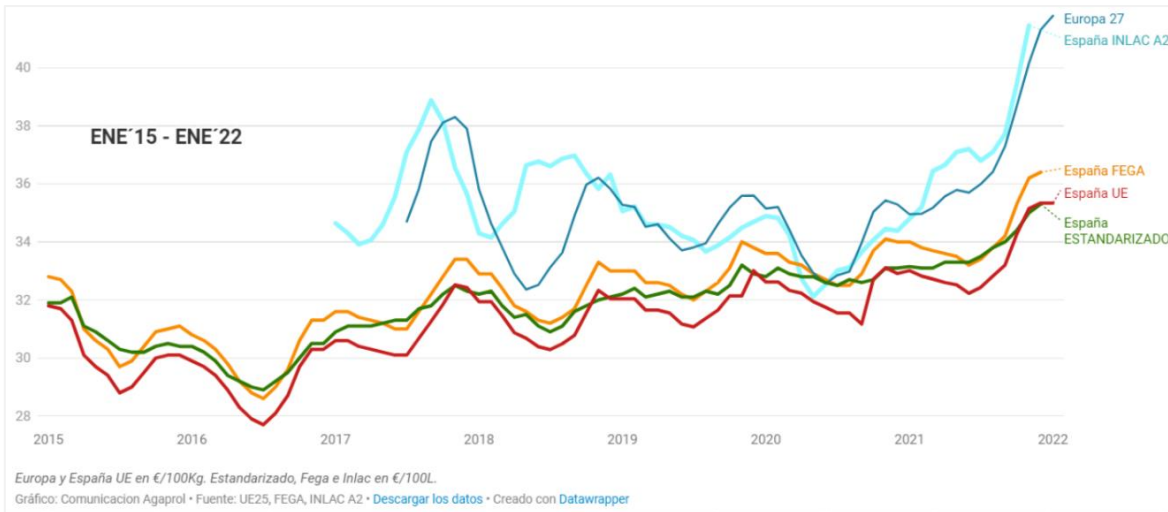


Figure 5 Graph source: Comunicación Agaprol, Fuente UE25, FEGA, INLAC A2

**1.3.2. Packaging**

**Yogurt** is a semi-solid fermented milk product. Most of the industrialized yogurt production uses cow's milk. Whole milk, partially skimmed milk, skim milk or cream may be used. Other yogurt ingredients may include some or all of the following: other dairy products (concentrated skim milk, nonfat dry milk, whey, lactose, these products are often used to increase the nonfat solids content), sweeteners (glucose or sucrose, high-intensity sweeteners e.g., aspartame), stabilizers (gelatin, carboxymethyl cellulose, locust bean Guar, alginates, carrageenan, whey protein concentrate), flavors and fruit preparations (including natural and artificial flavoring, color).



Figure 6: Different packages

**Danone** as transformer of this product, is wasted, with the negative consequences that this entails from the point of view of from a social, economic, and environmental point of view. Currently, in Spain each person throws away 77 kilos of food per year (9% dairy), of which 42% is generated in homes. In addition, food waste is responsible for 7% of global greenhouse gas emissions greenhouse. According to the European Commission, food labeling is responsible for 10% of all food wasted in the European Union, so differentiating between expiration date and preferred consumption is essential.

In addition, two years ago the European Union approved a directive that established the express prohibition of the marketing and sale of certain single-use plastics for the year 2021. The rule meant in practice a definitive goodbye for some common items, such as beverage cups, including their lids and plugs, as well as food containers intended for **immediate consumption** (such as takeaway food containers). But the community law left a maximum margin of two years for the member countries to adapt their legislation to the new regulations: what is known as 'transposition'. The measures will enter into force in **Spain on January 1, 2023**.

Also, the law introduces measures designed to reduce the use of other **non-compostable plastic** items not included in community regulations (such as **single-dose items**, plastic rings, and plastic fastening pieces) **for the sake of their next substitution for products of other materials**. From that date, the free distribution of non-reusable containers will be strictly prohibited, and a price must be charged for each of the plastic products delivered to the consumer, an environmental tax that must be reflected separately on the invoice.

**CÓMO CONVERTIR RESIDUO EN RECURSO**

De la mano de **Saica Natur** y junto a otros gestores especializados y de proximidad en el territorio español, aseguramos el **correcto reciclaje e inserción** de residuos como plástico, vidrio y cartón.

**SAICA**  
**>98% RESIDUOS VALORIZADOS**

Apostamos por una **economía circular** también en nuestro proceso de producción para que nuestros residuos no lleguen al vertedero y puedan volver a ser incorporados al mercado como **nuevos recursos**.

Todos los residuos son tratados en España y son reciclados o valorizados por gestores de proximidad.

Figure 7: Waste recycling process

## 1.4. DISTRIBUTION AND RETAIL

### 1.4.1. Dairy Market in EU

EU is the world's largest producer of cow milk followed by the United States and India. In 2021, the 27 countries of the European Union collectively produced about 145.7 million metric tons of cow milk. The export value of dairy product worldwide reached 55.75 billion U.S. dollars in 2020, up from 52 billion U.S. dollars in the previous year. The European Union also was the top exporter of dairy products.

Source: <https://www.statista.com/topics/3956/milk-market-in-europe/>

Dairy consumption continues to be high in the European Union, with milk consumption equaling 33 million tons in 2020.

**Global Dairy Top 20, 2021:** half of the top global dairy companies are from EU.

#	Company	Country of headquarters	Dairy turnover, 2020
1	Lactalis	France	€ 20,2+ billion
2	Nestlé	Switzerland	€ 18,2+ billion
3	Dairy Farmers of America	US	€ 16,6+ billion
4	Danone	France	€ 15,2+ billion
5	Yili	China	€ 12,1+ billion
6	Fonterra	New Zealand	€ 11,9 billion
7	Friesland Campina	Netherlands	€ 11,1 billion
8	Arla Foods	Denmark/ Sweden	€ 10,6 billion
9	Mengniu	China	€ 9,7+ billion
10	Saputo	Canada	€ 9,3 billion
11	Unilever	Netherlands/ UK	€ 5,8+ billion
12	DMK	Germany	€ 5,6 billion
13	Meiji	Japan	€ 5,2+ billion
14	Savencia	France	€ 5,2 billion
15	Kraft Heinz	US	€ 4,9 billion
16	Agropur	Canada	€ 4,9+ billion
17	Sodiaal	France	€ 4,8 billion
18	Gujarat Co-operative Milk M.F.	India	€ 4,6 billion
19	Schreiber Foods	US	€ 4,5 billion
20	Müller	Germany	€ 4,5 billion

Table 3 Global Dairy Top 20 Companies. Source: Rabobank 2021

Source: <https://www.dairyindustries.com/news/38102/lactalis-unseats-nestle-in-2021-global-dairy-top-20/>

### 1.4.2. Dairy Market in Spain

Household expenditure in dairy products  
**€5,8 bn**

Preferred type of milk in Spanish households  
**Semi-skimmed milk**

Dairy products share sales in supermarkets  
**60%**

Per capita skim milk consumption  
**17,93 liters**

Number of employees in dairy industry  
**28,239**

Spanish region with highest milk production  
**Galicia**

Source: <https://www.statista.com/topics/7966/dairy-market-in-spain/#dossierKeyfigures>



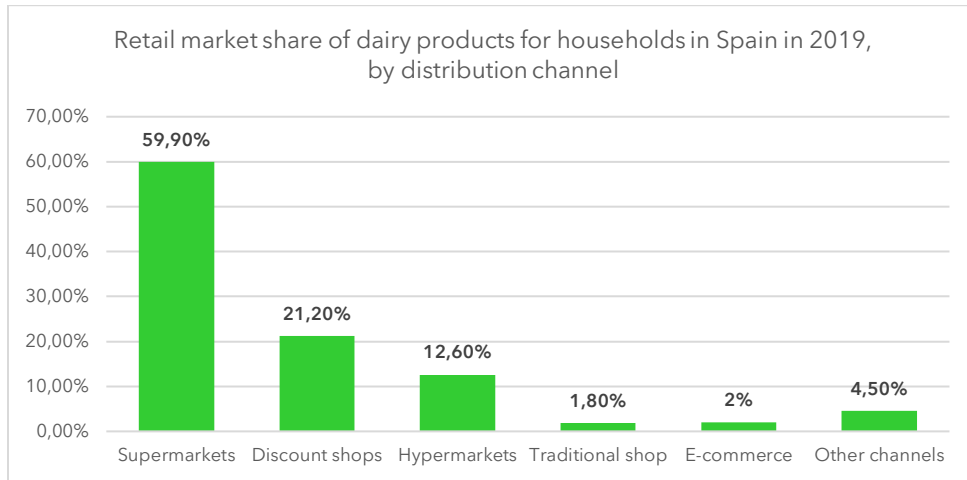


Figure 8: Retail Market Share Distribution

Source: <https://www.statista.com/statistics/744857/retail-sales-of-dairy-products-in-spain-by-distribution-channel/>

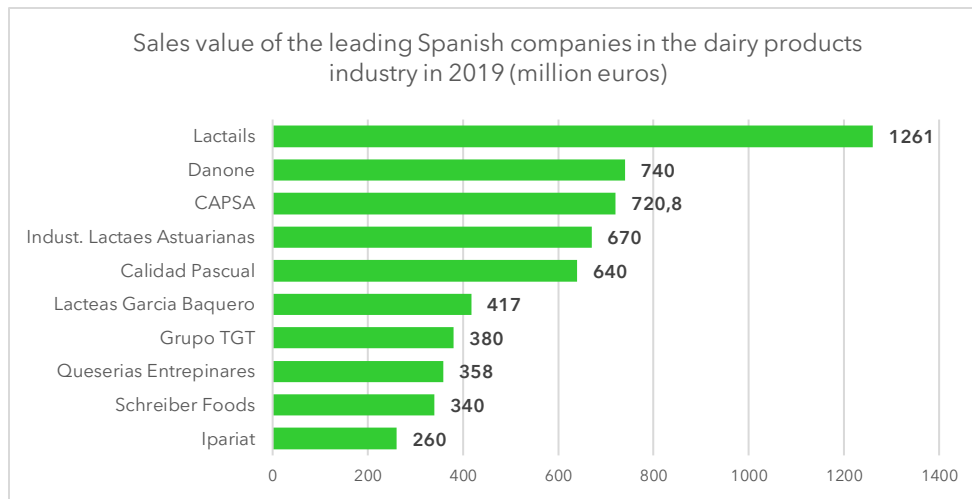


Figure 9: Leading Dairy Production Companies

Source: <https://www.statista.com/statistics/744857/retail-sales-of-dairy-products-in-spain-by-distribution-channel/>

### Yogurt Market in SPAIN

- Revenue in the Yogurt segment amounts to US\$1.39bn in 2022. The market is expected to grow annually by 2.15% (CAGR 2022-2027).
- In relation to total population figures, per person revenues of US\$29.80 are generated in 2022.
- In the Yogurt segment, volume is expected to amount to 469.3mkg by 2027. The Yogurt segment is expected to show a volume growth of 1.3% in 2023.
- The average volume per person in the Yogurt segment is expected to amount to 9.4kg in 2022.

## 1.5.CONSUMER

Milk is a product that people consume daily. From this food we get calcium and proteins that are both important nutrients for our body. In this section the evolution of milk consumption is going to be analyzed next to the reasons of different consumption tendencies that are growing in Spain.

### 1.5.1. Evolution of the consumption of milk in Spain

The consumption of milk in Spain it has been quite stable during these past years as it can be seen in the graphic bellow taken form the Food Consumption Report of Spain of 2020.

