



JACCA: AGRO-WAREHOUSE
Integrated Solutions



**GENEVA
GRADUATE
INSTITUTE**

JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS

ADDRESSING THE CHALLENGES OF POVERTY REDUCTION

Project Pilot Area: AFRICA (Northwest Region of Cameroon)

THE GENEVA CHALLENGE 2022



ABSTRACT

Poverty is a cross-cutting multi-sectoral challenge that always presents negative consequences. However it is described, the monster of poverty has a more acute impact on some groups than others. Rural areas in Sub-Saharan Africa bleed from the paradox of the blessings of abundant natural resources on one hand while grappling with extreme lack on the other hand. Sustainable Agriculture has been identified by the World Bank and the United Nations as a veritable tool for alleviating rural poverty, as agriculture is the major source of livelihood for the majority in rural settlements. Poor Agro-food value chain magnified by exploitative activities of middlemen is the major limitation to the profitability of rural farmers. JACCA Agro-Warehouse Integrated Solutions seeks to address this challenge by providing warehousing and storage facilities to reduce post-harvest losses and mitigate marketing challenges: serving as a node linking rural farmers with urban markets and subsequently, international markets. Through digitalization, our warehouse receipt solution is designed to engage stakeholders in a transparent system of direct trade. It will also aid access to financial support for the farmers, while we provide them with capacity-building and mentorship to ensure all-year-round productivity for sustainable agricultural development and economic growth in rural Africa. This has direct impacts on the attainment of Sustainable Development Goals (SDGs) 1 and 2: “No Poverty” and “Zero Hunger”. JACCA Agro-Warehouse Integrated Solutions is to be piloted in the North-West of Cameroon; it is designed to be scalable to the entire sub-Saharan Africa and it can also be assimilated by other regions comparable to Africa like rural Asia and rural Australia.

Keywords: Poverty, Agriculture, Agro-food value chain, Poverty Alleviation, Sustainable Development

THE TEAM



• Ayanfeoluwa Oluwanifemi AKINBOLA

Is a highly motivated goal-getter who is passionate about environmental conservation, social development, leadership and youth empowerment. Her future career goal is to contribute to the development of her country- Nigeria and Africa, in line with the Africa Agenda 2063 and the Sustainable Development Goals (SDGs). She holds a Bachelor's Degree in Civil Engineering from the University of Ibadan, Nigeria; and is currently enrolled on the Master of Water Engineering Program at the Pan-African University-Institute for Water and Energy Sciences- Including Climate Change (PAUWES), Algeria.



• Chimwemwe Nalwesya CHIBUYE

has a Bachelor of Science degree in environmental health from Lusaka Apex Medical University, Zambia. She has experience in the Zambian agriculture sector, in crop seed and sustainable climate-smart agriculture research and rural farmer engagement. She is currently a Master's degree student in Water Policy at Pan African University Institute for Water and Energy Sciences (PAUWES), Algeria.



• Chidinma Lucy UKA

holds a bachelor's degree in Economics from the University of Nigeria. She is interested in the Sustainable Development Goals in all ramifications and has garnered professional experiences from both Nigerian and International firms. She currently studies Energy Policy (MSc) at the Pan African University for Water and Energy Sciences - including Climate Change (PAUWES), Algeria.



• Rodrigue Jinyuy BIRKA

Is an Environmental Youth Activist and Advocate for Sustainable Economic Development. He has as goals while achieving financial independence to play a pivotal role in the sustainable development of Africa. Rodrigue graduated from the Catholic University of Cameroon (CATUC), Bamenda as valedictorian with a first-class Bachelor of Science in Economics. He is presently studying for a Master of Science in Water Policy at the Pan African University for Water and Energy Sciences, including Climate Change in Algeria.



• Eric Appiah ATIEMO

Is a graduate of the Kwame Nkrumah University of Science and Technology (Kumasi-Ghana) in BSc Development Planning and has been a practising research consultant in urban and rural development. Eric is currently pursuing an MSc in Energy Policy at the Pan African University, Institute for Water and Energy Science-Including Climate Change (PAUWES), Algeria.



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1.0 INTRODUCTION





1.0 INTRODUCTION

The World Bank Group's goals are to end extreme poverty and promote shared prosperity. In the same vein, the United Nations Sustainable Development Goals (SDGs) seek to end poverty in all its forms everywhere by 2030. For almost 25 years, owing to the measures put in place by various actors to eradicate poverty, the number of people living in extreme poverty (on less than \$1.90 per person per day) was steadily declining. Unfortunately, this trend was rudely disrupted in 2020 when poverty spiked due to the disruption caused by the COVID-19 pandemic. The COVID-19 crisis has not been the only barrier to poverty alleviation mechanisms; socio-political conflicts combined with the effects of climate change have also been plaguing the efforts toward poverty alleviation, especially in the agricultural sector (World Bank, 2022).

The Agricultural sector is one of the most active in any economy because food security and good nutrition for citizens are both dependent on it. Malnutrition and poverty are inextricably linked, creating a vicious cycle in which one fuels the other. Malnutrition causes poverty by reducing the population's economic potential, and poverty reinforces malnutrition by increasing the risk of food insecurity (Siddiqui et al., 2020). Agricultural development is a potent tool in curbing extreme poverty, boosting shared prosperity, and feeding a projected 9.7 billion people by 2050. Compared to other sectors, growth in the agriculture sector is two to four times more effective in raising incomes among the poorest. Analyses in 2016 found that 65% of poor working adults made a living through agriculture. Agriculture is also crucial to economic growth: in 2018, it accounted for 4% of global gross domestic product (GDP) and in some least developing countries, it can account for more than 25% of GDP (World Bank, 2022).

The year 2022 has been characterized by adverse weather conditions in the Northern and Southern African regions. This has curtailed the cereal production prospects in several Western and Eastern African countries as shortfalls in cereal production have been registered due to internal conflicts and poor rainfall (FAO, 2022). Climate extremes threaten millions of people with acute food insecurity with the largest impacts in Africa, Asia, and Central, and South America. The sudden loss in food production coupled with decreased diversity in diets has heightened the prevalence of malnutrition, adversely affecting low and middle-income households, the elderly, children, and pregnant women. Due to climatic and non-climatic drivers, roughly half of the world's population currently experiences severe water scarcity for at least some part of the year (IPPC, 2022). The year 2021 was also riddled with conflicts and contrary weather conditions in East and West Africa which brought about widespread crop damage, leading to a production downturn.



Cameroon like most African States is bedeviled by insecurity and population displacement. It is estimated that by October 2021, 2.4 million people would be severely food insecure; mainly due to the COVID-19 pandemic, conflict, and socio-political unrest. The Northwest of Cameroon has 42% of its inhabitants being severely food insecure (FAO, 2021). Considering this region, the challenges faced by the rural farmers limit the impact of various poverty alleviation intervention mechanisms in the agriculture sector. The challenges include poor agro-food value chains, excessive reliance on rain-fed agriculture which is unreliable and intensifies food insecurity during dry seasons, land underutilization, deficient supply of viable seeds, lack of access to zero or low-interest rate loans, age-gender disparities, and the failure and limited scope of already existing farmer organizations.

Although data from The World Bank shows a 3.5% rise in GDP in 2021 compared to 0.5% in 2020 for Cameroon, this growth does not reflect the reality of the common man. Observing the struggles subsistence farmers grapple with to afford three square meals daily, for their families with the hope of a little more to sell for some cash is a harsh reality. These subsistent farmers employ poor farming practices with low-quality inputs and thus have low-grade produce. The lack of adaptable storage facilities for the harvested grains causes them to lose quality. After a futile search for a ready-market and substantial post-harvest losses, the farmers are out of options and the now low-quality grains do not command competitive prices with the exploitative middle-men who buy these sweat-earned products at give-away prices and then re-sell them at inflated prices in urban markets.

JACCA Agro-Warehouse is an integrated solution intended to improve the agro-food value chain as an economic tool to address the challenge of poverty reduction among rural subsistent farmers.

1.1 THE CONCEPT OF POVERTY

Poverty, according to the World Bank, is defined as hunger and the inability to meet basic requirements, such as food: “Poverty is hunger. Poverty is the lack of shelter. Poverty is being sick and not being able to see a doctor. Poverty is not having access to school and not knowing how to read. Poverty is not having a job, fear for the future, and living one day at a time” (Economic and Social Inclusion Corporation, 2022).

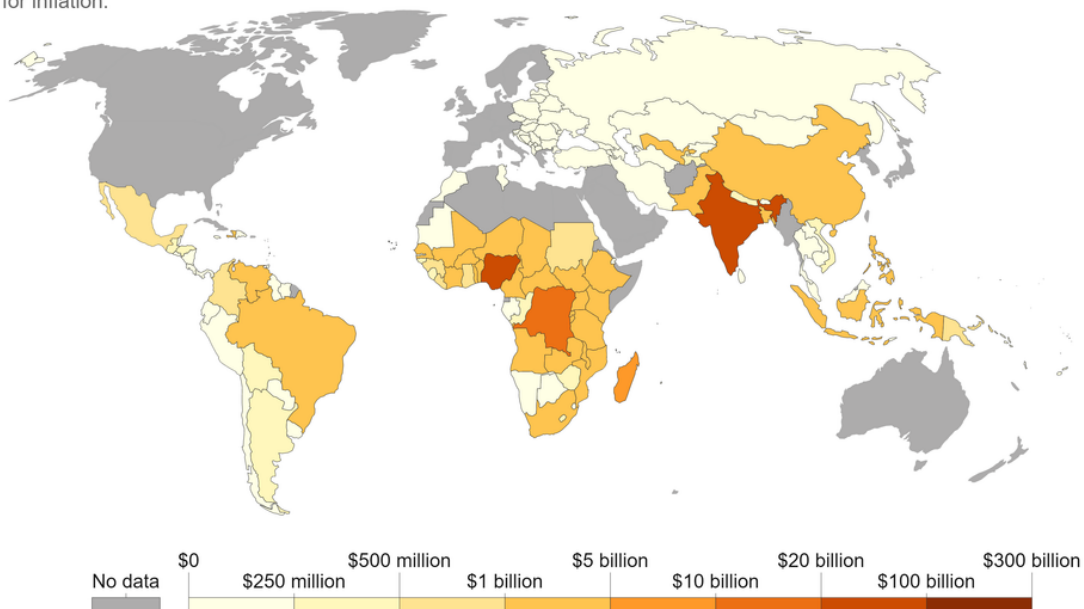
This shows the multi-dimensional nature of poverty, which is also measured by the United Nations Development Programme with the Human Development Index (HDI). This index measures the deprivations in the three basic dimensions being- “a long and healthy life, knowledge, and a decent standard of living” (Nyasulu, 2010). The economic aspect of poverty which engulfs livelihood, food security, and good standard of living are what define our area of interest, thus, the primary focus of this project.

