

2020 GENEVA CHALLENGE

VERTICAL FARMING IN REFUGEES SETTING (VEFIRS PROJECT)

*A tool for fostering inter group relations and
social integration*



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Executive Summary

In the last decade, Uganda in East Africa has witnessed an influx of refugees from South Sudan, Burundi, and Democratic Republic of Congo. The demand for land continues to grow at a fast pace especially in Bidibidi, the largest refugee settlement in East Africa. This continues to provoke tensions among refugees and host communities. As a result, refugees remain susceptible to exclusion from social, economic and political affairs in the settlement and are bound to exclude themselves from communal life. Uganda's approach to hosting this faction of marginalized people is premised on the government policies which have prioritized social inclusion. This enables them to have rights to attend schools for basic and elementary education, work and move freely within the country. What impedes self-reliance among the refugees, especially those in Bidibidi is the poor quality and size of plots of land provided to them which hinder agricultural productivity. In response to the situation, the United Nations and the Government of Uganda continue to supply food rations to refugees and host communities to ease the tension yet these people constantly complain that the food is insufficient and distribution is often delayed. The VEFIRS project aims to build the adaptive capacity of refugees and the host community of Bidibidi settlement to land scarcity and rocky soil through multi-storey vertical farming approach. The goal of this initiative is to help them become self-reliant in overcoming food shortage and poverty which are drivers of unethical behaviors. The multi-storey vertical farming technology shall be implemented in Bidibidi and will run from November 2020 to May 2021. The technology is a low-cost strategy that utilises locally available materials, easy to adopt and maintain, and environmentally friendly. The project will adopt a community centered approach in which project beneficiaries will participate in the design and execution of the technology. Skilled facilitation will be provided and progress monitored routinely. The project is expected to foster inter group relations and social integration while contributing towards the attainment of the Sustainable Development Goals #1, 2, 5,8,12, 13 and 15.

VEFIRS Project Team



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Monique Mededode Sognigbe is a Beninese and a final year master student of Food Security and Community Nutrition at Gulu University in Uganda sponsored by MasterCard Foundation through RUFORUM. Monique holds a Bachelor's degree in Life and Earth Sciences from the University of Abomey Calavi in Benin. She worked as Research Assistant and Laboratory Technician at the Laboratory of Genetics, Horticulture and Seed Sciences at the University of Abomey- Calavi. She is currently investigating the stability of sunflower oil produced by small-scale processors in Uganda. Monique has interests in food and nutrition security, community transformation and services, and climate change adaptation and resilience.



Iyaloo Nghinaalo Sheyavali is a Namibian supported by the MasterCard Foundation through RUFORUM. She is a final year student pursuing Master of Science in Food Security and Community Nutrition at Gulu University, Uganda. Iyaloo has a background in Food Science and Technology with huge interest in agro-processing, food product development, project planning, monitoring, and evaluation. Her research focuses on the effect of traditional malting practices on the functional properties, microbial quality and acceptability of Iron rich beans.



Marveen Nafula is a Ugandan supported by the MasterCard Foundation through RUFORUM and is currently in her final year pursuing Master of Science in Food Security and Community Nutrition at Gulu University. Her research focuses on adoption of cereal based malting to improve the nutritional quality of Iron rich beans. She studied Animal Production and Management at Busitema University in Uganda. She previously worked as a veterinary officer at a pioneer Agricultural Company in South Sudan for two years.



Aaron Ekipetot Nanok is a Kenyan and currently pursuing Master of Science in Food Security and Community Nutrition in the Department of Food Science and Postharvest Technology, Gulu University. He is supported by the Master Card Foundation through RUFORUM. Ekipetot is currently investigating integration of nutrition in food production among the rural households in northern Uganda. He is an Agricultural Officer working with Turkana County Government with four years of field experience. He is an Associate Expert in EIA/EA and holds a Bachelor's degree in Natural Resources Management from Egerton, Njoro (Kenya). He is a PMI CERTIFIED MEMBER, a project expert with a postgraduate diploma in project planning and management from Uganda Management Institute (UMI). Aaron is interested in project design & implementation and policy development in times of Climate Change.

INTRODUCTION

1.1 Background

After the struggle of African countries for independence, the transition from colonial governments have not led to successful peace in the continent until today. This has resulted in political instability, insecurity, ethnic violence, human rights violations and armed conflicts. Due to this, people are forced to leave their homes and seek asylum in neighboring countries. The vast majority of people of concern to the United Nation High Commission for Refugees live in Sub-Saharan Africa region, where an estimated 6.5 million people were refugees and 16.5 million were internally displaced persons (IDP) in 2018. Moreover, as the situation continues to worsen, about 10 million refugees have been denied nationality and access to basic rights such as education, health care, employment and freedom of movement with no voice in host countries because of their statuses (UNHCR, 2019).

The condition is more pressing in East Africa specifically in Uganda where the country became a host to 1.424 million refugees in April 2020 with South Sudan, Democratic Republic of Congo and Burundi accounting for 65.5, 30.9, and 3.6% respectively (UNHCR, 2020). This makes it the largest host of the refugee population in Africa and the third in the world after Turkey and Pakistan. Moreover, a recent report released by UNHCR in 2020 informed that the number of refugees in Uganda is most likely to hit 1.73 million by the end of 2020 (UNHCR, 2019).

