ASSESSMENT OF CONSORTIUM APPROACH IN FOOD VALUE CHAIN DEVELOPMENT ON INCOME OF SMALLHOLDER FARMERS IN TANZANIA, EAST AFRICA

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Regional solutions to local problems

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ACRONYMS/ABBREVIATIONS

BEST-EAC	Beans Enterprises & Structured Trade in the East Africa Community
CARI	Competitive African Rice Initiative
CESDEV	Centre for Sustainable Development
EAC	East African Community
FAO	United Nations Food and Agricultural Organization
FGD	Focus Group Discussion
GAP	Good Agricultural Practices
GDP	Gross Domestic Products
GPS	Global Positioning System
IFAD	International Food and Agricultural Development
IMF	International Monetary Fund
MATI	Ministry of Agricultural Training Institute
MDP	Master's in Development Practice
MT	Metric Tonnes
PHH	Post-Harvest Handling
PRS	Poverty Reduction Strategy
PSDS	Private Sector Development Strategy
RCV	Randomization Control Variable
REACTS	Regional East African Community Trade in Staples
RGL	Raphael Group Limited
SHIRCO	Southern Highland Rice Consortium
SME	Small and Medium Enterprises
SWOT	Strength, Weakness, Opportunity and Threat
UNDESA	United Nations Department for Economic and Statistics Agency
USD	United States Dollars
USAID	United State Agency for International Development
WEF	World Economic Forum
WFP	World Food Programme
WHS	Warehousing System

EXECUTIVE SUMMARY

Agriculture is an important driver and enabler of economic development of East African Community (EAC) and accounts for about 80% of the workforce involving smallholder farmers for their livelihood, yet EAC is characterized by low agricultural productivity and income thus rated amongst the poorest in Africa. Agricultural sector contributes an average of 36 percent of the GDP of EAC (EAC Vision 2050, 2016). In Tanzania, agriculture accounts for more than a quarter of GDP, employing 80% of the workforce, providing 85% of exports, yet Tanzania is one of the world's poorest countries. In response to these, several value chain approaches have been adopted with varying results, yet low productivity and income of smallholder farmers persist in the country, thereby making smallholder farmers vulnerable to shocks. Tanzania's main food crops are maize, rice, cassava, banana, beans, wheat, sorghum and millet. Other crops are pulse, groundnut. The Main cash crops are coffee, sisal, cashew nut, tea, cotton and tobacco, etc. Official statistics in 2014 documents cereals/maize, wadding, felts and nonwoven materials as the largest intra-regional traded commodities transacted, representing 51 percent of the total intra-EAC export of USD317.56 million. Rice is cultivated as both food and cash crops.

Many of the adopted food value chain approaches prioritize in isolation the different nodes of the chain, thus lack collaboration in the entire nodes. These approaches have not been able to get the involvement of all the partners in value chain development to drive the process, thereby find it hard to be sustainable. They focused on either building capacity, creating access to credit, reducing or mitigating risk, increasing efficiency, enhancing competiveness, ensuring produce availability, promoting standards and compliance or facilitating market linkages, thereby making them to be fragmented and less integrative.

Nonetheless, Consortium Approach is a collaborative approach to food value chain development built on win-win partnership that focused to close the gaps of low agricultural productivity and income of smallholder farmers. Kilimo Trust, a non-profit East African organization adopts consortium approach in delivering projects objectives in the implementation of its agribusiness projects. The utilization of this approach is seen in the implementation of the Competitive African Rice Initiative (CARI) project in Tanzania funded by Bill and Melinda Gates Foundation with project duration of 2014 to 2018 (the project was to exit in 2017, but extended in second quarter of 2017 to 2018). Equally, the Regional East Africa Community Trades in Staple

(REACTS) of IFAD with project duration of 2014 to 2017 in Uganda, Tanzania, Rwanda and Kenya and the Beans Enterprises and Structured Trade in the East Africa Community (BEST-EAC) of UKaid from 2015 - 2017 in Uganda both adopted consortium approach model in implementation.

The study was conducted in Mbarali district of Mbeya region in Southern Highland of Tanzania under the Competitive African Rice Initiative (CARI) project. A total of 155 smallholder paddy farmers under the Southern Highland Rice Consortium (SHIRCO) farmers group in Tanzania were interviewed with the aid of structured questionnaires and focus group discussion guide. 10 key informants who are partners and 7 stakeholders in the consortium were interviewed using key informant interview (KII) guide. Survey method that employed both descriptive and inferential statistical methods under which data were collected from different respondents at different locations once through survey was used. Both quantitative and qualitative data were collected and analyzed using frequencies, percentages, mean, standard deviation (descriptive statistics) and t-test (inferential statistics).

As found by the study, majority (66.5%) of the respondents are male and female accounts for 33.5% with most of the farmers within the age of 35 to 59 years. Demography of farmers shows variations in age, marital status and educational attainment. Majority of the farmers are married and most of the farmers had primary education. The main planting season for paddy in the study area is November to March. The report found mean average land cultivated for paddy before SHIRCO consortium was 3.37 acres while 3.55 acres was used by farmers after the consortium. The mean harvest per hectare of paddy in SHIRCO consortium amounts to 2.9MT as against 1.4MT harvested by farmers before SHIRCO consortium. Furthermore, farmers' gross margin before SHIRCO consortium was US$855.03 while an incremental gross margin of US$2298.14 was recorded after the consortium indicating a strong significant change. The revenue, mean harvest, gross margins show a significant difference as a result of the consortium. Consequently, the main drivers of the results entail adoption of farming as a business, end-user market focus, availability of assured market, access to quality inputs and credit supported by delivery system, payment modality and warehousing system. Though the land used increased marginally, but not the main driver of the results recorded.

Equally, skills and knowledge gotten through training in the consortium contributed immensely to the upward trajectory in production and income of farmers, thereby causing a significant shift from subsistence farming to farming as a business. Also, group action enabled farmers to access quality inputs and credits from banks while contributing to enhancement of farmers' decision making ability.

The approach has some number of strengths to build on, weaknesses to be mindful of, opportunities to harness and threats to mitigate. The SWOT Analysis revealed that the main strength of the consortium is private sector ownership and commitment resulting in profit for partners. In opposition to the strength is the weaknesses of donor-driven approach, trust problem, delay in loan disbursement underpin by difficulty in creating ease of inclusion of youths in agribusiness and lack of gender-friendly labour saving technology. The demand-driven nature of the approach together with replication potentials and attractiveness to financial services offers opportunities to harness. Nonetheless, threat of climatic condition underlay with dependency on one buyer and politics of food are issues of concern for the consortium that need to be mitigated upon.


KUBOTA

1.0 INTRODUCTION

1.1 Background of the Study

Agriculture provides enormous opportunity for diversification of the income based of East African Community (EAC). Agriculture is an important driver and enabler of economic development of most African countries. Agriculture as one of the most important sectors in East African Community accounts for about 80% of the workforce comprising the smallholder farmers in rural areas for their livelihoods. In spite of this, the EAC is characterized by low agricultural productivity and low income thus rated amongst the poorest in Africa. Approximately 60 per cent of the population of EAC live below the poverty line and 46,362,187 people (Kenya 16,728,252; Tanzania 11,679,275; Uganda 7,329,365; Burundi 6,373,165; Rwanda 4,252,130 population) of EAC's poor live in rural areas and majority of are smallholder farmers who have yet agriculture as their means of livelihood (State of East Africa Report, 2016). This problem is due to the fact that most smallholder farmers are constrain by low productivity and income which have placed them in position of not been able to feed themselves adequately throughout the year, thereby make them vulnerable to shocks, stress and poverty. The EAC Vision 2050 (2016) reported that the key long-standing challenges of smallholder farmers is low productivity stemming from poor access to farm inputs and the lack of access to markets, credit and technology compounded by the volatile food and energy prices. Smallholder farmers dominate agricultural sector of EAC, occupying the majority of land and produce most of the crop and livestock products.

According to report by International Fund for Agricultural Development (IFAD and UNEP, 2013), approximately 2.5 billion people living in developing countries are involved in full or part-time smallholder agriculture managing an estimated 500 million small farms and majority of the farmers earn daily income below USD2. The report indicates that majority of these people lived in rural areas and 80 percent of the world estimated 500 million small farms are manage by smallholders and provide over 80 percent of the food consumed in a large part of the developing world, contributing significantly to poverty reduction and food security. In 2015, 80% of overall food produced in Asia, Sub-Saharan Africa and Latin America are supplied by smallholders, but 70% of the 1.4 billion people in extreme poverty live in rural areas and 75% of these rural poor are also smallholders (IFAD CFS, 2015).

There is an extensive literature on the definition and concept of poverty based on income or consumption, wellbeing, basic needs and deprivation. Poverty as defined by World Bank is the lack of, or the inability to achieved, a socially acceptable standard of living. Poverty may be represented by one-dimensional indicator (income) or multidimensional indicators (income, health, nutrition, education, capability, etc). The economic and social issues in the EAC cannot be explain in terms of going to scale without also factoring in the challenges of food security issues arising from climate change condition, lack of access to efficient market system, poor access to quality inputs, lack of access to finance and inadequate application of production techniques to improve production volume per unit area causing low productivity and income combined with poverty. The EAC has a combined Gross Domestic Product (GDP) of USD146 billion and is home to 150 million citizens of which 22 percent is urban population (EAC Statistics, 2016). Of the nearly 7.6 billion world's population recorded in mid-2017, Africa is home to 1.3 billion of which EAC, a regional intergovernmental organization of six Partner States made up of Kenya, Tanzania, Uganda, Rwanda, Burundi and South Sudan, with headquarters in Arusha Tanzania accounts for over 185 million people and estimated to rise to over 263 million in 2030 and shift to 412 million by 2050 (UNDESA, 2017). Migration to urban areas combined with population growth rates is resulting in increased demand for food of 5 to 10 percent per annum and this will be the key driver for the development of a market-oriented agricultural sector in EAC (EAC Vision 2050, 2016). The population growth rate is rising more than the level of growth required in agriculture to provide adequate food security and significantly reduce poverty. Agricultural output in SSA would need more than double by 2050 to meet increased demand (FAO, 2017). The growing population in the face of low agricultural productivity and income combined with high poverty rate backstopped by vagaries weather effects pose a serious challenge.

In view of these problems, the EAC developed its Private Sector Development Strategy (PSDS) in 2006 and has through its poverty reduction strategy (PRS) implemented policies and programs that aimed to reduce poverty among smallholder farmers and rural poor. The PSDS is part of a broader strategy by EAC to invigorate agriculture toward poverty reduction and economic growth. Equally, EAC vision 2050 commits among other things to achieve 270 million metric tonnes of food production and 10 percent contribution of agriculture to GDP. The EAC vision 2050 planned to reduce under-five child stunting from 14.8 percent to 5.5 percent in 2030 and

further to 0.3 percent in 2050. However, malnutrition is not decreasing at the rate required, thereby affecting majority of the EAC population (Ouma, 2016). Improvement in agriculture has a critical role to play in achieving the ambitious target of the EAC 2050 vision. This creates the need to adopt innovative approach to value chain development in order to bridge the gap of low productivity and income in agribusiness, thereby reduce poverty and delink the challenges confronting EAC.

According to UNDESA (2017), Tanzania population will move up from 57.3 million in 2017 to an estimated 138 million in 2050 to rank the 14th most populous country on earth while maintaining the most populous in the EAC and shift to 303.8 million people in 2100 to rank 8th in the world. Agriculture in Tanzania accounts for more than a quarter of the GDP and employing 80 percent of the workforce, providing 85 percent of the country's exports (WEF, 2016), yet the country is one of the world's poorest country. Majority of the people are living in rural and semi-rural area accounting for 67.7 percent; 37,613,489 people (World Bank, 2017). Three out of ten Tanzanians live in poverty and four-fifths of the population is dependent on subsistence agriculture (WFP, 2016). The Gross International Reserves of the country stood at USD4.3 billion at the end of January 2017, a level sufficient to finance the equivalent of approximately four months of projected imports of goods and services. Poverty rate fell from 60 percent in 2007 to an estimated 47 percent in 2016 based on USD1.90 per day global poverty line; about 12 million Tanzanians still live in extreme poverty earning less than USD0.60 per day. While the poverty rate has recently declined, the absolute number of the poor has not changed given the fast pace of population growth at over 3 percent per annum (World Bank, 2017). The result of the National Nutrition Survey (2015) indicates a drop in chronic malnutrition – stunting, or low height for age – among children under-five in Tanzania from 42 percent in 2010 to 35 percent in 2014 and further to 34 percent in 2015-2016. In Mbeya region, the prevalence of stunted children under-five years is 36% (171,034 children). One in three children under-five in the country is stunted or too short for their age (TDHS & MIS, 2015-16). Undernutrition especially stunting is a silent crises for children in the country with attendant consequences of impairment on cognitive development, poor school performance and under-five child mortality coupled with economic loses. The nutritional status is still a concern and demand accelerated efforts to further push down the level of malnutrition.

Agriculture plays an important role in the economy of Tanzania and the main crops are maize, rice, cotton, tea, bean, pulse, groundnut, cassava, potatoes, sorghum, bananas, and wheat. In 2014, cereals/maize, wadding, felts and nonwoven materials were the largest intra-regional traded commodities representing 51 percent of the total intra-EAC export of USD317.56 million (IMF Direction of Trade Statistics, 2016). 34% of women and 37% of men own land alone or jointly (DHS & MIS, 2015-16). Agriculture in the country is dominated by smallholder farmers and farming is predominantly rain-fed with traditional farming techniques, making smallholder farmers vulnerable to climatic, economic and seasonal shocks thereby exposing farmers to poverty. Smallholder farmers are constrained by limitations of subsistence farming practice that live them vulnerable to climate change effects, lack of access to finance, biological, agrochemical and mechanical inputs. Others include low knowledge of good agricultural practices (GAP), low margin and poor access to efficient market, giving rise to low productivity and income. Official statistics indicated that the incidence and severity of poverty is more in rural areas than in urban areas. These challenges in rural areas are exacerbated by inadequacy of social infrastructures such as health facilities, schools, road, water, etc. At times, the modest decline in rural poverty is due to migration of some rural poor to urban areas and not necessarily due to improvement or increase in rural income. The pattern of outmigration from rural areas will alter the structures of both urban and rural areas in terms age and sex composition (Tanzania HDR, 2015). Mwatawala et al, 2016 reported that poverty in the country is more endemic among households engaged in crop farming, livestock keeping, fishing and forestry.

Sometimes, agricultural or rural development policies are often contradicted by other policies affecting pricing of industrial goods, exchange rate, interest rate and effective demand for rural goods, thereby counteracting the efficacy of a viable program. The practice of double checking broad spectrum of policy effect practiced in Canada using concept of “rural lens” whereby any national policy initiative must be scrutinized from the point of view of its potential impacts on rural areas and the wellbeing of rural people will enhance policy effects. The concept of rural lens is a simple and effective practice that can help avoid costly mistakes and allows rural people to challenge adverse policy initiatives. Agriculture offers way out of poverty and to maximize these potential, smallholder farmers needs to be integrated into the opportunity of agriculture value chain that is built on win-win partnership.

The constraints faced by smallholder farmers can be enhanced through partnership with other actors involved in the different phases required to bring commodity from production to the end-use. Better and additional value can be added to commodity when actors in the production, supply, distribution, processing and marketing process of a commodity partnered together in a value chain development. Value chain approach can better link smallholder farmers with the market and improve productivity, competitiveness and business growth, thus value chain is a viable vehicle for linking smallholder farmers, small-scale businesses with the market and is an instrument for pro-poor initiatives. The outcome of value chain in increasing efficiencies, improving competitiveness and creating value addition among firms in the industrial sector gave impetus to the adoption of the approach in agricultural sector. Furthermore, the multipronged challenges facing agricultural sector reinvigorate the need for innovative approaches to tap the potentials of the sector by addressing the underlying challenges that characterize the sector.