1.2 GLOBAL POVERTY SITUATION

The poverty gap, 2013

The poverty gap is the amount of money that would be theoretically needed to lift the incomes of all people in extreme poverty up to the international poverty line of \$1.90 a day. These estimates are expressed in international dollars using 2011 PPP conversion rates. This means that figures account for differences in prices levels, as well as for inflation.

Our World
in Data



Source: OWID calculations based on PovcalNet

OurWorldInData.org/extreme-poverty/ • CC BY

Note: The cost of closing the poverty gap does not take into account costs and inefficiencies from making the necessary transfers.

Figure 1: Global Poverty Gap

Source: Our World in Data (OWID) calculations based on PovcalNet, 2013



The first Sustainable Development Goal (SDG 1), that is, “No Poverty”, has the aim of eradicating extreme poverty for all people and providing equal access to economic resources by 2030. However, statistically, the number of extremely poor (living below \$1.90/day) globally as of 2020 was 9.4% of the global population, which will increase by 6.5% (550 million) in 2030 (World Bank, 2019). Additionally, within the same year (2020), global hunger increased extremely due to the COVID-19 pandemic with up to 811 million people being undernourished, out of which 418 and 282 million people live in Asia and Africa respectively.

The COVID-19 pandemic and climate change are eroding the gains made in poverty reduction and shared prosperity. Economic forecasts indicated that the pandemic caused a contraction in global per capita Gross Domestic Product (GDP) growth of between 5% and 8%. It was estimated that 88 million people worldwide were pushed into poverty under the baseline COVID -19 scenario. The new profile of the poor is rural, young, and uneducated; children and youth (aged 15 to 24 years) representing two-thirds of the global poor, which are prominently in Sub-Saharan Africa; in high-income countries, the poor are mostly the elderly (World Bank, 2020).

1.3 POVERTY IN AFRICA

According to the (World Bank, 2016), poverty in Africa has dropped significantly from 54% in 1990 to 41% in 2015; despite this decrease, the number of poor people has increased from 278 million in 1990 to 413 million in 2015. The growth experienced in sub-Saharan Africa has its drawbacks: despite the poverty reduction, the divide between the population and the bottom 40% keeps on increasing, therefore the growth experienced is not inclusive. African poverty is characterized as a mixture of chronic and transitory poverty, where conflict-affected states have higher poverty rates, high gender inequality, and low human capital which disrupts poverty reduction efforts. The diversification of economies into labor-intensive sectors and reducing the disparities between underdeveloped and advanced regions within each country are among the ways to expand the benefits of growth (World Bank, 2018).

African poverty is complex, it is characterized by an increasing unemployed youth population, rural predominance (82% reside in rural areas without social amenities, earning their living primarily from subsistence farming and non-wage micro-enterprises), population displacement, low purchasing power, and rapid urbanization with fewer opportunities for formal income generation. The poor in Africa can be classified into three groups: **the chronic poor** who suffer from constant extreme deprivation, **the borderline poor** who are occasionally poor, and the newly poor that are victims of the changing economic circumstances (Hope, 2009).

1.4 PROBLEM STATEMENT

Food security is a major concern for countries especially as the global population is constantly rising and the desire for a sustainable global society grows. While the agricultural sectors in various countries have substantially improved in terms of technological breakthroughs in farming, the majority of countries throughout the world are yet to achieve a stable food production culture.

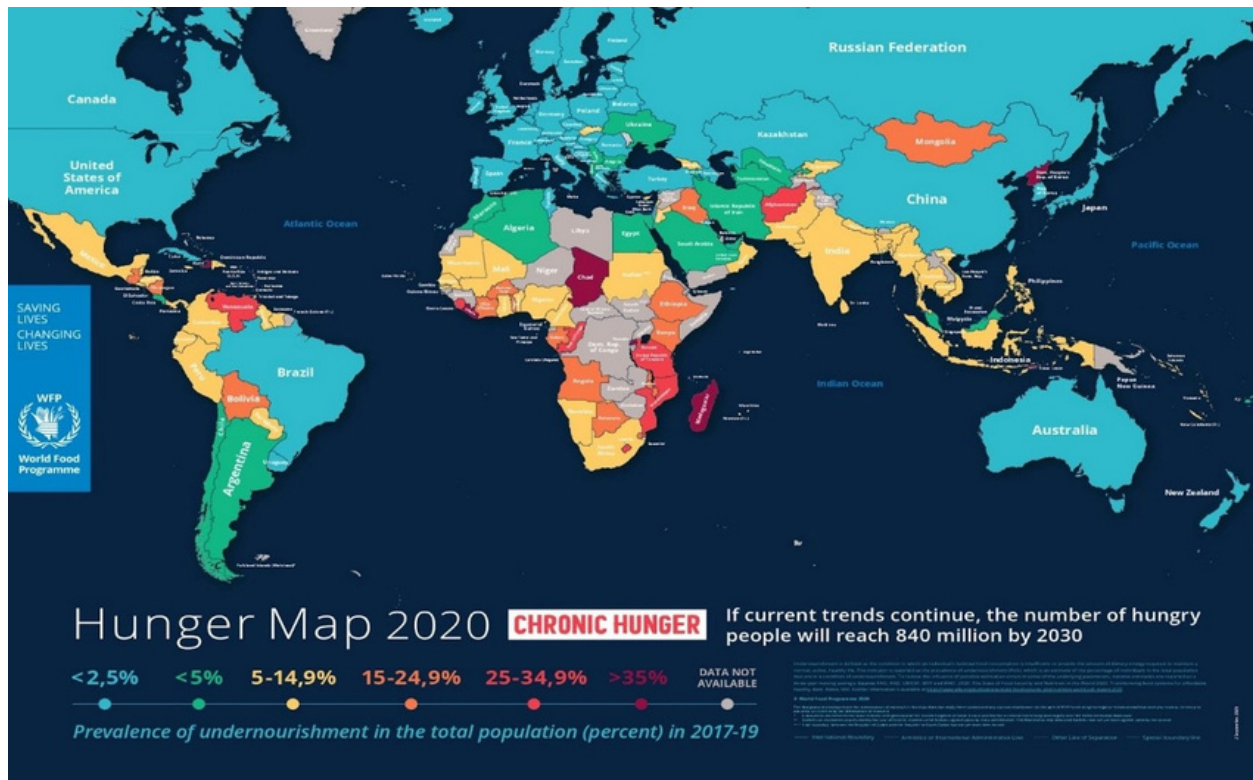


Figure 2: Global Hunger Map

Source: World Food Programme, 2020

According to the World Food Programme's Hunger Map of 2020, the incidence of malnutrition in each country's population increased from 2017 to 2019; if current trends continue, the number of hungry people will reach 840 million by 2030. The second Sustainable Development Goal, "Zero Hunger," aims to eliminate global hunger by 2030; yet statistics from the World Food Programme contradict this ambition. The map demonstrates the wide discrepancy in food security across continents, with Africa having the most food-insecure people, resulting in chronic hunger. Amidst the rising food insecurity globally, Africa is beleaguered by a poor agro-food value chain structure, which has limited rural farmers' profitability.



Globally, estimated annual food quantitative losses and waste in the supply chain account for 40-50% of the world's fresh products, with cereals accounting for 30% and oilseeds, meat, and milk products accounting for the remaining 20% (Gustavsson et al., 2011). The COVID-19 outbreak brought attention to the global food system's flaws. Lockdowns travel bans, and economic downturns disrupted local and global supply systems, leaving food spoiling on farms and producers and farmers at a fix. Moreover, the Russia-Ukraine war has been an eye-opener for us on how dependent Africa is on Agricultural produce from these countries. As a result of this war, food prices have inflated in Africa presenting very hard conditions for the poor especially and a very high level of food insecurity.

Food losses and waste are declines in food quantity or quality along the food supply chain and in low-income Sub-Saharan Africa, they are primarily due to infrastructure, storage facilities, harvesting techniques, and packaging, and are estimated to be close to 30% of total production (Gustavsson et al., 2011). The Global Report for food crisis data of 2022 by the world food program revealed that the population of Cameroon in food crisis increased from 1.9 million in quarter 3 of 2021 to 2.4 million in quarter 4. This food insecurity is strongly linked to losses in the food value chain and has had a ripple effect on the country's economy with the rural population feeling more impacted. In Cameroon, grain production increased from 788,129 tons in 1969 to 4.2 million tons in 2018, growing at a 4.33% average annual rate. The most widely grown cereal crop, maize, has a harvest area of approximately 1,315,953 hectares and contributed 2.3 million metric tons of the 4.2 million tons produced in 2018 (FAO, 2019). Although they are typically grown throughout Cameroon, grains are most common in the northwest (Cameroon Price Bulletin, 2021).

Inadequate storage facilities and rural farmers' lack of knowledge regarding grain preservation, results in grains becoming contaminated with insects before being stored, leading to losses of about 40%. Rural farmers have non-automated storage intervention methods which include gathering the grains, sun drying, removing the grains from the cobs or pods, bagging, and pounding into flours with the aid of a mortar and pestle. This approach is highly flawed and has negative effects on health in addition to the accompanying losses (Tata, 2020). This method is challenging to store large grains during the rainy seasons because it is time-consuming, unstable, and highly dependent on the weather. The automated storage intervention method involves the use of locally made Biogas/LPG/Solar/Electrical Dehydrators as an alternative drying technique. This machine aids farmers in drying and is not weather-dependent, but it has not been possible to obtain a commercial machine, thus drying is still primarily done in small volumes, which results in the loss of grains that cannot be dried, sold, or consumed on time.