While the refugee situation in Uganda becomes protracted owing to the continuous influx of refugees from different conflict-stricken regions, the size of land, a major source of livelihood for refugees and nationals alike, has remained the same. This has prompted land scarcity and increased tension among refugees and host communities. Most often, they are faced with physical, legal and food insecurities. Therefore, to survive, they frequently engage in life-threatening activities such as early marriages, theft, sexual exploitation and abuse. Consequently, to improve security of refugees, the government has allocated settlements for residential and agricultural purposes. By this, refugees are able to pursue their livelihoods just like the Ugandans (Civil Society Budget Advocacy Group, 2018). Despite the concerted efforts by the government, UNHCR, and other developmental agencies, these provisions and services are insufficient and short term. Therefore, the project proposes vertical farming technology as a supplement to the many interventions in order to reverse the current and emerging livelihood related social challenges for both refugees and the host communities in Bidibidi of Uganda.

1.2 Case Study

Bidibidi Settlement is located in North West Uganda in Yumbe district inhabited by the Aringa people. The settlement covers an area of 250 square kilometers (Boswell, 2018). The Eastern half of Yumbe stretches southward from the South Sudanese border and spills over into Moyo district along the western bank of river Kochi. Bidibidi became a refugee settlement in 2016 following the two decades of war in Northern Uganda prompting government action. The settlement was established to host the rapid influx of refugees, primarily arriving from South Sudan following a decade of tribal conflict between the Nuer and the Dinka speaking people (Hodgson, 2018). Until then, it became one of the largest refugee settlements ever in the world with a total population of over 232,718 (UNHCR, 2020). Among this population 82% constitutes women and children. Yumbe is categorized as a tropical savannah (Bassi *et al.*, 2018) and it is divided into five zones. Each of these zones is divided into clusters, which are further divided into individual villages surrounded by host community settlement (Dawa, 2019). The different zones have different soil types, some have fertile loamy soil; and some parts are composed of gravel soil and the areas close to the Nile have sandy soils (Narangui & Bush, 2017). However, Bidibidi area is composed of hunting grounds with low, rolling hills and mostly rocky soil which is not suitable for agriculture. Studies have shown that there is little crop production as settlers usually complain of the lack of farm inputs such as land, farm tools, seeds and the rocky soil which makes it hard for them to cultivate (Boswell, 2018 & Development Pathways, 2018). The host community of Yumbe district is primarily engaged in agro-pastoralism. Their source of livelihood is crop production (cassava, sorghum, sesame, and groundnuts as the main crops) and livestock rearing (sheep, goats and cows for milk and meat) (Narangui & Bush, 2017). The area has a bimodal rainfall pattern with the first season starting from April to June and the second season July to November. The two rainy seasons provide an average of 1250 mm of rainfall every year. With climate change and variability the area also experiences extreme dry spells leading to food insecurity.


1.3 Justification

In Uganda, refugees are not hosted in camps but in settlements with freedom of movement and full right to work. This enables them to have the same share of economic opportunities with host communities in the labor markets, rights to own property, access to education and basic services (Bassi *et al.*, 2018; Hovil, 2018; Zetter & Ruaudel, 2016). Moreover, they are consecutively given small plots of land for housing and farming in order to supplement relief support (Loiacono & Vargas, 2019).

Despite this myriad claimed services for refugees' welfare, they still face many challenges such as limited trading and employment opportunities. They live in remote areas and tend to suffer social stigma from employers, which hinders their ability to engage in the local economy (Bertrand & Duflo, 2016; Krause, 2016). In Bidibidi settlement, access to land remains an issue as there are no formal land rights granted to refugees. As such, there is a constant risk of violence, assault and coercion on an already traumatized population. More so, the population in the area has increased by 50% which is attributed to the continuous influx of refugees in the settlement. This has exerted more pressure on the available natural resource base in the area (Barigaba, 2017). Furthermore, previous data indicate that, although the Aringa people survive on growing crops and rearing livestock, most of the refugees do not own livestock. The land that is accessible is naturally rocky thus unsuitable for farming (Boswell, 2018).

While this situation remains critical, the UNHCR and the government of Uganda have continued to supply food rations in the settlement to sustain the population, yet refugees and the host community consistently complain that food distribution is insufficient and often delayed (UNHCR, 2017). Besides, it is believed that the government distribution of agricultural seeds seems inefficient as the quantity provided (0.5 kg) is too little for meaningful production. Similarly, as the government continues to work with the community to plant trees, these long term plans might not deliver the needed results in the soonest possible time.