Typically, "value chain" describes the full range of value-adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs, assembly, physical transformation, acquisition of required services such as transport or cooling, and ultimately response to consumer demand (Kaplinsky and Morris 2002). In the views of FAO, value chain describes the range of activities required to move a commodity from the first point of production to the last point of consumption (FAO, 2015).

For Webber and Labaste (2007), value chain are the full range of activities required to bring a product or service through the different phases of production, including physical transformation, the input of various producer services, and response to consumer demand. It includes the vertically linked interdependent processes that generate value for the consumer. Value chain as defined by Miller and Jones (2010) includes the full range of activities and participants involved in moving agricultural products from inputs suppliers to farmers' field and ultimately, to consumers' table.

A working definition of value chain offered herein entails the interconnected activities and actors involved in the various phases of production, including underlying support services required to produce and move a product from producer to end-user.

1.2 Study Objectives

The broad objective of the study seeks to analyze the contribution of consortium approach on improvement of income of smallholder farmers in rice value chain under the Competitive African Rice Initiative (CARI) project in Tanzania. The specific objectives of the study were:

1. To determine the effectiveness of the consortium approach vis-à-vis conventional approach on income of smallholder farmers.
2. To determine the critical success factors for sustainability of consortium approach.
3. To investigate the strengths, weaknesses, opportunities and threats of consortium approach.

"Agribusiness value chain would be better placed and yield better value addition when partnership is not a zero sum gain, but anchor on collaboration that build win-win linkages and integrate smallholder farmers in a manner that enhance their capacity building on good agricultural practices, improve their access to quality production inputs and finance and creation of market for their commodity"

Ejewule Emmanuel.

2.0 Methodology and Technical Approach

The study on consortium approach on rice value chain under the Competitive African Rice Initiative (CARI) project in Tanzania took place between June and July, 2017 and involved field visits to smallholder farmers groups in Mbarali districts of Mbeya region in Tanzania. Interviews were held with key informants and stakeholders in the project. The study review and draw from works of many authors on value chain development.

2.1 The Study Area

The study was conducted in Mbarali district of Mbeya region which is located in Southern Highland of Tanzania (SHT). Of the 31 regions in Tanzania, Mbeya region is one of the ten intervention regions (Morogoro, Singida, Dodoma, Coastal region, Tabora, Simiyu, Shinyanga, Geita and Zanzibar) of the CARI project in Tanzania. Mbeya region shares borders with the Republic of Malawi to the West. Temperature averages range between 16^0C in the highland and 25^0C in the lowland areas. The climate is usually tropical with marked seasonal and altitudinal temperature variations and sharply defined dry and rainy seasons. The Agro-ecological zones of the region are high potential zone (areas with high rainfall and fertile soils, with a lot of agricultural production, lie at altitude of 1,500 to 2,400 metres above sea level), medium potential zone (lie at an altitude of 800 to 1500 metres above sea level, moderate rainfall and are highly variable and increase with altitude) and low potential zone (lies at altitude of 500 to 1000 metres above sea level, rainfall are unreliable and soils are less fertile, temperatures are warm). The region covers a total of 35,954 sq. kms (4.1% of total area of Tanzania). The region has 13 constituencies (NBS, 2016) and has more population living in rural areas. Agriculture contributes most to the Region's cash income (Mbeya Region Profile, 2017).

Mbarali district, one of the 7 districts in Mbeya region, is a benefitting district of the 10 districts of the CARI project in Tanzania. The district occupied 46% (largest) of the land area in Mbeya region. It occupies 16,632 sq. km dry land area (46.9%) and 0.1% sq. km water area in the region. The administrative division of the district entails 2 divisions, 20 wards and 102 villages. The population in 2015 using Tanzania NBS census data was 329,132 people of the region's 2,965,207 population. Areas that are suitable for paddy production are the low altitude areas (below 350 metres above sea level) and in most of these areas average yield of smallholder

farmers are low and range between 1.6 to 2.4 tonnes/ha. The study indicated that 5 to 6 tonnes/ha are recorded in irrigated schemes while 4 to 6 tonnes/ha are potential yields for upland and 6 to 10 tonnes/ha for lowland irrigated ecosystems in optimum conditions depending on the varieties of rice grown and the level of management (Ngailo et al., 2016). Many irrigation schemes are located in the district relative to others in the region, though majority of the irrigation water used in the paddy fields is harvested as overflow from the highlands. The study area was purposely selected based on the fact that is most important for rice production in the Southern highland of Tanzania and the commodity coverage is paddy (rice).

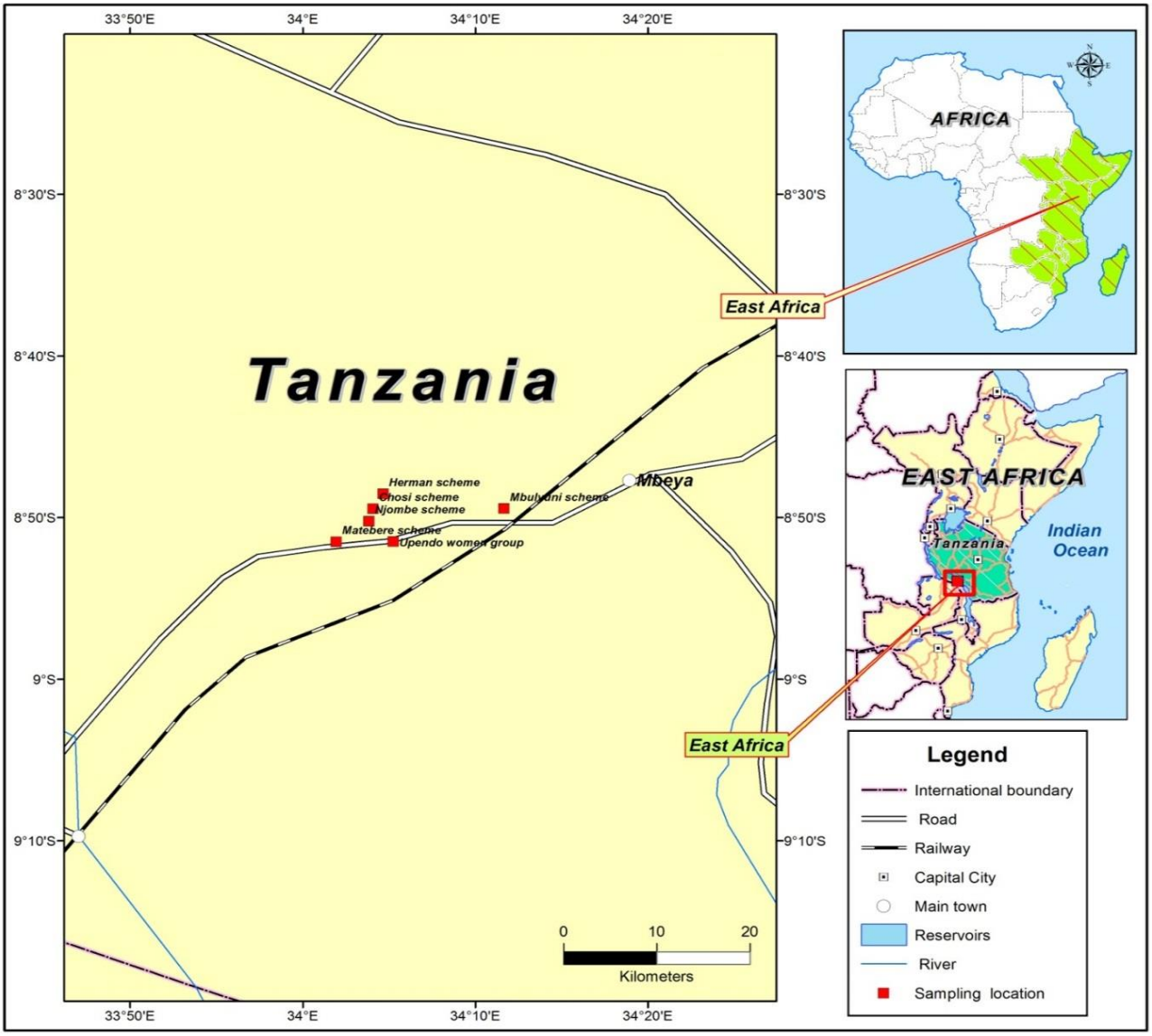


Figure 1.1: Area Map Showing the Survey sites depicting farmers groups

Source: Geographical Information System (GIS), Author (2017)

2.2 Research Design

The study employed survey method under which data were collected from different respondents at different locations once through survey questionnaires, FGD and interviews. This design was used in order to minimize the chance of drawing incorrect causal inferences from the data, maximize reliability of data and minimize bias. The data collected for the study were both primary and secondary data involving quantitative and qualitative data. SPSS IBM 20 and MS Excel spreadsheet were used to analyze the data.

2.3 Study Population

A total of 2,975 smallholder farmers are beneficiaries of the CARI project under the Southern Highland Rice Consortium (SHIRCO) in Mbarali district in Mbeya region in Tanzania. The 2,975 smallholder farmers are made up of 2,011 male and 964 female and serve as the population of the study.

2.4 Sampling Procedure and Data Collection Method

Multistage purposive cluster sampling techniques was used in selecting the study area and entail:

Stage 1: The purposive selection of SHIRCO consortium under the CARI project.
Mbarali, Kyela, Momba and Busokelo

Stage 2: The purposive selection of Momba, Busokelo, Kyela region, Mbeya region from the 10 intervention regions implementing the CARI project in Tanzania.

Stage 3: The purposive selection of Mbarali districts in Mbeya region.

Stage 4: The purposive selection of 3 wards from Mbarali district of Mbeya region.

Stage 5: The random selection of 11 villages in Mbarali district of Mbeya region.

Stage 6: The random selection of 6 farmers groups in SHIRCO consortium in Mbarali district.

Stage 7: The random selection of 155 smallholder farmers in Mbarali district of Mbeya region.

Stage 8: The purposive selection of partners firms in SHIRCO consortium.

Stage 9: The purposive selection of top management of the partnered firms in SHIRCO consortium resulting to the interview of 10 key informants.

The sample units are smallholder paddy farmers in Mbarali district who are beneficiaries in the Southern Highland Rice Consortium (SHIRCO) under the Competitive African Rice Initiative (CARI) project in Tanzania and partners (lead firm, input suppliers, support services institutions and KT) in the consortium and other key stakeholders.

2.5 Sample Size Determination

The sample size of 155 drawn from the population of beneficiaries of SHIRCO Consortium under the CARI project in Tanzania was generated at the 7th stage of the multistage purposive cluster sampling techniques using Sample Size Calculator adapted from Survey System available at http://www.surveysystem.com/sscalc.htm. The sample size drawn from the beneficiary population of 2,975 smallholder farmers used statistical confidence level of 95 percent at interval level of 1.96. The resultant sample size of 1,359 smallholder farmers derived by the sample size calculator was rescaled at 10 percent to obtain adjusted sample size of 136 smallholder farmers. An excess provision of 19 smallholder farmers was made resulting to sample size of 155 smallholder farmers for the study. In addition, 17 key informants were selected through a non-probability sampling techniques for the study. They include general manager and production manager of the Raphael Group Limited (lead firm), managing director of Agriseed Tech. Ltd (Improved seeds company), regional sales agronomist of Yara Tanzania Ltd (fertilizer company), company agronomist of Obo Investment Co. Ltd (On farm chemicals company), agronomist and horticulturist of Ministry of Agriculture Training Institute (government training institute), managing director of Khebandza Marketing Ltd (marketing service company), Business Development Service consultant (BDS), CEO of Kilimo Trust, program officer of CARI project (Kilimo Trust), motorcycle riders and community youths.

Table 2.1: **Sample Size Determined for the Study**

SHIRCO CONSORTIUM SAMPLE SIZE UNDER CARI PROJECT, TANZANIA								
Districts Selected	**Beneficiaries**							
	Gender		**Total Beneficiary (Population)**	***Calculated Sample size**	**10% of Calculated Sample size**	**Adjusted Sample size**	**Extra Provision**	**Adjusted Survey Sample Size**
	Male	**Female**						
Mbarali	2,011	964	2,975	1359	135.9	136	19	*155

***CALCULATED SAMPLE SIZE:** http://www.surveysystem.com/sscalc.htm

Care has been taking at every data collection processes to enhance precision in the estimates of effects (reliability) of the study.

2.6 Method of Data Collection

The data collected and used for the study cover both primary and secondary data sources and are both quantitative and qualitative. The secondary data were collected from journals, newsletters, baseline survey, published research works and books. Primary data were collected from smallholder paddy farmers participating in Southern Highland Rice Consortium (SHIRCO) under the CARI project in Tanzania randomly selected using pre-tested questionnaires that is mainly open-ended in addition to face-to-face, one-on-one interview, focus group discussions and observations.

Quantitative data were collected from smallholder farmers using structured questionnaires and the items measured male and female socio-economic characteristics, farmland cultivated, farm inputs, production outputs, production costs, income level etc. Focus group discussion guide, key informant interview guide were used in addition to structured questionnaire to obtain qualitative data from smallholder farmers covering socio-cultural variables of the male and female farmers.

Coordinates and photograph of projects and respondents were taken using application of digital cameras, Global Positioning System (GPS) besides voice recorder to tape the interviews with respondents. The structured questionnaires were pre-tested before the commencement of the research. The use of combination of tools was to obtain the desired data and validates respondent views and comments in order to ensure the integrity of the information provided. There is disparity in some official quantitative data and inconsistency applies to data on import and export besides informal trade which takes place through routes that bypass customs and such routes are known as *'panya'* tracks. Care was taken to ensure integrity of data and source of data are cited.

2.7 Data Collection Procedure

Data collected for the study were generated with the assistance of six (6) field enumerators recruited and trained in a one day pre-field training exercise. The enumerators were drawn from Business Development Service consulting firm, lead firm (Raphael Group Ltd) and community youths. The enumerators are graduates with university degrees and have practical knowledge of agriculture, paddy production and socio-economic and cultural characteristics of the study area. The researcher and field enumerators rode on motorcycles to villages, farms, market places and

homes to administer questionnaires to farmers. Focus group discussion (FGD) was conducted in Chimala village with selected male and female farmers of Mbarali irrigation scheme including members and leadership of the group. FGD was also conducted at Chimala village with some motorcyclist (community youths) who are farmers but nonmembers of the consortium to assess their awareness of the consortium, youth participation in agribusiness and stimulate their inclusion in the consortium. Interviews were conducted with key informants that are partners in the consortium using key informant interview (KII) guide. The data collection exercise covers June to July, 2017.

2.8 Analytical Methods and Techniques

The data collected were coded and analyzed using Statistical Package for Social Sciences (SPSS statistics IBM 20) and MS Excel spreadsheet. Collected data were collated, verified, coded, entered, cleaned and merged in data sheet. Both qualitative and quantitative data were generated for the study and presented through combination of cross tabulation, graphical and pictorial representations. Descriptive (frequencies, percentage, ratio, means, and standard deviation) and inferential statistics (t-test) were used to ascertain the distribution of variables in the study to determine the general effectiveness of the consortium approach in the study areas.

Data on Objective 1 was generated using questionnaire, KII, FGD guides and analyzed using descriptive statistics (percentage, frequencies, mean and standard deviation) and inferential statistics (t-test and p-value). Derivative of Objective 2 and 3 are drawn from questionnaire, KII, FGD guides, observation and documentation review and analyzed using descriptive statistics and financial model.

