HYDROPONICS

AIM2Flourish Report

GROUP 12

2023

INTRODUCTION

Business Overview

The business started in 2019 and engages in various agricultural activities, including crop farming, livestock farming, and the trade of agricultural products, among other related ventures. City Shamba wants to establish a cutting-edge, innovative agriculture enterprise dedicated to facilitating the shift of food systems toward intelligent and sustainable farming. They aim to enhance food security, generate employment opportunities, and combat climate change. They enable large-scale production on a small-scale farm, providing better quality foods for lower prices and significantly less ecological and environmental impact. They can yield at least 60% more than a conventional farm can. City Shamba offers 17 different agriculture-based services, some solely to help train more people in this practice and educate them on the importance of their work. In addition, you are also able to buy products for farming directly from their website. They have completed 706 projects since 2019 and have 248 on the go.

Innovation Overview

City Shamba is based in Nairobi, Kenya, and pioneer in sustainable agricultural innovation with vertical farming and aquaponics. It combines both to optimize resource use, reduce environmental impact, and enhance food security, addressing crucial rural challenges in the region.

DESCRIPTION OF INNOVATION

City Shamba is based in Nairobi, Kenya, leads the charge in sustainable agriculture, reshaping traditional farming practices. Their key breakthrough involves merging vertical farming and aquaponics. Vertical farming optimizes space by growing crops in stacked layers, and aquaponics combines fish farming with hydroponics, creating a system where fish waste fertilizes plants, and plants clean the water for the fish. This innovation reduces resource use, conserves water, and eliminates the need for traditional soil cultivation.

Strategically addressing agricultural and socio-economic challenges, City Shamba employs inventive techniques like vertical farming and aquaponics. These methods optimize space, enhance crop yields, and conserve resources. This strategy aligns seamlessly with UN SDG 2 (Zero Hunger) by improving food production efficiency, supporting SDG 12 (Responsible Consumption and Production) through sustainable agriculture, and advancing SDG 3 (Good Health and Well-being) with nutritious, locally grown produce.

Furthermore, City Shamba actively contributes to sustainable urban development (SDG 11) by introducing space-efficient farming technologies suitable for urban areas, promoting local food production, and reducing the environmental impact of food transportation. Their commitment to partnerships resonates with SDG 17 (Partnerships for the Goals), fostering inclusivity and addressing poverty (SDG 1) by creating opportunities for livelihood improvement through sustainable agriculture. In essence, Green Ponic Solutions' strategic approach aligns intricately with UN SDGs, offering a comprehensive and impactful agricultural innovation that resonates with broader societal and environmental objectives.

INSPIRATION FOR INNOVATION

01

The founder of the company is Gregory Kimani, who is also the CEO. He grew up in poverty within the slums of Nairobi, which is a source of inspiration for the innovation and the social initiatives he undertakes. During the interview, Kimani stated, "I could not afford three meals in a day, and that was quite a widespread challenge for so many families," to illustrate his motivation factor.

02

Extreme poverty in the Kenyan slums implies there is limited food, so he could not afford a three-course meal. The struggles inspired his mission to create sustainable city communities, especially in the slums, to ensure they can utilize the limited space to grow their crops to satisfy daily needs. His statement reflected a genuine desire to utilize the knowledge he acquired over the years and the resources to address the systematic issues they grappled with while growing up.

03

The intention to utilize the knowledge and understanding of the challenges faced by urban slums and cities illustrates an authentic commitment to developing community-driven innovation. His desire to make a difference locally and globally illustrates a vision driven by individual experiences that invoke societal transformation. His journey is a testimony to how individual experiences can inspire change and the development of practical solutions that serve to ensure sustainable development.

IMPACT OF INNOVATION

Hydroponics, a soil-less method of plant cultivation, presents a dichotomy of immediate challenges and enduring benefits. Substantial setup costs for farmers may deter the initial implementation of this innovative agricultural technique. However, the long-term advantages encompass enhanced crop yields and augmented sustainability. Consumers are afforded consistent access to fresh produce, although initial price considerations may be a factor. The growth of the hydroponics industry offers potential profitability for investors. From an environmental standpoint, hydroponics contributes to reducing resource usage and enhancing efficiency, thereby fostering sustainability.