JACCA Agro-Warehouse steps in to bridge the various gaps noted above. We are an independent business enterprise that offers commercial warehouse/storage facilities (and capacity-building services) that will serve as the hub connecting rural farmers with urban and global markets in an effort to maximize the potential of African agricultural resources, reduce post-harvest losses and close gaps regarding the redundancy of the agro-food value chain in Africa as a tool for eradicating poverty.

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2.0 AGRICULTURE AND POVERTY NEXUS IN AFRICA



2.1. BACKGROUND OF TARGET AREA: THE NORTH WEST REGION OF CAMEROON

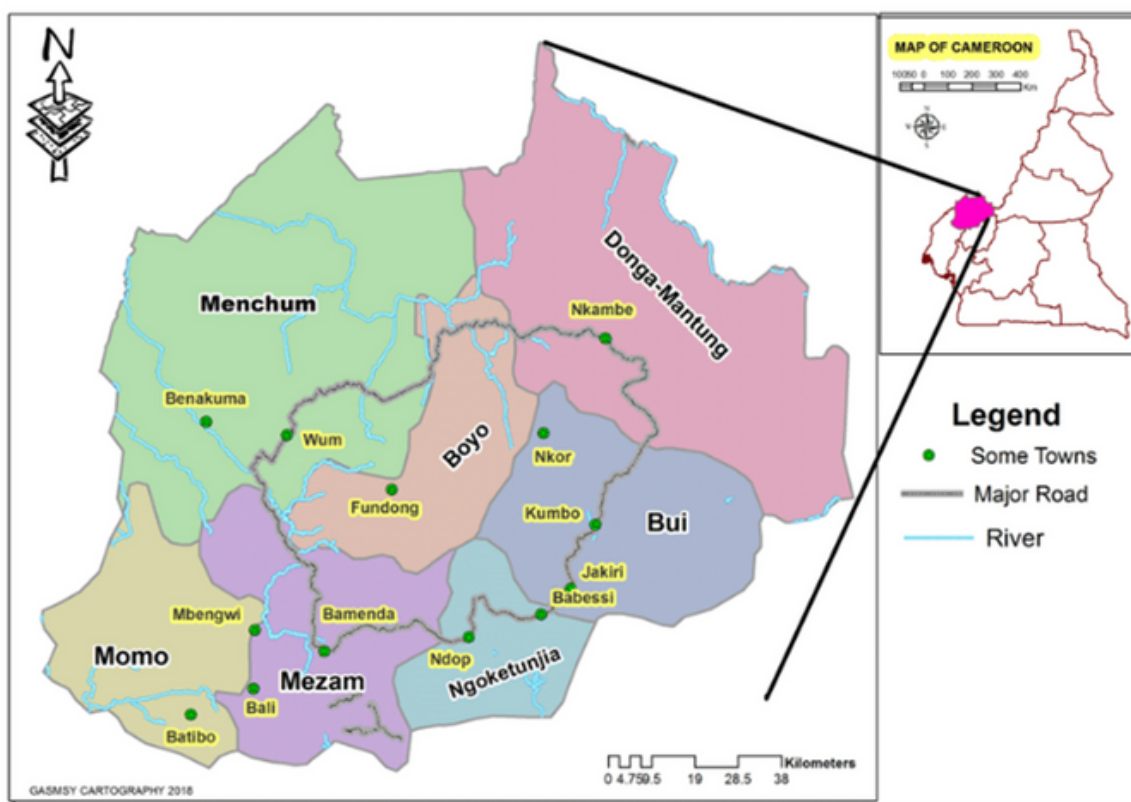


Figure 3: Map of the North-West region of Cameroon

Source: Akwanjoh & Tita, 2020

The North-West is one of the ten regions of the Republic of Cameroon. It is bound to the North and West by the Federal Republic of Nigeria and to the south by the South-West Region. This Region spreads over a surface of 17910 km² with an approximate population of 2 million. The topography of this region greatly influences the climate of the surrounding areas: the high mountains and plains experience temperature extremes- based on seasons, they are either very cold or very hot respectively. The region experiences two distinct seasons: the dry season spans mid-October to mid-March, while the rainy season extends from mid-March to mid-October, which is very conducive for agriculture.

Like Cameroon to Africa, the North-West Region of Cameroon is representative of most of sub-Saharan Africa; given that the ecological and agricultural diversity in Cameroon is similar to what is obtainable within the entire Sub-Saharan Africa. The crops cultivated in this region include maize, beans, potatoes, groundnuts, yams, cassava, coffee, palm oil, rice, banana, plantains, and sugarcane (Walker, 1990).



2.2 AGRICULTURE IN AFRICA: CAMEROONIAN PERSPECTIVE

In rural Cameroon, about half of the population lives in poverty with about two-thirds of the rural population relying on agriculture- both subsistence and commercial for their livelihoods. This dependence on agriculture is expected to intensify, given the importance of food security and the vast potential of the agricultural sector in Cameroon (SUNDJO, 2021).

According to a recent large-scale food security study by WFP (2018), inadequate food production in disadvantaged areas results in food insecurity in about 10% of the households in rural Cameroon. Without renewed efforts to upscale the domestic availability of food beyond present levels, rural Cameroonians may continue to be deprived of adequate access to food. Agriculture engages about 70% of Cameroonians and contributes tremendously to the country's economy, as it has been appraised to contribute about 40% of the country's Gross Domestic Product (GDP). However, the agricultural sector in Cameroon suffers from low levels of government contribution in terms of subsidies; the adverse impacts of climate change on the agriculture sector may further worsen this situation (Abia et al, 2016).

Peasant farmers who only cultivate for livelihood and subsistence reasons are at the base of the agro-economic hierarchy. They are generally not integrated into policy formulation and decision-making processes, hence they rarely benefit from interventions from higher levels. These peasant farmers are the focus group of the JACCA Agro-Warehouse Integrated Solutions. The current surge in population implies an increased demand for food and agricultural products while posing investment opportunities at local and national levels. Cameroon is blessed with abundant arable land, unfortunately, her full agricultural potential is not being maximized. Subsistence farmers in rural Cameroon experience numerous challenges that keep them in the poverty trap and prevent them from achieving sustainable agriculture for economic emancipation, ending hunger, achieving food security, and improving nutrition.

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3.0 MAJOR CHALLENGES FACED BY RURAL FARMERS IN AFRICA



3.0 MAJOR CHALLENGES EXPERIENCED BY RURAL FARMERS IN CAMEROON



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Rural agriculture in Cameroon is plagued by a huge number of challenges ranging from poverty, finance, technical, and marketing challenges to name a few. The most significant of these challenges are: inadequate storage facilities, poor farm-to-market links, lack of value creation, climate change, political instability, access to capital, knowledge and technology gaps, and inadequate policies to support economic growth. Agriculture indeed is a crucial weapon for poverty alleviation, however, owing to these challenges, the agricultural potential in Cameroon is still not fully exploited. Significant attempts have been made by various actors in alleviating poverty through agricultural development in Cameroon. Although some positive results have been recorded, a significant proportion of the rural population in Cameroon who depend solely on subsistence agriculture for their livelihoods still face difficulties in accessing basic human needs like feeding and clothing which stem from the numerous challenges they experience. Many of these challenges are uniform across all of Africa, especially south of the Sahara.

3.1 THE AGRO-FOOD VALUE SUPPLY CHAIN CHALLENGES IN CAMEROON'S NORTH WEST REGION

A major problem faced by rural farmers in developing countries is post-harvest loss. Post-harvest loss encompasses food loss (food produced for human consumption that goes unconsumed) along the entire food supply chain. Food loss may be due to spoilage, quality loss, nutritional loss, seed viability loss, and commercial loss. In the food supply chain, postharvest losses can range substantially in size depending on the crops, regions, and economies. Despite efforts to make the greatest use of the food produced in various countries, a sizable amount of produce is lost during post-harvest processes because of a lack of expertise, outdated equipment, or inadequate storage facilities (Kumar & Kalita, 2017).

In Africa, post-harvest food loss ranges from about 20% to 40%. Every year, about 1.3 billion tons of the world's food production (one-third) is lost globally during post-harvest processes. According to the World Bank, Sub-Saharan Africa (SSA) alone loses food grains worth roughly USD 4 billion annually. This clearly shows that despite the efforts made to reduce poverty by boosting agricultural productivity, the food value supply chain still experiences great challenges, especially in developing countries as the final output is greatly reduced, consequently increasing food insecurity (Kumar & Kalita, 2017). Most interventions have been geared toward increasing food production, especially in rural Africa without a corresponding increase in food processing, preservation, and storage. For the last 30 years, in the World Food Logistics Organization (WFLO) and Costa, about 95% of investment in agricultural research has focused on increasing production with only 5% on reducing post-harvest losses in Sub-Sahara Africa (Nkwain et al., 2020). Although losses occur at each stage of the supply chain from production to consumer level, storage losses are considered most critical in developing countries. For instance, the various stages in the supply chain of grains may include harvesting, threshing, cleaning, drying, storage, processing, and transportation. Post-harvest losses mostly occur at the level of storage (Kumar & Kalita, 2017).



Figure 4: A man transporting maize grains in a sack on a motor bike in Uganda

Source: *The East Africa*, 2022

The lack of irrigation mechanisms makes it impossible to farm in the dry season. Grain production witnesses huge post-harvest losses in its value supply chain. On-farm, some of these challenges include harvesting at inappropriate periods, inappropriate harvesting containers and packaging materials, poor field sanitation, etc. Most of these affect the quality of the produce after harvest. Off-farm, the challenges range from lack of access to good roads, poor means of transportation such as the use of bikes, lack of appropriate storage facilities, lack of processing equipment, and factories, to the lack of a reliable market. This is indeed a whole breakdown in the value chain.

