

NG DRONE



NG DRONE's objective is to increase crop efficiency and productivity through technology.

With this initiative, we are advocating the transition to a more sustainable world with the introduction of smart agriculture, a concept that will meet the needs of a growing population.

The activity of this project is summarized in monitoring and controlling numerous variables that affect crops by means of UAVs and other devices, to be later processed by Artificial Intelligence.



INTRODUCTION

This project is motivated by our growing concern for the current state of the environment. In order to promote a more sustainable management of plantations and to avoid actions such as the occupation (or deforestation) of more and more natural areas by humans, a new concept of intelligent agriculture has been designed.

In addition, the incipient increase in the world's population makes it necessary to optimize all food-related processes, since more will have to be produced to meet demand. If agricultural methods do not change, future generations may be affected by a production shortfall and thus higher prices. As a consequence, such optimization can be reflected in better water management for irrigation, which is positive for countries currently affected by increasingly frequent periods of drought due to climate change.

On a planet where resources are limited for an exponentially growing population, it is our duty to devote all our attention to solutions that ensure the future of both mankind and the planet.

MARKET

Our initial target is the agri-food sector, although possible developments for other applications are not ruled out. Although today there is more machinery and less manpower required, agriculture has not completely detached itself from its origins. This applies to traditional agriculture as well as to ecological and sustainable initiatives. However, given the size of the sector and the casuistry, the following market segmentation will be made.

- **Sustainable agricultural enterprises:** Primary target client, given the sustainable nature of this initiative, it is expected that, in the first instance, greater acceptance will be achieved among this group of clients. The objective is to start on a small scale, adapting the product according to the customer's needs and moving towards larger crops within this segment.
- **Traditional agricultural companies:** Secondary target customer, this is the customer segment that will bring the most profitability to the company. However, they are based on the classic methodology, so the period for attracting this customer is estimated to be longer, since it represents a change in the way of understanding agriculture. From the development made with the previous segment, it will be possible to offer the product to larger companies with a guarantee and gain more confidence among potential customers.
- **Research:** This initiative is especially useful for monitoring ecosystems, endangered species, pest control, etc., covering many of the activities carried out by regional governments for the conservation of natural parks or protected areas.

COMPETENCE

So far, the number of projects related to this activity is rather scarce. However, several countries are researching and allocating resources for the development of smart agriculture, such as India and China. In Europe, there is an Italian start-up called xFarm that offers an interface for customers on crop status and management. Also, the Japanese company Avinton has an initiative focused on smart farming that is quite innovative. Despite this, the existing competition in the sector is scarce, perhaps because of the deep rootedness towards the existing classical methodology.

COMPETITIVE ADVANTAGE

Competitive advantage will be based on increased crop monitoring with adapted drones capable of covering large crop areas coupled with the processing and analysis of large amounts of data (Big Data) using an Artificial Intelligence platform. The ability to turn data into real business value is what characterizes a data-driven organization: it is where smart farming becomes reality.

BUSINESS MODEL

The business model thought out for this initiative is realized in a canvas on the last page. This canvas contains a global perspective of the business model. In this section we will analyze **how revenues will be generated**.

At the earliest stage of the project, the target customer will be sustainable companies; once the product is established, it will be possible to move on to a broader customer segment, large agricultural companies or governments.

As for the source of income, different packages will be offered to customers in the form of monthly subscriptions. These customized packages will include the necessary equipment (drones, sensors, stations, etc) depending on the cultivated area, and the assistance of Artificial Intelligence in the form of an application. The revenue structure is designed in the form of monthly subscriptions because the AI platform and its connection with the crops are the most important asset of our initiative, where smart agriculture comes to life. On the other hand, the goal is to make it cheaper and design our own specialized drones and offer them in packages for customers. There will be packages that offer more services than others, for example drones with more sophisticated sensors, with analysis of more parameters (e.g. sweetness of the product) or with implemented predictions (e.g. demand forecast in a region, forecast of the amount of product to be harvested, etc.).

However, the above cost structure is not planned to be achieved until the development phase of the project is completed. This phase consists of having several partners (small sustainable companies) and carrying out drone flights, sensor tests, analysis of large amounts of data for different crops in their crops and facilities to carry out the machine learning process for the Artificial Intelligence platform. This activity should be funded until the end of the development phase.

VISION

The first months or years will be dedicated to the development of both the drones and the Artificial Intelligence platform. Once this phase is over, the product will be focused on a limited number of customers on a sustainable basis and generally not very large. This will allow better analysis of customer needs, product inefficiencies and help the AI to improve (the larger the database and casuistry the better the predictions).