2.9 Experimental and Randomized Control Variable

The study employed randomization in order to demonstrate a causal relationship between intervention of consortium approach and outcomes on income of smallholder farmers before and after in SHIRCO consortium under CARI project in Tanzania. Randomized control trials estimate program effectiveness by comparing participant outcomes before and after the intervention of consortium approach. The sampled smallholder paddy farmers were randomly selected as experiment and control group and the outcome of consortium approach on their

income before and after were assessed to ascertain causal relationship between intervention of consortium approach and outcomes toward determining effectiveness of consortium approach. Comparison is made on outcome of the farming business of the farmers before and after SHIRCO consortium. The randomized control variable (RCV) enhanced precision in estimates of effects (reliability) of the study and accounts for selection bias.

2.10 Measurement of variables and a *priori* expectations

The study measured input, output, outcome and impact indicators of independent and dependent variables:

Input Indicators: The resources, efforts required in the production of paddy were measured. Measurement was made of skills and knowledge, production inputs (improved seeds, fertilizers, agro chemicals), technology, finance, labor, land needed to carry out activities at the different phases of production process required to bring about paddy production in the consortium. The farmland cultivated is measured in per acre by the farmer in the consortium.

Output Indicators: The study measured deliverables of the production process. The amount of paddy produced by farmers was measured using standard scaling. The farmers measured their outputs using bags of 120 kilograms. Conversion of the 120 kilograms scale was made to reflect the measurement in metric tonnes.

Outcome Indicators: The effects of the outputs on the beneficiaries of the consortium were measured and entail improvement in access to inputs, credit and market.

Impacts Indicators involves changes resulting from project outcomes and connotes the long term generalized effects (direct and indirect; intended and unintended) of consortium approach on benefitting SHIRCO consortium members. The effects can be economic, socio-cultural, institutional, environmental and technological besides changes in production, productivity, income, capacity building and well-being.

Other Indicators determined by the study are the socio-economic characteristics of beneficiaries – age, gender, delineation, marital status, farmers group, livelihoods, nativity, educational attainment and constraints to paddy farming.

The independent variables measured in the study cover socio-economic characteristics of the respondents namely gender, age, ethnic background, marital status, educational attainment, nativity, farm size, planting season, capacity building on good agricultural practice (GAP), post-harvest handling (PHH), farming as business, farm inputs, technology, payment modality for inputs, delivery mechanism, access to credit and storage facilities. Others are cost of production, production outputs, market requirement, farm proceeds (income), savings and other livelihoods of farmers in addition to constraints and challenges experienced by farmers. The dependent variable of the study covers productivity and income of the farmers.

Gender

The respondents were asked to identify their gender and gender-related issues on access to farmland, time-saving technology and decision making power and association in farmers group.

Age

The study requested respondents to state their age. The age was measured to determine their categorization.

Marital status

The respondents were asked to determine their appropriate marital status to ascertain farmers that are single, married, divorced, separated, and widowed. Additional information for the married farmers show the number of wives or husband they have.

Educational attainment

The study measured the educational level of farmers disaggregated into no formal, adult literacy, primary, secondary, advance and tertiary/university. Farmers were asked to state their highest level of educational attainment.

Nativity

The study determined the place of origin of the farmers. Farmers stated the length of years of their stay in the community and the reasons thereto.

Group membership

Participation in the consortium is based on membership of a farmer group. Farmers were asked to identify the farmer group they belong to in the consortium.

Farm size

The size of farmland cultivated by farmers before and after in the consortium was determined in the study.

Planting season

The study determined the main planting season for paddy in the consortium.

Capacity building

The respondents were asked to state trainings received before and after in the consortium stating the type of training, frequency, timeliness, ease of acquiring, constraints and needs so as to determine the skills and knowledge acquired together with level of satisfaction and helpfulness.

Farming as business

The study measured the practice of agriculture adopted by respondents to ascertain their disposition to practicality of faming as business in line with commercialization of smallholder farmers in the consortium.

Access to Inputs/Technology and Credit

The respondents were asked to provide information on the inputs used by identifying the quantity, quality, payment modality, costs and delivery mechanism stating the source, timeliness and level of satisfaction. The study measured respondents' access to credit before and after the consortium including technology used by respondents in the consortium.

Market requirements

Available in the consortium is inclusion of buyer as lead firm of the consortium. The inclusion of a buyer provides market linkage for respondents. The respondents were asked to state their buyer; quantity supplied and supplies that meet market (buyer) specification.

Costs and Outputs

The cost elements of the farm business were assessed. The respondents indicated the cost of inputs used per acre and items of expenditure incurred from production to market. Farmers' access to storage facility and the capacity utilized before and after the consortium were ascertained. The outputs realized from the acreage cultivated in the consortium were measured.

Income level

The study determined the income realized by respondents in a season from the acreage cultivated before and after the consortium and assessed the saving culture of the respondents in line with principles of farming as business.

Livelihood Activities of Farmers

The respondents were asked to identify other entrepreneurial activities engaged in or reinvest in from proceeds of the farming business. The enterprises were ranked in order of importance (1=most important, 2=second most important, 3=third most important, etc.).

Challenges/Constraints of Farmers

Incorporated in the assessment is the identification of general and specific constraints farmers face in the consortium. The respondents were asked to state the constraints and challenges they experienced in the consortium.

3.0 Value Chain Development in Agriculture

There is extensive literature on the concept of value chain development in business particularly in the industrial sector. The outcome of value chain in increasing efficiencies, improving competitiveness and creating value addition among firms in the industrial sector gave impetus to the adoption of the approach in agricultural sector. Furthermore, the multipronged challenges facing agricultural sector reinvigorate the need for innovative approaches to tap the potentials of the sector by addressing the underlying challenges that characterize the sector. Value chain approaches have been used in agriculture to address different challenges and to capture value addition along different nodes of the chain, providing interventions to phases in a node and delivering value to different actors. Agriculture like other sectors has experienced rapid changes that tend toward integrated market system driven partly by market, responsiveness to end-user preference, safety standards, quality, price, globalization of food chain. Miller and Jones (2010) opined that the future of farmers, traders and agribusinesses in the food or agro-industrial chain and the level of finance whether loan or investment that could be attracted depends upon their ability to compete in the marketplace and/or to adapt to markets in which they can compete. Their work asserts that agricultural sector is a global marketplace driven by competitiveness, which demands certain levels of efficiency and productivity. Likewise, success depends on the collective competitiveness of everyone involved in the particular chain.

Value chain approaches vary majorly in their focus on specific products or target markets, in the activity that is emphasized, and in the way in which they have been applied (Webber and Labaste 2010). However, few value chain approaches adopt collaborative approach in delivering value to actors, enhance economic growth, improve efficiency and maintain better competitiveness and gain increased market share. In EAC not very many value chain approaches yield to collaborative model, yet documented studies on impacts of collaborative value chain approach on income of smallholder farmers is not widespread. This study seeks to fill this gap through assessment of the consortium approach to food value chain development on income of smallholder farmers in Tanzania vis-à-vis conventional approaches.

3.1 Forms of Value Chain Approaches to Agribusiness

Value chain approaches namely productive chains, value chains, filières, clusters, marketing chains, supply chains or distribution chains have been applied in agricultural sector to address underlying challenges of low productivity and income faced by farmers especially smallholder farmers.

The French Filière Approach to value chain development is use to describe the flow of physical inputs and services in the production of a final products of goods and services with concern on quantitative technical relationships. The approach which started by studying contract farming and vertical integration in French agriculture in the 1960s, was later applied to the analysis of the developing country agriculture to achieve French Agricultural Policy in developing selected export commodities in rubber, cotton, cocoa and coffee. In the early time of the approach, the focus was to ensure that public institutions that are in charge of creating smooth flow of commodities have steady flow of the selected commodities. The issue of ensuring better commodities price by better management of transaction cost was not given due consideration. Until 1980s when international trade and processing was incorporated in the approach, Filière focus on local production system and consumption. Recent work by French Researchers such as Griffon (1989) on Filière has applied transaction cost dimension as continued interventionist approach of French policy support to Francophone Africa's primary commodities. Regulatory, transaction cost, trade and market dimensions have been incorporated in the approach to enhance efficacy of the approach following the negative consequences of market liberalization in developing countries (Raikes et al 2000 and Kaplinsky and Morris 2002). Indicative of the outcome of the approach is the inability to integrate smallholder farmers in the value chain in a manner that builds local capacity to sustainably develop agribusiness rather than servicing supply needs of French interventionist policy of source of raw material of its industries.

Cluster-based approach to value chain development is agglomeration or networks of production populated by strongly interdependent firms (including specialized suppliers) within a value-adding production chain as well as service providers and associated institutions in a particular field (Theus and Zeng, 2012). The approach is built on the thinking that individual firms face constrains within the sector they operate and the solution to it requires the inputs of other firms

in the sector. It holds that the firm alone cannot address the challenges. The approach is an industry-based approach that focuses on geographic concentration of interconnected companies and their interactions. It views collaboration between cluster members as the source of resolutions of common problem. Based on the geographic focus of the approach, cluster approach does not always focus on the entire value chain but on core and supporting companies in specific locations (USAID, 2008).

3.1.1 Case Study of Mozambique: Cashew Value Chain

Cited is a cashew value chain in Mozambique aimed at revitalizing processing capacity in the country and maximizing benefits to small growers of cashew. The case demonstrates response by firms to address challenges collectively by identifying common areas for collaboration through forming association in order to achieve economies of scale in their operations. The value chain approach provides for identified lead firms to set up new processing centres that would be replicated by other processors as a model following success of the operation. However in the course of implementation, the processors were faced with constraints that drove them to organized themselves into association to identified areas to cooperatively operate and carry out shared functions toward capturing economies of scale which is realizable by horizontal linkages.

Mozambique attained status of world's leading producer of cashew between 1920s to mid-1970s recording peak output of 240,000 MT in 1973 and was the first African nation to process cashew in industrial scale following export ban of raw nuts imposed by the government in 1978. By late 1990s, Mozambique cashews were exported mostly to India in raw nuts rather than in value addition. In 1994, the collapse of the cashew sector was occasioned by impact of civil war, price control and export ban. In 1995, World Bank loan conditionality induced the government to liberalize the sector. Export tariff was reduced, accounting for slight price increase, nonetheless more factories closed down. In 2004, a small hand-processing plant was designed, piloted and replicated to which Miranda Caju was the first successful plant on which other plants in Nampula province of the country were modeled after. It was discovered that the value chain lack extension services and capacity building given that processors and growers relied heavily on technical assistance. For long term sustainability of the entire value chain, the stakeholders (Miranda Caju and other entrant processors) realized that extension services should be fee-based

rather than subsidy-based. However, the impact of fee-based extension services will erode the profit of processors, except Miranda Caju plant. To operate profitably, the processors formed horizontal linkage to distribute the cost of extension services. Under the coordination of Technoserve engaged by USAID, Miranda Caju (lead firm) and six other processors created a private firm known as Agro Industria Associades (AIA) to provide services which were offered to them by private consulting firm. AIA, headed by a president, started with an equal contribution of seed fund of USD500 by the seven processors and operates as a private sector-led service firm offering fee-based (processing – importing packaging and machinery; distribution – warehousing and loading at Port Nacala and export administration papers filing; marketing - order filing to global buyers and provision of shipment quality control such as Hazard Analysis and Critical Control Point- HACCP, and EurepGAP compliance, marketing intelligence) and non-fee-based services (training, branding and advocacy and policy dialogue) to members.

The realizable benefits of the approach by setting up AIA entail increased producers' market power through improved quality control in which in 2006, the number of poor quality claims on its export was 12 containers as against 26 containers in 2005; cheaper access to inputs by combining orders to reduce shipping freights for members processors and improved market linkages and information sharing which has translated into cooperation among members and enhance banks credit rating besides improving the industry image through local brand name known as *Zambique brand*.

However, the approach has not shown adequate integration of smallholder farmers and growers in ensuring an inclusive vertical linkage that is built on win-win partnership. The approach focused more on improving the competiveness of processors by capturing value addition on cashew processing for export in view of the solely export of raw nuts. The approach varies in the commodity traded, activities emphasized, the way it is applied and the actors involved. Emphasis of the approach was on the need to revitalize the cashew subsector focusing on processing.

3.1.2 Case Study of Kenya: Green Beans Value Chain

In Kenya, green beans were cultivated as a major cash crop among smallholder farmers and the popularity of growing the crop was due to the short growing period. With proper application of chemical fertilizer, green beans monoculture cultivation can yield up to four harvests per year.

Smallholder farmers and small and medium producers were increasingly pushed out of the cultivation of green beans due to market requirements and conditions. The outputs were denied access to European (EU) market as a result of inaccurate records of chemical usage coupled with low level of information sharing among the value chain. The market condition in EU influenced green beans value chain represented by large exporters in Kenya to be more integrated. The SMEX (SME Exporters) value chain is made up of approximately 15 – 20 exporters that contract or have close working relations with nearly 4,000 SME farmers, small outgrowers and farmers associations. Addressing the challenge, the value chain exporters were more integrated and the chain was characterized by having strong links to end market and producers of green beans through contractual agreements and ownership, information sharing which strengthen the supply chain, eliminates costly demand shortages or oversupply and enable products to be trace to their production, thereby ensuring quality control and certification (Webber and Labaste, 2007).

3.2 Consortium Approach to Food Value Chain Development

Consortium approach is a model that catalyzed private sector investment in agribusiness value chain built on win-win partnership involving actors along all the nodes, and intervening on issues on the entire value chain, to capture value addition in delivering to a specific end market. The approach is built on a win-win partnership involving all actors – smallholder farmers (producer), input suppliers, off taker (buyer/processor) and service providers – financial institution (bank), marketing, training and research institutions in value chain development. The consortium approach ensures that smallholder farmers are integrated into agribusiness in a manner that enhance their capacity building in good agricultural practices, improve their access to production inputs and finance and creation of market for their commodity. Kilimo Trust adopts

Prof Nuhu Hatibu, CEO Kilimo Trust

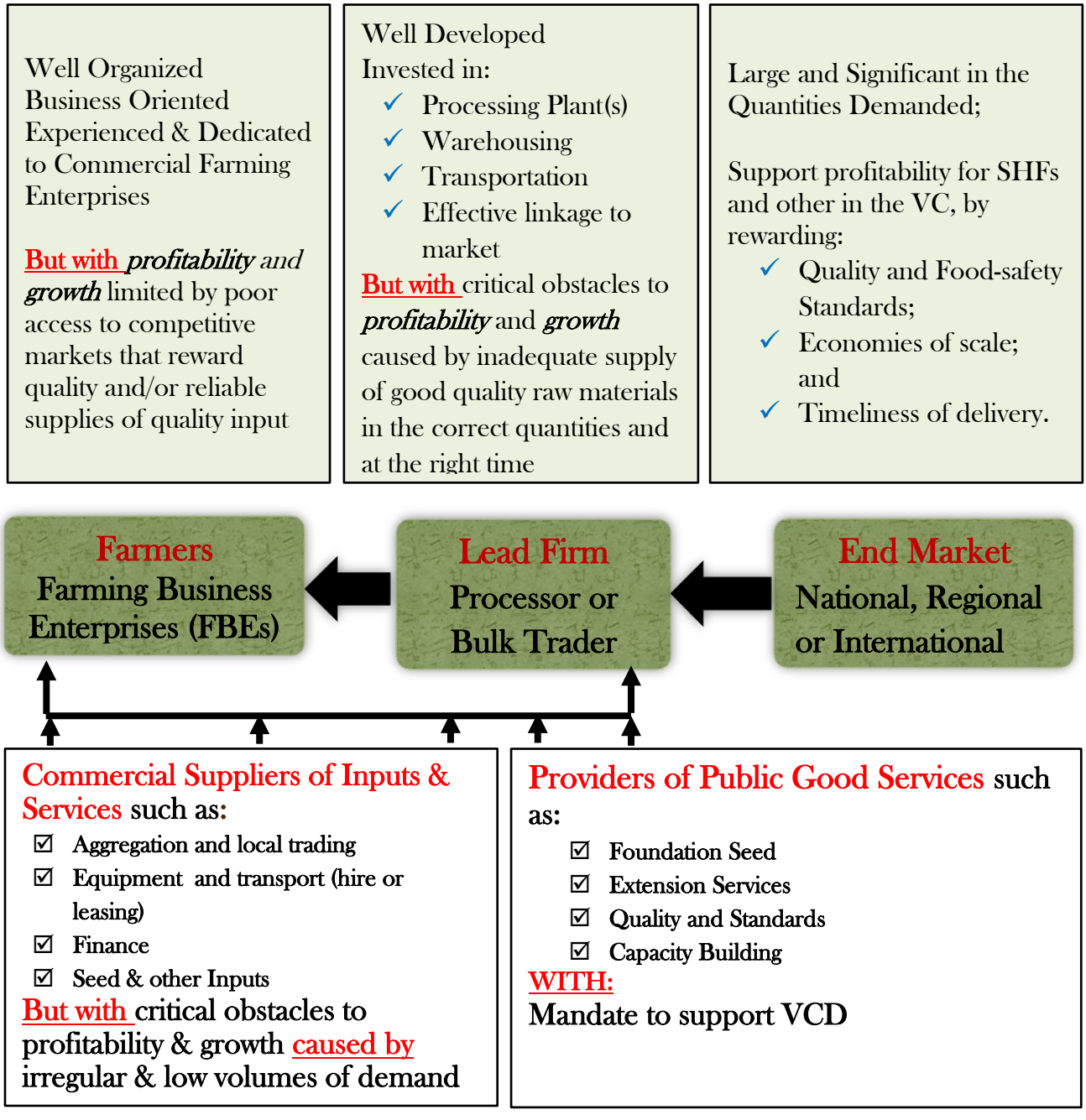
"Consortium approach is the road and the projects travel on the road. The Model pushes for private sector ownership".