3.2 THE CASE OF MAIZE IN CAMEROON'S NORTH WEST REGION

Cameroon produces a variety of food crops but many of her citizens are still food insecure. This is partly because little or no value is added to the available food crops in the food value supply chain. Seeing heaps of spoiled food crops rotting in her regional and local markets is very common, whereas thousands cannot afford to feed themselves daily. In the North West Region of Cameroon, especially in the Lower Boyo Division, most farmers still depend solely on their indigenous knowledge of food preservation and storage for the extension of the shelf-life of their food crops because of limited modern preservation and storage facilities (Nkwain et al., 2020). About 30% of agricultural produce is lost after harvest throughout the value chain. Looking at the project area, in Jakiri Sub-Division, a wide range of food crops are grown. These include maize, beans, cocoyam, yam, soya beans, potatoes, and groundnuts as well as vegetables (green beans, tomato, pepper, okra, onion, and cabbage), and fruits (banana, mango, guava, mandarin, papaya, jackfruit, pineapple, papaya, oranges, lemons, and limes). In this part of the Region, just like the others, food crops are harvested seasonally; as the new harvest approaches, prices rise. Farmers occasionally gain from these price increase by preserving their harvest for a long time capitalizing on out-of-season sales. These advantages are short-lived, since long-term storage increases the crop's vulnerability to damage, especially from pests and diseases as a result of the substandard, insufficient, or utterly lacking post-harvest management. Post-harvest management in the majority of emerging and impoverished nations is woefully inadequate. (Shende & Lifeter, 2017).

Post-harvest losses are encountered throughout the food supply chain from agricultural production to final consumption. The table below depicts various causes of post-harvest loss at various stages of the food supply chain.

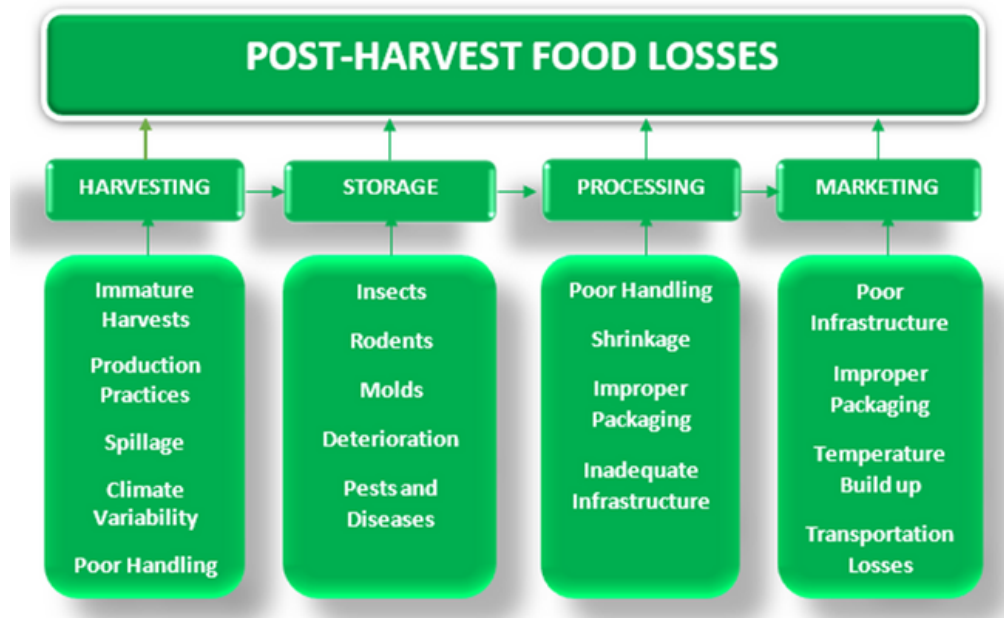


Figure 5: Causes of Losses at the various post-harvest stages

Source: (Shende & Lifeter, 2017)

At harvest, huge quantities of food grains such as rice, maize, and beans are lost due to spillages or even abandonment in the farms if labor is insufficient. Other crops such as Irish potatoes, yams, cassava as well as vegetables, and fruits record very high losses owing to their perishable nature coupled with the lack of adequate storage facilities. Post-harvest losses are dominant at the harvesting and storage stages in the food value supply chain due to attacks from pests and diseases, poor quality of storage facilities, limited technology, poor road networks, and inadequate training and information for the rural farmers (Shende & Lifeter, 2017).

Maize is a staple food crop that is cultivated by most farmers in Cameroon, especially in the North West Region. Rural farmers cultivate maize both for household consumption as well as for sales. Most rural farmers still use traditional methods both on and off the farm. Maize cultivation is mostly rainfed and after harvest, old and traditional methods of storage are used. In an attempt to increase production by extending cultivation into the dry season, by leveraging irrigation, farmers are challenged with limited storage facilities. Production and storage of these grains are greatly hampered by inappropriate storage practices and pest infestation. A common mechanism for maize storage after harvest in this region is called the “Banda”. This is a layer that is built beneath the ceiling using bamboo. This is usually done in kitchen buildings where there is the possibility of having a fire. The purpose of the fire which is on the floor of the building is to produce heat that can dry the maize which has been stored above it. A lot of wood is used in this process (Mussa, 2013).

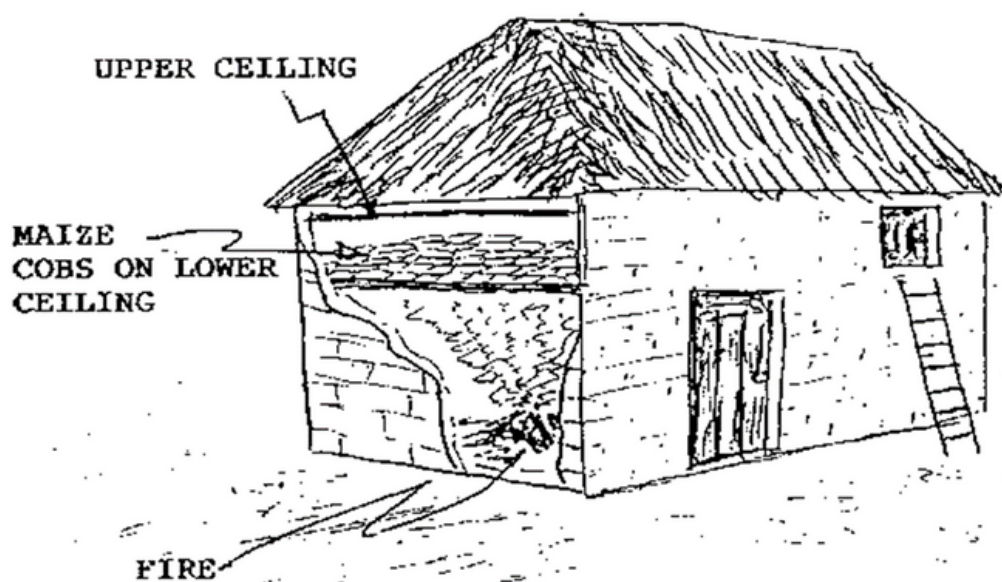


Figure 6: Traditional Maize Storage System

Source: FAO Project PFL/CMR/001, 1982

With this traditional system of storing maize, farmers lose about 40% of their harvest mainly to attacks from insects and pests as well as rotting. Rats pose a continuous threat to maize stored using this traditional method of storage. One of the major concerns for maize farmers and consumers in Africa is aflatoxin, a poison produced by a fungus, which occurs when the grains are not dried properly. Access to advanced and modern technologies/mechanisms for storage is greatly limited by finance and technology (Mussa, 2013).



Figure 7: Post-harvest loss of maize due to poor post-harvest management practices

Source: Opinions Archives - Sesi Technologies, 2022

Moreover, the value chain challenge is not limited to storage. Access to ready markets where farmers can sell their produce at competitive and valued prices is a post-harvest nightmare for most rural farmers. In Jakiri Subdivision in the North West region of Cameroon where market gardening is very common for example, the lack of appropriate storage facilities causes farmers to sell their produce immediately after harvest at the buyers' price which is often very low. Thus, the after-harvest loss is very high, coupled with the absence of value-addition. The middlemen in the distribution chain who buy these products to sell in other cities tend to make more profit than the farmers who produce. Farm-to-market roads are very poor, causing farmers to incur very high transport costs which reduce their end profits. Some farmers even have to use their heads and motorcycles to transport their produce out of the farms to the market given the inaccessible nature of the roads by vehicles which sometimes get stuck in the mud leading to delays. (Angwafo & Eric Bime, 2020).

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4.0 JACCA AGRO-WAREHOUSE AS AN INTEGRATED SOLUTION FOR SUSTAINABLE AGRO-ECONOMIC DEVELOPMENT AND POVERTY ALLEVIATION



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4.0 JACCA AGRO-WAREHOUSE AS AN INTEGRATED SOLUTION FOR SUSTAINABLE AGRO-ECONOMIC DEVELOPMENT AND POVERTY ALLEVIATION

Given the challenges discussed in the previous section, we are introducing an Integrated solution for sustainable rural crop farming that will be a game-changer for rural farmers in Africa and Globally.

PROJECT GOAL: Alleviating rural poverty by maximizing Africa's agricultural potentials within the agro-food value chain by 2030.

SPECIFIC OBJECTIVES OF JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS

- To establish effective warehouses for subsistence farmers in rural and semi-rural settlements
- To augment the agro-food value chain
- To facilitate the adoption and implementation of improved agricultural and climate-resilient practices by rural farmers
- To leverage technology in digitalizing the farm-to-market-to-table process

4.1 TARGETS OF JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS

J.1: By 2030, provide at least 50% of farmers with reliable support and mentorship, and capacity building system to bridge the technical knowledge gap and provide access to information on modern sustainable farming practices, climate change, and climate-smart agriculture.

J.2: By 2030, all registered farmers belong to cooperative societies to help ensure solidarity and improved farmer and other stakeholder engagement in the project.

J.3: By 2030, all registered farmers with JACCA engage in strong and attractive markets for agricultural products and improved incomes, by ensuring the availability of adequate storage facilities for farmers.

J.4: By 2030, all clients and registered farmers track the improvement of their agricultural productivity with the mobile application and warehouse receipts.