To address the existing situation, vertical farming technology is proposed as an effective and efficient solution to build the adaptive capacity of the refugees and the host communities. This technology is a low-cost strategy to remedy the growing land scarcity and soil infertility. It is also desirable for the settlement where the population is growing at a fast pace such as Bidibidi settlement. Failure to intervene will lead to food and nutrition insecurity, a precursor of malnutrition among vulnerable groups. Hence, the purpose of this project is to increase the adaptive capacity of refugees and the host community of Bidibidi settlement to land scarcity and rocky soil through vertical farming approach with the goal of contributing to attainment of self-reliant and poverty reduction among refugees and the host community



LITERATURE REVIEW

2.1 Overview of Vertical farming technology

Interest in vertical farming gained traction following the publication of the book by Despommier (2010) who argued that the benefits of indoor greenhouse farming could be multiplied greatly by building high-rise buildings in urban environments. He proposed that one approach to addressing the future trend of diminishing agricultural resources, an increase in population growth, and changing climate involve the concept of vertical farming. Vertical farming is defined as cultivating vegetables vertically by new agricultural methods, which combines the design of buildings and farms all together in high-rise buildings (Benke & Tomkins, 2017). This technology needs to manifest both in the agricultural technique and architectural technology together. Novel contributions have been published on vertical farming; one of such is the work of Besthorn (2013) who examined the history of urban agriculture and revealed that vertical farming holds for communities with food security problems.

2.2 Types of Vertical Farming Technology

In Africa, the versions of vertical farming do not necessarily follow the same model of developed countries. For instance, in Kampala, the capital of Uganda, urban farmers have ventured into vertically stacked wooden crates for vegetable production. As a result, fifteen (15) vertical farms have been installed and operational. However, in Kenya, sack gardens represent a local and practical form of vertical farms. Furthermore, it has been cheap to design and build to suit their livelihood. In Kibera for example, over 22,000 households have farmed on sacks in Kenya. Below are the commonly practiced vertical farming technology:

2.2.1 Stacked Growth Surface

Stacked growth surface is a type of vertical farming system which comprises multiple levels of horizontal growing platforms. Crops such as lettuce, spinach, herbs, tomatoes, and pepper are commonly grown. It is made of materials such as soil, and wood which provide a medium for plant roots. This technology requires less water because it has the propensity to retain soil moisture. The horizontal layers can be stacked on top of each other within taller structures to form a vertical farm. It can be achieved in glass houses or controlled environments and is mostly used in large scale commercial enterprises growing relatively large volumes of several horticultural crops.

2.2.2 Multi-Floor Towers

Multi-floor towers utilize different levels of planting that are allocated on different floors of a tower structure. Crops are isolated from each other to support continuous growth. This approach is most suited for controlled environment systems. Horticultural crops grown in the stacked growth surfaces can grow here.

2.2.3 Cylindrical Growth Unit

The cylindrical growth unit also called multi-storey vertical garden is a technology that is designed and constructed in the form of a building with layers placed on top of each other for crop production purposes. The technology uses sacks, dam liners, and plastic bottles among others. It is a cost-effective farming technology as it discourages pests, weeds, and conserves water through minimal evaporation. This garden is suitable to grow kales, tomatoes, spinach, black African nightshade, cowpea leaves, pigeon pea, onions, strawberries, coriander, capsicum, eggplants, okra, and amaranths. A new multi-storey gardening farming technology using HDPE dam liners with a thickness of 0.5 - 1mm was invented by a Kenyan electrician in 2013. The liners allow smooth flow of water downwards and last for years as compared to the first conventional multi-storey garden using sacks.

However, the concept of vertical farming experiences social barriers along-side technical barriers as food grown is perceived as being 'food made from chemicals' and 'not natural'. This is a potential obstacle for the uptake of the technology and more research should be done on integrating it in current and best farming practices. Much as limited studies have been done on the health implication of addressing these social barriers, multi-story gardens are effective in reducing the social barriers associated with the technology. It is a form of vertical farming that relies on organic farming with little or no effect on human health. Despite its potential, the multi-storey vertical garden has not been implemented in refugee settings in Uganda. As such, the VEFIRS project shall implement this type of technology, often organic-based, easy to adopt, and maintain in an environment where soil degradation is a concern.

2.3 Vertical farming Technology in Uganda

There was a civil conflict in Uganda during Amin's regime (Former president of Uganda) from the early 1970s until the mid-1980s. This conflict caused institutional breakdown and consequent economic decline which made life difficult particularly for the residents of Kampala. Amin's regime which began with the expulsion of Uganda's Indian minority in 1972 saw the birth of the Magendo economy. This led to a dramatically increased participation of urban women in income-generating activities other than wage labor. The cost of food also went high resulting in changes in the diet of most urban dwellers. As a result, women started engaging in vertical farming as a way of supplementing their diets and earning extra income. Vertical farming was also sparked off by high levels of unemployment and inadequate supply of fresh food in the cities (Sabiiti *et al*, 2014). The technology is characterised as a household survival strategy. It involves the allocation of labour and resources undertaken jointly by members of a household in the face of an increasingly hostile urban economic environment. Most of the vertical farms in Uganda are located along the road sides, railway lines, in open spaces and parks, along the drainage and valleys, on the veranda, on the balcony and within backyards of residential plots. It is practised using old tyres and pipes, and plastic bottles. The most commonly grown crops include starchy staples (maize, sweet potatoes, yams, and plantains), fruits (strawberries, mangoes, and oranges), vegetables (spring onions, tomatoes, eggplants, and cabbages) and legumes. This technology is practised by the urban poor in Uganda, the most recent migrants from rural areas, and a broad cross-section of the urban population. Vertical farming has been successful because it is easier to manage the farms, and there is good access to market for fruits and vegetables.