"Consortium approach is the road that is laid up by Kilimo Trust and all the projects travel on the road. The projects use the approach to achieve their objectives".

Prof. Nuhu Hatibu, CEO Kilimo Trust

Consortium Approach to Value Chain Development (CAVCD) in implementing its agribusiness projects. The approach is use in the implementation of Competitive African Rice Initiative (CARI) project in Tanzania and Regional East Africa Community Trades in Staple (REACTS) project in Tanzania, Uganda, Kenya and Rwanda in East African Community.

About the Consortium Approach: Distinguishing Attributes



***Box 1:* Five Steps to Form Consortia**

Step 1:

- ☑ Open Invitation to agribusiness firms and FBOs to express interest to forming consortia
- ☑ Intensive due diligence and selections of promising firms and FBOs

Step 2: TA and BDS to enable firms and FBOs to negotiate and agree on partnership and shared vision of success – i.e. putting the consortia backbone in place.

Step 3:

- ☑ Each consortium backbone then identifies critical constraints to capturing and competing in the identified market, so as to deliver their VoS.
- ☑ They then determine which partners from the inputs and services sub-sector they should invite to their consortium.

Step 4: With support from KT Team the two parties, then identify, profile, assess, select the most suitable suppliers of inputs and other services, to join their Consortium.

Step 5: All the willing partners negotiate, develop and sign/approve:

- ☑ A Memorandum of Understanding (MoU), stipulating roles and responsibilities; and
- ☑ A sub-project to deal with the most binding constraints – to be supported by the project through matching grants funding.

3.3 Southern Highland Rice Consortium (SHIRCO)

SHIRCO consortium is a value chain of actors involved in agricultural commodities who are mainly located in the Southern Highland of Tanzania (SHT). The consortium is made up of smallholder farmers in the SHT region, lead firm (buyers/processors), input suppliers and support service providers – government training and research institute, financial institution, marketing firm. The consortium is organized by Kilimo Trust in pursuant to commercialization of smallholder farming and poverty reduction. The Southern Highland Rice Consortium (SHIRCO) was organized under the matching fund project of the Competitive African Rice Initiative in Tanzania.

The Southern Highland of Tanzania refers to region encompassing the four provinces of Iringa, Mbeya, Rukwa and Ruvuma. The highland comprise a range of volcanic mountains, partly covered in forest and grassland and is renowned for agriculture as one of the food basket of the country and experiences the coldest weather in Tanzania, peaked in the month of July.

Agriculture accounts for over 75 percent of occupation for the people. The crops grown in the zone include maize, paddy, sorghum (are the main cereal crops), cassava, potatoes, beans, vegetables, coffee, tea, cocoa, tobacco, sunflower, wheat, cardamom, pyrethrum. The areas most suitable for paddy production are the low altitude areas especially below 350 metres above sea level. Many irrigation schemes are located in the district relative to others in the region, though majority of the irrigation water used in the paddy fields is harvested as overflow from the highlands.

3.4 Competitive African Rice Initiative (CARI) Project

The Competitive African Rice Initiative (CARI) project is a multi-donor funded project implemented in East Africa (Tanzania) and West Africa (Nigeria, Ghana and Burkina Faso) and has a project period of 2014 to 2018 (initially planned to exit by 2017, but extended to 2018). The project, a partnership based development program, is a response to bridging the gap in rice food subsector to safeguard food security, save foreign exchange from food importation and foster rural economic growth. Underlay with four objectives, the developmental goal of CARI project is to improve the livelihoods of smallholder rice farmers and traders aim to double incomes of 30,000 smallholder farmers in each of the four countries in rice value chain, totaling 120,000 smallholder farmers. The CARI project seeks to build on the identification, optimization and expansion of sustainable business model that integrate small-scale rice producer with daily income below USD2 using value chain approach, thus the application of Kilimo Trust Consortium Approach to value chain development in implementing CARI project in Tanzania. CARI project is a multi-donor funded project founded by Bill & Melinda Gates Foundation, BMZ and Walmart Foundation. The approach is to provide Matching Grant Funds (MGF) to selected partners as a development incentive and to

ensure high ownership and commitment. The implementing agencies are GIZ (Nigeria), Kilimo Trust (Tanzania), JAK-F (Ghana) and TECHNOSERVE (Burkina Faso).

- **Developmental Goal of CARI Project**
  - To improve the livelihoods of smallholder rice farmers and traders in Tanzania, Nigeria, Ghana and Burkina Faso.

- **Aims**
  - To double incomes of 120,000 smallholder farmers in rice value chain.
- **Specific Objectives of CARI Project**
  - To increase the productivity and quality of paddy rice.
  - Improve sourcing capacity through structured producer-off-taker linkages as well as improved storage technologies and processing efficiency.
  - To increase access to financial products and services by the value chain actors.
  - To support processes required to improve policy environment for development of the rice sector.

3.5 Regional East Africa Community Trades in Staple (REACTS) Project

REACTS formed in 2014 with an exit period of 2017, is an IFAD-sponsored, Kilimo Trust implemented project in Tanzania, Uganda, Kenya and Rwanda in EAC with the main objective of increasing farmers income through regional trade in targeted rural areas. The project is supporting smallholder farmers in the EAC to focus on regional cross-border markets and trade, assisting smallholder producers of key food commodities to 'farm as a business' and become competitive by effectively utilizing their comparative advantage. REACTS project seeks to use network of IFAD-funded projects in EAC to build a long term programmes that leverage investment to effectively link small-scale farmers (men, women and youth) to regional and cross-border markets in EAC, thereby strengthen a structured regional trade in food driven by private

sector involvement and build business linkages among the actors. The REACTS project was executed through two output components comprising knowledge-driven targeting of EAC's regional cross-border markets with others in the region and improvement in the structuring and efficiency of business-linkages for integrating smallholders to regional cross-border markets and building-on successes of access to national markets. IFAD funding of the project was against the backdrop of addressing inadequate access to markets caused by limited regional trade in food commodities which in turn affects low agricultural productivity IFAD (2014). The objective of the REACTS project was to enhanced incomes and accelerates wealth creation for smallholder producers of food commodities through regional trade. The project covered West Nile Region, Northern region of Uganda, Eastern region of Rwanda, Arusha region of Tanzania and Kenya. At the conclusion of the project it is expected that the beneficiaries will experience an increase by 20% on income of at least 10,000 smallholders farmers, of the 15,000 small-scale farmers targeted by the IFAD projects in the EAC and ensure inclusive business linkages to cross - border market (IFAD Report, 2014).

3.6 Characteristics of Paddy (Rice)

3.6.1 Global Rice Summary

Globally, rice is central to the food security of over half of the world's population. Rice is the fastest growing food source in Africa and the demand for rice has been growing faster than anywhere else in the world in recent years, far outstripping the sub-region's population growth. In 2014, global production share of rice, paddy by region revealed that Asia had 90 percent of the world's output followed by America with 5.1 percent, Africa with 4.2 percent and Europe and Oceania had 0.6 and 0.1 percent respectively. Of the top 10 rice producing countries in the world, China mainland with a production (milled basis) of 141.5 million MT is topmost among the countries. India is second with 105.5 million MT, Indonesia is third with 44.4 million MT, Bangladesh is forth with an output of 34.5 million MT and Viet Nam's 29.2 million MT and Thailand's 22.0 million MT placed them in fifth and sixth position respectively. Myanmar recorded 16.9 million MT occupying seventh position and Philippines is eight on the ranking following its outputs of 12.4 million MT, Brazil and Japan occupied the ninth and tenth spots with a production of 8.2 million MT and 7.8 million MT respectively (FAO, 2016).

According to FAO Rice Market Monitor (2016) global rice production in 2015 stands at 494.6 million metric tonnes (milled basis). The production was driven by increase in acreage rather than productivity. The increased demand in China, Middle Eastern countries and marginally in Africa influenced global rice market. The reduction in demand by major world rice importing countries driven by self-sufficiency strategy and the declining land for rice cultivation in Asia affected the rate of rice production outputs in the period. Consumption in the period exceeded production output for the year whereby 507 million MT of rice was utilized representing 5 million MT above the production recorded. The scenario was different in Africa evident in the decrease in import by 1 million MT attributed to import substitution measures and effect of persistent depreciation of currencies. The growing population, increased in urbanization and changes in employment patterns will cause rice consumption in Africa to continue growing in the foreseeable future (Macaulay, 2015). In 2015-2016, global supply of rice amounts to 709.2 million MT (milled basis), food use and feed use were 397.2 million MT and 18.0 million MT (milled basis) respectively (FAO RMM, 2017).

3.6.2 Paddy (Rice) Production in Tanzania

Official statistics show that over 1.5 million farming households in EAC depend directly on rice for food and income security and smallholder farmers on the average earn about USD550 per household yearly from rice production enterprises, growing rice on farm of less than 3 Ha out of which 1.1 million are in Tanzania indicative that rice production in EAC is vastly carried out by smallholder farmers with Tanzania top of rice production accounting in the EAC. Tanzania and Uganda are the leading producers of rice in EAC with Tanzania as the largest producer and equally the largest consumer of rice. Tanzania accounts for third-quarter of rice production in EAC, placing the country as the main producer in the EAC (Kilimo Trust, 2017). Tanzania has the most available land for rice cultivation in the EAC (Nzomoi and Anderson, 2013). Its production of 1.7 million MT in 2014 placed it as the 1st in the EAC and 26th in the world.

Rice is both a staple crop for 70% of farming families and with over 80% of the farming families having it as cash crop earning average annual income of USD550 per household. FAO (2015) data indicated that rice production in Tanzania in the decade from 2001 to 2011 grew at 6.99 percent per annum. Rice increased from about 0.62 million MT in 1995 to 2.6 million MT in

2015 while 140,000 MT was imported in 2014 (FAOSTAT 2014, Kilimo Trust 2014 and FAO 2015).

Average rice yield per hectare in Tanzania is 1.5MT, lower than 2.5MT in Africa and Asia's 4.4Mt/Ha average production (top region in rice production globally). 75% of Tanzania's average yield per hectare is under rain-fed lowland ecosystem (FAO, 2015). Yield varied greatly by ecosystem and variety used (Nkuba et al., 2016) reinforced by access to market, inputs and adoption of GAP. As reported in Kilimo Trust (2016), 80% of rice production by smallholder farmers is under rain-fed ecosystem. Tanzania rice production is vastly rain-fed under lowland conditions, and some are grown with the assistance of irrigation which is largely traditional irrigation system. Small portion of rice production are grown in upland ecosystem. Rice production in the lowland rain-fed ecosystem is prone to vagaries weather effects evident in drought and floods causing irregular yields. In the event of flood, farmers are faced with challenge of water management and had to delay harvest waiting for their farm to dry out leading to poor paddy quality and losses. Rice production in irrigated lowland in the country is mainly carried out in Mbeya region, Mtibwa and Kilombero district. Mbeya region is the third largest rice producer of rice in Tanzania and rice is the second most important crop after maize. Rice from the region are largely served to Dar es Salaam which is the largest rice consuming market in the country driven by rising urbanization, population and income. With irrigation, farmers can control the supply of water and evidential data shows that the quality of paddy grown is good and yield increase obtains. Irrigated lowland rice production is not directly dependent on rain, but not isolated from the effects of climatic change conditions. The source of water that feeds the farms are from rivers or bunds that feeds from rain. When there is shortage of rainfall, the volume of water is low and water collected from the water source through irrigation canals to the farms is low, thereby affect water sufficiency to farms. Where farmers experience such situation, as a coping strategy, farmers often reduce investment and farmland use for the following season cultivation, consequently low production is usually reported the next farming season. On the other hand, rice grown in upland ecosystem in the country is without irrigation and under dryland conditions. Production under such conditions tends to be low with poor quality as crop yields are affected by the effects of drought, abiotic and biotic stress and low soil fertility.

Farmers in Mbarali district involved in SHIRCO consortium used river-fed irrigation scheme and varying data ranging from 5% to 40% was cited as the proportion of farmers that use irrigation. Shinyanga, Tabora, Mwanza, Mbeya, Rukwa, Arusha and Morogoro regions are the leading producer of rice in Tanzania.

Normally, increase in rice production is chiefly driven by increase in the size of land cultivated, reinforced by protective tariff on rice. Rice production in Tanzania during 2016 season was estimated to increase to 3.4 million tonnes (2.2 million tonnes, milled basis), up by 15% with the expansion attributed to increase in area and yield driven by attractive price at planting time and fair growing condition in the first half of 2016 (FAO RMM, 2017). Tanzania is largely self-reliant in rice, but the growing population, vagaries weather effects and increased domestic demand for rice will require increase in the rate of production of paddy to sustain local demand for rice and minimize importation.

3.6.3 Rice Consumption in Tanzania

Rice is the second highest consumed commodity after maize in the EAC. Per capita consumption in the EAC shows that Kenya consume 10-18kg per person, 5-7kg in Uganda, 4kg each in Rwanda and Burundi and 25-30kg in Tanzania representing the highest per capita consumption in EAC. As applicable Africa, the demand for rice in the EAC sub-region outstrips production. Rice consumption is rising rapidly in excess of 25 kg/person/year in Tanzania. Official statistics reported varying consumption pattern of rice in rural areas of EAC Partner States. In Uganda rice is more produced by farmers in Eastern Uganda and consume less than the quantity sold. Rice farming is more for cash crop than food crop to the farmers. The rural consumption of rice by Kenyan rice farmers is next to Uganda largely by farmers in areas of rice irrigation scheme. Variations however exist for farmers in other areas of rice producing areas of Kenya. Tanzania rural consumption of rice by rice farmers is higher in the EAC as rice is consumed in areas that produce the rice. Consumers of rice in rural and urban areas of Tanzania have significant preference for local rice varieties.