**Evolución anual de total compras (millones kg o l) por tipos**

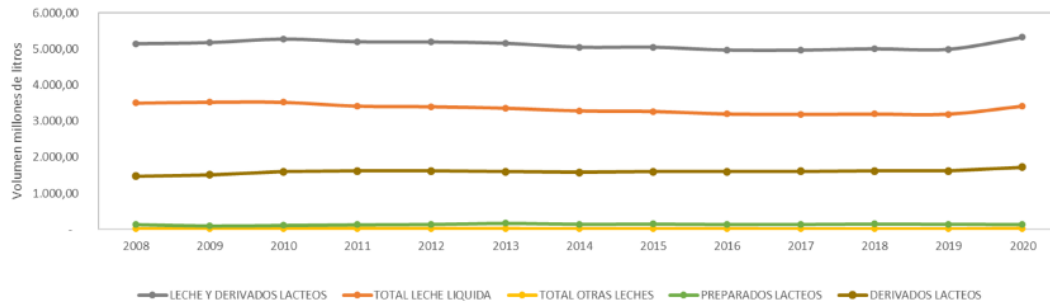


Figure 10: Annual evolution of the consumption

Source: [https://www.mapa.gob.es/ca/alimentacion/temas/consumo-tendencias/informe-anual-consumo-2020-v2-nov2021-baja-res\\_tcm34-562704.pdf](https://www.mapa.gob.es/ca/alimentacion/temas/consumo-tendencias/informe-anual-consumo-2020-v2-nov2021-baja-res_tcm34-562704.pdf)

Since 2010 consumption has suffered a slight decrease, but in 2020 there was a rise due to the lockdown caused by the Covid-19. In the months of March, April and May consumption was much higher than in the rest of the months. Therefore, apart from this exceptional situation, it can be said that the consumption of milk is slowly decreasing. This can be explained by the growth of vegetarian and vegan people in Spain.

According to the study The Green Revolution of 2019 carried out by Lanter we can see how is increasing the quantity of people in Spain that choose to change their diet in order to reduce or eliminate the animal's protein in their daily meals. The "veggie" diets have increase in a34% from 2019 till 2021. Also, there are 315.000 vegan people in Spain that do not consume milk that is a 60% more than in 2019.

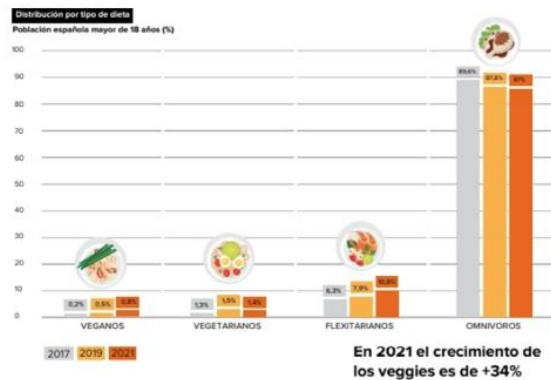


Figure 11: Vegetable consumption

Source: <https://www.lantern.es/papers/the-green-revolution-2019>

In the Figure 12, we can see the reasons why people decide to reduce their animal protein consumption. The main reason is to take care of their health, a lot of studies and experts are already saying that we overconsume meat and milk and in consequence that affects our health. Other reason why is the growth in concern of the animal care and environmental impact.

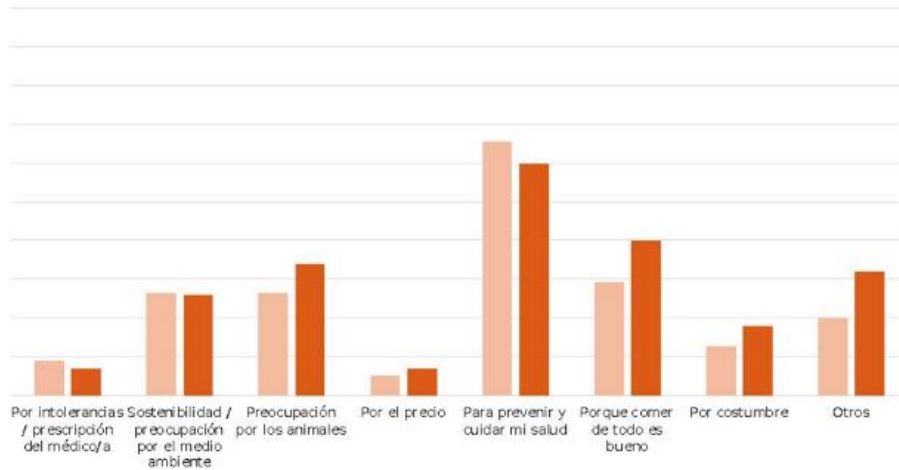


Figure 12: Reasons why people decide to reduce the animal protein consumption (in Spanish)  
 Source: <https://www.lantern.es/papers/the-green-revolution-2019>

### 1.5.2. Interview to a vegan person, Javier.

In order to understand better the reasons behind this trend and the opinion in farming of those users that have choose to stop consuming milk, we have interviewed a vegan person, Javier of 23 years old.

#### INTERVIEW

Since when are you vegan?

4 years

Why did you choose to stop eating animal proteins?

5 years ago, I went vegetarian due to sustainability reasons. Afterwards I watched a documental named Cowspiracy, and I friend of mine that was already vegan started to introduce me to animals' ethics. After talking with him and doing some research I took the decision to start the transition into veganism. This transition took me one year.

With which food do you replace the nutrients from meat and milk (protein and calcium)?

I get the vegetal protein form vegetables like lentils or chickpeas and cereals. Also, there

are tofu, seitan or soya that are rich in protein. Regarding the calcium I get it form vegetable drinks, almonds, broccoli, kale, or cauliflower.

¿Do you spend more time cooking now?

Before I was vegan, I didn't cook my own food, but I really don't spend much time cooking. During these years I have discover which recipes work best for me. There are a lot of them that are easy and if I don't have time in Barcelona there are already a lot of vegans take away restaurants or already cooked foods in the supermarket.

¿What is your opinion in intensive and extensive farming?

My opinion in intensive farming is not good because from the ethic point of view, the animals are in hard and bad conditions with lack of hygiene. This generates a lot of stress

in the cows among other consequences. Regarding the environmental impact they contaminate aquifers, they release a lot of CO2 and methane and they excessive use of water. They are turning the province into a theme park of macro farms.

Moving on to extensive farming, obviously is better than the intensive one regarding the environmental impact. Also, the living conditions of the animals and their life expectancy is better. The problem is that you need more land and water and considering the consumption that we have now a days is

impossible to produce all the milk in an extensive way.

Therefore, the solution is to reduce the consumption to eliminate the intensive farming and afterwards reduce the extensive farming.

Another difference between the two types of farming is that the intensive one is more automatic. Due to this the farms need less people to take care of more animals destroying jobs and thus emptying the towns. With extensive farming you can create better jobs.

### 1.5.3. Conclusions of consumption of milk in Spain.

Overall, it can be said that the consumption of milk in Spain is decreasing due to the growth of people's concern about their health, animal care and environment. The studies and activist have played an important role in providing information to the users about their consumption habits. In consequence, people have decided to change their diet reducing or eliminating the consumption of any animal protein.

## 1.6. GOVERNMENT, LEGAL, AND TRANSPORTATION

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### Government

Government: Catalonia exports to 200 countries with the largest trading partners being France, Germany, and Italy. Spain has deficit with China, Germany, and Netherlands. Fastest growth in surplus is from Australia and France. Beef exports keep growing with new trading focus on Algeria, Morocco, Canada, Indonesia. Demand for beef has decreased for restaurants and hotels given Covid.

### Legal

Market regulations are set by EU. Contracts are very short term between companies and retailers. Contracts between farmers and corporations such as Danone are renegotiated yearly.

### Transportation

The transportation sector causes majority of emissions at 29%. Agriculture causes second most mainly because of fertiliser use and manure management.

## 1.7. INTERVIEWS, SURVEY, AND INSIGHTS

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### 1.7.1. Interview with Danone

**What are you assessing when choosing a farm?**

Most of the farms that we worked with were chosen 20-25 years ago. In case we need to change a farm or choose a new one the main point that we consider is the proximity to our plants. This is because we have a collecting route to pick up the milk and we want it to be as efficient as possible. Other important points are animal welfare and CO2 emissions.

**Who decides the price of the raw material in your contracts?**

Price of milk = standard price + penalties depending on quality of animal welfare.

The price depends on many factors such as the price of supermarkets, milk owner, raw material for farming or butter. The prices of each sector are not steady, so the price changes monthly.

We have two types of contracts. The first one is the market price contracts that last for 1 year. Here we buy the milk from the farmer

according to the actual market. The second one is cost model price contract that lasts between 3 and 5 years. The farmers give us the production cost and we add the 10% profit for the farmer.

We have been having problems with the farmers because the price of milk has been increasing recently due to the current situation. The lack of supplies and the war in Ukraine (the main cereal exporter) are increasing the raw material price.

**How much of your farms are intensive and how much are sustainable? Do you work with mixed farms?**

Farming model in Spain is mainly intensive and that is the farming type that our farmers use. To ensure animal welfare we have an external certification called Welfare Quality Standards.



**Do you give any incentives or benefits to the farms for having sustainable practices? What do you define as sustainable? Which criteria do you use to define it?**

We give incentives based on an exam that goes from form 0-100 points. The average of our farms is 76. If they achieve to reduce the CO2 emissions, they earn money. This examen is carried out by using a collection data system where the farmers must introduce the data like number of cows, food quantity, electricity, or mangle of manure from the previous year.

We have a global goal that will be achieved with small goals. The average in Europe is 1.2-1.3 of kg of CO2 emitted per kg of milk produced. Our target is of 1 kg of CO2 emitted per kg of milk produced.

The best of our farms generates 0.8 kg of CO2 per kg of milk produced. These are some of the strategies to achieve it:

- Be as efficient as possible
- Feeding the cows without soya
- Managing the manure with compost
- Not having cows not doing anything

**Do you have training for farmers? How long is the training period? How do you plan the training?**

The training courses are mainly about the quality of milk. We have an agreement with veterinarians to help the workers by an external contract.

Also, last year we had three training sessions about animal welfare. They shared with them the knowledge about the space they need, heat stress... Regarding CO2 emissions, during last 2 years we had session with the university of Valencia. To achieve our targets an action plan has been developed by Danone. Each year we go through the document to update it.

**¿What about the new market of vegetable drinks?**

The market of vegetable drinks represents 15% of our company but is growing fast. The younger generations are the ones that consume more plant-based products. The production of almond works well in the Mediterranean cost in Spain and Italy. The production cost is about 2 euros and the sales are between 4,6 and 8 euros. It requires a different mindset because almonds are harvested in August or September, so the farmers just get paid at this time of the year. The first projects that we carried out on mixed farms that produce almonds and milk have worked well.

### 1.7.2. El Pinós visit - 01/03/2022

We decided to visit them to get a clearer view of the day-to-day life on a farm in Catalonia. El Pinós is a family-run cow farm located in the Osona region, half an hour from Vic. They have a medium-sized farm, between 150 and 200 cows.

After their visit, our priorities and vision of the problem changed utterly. We realized the complexity of being sustainable. Most importantly, they introduced us to a new and vital element in the equation that defines the sustainability problem on the farm: economic sustainability. Without it, there is no way to pursue environmental sustainability.



Figure 13: Pinós Location

#### THE INTERVIEW

**What kind of farm do you have (extensive, intensive, which animals, what do you produce)?**

We have cows around 160 of us want to go up to 180. We produce milk just to drink. Basically, we make milk and breeding (of cows). We are also selling to do cheese to some people in the area, but it is a tiny market.

We are neither fully extensive nor fully intensive. Cow breeding is done extensively. We have about 20 hectares for that. The milk is done intensively.

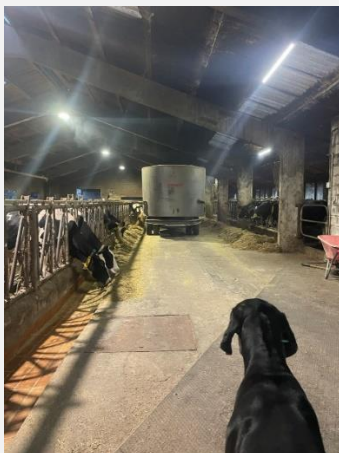


Figure 14 El pinós

**Why have you decided not to be an extensive farm and have an intensive milk production?**

We want to look for washing. We should let the cows graze for more than six months a year to be extensive. We are 1,000 meters above sea level, making it impossible to have the cows six months away.

In addition, many hectares are needed for extensive milk production, and it is impossible in this territory. There is some extended farming in Europe because of the favorable climate, and they spend less than six months inside. It is too hot here.