2.4 Vertical farming and the SDGs

From the perspective of the Sustainable Development Goals (SDGs), the focal point of this project is to contribute toward the attainment of:

- SDG#1: End poverty in all its forms everywhere
- SDG#2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture
- SDG#5: Achieve gender equality and empower all women and girls
- SDG#8: Promote sustained, inclusive and sustainable growth, full and productive employment and decent work for all
- SDG#12: Ensure sustainable consumption and production patterns
- SDG#13: Take urgent action to combat climate change and its impact

- SDG#15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss

There is a lot of evidence that agriculture is the core contributor to the goal of alleviating poverty in developing countries. However, traditional farming requires big land size which often excludes the poorest displaced people who have limited access to land from experiencing the stated economic transformation. Multi-storey vertical farming is a modern agricultural model that makes farming more attractive to the vulnerable. The technology uses less land to maximise agricultural productivity and yield. This will help in reducing the current land conflict that exists between the refugees and host communities in Bidibidi settlement of Uganda. Furthermore, the sustainability and increase in agricultural productivity will enhance both communities' livelihood and consequently lift up their household incomes (SDG 1). Vertical farming is of paramount importance to prevent adoption of unethical survival strategies and make effective the sustainable development goal of zero hunger among the vulnerable populations. It will increase agricultural productivity and facilitate production diversification, hence make nutritious foods physically available at home (SDG 2 & 12). Income generated from the sale of harvested agricultural produce will enhance the refugee households' purchasing power over other nutritious foods that cannot be produced with this technology. The sustainability of this agricultural method resides in its uniqueness of less water requirement (SDG 8 & 12). In addition, a multi-storey garden requires less labor and it is a decent work for both men and women. It prevents any kind of discrimination and exposure to work-related violence (SDG 5 & 8). It will allow both communities to meet standards of living, open the opportunities for social integration, freedom and participation in decision making for refugees and the host community. Historically, agriculture contributes to climate change through the conversion of forest into agricultural land, which is a source of greenhouse gas emissions. Multi-storey Vertical farming is an improved intensive agricultural production option for both adaptation to and mitigation of climate change. It improves agricultural land and water management practices that can contribute to soil moisture retention, maintain appropriate amounts of nutrients in the soil, strengthen resilience and enhance productivity. Both refugees and nationals have the possibility of producing food irrespective of the rainy season fluctuations as unprotected water sources are constantly available, therefore enhancing the sustainability of vulnerable livelihood systems. It will potentially prevent a perspective of conversion of more forested land to agricultural land, which is the traditional way of producing food (SDG 13& 15).

PROJECT DESCRIPTION

The multi-storey vertical farming technology initiative dubbed “VEFIRS” is an adaptation approach to livelihood designed for refugees and host communities of Bidibidi settlement. The project shall consist of an integrated farming approach in which vegetable production will be most dominant. The project will run from November 2020 to May 2021 and shall be designed and managed by the refugees and host community.

3.1 Project Goal and Objectives

The overall objective of the VEFIRS project is to increase the adaptive capacity of refugees and the host community of Bidibidi settlement to land scarcity and rocky soil through multi storey vertical farming approach with the goal of contributing to attainment of self-reliant and poverty reduction among refugees and the host community

3.1.1 Specific Objectives

1. To increase the transfer of vertical farming techniques to the rural setting settlement of Bidibidi to scale up green leafy vegetable production
2. To increase household access to diverse and nutritious foods among refugees and the host community in Bidibidi settlement
3. To increase household income generation in refugee and the host community of Bidibidi settlement

3.2 Beneficiaries

The VEFIRS project will reduce the strain on government expenditure. It will directly benefit all refugees and the host community of Bidi Settlement encapsulated into food insecurity and poverty. A minimum benchmark of 1, 000 households consisting of refugees and residents will benefit from this project.

3.4 Project Implementation

3.4.1 Project Infrastructure/materials

The VEFIRS project will utilize dam liners, seeds, soil, manure, spade, fork and garden hoe. These are locally available materials which can be easily accessed and maintained in Bidibidi. The complete design of the proposed technology is in Annex 1.

3.4.1.1 Dam liners

Dam liners are made from reinforced polyethylene. It has gained a lot of consideration and is used as an inexpensive but effective and efficient water proof material for trapping water in water reservoirs for irrigation, animals or fish ponds (Xiaoyu, 1997). It has a thickness of 0.5 - 1 mm.

3.4.1.2 Garden hoe, fork and Spade

Garden hoe and fork are hand tools used in horticultural gardening to shape and clear soil, remove weeds, and harvest root crops. It consists of a blade made from metal, which is fixed to the handle of wood. A spade is used in collection and mixing of soil components.

3.4.1.3 Soil

Arable soil is the most suitable soil for horticultural gardening. It contains organic matter with good moisture retention capacity. Considering that most of the land in Bidibidi settlement is rocky hence impossible for direct crop sowing, the project will use arable soil. It shall be identified with the help of the refugees and the host community and taken to the different demonstration sites.

3.4.1.4 Animal manure

Manure is an animal excreta bedded in the plant material. It is applied to cropland as an organic fertilizer for the improvement of the soil tilth, structure and organic matter levels. It increases water infiltration, nutrient and water holding capacity.

3.4.2 Implementation Strategy

The project will be implemented in three phases; Initiation and planning, implementation phase, and closeout. The implementation strategy is outlined below with the detailed implementation plan in Annex 2.