Rice is a major food staple for farmers who grow it, account as staple for two-third of the farmers. Smallholders in rural areas retain about 370kg of their production for consumption by their own household of around five persons. FAO (2015) report indicates that demand for rice in

Tanzania is projected to triple by 2020, and a substantial – and - deficit is forecast (1.15 million tonnes in 2009 to 2.84 million tonnes in 2020). In tandem with this, the National Bureau of Statistics of Tanzania forecast consumption to triple by 2020 driven by rising urbanization, population growth and income. The export ban in force at the time of the report was orchestrated by government policy of managing rice shortage and to deter sells of the commodity outside the country in order to ensure food security. The tradeoff of the policy is the price farmers would have gain. Tanzania is both the main producer and largest consumer of rice in the EAC. Demand for rice in Tanzania will witness rate of growth ahead of rate of growth of local production giving rise to imports to offset the deficits (USDA, 2016).

3.6.4 Rice Market

There is a buoyant market for rice in the EAC. In 2014, consumption of rice in EAC stood at 1.8 million MT; Tanzania consumption amounts to 1.18 million MT, Kenya consumed 370,000MT, Uganda recorded an estimated annual consumption of 167,000 MT and 83,000MT and 58,000MT were the estimated annual rice consumption for Rwanda and Burundi respectively. Stryker and Amin (2012) export data on Tanzania's rice export from 2001 to 2011 showed that in 2001 the amount of tonnes milled rice was 4,768 and by 2011 stood at 76,260 tonnes milled rice exported to EAC as shown in table 3.1. In same period, rice imports varied from 139,053 to 32,884 with 2003 recording the largest imports of 189,621MT milled basis. The importation of rice is greatly influenced by price coupled with politics of food security. The international price of Thai Super Al broken rice is significantly lower than the domestic wholesale price of rice in Tanzania, thereby accounts for the regular importation of the commodity. As shown in the table, up until 2009, import of tonnes milled rice exceeded export, but from 2009 to 2011, the amounts of milled rice imported were less than export. Production output of rice was below consumption in the period 2001 to 2006 and from 2007 to 2011 outputs exceed consumption. Table 3.2 revealed export data by FAO for 2012 and 2013 were estimated at 17.5 (000t), 51.4 (000t), and data by USDA show 2014 to 2016 recorded 30 (000t) each. Import data by FAO for 2012 to 2014 were 179.5(000t), 284.8(000t), 190(000t) respectively and 200(000t) were recorded for 2015 and 2016 respectively as indicated by USDA.

Due to issues of inconsistency in data, poor data gathering, challenges of reporting data on informal trade, data on import shows variance with export data at country level.

Table 3.1: **Estimates of Tanzania Rice Consumption and Production, 2001-2011 (tonnes milled rice)**

Year	Production	Consumption	Exports	Imports	Population
2001	724 162	824 447	4 768	139 053	35 117 019
2002	826 610	857 805	9 055	76 530	36 105 808
2003	746 582	88 197	11 006	189 621	37 149 072
2004	786 800	924 299	2 487	181 986	38 249 984
2005	964 769	976 646	10 618	67 495	39 410 545
2006	996 504	1 033 891	10 093	90 480	40 634 948
2007	1 102 874	1 084 885	20 176	45 187	41 923 715
2008	1 158 631	1 132 699	34 197	64 147	43 270 144
2009	1 230 121	1 177 027	48 218	39 607	44 664 231
2010	1 353 714	1 250 465	62 239	1 493	46 098 591
2011	1 423 236	1 332 078	76 260	32 884	47 570 902

Source: FAO 2015 based on data from Stryker and Amin, 2012

The export markets are in the main producing areas (including Mbeya the study area) and have close proximity to the importing EAC countries. The exports from Tanzania are majorly to neighbouring countries of Kenya, Uganda, Rwanda and Burundi and occasionally to Malawi and Zambia. In these market, consumers have preference for good quality Tanzanian rice where it has 15 percent price premium over other imported rice, however, the rice are not available in regular supply due to restrictions elicited by politics of food through export ban, high export tariffs imposed by the GOT. In Tanzania, consumers have more preference for the aromatic long grain rice to the sticky white long grain rice and the brown rice. Typically in Tanzania, rice is sold to consumers in polished milled rice. Most of the rice are purchase from traditional street retailers/shops or farmer's market with others from farm-gate and processors. Consumer preference on rice quality is based on region of cultivation and place of origin.

Lazaro et al., (2015), revealed that the common varieties in Tanzania include two varieties from Mbeya region: Kyela rice (Kyela district) viewed as the best quality aromatic rice followed by Mbeya rice (Mbarali district). Morogoro rice (Morogoro region) viewed as average-quality semi-aromatic rice, while Shinyanga rice (Shinyanga region) is considered low quality due to its non-aromatic nature and high foreign matter content. Rice is consumed in rural and urban areas with Dar es Salaam being the major end market accounting for about 60 percent of national consumption (FAO 2015).

Table 3. 2: Tanzania Rice Production, Consumption, Export and Import, 2001-2016

Year	Harvested Area ('000 Ha)	Yield Paddy (t/Ha)	Production		Consumption Milled Rice ('000 t)	Export		Import	
			Paddy ('000)	Milled Rice ('000 t)		Qty ('000 t)	USD ('000)	Qty ('000 t)	USD ('000)
2016	1100	2.55	2800	1848	2018	30		200	
2015	1000	2.7	2700	1782	1972	30		200	
2014	925	2.83	2621.03	1730	1875	30		190	
2013	928.27	2.36	2194.75	1463.9	1178.04	51.43	20003	284.79	128436
2012	799.36	2.25	1800.55	1200.97	1141.59	17.49	5427	197.52	94681
2011	1119.32	2.01	2248.32	1499.63	1053.97	35.18	12719	50.85	24227
2010	1136.29	2.33	2650.12	1767.63	1026.88	48.28	14348	74.88	33612
2009	805.63	1.66	1334.8	890.31	970.76	0.81	216	39.6	11161
2008	887.66	1.6	1420.57	947.52	1047.4	5.59	1648	64.19	16357
2007	557.98	2.4	1341.85	895.01	922.97	20.16	3974	48.45	6114
2006	633.77	1.9	1206.15	804.5	892.36	4.39	1410	94.2	22498
2005	701.99	1.66	1167.69	778.85	845.77	9.29	1734	75.02	15170
2004	613.13	1.73	1058.46	705.99	885.42	2.43	524	194.28	50770
2003	620.8	1.77	1096.92	731.65	854.64	10.91	1678	189.2	34064
2002	565.6	1.74	984.62	656.74	722.31	9.05	1972	76.5	11916
2001	405.86	2.14	867.69	578.75	707.55	6.43	2486	139.03	29939

Source: IRRI World Rice Statistics Query Result, 2017 based on data from FAO, USDA. Aggregated by Author. Note: 2001-2013 (FAO) and 2015-2016 (USDA)

The capacity of the country to sustain an export surplus requires a 10 percent annual growth rate due to a rapidly growing domestic demand, and a 5 percent growth rate would result in trade deficits. With changes in demographic and socio-economic status of the country evident by impacts of growing population, increasing urbanization, growing middle class, growing consumer preference and vagaries weather effects on rice food subsector, the rate of growth of rice production required to achieve export surplus will demand more than 10 percent without which increase in importation is eminent.

3.6.5 Excerpt of Human Success Story from SHIRCO Consortium

Women play important role in agriculture labour force in developing countries, but controls less land than men. They are constrained more by limited access to farm inputs, credits, extension services and technology. Empowering women is crucial to poverty reduction and improvement of development indices of Africa. When women are empowered, it transcends family well-being, education of children, health and promotion of good values that enhance better society.

Empowerment of women provides the opportunity to expand their capacities to live the kind of life they have reason to value, offers the abilities to make choices on economic activities and participates in decision making and governance process. Findings of the study on consortium approach show improvement in production, productivity, income as well as farmers' wellbeing in the area of building and renovation of houses, purchase of motorbikes, cars, acquisition of more farmland, payment of children school fees, improvement in food security and few marrying addition wives, among others. Few examples are shown in Box 2, 3 and 4.

> ***"Under-investing in women limits development, slows down poverty reduction and economic growth"***
> **World Bank**

Box 2: Case Study of Mary Kayanda in SHIRCO Consortium, Mbarali District

Mary Kayanda, a farmer, had lived in her old mud house since 1992 (about 16 years). As a result of the consortium, her farm size moved from 1 acre to 3 acres and now 6 acres.

The knowledge of GAP, PHH and farming as business helped to increase her yield and production as well as income.

She joined SHIRCO consortium two years ago and now has commenced the building of her new home.

Picture 2: Mary & her husband.

Mary interviewed by Researcher

Box 3: Agribusiness Empowerment: Case Study of Maria Nyoni, Treasurer of Upendo Women Group

Maria, a farmer, is a 30-year old married lady with a child. Her husband is also a farmer. Maria is the treasurer of Upendo Women Group, one of the Schemes in SHIRCO under CARI project in Tanzania. She hails from Sae village in Mbeya, Mbeya region of Tanzania.

Maria relocated to Chimala in Mbarali district of Mbeya region due to lack of means of livelihood and need for empowerment. Maria was about 26 years old in 2013 when she moved to Chimala village, Mbeya region because of agriculture. While in Chimala, Maria joined Upendo Women Group, an initiative of RUDI (Rural Urban Development Initiative), a non-governmental organization. Upendo Women Group joined SHIRCO in 2013. In the course of practicing agriculture, Maria met Mr. Twalibu who is a farmer and both of them found love and got married in 2013.

Before joining SHIRCO, Maria cultivated 0.20ha (0.5 acre) with output of 0.72MT (6 bags of 120kg) of paddy. As a member of SHIRCO through Upendo Women Group her farmland increased from 0.20ha (0.5 acre) to 0.80ha (2 acres) and now 2.02ha (5 acres) in line with the decision of Upendo Women Group. Evidential data on yield show significant changes from 0.72MT (6 bags of 120kg) per 0.20ha to the range of 3.60MT and 4.20MT (30 – 35 bags of 120kg per 0.20ha - 1 acre) representing 400% - 483% increase in yields. Young Maria is supporting the welfare of the family; basic family needs, improved food security, assisting in education of their child and opened a catering business. She acquired land for building her own house and the building has commenced.

Box 4: Agribusiness Empowerment: Case Study of Upendo Women Group in SHIRCO

Formed in January 2013 by Rural Urban Development Initiative (RUDI), Upendo Women Group is one of the farmers groups in SHIRCO consortium under CARI project. The Group is committed to well-being of members and is working toward ensuring every member own a home. The Group is made up of 30 members and membership is solely women. Member must be an entrepreneur in order to join the Group. Led by Mrs. Flora Mombeki (chairperson), the Group is working to make advancement in achieving a brand name in rice by adding trading to its existing role of producer of paddy. It has proposed buying its own machine costing Tshs 15 million (US$6,702.41) and land to build its factory for milling. License (Brela certificate) that allows for marketing locally and internationally has been secured by the Group. The application by the Group to raise loan from bank in its name to expand group farm which is currently 2.83ha to 6.07ha (7 acres to 15 acres) was not successful and this is not unconnected with challenges women face in accessing finance, thus gender issue.

Being in SHIRCO, members' access to factors of production increased with farmland shifting from 0.20ha (0.5 acre) to 2.02ha (5 acres) for each member. The Group has a group farm of 2.83ha (7 acres) where each member contributes to the farm. Prior to SHIRCO consortium, yield was 0.72MT per 0.20ha (6 bags per 0.5 acre equivalent of 12 bags of 120kg per acre), but after SHIRCO consortium, the yield is 3.60MT to 4.20MT (30 – 35 bags of 120kg) on 0.40ha (1 acre) translating to 400% - 483% increase in yield.

By extrapolation on one hectare, 8.89MT to 10.37MT was recorded based on 30-35bags of 120kg per acre. In line with its commitment to poverty reduction and given the notable impacts recorded in the lives of members, the Group registered a new Group called 'Faraja Upendo Group' (Faraja = Comfort, Upendo = Laugh) for both gender with memberships put at 30 under the supervision of Upendo Women Group.

While issues such as climatic condition change (drought, seasonal variation), high interest rate, delay in inputs supply, long loan processing and delay in disbursement stood as constraints to advancement for the Group - these factors emerged largest: gender-related financial challenge and chiefly among the issues is lack of capital for expansion (acquisition of land, milling machines), fear to entrust women with finance and lack of gender-friendly labour saving technology.

Addressing these issues will provide impetus to the Group and help in poverty reduction, women empowerment and economic growth.

4.0 RESULTS AND DISCUSSIONS

4.1 Socio-Economic Characteristics of Respondents

Result of the study revealed that of the 155 smallholder farmers interviewed, majority (66.5%) are male and female accounts for 33.5%. As shown on table 3.1, the age categorization of the farmers revealed that adults (66.5%) are more, followed by youths (25.8%) and elders (7.7%).

Further analysis of age demography along gender line shows that of the male farmers (66.5%), majority (66.0%) are adult, followed by youth (25.2%) and elder accounts for 8.7%. For female farmers (33.5%), adult (67.3%) is more followed by youth (26.9%) and elders (5.8%). The study found that paddy production is appealing to women and is one of the crops that if gender-related issues that constrained women in agriculture are addressed more women will leverage on its production. Gender-sensitive interventions that will not only improve participation but also enhance time-saving (through gender-friendly labour saving technology) and decision making will make it easy for women in agribusiness. This can improve nutrition by increasing time available for women to take care of children and food preparation (FAO, 2017). Gender-friendly labour saving technology will leave women with more time to participating in other economic activities and leisure, thus help to improve their health. As indicated by Dioula et al (2013) agriculture will have negative effects on nutrition when it reduces the time that women allocate for child care. The participation of youth still desires more in order to maximize their human capital in agribusiness toward poverty reduction and economic growth.

On marital status, the findings show that 9.0% of the smallholder farmers are single, 82.6% are married, 0.6% are divorce, 1.9% are separated and 5.8% are widows. Of the married farmers, male accounts for 68.8% and females represent 31.2%. Further analysis of gender composition of marital status of male farmers shows that majority (85.4%) are married, followed by single 9.7%, separated 2.9% while male farmers who are divorce and widow account for 1.0% each. On the part of female farmers, their marital status revealed that majority (76.9%) are married followed by widow 15.4% and single 7.7%. In Africa, most of the workforce in agriculture lives in families and agriculture is an age-long practice inherited from parents and is the main source of meeting food needs of families in addition to source of livelihood. Opara (2014) asserted that married farmers are likely to be under pressure to produce more for family consumption and sales with incentive of family labour. Oladejo et al (2011) reported that marital status determines

household family size which dictates the availability of labour in agricultural activities. Farmers who are married have the responsibility to cater for their family and that drives them to ensure they meet food and other needs of the family leveraging on agriculture besides providing source of labour.