Hydroponics ensures consistent access to fresh produce for consumers, as crops can be grown year-round regardless of weather conditions or seasons. However, the initial price of hydroponically grown produce may be higher due to the costs associated with setting up and maintaining the system.

As more people embrace healthy lifestyles and locally grown produce, the demand for hydroponically grown crops will likely increase.

Regarding crop growth, hydroponic systems can lead to faster plant growth and harvest times than traditional soil-based farming. This is because the plants are provided with optimal nutrients directly to their roots, and they do not need to grow extensive root systems to search for nutrients, allowing more energy to be diverted to the growth of vegetation and fruit. Therefore, the increased crop yields can be realized within a few weeks to months, depending on the crop being grown.

For farmers and growers, the effects of hydroponics can be realized in their farming operations, regardless of the scale. Hydroponics can be used in various scenarios, from growing a small collection of herbs in a kitchen to numerous plants in a large-scale commercial operation. This farming method can benefit people with limited or no outdoor space, such as urban residents, apartment dwellers, or renters who need an outdoor garden.

IMPACT OF INNOVATION CONTINUED

In terms of geographical location, the effects of hydroponics can be realized anywhere, as it allows for the growth of crops in areas where traditional farming may not be feasible. This includes areas with extreme weather conditions, poor soil quality, or limited cultivable land. For instance, hydroponics has provided fresh, local food for areas with extreme droughts and low soil quality, such as in sub-Saharan Africa.
From a consumer perspective, the effects of hydroponics can be realized through access to fresh, locally-grown produce. Hydroponic farming offers the opportunity to grow fresh foods within minutes or hours of the consumers who will eventually enjoy them. This can lead to improved taste and quality of the produce, as the greens grown locally in a hydroponic system often taste much better than those that have traveled thousands of miles from a farm to the grocery store.
For investors, the effects of hydroponics can be realized in the form of potential returns on investment. Hydroponics is a growing industry with increasing demand, and it has attracted investments from various individuals and companies, including Elon Musk and Jeff Bezos.
Regarding environmental impact, the effects of hydroponics can be realized globally. Hydroponics is a more sustainable farming method than traditional soil-based farming, as it uses less water, does not contribute to soil degradation, and can help slow land degradation. Therefore, adopting hydroponics can contribute to global efforts to address environmental challenges such as water scarcity and land degradation.

INNOVATION BENEFITS THE BUSINESS

Hydroponic farming, a soil-less method of cultivating plants, stimulates economic growth in various ways. Consumers benefit from consistent access to fresh produce throughout the year, leading to increased demand for locally grown produce. Faster plant growth and harvest times in hydroponic systems increase crop yields, benefiting farmers and growers. This method can be implemented anywhere, allowing for crop growth in areas where traditional farming is not feasible, such as regions with extreme weather conditions, poor soil quality, or limited cultivable land. From an investment standpoint, hydroponics is a growing industry with increasing demand. The global hydroponics crop market is estimated to be valued at USD 37.7 billion in 2022 and is projected to reach USD 53.4 billion by 2027, with a Compound Annual Growth Rate (CAGR) of 7.1%. This growth attracts investments from various individuals and companies, creating new job opportunities and boosting local economies.

7.1%

Compounded Annual Growth Rate

Global hydroponics market is estimated to be valued at USD 37.7 billion in 2022 and is projected to reach USD 53.4 billion by 2027

INNOVATION BENEFITS THE BUSINESS

Environmentally, hydroponics is more sustainable than traditional soil-based farming, as it uses less water, does not contribute to soil degradation, and can help slow land degradation. However, it is essential to note that hydroponic farming can have a higher environmental impact than conventional farming due to significantly higher energy consumption and subsequent Greenhouse Gas (GHG) emissions. Regarding productivity, plants grown in hydroponic systems achieve a 20–25% higher yield than those grown using traditional agricultural systems, with 2–5 times higher productivity. This increased productivity can lead to more efficient use of resources and contribute to economic growth in the agricultural sector.
In summary, hydroponic farming stimulates economic growth by increasing demand for locally grown produce, creating new job opportunities, and boosting local economies. It also contributes to sustainable farming practices, which can help slow land degradation and improve resource efficiency. Due to this growth City Shamba has been able to hire more employees and expand operations.

