



SKY-GARDEN

Smart Vertical Farming

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Execution Summary

Smart vertical farming company is urban farming company which focuses on providing technologies for smart vertical farming in Ethiopian cities with affordable and reasonable price. It will have a mobile application software and it will import sensors and other technologies so that they can be integrated to give a solution to smart urban vertical farming system. It will also give user guides for installation and maintenance so that the customers can manage themselves the technology after initial guidance.

Regarding its marketing it will have an official website that is used for advertising purposes which helps to reach many customers in a shorter period of time. Our target customers will be people who live in towns of Ethiopia who have access to electricity and network connection, especially those who live around condominiums and other crowded areas who do not have enough space to perform agriculture in the traditional way.

The company will have a main office and stores across the city for product stores and selling centers. It will also have an agent distributor who can take the product and sell to customers. Its initial capital will be from loan funds, from owners contribution as well as A series funding or angel funding.

The operation of the technologies is that in such a way the sensors read and detect the weather condition, temperature, humidity and moisture or water level of the soil. Then the system informs the owner through smart-phones about the statistics of the situation and it also takes automatic actions such as watering. The main container will be vertically aligned in a case and in each container customers can plant whatever they want.

Description Of Venture

Mission statement

Our mission is To expand smart vertical farming which is a practical technology through which large quantities of foodcrops and medicinal plants can be produced in a very small space only with the help of advanced technology in Ethiopia.

Objective

- The main objective of smart vertical farming is to maximise yield against minimal usage of natural resources. It promotes precision farming as well as sustainable agriculture way morethan traditional techniques of cultivation.
- Here, the vertical method of cultivation aims to overcome the challenges posed by conventional farming techniques in citiesand towns of Ethiopia.

Specifically our company objectives are the following:

- Promote smart vertical farming in Ethiopia.
- Contribute to the countries sustainable development goal byexpanding urban farming .
- Solving the problems of urban farming posed by traditionalway of farming.

Products (service)

Our service is providing all necessary equipment and technologies that are mandatory to install and expand smart urban vertical farming.

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Market analysis

With the global population set to exceed 10 billion people, and 112 million people in Ethiopia's case, by 2050, the challenge of providing enough food for everyone in a sustainable, efficient, and cost-effective way is rising in significance. One potential solution for this is the quite literally growing trend of vertical farming: a type of urban farming where crops are grown in stacked layers, rather than spread out across large plots of land, which allows humans to condense about 700 acres of farmland into the size of a big box retail store. These farms offer many benefits over traditional ones, including the prospect of better access to healthy foods in underserved communities. Shedding the restrictions of seasonal weather patterns, overcoming transportation challenges and enhancing yields (usually 50 to 100 times greater than that of a traditional crop farm), vertical farming could be the future of food production.

Due to social, political, and economic causes, high food prices have emerged as a major national challenge, especially for poor households in urban areas of Ethiopia. People living in these areas struggle to cope with sustained high food prices and achieve food security. A study conducted on 550 households selected from three sub-cities of Addis Ababa in 2012 found that 75% of households were food insecure and 23% were in a state of hunger. These kinds of situations, coupled with the current inflation in the country, make the idea of producing food at home through vertical farming with the help of the latest and affordable technology very trending, which in turn makes our product in highest demand in Ethiopia's urban economy.

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Additionally, as the work-culture in cities is not convenient for people to take care of indoor crops, the people have a high chance of buying our product. Since we are the first manufacturing firm in the smart vertical farming sector, we do not have any potential competitors in the market, which makes our product's degree of substitutability nearly zero.

Development and production

production process

Our business of smart vertical farming ties its ground on installation of materials and its control systems production and embedding them to these materials. The facility materials shall be imported from well known manufacturers and vendors after passing the needed quality requirements and testing issues.

The business will involve digital system (software) deployment to control and monitor the growth of plants on the smart vertical farm, which is meant to be the base for our business. The digital system is capable of collecting data about the environmental parameters and then give a possible recommendation with the collected metrics. These environmental parameters include temperature, moisture, sunlight exposure and soil acidity. The farming facilities will be pre-loaded with the sensors of these environmental parameters.

Technical applications of artificial intelligence, internet of things (IOT), machine learning will be extensively used through our system. The software installation will manually be done after physical installation of the vertical farming facility. The software will be produced based on the nature of the machines and considering portability and compatibility issues, there shall be different versions of it.

The software's input feeders such as the sensors shall be programmed in a way that takes into account the vary nature of the climate and scientific study and research on local Ethiopian farmers' experience. The information gathering shall be conducted with a small group of people whose responsibility isto study the demographic, climatic and geographic location of the concerned metropolitan center. By aggregating the application of AI, IOT, and machine learning The software engineers team shall take care of the technical issues of designing and testing of the software prototype and then shall be passed to patented mass production of the software.