Table 4.1: **Distribution by Demographic Composition of Farmers**

Domains	Number of Farmers (Respondents)
Gender (n=155)	
Male	103(66.5)
Female	52(33.5)
Age (n=155)	
Youth	40(25.2)
Adult	103(66.0)
Elder	12(8.7)
Marital Status (n=155)	
Single	14(9.0)
Married	128(82.6)
Divorced	1(0.6)
Separated	3(1.9)
Widow	9(5.8)
Educational Attainment (n=155)	
No Formal	3(1.9)
Adult Literacy	1(0.6)
Primary	122(78.7)
Secondary	26(16.8)
Advance Level	2(1.3)
University/Tertiary	1(0.6)
Group Membership (n=155)	
Mbuyuni Scheme	68(43.9)
Matebete Scheme	65(41.9)
Herman Scheme	13(8.4)
Upendo Women Group	4(2.6)
Chosi Scheme	3(1.9)
Njombe Scheme	2(1.3)
Source of Farm Land (n=155)	
Self-owned	63(40.6)
Inherited	55(35.5)
Leased/Borrowed	37(23.9)
Main Planting Season (n=155)	
November – March	155(100.0)

Educational attainment of respondents shows that majority of the farmers (78.7%) had primary education, 1.9% had no formal education, 0.6% had adult literacy, 16.8% attended secondary

education and 1.3% and 0.6% obtained advance level education and tertiary level education respectively. Education attainment in rural areas is low and majority of people in rural areas are into agriculture mostly for subsistence. Majority of the smallholder farmers attended primary education and this is in tandem with the views of Mwatawala et al (2016) which they held that majority of developing countries population who depends on agricultural activities have low level of education. With the right training module on good agricultural practice communicated in a participatory manner, reinforced by commercialization of smallholder famers, the skill and knowledge of farmers on improved agriculture will record increase. The incentive in agriculture is yet to attract more youths in the sector and the constraints of access to credit and mechanization couple with the time it takes from point of cultivation to point of gross margin in agriculture are some of the factor limiting youth participation in agriculture. The Committee on World Food Security, FAO (2016) asserts that young smallholder farmers faced constraints in accessing markets as a result of financial resources, opportunities, skills and capacities noting that agriculture and food systems can present an important sector for youths who are exploring income and employment opportunities in both rural and urban areas. Addressing the underlining factors to low productivity and income will encourage more youths and retain those in the sector toward reducing the aging farming population. Education enhances farmers' ability to seek information and utilizes knowledge in a better way to reduce cost of under or overuse of inputs and increase better market information and linkage. Haru (2014) opined that education changes the type and magnitude of information of inputs to be use in production.

4.2 Group Membership of Farmers in SHIRCO

The consortium operates on a farmer group membership-based approach where farmers constitute themselves into group known as 'scheme' for better organization and cooperation in line with horizontal linkage in the value chain with the outcome of upgrading, capturing more value, improving efficiency, generating economies of scale and better integration in order to enhance competitiveness and address underlying challenges of low productivity and income. As highlighted on table 3.1, the respondents cut across six farmers group namely Mbuyuni irrigation scheme (43.9%), Matebete irrigation scheme (41.9%), Herman scheme (8.4%), Upendo Women Group (2.6%), Chosi scheme (1.9%) and Njombe scheme (1.3%). Application for bank loan is facilitated through farmers group. Partnered banks deal with farmer group other than individual

and the conditionality for loan include collateral of title deed of farmer, membership of farmer group, guarantee from a granter like PASS, size of farmland (including riskiness of farm location) and production capacity. The farmer group is structure with management committee composed of chairman/chairperson (president), secretary, treasurer elected by farmers. The executives represent farmers to liaise with input suppliers, bank and lead firm (buyer) who are actor in the value chain. By design, the consortium makes it a requirement for group membership to include men, women and youth. The group has helped to promote collective action, cooperation and foster information sharing and learning. Some farmer groups have shown indications of vertical growth. For example Mbuyuni irrigation scheme and Upendo Women Group are demonstrating strong growth outlook for vertical integration driven by strong commitment of the leadership and members' cooperation. Upendo Women Group currently has a newly established subsidiary group of 30 members for both men and women. In addition to setting up the new farmer group, Upendo Women Group is working toward having a brand name by adding trading to its portfolio of producer. The group aim to own milling/processing factory to package and sell milled rice to both local and international market. However, finance is a major constrain (see box 4 in page 35 for details).

Mbuyuni irrigation scheme is a beneficiary of warehouse facility and milling machines provided by government. The group also benefitted from JICA (Japan International Cooperation Agency) support of combined harvesters. The group plan to own a brand name of milled rice when the machines are finally installed and operational. The inputs delivery and payment mechanism in the consortium is well enhanced in the group. Group members are given subsidized cost of hiring combined harvester with options of paying cash at point of hire or credit payable after sales.

Findings from the study indicates that groups in the consortium are making progress and would capture more value and upgrade if identified challenges of delay in supply of inputs by suppliers, delay of loan processing and disbursement by bank, double-digit interest charge of 19% - 19.5%, conflict between herders and farmers induced by climate change effect on pastoral fields, water management conflicts, health-related water contamination with agrochemicals, conflict on demarcation of farms for combined harvest passage, trust issues and complaints on price offered by buyer are given due attention.

4.3 Main Planting Season and Source of Land

The study shows that November to March is the main planting season of paddy in Mbarali district and respondents are in agreement that the period is their main planting season. Land is a critical factor endowment of any production activities and as such in agriculture. Findings on source of farmland revealed that majority of the lands are self-owned (40.6%) followed by Leased/borrowed (35.5%) and inherited (23.9%). Before the consortium, the farm size used by farmers ranges from ½ acre (minimum) to 22 acres (maximum), but after the consortium, it ranges from 1 acre (minimum) to 22 acres (maximum) where the standard deviation before and after the consortium are 2.9 acres and 3.0 acres respectively. Evidence on the mean farmland area before 1.36ha (3.37 acres) and after 1.44ha (3.55 acres) the consortium shown by p-value (0.6821*) is >0.05 indicates no significant change, thereby revealing the effect the consortium has on production outputs on same farmland size used (see table 4.1 and 4.2 for details). The results indicate increase in yield and increase in production outputs. There is positive combinatorial impact of skill and knowledge, inputs, finance and assured market on yields and production outputs. These production factors together with land drive increase in production outputs recorded in the consortium.

***Table 4.2*: Distribution by Farm Land Used in the Consortium**

Land area (acres)					
Variable	**Farmers (Respondents)**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Before	155	3.45	2.9	0.5	22
After	155	3.54	3.0	1	22

4.4 Research Results on Objective 1: To Determine the Effectiveness of Consortium Approach vis-à-vis Conventional Approaches on Income of Smallholder Farmers

4.4.1 Skills and Knowledge

Training is one of the important components of consortium approach and when asked, majority of the respondents (96.1%) reported they received training in the consortium, while 3.9% indicated they were not trained. After the consortium, the number of times training was offered varied among respondents and ranges from one to eight times. The mean number of times trainings was offered is 3.7 times with standard deviation of 1.5 times. Further analysis based on farmers group revealed that the mean number of trainings for Matebete irrigation scheme was 3.9 times, Mbuyuni irrigation scheme 3.6 times, Herman scheme 3.9 times, Chosi scheme 3.0 times, Upendo Women Group 2.8 times and Njombe scheme 2.5 times.

Results of the study revealed that the consortium offered farmers the opportunity to learn better ways of practicing their agricultural business through trainings on different aspect of agriculture using training modules, demonstration farms and pictorial representation. The trainings have helped to improve farmer's skills and knowledge. Before the consortium, only 7.7% of the respondents were trained on good agricultural practices (GAP), 7.4% had training on post-harvest handling (PHH), 2.6% on farming as business, 4.5% on record keeping, 4.0% on minimizing costs, and 2.7% and 4.6% were trained on financial literacy and being profit-minded respectively (see figure 4.1). Respondents indicated that the practice of agriculture before the consortium was more of traditional farming practice characterized by untimely land preparation, inadequate and inappropriate fertilizer application, untimely and random planting, low use of improved seeds, untimely harvesting and poor PHH. Farmers losses some amount of paddy during harvesting due to traditional way of harvesting, transportation constrains, poor method of drying (drying on bare ground making it stony and sandy) and inadequate storage facilities. Before the consortium, the incentive for farming was more of subsistence and cultural heritage other than farming as business where only 2.6% reported they were trained on the rudiments of farming as business.

Indicative of the consortium as found by the study is improvement in skills and knowledge of farmers driven by trainings. SHIRCO consortium provided opportunity for participating farmers

to gain composite trainings; 96.1% of the farmers reported they were trained on GAP, 92.9% on PHH, 94.7% on farming as business, 93.4% on record keeping, 91.9% on minimizing costs, 92.1% and 93.4% on financial literacy and being profit-minded respectively. The study found out through key informant interviews that the trainings reflect focus on end-market aimed to improve demand and supply side of the value chain driven by market. Farmers reported trainings on GAP helped them to improve their farming practice evident in early and timely land preparation, timely planting preferably planting in line and spacing, use of improved seeds, better application of fertilizer and improve application of herbicides with outcome of increase in production outputs. Trainings on PHH has shown to reduce losses during and after harvesting by adopting use of combine harvester, timely harvesting, use of tarpaulin to sun-dry in order to reduce sand, stone and reduce moisture content. Farmers during storage leveraging on farmers group warehouse to store their paddy in line with PHH whereby storage of a bag of 120kg cost TZS2,000 ($0.89) a year.

The training on farming as business comes handy for the farmers in that commercialization of smallholder farmers not only improve income but also food security. Farmers (94.7%) indicated that training on farming as business enlightened them to reinvest part of farm proceeds in the farming business and invest in other ventures. Record keeping helps farmers to ascertain production and income level in order to determine progress of the business. Record keeping is an important trajectory of farming as business that provides for determination of efficiency in production and income, thereby help farmers to calculate quantity and costs of inputs use to reduce loss, waste and overuse in order to minimize costs. Also, training on financial literacy is put into use by investing in other business and planning farm. Equally, knowledge of being profit-minded enables farmers to plan farm activities to ensure that worth of production is higher than farm expenditures for profitability of farm business.

Expressing satisfaction on the trainings received, few farmers indicated they had training before SHIRCO consortium and their experiences of the training in terms of ease, timeliness, frequency and cost effectiveness was low whereby 74.2% indicated difficulty in acquiring training, 87.4% reported the training was not responsive, 88.7% viewed the training insufficient and 70.2% find it hard to account for costs of farm operation. On the other hand, after the consortium, the satisfactions expressed by farmer on the trainings received in terms of; ease (95.4%), timeliness

(83.4%), frequency (74.2%) and cost effectiveness (97.3%) was considerable. Farmers rating of level of satisfaction revealed that 52.2% indicate the training was very helpful, 43.9% reported it to be helpful and 3.9% viewed the trainings not helpful (see table 4.3 and 4.4).

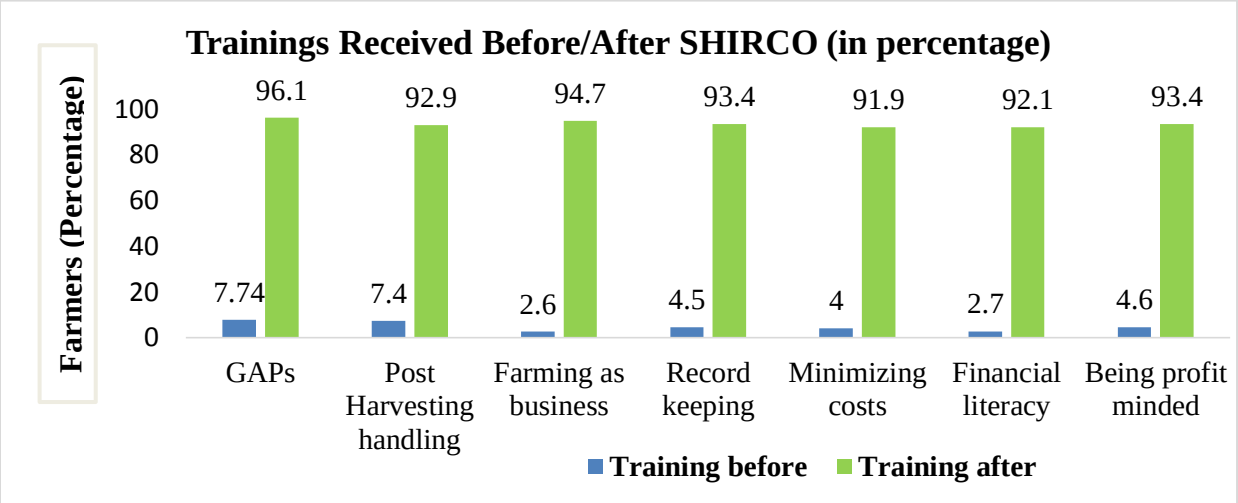
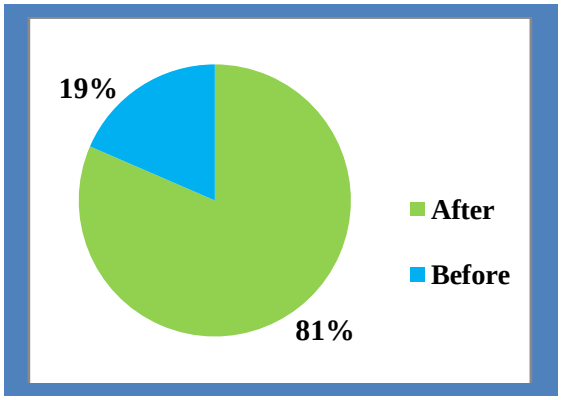


***Figure 4.1*: Distribution of Farmers According to Training Received Before and After in the Consortium**

***Table 4.3*: Distribution of Farmers by Satisfaction to Skill and Knowledge Acquired Before and After in the Consortium**

Satisfaction in Skills and Knowledge Acquired Before/After SHIRCO					
Period	**Level of Satisfaction (n=151)**	**Attributes of Training**			
		Ease	**Timeliness**	**Frequency**	**Cost Effectiveness**
BEFORE	Very Satisfactory	1(0.7)	1(0.7)	1(0.7)	1(0.7)
	Satisfactory	5(3.3)	3(2.0)	1(0.7)	4(2.6)
	Fair	33(21.9)	15(9.9)	15(9.9)	40(26.5)
	Poor	112(74.2)	132(87.4)	134(88.7)	106(70.2)
AFTER	Very Satisfactory	50(33.1)	45(29.8)	46(30.5)	55(36.4)
	Satisfactory	94(62.3)	81(53.6)	66(43.7)	92(60.9)
	Fair	6(4.0)	25(16.6)	37(24.5)	4(2.6)
	Poor	1(0.7)	0(0.0)	2(1.3)	0(0.0)

***Figure 4.2*: Distribution of Farmers by Level of Skill and Knowledge Enough to Continue in the Consortium**



The trainings offered in the consortium made noticeable impacts on benefiting farmers. However, there still exist gaps requiring more training on climate change conditions, water management, GAP (fertilizer, pesticides/herbicides, PHH, cost minimization, financial management, preparation of group budget, leadership management and marketing techniques. Trainings should be conducted few weeks before start of farming season and the training components should include gender issues. At the time of the report, farmers experienced shortage of rainfall (drought) in the study area with likelihood of low yield ensuing the next farming season and income would be negatively impacted, thus the need for trainings on climate change, water management is crucial. While trainings offered in the consortium is market-focused, the area of training needs farmers are facing should be address in order to be responsive and proactive to the actual and resultant challenges farmers are facing. Farmers should be involved in planning training requirement. The Ministry of Agriculture Training Institute (MATI), the service agency responsible for providing training support services to farmers and extension worker in the consortium, together with input suppliers and lead firm of the consortium should respond to these training needs. The constraints of MATI to conduct trainings in several villages at a time were attributed to shortage of staff, funds and should be address. MATI should be involved when planning for training needs of farmers.