**How is the livestock/farm here in Catalonia? Which is the biggest farm?**

In Vic, 15% of livestock is in the cow sector. Extensive livestock farming is not financially profitable now.

The largest dairy farm is St. Josep Franja of Westeros. It has land of 4,800 cows. They have got 80, and I have got 80 people working.

**What does a cow eat? How much? Amount?**

We do a food formula to cover the liters of milk. We have grass, fermented grass put into deposits, dairy fermentation, straw, "ofals," cornmeal, soybean, wheat...

The cows are fed twice a day, but they eat all day. In total, every cow eats between 25kg-27kg of dry matter

**¿Do these products cultivate in Catalonia?**

Most products come from the French or the United States. What is produced in Spain is not enough. For the weather in Catalonia, it would be much more expensive to produce here.

**Do you have pastures for cultivation not to buy abroad?**

In our fields, we plant the herbs of birth, the deaf, and the grains to envy so that they eat the cows. 50% of what we need to feed, we plant it. The other 50% we need to buy it. We have 100 hectares of cultivation (between own and leased, half and a half). You must have enough hectares for the manure because they penalize you. The nitrates you can throw on the floor are 175 kg/hectare. If we pass, they could ask us to reduce the number of cows or pay the penalty. Then we also have 20 hectares for grazing.

**What are your expenses?**

We spend 30,000 liters of water every day. It then declassifies, etc., and chlorine hydroxide is treated. Most are for drinking. Each liter of milk is three liters of water per cow. Much is also used for cleaning. Our machines are cleaned by themselves every time a new cow enters. Then it also cleans the cow's mammals, etc. Water is treated for both. We give them the same water we use to clean up. Then all the energy we need (to feed animals and electricity etc.)

**¿What do you do with the waste?**

All the pork we produce, with dirty water, goes to create the tangle for the fields and jars. Here we consume all the manure and waste we produce.

Liquid goes to the field, and the excess of what we use to make animal beds.

**¿What does a farm need to be sustainable?**

Efficiency in the production, efficiency in handling animal WellCare, selling the product at a sustainable sale price, environmentally sustainable, ...

A farm needs to be efficient in selling a good product.

Efficient and innovativeness lead to be sustainable. It is closely tied to being efficient. A farmer cannot stay with old practices. It must be updated. Look for food of better quality. That is much work with the products.

Systems with robots to be more efficient and search for products from the field that have the qualities. An example is France. Half of the food is concentrated here in France because it has a great territorial base. That is why they should not be based so much on buying products because of their livestock farming. This is not very easy here, so it must be innovative and compensated on the other side.

For example, I am now researching a product that lasts in the 12-year field. You do not have to plant every year. His name is Selphie. It is a product q lasting 12 years, and two cuts can be made each year. The saving is that it gives the same q the barley and the maize as food, and now the maize is too expensive, and no farmer can plan it. If this plant works here, we should not import, and we could be more sustainable on that side. In addition, as it makes a flower-like sunflower, there is the

supplementary business of 150k honey per hectare for bees. Diversification that would serve to feed. Testing. It is a product coming from Canada and is being tested in Germany. It must be monitored for environmental protection here, which is why it is still in the process of being tested. Now, the tests that are still done are with manual extraction. Implementation goes to EUR 1500 per hectare and some 22.000 kilograms of dry matter per hectare.

#### **Selphie Advances:**

- It is proven that does not cause soil erosion.
- It needs less fertility, nitrates, etc.
- Consumer tool
- It's paid at the same price as the deaf but lasts longer.
- It does not need so much shelter.

#### **Is it possible to be sustainable now?**

There is no sustainable farm now. In the milk sector 0 because prices are below the production cost. Here the problem is that 90% of farms are mortgaged. If prices were covering the cost, the farms would be sustainable. Being efficient means being sustainable.

#### **Why do you have losses?**

Here, the production costs per liter of milk have risen due to feeding prices. The cereal has already risen in price. The maize is now 409 per ton. From 2020 to 2021, there has been a difference in the price of grain from .92.800 more on our farm. The market has increased costs. And now, with all this from Ukraine. We do not know what we are going to do.

Milk is bought at 310.-340 per ton of milk. Nevertheless, the costs are 410/420 after Ukraine. Commercialists do not pay us over the cost price. That causes losses. We lose 500€ per day.

In addition, how are production costs shown? We have never looked at Spain's statistics, which makes us go wrong. In Catalonia, a few years ago, he did the study so that he could prove what it cost us. We found that the production cost is €380 per ton of milk. In contrast, marketers pay 310 -340 p. per ton. The rest of Spain has not even looked at this! Moreover, now, we are even worse. Farms are moving to 420—the ton.

In addition, farmers do not have a strong voice. In Catalonia, the peasant population does not reach 2%. At the vote level, there is no strength. If we had the strength, we would have a counselor who would be worth it and take root in the situation. In Spain, the percentage rises somewhat. For example, in the North, there is more representation. Maybe there, they can press more and help us bounce back.

#### **How do you manage to put up with the situation?**

Most farms have folded. Two farms are folding every day in Spain. Ten years ago, there were 24.000 farmers in Spain, and there were 12.000. In Catalonia 10 years ago, there were 4.000 farmers. Today (if none of them have been together), there are 386.

That does not mean that we are making less milk, but it does! They were tiny farms, but they did their job. They set up people in the territory, creating generational relief. There is now an extinction crisis in the rural area as fieldwork is becoming increasingly unsustainable. Now only those who managed to save in recent years remain. Now you are pulling out of the savings.

**Do the corporations know that are paying below the cost price? What solutions are they putting?**

Now there is Danone and Pascual, who have farms that work for them. They pay a fixed salary to most workers, and Danone or Pascual carries everything. If you like, you know q they lose money. They do so because it is the only way to have fixed milk. Farmers now get more telling, but it's sad.

**What relationship do you have with cooperatives? What about the other farmers?**

Good! between farmers. We help each other. With milk factories and retail, the relationship is fatal. too. The Madrid Government created a law that says nothing can be sold below the cost, but they still do not offer to buy over it. This causes farmers to lose money.

**¿What solution do you see? What is being done about this?**

Having a fair selling price for us. We have now merged two cooperatives, **Plana de Vic and Vaqueros d'Osona**, to achieve a fair price for the milk. My son is the president of Osona cowboys. We want to promote fair trades.

Since the fusion, we have worked with Bonpreu and Escalate. Bonpreu and Escalate are just now pulling out a new milk line called Terra and Tast, which sells milk at 99 cents per liter, paying the 400 € per ton. With the war in Ukraine, prices have rocketed again, but we hope they will fall again later. At least it is a start. The price was agreed upon with farmers. Bonpreu and Esclat are opting for proximity products. They want to test if Terra and Tast were selling well and it has very well! Earth and Tast's blasts are empty. It gives the other milk producers cause to put their batteries on.

Why have they done so? For television media and so on, supermarket propaganda says that they offer farmers fair treatment. They have free propaganda.

We are also trying to get down to signing contracts. We used to sign at 320-330€ per ton. Nobody wants to sign now. I am glad because the other day, a farmer came to tell me he refused payment at 390€ per ton. It is still below the current cost price. The situation cannot be held up any longer. Let's see what happens. Because contracts are now closed, and new ones must be signed.

Attempts are also being made to reduce costs by investing in machines to be more efficient. Also, when a cow is eight days old, a little cartilage is removed from the ear, and the cow's DNA is looked at. This compares the best tea per liter, and it is to choose the bull to make your cow more efficient. Everything turns in economics. If we get a fair price and fewer animals. Day-to-day will be less expensive. Fewer animals mean less water, less food, less manure, etc. If we produce the same thing, but you need a cow and not three, better.

In Spain, it must be thought that 7 million liters of milk are produced, and they are not enough. Half of the milk consumed in Spain comes from outside. The thing is, outside the milk is more expensive. In Germany, it is 500. on the ton and in France it is 440. on the ton. Here they get much more money. So, if we refuse to sell below the cost price, if they do not want to pay us, they will have to spend more to buy outside. Prices must be balanced.

**¿ Who do you sell the milk to?**

Milk is sold to milk manufacturers: Pascual, ugly (chocolate). In fact, our farm comes out in the milk advertisement. Contracts vary



depending on needs. They are done year by year and must be reviewed two months earlier. With this on Terra and Tast, we are dealing directly with supermarkets. It is a more direct deal, and we save intermediaries.

#### Have you made any investments?

Yeah. We have invested in three milk machines. We invested a few years ago, and now we invested in two new ones. On both machines, we spent 350.000 more, and it was about EUR 180-200 millet per machine end. This without counting the reforms we had to make to adapt the farm to the new machines.

#### When do you think you will take the time to write down the machines?

We count for ten years, but we hope that it will be 15 years.

#### Why did you decide to invest?

We cannot stay the same. I need to modernize. Besides, right now, what we are producing and what we are being paid for each ton of milk do not cover the costs. We are currently losing EUR 500 a day. We have decided to invest to try to produce more and survive. Have more gains.

#### Why with milk machines and not others? Could you tell us how they work?

This type of milk machine has been in existence for 20 years. There are other machines. For example, accurate seeding machines, solar panels, etc. But you cannot do everything. Our goal right now is to stop losing losses. With milk machines, we can:

1. You can reduce the number of workers (this implies fewer wages at the end of the month). Apart, fewer, and fewer people want to work on the farm (normal as there are no gains), so if you do not

have enough workers, you produce less. Right now, we have got 180-200 cows, and there are only 3 of us (I, my son, and my grandson), and with the milk machines, it's more than enough.

2. You produce more milk. Before we had the machines, we milked each cow twice a day: morning and night. I did not give time for more. That does not mean the cow cannot give us more milk. It is like when a woman with her child. She gives her breast more than twice a day. You can milk every cow 3-4 times per day with the machines. We are now at an average of 40.5 liters/cow of milk per day, but we are still in a period of adaptation. We spend 43-44 liters/cow a day. We used to have more cows, but we had to lower the number because some were not suitable for robots. Now we have 160, but we want to go up to 180.
3. Animal welfare is increasing. They're queuing up, as you can see. When they want to go, they're going to breastmilk. The cow alone on the machine does not force the animal, so they're not stressed. Besides, it cleans the mummy before we milk it and massages them to remove the milk more easily and without harm.



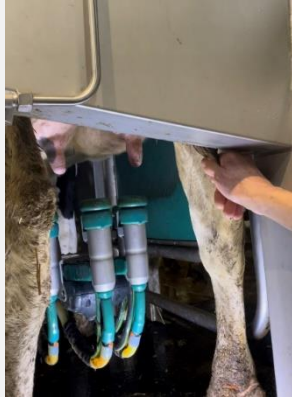


Figure 15 Cows doing a waiting line to use the machines and a picture of a cow getting cleaned.

4. Improve product quality. The machine itself makes the selection of the milk. Depending on the cow, some have some breast that does not have good milk. The machine analyzes this and separates good milk from bad. Badness is then also used for the tanning we use for the field.



Figure 16 Machine monitor showing how this cow has one breast that is not producing good milk.

5. Saver of future medicines. The machine can also see whether a cow produces or behaves rarely. So, you can treat her before she gets sick. Avoid giving her drugs. This is a saving because you avoid needing the veterinarian and buying medicines, but you also avoid giving the cow antibiotics. If animals that we eat, or consume products that come from them, consume antibiotics, humans immunize (this is also a problem today). So, this is still the best quality product.

6. The machine separates solids and liquids directly with a separator, solid compactor. A part of the hardware passes the liquid (good milk) over one side and everything else over another. It is then compacted and used to make the beds of the cows and ads through the field, which favors my ability by at least 20%.

For family farms, which help the survival of farms in the territory. These robot systems we have are dedicated to average farms of less than 200 cows per farm. Machines are about 5 min/cow. So, if you go over 60 cows per machine, you do not go over to make more liters because the cows come into competition, and you do not make more liters, but you spend more as each cow asks for food, water, etc.

#### ¿Do you have any help?

The Government says they will provide help, but for now, the Agronomist and Ramaders Delegation know nothing. The European Union gives different aids. We want to receive the new technology. They will give us 50% of the initial investment if they approve.