Required resources: For the business to be run, we need the following requirements.

Materialistic Resources

Name	Amount needed in number
Customer office	1
Demo workshop	1
Store	1
Office chairs	5
Office	1
Folder shelf	(1) of size 4m x 2.5m
Store shelf	(3) of size 10m x 4m
Selling points(shops)	3
Pickup vehicle	1

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Non-materialistic Resources

Name	Amount needed in number
Software engineers for system design & development	10
Technical SRS writer	1
Manager	1
Information desk personnel	1
Store keeper	3
Sales men	3
Driver	1
Guards	2
Social media personnel	1

Quality assurance

During the development stage of our Business keeping track of our products and services is very mandatory and will be paid a significant amount of attention.

The SRS will be prepared based on what the real consumers of our services and products want. For this the SRS writer is expected to collect the necessary information from our potential customers and the software engineers shall design the system based on the SRS document.

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Once the software engineers make ready the System after passing through a series of testing stages, it shall be implemented in a demo workshop and will be tested for its efficiency and quality. Finally, it shall be embedded to the machines and be brought to the market. The salesmen on respective sales points shall receive a training of basic installation of the system and will manage to install for every customer reaching out to their endpoint.

The manager will be responsible for checking the satisfaction of customers and hence assure the quality of our products and installation based on the received feedback from customers.

Marketing plan

As the basic business ground of our business is to deliver a service, it's necessary to have one structured and well planned way of commercialization and distribution of our services. The unfamiliarity and non abundance of the business idea and its modern application of technology shall create a very favourable environment for our business from the competition aspects and might need us to do more on the promotion and reaching out to our possible customers. Hence we will be using the following market plan to run our business.

Overall concept and orientation

Generally, the marketing mode of our services and products shall be devised based on the country's domestic market rules and custom regulations. Much of our focus point goes to metropolitan areas as our service fits well there. From the fact that the incubation rate of new ideas and technologies is much greater at urban areas and also the resource scarcity of land and the like shall make our products out there a non optional. For these and other reasons we are targeting the metropolitan (urban) areas and shall give much of emphasis for it.

Marketing strategy

To make our products and services marketable, we will have 3 sales points with one sales man for each of them. This helps us reach our customers so easily and much faster with broader area coverage.

Once the installation is done for customers we shall use this as a way to attract other more customers by providing extra incentives and providing different bonus packages for free. We shall also give a partnership opportunity for our first heat customers by making a volunteer arrangement of bringing new customers to our business and get a commission for their effort. This is expected to boost the number of our customers and our partners at the same time which is meant to bring a good image for our business in the community.

Apart from indoor partnerships and bonus packages we use every possible way of advertisement and promotions to facilitate our business. Our social media presence shall be given a considerable weight and thus shall be handled with its own department. This department shall handle every issue related with promotions and advertisements. Any updates and services on our services shall be available to the public with just a click of posts. And if necessary will use other advertising options such as Radio, TV, Magazines, Newspapers and the like.

Communication nowadays is becoming much easier over social media and other electronic services such as email. The business will carefully include these all and will try to grasp much of its advantages.

Our target won't be fixed on only urban centers and with time, it will expand to other rural areas based on the demand from our customers. We believe that the outgrowing nature of our business behaviour would be on demand with considerably little amount of time. And this shall create an opportunity for the business to be grown into remote rural areas.

Sales forecast

Based on the marketing strategies and plans discussed above our sales are expected to grow at an exponential rate with time. The following are the sales forecasts of five consecutive years.

Year	Number of installation	Number of partners upgrade from being customers	Expected sales(ETB)
2023	15	5	1,500,000
2024	35	15	3,500,000
2025	60	30	6,000,000
2026	90	50	7,000,000
2027	125	75	12,500,000

The above table is an approximation based on presumptions and facts about the market plan we have made. With these five years of operation the business sale is expected to grow at an exponential rate proportionally with the number of installations and the number of newly upgraded partners from customers.

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Organisational plan

Form of Business

The business will undertake a form of partnership. The project shall be running with a small number of shareholders at the beginning stage. The number of partners is expected to grow considerably with the real operating time of the company. The shareholders will earn according to the percent share they have in the company. The more the share someone has, the more the profit goes to him. We are planning to engage in this business with fully committed members. The organisation is managed by a manager who controls the overall system and flow of the business.