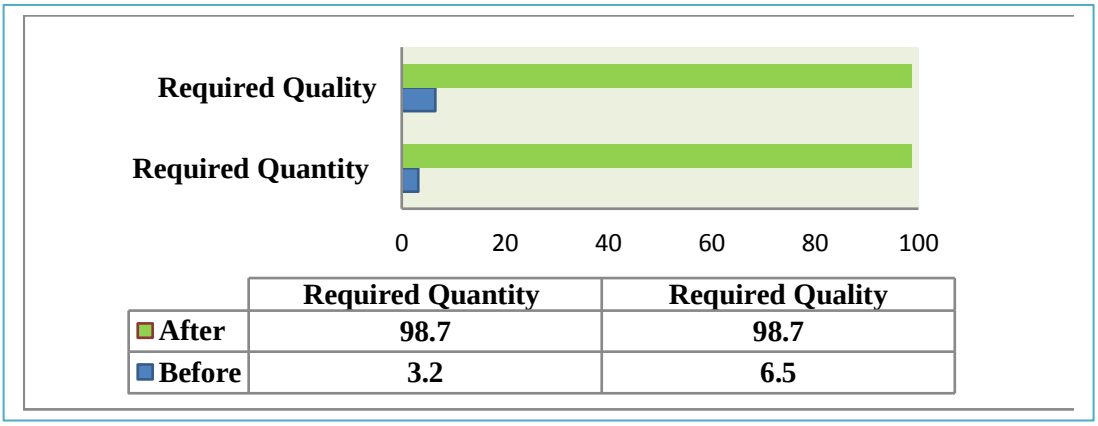
4.4.2 Production Inputs and Technology

The organization of the consortium provides for inclusion of input suppliers in the value chain to address the challenges of lack or inadequate access to quality inputs. The consortium approach involves all actors required to provide for activities in the phases of production and moving the produce from upstream (farmers) to downstream (market and consumers). Designated suppliers provide separate, but integrated services of supplying improved seeds, fertilizers and pesticides/herbicides. Each of these inputs is provided by separate companies who are actors in the consortium.

4.4.3 Source and Type of Inputs Accessed by Farmers

As described already, the consortium approach encompasses input suppliers in the value chain. For instance, improved seeds are provided by Agriseed Technology Limited; fertilizer by Yara Tanzania Limited and pesticides/herbicides by Obo Investment Company Limited. Before the consortium, 14.2% of farmers used improved seeds, 78.1% used fertilizers and 69.6% used pesticides/herbicides, but not in the right proportion as they were underused (On average, 55.52kg of fertilizer was used per hectare. Majority of the farmers (85.8%) used local seeds for paddy cultivation characterized with low yields. After the consortium approach, respondents' access to inputs increased; improved seeds (97.4%), fertilizers (99.4%) and pesticides/herbicides (100%). On average, 101.15kg of fertilizer was used on one hectare, but majority used the recommended minimum 150kg per 0.40ha (1 acre). The trainings offered on application of improved inputs facilitated better use of inputs and helped to reduce overuse and underuse of inputs with associated costs of wastage or low yield at high production costs.

Before the consortium, farmers reported limited access to quality inputs as shown in table 4.4 and figure 4.3. Very few respondents (3.2%) indicated access to inputs in the required quantity and 6.5% reported they have access to the required quality of inputs. The major reasons for low access to inputs in the required quantity and quality were due to lack of capital, low education on agricultural inputs, ignorance and lack of awareness. On the other hand, after the consortium farmers indicated increased access to inputs.



	Required Quantity	Required Quality
After	98.7	98.7
Before	3.2	6.5

Figure 4.3: Inputs Bought in Required Quantity and Quality by Farmers Before and After in the Consortium

Table 4.4: **Inputs and Technologies Accessed in SHIRCO Consortium by Farmers**

1a. Inputs Type Accessed (n=155)	**Respondents (Farmers)**	
	Before	**After**
Improved Seeds	22(14.2)	151(97.4)
Fertilizers	121(78.1)	154(99.4)
Pesticides/Herbicides	108(69.6)	155(100)
Plough/Power Tiller	65(41.9)	154(99.4)
Tractor	2(1.3)	2(1.3)
Combine harvester	36(23.2)	149(96.1)
Tarpaulins	69(44.5)	139(89.6)

Table 4.5 revealed the various sources where farmers get inputs from. Majority of the farmer (91.4%) get improved seeds from input suppliers (partner input suppliers of the consortium), (3.3%) sourced from input shops and 5.3% get inputs from both input suppliers and input shops. The reason advanced by farmers that get inputs from shops was delay in delivery of inputs from the consortium input suppliers while those that supplement from both sources attribute it to delay by suppliers and need to get more inputs due to their farm size. For fertilizer, 99.4% get inputs from consortium input suppliers. All the respondents used herbicides and sourced the input from consortium input supplier.

Table 4.5: **Source of Inputs Accessed in SHIRCO Consortium by Farmers**

1b. Inputs Sources	**Respondents (Farmers)**
Improved seeds (n=151)	
Input suppliers	138(91.4)
Input Shop	5(3.3)
Both (Input suppliers and Input Shop)	8(5.3)
Fertilizers (n=155)	
Input suppliers	153(99.4)
Fellow Farmer	1(0.6)
Pesticides/herbicides (n=155)	
Input suppliers	155 (100.0)

The contractual arrangement on delivery mechanism and payment modality of inputs in the consortium enhance farmers' access to quality inputs. The delivery mechanism for inputs follows an arrangement where farmers aggregate their input needs and communicate to their farmers group which in turn direct the requisition orders to input suppliers. Confirming the orders with representatives of farmers groups, input suppliers deliver inputs to farmers groups (schemes) from where each individual farmer gets their allotted inputs from the group store or warehouse.

Majority of the farmers (92.1%) indicated that they received allotment of improved seeds from their farmers group store, 2.6% got theirs deliver to their farm premises by the group, 2.6% bought from input shop and 4% from both input shop and group store. Farmers (93.5%) widely held that they got their allocation of fertilizer delivery from group store while 3.2% bought from input shop and 3.2% procured from both input shop and group store. Delivery of pesticides and herbicides to farmers was majorly through group store. Further analysis revealed that while all the respondents got herbicides from the consortium input supplier some farmers bought additional units from shops to complement, thus 98.1% from input supplier and 1.9% from both shop and input supplier as shown in table 4.5. Before the consortium the delivery mechanism was mainly done by individual farmer.

Table 4.6: Inputs Delivery to Farmers in SHIRCO Consortium

1c. Inputs	**Respondents (Farmers)**
(i) Improved seeds (n=151)	
Farm premises	4(2.6)
Group/Cooperative store	139(92.1)
Input Shop	4(2.6)
Group store & Input Shop	4(2.6)
(ii) Fertilizers (n=154)	
Group/Cooperative store	144(93.5)
Input Shop	5(3.2)
Group store & Input Shop	5(3.2)
(iii) Pesticides/herbicides (n=155)	
Group/Cooperative store	152(98.1)
Group store & Input Shop	3(1.9)

Payment for inputs supplied is made by partnered banks of the consortium through the instrument of credit advance to input suppliers. Banks pay inputs suppliers to get refund from farmers at a later date in arrangement where the inputs suppliers after delivery of inputs, collect invoice from farmers group for inputs supplied and approach bank for payment. Farmers repay the input credit advance granted by the bank after harvest and sales of their paddy to consortium buyer. The buyer aggregate produce from farmers and deposit farmers' sales proceeds with partnered bank from where the loan and inputs credit advanced are deducted and the residue is credited to farmers account and therefrom the farmers can access balance of their proceeds. The

financing arrangement has increased farmers access to credit to fund farming operation and increased inputs suppliers' ability to turn credit into cash.

Payment for fertilizer showed that majority of the farmers (86.4%) got the inputs from consortium input supplier on credit through credit advance payment arrangement financed by bank, 7.8% paid cash, 1.9% made part payment and 3.9% used both cash and credit payment. 87.4% of the farmers had credit advance for improved seeds to pay after sales of paddy to the consortium buyer financed by bank, 6.6% paid cash, 2.0% paid part payment and 4.0% from the group credit arrangement and bought additional improved seeds cash from input shop to complement due to delay in delivery for the input and the size of their farmland. Payment for herbicides show that 87.1% of farmers got credit through group arrangement, 9.0% pay cash, 1.3% made part payment and 2.6% got group credit advance and cash purchase from shop.

Evidential data on payment modality for inputs through the instrumentality of credit advanced by partnered banks and availability of input suppliers in the consortium enhanced farmers access to inputs compare to before the consortium (table 4.7). Before the consortium access to improved seeds was 14.2%, fertilizer 78.1%, pesticides/herbicides 69.6% while after the consortium access to improved seeds, fertilizer and pesticide/herbicide were 97.4%, 99.4% and 100% respectively.

Table 4.7: Payment Modality of Inputs Received by Farmers from Inputs Suppliers

1d. Payment Modality for Inputs	**Respondents (Farmers)**
(i) Improved seeds (n=151)	
Cash at point of purchase	10(6.6)
Advance payment	3(2.0)
Credit	132(87.4)
Both Cash and credit	6(4.0)
(ii) Fertilizers (n=154)	
Cash at point of purchase	12(7.8)
Advance payment	3(1.9)
Credit	133(86.4)
Both Cash and credit	6(3.9)
(iii) Pesticides/herbicides (n=155)	
Cash at point of purchase	14(9.0)
Advance payment	2(1.3)
Credit	135(87.1)
Both Cash and credit	4(2.6)

The timeliness of delivery of inputs by supplier to farmers in the consortium is important in that farming has a lot to do with early and timely activities. Respondents indicated that improved seeds were delivered before planting season (64.5%), middle of planting season (21.7%) and after planting season (13.8%). Furthermore, 60.5% of respondents indicated improved seeds delivered were on time while the remaining considered the delivery untimely. The gap in timely delivery of inputs should be taking care of by addressing the underlying issues.

For fertilizer delivery by input supplier, 75.3% indicated they received the input before planting season, 17.5% stated middle of planting and 7.1% confirm receipt after planting season. 80% of the farmers confirm the delivery of the fertilizer to be timely while 20.0% consider the delivery to be untimely. On pesticides/herbicides delivered to farmers, 74.2% were received before planting season, 18.1% in middle of planting season and 7.7% after planting season. As a result, 84.5% of the farmers consider the delivery of pesticides/herbicides to be timely while 15.5% confirm the delivery untimely (table 4.8).

Table 4.8: Timeliness of Accessing Inputs from Suppliers and Technology

1e. Timeliness of Accessing Inputs and Technology	Respondents (Farmers)
(i) Improved seeds (n=151)	
Before planting season	98(64.9)
Middle of planting season	33(21.9)
After planting season	20(13.2)
(ii) Fertilizers (n=154)	
Before planting season	116(75.3)
Middle of planting season	27(17.5)
After planting season	11(7.1)
(iii) Pesticides/herbicides (n=155)	
Before planting season	115(74.2)
Middle of planting season	28(18.1)
After planting season	12(7.7)
(iv) Power Tiller (Plough) (n=154)	
Before planting season	153(99.4)
Middle of planting season	1(0.6)
(v) Tractor (n=2)	
Before planting season	2(100.0)
(vi) Tarpaulin (n=139)	
After planting season	139(100.0)
(vii) Combined harvester (n=149)	
During harvesting season	149(100.0)

Farmers attribute the reasons for the untimely delivery of inputs from suppliers to prolong loan processing and delay in disbursement by bank. Findings from key informant interviews with inputs suppliers suggested that farmers are marginally responsible due to time lag for aggregating and placing requisition order for inputs. Care should be taking to address the delay in supply of inputs to farmers keeping in view the consequences of reduce production outputs vis-à-vis income associated with late farming.

4.4.4 Source and Type of Production Technology Accessed by Farmers in SHIRCO Consortium

Access to technology is mainly through individual hiring of equipment from operators who are fellow farmers, farmers group or individual service providers. Technology used by farmers in the consortium include power tiller for plough and transport, combined harvester for harvesting. As a measure of PHH, tarpaulin was used to sun-dry paddy as against the former practice of sun-drying on bare ground or floor prior to the consortium. Harvested produce (paddy) are stored in warehouse owned by government, individuals and farmers at a charge payable in cash or credit. Pallet, weighing scale and moisture metre are provided in the warehouse for storage of the paddy.

The report found that after the consortium, 99.4% of farmers used power tiller, 96.1% used combined harvester, and 1.3% used tractor signifying increased access to technology compare to 41.9%, 44.5% and 1.3% that used power tiller, combined harvester and tractor respectively before the consortium. The low use of this equipment before the consortium is attributed to lack of capital and non-availability of the equipment reinforced by subsistence farming practice. Subsistence farming yield less to mechanization in that farming is less seen as business but more as source of food. After the consortium, farmers are adopting the concept of farming as business and that requires adoption of machines.

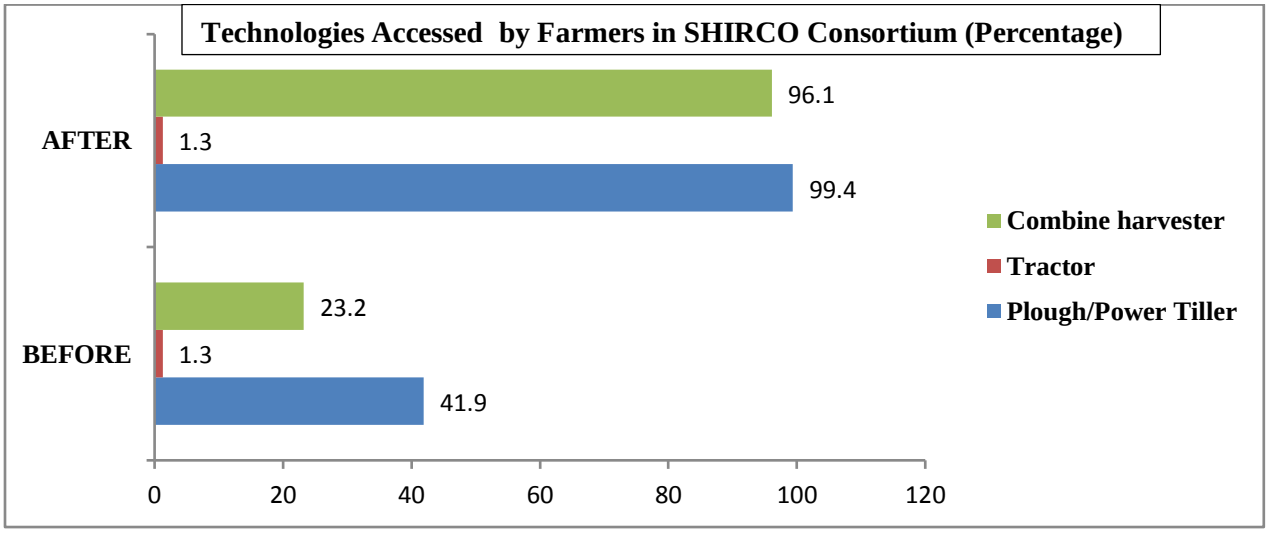


Figure 4.4: **Technologies Accessed in SHIRCO Consortium**

Table 4.9: **Source of Technologies Accessed in SHIRCO Consortium**

Technologies	Respondents (Farmers) n=155
(i) Power Tiller: Plough (n=154)	
Own farm	12(7.8)
Fellow farmers	140(90.9)
Service providers	2(1.3)
(ii) Tractor (n=2)	
Own farm	1(50)
Fellow farmers	1(50)
(iii) Combined harvester (n=149)	
Fellow farmers	144(96.6)
Service providers	5(3.4)
(iv) Tarpaulin (n=139)	
Own farm	132(95.0)
Fellow farmers	7(5.0)

Payment modality for hiring of power tiller (plough) is mainly on cash basis while hiring of combined harvester is by composite permutation of cash, part and credit payment. Mbuyuni irrigation schemes allows members the option of deferred payment redeemable after sales to buyers for hire of combined harvesters while farmers in other groups hired from service providers on cash basis. Mbuyuni irrigation scheme has its own combined harvesters and it's the only group at the time of the report that has its own combined harvesters, though funded by JICA-GOT partnership. The cost of hiring is charged based on per acreage at TZS120,000 – TZS150,000 ($53.60 - $62.53).