When these inefficiencies are solved and the customers are satisfied, it will jump to larger customers also on a sustainable basis and repeat the previous process. Here the challenge will be to move on to a larger operation and the management problems that this entails. Finally, once the product is established in this sector, the aim is to move on to large intensive agriculture producers, with a satisfied customer base that is synonymous with guarantee and security.

SOCIAL IMPACT

This initiative is aimed at creating a sustainable community with automated and efficient agriculture, where the use of fertilizers and pesticides will be highly localized, if eradicated. The effective use of cultivated land aims at the cessation of human occupation of natural areas for new plantations. It also entails a more responsible consumption of water, which is becoming increasingly scarce in some regions, a situation exacerbated by climate change.

KNOWLEDGE BASE AND PROJECT STATUS

Both members are finishing the degree in Aerospace Engineering. As for the design of the drones, it is based on a project carried out on the design and control of a UAV for cleaning windows. The advantage of being able to create our own drones is the cost reduction and the customization of the drone for different activities or customers, which adds a versatile character to our activity.

On the other hand, at the software level, the Artificial Intelligence platform has not been addressed for the moment. Also, the project lacks a database that stores as many variables as possible from different crops so that Artificial Intelligence can learn and improve. In addition to predictive models both meteorological and agronomic or market.

In conclusion, the project encompasses three areas of knowledge: engineering, Artificial Intelligence and agronomy. Of which the first one is fully covered and the remaining ones need a boost.

EMPATHY MAP

With our tool, the client intends to increase profits and reduce crop inefficiencies (in the form of localization of diseases, fungi, controlled consumption of water, pesticides, etc.). Moreover, with the predictive nature of the tool, the customer will aim to anticipate disasters, whether natural or economic. All these measures result in the construction of a sustainable environment, and if it turns out that the client considers sustainability as a priority, this demand will also be satisfied.

VALIDATION OF THE BUSINESS MODEL AND MINIMUM VIABLE PRODUCT

First of all, in order to analyze to what extent potential customers (small sustainable companies) will support the initiative, an attractive web page will be designed where the initiative will be summarized with videos and where the potential customer can interact with an interface that simulates Artificial Intelligence. To check how many of them would be willing to buy the product, a free registration form could be created to better analyze the customer.

Once the acceptance within the selected market segment is analyzed, if it is positive, we will work together with these companies (limited number) to develop the tool and thus meet the needs of customers.

ECONOMIC DATA

As a first estimate, we will analyze how much it would cost in terms of hardware to work on 1 hectare of land. This estimate will strongly depend on the client's needs. In addition, the cost of the development of the Artificial Intelligence platform has not been taken into account. In the canvas on the last page, a cost estimate for the realization of the minimum viable product has been made.

	QUANTITY	PRICE (total) (€)
UAV	2	300
Sensors	10	50
Data stations	1	100

PROBLEM

- **Increased demand in the agri-food sector:** the great challenge in the very near future will be to feed a growing population on a planet with limited resources.
- **Competition with lower production costs:** countries with cheaper labor makes it difficult for companies from countries with more expensive labor to obtain a higher profit. Therefore, automation in the sector would imply a reduction in production costs.
- **Inefficiencies:** to meet world demand, crop yields must be increased.
- **Unsustainable situation:** it is necessary to make the most of the land in use and not occupy natural spaces, otherwise there will come a time when there is no space and ecosystems will be destroyed.
- **Inefficient resource management:** more responsible water consumption and more localized use of pesticides.
- **Dependent on nature:** anticipate events in order to be prepared for any natural or geopolitical event using technologies.

SOLUTION

- Efficient resource management
- Increased crop yields
- Reduced losses due to diseases and pests
- Increased predictability of weather, market, product quality, etc.
- Labor reduction and process automation
- Increased attention to large crop areas

KEY RESOURCES

- **Physical resources:** specialized UAVs, sensors, communication stations.
- **Intellectual resources:** to develop the Artificial Intelligence platform, the application interface, the web page and user traffic control.
- **Human resources:** client company interaction and system maintenance.
- **Financial resources:** key at the beginning of the initiative for the development of the Artificial Intelligence platform. Also in the form of partnerships with customers to test and improve the product.