Organisational Structure

The organisational structure of the company exhibits a Private Limited Company (PLC) organisational basement and the extent of responsibilities of the company shall be defined and limited accordingly. The rights and regulations of every person working for the company shall be stated on the well documented rules and regulation of the company. This document shall be used as a guideline for the operation and responsibilities of each individual in the company. Moreover anything related to ownership among the members of shareholders with respect to the law of the country shall be included in it. For the sake of clarity and common agreement, this document shall be drafted by the for-founders of business and can be amended if found necessary. The flexible nature of the document helps the new partners to make their idea clear to the rest shareholders and then be stated on the document if reached on an agreement. The organisational bodies with respect to their responsibilities is stated in the table below.

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Name	Job title	Job description
Semira Nuri	General director	- Manages the interoperability of the company and makes sure the overall running of the business. - takes care of the legal issues of the company - the highest decision maker during operation.
Meseret Degu	Site manager	- makes sure that the installation of the vertical farming is as per the standard of the company. - having a regular visit to sites of our installations and taking the needed checkups on the system
Bezawit Nigusie	Customer service	- device of attracting new customers. - managing customer's requests and providing them a partnership opportunity after a successful delivery of our service.
Mahider Getahun	Technical support expert	- gives support on engineering issues of the system - teams up the software engineers so that a service is provided within a short period of time.
Atitegeb Ayan	Head of marketing department	- will take care of new comer customers and will help them visit our modelling workshop.
	IT manager	- responsible for the information flow among the business nodes and endpoints. - will be responsible for information flow among our company and the vendors of hardware facilities we will use.

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Financial plan

The following tables and descriptions include the capital that we need for both fixed inputs and variable inputs that we need for the business.

We have planned to get the financial support of the business covering both fixed capital and operating costs from Commercial Banks that will be paid within two years. This will be done by getting “medium term loan” from these banks on which we can repay it with as much minimum interest rate.

Here the following table illustrates our financial plan to base and run our business.

Capital Requirement	Equity (ETB)	Loan (ETB)	Total (ETB)
Investment Capital • Common installation machinery and tools: Grinder, Cutter, Solder • Workshop • Store • Office	500,000	1,000,000	1,500,000
Working Capital • Raw Materials: Arduino kit, Steel / Iron rod, Wire • Electric consumption • Wage and Salary: Store keeper, Mechanical maintainer (welding, etc...), Guards • Software engineers for system design & development • SRS document writer	400,000	1,000,000	1,400,000
Total	9,000,000	2,000,000	2,900,000

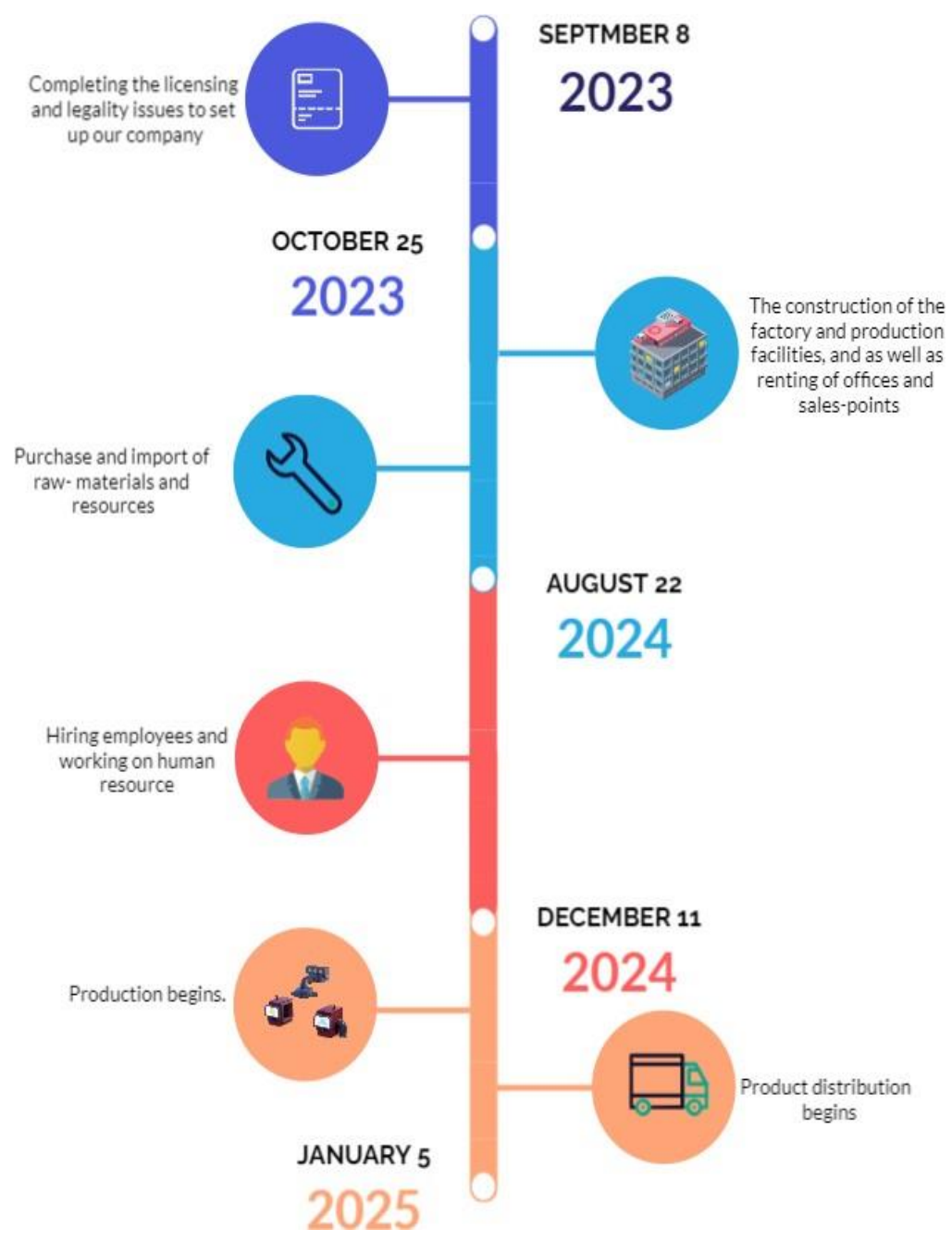
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Risk assessment and contingency plan