2.5X

Higher productivity

Plants grown in hydroponic systems achieve a 20–25% higher yield than those grown using traditional agricultural systems.

SOCIETAL AND ENVIRONMENTAL BENEFITS

01

Food Securiy

City Shamba introduces a food security initiative tailored explicitly for urban environments, addressing the challenges of hunger and malnutrition. Organized groups from primary to university ages can access valuable knowledge and resources through agriculture resources and information centers. Individuals will be equipped with the skills to cultivate their food.

02

Primary Objective

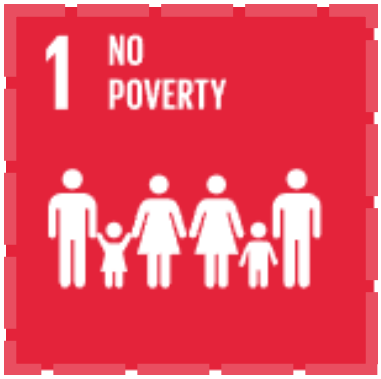
The primary objective is to facilitate a transformation in the urban food system, emphasizing the importance of localized food production to enhance food security and nutrition. This service is available to individuals interested in becoming more knowledgeable on agriculture, those who understand that change needs to be made to help society, and those interested in being a part of the change. This can be anyone of all ages, as different organized groups will cater to the needs and wants of each age group. This happens at public locations where the groups typically meet, but anyone can stop by and partake in the learning.

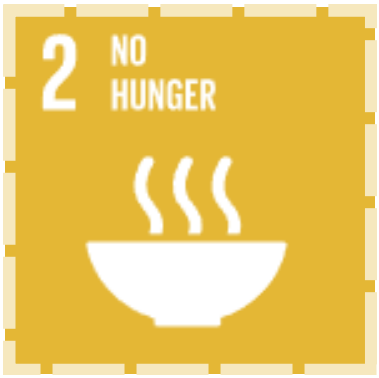
03

Environmentally Friendly

Their company is also helping the environment as they believe that whatever they are building should be built to help the environment; they will not do anything unnecessary and ruin the farming land. When planting, they ensure the use of organic inputs that help to build sustainability. They also decompose organic waste that, if not used, would go to the landfill and pile up. Therefore, this helps with the carbon footprint. They then take all the decomposed waste and have animal food and grass fertilizer used on their farm to help produce more crops. The integration of agriculture with the waste produced is really helping our environment to reduce and minimize the carbon food being produced.

UN GLOBAL GOALS: TOP 5 FOR CITY SHAMBA





A vision statement from City Shamba's - Greenponics Solutions: To create the most compelling smart agriculture Centre driving the transition of food systems to smart and sustainable farming methods aimed at improving food security, create employment, universal production and mitigate climate change impact.

ACKNOWLEDGEMENTS

Authors:
Luis Alvarez-Cascos
Marcelina Unold
Marcel Oyugi
Santiago Gomez
Shelby Mayberry
Mureti Gregory

Professors: Dr. Mary Ragui, Dr. Ruben Burga, Dr. Isabel Rodriguez, Romina Gholizadeh and Yang Hoong

Business Name : City Shamba/Greenponics Solutions
Business Type : Private Limited
Business Industry : Agriculture
Business Location : Nairobi, Kenya
Website: https://greenponicssolutions.com/service.html
Facebook : Greenponics Solutions
Twitter : https://twitter.com/greenponics_s
I**nstagram :** green.ponicssolutions
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We thank you for your continued support in reaching the UN Global Goals

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CONTACT INTERVIEWEE

Gregory Kimani
CEO & Founder

gregkim48@gmail.com

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