

SOIL POLLUTION

Illness Reduction and Improvement of Well-Being



Team 1

Àlex Martorell (UPC)

Albert Castro (UPC)

Lorenz Ververidis (ESADE)

Marina Michel (ESADE)

Mary Lyn Bou Habib (IED)

UNDERSTANDING THE PROBLEM	3
WHAT IS THE CHALLENGE?	3
IDEATION	3
CARD SORTING	4
PROBLEMS PRIORITIZATION: IMPACT VS. EFFORT	5
FIRST ROUND OF DESK RESEARCH	6
STAKEHOLDERS MAP	9
RESEARCH	11
SURVEYS, INTERVIEWS & INSIGHTS	11
PROBLEM STATEMENT	15
OPPORTUNITIES	15
THE SOLUTION	17
WHAT IS THE SOLUTION & ITS FACETS	17
THE SOLUTION: FOOD ZERO	17
HOW IT WORKS	17
ATTRACT & TECHNOLOGY IMPLEMENTATION	18
BUILDING THE FARMER/CUSTOMER RELATIONSHIP	20
BENEFITS OF THE SOLUTION	20
PROTOTYPE	22
CUSTOMER APP	22
FARMER POS SYSTEM	24
BUSINESS MODEL	28
BUSINESS MODEL CANVAS	28
1. KEY PARTNERS	28
2. KEY ACTIVITIES	28
3. KEY RESOURCES	28
4. VALUE PROPOSITION	29
5. CUSTOMER RELATIONSHIPS	30
6. CHANNELS	30
7. CUSTOMER SEGMENTS	30
a. THE FARMER	31
b. THE FOOD CONSUMER	31
8. COST	32
9. REVENUE STREAMS	32
PRODUCT IMPACT ROADMAP	33
APPENDIX	34
SOURCES	34
POSTER	35
MEET THE TEAM	36

1. UNDERSTANDING THE PROBLEM

1.1. WHAT IS THE CHALLENGE?

In the aim of working towards providing a better future for our planet and for the people living in it, our challenge was to work on the 3rd Sustainable Development Goal (SDG). It revolved around Good Health & Well-Being by ensuring healthy lives and promoting well-being for all at all ages. And that all by focusing our work on target 3.9 which is: “By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination”.



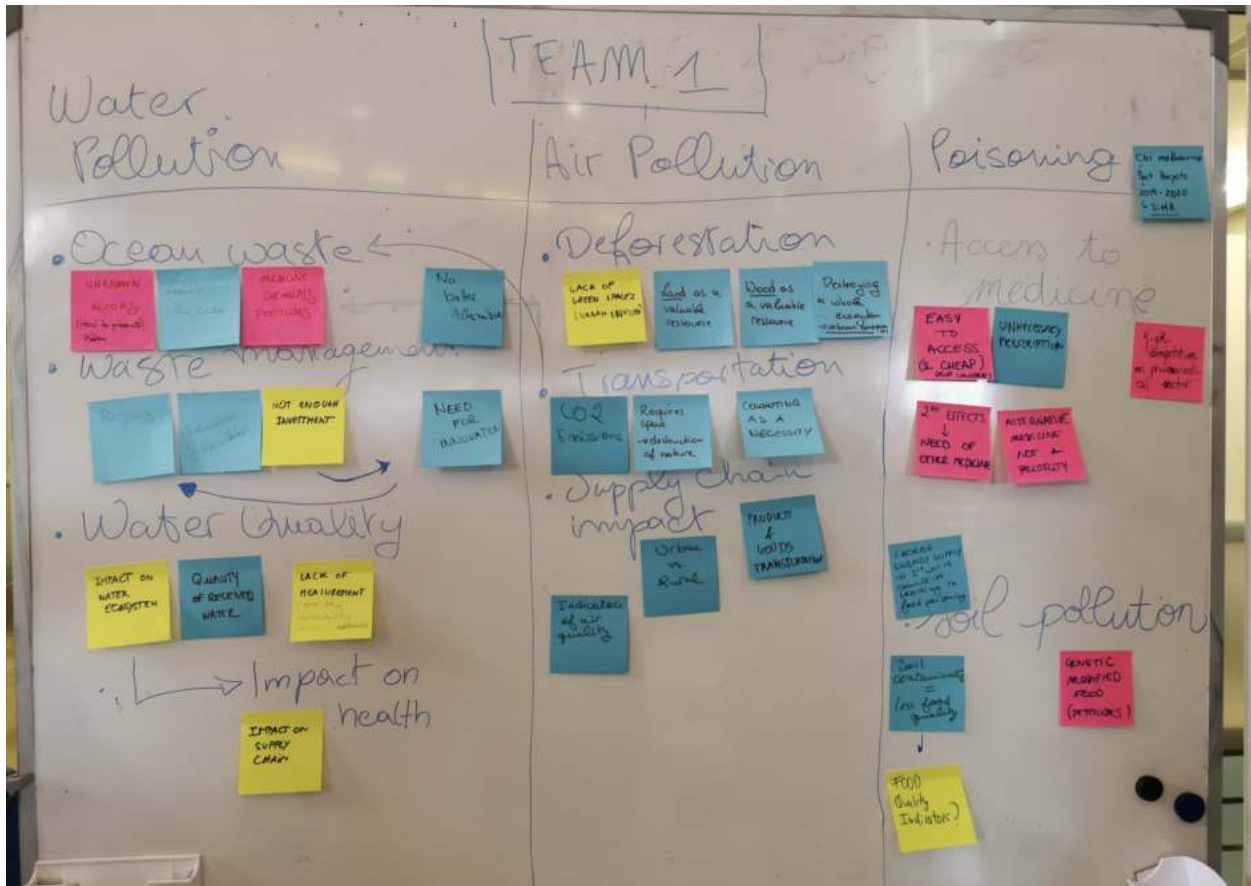
1.2. IDEATION

In the first part of the ideation process at CERN, we started off with a rapid ideation session. We gathered around as a team, each had a piece of paper with sticky notes next to it. We set a timer of 2min and each would write down a question about the problem in one of the topics presented in the challenge. When the timer is done, we put the sticky note on that paper and hand the paper to the person next to us. At the end of the session, we had 5 different topics to discuss with different points of view. It all started off with discussing water pollution, air pollution, soil pollution, and poisoning. Sharing our personal point of views without doing any desk research

yet to validate whether these points are true or not, we let out the first things that came to our minds.

1.3. CARD SORTING

We used the sticky notes from our previous brainstorming exercise to sort them out on a board under categories and started with linking the ideas and points.



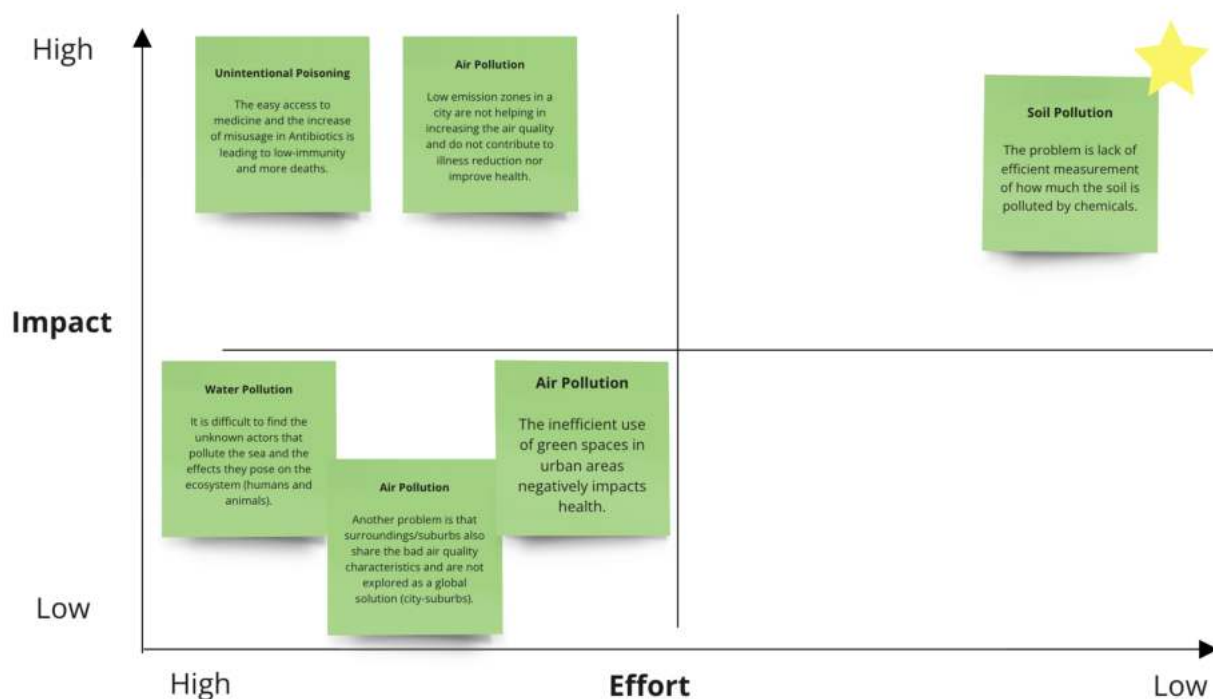
The conclusion involved several problem statements based on each of the categories:

- **Water Pollution:** It is difficult to find the unknown actors that pollute the sea and the effects they pose on the ecosystem (humans and animals).
- **Soil Pollution:** The problem is lack of efficient measurement of how much the soil is polluted by chemicals.
- **Air Pollution:** Low emission zones in a city are not helping in increasing the air quality and do not contribute to illness reduction nor improve health.

- **Air Pollution:** The inefficient use of green spaces in urban areas negatively impacts health.
- **Air Pollution:** Another problem is that surroundings/suburbs also share the bad air quality characteristics and are not explored as a global solution (city-suburbs).
- **Unintentional Poisoning:** The easy access to medicine and the increase of misuse in Antibiotics is leading to low-immunity and more deaths.

1.4. PROBLEMS PRIORITIZATION: IMPACT VS. EFFORT

Following that exercise, we were left with 5 different problem statements. Therefore, we had to compare them based on the Impact/Effort prioritization matrix to be able to focus on one topic.



The conclusion was that there were already a lot of actions being taken in regards to air and water pollution and the personal efforts would be very high to achieve.

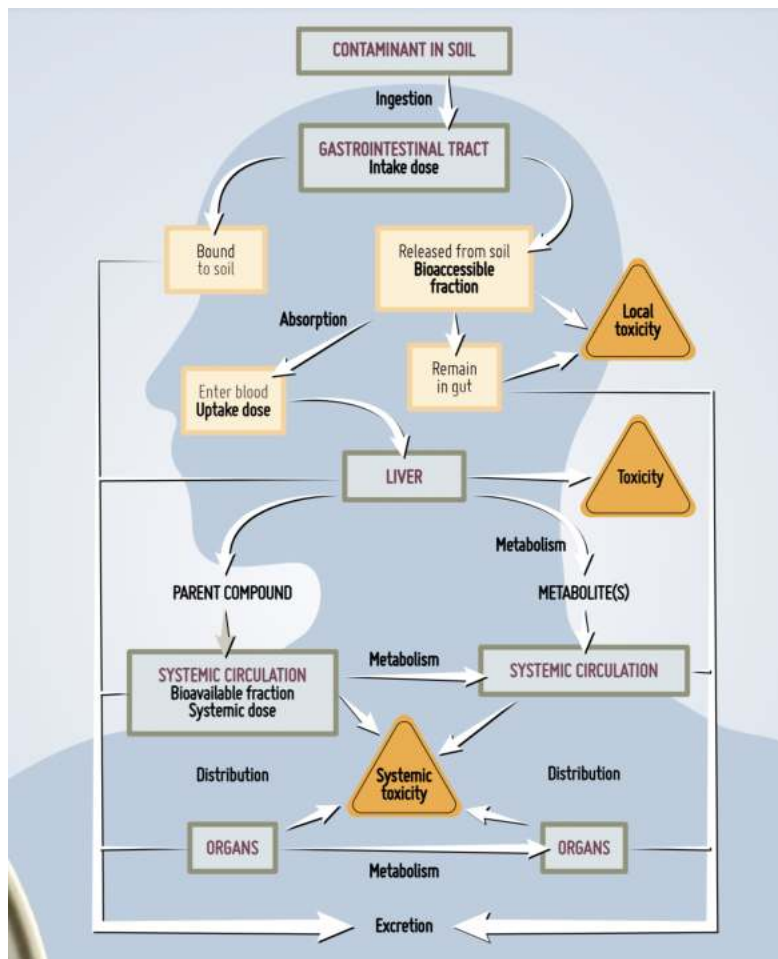
The winning problem statement was for soil pollution: **“The problem is lack of**

efficient measurement of how much the soil is polluted by chemicals”.

1.5. FIRST ROUND OF DESK RESEARCH

The first round of desk research aimed to validate if that hypothesis was valid. And the discoveries pointed out that in fact there are measurements for chemicals in the soil, but not for heavy metals. We found that it would be more efficient to focus on soil contamination from heavy metals like Arsenic and Cadmium due to the lack of affordable solutions for them. Also, based on a study conducted by FAO (Food & Agriculture Organizations of the United Nations), people can be exposed to contaminants present in soil through ingestion or through consumption of plants or animals that have accumulated large amounts of soil pollutants.

Contaminated soil poses unacceptable risks to human health - or to ecosystems - and is a very serious problem that sometimes persists for a long time and can be very difficult to correct. Below is a diagram of the effect of soil contamination on the human body.



Inhaling soil particulate matter and the ingestion of contaminated food can potentially result in serious conditions, of which the most common include:

- **Cancer, including leukemia** – caused by the contact with soils contaminated with chemicals (e.g. gasoline, benzene)
- **Nervous system damage** – caused especially by the presence of lead (Pb) in soil, and affecting especially children
- **Neuromuscular blockage and depression** of the central nervous system
- **Kidney and liver damage** – caused by chemicals such as mercury (Hg)

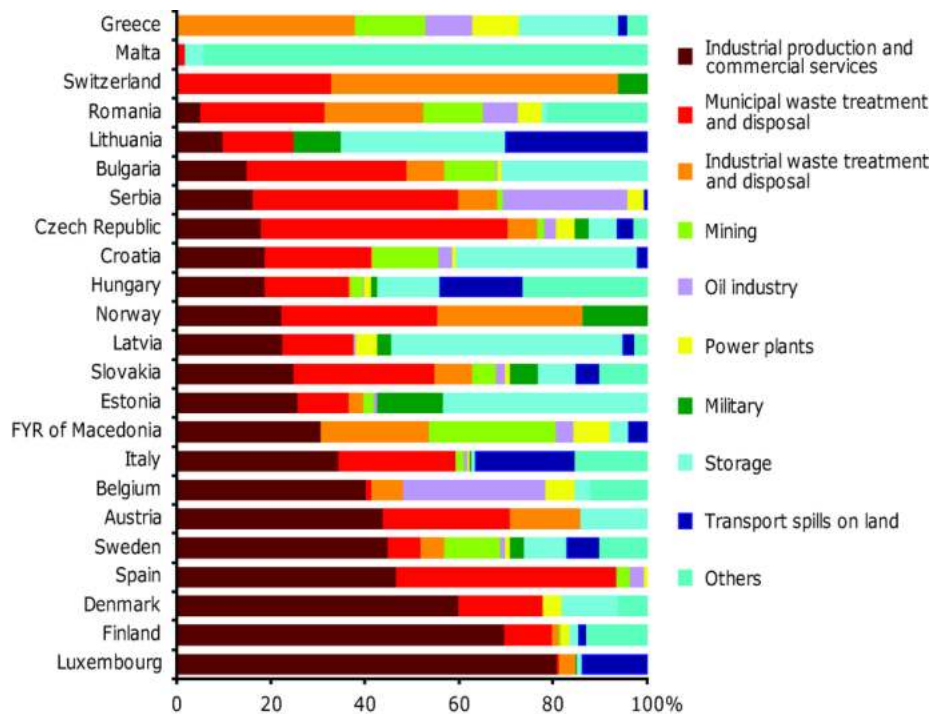
In addition to that, the soil contamination regulations monitored by the UN in Europe and especially in Spain, allow the soil to have a certain “acceptable” threshold of pollutants, which has a risk level but is defined as low.