VALUE PROPOSAL

- **Crop monitoring and control service:** using specialized drones and various sensors distributed throughout the field. Permanently connected to the client, they allow real-time and remote interaction with the crops through an application.
- **Artificial Intelligence support service:** once the data is collected and compared with an extensive database, artificial intelligence communicates to the customer the needs of their crops, such as pests, diseases, product quality, best time to harvest, cultivate, etc.
- **Product customization:** depending on the type of crop in the area where it is located and the customer's needs (priorities to optimize one activity over another), the drones will be equipped with great versatility to adapt to the required tasks. Likewise, the Artificial Intelligence platform will learn more about the customer and create a more personalized product.

ELIMINATE	INCREASE
<ul style="list-style-type: none"> • Labor • Poor resource management 	<ul style="list-style-type: none"> • Productivity • Product quality
REDUCE	CREATE
<ul style="list-style-type: none"> • Plague and diseases • Inefficiency • Use of pesticides 	<ul style="list-style-type: none"> • Sustainable community • Greater automatization • Responsible consumption of resources • greater predictivity

SPECIAL ADVANTAJE

- **Differentiation with the traditional agricultural market:** greater automation leading to a reduction in the cost of production. Introduction of Artificial Intelligence to optimize and manage crops. This tool will provide the customer with a personalized diagnosis of his crop that will give him an advantage over his competitors with a more competitive product and a more efficient production.
- **Differentiation from direct competition:** offer a customized product to the customer with a versatile drone fleet and an Artificial Intelligence platform able to offer a competitive advantage to the customer with an easy to understand interface.

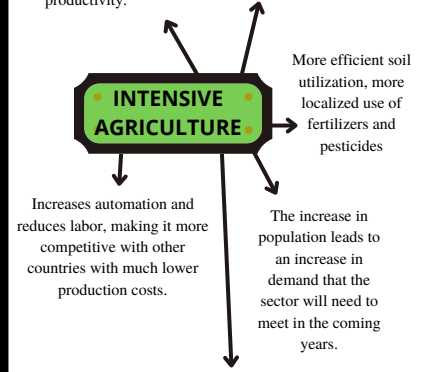
CHANNELS

- **Advertising with Google:** the goal is to reach the target customer with the filters that Google makes available to us.
- **Entrepreneurship and sustainability fairs,** agricultural innovation, etc.
- **Media:** for the innovative and groundbreaking character
- **Customers:** it is necessary for companies to test the product and position themselves advantageously in the market to give a privileged view of the product. Attract new customers through established customers. **Example:** company tests the product and in one year increases production and profits or reduces losses, etc.

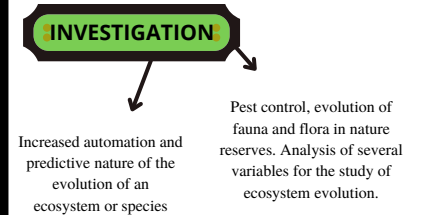
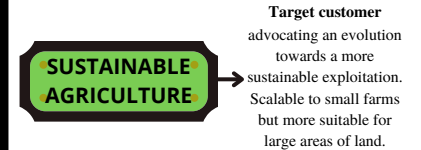
Attractive website, where simulations and product description appear and where the customer can interact. Way to test the prototype and analyze the initial potential number of customers and their needs.

CUSTOMER SEGMENT

Space and resources are limited, requiring greater efficiency and productivity.

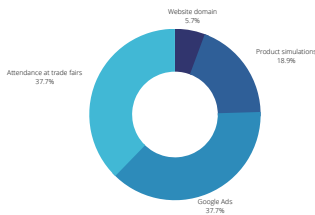


Target customer who is settled with the current agricultural methods and may not care about sustainability. Special focus on this segment with a recruitment campaign to show the advantages for your company and the world of this new concept.

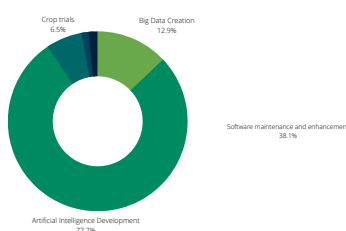


COST STRUCTURE

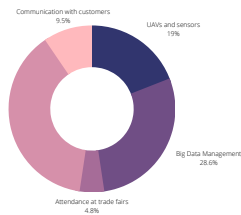
PRODUCT FEASIBILITY STUDY



PRODUCT DEVELOPMENT



ONGOING INITIATIVE



REVENUE STREAM

SALE OF NECESSARY TOOLS:

- **Specialized UAVs:** specialization in crop analysis, pest control, cleaning, irrigation, or transport. Wide range of products
- **Fixed sensors**
- **Ground stations**

SUBSCRIPTION OFFER

For the use of the Artificial Intelligence platform, where the initiative comes to life will be carried out through subscriptions. There will be different subscriptions, depending on the type of crops and tools available on the platform.