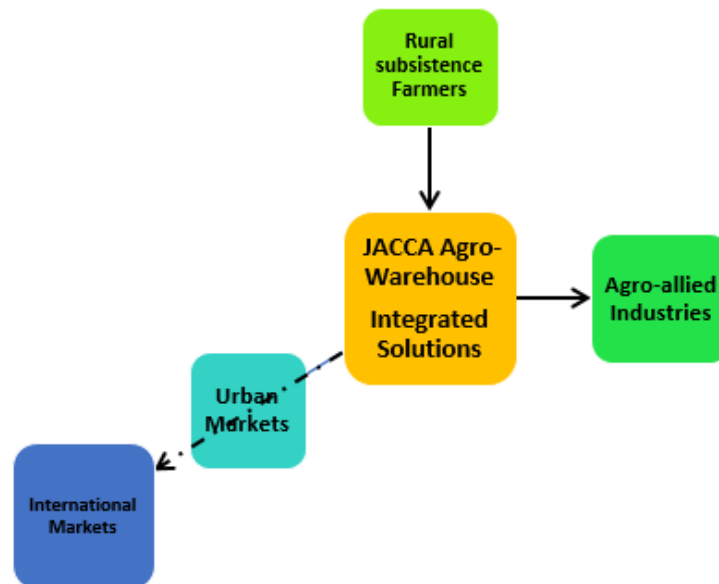


Figure 8: JACCA Agro-Warehouse Integrated Solutions as a tool for agro-economic growth and poverty alleviation

Source: Team's Perception

4.2 PROJECT JUSTIFICATION

The contribution of any sector to poverty reduction is shown to depend on its own growth performance, its indirect impact on growth in other sectors, the extent to which poor people participate in the sector, and the size of the sector in the overall economy. Bringing together these different effects using cross-country econometric evidence indicates that agriculture is significantly more effective in reducing poverty among the poorest of the poor (as reflected in the \$1-day squared poverty gap). It is also up to 3.2 times better at reducing \$1-day headcount poverty in low-income and resource-rich countries (including those in Sub-Saharan Africa), at least when societies are not fundamentally unequal (Christiaensen et al., 2011).

Agricultural development is generally recognized as a primary solution to poverty reduction, particularly in developing nations. Christiansen, (2018) highlights insights into why agriculture is paramount to the development of economies, especially in developing countries that are largely dependent on the growth of the agricultural sector. Firstly, it has been well established that growth in agriculture is three-fold more effective in the reduction of poverty as compared to the growth that is generated outside of the agriculture sector. Secondly, the advantage of the growth in the agriculture sector as compared to other sectors is the impact on the welfare of citizens due to the reduction in food insecurity and malnutrition. Third, the reduction of poverty through agriculture has a greater direct impact on the poorest in society. Fourth, the rise in agricultural productivity pulls surplus labor from less productive domestic endeavors into agriculture and releases agricultural labor into non-agriculture activities; thus reducing poverty.



4.3 THE CASE OF PRE-EXISTING FARMER ORGANIZATIONS

Farmer organizations in the agricultural sector is not a new phenomenon. In the North West Region of Cameroon for example, farmer cooperative groups and parastatals exist with the aim of agricultural development. A farmer organization is a group of rural farmers and producers who unite to provide services and improve rural incomes or employment opportunities in relation to agricultural activities among themselves. These farmer organizations usually train their members on improved crop and animal production, purchase agricultural inputs in bulk for distribution, provide financial support like thrift and loans for members, share experiences, engage in communal farming, and cooperative marketing of group products.

The economic crisis of the 1980s encouraged the creation of many farmer cooperatives handled by the farmers, since the government could no longer manage these organizations. This led to new legislation to regulate the agricultural sector; notable among these are: Law No. 90/053 of 19 December 1990 on freedom of association, Law No. 92/006 of 14 August 1992 on cooperative societies /common initiative groups (CIG), and Law No. 92/006 of 14 August 1993 which led to the liberalization of the agricultural sector and the creation of many farmer organizations in the region (Nji & Engwali, 2019).

Farmer organizations kept growing to over 12,000 but majority of them were inactive, as they were created mainly to enable members benefit from financial or material assistance from projects like ACEFA (Programme for the Improvement of Competitiveness of Family Agro-pastoral Farms) and GP-DERUDEP (Grassfield Participatory and Decentralized Rural Development Project). The number was so large that by 2015 there were a total of 16,425 farmer organizations in the North West region of Cameroon (Nji & Engwali, 2019).

Most farms have not been optimised since farming by members of cooperatives is done individually with little or no supervision, while postharvest sales are done collectively. Owing to this, only 9.6% of the farmer groups are active and carry out group activities while about 90% of these farmer organisations have died. The difficulties faced by most farmer organizations involve access to finance to expand their activities, transparency, mismanagement of funds, price fluctuations, and poor farm-to-market linkages, especially in the rainy season to sell products among many others (Fongang, 2012).

These explain why many farmer organisations and existing intervention projects are unable to impact rural agriculture on a large scale. The realities of existing farmer organizations reveal the current limitations in the maximisation of agricultural productivity in this region. Consequently, it is imperative to provide an intervention in these rural settings that will completely change the face of crop production and promote sustainable agricultural development. This is where JACCA Agro-Warehouse Integrated Solutions comes in. What difference will JACCA Agro-Warehouse Integrated Solutions make in these rural areas? The answer is contained in our intervention approach.

JACCA COMPETITOR ANALYSIS



JACCA: AGRO-WAREHOUSE
Integrated Solutions


 JACCA: AGRO-WAREHOUSE Integrated Solutions		JACCA Agro-Warehouse Integrated Solutions	CERTISPEC SERVICES	DIGI FARMS
		OUR COMPANY	DIRECT COMPETITOR	INDIRECT COMPETITOR
COMPANY PROFILE	COMPANY HIGHLIGHTS	Founded in 2022: Agribusiness enterprise providing grain warehouse storage facilities, urban and international market linkage, and capacity building	Founded in 2006: A subsidiary of the Certispec Services Group; a Canadian multinational.	Founded in 2020: Agribusiness enterprise providing door-to-door delivery of agricultural products and farm produce
KEY COMPETITIVE ADVANTAGE		Post-harvest loss prevention, close proximity to the farming community, warehouse receipt system	Established customer base, offers diverse services, located in Port Cities, warehouse receipt system	Boosts local consumption and production of agricultural products in Africa, established customer base
TARGET MARKET	MARKET INFORMATION	Small-scale rural farmers and various stakeholders in the Agriculture food value chain	Government agencies, financial institutions manufacturers, importers, exporters, and, traders	Local commodity producers
MARKETING STRATEGY		Collaboration, social media, value addition	Social media	Social media
PRODUCTS AND SERVICES	PRODUCT INFORMATION	Storage, access to finance quality control, market Linkage, Logistics	Third-Party custody (CMA), warehousing, inspection services for a variety of agricultural products	Door-to-door delivery of cash crops and food
PRICING		Affordable	High	Affordable
DISTRIBUTION CHANNELS		Direct	Direct	Direct
STRENGTHS	SWOT ANALYSIS	Post-harvest loss prevention	Inspection and certification services for a variety of agricultural products,	Tech-driven agribusiness providing e-commerce services
WEAKNESSES		Dependent on seasonal agriculture High cost of operations	The company structure does not facilitate the inclusion of small-scale rural farmers.	Focus only on national market penetration
OPPORTUNITIES		Donor and government support	The improvement of the third-party warehousing system through collaboration with stakeholders.	Expansion in more cash crops delivery for the Cameroon urban market
THREATS		An inadequate legal framework to control warehousing activities	Inadequate warehouse receipt support infrastructure	Agriculture start-ups offer the same services

Table 1: Competitor Analysis

Source: Organisation Document



4.4 INTERVENTION APPROACH

POST-HARVEST LOSS PREVENTION AND QUALITY CONTROL

Farming in Cameroon is seasonal; due to the limitation of storage and processing facilities, rural farmers are forced to sell their produce immediately after harvest. JACCA Warehouse system ensures well-operated warehouses where maize cereal stocks are stored, properly monitored, and checked for quality. In order to ensure high quality and quantity of the commodity stored, the following procedures will be undertaken by JACCA:

- Establishing standards for the products through the education of small-scale rural farmers on quality standards by comprehensive training and monitoring throughout the farming process.
- Rejection of sub-standard products; as well as grading and testing of all products prior to storage.
- Cleaning, repackaging, and storage of received maize cereals in line with our service charges.
- The divisions in storage according to grades set by International Standards.

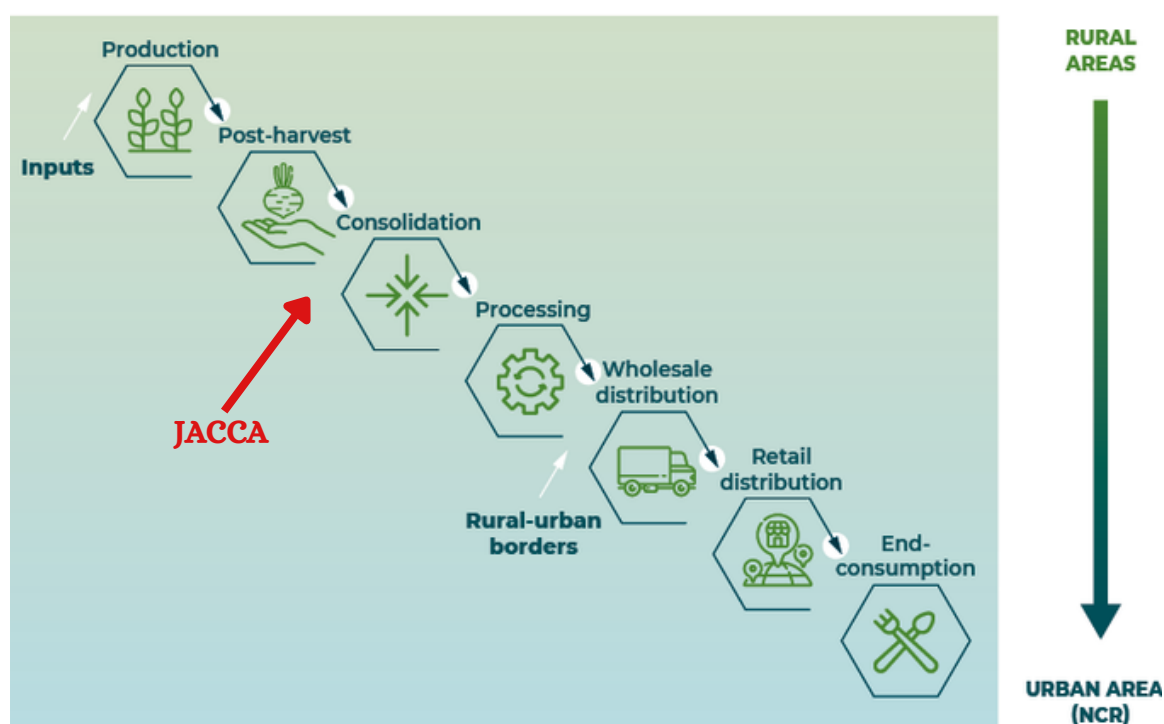


Figure 9: Intervention of JACCA in the rural-urban agricultural food supply chain
Adapted from Palo et al., 2020