- There are 3.2 billion people in the world who are negatively affected by contaminated lands.
- 19 million tons of grains are contaminated each year.

- Based on some predictions and forecasts, if we continue with the same pace of applying regulations and ignoring some of them, 95% of world-wide lands will be contaminated by 2050.

To determine if a soil is contaminated, three factors are taken into account: the concentration of contaminating substances, exposure to contamination by different routes, and the toxicity of the substances present.

In Spain, contaminated soils predominate in areas where mining and industrial activities are carried out.





The question is, do people really know that these pollutants are affecting the food grown in these soil and therefore affecting their health? And this is what needs validation in our interviews and surveys.

1.6. STAKEHOLDERS MAP

We proceeded with creating a stakeholders map for the chosen problem statement to see who are the involved entities and the degrees of their impact and contribution in our problem.

We were able to pinpoint several entities in different areas.

Target Audience: Consumers (who care about their food intake).

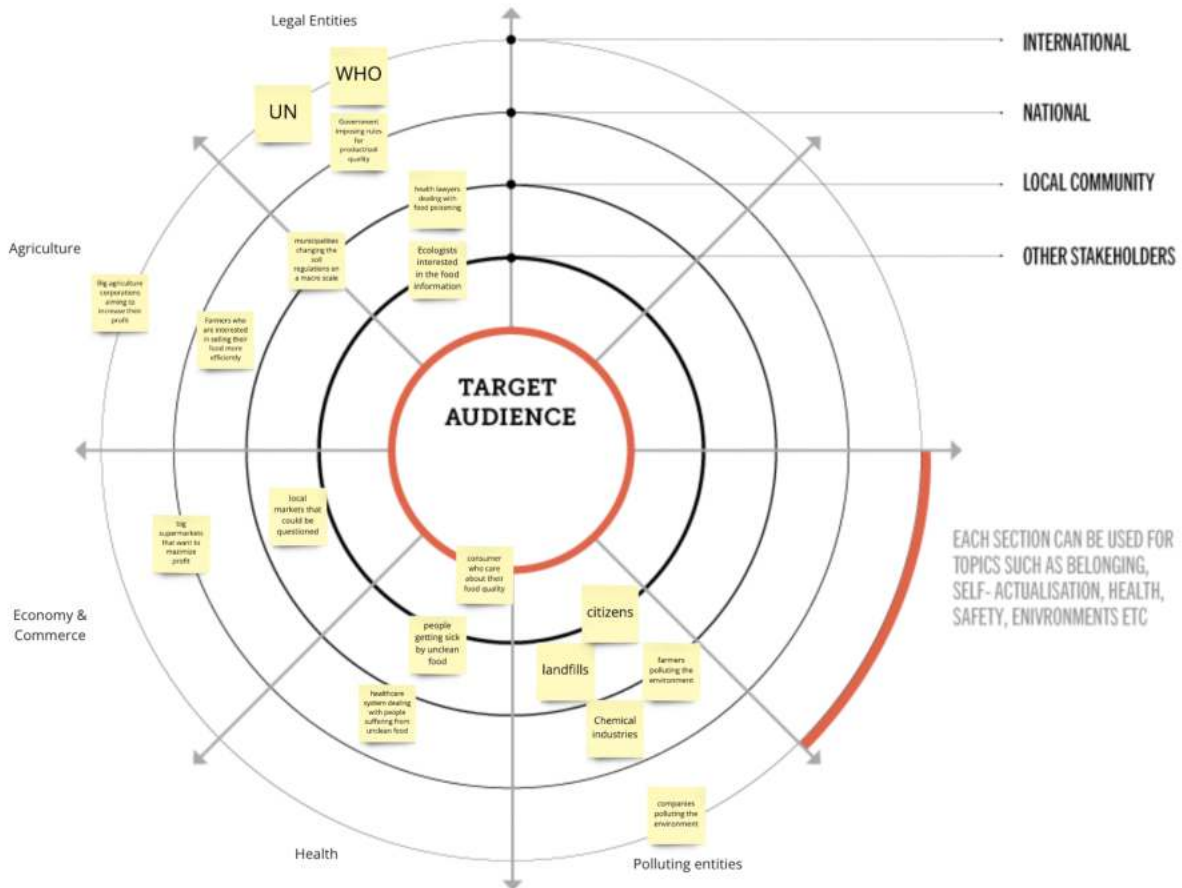
Legal Entities: Ecologists, Health Lawyers, Municipalities, Governments, WHO, UN.

Agriculture: Municipalities, Farmers, Big Agriculture Corporations.

Economy & Commerce: Local Markers, Big Supermarkets, Food Distributors, Wholesale.

Health: Poisoned Individuals, Healthcare System.

Polluting Entities: Citizens, Landfills, Farmers, Chemical Industries, Farming Industries, Big Corporations (contributing in pollution).



Going from a National to a Local level, mapping out which entities are correlated and have the biggest impact on each other. Some are out of reach when reaching a national level, and some are more accessible on a local level.

We were able to highlight the biggest impact of the direct correlation between consumers and where they buy their food & vegetables from, i.e., local farmers, supermarkets, local markets, etc. But how will this relate back to soil pollution and its impact on health?

This might be an opportunity to explore further research to identify whether consumers are actually aware of this problem, and if farmers are doing something about it.

2. RESEARCH

2.1. SURVEYS, INTERVIEWS & INSIGHTS

Now, it was time for us to validate our problem statement by collecting quantitative and qualitative data. We have recognized that there are multiple hypotheses that we are currently relying on and need to prove in order for our problem to be of true value. We split the hypotheses in two groups of our users; the health freaks and the farmers.

SURVEYS:

We identified the “Health Enthusiasts” by asking personal questions about their consumption and exercise behavior. To have more accurate results, we removed the people that answered that:

- They do not exercise
- They believe they do not eat healthy
- Did not care the most about eating “healthy food”

So, we sent out a [survey](#) for our target audience to know more about their food consumption habits and the way they perceive the effect of the environment on that.

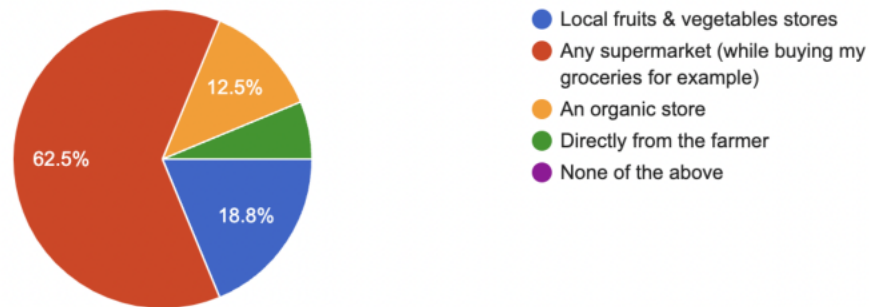
These are the following hypotheses that we validated:

Health Enthusiasts:

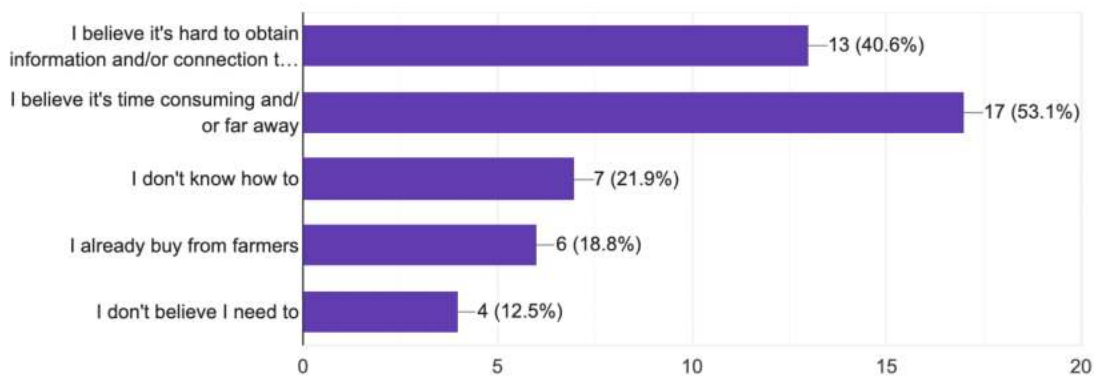
- Health enthusiasts would be interested in direct contact with local farmers
 - According to our survey, 20/25 are interested in direct contact then but lack information
- Health enthusiasts are overwhelmed by the information circulating around
 - 17/32 say they do not want to receive more information of the products they consume
- Health enthusiasts care about the quality of the soil

- 17/32 believe this to be a problem of highest priority
- 8/32 believe they lack information about this topic
- Health enthusiasts care about the environment
 - 30/32 say at least “yes they do”
 - 26/32 are trying to change their habits it at least sometimes to change the climate problems

Where do you buy your fruits & vegetables from?