#### How do you handle this aid?

First, you must invest. Once you've made the reforms, you present in "Europe" as the token of what's cost you. So, if 'Europe' decides your proposal is valid, you're paid half of what you said it costs you investment.

For example, we have only put the price of machines. We have left out everything that reform itself has a cost: the patient, the electrician, etc. We've been afraid of being too ambitious and being left without that. If the budget presented is too high, they reject it. So if AproveEurope approves our aid, retornar70,000 will return us, which is half the cost of the machine.

That means you have had to make the total investment first, right?

Yeah. We had to borrow. Moreover, we hope that "Europe" will give us the help and that the situation will improve to pay for it and continue the business. In the end, we want to survive. We choose to be able to produce more by spending less and trying to make a

profit or reduce or eliminate losses, even if it is. Everything depends on whether we receive the aid.

**How long will you get the help?**

We hope in a year. That means one and a half years after the initial investment. It is a slow process.

### 1.7.3. Salt Cal Rei farm visit



They are in the region of Osona, ten minutes from **VIC (Barcelona)**, specifically in Sta. Eugenia de Berga. They have guided tours with no age limit, or type of public, they are adapted in each case, to offer a more personalized and careful activity. Guided tours last between 1:30 to 2h.

#### INTERVIEW

**¿How have they feed the cows?**

In the farm they harvest their own crops, mainly hay, but it is not enough so they have to buy some part outside. Then, they mix the hay with other supplementary aliments to provide minerals to the animals. For the harvest they need heavy machinery, but currently they don't have the resources to invest in the maintenance and renewal, making their daily work more difficult and insecure.



Figure 17: Cal Rei cows

**¿How they manage the manure?**

They have different practices to reuse manure waste. On one side they use it to generate compost by oxygenation. They move it constantly until it dries. Also, they use it as beds for the cows inside the stables. On the other side, the liquids are conducted through a series of pipes that transport it to a lagoon. The lagoon is emptied every year and a percentage of it is reused for crops.



Figure 18: Cal Rei manure

¿How is the milk extracted?

The milk extraction is automatic. Each cow gives to the machine 40L of milk per day during 4 processes that are carried out during the day. This process lasts between 12-18 minutes. While the milk is being extracted the machine analyses the health of the cow and predicts any diseases like mastitis. Thanks to this the farmers can prevent the disease before happening avoiding like that the use of antibiotics.



Figure 19: Cal Rei milk extraction

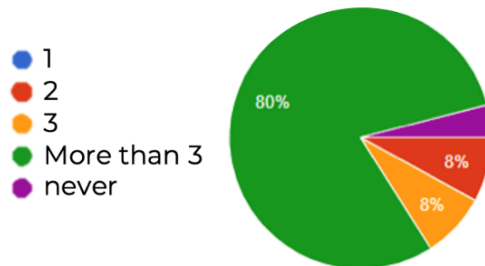
¿What is the current situation of the farms?

The farm is struggling to maintain itself. The big companies have been buying the milk under production cost during the past years. In consequence the farmers have been surviving thanks to their saving, but they cannot invest in sustainable practices. Also, as another source of incomes they are giving tours for small children that want to know about the process.

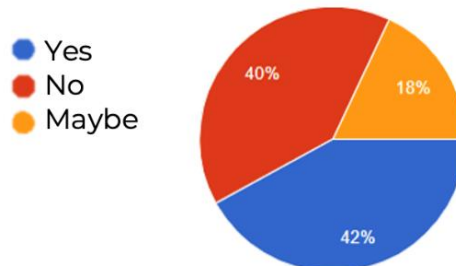
1.7.4. Consumer survey.

To get to know our consumer better we did a survey where we found four interesting insights.

- 80% of the people consume more than three times per week any dairy product.

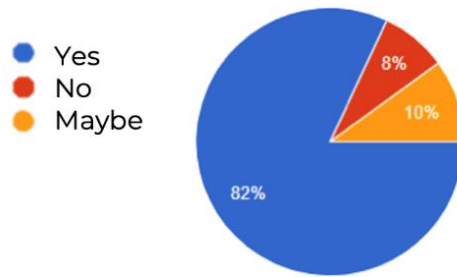


- 58% of the people do not know about or are not sure about the social and environmental impact of dairy product consumption.

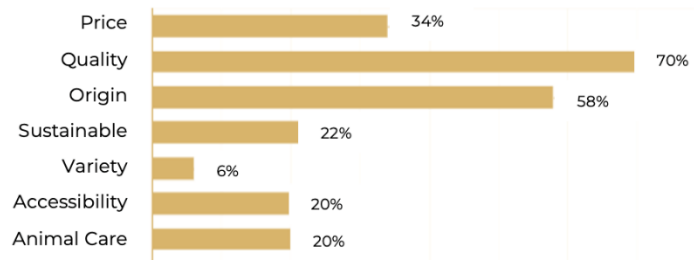




3. 82% would consider changing to a more sustainable and environmentally friendly brand



4. The main characteristics that influence the purchase decision are quality (70%), origin (58%), price (34%) and sustainability (22%).



### 1.8. ICEBERG MODEL

The model basically seeks to discover the root causes of events by looking at levels that are usually hidden because we abstract from them. This is what the name "Iceberg Model" refers to, many times the causes and reasons for the problems are hidden in plain sight, which is why they simply go unnoticed no matter how big they are.

This model is a tool that seeks to change perspective in the face of a given situation; as we delve into it, we will discover deeper levels (and that are often not obvious) about the causes that generated the specific problem or occasion.

In the project the iceberg cause levels are:

- **Events:**

*What is happening right now?*

- More demand for meat, resulting in an increase of cattle sizes
- Pollution of water and ground
- Over-use of land, crops for feed cattle instead for humans
- Cattle (greenhouse gas) animal is methane
- 90% of family farms have disappear

- **Patterns:**

*What has been happening over time?*

*What are the trends?*

- Consumption of substitutes (protein and calcium)
- Introduction of new technologies
- Zero waste and 0 Km
- People seek to have a lower environmental impact
- People want a transformation in their consumption model
- Healthy, nutritious and conscious food



• **Structures:**

*What is influencing these patterns?*

*Where are the connections between patterns?*

- Lack of bargaining power with industry
- The farmer is delivered under the conditions of the industry
- Disconnected links in the food chain
- Producers should make use of advisory tools

• **Mental models:**

*What values, beliefs, or assumptions shape the system?*

- Demand high quality milk for a low price
- There is animal abuse obtaining milk
- Milk consumption is good up to a certain point for health

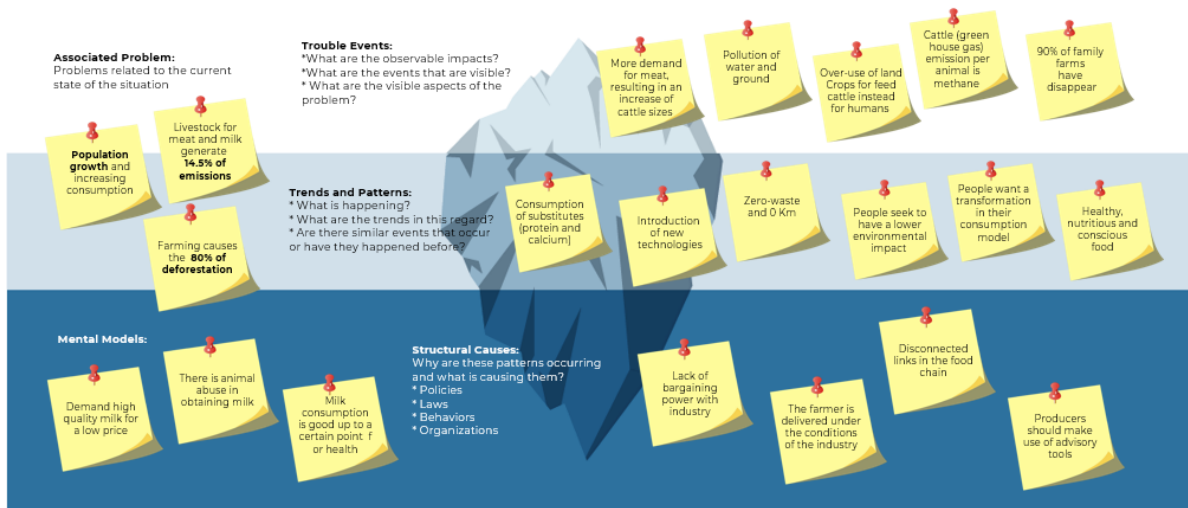


Figure 20: Iceberg Model

### 1.9. FUTURE CONE

In order to understand and visualize better the problem, its context and plan into our solution, we used the future cone tool to explore potential future scenarios. This tool not only allowed us to envisage the different possible outcomes, but it also helped us to challenge our current assumptions about the situation.

We set out a range of 3 scenarios, categorizing them into idealistic, desired, and pessimistic (what will happen if nothing changes). By considering current trends that are likely to happen in the future, we defined the activities which would need to happen and change to make the scenarios possible. Then we organized the activities by prioritizing which ones needed to happen first for the others to follow.

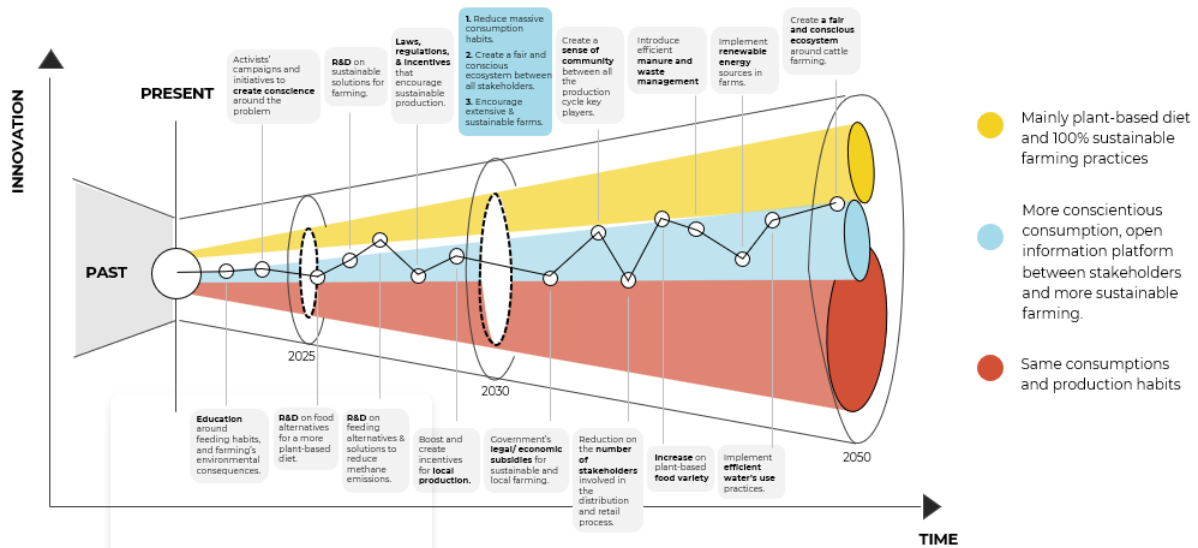


Figure 21: The Future Cone

As our main goals, we identified first the need to reduce massive consumption habits, second the need to create a fair, open, and conscious ecosystem between all the stakeholders, and third to encourage extensive and sustainable practices in farms. From this we concluded that the main obstacle to reach our desired scenario would be to raise funds for covering all the activities (R&D, and implementation of new sustainable practices) and create incentives for companies to become part of this initiative and support the change.

Source: <https://medium.com/building-the-agile-business/possible-futures-1e91eecdcb08>

## 1.10. 1WWWWH QUESTIONS AND ANSWERS

### WHO?

#### WHO HAS THE PROBLEM?

Small and big cattle farmers  
Corporations/ Dairy products sellers

#### WHO HAVE AN INTEREST IN FINDING THE SOLUTION?

Small, big, and sustainable cattle farmers  
Local Governments

#### WHO ARE THE STAKEHOLDERS?

Farmers, Consumers, Markets,  
Corporations, Distributors, Government institutions.