To maintain the quality of the maize, the following parameters will be monitored continuously, in line with the Codex International Food Standards, Standard for Maize CXS 153-1985:

FACTOR	PARAMETERS
Moisture content	15.5% m/m maximum
Filth	0.1% m/m maximum
Organic extraneous matter	1.5% m/m maximum
Inorganic extraneous matter	0.5% m/m maximum
Contaminants, heavy metals and pesticides	Absence of residues from agriculture chemicals

Table 2: Major benchmarks for maize storage parameters

Source: Joint FAO/WHO Codex Alimentarius Commission, 2007

LINKING RURAL FARMERS TO URBAN AND INTERNATIONAL MARKETS THROUGH TECHNOLOGY

The Cameroonian agriculture market system is an ideal environment for our maize storage service due to the seasonal fluctuation in agriculture product prices. This ensures that the tactic of delayed sales is lucrative for farmers. JACCA mobile application will be the link between various stakeholders in the agriculture value chain. The app will be an online marketing platform for our stock, as well as offer information services on inventory management, transportation, retail, agriculture market prices, and customer care services.

This enables us to eradicate the middlemen who prey on rural small-scale farmers' lack of knowledge and increase the transparency of markets through the provision of current, valuable market price information.



WAREHOUSE RECEIPT SYSTEM

Farmers deposit maize at certified warehouses regulated and operated by JACCA, and receive a warehouse receipt. This is a certification of legal ownership of the stored commodity indicating the quality and quantity. This will improve access to finance as the warehouse receipts serve as secure collateral to obtain credit from banks and financial institutions. JACCA will operate a private collateral system of management by providing commodity storage activities that exceed the capacity of community led warehouse receipt systems in Cameroon. The warehouse receipt system provided will be the mechanism that facilitates storage of agriculture commodities with the following guidelines :

- The warehouse receipt will be equivalent to the stored commodities
- The duties, rights and liabilities of each shareholder in the warehouse receipt system will be clearly defined
- All maize stock will be accepted for storage in the warehouse receipt system if they do not exceed three months post-harvest



4.5 IMPLEMENTATION OF JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS

Post-harvest treatment of the grain crops is done to:

- minimize the probability of mold growth
- increase the storage (shelve) life of the grains
- command a higher market value

Features and characteristics of the JACCO Agro-Warehouse:

- Clean and hygienic
- Structured to prevent moisture-intake
- Well-ventilated
- Maintained at crop-specific atmospheric temperatures
- Options of shelling and milling or leaving as whole grain
- Protected from rodents and insects (weevils)
- Protected from rain and wind
- Routine inspection to determine conservation conditions
- Routine inspection for repairs in damaged areas of the facility
- Post-harvest processes will be operated by renewable-energy powered systems like solar grain dryers and mechanical dryers fuelled by dry corn husks

INBOUND AGRO-WAREHOUSE PROCESS FOR GRAIN CROP PRODUCTS

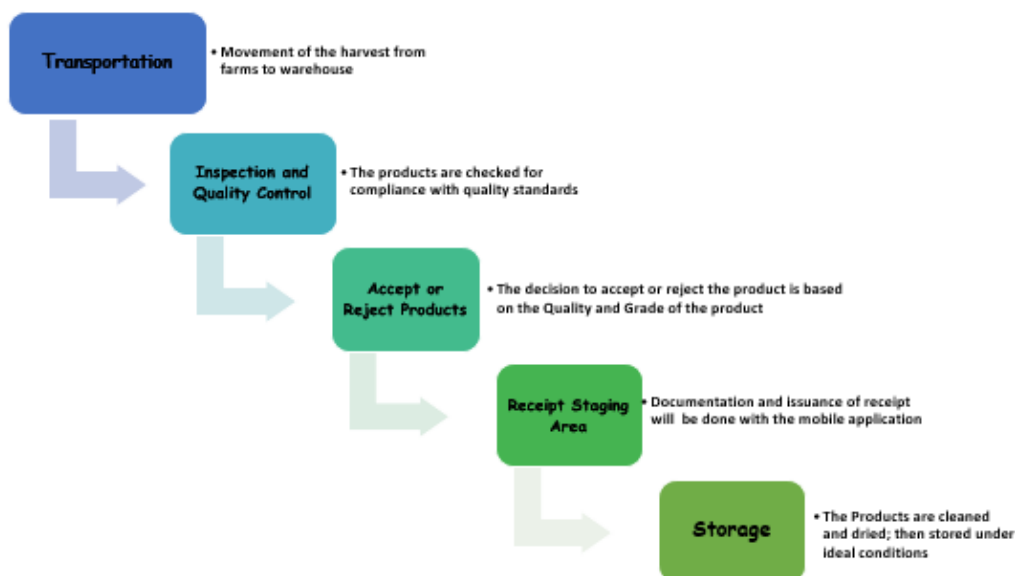


Figure 10: Process flow for inbound crop products

Source: Teams perception



OUTBOUND AGRO-WAREHOUSE PROCESS FOR GRAIN CROP PRODUCTS

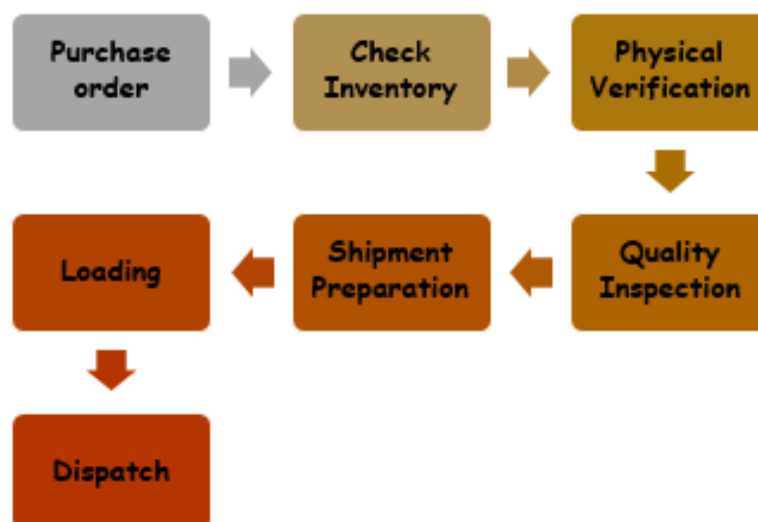


Figure 11: Process flow for outbound crop products

Source: Teams perception

FEATURES OF THE JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS MOBILE APPLICATION

The JACCA mobile application is designed to be a meeting place for all stakeholders. It is

- User-friendly
- Based on the User's language of preference
- Designed to operate on even the most basic mobile devices
- Secured with end-to-end encryption of data
- A database for the user's account history



Below is the prototype of the JACCA mobile application:

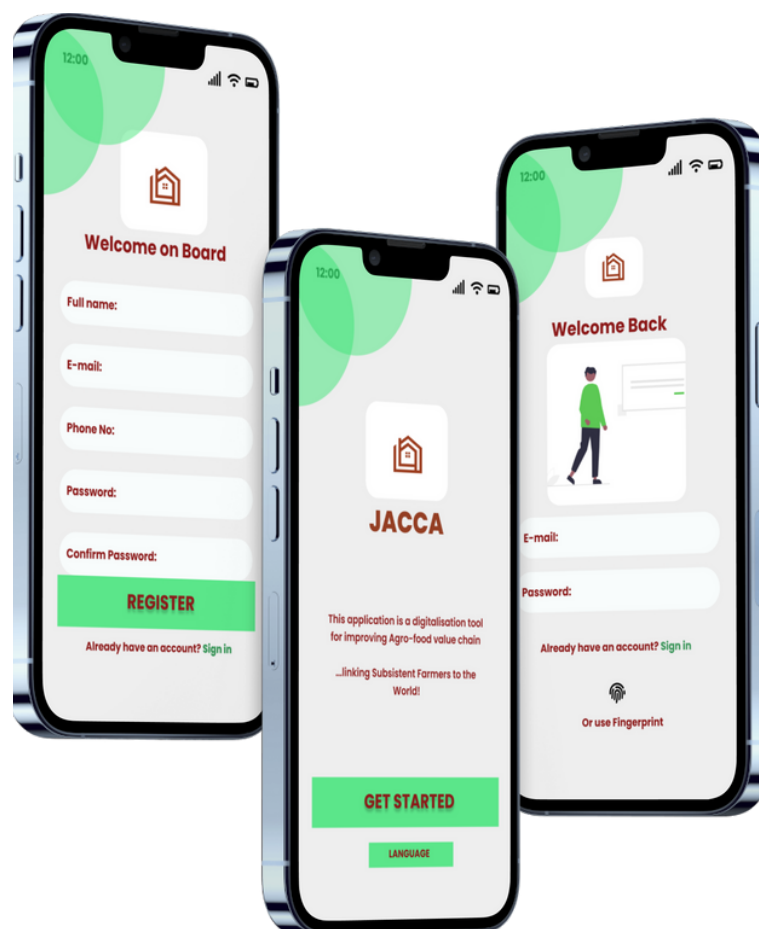


Figure 12: Process flow for outbound crop products

Source: Designed with Figma



Figure 13: Process flow for outbound crop products

Source: Designed with Figma

There are options on the mobile application to allow users to apply for:




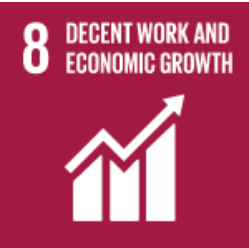
- Depositing farm produce
- Retail purchase
- Information services
- Transportation services
- Contacting us
- Feedback and complaints



5.0 FINAL CONSIDERATIONS



5.1 ANALYSIS OF JACCA AGRO-WAREHOUSE INTEGRATED SOLUTION'S CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS (SDGs)

SUSTAINABLE DEVELOPMENT GOALS (SDGs)	HIGHLIGHTED TARGETS	CONTRIBUTION OF JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS
 <p>End poverty in all its forms everywhere</p>	<p>Target 1.1: Eradicate extreme poverty Target 1.2: Reduce poverty by at least 50% Target 1.4: Equal rights to ownership, basic services, technology and economic resources</p>	<p>JACCA will improve the income and profitability of rural farmers by ensuring that more men and women have equal rights to agro-economic resources, natural resources, appropriate new technology and financial services.</p>
 <p>End hunger, achieve food security and improved nutrition and promote sustainable agriculture</p>	<p>Target 2.1: Universal access to safe and nutritious food Target 2.3: Double the productivity and incomes of small-scale food producers Target 2.4: Sustainable food production and resilient agricultural practices Target 2.A: Invest in rural infrastructure, agricultural research, technology and gene banks Target 2.C: Ensure stable food commodity markets and timely access to information</p>	<p>JACCA will double the agricultural productivity of small-scale food producers including women. We will ensure food security by minimizing post-harvest losses, improving nutrition and promoting sustainable agriculture. We will ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information.</p>
 <p>Ensure healthy lives and promote well-being for all at all ages</p>	<p>Target 3.9: Reduce illnesses and deaths from hazardous chemicals and pollution</p>	<p>JACCA will substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by ensuring strict compliance of our products with global crop quality and health standards.</p>
 <p>Promote inclusive and sustainable economic growth, employment and decent work for all</p>	<p>Target 8.1: Sustainable Economic Growth Target 8.2: Diversify, innovate and upgrade for economic productivity Target 8.4: Improve resource efficiency in consumption and production Target 8.5: Full employment and decent work with equal pay Target 8.6: Promote youth employment, education and training</p>	<p>JACCA will sustain per capita economic growth in accordance with national circumstances especially in developing countries. We will achieve higher levels of economic productivity through diversification, youth engagement, technological upgrading and innovation, including focusing on agriculture as a high-value added and labour-intensive sector.</p>





SUSTAINABLE DEVELOPMENT GOALS (SDGs)	HIGHLIGHTED TARGETS	CONTRIBUTION OF JACCA AGRO-WAREHOUSE INTEGRATED SOLUTIONS
 <p>Reduce inequality within and among countries</p>	<p>Target 10.1: Reduce income inequalities Target 10.2: Promote universal social, economic and political inclusion</p>	<p>JACCA will contribute to the progressive achievement of sustained income growth of the bottom 40% of the population at a rate higher than the national average. We will empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.</p>
 <p>Ensure sustainable consumption and production patterns</p>	<p>Target 12.1: Implement the 10-year sustainable consumption and production framework Target 12.2: Sustainable management and use of natural resources Target 12.3: Halve global per capita food waste</p>	<p>JACCA will ensure the sustainable management and efficient use of natural resources: crop products for direct consumption and as an input for agro-allied industries. We will work towards the reduction of per capita food waste at the retail and consumer levels and reduce food losses along production and supply chains, especially post-harvest losses.</p>
 <p>Take urgent action to combat climate change and its impacts</p>	<p>Target 13.3: Build knowledge and capacity to meet climate change</p>	<p>Through trainings and farmer education, we will improve awareness and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.</p>
 <p>Revitalize the global partnership for sustainable development</p>	<p>Target 17.3: Mobilize financial resources for developing countries Target 17.5: Invest in least-developed countries Target 17.7: Promote sustainable technologies to developing countries</p>	<p>JACCA will adopt and implement investment promotion regimes, beginning with least developed countries. We will be a contributor by mobilizing additional financial resources for developing countries from our project investment. By leveraging digitalization, we will promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing economies.</p>

Table 3: Contribution of JACCA to the attainment of the SDG

Source: UN SDG Goals and Teams perception



5.2 STAKEHOLDER ANALYSIS

These are the project's key actors: individuals, agencies, and institutions that have interest and/or influence over the project and how this interest and influence would affect the outcome and viability of the project. This analysis is very necessary prior to the implementation of the project, and relevant to the planning, implementation, monitoring, and evaluation of the project to achieve the desired objectives and goals. The interest is assessed in relation to the projects' relevance to the stakeholders and the influence is to assess their contribution to the project goals and objectives. The table below shows the various stakeholders, their roles and interests that can be explored and harnessed to manage how they are influenced by the project or their influence over the project.

Project Stakeholders	Roles	Interest
Project team	<ul style="list-style-type: none"> • Designing of project • Planning of project • Implementation • Monitoring and Evaluation 	<ul style="list-style-type: none"> • Alleviate rural poverty through maximizing agricultural potentials in host communities • Improve resilience in community to solve existing and emerging economic problems • Create good relationships with clients (farmers and traders)
Beneficiaries (farmers)	<ul style="list-style-type: none"> • Transportation of produce to warehouse • Keep good records • Track sales on mobile application • Adequate participation in project activities 	<ul style="list-style-type: none"> • Increased knowledge and experience in good farming practices • Good record keeping • Increased income and productivity
Market (Wholesalers and Bulk retailers)	<ul style="list-style-type: none"> • Connecting with warehouse • Transportation of produce from warehouse • Keep good records • Track stock and sales on mobile application 	<ul style="list-style-type: none"> • Purchase the needed agricultural produce • Value of money • Maintain good relationship with warehouse operators
Project investors	<ul style="list-style-type: none"> • Provision of adequate funds and loans for the project • Monitoring and evaluation • Review of project reports 	<ul style="list-style-type: none"> • Making profits • Contribute to the development of the agricultural sector
Local, national institutions and general public	<ul style="list-style-type: none"> • Updating policy documents to favor agricultural development • Creating an enabling and peaceful environment for optimum productivity 	<ul style="list-style-type: none"> • Improved access to food and enhanced livelihood opportunities • Reduced youth and general unemployment situations • Increased tax revenues
Other stakeholders (e.g. contractor, transportation company, application designer, microfinance institutions)	<ul style="list-style-type: none"> • Construction of the warehouse • Transportation of goods from warehouse to markets (wholesalers) • Designing and managing of mobile application • Assist with growing businesses 	<ul style="list-style-type: none"> • Win contracts and make a living • Improved market accessibility to agricultural produce • Ensured convenience in tracking productivity and business • Assisting farmers with soft loans

Table 4: Stakeholder Analysis

Stakeholder Interest and Influence Analysis

The interest-influence analysis is a chart that informs the extent (whether high or low) of interest or influence a stakeholder has over a project. This helps to know how to prioritize the various stakeholders in relation to their influence and/or interest that can be harnessed to manage the entire project and achieve the desired goals and objectives. In order to protect the project from stakeholder influence and build the right interdependencies among the various stakeholders, the buffering and bridging approach will be employed. This approach is one that would engage relevant stakeholders by using strategies that include: scheduling timely meetings, signing agreements on matters agreed on, regular briefs to stakeholders to know project progress, partnering, and activity reports. The figure below shows the stakeholder interest-influence relationship.