Why don't you buy directly from the farmers?



INTERVIEWS:

Barcelona has several local markets happening during weekdays in different locations spread out in the whole city. Note the difference between “**local markets**” and “**markets**”. The former refers to stands set up in a public square, or a street corner for just a few hours once a week or maybe twice. Hard to find, most of them with scarce or zero advertising, it is usually neighbors that share the location with

other neighbors that do not know about it. With the latter we refer to specific buildings built for the purpose of becoming markets. These markets have many stands categorized by food kind (poultry, fruits, vegetables, fish...). In the city of Barcelona specifically, there is usually one per neighborhood (i.e. La Boqueria in Ciutat Vella, one of the more popular).

Our main interest/target are especially the local markets, because that is where farmers come and sell their produce directly to clients. Observe that in Catalan, local markets are called “Mercats de pagès” (pagès = farmer, which clearly states that it is farmers directly who are selling). The Ajuntament de Barcelona (Barcelona municipality) provides a list of locations and timetables of some of the local markets that are found in the city¹.

It seemed very relevant to solve some of the key questions to have an interview with one of the local farmers.

One of the more interesting interviews was with Àlvar, a young farmer from the western part of Catalonia that is currently working as a farmer in Mataró. One of the locations where he sells together with another farmer is in the neighborhood of Sant Antoni (Av Mistral corner with Carrer Vilamarí), on Tuesdays from 5 PM to 8 PM. He mentioned that this is not the only place where they sell in Barcelona.

It is also important to mention that local markets are for the most part outside of Barcelona (i.e. A farmer that has a piece of land in el Baix Llobregat might sell it directly there without traveling to Barcelona). However, as we will develop further in this report, the focus is to also target these farmers.

Many questions were asked, find below an excerpt with the more interesting insights from the interview.

Do you pay attention to soil contamination? Are there regulations for soil pollution that you follow?

1

https://ajuntament.barcelona.cat/lafabricadelsol/ca/noticia/ubicacions-i-horaris-dels-mercats-de-pages-a-la-ciutat_1051780

The answer is yes, as a matter of fact, since we are considered “ecological” we have to comply with regulations imposed by the CCPAE² (Consell Català de la Producció Agrària Ecològica). There are checks every 15 days to make sure we comply with CCPAE regulations. Many things that big agricultural corporations can do which we cannot, regarding the strict regulations we follow. We have contaminant levels checked by an external company (outsourcing) to fulfill requirements.

This was verified by our team. CCPAE issues a certification that states whether a crop is organic/ecological. To obtain it, one must go through strict checks. In their website, we can find the a summary of the criteria to fulfill for fruit/vegetable crops:

- Organic plant based foods are grown without fertilizers or pesticides that are of a chemical composition (fungicides, insecticides, herbicides). Hence, no waste derived from these.
- Only organic fertilizers and natural minerals are used. Nitrogen fertilization is limited to 170kgN/ha per year.
- The health of the soil should be based on preventive methods, so only phytosanitary natural products stated in the Annex II of Regulation (CE) 889/2008.
- Transgenic crops are forbidden.

Is there any help or incentive for improving the quality of soil?

Not really. Actually, we find it hard almost to survive as independent farmers. Agroindustry is the major problem we have now, they have all the money, and of course, since they have a lot more resources and do not have to adhere to these regulations we follow. One of the things we demand is public help. We receive no money from institutions.

Why do you come to Barcelona to sell?

We are part of a network of local farmer markets established by the municipality. On

² http://www.ccpae.org/index.php?option=com_content&task=view&id=36;lang=ca_ES#_YrNbwXZBzIU

a bigger scale, we are part of the “Xarxa de consum solidari” (solidary consumption network). The goal of these markets is to promote healthy and fresh food to neighbors with the ultimate goal of food sovereignty. Not only are we here today, but we also sell at other places in Barcelona other days of the week.

Do you believe that it is hard to reach out to potential customers?

I believe that a fair enough job is being done. Of course our clients are older than population average, and all of them are people that are aware of the difference they can find in our products, and come specifically to us because we offer food that cannot be found in supermarkets or even markets. However, I do not believe it makes much of a difference to advertise ourselves in social media. Of course everything helps, but what is needed more now is a change of mindset. You are young, how often do you come to local markets, or how often do friends of yours do?. I believe the problem will not be solved with better advertisement, but the mindset and the economic system have more to do with it.

2.2. PROBLEM STATEMENT

We are now dealing with a double-ended problem that will tackle both consumers (health enthusiasts) and producers (farmers).

Local farmers: do not have enough resources for continuous soil maintenance and do not receive any help from the government.

Consumers: do not know about the levels of contamination derived from soil pollution in fruits and vegetables and its negative effects on health.

2.3. OPPORTUNITIES

The opportunities we were able to pinpoint based on these data are the following:

- How might we connect consumers with eligible local farmers?
- How might we provide farmers with long-term and low-cost soil maintenance to avoid accumulation of contaminants with time?

3. THE SOLUTION

3.1. WHAT IS THE SOLUTION & ITS FACETS

The idea of the solution aims to improve the quality of the produced food for both farmers and consumers, promote continuous soil care for farmers, and improve food consumption behaviors for consumers.

This can be achieved by tackling the solution from two different facets:

- a. By creating an AI-based consultancy solution where farmers can be advised with soil cleaning methods and recommendations
- b. Designing an app where customers can easily locate nearby eligible farmers

3.2. THE SOLUTION: FOOD ZERO

FoodZero is a novel breakthrough in the farmer-consumer relationship, in the form of a mobile application that acts as an intermediary between these two sectors of society. It acts as an affordable consulting medium for farmers, as it provides guidelines and recommendations on how to adequately maintain soil health through our enhanced mass-spectrometry analysis with the Attract technology called FastICPIx. Which will result in healthier quality of grown food, and farmers can advertise their produce to potential customers nearby. For customers, the app serves as a locator of their ecological farmer as well as an easy payment method.

3.3. HOW IT WORKS

Since our goal is to reduce the number of deaths from soil pollution, we consider the most crucial support to be, helping the farmers in maintaining their soil properly. While they may not lack knowledge, they do lack the resources to do so. This is where we found a possibility to help.

We want to create a direct relationship between users (that are interested in healthy food) and farmers. Firstly, this provides the farmer with the possibility to expect higher demand for their higher quality products and secondly, the supply chain will get reduced dramatically.

To create such a relationship, we created the platform FoodZero. A platform for health freaks looking for the highest quality products, which is accessible for all farmers with less contaminated soil. We, as FoodZero, obtain the information from the soil by AI and Attract and (in order to reach our ultimate goal) provide all farmers with consultancy on how to increase their quality. In return, we obtain valuable data from them which we can use for further improvements.

3.4. ATTRACT & TECHNOLOGY IMPLEMENTATION

Using recent developments in light photodetectors thanks to the ATTRACT Technologies FastICPix enhancing Mass-Spectrometry analysis, FoodZero offers fast environmental consulting on soil contamination levels.

To understand how the technology has been enhanced, first of all we might start by explaining what mass-spectrometry analysis and FastICpix are.

Mass-spectrometry analysis is a sensitive low-cost lab technique used to detect, identify and quantitate molecules based on their mass-to-charge (m/z) ratio. All mass-spectrometers are composed by at least three main components:

- Ionization Source
- Mass Analyzer
- Ion Detection System

The Ionization Source will convert molecules to gas-phase ions so that they can be moved about and manipulated by external electric and magnetic fields. Afterwards, the Mass analyzer will sort and separate the ions according to mass-to-charge to finally be analyzed by the Ion Detection System where they are measured and their mass-to-charge $[m/z]$ ratios are stored together alongside their relative abundance.