3.4.2.1 Community engagement and mobilization

3.4.2.1.1 Community entry meeting

A meeting with the Chief Administrator Officer of Yumbe district, and the refugee community local council will be arranged in order to grant permission and request for support.

3.4.2.1.2 Selection of participants

Project participants will be selected based on the household's vulnerability. They shall be identified with the help of the local leaders. Identified participants will be screened to ensure they fit into the project requirement and community profile. Thereafter, a general meeting with selected participants will be arranged. During the meeting beneficiaries will be informed of the purpose and benefits of the project, community contributions to the project success.

3.4.2.2 Site visits and infrastructure setting up

The local leader will be instructed to identify an open space for demonstration purposes. This process shall be facilitated by the community focus person and guided by the project team to ensure a suitable site is selected. The demonstration site will be set up with the total involvement of the project participants from design to implementation and shall be closely monitored by the community focus person and the project team. At the end of the demonstration, beneficiaries will be asked to replicate similar technology at their homes. Continuous supervision will be provided by the community trainers of trainees (TOT) and project team.

3.4.2.3 Organizing training and materials

Seeds shall be bought and germinated with the help of the community. Materials needed for the construction of the project will be procured, transported, and stored in Bidibidi accordingly. Setting-up of the training site will be done with the help of the TOTs and the local council beforehand.

3.4.2.4 Conducting training

The training will take place over a period of 7 weeks and will have different slots for clusters. Each session will run for a day. The beneficiaries will be trained on building multi storey structures, sowing of seeds, and water regime management. Food cooking demonstration training will be provided. Besides, participants shall be educated on how to keep record of their sales and expenditures in order to keep track and account for the money they are making. They will also be trained on marketing, financial literacy, entrepreneur skills to encourage innovation and sustainability. The training will be participatory and it will be delivered onsite using demonstration and visual presentation. The entire training will be learner centered.

3.4.3 Logical Framework

Narrative Summary	Performance Indicators	Means of Verification	Assumptions
Goal: To contribute to attainment of self-reliant and poverty reduction among refugees and the host community			
Purpose: Increase adaptive capacity of refugees and host community to land scarcity and rocky soil	At least 40% of households who reported having increase in yield by the end of May 2021	Baseline and Endline survey Ministry of Agriculture Report	Favorable climatic conditions exists
Outcome 1: Increase transfer of vertical farming techniques to refugee and host community	At least 30% of refugee and host community who adopted multi-storey technology by the end of May 2021	Ministry of Agriculture Report Baseline and Endline	Local political leaders support implementation of the technology
Output 1: 1.1 Multi-storey demonstration site constructed 1.2 Trainings conducted on the use of multi-story technology	1.1 At least 40 multi-story demonstration sites constructed by the end of May 2021 1.2 50% of refugees and host community who participated in the multi-story training by the end of May 2021	1.1 Household survey 1.2 Training Attendance sheet	Beneficiaries continue to have sufficient time to attend trainings and demonstrations
Outcome 2: Increase household access to diverse and nutritious foods among refugees and the host community	2.0 At least 30% of household reported having access to diverse food groups by the end of May 2021 2.1 At least 30% of households reported having a balanced diet daily.	Baseline and endline survey	Favorable climatic conditions prevails

<p>Output 2: 2.1 Increase in agricultural production of targeted beneficiaries</p>	<p>2.1 30% of households with an increase in yield by the end of May 2021</p>	<p>Baseline and endline survey</p>	<p>No repatriation of trained refugees</p>
<p>Outcome 3: Increase household income among targeted beneficiaries</p>	<p>At least 30% of people with income greater than \$1.90 by the end of May 2021</p>	<p>Market Survey</p>	<p>Economic stability prevails</p>
<p>Output 3 3.1 Increase market access among targeted beneficiaries 3.2 Capacity of refugees and host communities improved in entrepreneurship</p>	<p>3.1 At least 30% of households accessing the market weekly by the end of May 2021 3.2 At least 30% of refugees and host community with improved entrepreneurial skills by May 2021</p>	<p>3.1 Market Survey 3.2 Baseline and Endline survey</p>	<p>Climatic conditions are favorable allowing people to access market</p>
<p>Activities 1.1. Community engagement and mobilization 1.1 Site visits and infrastructure set-up 1.2 Conduct training on uses of the multi-storey 2.1 Conduct training and awareness on balance diet 2.1 Production site visits 3.2 Conduct Entrepreneurial training</p>	<p>Inputs/Resources 1.1 Travel and accommodation to field visit 1.1 Travel to site 1.2 Space for training and training materials/facilitators 2.1 Space for training and training materials/facilitators 2.1 Travel to production site 3.1 Space to hold meetings, trainers/peer facilitators, training materials</p>	<p>Cost Euro 12,425.80</p>	<p>Refugees and host community have no new demands on their time preventing them from participating</p>

3.4.4 Project Stakeholder Analysis

The project staff will identify the project's key stakeholders, their interests and ways those interests may affect the viability of the project. This step will be necessary while putting into consideration participatory planning, implementation and monitoring of the project activities. Stakeholders will be identified through mapping prior to implementation of the project's activities. Their influence will be assessed in relation to their ability to contribute to the project goal and objectives. This will be necessary to explore their needs and support while seeking the best strategy to manage their interests and expectations.