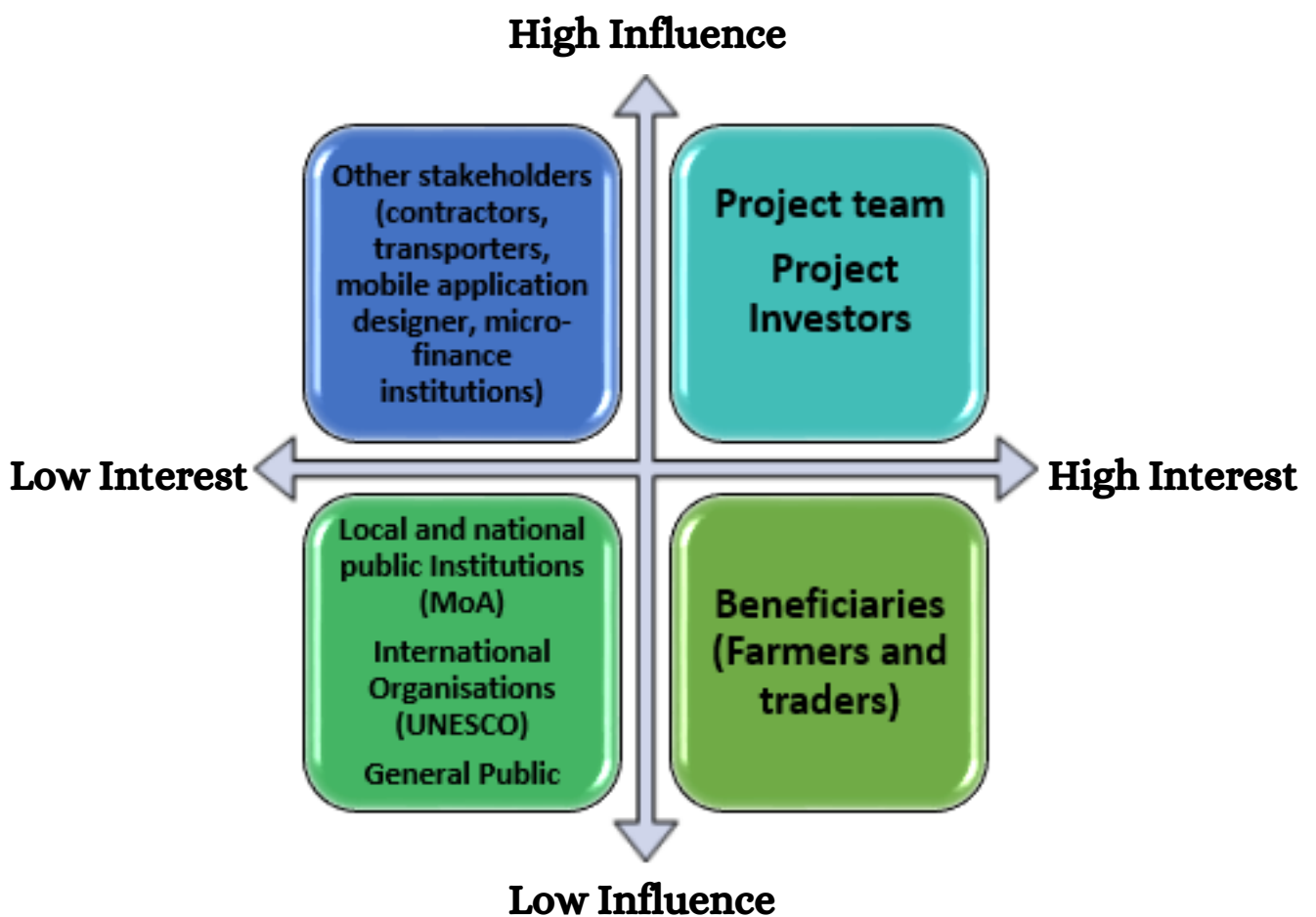


Figure 14: Stakeholder Interest-Influence Relationship

Source: Organisation Document



5.3 LOGICAL FRAMEWORK

Narrative Summary	Objectively Verifiable Indicator	Means of verification	Assumptions
<p>Purpose: To maximize Cameroon's agricultural potentials by improving the agro-food value chain with an effective warehouse system by 2030</p>	<ul style="list-style-type: none"> At least 50% of farmers are reported having an improved agricultural productivity with optimum benefits using the warehousing system. 	<ul style="list-style-type: none"> Baseline surveys and reports Ministry of Agriculture report Project progress report Proper warehouse receipts Viable mobile application 	<ul style="list-style-type: none"> Adequate support from Ministry of Agriculture, community leaders and communities in Cameroon
<p>Output 1: Augment the agro-food value chain</p>	<ul style="list-style-type: none"> At least 50% of farmers sell outside the communities At least 50% of farmers have good returns on produce Cooperative societies created for farmers 	<ul style="list-style-type: none"> Ministry of Agriculture report Project progress report Market survey Minutes of monthly meetings of cooperative societies 	<ul style="list-style-type: none"> Availability of land Cooperation of farmers in cooperative societies
<p>Output 2: To establish effective warehouses for subsistence farmers in rural and semi-rural settlements</p>	<ul style="list-style-type: none"> Over 90% of produce are properly stored in warehouse for sale Issuance of warehouse receipts to all farmers for proper record keeping 	<ul style="list-style-type: none"> Siting of warehouse in the community Copies of warehouse receipts 	<ul style="list-style-type: none"> Conducive environment created for storage Sufficient storage equipment Effectiveness of transportation services
<p>Output 3: To leverage technology in digitalizing the farm-to-market-to-table process</p>	<ul style="list-style-type: none"> To link at least 50% of the rural farmers in question to urban and international market base At least 70% of farmers trained on the use and benefits of the mobile application Delayed sales reduced by 80% 	<ul style="list-style-type: none"> Viable mobile application 	<ul style="list-style-type: none"> Availability and reliability of mobile application Ease in use of the mobile application



<p>Output 4: Advocate for policies that promote local/grassroot agricultural development</p>	<ul style="list-style-type: none"> • Equity in land ownership for both men and women • Improved access to extension services • Farm to market roads improved 	<ul style="list-style-type: none"> • Project progress report • Baseline survey and report 	<ul style="list-style-type: none"> • Extension officers visit farmers regularly to offer services • Cooperation of the government and good weather condition for road construction
<p>Activities:</p> <ul style="list-style-type: none"> • Community engagement and mobilization • Data collection (field works) • Stakeholders' engagement • Organising trainings for farmers on advanced agricultural and climate-resilient technology • Peer meetings • Market, farms and production site visits • Organising entrepreneurial training for farmers and traders • Forming corporative societies for farmers and traders 	<p>Inputs:</p> <ul style="list-style-type: none"> • Field work resources (logistics) • Traveling and accommodation arrangements • Resources for training and engagement (space for training) • Training logistics for advanced agricultural and climate-resilient technology for farmers • Training logistics for entrepreneurial training • Connecting host communities to relevant institutions or agencies • Space for holding meetings 	<ul style="list-style-type: none"> • Minutes from meetings • Receipt of rented spaces • Baseline data report • Project report • Cost 	<ul style="list-style-type: none"> • The host communities are willing and ready and willing to participate in trainings and engagements • Institutions are willing to accept the project team and create an enabling environment for operationalisation • Logistics are all available for training • Resources (money) for activities are available

Table 5: Logical Framework

Source: Organisation Document

5.4 SWOT ANALYSIS

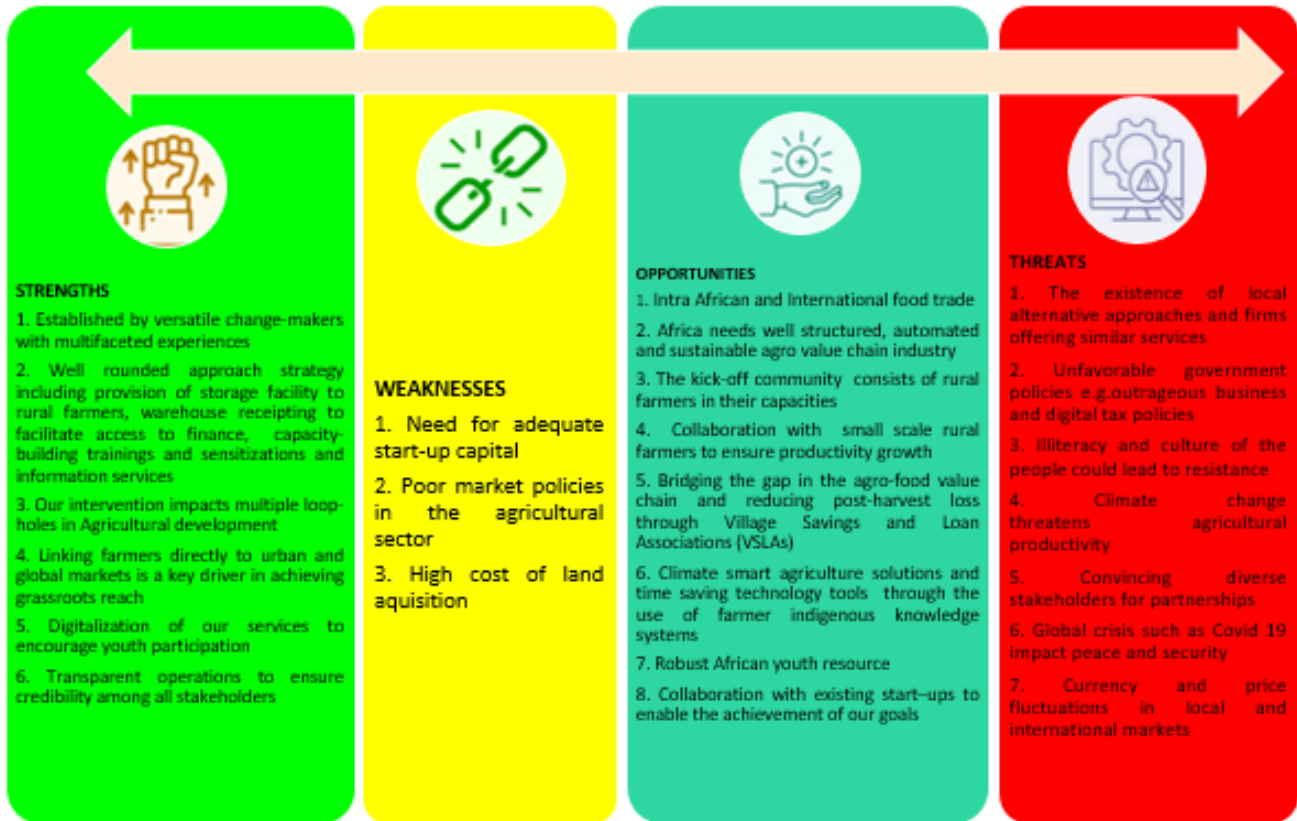


Figure 15: SWOT Analysis

Source: Organisation Document



5.5 CONCLUSION

Winning the battle against poverty at the grassroots is an enormous challenge. The JACCA Agro-Warehouse Integrated Solutions aims to provide intervention in line with the improvement of the agro-food value supply chain for sustainable economic growth. Our intervention is to create a warehousing system and a software application that will be a node connecting subsistent farmers to vibrant urban markets and agro-allied industries and subsequently international markets. The reality for rural farmers is that their hard labor is usually not rewarded by commensurate profitability. This is based on their poor agricultural practices, knowledge-gap, and limitation in accessing secure and viable markets for their products; they are usually exploited by middlemen who acquire their products at give-away prices. Hence, JACCA Agro-Warehouse Integrated Solutions will equip the farmers and increase their capacity for growth while providing a level playing ground to increase their competitiveness in the urban and global markets. It will provide a system envisioned to augment the efforts of rural farmers by leveraging technology through a digitalized mobile application that allows for engagement and transparency among all stakeholders and a database for monitoring the productivity of the farmers. The success of this intervention should impact food security, encourage youth participation in agriculture and provide profitable employment opportunities. JACCA Agro-Warehouse Integrated Solutions will contribute significantly to the alleviation of poverty among the poorest of the poor in society; it is scalable, flexible, and replicable.

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