The key point of mass-spectrometers is that they use photodetectors as a counter of ions to measure the sample's composition . Here is where FastICPix takes part in enhancing the actual mass-spectrometer.

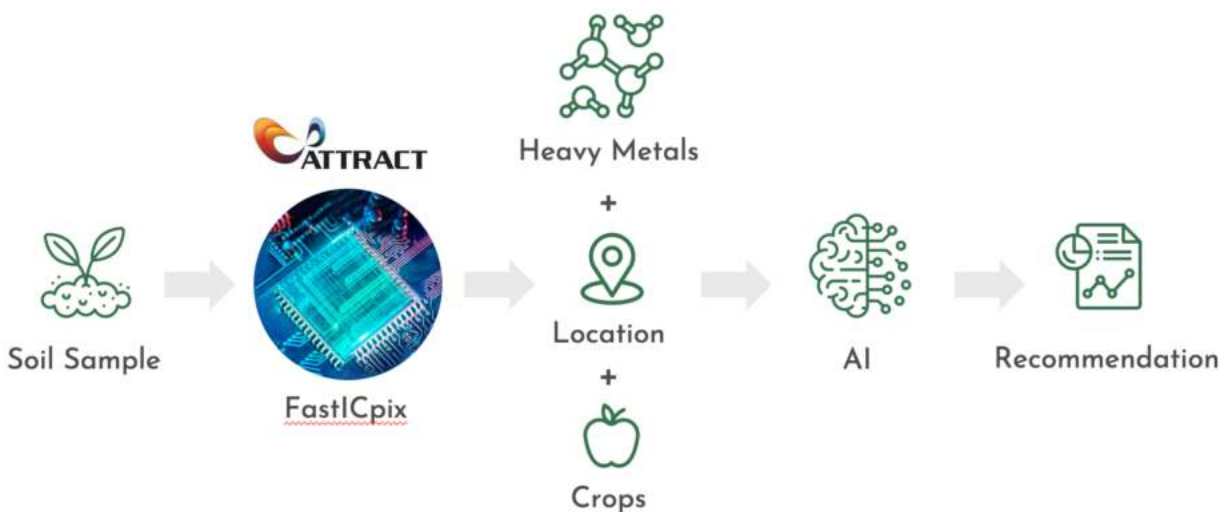
FastICPix is a novel reconfigurable low light-level hybrid detector concept that can be scaled to arbitrarily large areas and that aims to measure the position and the time of arrival of a single photon.

They join analogue Silicon Photomultipliers (SiPMs) and digital SiPMs. Analog SiPMs are a concatenation of Single Photon Avalanche Diodes (SPADs) leading to a large capacitance, thereby limiting the single photon time resolution; however, they are very sensitive to photons. Digital SiPMs, on the other hand, have readout electronics associated with every SPAD, hence improving the single photon time resolution and better detection efficiency.

FastICpix is a hybrid solution mixing analogue and digital SiPMs on a programmable solution that can be adapted to the requirements of the project or solution.

In our case, by making a smart selection and splitting the entire detection SiPM into smaller cells that would be separated into smaller SiPMs. We can keep the time resolution small because it is only affected by the cell size, not by the entire sensor. And at the same time be more sensitive in ion detection, which allows us to offer a quick analysis to our clients.

In addition, once the soil sample is collected from our client's field, the sample is taken to our research facility where it will be analyzed with our enhanced mass-spectrometer providing us with heavy metal levels from the field.



With the levels of heavy metals, the location of the field, what type of crop is going to be grown, we can fit our AI model to provide us with the best recommendation on how to treat the soil to mitigate heavy metal levels and improve the quality of the field.

If the farmer agrees to said solution, it guarantees their appearance on the application, which consists of a network of potential clients who will know the

farmer location and the produce they offer.

3.5. BUILDING THE FARMER/CUSTOMER RELATIONSHIP

In recent years, in Catalunya and in Spain there has been a strong growth of the Km0 (Kilometer 0) concept. This means to try and get your produce from your local farmer, in your local market close to where you live. The fruits or vegetables you buy should be in season and of course, should have been grown in what is called “ecological process” and cannot be imported. However, as much as social support as this option has received in Spain, it is far away from being fully implemented. Now we are starting to see more and more people actively seeking for a local farmer and buying produce directly from him, without any intermediaries.

So, how are farmers and consumers getting connected?



The relationship between farmer and customer will be built upon our app where each of them will have its own space to look for products in case of the customer and to upload which products it has in case of the farmer.

The consumer can locate through the app the closest farmer and see the available products offered. The interested consumer can go to the farmer's location and purchase directly from him, through an easy payment method offered by the app.

This is how the app ensures direct contact between local farmers and consumers, sectors that have been far apart and are now being brought together.

3.6. BENEFITS OF THE SOLUTION

Our solution aims to focus on local farmers and consumers, two sectors that have been far apart and are now being brought together. Its main pillars consist of:

- Improving food consumption behaviors by offering good quality food options for consumers to locate nearby
- Promoting continuous soil care to avoid contamination accumulation

- Improving the quality of produced food by guaranteeing de-contaminated soils

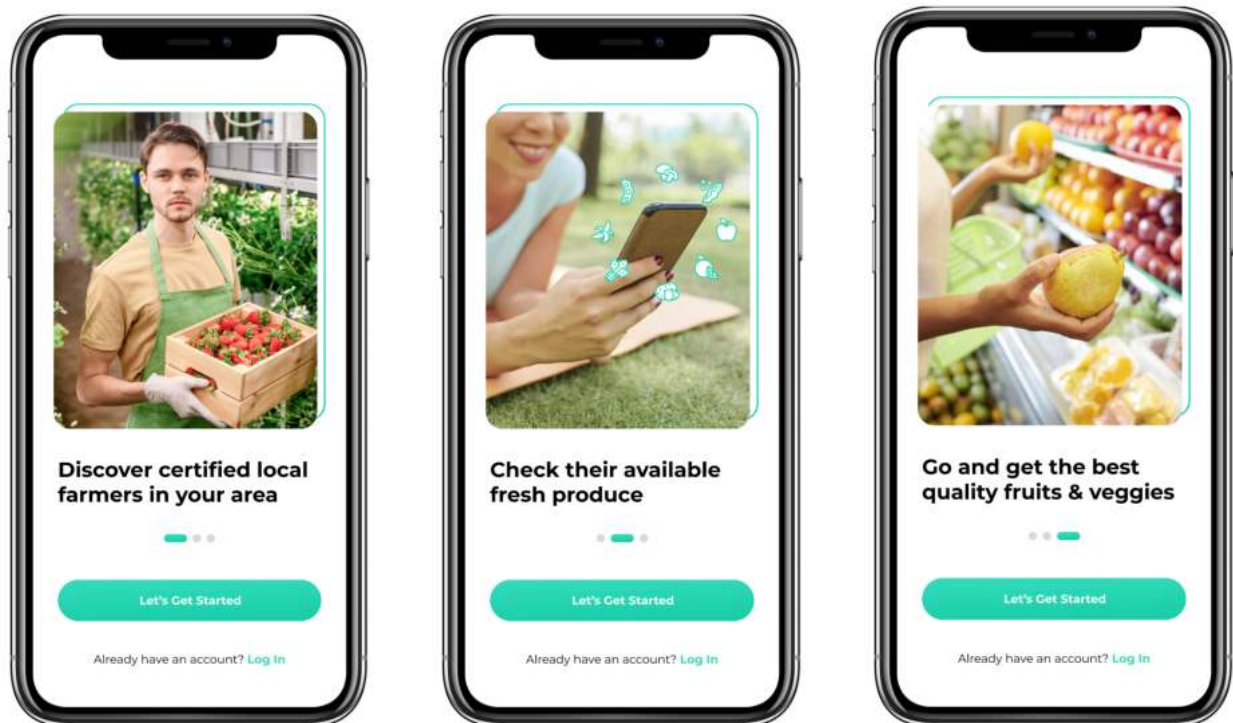
This is the core of our idea developed to combat such a major problem as Soil pollution. We aim that this idea can be part of a revolution on how we interact with our farmers, and on how we understand and fight soil pollution in an efficient way.