### WHAT?

#### WHAT IS THE PROBLEM?

Lack of good communication and information transfer between the main stakeholders. Farmers have a disadvantageous position to negotiate, making it hard for them to invest in sustainable practices.

#### WHAT HAS BEEN DONE TO SOLVE IT?

- Adding value to the product
- Farming cooperatives.
- New distribution channels

### WHERE?

#### WHERE IS THE PROBLEM?

Global issue. We are going to focus on Spain, specifically in farms that want to adapt sustainable practices.

#### WHERE IS A POSSIBLE SOLUTION?

Farms with sustainable practices.  
Markets with local products.  
Corporations willing to make a change.  
Places where the land can be apt for cattle.

### WHEN?

#### WHEN DID THE PROBLEM OCCUR?

- 1986-2014, Dairy Production in the EU had a set of boundaries on what and how much to produce.
- 2015, the law was revoked + north European countries started producing more. = Increased PRICING competition.

#### WHEN SHOULD IT BE SOLVED?

As soon as possible.

### WHERE?

#### WHY IS IT A PROBLEM?

There is no incentive for farmers to implement sustainable practices. Hence, dairy products will continue to be produced under intensive, environmental harming conditions and greenhouse gas emissions will not be reduced.

#### WHY IS THERE NO SOLUTION?

There is no open communication between farmers and corporations. Consumers are not aware of the consequences for asking low prices in the supermarkets.

### WHEN?

#### HOW DID THE PROBLEM COME ABOUT?

Low price of dairy products in Spain.  
Consequence: Reduction of farms in the country, and no leverage to invest.  
+ taxes for environmental licenses.  
+ INLAC setting market prices compared to other countries.  
+ industry regulations and complex structure.

#### HOW DID THE STAKEHOLDERS TRY TO SOLVE THE PROBLEM?

Farmers: cooperatives and law/ policy regulations.  
Governments: subsidies.

## 2. CONCEPTUAL DEVELOPMENT: FINDING A SOLUTION

### 2.1. Description of The Problem

Over the last few years, farmers have not gotten the opportunity for a fair deal with big companies when selling their products (selling below-cost prices). Therefore, farmers lack of capital to invest on sustainable practices and some to even sustain their business without going to bankruptcy.

- **Farmers** do **not** have a **strong enough voice** to promote the change they need, neither to transmit to the final consumer the problem.
- **Companies are not willing to pay more** for the product, (no incentive + supermarket prices)
- **Laws** already regulate that companies cannot pay under cost, but they still do.
- **Consumers** are not aware of what is happening.

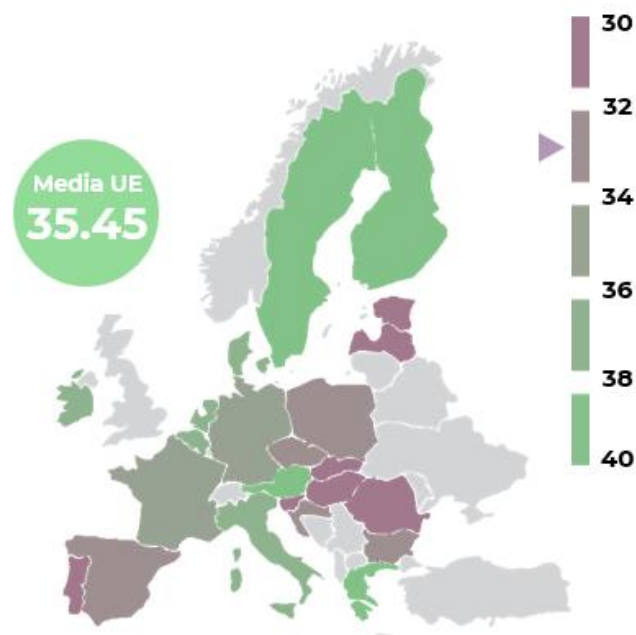


Figure 22: Selling price of the milk around Europe (in cents)

### 2.2. Ideation Process: Tools and Learnings

The ideation process was quite complex given that each member comes from a different discipline. However, the thought process of design thinking and system thinking allowed us to be more structured and organized. Design thinking allowed us to become creative and system thinking allowed us to refine our identified problems into structured and progressive ideas.

For example, we understand that there was not a concrete understanding by consumers on the product lifecycle of a dairy product. Therefore, we believed educating the consumers from an early age through educational programs would make the consumers more conscious about their decisions. However, this solution was missing the link to the root of the problem. We understood the systemic issue but did not emphasize with the root cause which was farmers being upset with lack of funding. This is where we had to become more empathetic and leverage more design thinking.

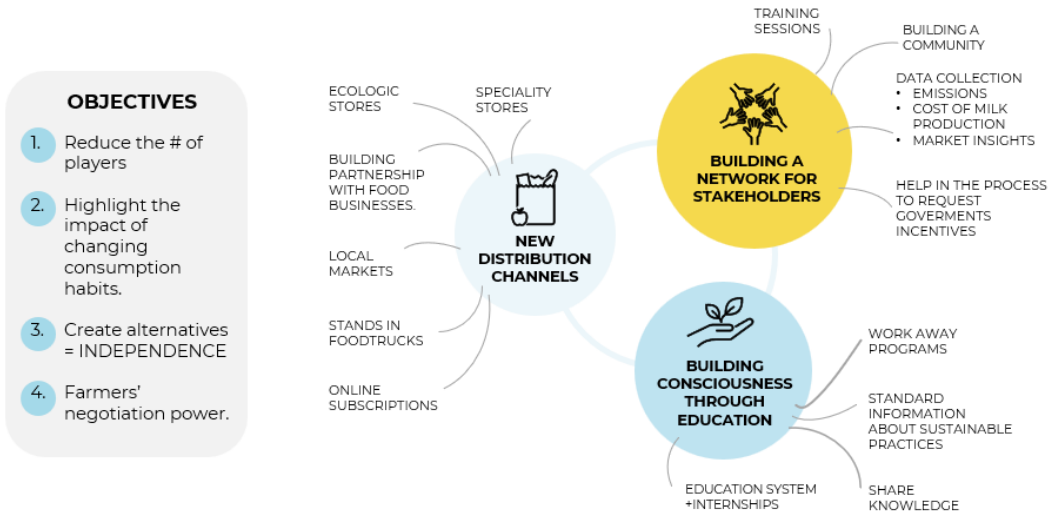


Figure 23: Objectives

Several ways we conducted design thinking methods were through brainstorming sessions.

### 2.3. Ideas before the Chosen One

Figure 24 shows a sample brainstorming session on how we evaluated ideas:



Figure 24: Brainstorming on how we evaluated ideas

#### 2.3.1. Idea 1 - Best Sustainable Practices

This is an online platform giving access to all stakeholders on the same information. The platform is an educational tool which can guide consumers on best consumption habits and to educate corporations, farmers, and governments on what sustainability really means. Not only is it a platform for knowledge but also for networking and community building.

- **Pros:** This platform educates all stakeholders which then pressurizes organisation to make change. Allows all stakeholders to be on the same page - giving them transparent information
- **Cons:** This solution is time consuming and costly. Many resources required to contribute knowledge.



**PROS**

- + Creates **awareness** around the problem.
- + **Calls out** companies, pressuring them directly.
- + Generates **standardized information and goals** for farms that want to become sustainable.

**CONS**

- Sustainable practices are not defined.
- Takes **resources and time** to get all the info and to update it constantly.

**IMPACT LEVEL**

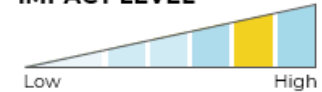


Figure 25: Idea 1 summary

**2.3.2. Idea 2 - Education Programs**

This is a reform of the educational system within Spain. We can start shifting the mentality of future leaders by educating them while they are young. This means exposing children and pre-teens to farms and understanding of healthy and sustainable decision making. Second, would incorporating sustainability best practices within every subject such business and art classes. Lastly, creating cross-disciplinary programs such as CBI giving practical experience between students of different disciplines.

- **Pros:** Educating future leaders at an early age. Preparing our youth for the future.
- **Cons:** This is a very long-term plan and ignores that action needs to happen now in order to create immediate impact.



**PROS**

- + Developing aware and creative leaders
- + Enhancing common sustainability knowledge across the country

**CONS**

- Costly. The material, professionals and their transport need to be paid
- Is difficult to align the schedule of the professionals and schools and it's time consuming

**IMPACT LEVEL**

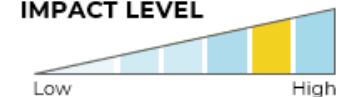


Figure 26: Idea 2 sumamry



### 2.3.3. Idea 3 - Milk Route



**PROS**

- + Encourages/put pressure on the corporations to **buy in a fairtrade way** from the farmers.
- + **Raises recognition** of those businesses that promote fair trade.
- + Creates a network of enterprises with fair and sustainable values for the whole community.

**CONS**

- Takes resources and time to get all the info and to update it constantly.
- It is a long-term solution and farmers are in a critical situation.

**IMPACT LEVEL**



Figure 27: Idea 3 summary explanation

The Milk Route is a network and platform that provides visibility on where the dairy products are sourced. Consumers gain awareness on which restaurants practice best sustainable practices, which products are sustainable.

- **Pros:** Creating awareness on sustainable products and giving easy guide to consumers on where to consume.
- **Cons:** To develop such a platform would require extensive amount of primary research - both cost and time.

### 2.3.4. Idea 4 - Local Market



**EXISTING MARKETS WHERE WE SETTLE**



**PROS**

- + Close the gap between farmers and consumers
- + Selling and marketing of dairy products
- + Setting fair **prices in a transparent and dignified way** or their quality work.

**CONS**

- Resale of other products brands not allow to be part of the municipal markets
- Number of places available to farmers in the fairs

**IMPACT LEVEL**

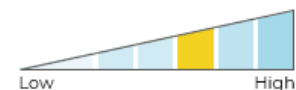


Figure 28: Idea 4 summary explanation

This is promoting consumption of local products and participating in trade fairs to promote sustainable locally sourced products.

- **Pros:** Allowing consumers to have direct access to farmer products and fair prices.
- **Cons:** May be difficult to scale awareness.

### 3. FINAL SOLUTION

#### 3.1. How we get to our final solution

We had the problem defined, but the solutions we were coming up with did not reach the impact we were expecting. Therefore, we decided to do a step back and rethink our solution. At that point, the only clear thing in our minds was the problem definition. We proceeded by asking ourselves these three questions and set the main objectives of our future solution:

##### 1. Who do we want to help?

- Directly the farmers and indirectly the environment

##### 2. How do we want to help/impact?

- We want to help farmers sustain their business; hence we need them to be economically profitable to cover their cost and invest in more efficient processes.

##### 3. What do they need?

- Here we were able to identify six main points that, without addressing them, no solution would work 100%. These are the following:
  - To sell above the production cost
  - The urgency for a solution, because they have been in this situation for a long time, and farmers are reducing their number.
  - The possibility to reject contract with corporations that do not meet with the minimum to payment.
  - Increase their strength and empower them. Spread the word and create awareness.
  - More accessible financing to invest and invest in the branch.
  - Farmers are farmers. They don't want to stop being farmers.

We started brainstorming possible action plans that could have a repercussion in these points. In the following table, we describe our design thinking process and the different possibilities we came up with.

#### OUR BRAINSTORMING

Target point: **a.**

- **Legal measures:**  
They already exist, but they are overruled when milk purchasing contracts are made. Moreover, we don't have enough power as students (yet) to change the legislation + it will take a long time.
- **Revalue the milk product.**  
Supermarkets sell milk at meager to attract consumers. Moreover, there is big competition between brands. Another critical point is that the final consumer doesn't know what is going on, so why would they pay more?

Target points: **b., c. and d.**

- **Offer them a new channel to sell in a Fairtrade mode.**  
Farmers need to start having profits immediately. Offering another channel would help them become less dependent on corporations that are not offering fair contracts. However, this leads to a more expensive final product. Returning to our questioning again, why would the final consumer pay more? We would need a massive marketing campaign that transmit the values. Maybe we could start targeting consumers who are already being conscious about similar environmental problems?