The proposed potential stakeholders are presented in table 2 below:

Project Stakeholders	Roles	Interests
Project team	Design and redesign, planning, procurement, implementation, monitoring and evaluation	<ul style="list-style-type: none"> ○ Building a community of practice among refugees and host communities to foster economic, political and social inclusion ○ Empowering communities to solve existing and emerging problems
Project beneficiaries	Implementation of the project’s activities	<ul style="list-style-type: none"> ○ Increased income ○ Increased diverse and nutritious foods ○ Increased agricultural productivity and profitability
Project sponsors or fund providers	Provision of project funds Monitoring and evaluation of project activities Reviewing project reports	<ul style="list-style-type: none"> ○ Improved community resilience and development
Local Government, General public, UN Agency (UNHCR)	To aid in project planning, Implementation and monitoring & Evaluation	<ul style="list-style-type: none"> ○ Improved access to adequate, safe and nutritious food for refugees and the host and community ○ Improved access to food and enhanced livelihood opportunities

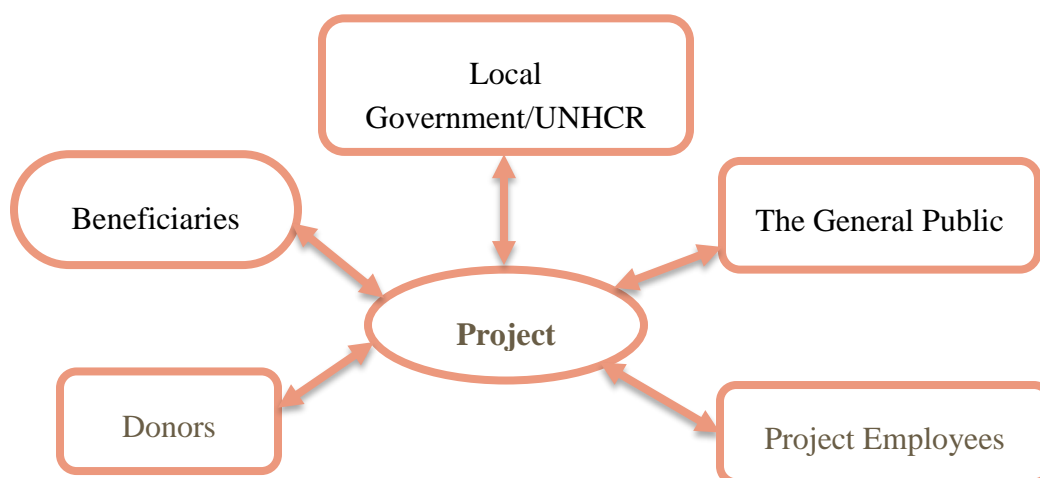


Figure 1: The project environment, interactions of the project and its stakeholders

3.4.4.1 Stakeholder Management Strategies

The project will adopt the approach of buffering and bridging. The buffering will protect the project from stakeholder influence. The activities in the approach will include signing agreements on matters agreed upon. Bridging will enable the project to cooperate and build interdependencies with key stakeholders of the project. This will include and not limited to:

- Regular meetings with stakeholders
- Consultation on major decisions
- Daily or regular briefs to the stakeholders
- Networking/collaboration/partnering
- Activity reports

3.4.5 Project Monitoring and Evaluation

Monitoring and Evaluation aim to ensure that every project is appropriately monitored to assess; if it runs according to the project proposal and initial plans; whether activities are implemented in time and objectives are being achieved; whether assistance reaches people who are most in need and project brings the desired changes in the targeted communities, as well as to identify key problems and threats for the project implementation. Quarterly project reviews and regular reporting is part of the monitoring and evaluation system.

For the Geneva Challenge specific purpose, a monthly narrative reporting will be agreed indicating the activities accomplished and the number of beneficiaries reached. Activities and final report will be prepared and submitted to the Geneva Challenge team during and at the end of the project.

Monitoring of the project will be the primary responsibility of the project team, and this will be done on a day-to-day basis in order to ensure that project objectives are being achieved, and then take remedial action wherever possible. The monitoring and evaluation team will be responsible for checking the project progress towards the achievement of its objectives at defined intervals.

The following is a detailed summary of the monitoring and evaluation process during the implementation of the project:

3.4.5.1 Developing the monitoring and evaluation plan

A monitoring and evaluation plan for the project will be developed showing the objectives achieved, how the data will be collected, who will be responsible, how the information will be reported and how and by whom the information will be used.

3.4.5.2 Quarterly Project Reviews

Quarterly project reviews and regular reporting will be part of the monitoring and evaluation system. Project and support teams will participate during the project reviews and lessons learnt will be documented at each project review.

3.4.5.3 Accountability and Feedback Mechanisms

In order to enhance accountability to beneficiaries, the beneficiary complaints and feedback mechanism will be implemented. This will ensure that all beneficiary complaints are recorded and feedback to the community is given in the shortest possible time. Community complaints focal points will be established on a voluntary basis. The project team will collate all complaints and they will be discussed at project level, especially those that have a bearing on the success of the project, its relevance, efficiency, effectiveness, sustainability and impact. Complaints that are linked to staff safety and security will also be given a high priority.