Good quality soil will reduce illnesses, help us produce healthier food, and most importantly, help us lead happier and healthier lives.

4. PROTOTYPE

4.1. CUSTOMER APP

In the first steps after downloading the app, the customer will be presented with pre-onboarding screens to explain the app features and functionalities.



As in all the apps, the customer must have to sign up to our app. They will be asked to introduce their name, phone number and later link their credit card to their account. This information is necessary to make payments between the customer and the farmer and to enable them to contact each other.

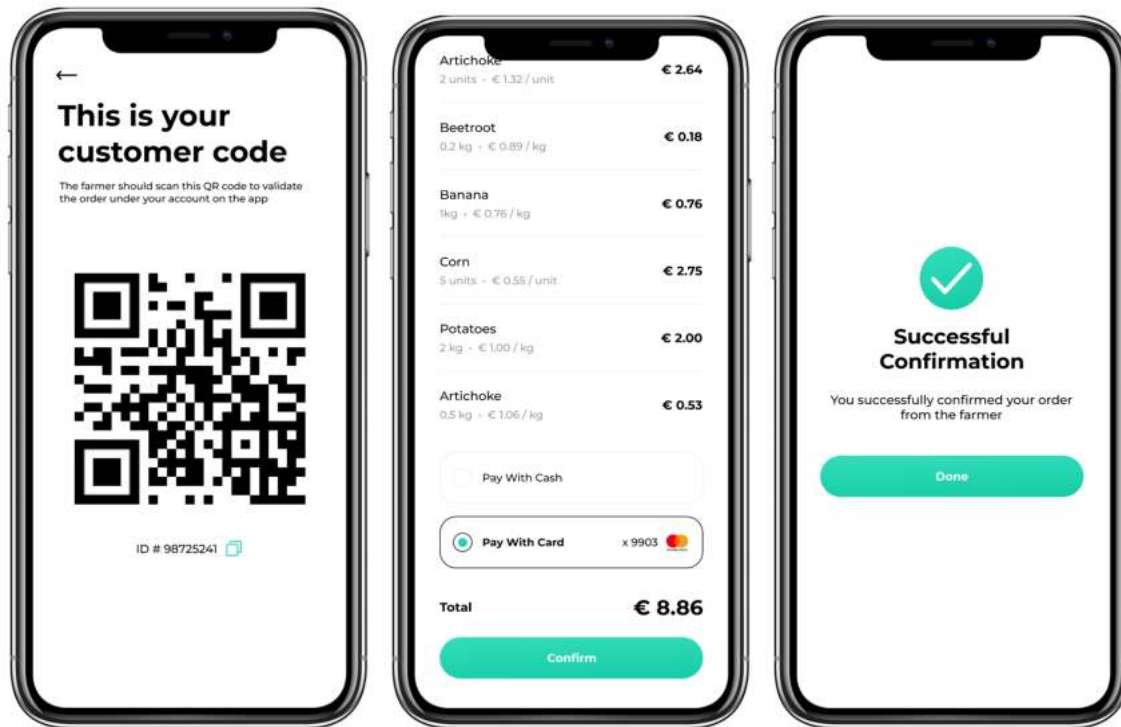


Moreover, once the customer is registered he will have access to a map that will show him the nearest eligible farmers and their available products and can navigate to the maps to get to the farmer he desires to buy from.



In the market, the farmer will ask the customer to reveal his QR code in the app to link the bill summary to the customer's account in order to confirm it and pay it

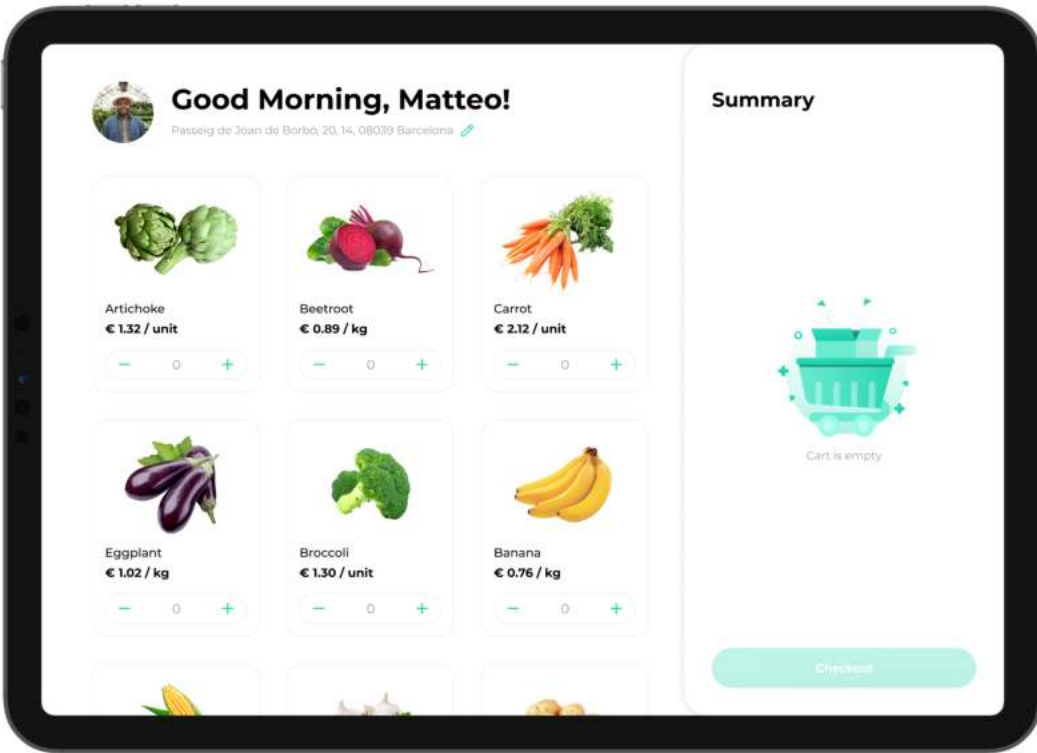
through the app.



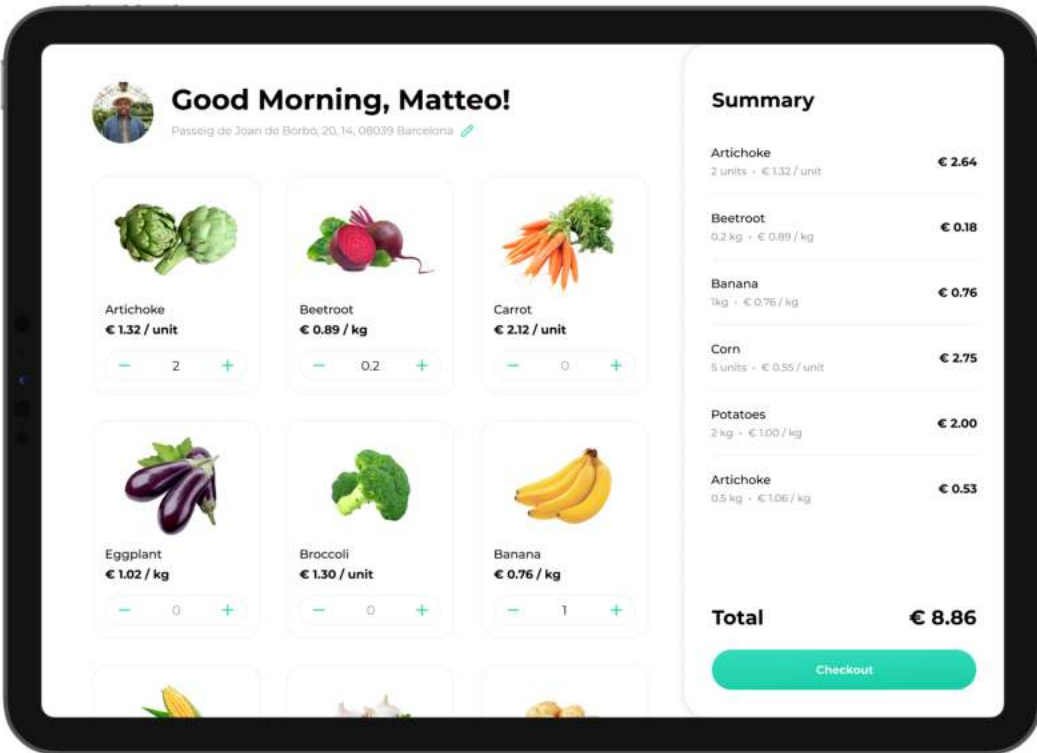
Here, you have the link to discover the [customer's app prototype](#).