- **Educate society**

We need to spread awareness to the final consumer to know the impact of their consumption habits. However, this takes time. So, we need to create awareness but not only get focus on that.

Target point: **e.**

- **Create a new funding program**

An idea could be to ask corporations to give loans to their farmers with no interest to help them with their profits. They could access it before doing the inversion to afford innovative measures.

Target point: **f.**

- Not offer farmers a new "activity" that can coexist with the one they do now  
Some of the farms surviving in the current conditions are doing it thanks to other companies. For example, touristic visits, or teaching at schools.

Taking all this into consideration we end up with the following:

**What if we could create a fair-trade channel for farmers and provide them instant funding for sustainable practices?**

### 3.2.Final Solution Brief

Our solution is a system that allows profits from corporations to be re-invested back into farms. This re-investment will be utilized for farms to improve their best sustainable practices. The entire system emphasises on sustainable practices. The catalyst for our system solution is our physical product "IUGO". "IUGO" is a sustainably sourced yoghurt brand with reusable material for consumers. Additionally, the "IUGO" packaging is transparent on communication the distribution of profitability and the sustainability purpose. We will explain further in the solution.

Initially the advantage of such a system is that it allows farmers to have an additional source of funding and implement best practices. Corporations can boost their image by onboarding such a product as "IUGO". The disadvantage is to be consistent with sustainable practices throughout the entire lifecycle.



Figure 29: Iugo slogan

### 3.3. Solution Description

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#### 3.3.1. Systemic Solution Map

Our proposal is a Systemic Solution to reevaluate the entire value chain and give back to farmers.

Our solution consists of different parts. First step to ensure sustainability in the entire process (economically and environmentally) will start with buying the raw material over the production cost, so they can have profits and continue their business. After asking the farmers, we decided to set a purchase price of €400 per ton of milk.

The dairy producer corporation would produce the final product. Our product and all the values related with it will be sold in markets that are already introducing sustainable products and practices and are committed to local and quality products. Thus, with more environmentally conscious consumers and local consumption.

An essential part of our systemic solution is also based on educating and raising consumer awareness and being as sustainable as possible. Therefore, we decided to introduce reusable packaging in our solution. We will put returning packaging points in the same markets we are selling the product. In this way, we make the consumer feel part of the solution and become aware of the problem. We want to create a product with as much transparency as possible, and we want to transmit this transparency to the consumer. Therefore, the yogurt packaging will show the values and principles of our product. We are making it clear to the consumer why it is necessary to be part of our solution. Then, a cleaning factory will collect and clean the packages, to after

reincorporating them to the production process again.

With this first part of our systematic solution, we will be creating a parallel channel where the farmer will be able to sell his raw material (milk) in a fair-trade. In addition, we will create consumer awareness, giving farmers a voice and helping them make the change. Consumers don't know there is a problem, hence the moment they realize that the price of milk is not sustainable, they will start asking for the change; pressuring big brands to offer fair-trade products. Thus, revaluing dairy products. As we have already said, the market is very competitive. Therefore, the best way to create change within the market is to enter it and mobilize consumers to demand a different product from the one they are now buying (unsustainable).

Then, with the profits, we will sustain the new production process (reusable packaging + consumer incentives to return it) and create a Loan Program to back up the farmers getting instant funds to invest for sustainability practices and gaining bargaining power to ask for future EU loans. These farms will sign a contract with the corporation to provide them raw material for at least 10 years. Unlike current subsidies, we want to provide farmers the loan from minute zero.

By paying the farmers enough money to maintain the business and helping them invest in sustainability, we will create the necessary change to achieve an economically and environmentally sustainable agricultural sector.

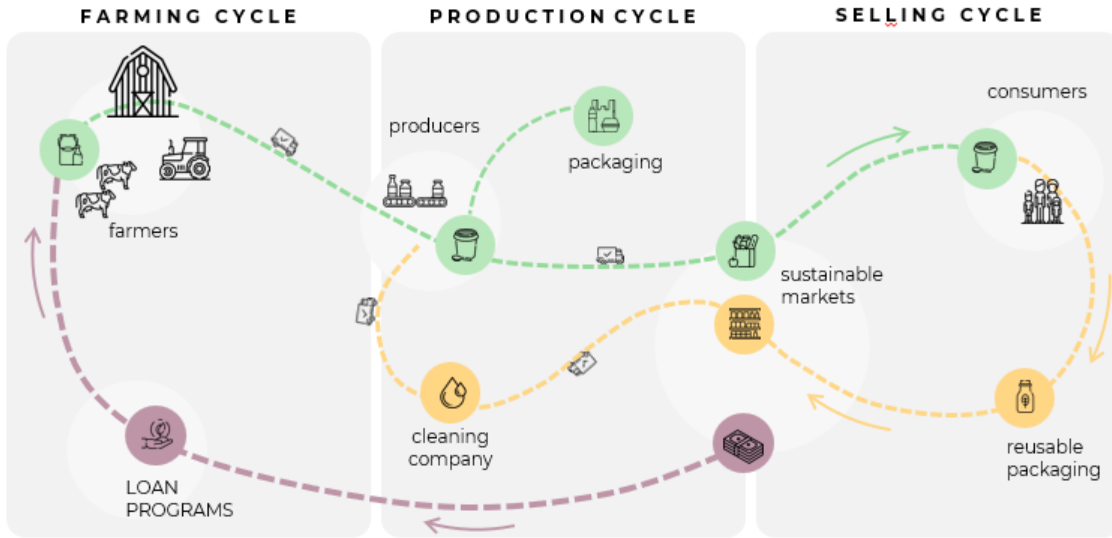


Figure 30: Systematic solution representation

### 3.3.2. Objectives and Impact (Short, Medium, Long - term)

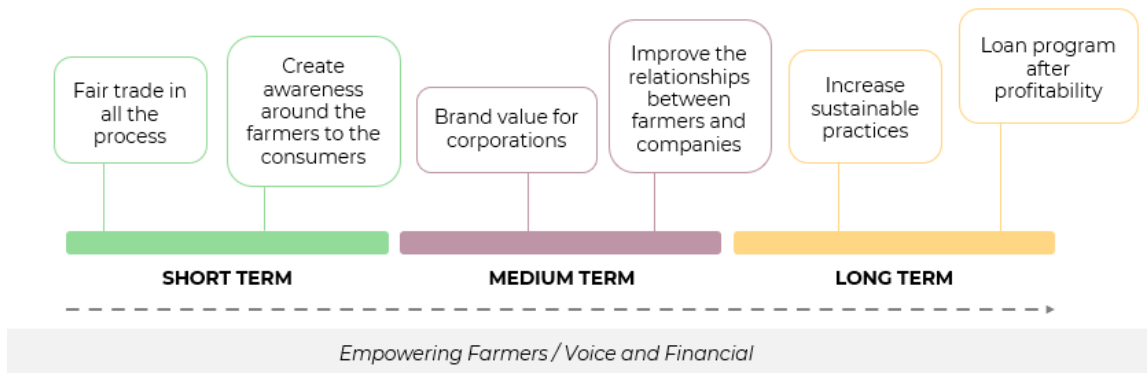


Figure 31: Impact time line

Based on the question we identified some key objectives broken down by a general timeframe.

- In the **short term**, we will focus on (1) creating awareness to consumers about the farmer's problem and (2) establishing a fair trading process
- In the **middle term**, focus will be on (1) enhancing relationships between all stakeholders, and (2) increasing brand value for corporations
- In the **long term**, there will be more emphasis on the (1) loan programs and (2) increasing sustainable practices

The key values for our solution revolve around empowerment which stems into ethics, quality, community, and transparency.

### 3.3.3. Product and Design Elements

The returnable yogurt packaging allows to preserve the product in good condition till it arrives to the consumer and makes the logistic more efficient thanks to its shape. It is composed of three elements: **the lid, the base, and the label.**



Figure 32: Iugo packaging

It is made by Polypropylene molding injection. This material has been selected for several reasons. First, it is a very versatile material that is frequently used for the fabrication of returnable packaging. This is due to its high durability during use, resistance to high and low temperatures and its compatibility with the food. Moreover, the PP can be recycled correctly up to six times if it is done correctly. As we are going to put a lot of containers on the market, it is very important for us to take care of the broken or damage packaging because we do not want them to finish incinerated or worse in the landscape or oceans. Therefore, once we have enough packaging that needs to be recycled, because they have reached 150 uses or are broken, we are going to take them to a recycling company to make new containers from that material. We cannot recycle them in the current recycling system because once they get mixed with other plastics that can contain toxic substances in the plants the material cannot be used for food packaging. Also, only 0.9% of the PP that reaches the plants is recycled.

Apart from the PP we also have a silicon ring on the lip to ensure a hermetic seal. This is a material that cannot be recycled but it does not deteriorate. Therefore, before recycling the packaging, we must remove this part and later put it back in a new packaging made from the recycled PP.

Moving on to the shape, the bottle has been designed to be stackable. Thanks to the shape on the top and on the bottom of the cup the packaging can be placed on top of each other, and they are less likely to fall. Also, once the packaging is used, and the consumer returns it to the supermarket, the bases and the taps can be stacked (Figure 33), taking up less space in the truck that picks them up.





Figure 33: Iguo packaging

Finally, we have the layer (Figure 34). Its shape is very simple but allows the consumer to remove it easily once the yogurt is finished. By pulling in the indicated area the layer rips off thanks to the cuts made by a die. The layer is made by FSC paper. Each flavor has its own color, purple, green and orange, so the consumer can identify it quickly. On the front we have the brand name and slogan and the type of flavor. On the sides we have important information that we want to transmit to the user. On the right there is a graphic that represents the percentage its sector takes from the yogurt to achieve the transparency we are looking for. Each section has a different texture that generates the feeling of quality. On the left side we have three seals that explain that the packaging is returnable, fair trade and local. Finally in the center of the label is our slogan **'Si no tens res a amargar mostra-ho tot'** 'If You Have Nothing to Bitter Show All'



Figure 34: Iguo Layer

### 3.3.4. Loan Programs

The loan program is a key aspect of the systematic solution. It is the result of components of the profit re-invested into the farms for best sustainable practices.

Right now, one of the best ways for farmers to invest in sustainability is from the European Union. The problem with this aid is that it arrives approximately 1.5 years after the investment, and asks the farmer to first make the investment, and then present a budget proposal with what it has cost them to invest. With this, although the EU pays them 50% of the total costs of the budget if they accept the proposal, it means that the farmers must make a very high initial investment with no guarantee of receiving the EU subsidy.

What we want to achieve with our loan program is to help local farmers with small to medium sized farms to receive instant funds to make the investments they need. Farmers who are linked to our brand will therefore be able to apply for its access, in exchange for a loyalty contract of 10 years minimum providing the company.

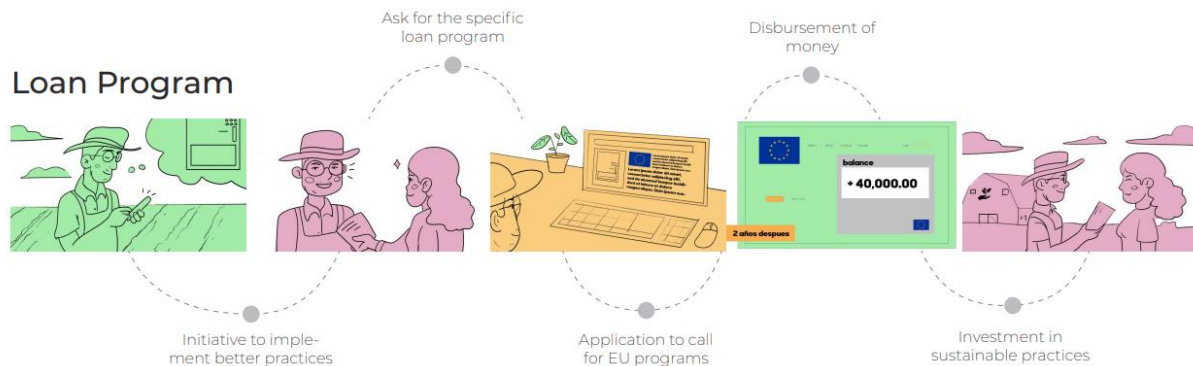


Figure 35: The Loan program representation

This program will work as follows: instead of telling the farmer to give us a budget, we will have our own investment programs with a precalculated budget. The farmer will be able to choose the one that suits them best and then the loan period will start. In the first year we will give the farmer all the money that we have calculated the cost of the machines with the renovations involved. We will advise the farmer to apply for European subsidy and after 2 years the farmer will have been able to recover a part of the money with the European subsidy.