3.4.5.4 Financial Monitoring

The funds will be disbursed by the Accounting Department in Gulu Office after the approval of the Project Coordinator. All funds will be accounted for at the Gulu Head Office level until the project completion. The findings and recommendations of such spot checks will be used to correct gaps in accounting procedures arising.

3.4.5.5 Technical monitoring

The team uses a two pronged approach to increase and ensure quality assurance of the project. First, there is regular supervision of all activities by qualified technical staff, beside the Core Leadership Team (Project Manager), which provides guidance to fast track the progress of the project at all levels. Secondly, the Monitoring and Evaluation Coordinator carries out internal monitoring at regular intervals and at key implementation stages of the project to ensure the quality and enable corrective action at the appropriate times. Any gap arising will be addressed appropriately and assigned procedures to carry-out remedial actions.

End of project evaluation is proposed for the VEFIRS project taking into account the effectiveness of project activities and sustainability of results (i.e. provision of seeds and tools). This will take into consideration community perception of farming as well as their willingness and ability to integrate vertical farming into their practices. Additionally, feedback from the communities will allow assessing, to a limited extent, whether the project has improved their situation regarding access to food and enhanced livelihood opportunities.

3.4.6 Expected Outcomes

3.4.6.1 Short term

Currently the main challenges in Bidibidi settlement are land scarcity and rocky soil. This hinders farming activities thereby leading to food insecurity and poverty which are drivers of sexual exploitation and abuse (SEA), isolation and violence. The design of this project will promote inclusive participation from the beneficiaries for a successful uptake of vertical farming leading to good harvests. Large participation in training will ensure a large coverage of important information and training on themes such as; nutrition, entrepreneurship, and the importance of adopting vertical farming. Additionally, a successful uptake/or adoption of vertical farming will allow farmers to grow quality nutritious vegetables using less space in an unsuitable farming place as well as simultaneously, produce high yields. As a result, refugees will have a source of livelihood. Hence, children and women will not have to resort to coping strategies such as early marriage, and transactional sex to make ends meet.

3.4.6.2 Long term

By the end of May 2021 an increase in the adoption of vertical farming techniques, access to diverse, safe and nutritious food as well as an increase in household income by at least 30% to refugees and the host community is expected. This will happen if the mindset of the targeted population is shifted from traditional ways of farming to vertical and smart agriculture. Therefore, with consistency this project will lead to reduction in dependency on food aid, contribute to food security, and reduce poverty and malnutrition in Bidibidi settlement. Upon successful implementation in Bidibidi settlement, the VEFIRS project team envisions cascading this initiative to all refugee settlements in Uganda and across African countries. This will help improve living standards of refugees (SDG 8), improve health (SDG 3), reduce poverty (SDG 1) and hunger (SDG 2) and promote gender equality (SDG5).

3.4.7 Risks and mitigation Measures

Risks are key factors that hamper the achievement of project objectives. The VEFIRS project might likely be faced with any of the risks listed and the mitigation measures to be instituted are presented below.

Risks	Mitigation measures	Severity
Unfavorable climatic conditions Prolonged drought, pest and disease infestation are common conditions that may affect multi-storey garden	The project team will <ul style="list-style-type: none"> ○ Train community on biological and mechanical pest management practices. Chemical control will be a last resort ○ They will be trained on rooftop rainwater harvesting method ○ The team will conduct a training of trainer's session to community based focus persons (TOTs) and leaders who shall work with the project team to scale knowledge after closure of the project. 	High
Lack of support from Government, NGOs and UN agencies in the take-up of the technology	<ul style="list-style-type: none"> ○ Project objectives will be aligned with the strategic plans of the Government of Uganda, Ministry of Agriculture and the UNHCR in accordance with refugees resettlement and repatriation plans ○ Inception meeting to be conducted with these institutions and roles clearly defined ○ Network meetings will be conducted with partners and beneficiaries routinely 	High
Unprecedented health crises (Eg. COVID 19)	<ul style="list-style-type: none"> ○ Provision of face masks and hand sanitizers ○ Ensuring compliance with health regulations and standard operating procedures 	Medium
Limited time and low turnout to trainings	<ul style="list-style-type: none"> ○ Activities and work plan will be aligned with the community plan through dialogue. Date of local festivals, holidays and market visits will be omitted from the calendar to ensure beneficiaries are able to partake in other community activities ○ Feedback mechanism will be established and concerns addressed accordingly 	Medium
Insufficient funds to execute project activities	<ul style="list-style-type: none"> ○ The VEFIRS project team will source funding from other reputable agencies and donors through proposal writings and pitching. 	High

3.4.8 Sustainability Plan

We envision the VEFIRS project to be owned by the community beyond the official end of the project life as sustainability will be built at the core of the project. This project will adopt a participatory approach that will rely on consistency, flexibility and transparency during the project life cycle. The beneficiaries of the project will take a central responsibility in every stage of the project management cycle (initiation, planning, execution, monitoring and controlling and closure). The government and UNHCR will be involved in the planning meetings of the project. They will provide the necessary synergy for the community involvement. All stakeholders will be engaged during key milestones of the project. The project will be flexible to cater for the needs of the beneficiaries and other stakeholders' inputs. The guidelines of the project sustainability plan are tabulated below.