4.2. FARMER POS SYSTEM

In our app we have a special space for the farmers where they are going to upload all the available products, location and phone number to be located and contacted by our customer.



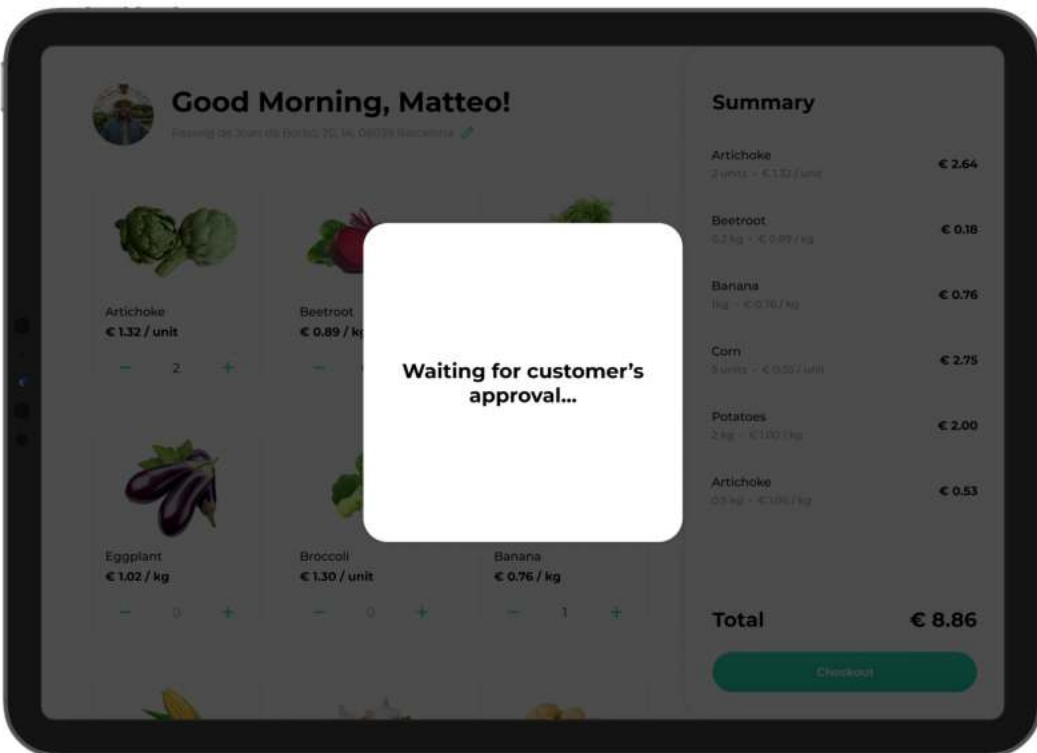
The farmer will introduce the amount and which products the customer wants in the tablet. Once the customer has selected everything he wants.



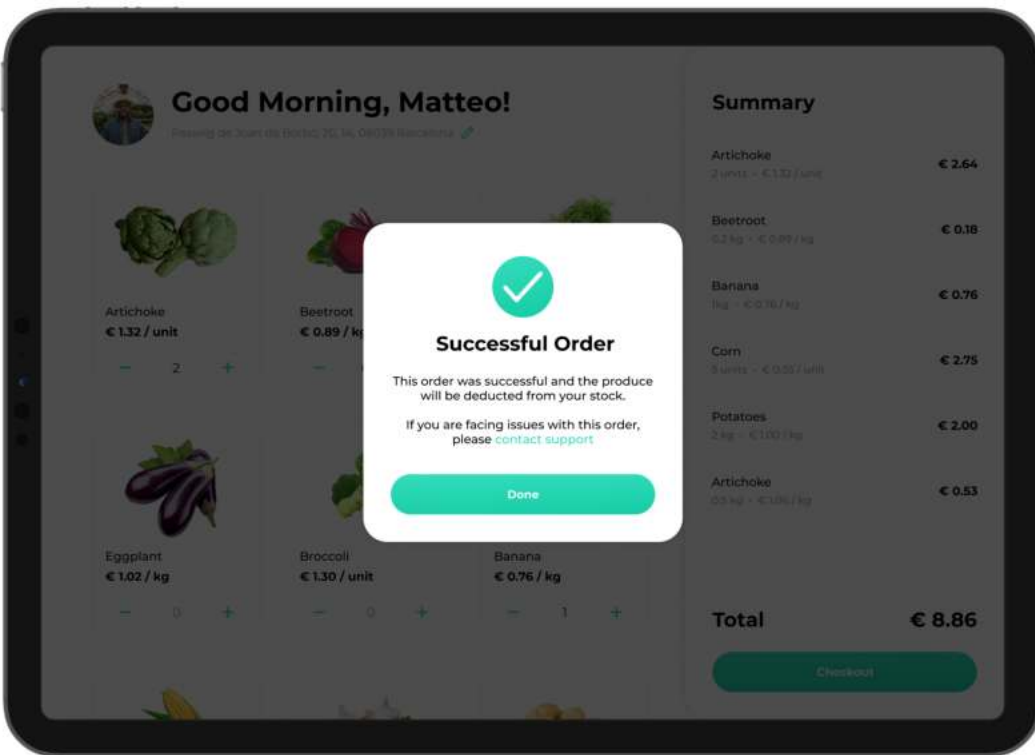
The farmer will proceed to enter or scan the customer code to link the bill with the right customer.



The bill summary is sent to the customer for approval and the farmer waits for customer's confirmation.



The order is successfully completed.



At the same time, the application is used to process the order and it also keeps track of the remaining stock of the farmer.

Here, you have the link to discover the [farmer's POS prototype](#).

5. BUSINESS MODEL

5.1. BUSINESS MODEL CANVAS

1. KEY PARTNERS

To start running the activity, it is essential for us to attract farmers. But in order to do that, we will also need companies specialized in soil cleaning, soil decontamination and soil maintenance. We will also need specialists, experts and researchers in soil to help us build the software and increase our knowledge in the sector.

2. KEY ACTIVITIES

The business model of FoodZero is divided into two parts:

1. The consultancy service provided to the farmer
2. The locator app service provided to the consumer

The service provided to the farmer consists of collecting a sample of the soil, analyzing it, and with our AI technology, all the contaminants and heavy metals will be detected and we will obtain a report with the status of the soil. For each problem, the AI technology will provide a solution and the best practice in order to reduce high numbers in our thresholds. Each solution is solved by a specialized company whom we will be partnering with. The objective is to retain the farmers as long as possible and do regular maintenance of their land(s).

On the other hand, we will provide an app for those people that are willing to consume local and healthy food. They will be able to locate the closest farmer or their favorite farmer and buy their produce. By increasing the availability of eligible farmers, people will be buying better quality food and thus reduce the risks of food contamination.

3. KEY RESOURCES

To start and run the business we will need different inner resources. First of all, we will need to hire an engineer to develop the platform and developers for the app. Then we will have to invest in a physical laboratory where the soils will be analyzed

and offices as well. Apart from the office, we will need to invest in a machine that analyzes the soil and transfers the data to the server. The five of us will be splitted in different departments (marketing, finance, technical part, platform and app improvement, etc). As for human capital, in the first months it will only be us and depending on how the business grows and expands, we will have new positions in different locations.

We need to extend the network of specialized companies for the cleaning/maintenance of the soil. For this, we will be contacting all companies working in the sector and willing to partner; starting locally and then expanding.

Initial cash flow needs to be concreted, as to pay the developer, the acquisition of the building/office and for the first months with no revenue.

There is no stock to consider in the activity of our company, as the stock of fruits and veggies will be owned by the farmer.

4. VALUE PROPOSITION

As we're proposing, the customer is divided into two segments, in addition to our unique value proposition which is also segmented into two.

- To improve the quality of the soil, we will consult the clients by providing them with solutions (e.g. treatment, cleaning method, etc) based on different types and levels of contamination problems. For each solution, one or more companies will be provided and the client will be put in contact with the latter. We will be doing regular checkings so the client is able to have control on a regular basis on the status quo of their soil.