Our entire business model has been designed to minimise risk and deliver smooth, predictable growth into the future. Expected risks and their corresponding contingency plans are listed in the table below.

Risk	Probability(in scale between0 and 1)	Preparation	Response
The prices of basic raw materials exceeds the expected price in our plan	0.4	- Purchase raw- materials that are enough in amount for a 1-year-period production. - Perform research on the prices of the raw-materials in a 3-months-period interval.	Make a reasonable increase in the prices of the products, to make up for increases in raw-material prices.
The factory run out of raw-materials and resources	0.35	- Purchase raw-materials and resources that are enough in amount for a 1-year-period production. - Purchase raw-materials and resources quarterly.	Properly utilise the raw-materials and resources found in the store
Frequent power failures occur in the factory	0.6	- Purchase and install power generator units in the factory as a part of its construction - Configure the Power units to automatic mode so that whenever the power goes out, the production continues without disruption using power from generators	

Scheduling and milestones



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Appendix

Vertical Farming is a novel method of growing crops by artificially stacking plants vertically above each other either in skyscrapers or by using the third dimension of space. This might help to solve many of the future's problems like malnutrition, polluted food etc. that could become evident along with food scarcity. In this kind of farming there is huge scope to acquire more agricultural produce as this practice allows a huge amount of crops to be grown in a much lesser space, when compared to traditional farming and other alternatives like permaculture, biodynamic and agro-ecological farming (Fenton, 2012; Padmavathy and Gopalswamy, 2011) thus reducing the use of agricultural land. Furthermore, this practice recycles and reuses other natural resources such as water and nutrients and creates less waste as plants grow in soil-less media. As a result, vertical farming leads to a smaller carbon footprint and causes much less pollution to the environment (Hamilton, 2016).

The History of Vertical Farming dates back to 1915 when the American geologist Gilbert Ellis Bailey wrote a book called Vertical Farming. Though the book

primarily dealt with the topic of using particular types of soils to grow crops, the idea of Vertical Farm came from the theory of this book (Bailey G, 1852). The concept of Vertical Farming has been there for decades; however, the demand for more food production, pollution free produce and inclusion of modern technologies would drive farmers, farming societies, and commercial companies to take up vertical farming on a large scale. The first vertical farm came into existence in the 1950s to grow cress indoors at a large scale. Today many biotechnology companies and startups have taken this concept to the next level making vertical farming an economically viable model (NFIB, 2015) considering the pollution free or organic cultivation.

Vertical farming produces about 10 times the amount of produce per acre, per year, than traditional soil farming. This type of growing uses 70 to 90 percent less water than a field farmer, as the water is recirculated and goes straight to the plant, resulting in minimal evaporation. Since most pests and diseases are soil-borne and hydroponics is soilless, there are fewer pest and disease problems. This type of growing allows crops that would traditionally be mono crop to have multiple yields.

SKY_GARDEN smart vertical farming makes all its operations, organisations, and investments in order to change consumer behaviour, increase awareness and demand toward farming. By selling domestic vertical farming production devices, it is aimed to change the habits of consumers. In the long term, it is aimed to have vertical agricultural machines in the homes of individuals.



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