It is important to make it clear that the aim of this program is to help farmers to get funding. Therefore, our loan program will be interest free. After 10 years, where we calculate that the investment is already making a profit, the money must be paid back, so we can help other people to invest if necessary.

Our programs will be the following ones:



Each program will have a specific equipment, specific rules, requirements, impact measures and budget planed, and the corporation’s foundation or social initiative would oversee managing it. Farms must apply to each of the programs and go through a Due Diligence process in order to get accepted and become part of the program. For Instance, our challenge sponsor DANONE has a program called Social Innovation Funds, where throughout 3 different foundations it distributes +200M € to invested in projects that have social, environmental and/or health impact, while strengthening its ecosystem. Our proposal is to raise more money through IUGO’s sales and allocate a part of it into this fund to pay the loans to finance the sustainability programs.

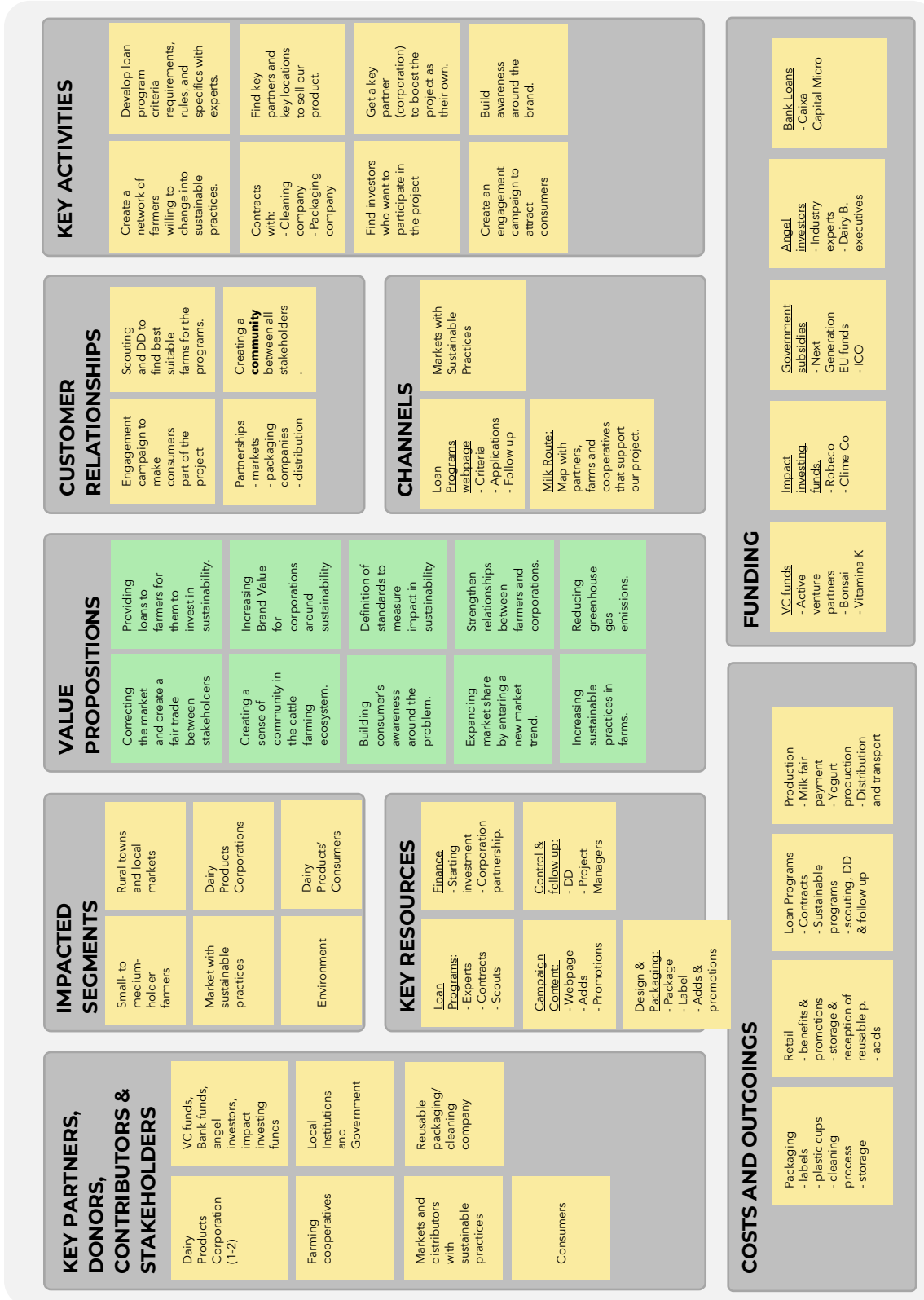


Figure 36.5: Danone’s Social Innovation Funds Foundations

We want to give more financial leverage and negotiation power to farmers, thus, by becoming part of the corporation’s loan program, it indirectly provides them with a banking guarantor and credibility when applying to other funds. The loans will have a repayment period of 10 years and will charge a minimum interest of inflation.

### 3.4. Business Model

#### 3.4.1. Impact Model Canvas



### 3.4.2. Description of the model

Our solution’s **value proposition** lies in the fact that we are adding value to the entire value chain of a commoditized product (yogurt) and benefiting from its generated profits to provide the small and medium farmers in Spain a fair payment + instant funding available to invest in sustainability programs.

Initially we need to sell the idea and establish a **partnership with a dairy producer corporation** that wants to become part of the change and is interested in launching our brand “IUGO” as part of its SBUs portfolio. This company would oversee managing the product’s strategy, production, sales, and distribution. In order to know if our solution was financially feasible, we decided to make DANONE, our challenge sponsor, our hypothetical partner and apply our business model and calculations considering its corporation characteristics.

Next, we will present our business model’s key activities: (See Financial Statements Section for financial calculations (page 47))

**A.** A Key aspect of our solution is the Loan Program for farmers. In order to make it feasible, our proposal is to include it in DANONE’S social innovative funds, specifically to become part of DANONE’S Ecosystem Fund (size +200M€). The fund will oversee performing Due Diligence, selecting, and signing contracts with the farmers. After that they will provide them with the instant fund to invest specifically in our program’s equipment.

- A **Basic Loan Program** to boost Rural Economy includes 2 machines that make milking process faster and efficient, reducing costs and increasing quality. This equipment has a cost of 175K€ each + 70k€ for the construction and accommodation of the farm infrastructure. In total the investment needed for one farm is 420k €.
- As a Pilot we are planning to target the 0,05% of farms in Spain (68), translating into a total investment of 28M€.
- If we consider Yogurt Market Size in Spain (1,4B€), in order to cover our investment, we would need to gain 2,04% of the entire market share, which is completely doable.

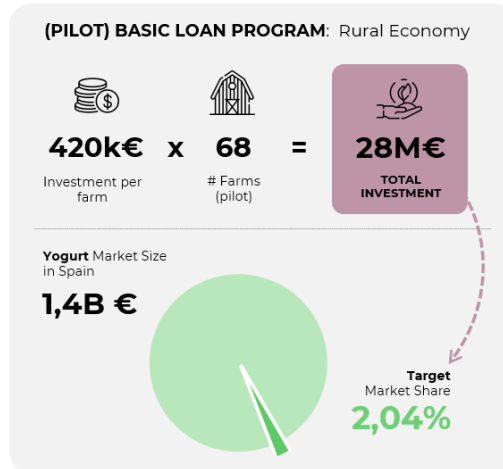


Figure 37: Basic Loan Program

- The 15% of our product sale will be directed to increase DANONE’S Ecosystem fund.
- The Loans will be repaid in a period of 10 years with a low interest to cover the inflation.

**B.** We would need to strengthen and use the **corporation’s partnerships with supermarkets and specialty stores** that are already reinforcing sustainable principles; those selected stores would be IUGO’s selling channel.

- To ensure customer engagement, we will increase the retail’s margin to 25% to cover storage costs and finance a points system card, that gives promotions and benefits to the people that purchase IUGO and return its reusable package back to the store.

**C.** We selected **DANONE’s natural ecologic 4pack 125g yogurt**, that costs 2,19€ in Ametllier, as the base to calculate **IUGO’s sustainable 500g yogurt** new pricing proposal. We increased the price by **0,51€**; from which **+0,02€** will cover the fair payment to the farmers (0,40€/ liter), **+0,09€** will cover the new sustainable packaging system + the retail benefits/ points, and **0,40€** will go to the corporation’s social innovation fund that will be in charge of IUGO’s loan programs that aim to increase sustainable practices in farms.

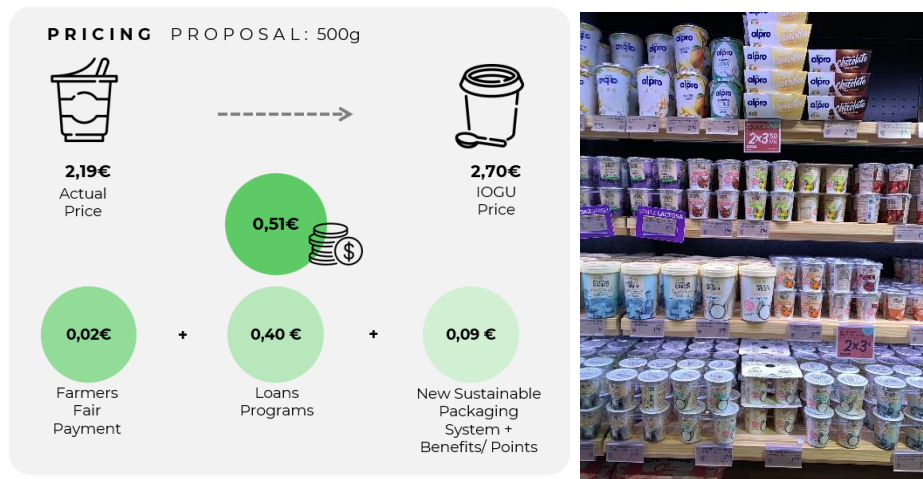


Figure 38: Pricing proposal

To calculate the cost of our product we considered the following expenses:

- A biodegradable plastic cup can cost from 2 to 3 times more than a basic white disposable plastic. Hence, we calculate our Polypropylene cup to cost 3x more than the one used + a cleaning fee of 0,08€/cup.
- As mentioned above 1 Polypropylene cup can be used 150 times; considering not all the cups will be returned and some will be damaged we calculated our costs by considering 50% of its lifetime.
- DANONE’s margin in 2021 for their EDP line (Essential Dairy and Plant-Based Products) is 9,10%. The new product will bring the corporation a 10% margin over the cost of production.