When the solutions are implemented or if the soil meets a certain threshold of requirements (e.g., allowed percentage of contamination or pesticides), the farmer will be able to appear on the map presented in our application, to be able to showcase his products and sell them physically.

- To offer an app, where the customer subscribes and depending on his location they can find the closest farmers selling their local produce (the location of one farmer can be different every day of the week). By using the app, the user will be able to consume more local and healthy products.

The purpose of our solution is to support organic and local food, against industrialized and imported aliments.

5. CUSTOMER RELATIONSHIPS

As a start, in order to attract farmers to use our solution, we will have to go one farmer at a time. Contact them, visit them, explain how our solution works, let them try it, etc. And when they decide to subscribe to our service, we will start the process of analyzing the soil, giving them recommendations and solutions provided by specialized companies that we will partner with, and allowing them to be on the FoodZero platform. When they are on the platform, they will need to inform the location they will be at and which day of the week as well as the hours, plus indicate their stock on a daily basis.

When food buyers will look for a farmer on the app, the relationship between farmer and consumer will start. Then the buyer will then go to the place where the farmer is located and the traditional way of buying in the market will happen: buyer chooses his fruits and vegetables and other products, the farmer packs them, a bill is issued, and then the payment occurs. The only difference in this cycle is that the farmer will enter the purchase details on a POS system provided by FoodZero and the bill is issued digitally and reflected on the buyer's app; therefore all transactions and activities will be reflected there.

6. CHANNELS

At the beginning, in order to attract customers, we will be having direct contact with farmers around Barcelona (max 2h drive) to explain to them how our solution works. After being tested by some clients, we will still be going to farmers individually but it will be possible for farmers to subscribe themselves to the platform.

When it comes to the food buyers, they will buy the products straight from the farmer's location. Thus, we will not interact with them in any other touchpoint. After acquiring enough farmers, we will launch a marketing campaign through social media and maybe physically, to attract as many food buyers as possible.

7. CUSTOMER SEGMENTS

FoodZero is the solution to the problem of soil contamination, having a two-sided customer segmentation.

On the one hand, we have the farmer producing food (e.g., fruits & vegetables) and on the other hand, the buyer interested in fresh products.

a. THE FARMER

Personal information

The farmer persona is the one owning land(s) and is already raising or willing to raise living organisms for food and/or raw materials.

Initially, we will start by targeting those farmers producing fruits and vegetables, living close to big cities (starting in Barcelona).

Again, we will be targeting those farmers growing fruits, vegetables but also farmers that grow cereals and plants intended for food production and who live further away from big cities.

The main target is the little-medium farmers without high resources to have regular maintenance on the quality of their soil.

Professional goals and challenges:

The aim is to provide farmers with a regular control of the evolution and maintenance of their soil. By increasing the quality of their soil, they will be available to reduce the quantity of contaminants in food produced, and so increase the quality of the food. By doing that, they will avoid high costs in cleaning the soil and also contamination accumulation or even loss of their land in case of very high levels of contamination. Likewise, by increasing the quality of produced food, they will be available to increase their selling cost and thus increase their benefits.

At the same time, as aid from the government is very low and regulations are very strict, it is very challenging to survive in a sector where big farmers dominate the market. So, they want to increase their visibility and increase their revenues.

How we can help:

The solution consists of four main parts:

1. Analyzing the soil in the lands of the farmers to provide them with a deep analysis since mainly heavy metals are the most harmful on health.
2. Providing consulting services to improve and maintain the soil.
3. Implementing the solutions we provide which will gain farmers access to our platform/app.
4. Increasing farmers' visibility to be able to sell more in big cities, where there is a high potential of selling.

b. THE FOOD CONSUMER

Personal information and goals:

When talking about the food consumer, we are referring to people who are +18 and willing to consume healthy. Consumers living in the city center have very low access to local food due to the lack of local farmers selling in the city. Normally, they buy their products from ecological shops or local markets although there are very few.

It can be all types of salary-ranged people, from students to highly qualified people.

How we can help:

After signing up to the app, customers will have access depending on their location to see the farmers available near their location and on which days, but also check the stock they have. The more purchases occur through the app, the more discounts they will get; but also the more local and healthy food they will be able to buy and so increase the quality of the food consumed.

By increasing the quality of the food consumed, risks and consequences on health related to food contaminations will be reduced.

8. COST

As our solution does not exist yet, we will need to invest in R&D and in the implementation of the activity:

- Individually visiting farmers
- looking for specialized companies
- Trial months cost
- Developer cost for the app & software development

When we start having revenues, we will have the cost of human resources, including the five of us.

9. REVENUE STREAMS

In our business model, there will be different revenue streams:

- When a farmer agrees on subscribing to our service, we will charge a fixed amount (to be concreted) for the analysis of the soil and the consulting service: providing solution(s) for cleaning, decontaminating their soil or maintaining the quality of their land. It will mainly depend on the m2.
- For each solution we will provide a specialized company whom we will partner with. When we will be doing the networking for clients we will also be contacting these specialized companies to partner with us. After the farmer and the company are put in contact, and the company completes its

service(s), a percentage of the total amount charged will be paid to us.

The analysis and cleaning/maintenance of the soil needs to be very affordable as we are addressing small-medium farmers.

- When a customer buys the farmer's product, a percentage of the bill will also be attributed to us. But again, very little percentage as the farmer needs to make profits out of it.

5.2. PRODUCT IMPACT ROADMAP

Short-term:

- Develop the technology and test its accuracy.
- Train the AI model with all the required specifications (heavy metals, location, crops) to deliver the best recommendations.
- Test the technology with the farmers by collecting as many soil samples as possible.
- Test the customer app and its functionality in the market.

Medium-term:

- Expand our network of farmers and customers to offer daily locations all around the city of Barcelona.
- Collaborate with third-party companies to further improve the AI model.

Long-term:

- Expand to other cities in Spain and create a map of nationwide soil pollution distribution.
- Measure the improvements in the quality of produced food.
- Measure the efficiency of the technology in comparing old sample results with new samples results and recommendations.
- Have enough data to measure soil contamination across time, create time-series models and validate if the technology is working and is reducing the levels of contaminants in the soil.

6. APPENDIX

6.1. SOURCES

- https://www.ign.es/espmap/mapas_conta_bach/Contam_Mapas_05.htm
- https://www.miteco.gob.es/es/calidad-y-evaluacion-ambiental/temas/suelos-contaminados/09047122800b7aff_tcm30-194664.pdf
- <https://www.fao.org/3/I9183EN/i9183en.pdf>
- <https://www.eea.europa.eu/data-and-maps/figures/breakdown-of-activities-causing-local-soil-contamination>
- <https://www.thermofisher.com/es/es/home/life-science/protein-biology/protein-biology-learning-center/protein-biology-resource-library/pierce-protein-methods/overview-mass-spectrometry.html>
- <https://www.broadinstitute.org/technology-areas/what-mass-spectrometry#:~:text=Mass%20spectrometry%20is%20an%20analytical,the%20sample%20components%20as%20well.>
- <https://www.intechopen.com/books/6534>
- <https://www.intechopen.com/chapters/58942>
- <https://www.iberdrola.com/sustainability/sustainable-nutrition>
- <https://www.environmentalpollutioncenters.org/soil/facts/>
- <https://www.environmentalpollutioncenters.org/soil/diseases/#:~:text=Long%20Term%20Diseases&text=Cancer%2C%20including%20leukemia%20%E2%80%93%20caused%20by,of%20the%20central%20nervous%20system>
- <https://www.sciencedirect.com/science/article/abs/pii/S0269749118330124>
- https://www.mdpi.com/journal/land/special_issues/Heavy_Metal_Soil
- Market applications for a new Generation of Active Hybrid Single Photon Sensors with ps time resolution, TESI project done by Sergi Aliaga, Kuba Bajda, Daniel Beck, Philipp Mortier. [31/05/2021]

6.2. POSTER



6.3. MEET THE TEAM



Lorenz Ververidis / Albert Castro/ Marina Michel / Mary Lyn Bou Habib / Àlex Martorell
EASDE UPC EASDE IED UPC