S/No	Action	Stakeholder Participation	Project life cycle stage
1	Organizing of community entry Meetings	<ul style="list-style-type: none"> ○ Project team ○ Community leaders 	Initiation
2	Signing of community & Project engagement pact, launching of the project	<ul style="list-style-type: none"> ○ Community members (beneficiaries and leaders) ○ Project team ○ Local Government 	Initiation
3	Identification of land for demonstration of vertical farming techniques	<ul style="list-style-type: none"> ○ Community leaders from both refugees and host community ○ Project team ○ Government agricultural officers 	Planning
4	Development of communication plan, hotline for feedbacks	<ul style="list-style-type: none"> ○ Project team ○ Community leaders 	Execution
5	Setting up of multi-storey vertical garden committee in Bidibidi	<ul style="list-style-type: none"> ○ Project team and Beneficiaries ○ Government agricultural officers 	Execution
6	Recruitment and training of the Local youth as TOTs	<ul style="list-style-type: none"> ○ Community members ○ Project team 	Execution
7	Purchase of Local available materials (Seeds, and implements)	<ul style="list-style-type: none"> ○ Community members ○ Project team 	Monitoring and controlling
8	Onsite training of the participants, land preparation setting of a demo plot	<ul style="list-style-type: none"> ○ Local youths (TOTs) ○ Project team ○ Beneficiaries ○ Government agricultural officers 	Execution

9	Grouping project beneficiaries to farming groups	<ul style="list-style-type: none"> ○ Project team ○ Beneficiaries ○ Local TOTs 	Execution
10	Monitoring and evaluation	<ul style="list-style-type: none"> ○ Project team ○ Local Government ○ Community TOTs 	Monitoring and controlling
11.	Transfer of the project to Local Government	<ul style="list-style-type: none"> ○ Project team ○ Local Government ○ UNHCR 	Project closure

4.0 Conclusion

Uganda is among the top refugee hosting countries in Africa and the world. Bidibidi, one of its settlements, is the largest in East Africa. Upon arrival, refugees are given a small plot of land for farming and settlement purposes. However, most of the soil in Bidibidi is naturally rocky making it unsuitable for farming. In addition, the continuous influx of refugees has resulted in many challenges including land conflict, food insecurity, and increase in poverty index. As a result, the refugees tend to venture into life threatening coping strategies such as sexual exploitation and abuse and theft. Women and children are the victims of this situation. As such, feelings of bitterness and insecurity remain contentious making life miserable for refugees and the host community. These problems require a quick and efficacious short term approach in order to prevent future complications. We therefore propose multi-storey vertical farming, as a low-cost strategy that has the ability to remedy these challenges. So far, vertical farming has been successful with a recorded high yield over a low space.

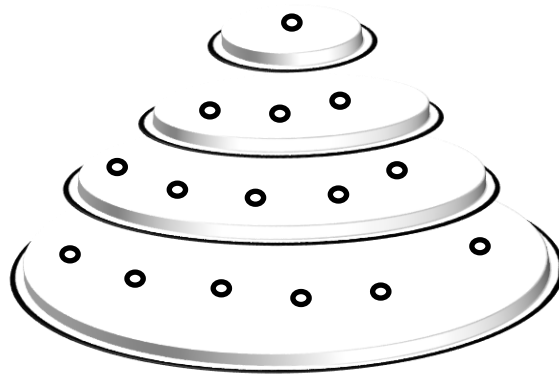
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6.0 Appendices

Appendix 1: Sample design of the Vertical farm Structure



Dimension: 4 sqft by 6sqft

Rings: 2-4 inches upwards

Plant population: 120-130 plants depending on the vegetable type

Appendix 3: Proposed Budget

Budget line	Description				Total (USD)	Total (CHF)
	Items	Unit	Unit cost (USD)	Quantity		
Tools	Dam Liner 1mm HDPE Geomembrane	Square Meter	1.9	1000	1900	1782.9
	Garden hoe	No.	9.2	40	368	345.3
	Garden fork	No.	5.4	20	108	101.4
	Spade	No.	4.6	20	92	86.3
	Seeds	Kg	30	5	150	140.8
Subtotal					2,618	2,456.7
Stakeholders Inception meeting	Drinks	Box	4.90	12	58.40	54.8
	Snacks	Lump sum			56.80	53.3
	Transport	Lump sum			108.1	101.4
Subtotal					223.3	209.5
Stationery	Printing				10	9.4
	Flip Chart	No	8.1	20	162.2	152.2
	Marker Pens	No.	4.3	5	21.6	20.3
	Notebook	No	2.7	25	67.6	63.4
	Communication	Monthly	13.5	6	81	76.0

Subtotal					332.4	321.3
Training	Setting-Up Multi-storey garden	Week	4	878.5	3514	3297.5
	Entrepreneurship and food demonstration	Week	3	878.5	2635.5	2473.1
Subtotal					6149.5	5770.6
Monitoring and Evaluation	Monitoring visits	Days	12	175.7	2108.4	1978.5
	Evaluation	Days	5	175.7	878.5	824.4
	Allowance(Training of Trainers)	No.	20	81	1622	1522.1
Subtotal					4608.9	4325
Grand Total					13,932.1	13,083.1

NB 1 dollar = 0.94 CHF