## Financial Statements

### (PILOT) BASIC LOAN PROGRAM

#### BASIC PROGRAM FOR FARMS (200 Cows)

1	Equipment	350.000,00 €
	Equipment lifetime	10 years
2	Farm remodelation (20%)	70.000,00 €
<b>3</b>	<b>Total Investment/ Farm</b>	<b>420.000,00 €</b>
4	Total farms in Spain	13.582
5	Target farms	68
<b>6</b>	<b>Total Investment</b>	<b>28.522.200 €</b>
	Yogurt Market Size Spain	1.400.000.000,00 €
<b>7</b>	<b>Target Market Share</b>	<b>2,04%</b>

Figure 39: Basic Loan Program

#### PRICING PROPOSAL

1	Cost of raw material	0,18 €	8%	1	Cost of raw material	0,20 €	7%
	Size	500 g			Size	500 g	
	Milk needed	0,50 l			Milk needed	0,50 l	
	Price/ liter	0,36 €			New Price/ liter	0,40 €	
2	Cost of production + packaging + distribution	1,25 €	57%	2	Cost of production + packaging + distribution + cleaning	1,16 €	43%
3	Danones Margin	0,14 €	7%	3	Danone Margin	0,15 €	6%
	EDP margin 2021	9,10%			Product margin	10%	
<b>4</b>	<b>Total Production Cost (1+2+3)</b>	<b>1,58 €</b>		<b>4</b>	<b>Total Production Cost (1+2+3)</b>	<b>1,51 €</b>	
5	Cost of retail	0,39 €	18%	5	Cost of retail	0,57 €	21%
	Retail margin	20%			Retail margin + promotions	25%	
6	VAT (10%)	0,22 €	10%	6	VAT (10%)	0,22 €	8%
				<b>7</b>	<b>Loan Programs</b>	<b>0,40 €</b>	15%
<b>PRICE (4+5+6)</b>				<b>PRICE (4+5+6+7)</b>			
<b>DANONE Natural- Ecologic Yogurt 500g</b> 2,19 € 100%				<b>DANONE New Sustainable Yogurt 500g</b> 2,70 € 100%			

<b>NEW PACKAGING COST</b>	
Plastic package cost	€ 0,54
Uses (50%)	75
Total cost 1 use	€ 0,007
Cleaning	€ 0,08
<b>Cost of packaging</b>	<b>€ 0,087</b>

<b>PRICE BENCHMARK</b>	
Low tier	2,59 €
Top tier	3,03 €

Figure 40: Final pricing proposal

### 3.4.3. Impact Map

With our solution we are adding financial, social, and environmental value. We are creating a sense of community between all stakeholders; hence every single participant is benefiting from it.

#### Financially

The **company** that decides to become our partner and owner of the product will not only benefit from selling a product with a high margin and from expanding its market share, but also will benefit because by taking part of a more conscious path towards sustainability it will build brand value. As Danone followed the probiotic yogurt trend with its brand ACTIVIA, or as it entered the vegan yogurt market with ALPRO, the partner company will venture into a new market “the sustainable yogurt market”, expanding its business scope.

#### Socially

This new market trend will start the change towards a production process characterized by fair trade and awareness. With the fair trade, **companies and farmers** will be able to sustain their business in the long term and strengthen their relationships. With the awareness, **farmers** will gain more bargaining power and thus local and rural economy will grow. To build awareness, we want our product to be as transparent as possible when communicating and informing consumers; transparency builds brand loyalty and strengthens the relations between **consumers and corporations**. In addition, it also makes consumer aware of the problem, building more responsible and conscious consumer habits.

### Environmentally

By introducing a fair trade in the value chain and launching the loan programs, **farmers** will first improve their financial position, and second be able to invest in sustainable practices. Consequently, the increase in the number of farms that implement sustainable practices translates in the reduction of greenhouse gas emissions, fighting climate change and contributing for a healthier and cleaner **environment**.

The loan programs will set standards of what farmers can do to implement sustainability; it will give them better tools to measure the impact of each initiative and serve as an example to other farms that want to join the change.

## 3.4.4. Marketing and Positioning Campaign

### Benchmarking

To generate positioning of our product and transparency in communication with our consumer, we have found an initiative that has served as a reference for us in the implementation of our market strategies. The person in charge of "WHO IS THE BOSS" initiative in Spain, Annaïck Locquenoux is a French woman who has been living here three decades and who has promoted a collaborative brand in which producers, processors, distributors and, above all, Consumers participate actively and transparently. The model is already working successfully in France and is currently being developed by a good part of the countries of the old continent.

She mentions that, *the best way to know what **we consume is to be able to decide on these criteria** and for that you don't have to be an agronomist. I would like to have a Spanish milk, a milk that remunerates the farmer at a fair price, because if the farmer can live with dignity from his work, he will give you a quality product. It is not a charity, it is something that allows us to realize as consumers that the farmer does not cover his production costs.*

*The producers are very excited and meet these criteria; a Spanish milk, with a fair remuneration at the end, is a very transparent product in terms of price. **Because I don't know many products in Spain on which you can know where our money is going, but in this one, yes.** You choose a product with a series of criteria and the farmer, for his part, gets involved and gives you a product with criteria such as animal welfare, in which, of course, he believes and also defends himself in a real way. It is not just animal welfare in words but as for example a scratching post for the cows or a fan or having the farm well ventilated during the summer when it is very hot.*



Figure 3941: Project Quien es el Jefe

**CAMPAIGN**

As we have seen, there are projects that make this situation visible and bet their structure and business model in favor of vindicating the work of the farmer. In the case of our product, we have created an advertising campaign called **"Cuida millor, viu millor"** because we see the importance of generating collective well-being, if you take care of your decisions locally, your future impacts will be rewarded in having a better life for yourself and others. The base of meetings and territorial networks demonstrate a clear objective in expanding these links and including more and more of the population in them, strongly related to the closest communities to favor **local consumption**. This search to build economic relations based on the common good and cooperation suppose a way of (re)building community, it is the social and physical networks that characterize this new wave of the **economy of experience**, where the food subject is no longer isolated but in interaction with others who belong to the community that is articulated around the company and its products, it is **co-creator** of the significant experiences that arise from these links.



Furthermore, the step by step of the user experience is described through our proposal and how through the system you can understand the operation of each stage, this in order to encourage participation in this new initiative and concludes in a win-win for the actors of the proposal:

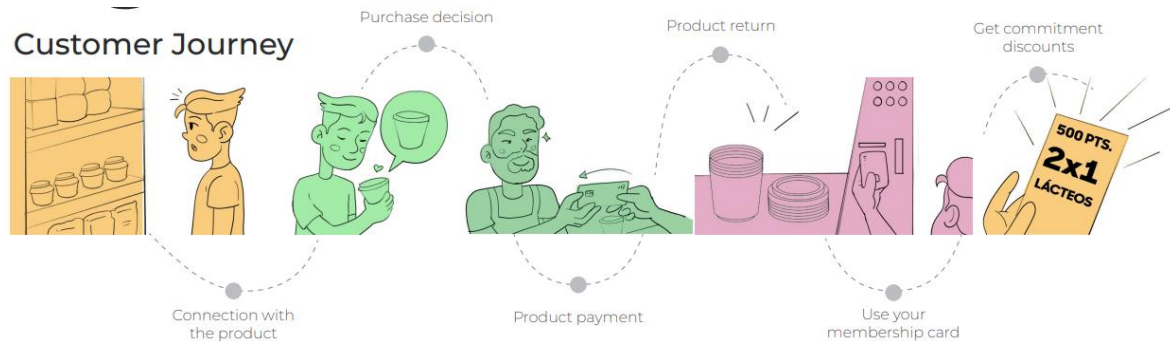


Figure 4042: Customer Journey Representation

1. The buyer enters the store and sees the product on a shelf
2. He reads the content, likes the initiative and decides to buy it. The buyer have to see clearly the graph below that is the one that represents how much of the price of the product each part is carried. It is very important that we be transparent in terms of information.
3. The person buy it and they register your purchase on your membership card, you get points. After a while, return the container to the supermarket. Leave it in a box swipe your membership card through the machine to return it.
4. With the points you have earned, you are given promotions. a ticket with points and some supermarket promotion such as 2x1 on products dairy products. 43

# 4. APPENDIX

## 4.1. Process Information Compilation

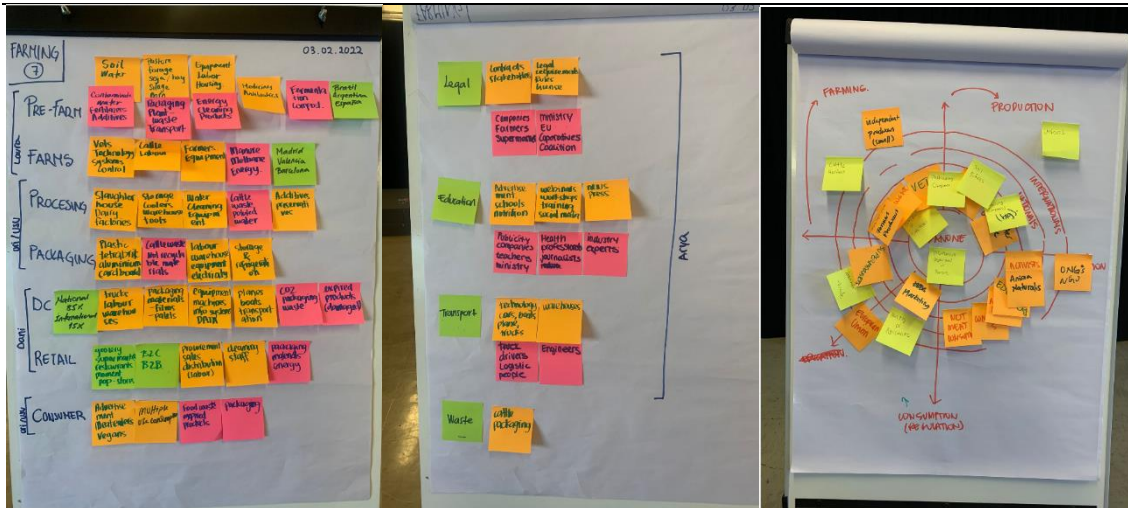


Figure 44: Photos of our process

CONCEPT	POSSIBLE SOLUTION
PLANT BASE DIET	
OVERPRODUCTION	
LAND USE	
ALTERNATIVE USES	



## 4.2. Impact Canvas

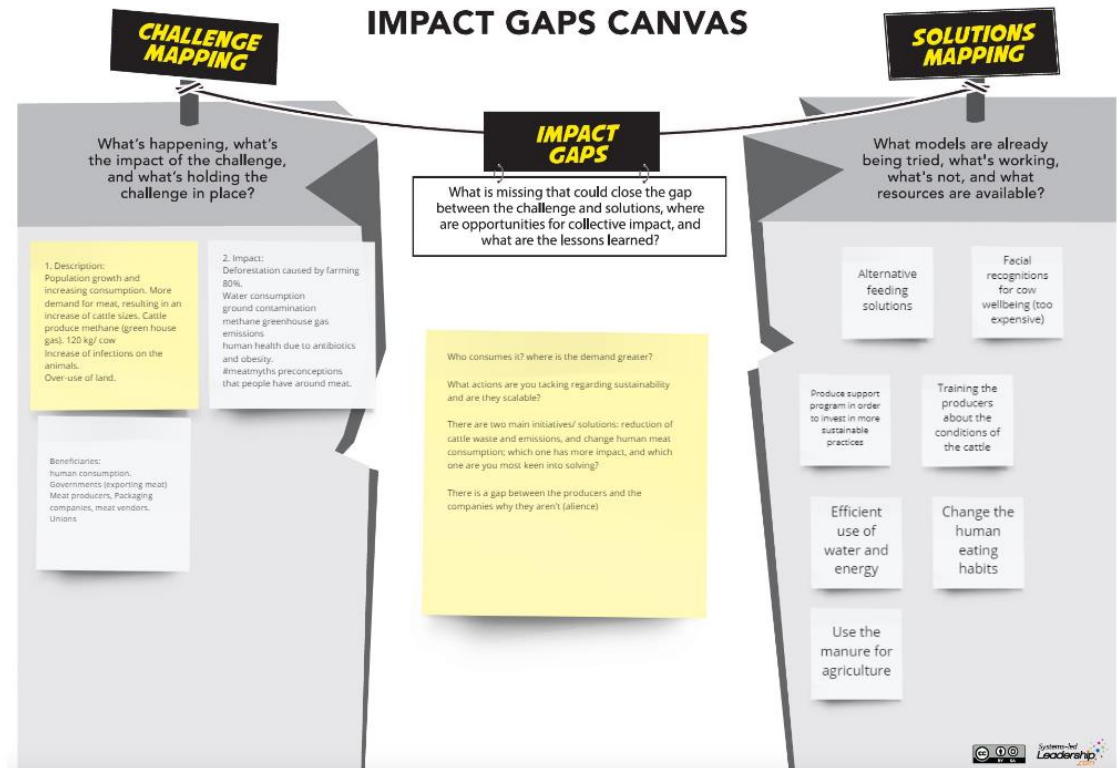


Figure 45: Impact Gaps Canvas

## 5. SOURCES:

### Farming

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