Table 4.10: Payment Modality for Technology by Farmers

2b. Technologies	Respondents (Farmers) n=155
(i) Power Tiller (Plough) (n=154)	
Cash at point of purchase	142(92.2)
Credit	12(7.8)
(ii) Tractor (n=2)	
Cash at point of purchase	2(100.0)
(iii) Tarpaulin (n=139)	
Cash at point of purchase	7(5.0)
Credit	132(95.0)
(iv) Combined harvester (n=149)	
Cash at point of purchase	127(85.2)
Credit	22(14.8)

92.2% of the farmers indicated that the hired power tiller on cash while 7.8% were on credit. The two farmers that used tractors hired on cash. Majority of the farmers owned their tarpaulins and use it to sun-dry paddy to reduce the moisture content. 5.0% of the farmers hired tarpaulin on cash while 95.0% used their tarpaulins and consider that amount as credit to the business. Of the 149 respondents that used combined harvesters, 85.2% paid cash while 14.8% hired on credit.

4.4.5 Warehousing Receipt System (WRS) in SHIRCO Consortium

The consortium operates a warehouse system (WHS). The storage arrangement in the consortium encourages farmers to bulk their produce and buyer aggregates from the warehouse. With the facility, farmers are encouraged to take collective action and bargain for competitive price for their produce. Aggregating produce in the warehouse is a precondition for accessing bank loan and farm inputs. The warehouses are built by government, individual service operator, lead firm (Raphael Group Ltd - RGL) and individual farmers. Warehouse built by government is under the management of farmers groups. Farmers pay to use the facility and the money is use as operational cost by the group to maintain the facility. A bag of produce stored in the warehouse attracts a charge of TZS1000 to TZS2000 ($0.45 - $0.89) for a year. Payment could either be in cash or on credit payable during sales of produce. Those built by the lead firm (RGL) are located at different areas to serve as collection points. Two farmer groups own warehouse; Matebete irrigation scheme and Mbuyuni irrigation scheme. Also, the warehouse at the lead firm, RGL processing plant is open to farmers, but not limited to members of the consortium. However, use of the warehouse is with a condition of selling the produce to RGL. The produce stored in the warehouse at RGL plant is used as collateral for attracting credit facility from bank by farmers knowledgeable in warehouse receipt system (WRS) and who have the capacity. This class of farmers stores their produce in RGL premise and pays storage charge to keep the produce pending when price increase before selling to RGL. Some of them use the produce in store to obtain credit from bank and sell at a price that could offset the interest charge of the bank loan. Under the WRS financing arrangement, bank confirms the amount and worth of the produce in store and with assurance of a buyer, grants credit to the farmer to get repayment when the produce are sold to the buyer under the terms of their contract. With increase production outputs, SHIRCO farmers group can pull paddy together, after meeting the contractual supplies threshold to the buyer, to take advantage of the WRS to get finance from bank to meet advancement needs.

Through intervention of the consortium, the lead firm, RGL recorded increased access to paddy that meet market requirement in terms of timeliness, quantity and quality. RGL has expanded its storage capacity leveraging on the warehouse receipt system (WRS) of the partner bank – NMB to build two warehouses. Similarly, the consortium had increased the firm's access to finance. There still exist needs for more storage facilities in the consortium and finance.

> *"Access to construction loan from bank to build two new warehouses in the factory"*
> **GM of RGL**

4.4.6 Farmers Access to Finance in SHIRCO Consortium

Prior to the consortium, few respondents indicated access to inputs in the required quantity (3.2%) and required quality (6.5%). The reasons were attributed to low education on agricultural inputs, ignorance, lack of awareness and lack of capital being the main limitation. Financial constraints hinder smallholder farmers to get improved inputs, technology and other activities of the farming business. After the consortium, 70.3% of respondents indicated access to bank loan. The consortium provides financial interventions through issuance of credit to farmer groups by partner banks who are financial service providers of the consortium. The partner banks of the consortium are NMB (National Microfinance Bank) and BOA (Bank of Agriculture) of Tanzania. The study area, Mbarali district is serviced by NMB. The Bank deals with farmer groups and conditionality for loan includes collateral of title deed of farmer, membership of farmer group, guarantee from a granter like PASS, size of farmland (including assessment of riskiness of farm location) and production capacity. In addition, assessment of outputs of the farmers per acre is gauged through produce (paddy) aggregated in group warehouse. The financial agreement is covered by outgrower's loan scheme, one of the financial packages of the bank and involves a tripartite relationship i.e. the bank, buyer/processor and the farmer/producer. The bank finances crop inputs delivered by agro-input dealers and the harvest is contracted to the off-taker who pays the crop proceeds through the bank whereby the loan is repaid and the remainder is available for the farmer/producer group. Findings show that 70.3% of respondents accessed credit from the bank while 29.7% did not and the reason for not accessing credit was attributed to high interest rate, borrowing from friends and family, fear, long loan processing, amount not enough relative to farm capacity and the decision not to take loan.

The amount ranges from TZS700000 ($312.64) to TZS4000000 ($1,786.51) and are released installmentally mostly in 3 installments. Respondents indicated that the loan helped to increase production. However, some operational limitations with the loan processing need to be strengthen in order to maximize more value in the farming business. Addressing issues of prolong processing and delay in disbursement will provide value addition in the consortium. Similarly 34.2% of the respondents expressed opinion that the interest rate is high and should be reduce.

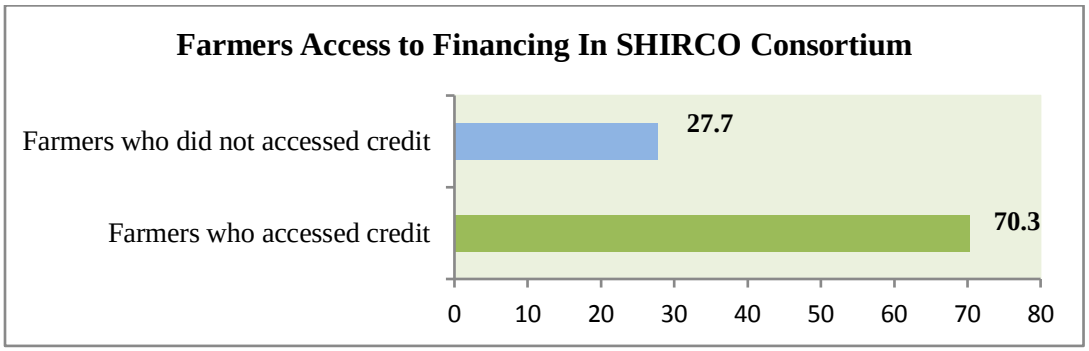


***Figure 4.5*: External Financing in SHIRCO Consortium**

The loan and credit has made noticeable impact in the farming operations of farmers, enabling them to access inputs, meet cultivation activities, pay for technology hiring, labor, storage and marketing of paddy, thereby contribute to increase production and enhance marketing. Nonetheless, access to credit should be expanded to cover more farmers and also be increased to meet expansion and advancement needs of farmers.

4.4.7 Marketing of Produce (Paddy) by Farmers in the Consortium

Marketing of produce before the consortium was done on individual basis. Each farmer sells to buyer of their choice, either to middlemen who in turn sell to buyer or to individual buyers. 51% of the respondents indicated that they sell to buyers who aggregate from individual farmers, 31.0% sell to middlemen who later sell to buyers, 4.5% sell to buyer who buy from aggregation centres and 13.5% sell to both middlemen and buyer who aggregate from individual farmers. Market was a cardinal challenge farmers faced before the consortium. The unguaranteed market affected production; farmers could not plan for expansion or get better value for their investment. The intervention of the consortium provides a different picture. Results of the study revealed that majority of the farmers (91.6%) sell to identified market (lead firm/buyer) through group

aggregation while 4.5% sell to middlemen, 3.2% to buyers who buy from individual farmers and 0.6% sell to both middlemen and buyer who aggregate from individual farmers as shown in table 3.7. The availability of a buyer (lead firm/processor) in the consortium is a game changer and has enabled farmers to have assured market that is helping to drive increase production and income.

Table 4.11: **Forms of Marketing by Farmers Before/After in SHIRCO Consortium**

Buyers	Before	After
Buyer picks from group aggregation centers	79(51.0)	142(91.6)
Buyer picks from individual farmers	79(51.0)	5(3.2)
Farmers sells to middlemen who takes to buyer	48(31.0)	7(4.5)
Individual buyer and middlemen	21(13.5)	1(0.6)

The market arrangement of the consortium incorporates distribution chain that provides for warehousing system with the outcome of bulking, collective action, security of produce, better price bargain, credit access, inputs access and promotion of group cooperation. The buyer (lead firm) of the consortium confirmed in key informant interview that the firm recorded increased supply of paddy from farmers and the produce met premium price in that the supply meets market requirement in terms of quantity, quality and timeliness. The payment modality for paddy bought from farmers involves bank transaction. The value of the paddy is not paid directly to farmers, but to bank where deductions for loan and credit advance for inputs granted to farmers are made and the balance credited to farmers account. Farmers expressed concern on the buying price offered by the consortium buyer indicating that the price should reflect market reality.

4.5 Impacts of Consortium Approach on Mean Harvest, Revenue and Land

Findings from SHIRCO consortium revealed that before the consortium, outputs recorded by farmers ranges from minimum of 0.72MT (5 bags of 120kg) per acre equivalent of 1.78MT/ha to maximum of 26.40MT on 8.90ha (220 bags of 120kg realized on 22 acres) and mean harvest per hectare realized by respondents was 3.41MT (equivalent of 28.38 bags of 120kg). After the consortium, production outputs ranges from minimum of 1.56MT on 0.40ha (13 bags of 120kg on one acre) to maximum of 79.20MT on 8.9ha (660 bags of 120kg on 22 acres) and mean harvest per hectare recorded by respondents stands at 6.95MT (equivalent of 57.93 bags of 120kg). Furthermore, evidential data of mean farmland used before and after the consortium is 3.37 acres and 3.55 acres respectively. There is increase in production and yield on farmland cultivated in the consortium and the changes recorded in production outputs is significant indicating strong evidence as shown by P<0.0000** (probability value<0.05). The study found that the increase in production outputs was driven mainly by skills and knowledge, access to inputs, credit and assured market with increase in farmland, though farmland used increased by 5.3%. Total output of 720.60MT was realized on 211.55ha used before the consortium while 1,550.04MT was recorded on 222.98ha after the consortium. Benchmarking the output for before and after on 211.55ha, the current outcome indicated 104.08% increase over outputs recorded before the consortium (that is on 211.55ha, out before was 720.60MT and after is 1,470.58MT) signifying increase in yields of 749.98MT. Technology used (power tiller use in ploughing help to plough on time and combined harvester use during harvesting help to save time, reduce waste and loss of paddy) contributed to enhance productivity (see table 3.7 and 3.8).

As stated already, 66.5% of the respondents are male and 33.5% are female. The findings indicated that mean outputs for male farmers before the consortium was 4.89MT and after the consortium, the mean output recorded per hectare 6.95MT. The mean harvest recorded by female farmers before the consortium per hectare was 3.45MT and after the consortium, 8.06MT was realized as mean harvest per hectare. Furthermore, production outputs by age recorded before the consortium revealed that the mean harvest per hectare realized by female youths was 3.41MT and 7.04MT was recorded after the consortium. Female youths recorded mean harvest of 4.09MT before the consortium while 7.66MT was realized after the consortium. Male adults recorded mean harvest of 3.43MT before the consortium and after the consortium mean harvest was 6.80MT while female adults realized 3.21MT and 7.25MT before and after the consortium

respectively. For the elders, the mean harvest realized before and after the consortium by male farmers were 3.37MT and 7.90MT respectively while 3.21MT and 7.26MT were recorded by female elderly farmers for before and after the consortium (see table 3.7). The age demography of the respondents cut across youth (25.8%), adults (66.5%) and elders (7.7%).

Table 4.12 **Effectiveness of Consortium on Mean Production Output (Total, Gender, Age)**

SHIRCO Consortium		
VARIABLES	**Before**	**After**
1. Total Production (n=155)		
Mean (per hectare)	3.41MT	6.95MT
Min. (@ 0.40ha)	1.78MT	3.85MT
Max. (@ 8.90ha)	26.40MT	79.20MT
2. Total Production by Gender (n=155)		
Male (n=103)		
Mean (per hectare)	4.89MT	8.23MT
Female (n=52)		
Mean (per hectare)	3.45MT	8.06MT
3. Gender by Age group (n=155)		
a. Mean Harvest by Youth per hectare (n=40)		
Male (n=26)	3.41MT	7.04MT
Female (n=14)	4.09MT	7.66MT
b. Mean Harvest by Adult per hectare (n=103)		
Male (n=68)	3.43MT	6.80MT
Female (n=34)	3.21MT	7.25MT
c. Harvest by Elder per hectare (n=12)		
Male (n=9)	3.37MT	7.90MT
Female (n=4)	3.21MT	7.26MT

Table 4.13 revealed that the mean revenue per hectare before SHIRCO consortium was $1046.74 and after the consortium respondents recorded mean revenue of $2,579.68. The results show increased changes in income with a strong significance of P<0.0000** (p-value<0.05). The increase in income is driven by increase production and yield coupled with assured market provided by the consortium. The buyer (lead firm/processor) of the consortium confirmed in a key informant interview that the quality of paddy supplied by farmers met premium price (see table 3.9). The availability of a buyer (market) in the consortium stimulates production in that farmers know that when they produce, there is a buyer ready to off take the paddy. By the contract arrangement, the buyer is responsible for the cost of transportation of paddy from the group aggregation warehouse to the factory. The buyer commit to off take any quantity of paddy

produce by farmers and to achieve this, farmers are given a threshold to meet and any outputs less than that, they farmers bear the cost of delivery of the paddy to the buyer's factory.

Table 4.13: **Effectiveness of Consortium on Mean Harvest, Revenue, Land**

SHIRCO Consortium			
VARIABLE	**Before**	**After**	**P-Value**
Mean Harvest per hectare (MT)	3.41MT	6.95MT	0.0000**
Mean Revenue per hectare (US$)	1 046.74	2 579.68	0.0000**
Gross Margin per hectare (US$)	855.03	2 298.14	0.0000**
Mean Land cultivated (hectare)	3.37	3.55	0.6821*

Table 4.14: **Effectiveness of Consortium on Produce Quality Supplied to Buyer**

VARIABLE	**Actual Volume Supplied**	**Actual Volume that Met Buyer Grade**
1. Grade of Paddy Sold by Farmers to Buyer (n=155)		
Max. (MT)	1,154.04	1,154.04
Mean (MT)	5.17	5.17

4.5.1 Costs-Benefits Analysis of SHIRCO Consortium

The result of the consortium shows that farmers' gross margin increased. Before the consortium, the practice of agriculture yielded less to farming as business whereby farming was conducted in more traditional way. The low production recorded was attributed to financial constraints, inadequate knowledge of GAP, PHH and low access to quality inputs – improved seeds, fertilizers and herbicides reinforce by market constraints. Although before the consortium, majority of the respondents used fertilizers and herbicides, the application of the inputs were inappropriate to the requirement of their farms. For instance, on an acre of farmland, 150kg (3 bags of 50 kg) is use in the consortium, but farmers reported using 50-100kg before the consortium. There was no assured market for the paddy; farmers sell to both middlemen and individual buyers. With intervention of the consortium, trainings offered on GAP, PHH, record keeping, farming as business, financial literacy enhanced farmers' capacity to conduct farming better than was practiced. The skill and knowledge helped farmers to improve their application of production inputs – improved seeds, fertilizer, herbicides and record keeping enabled cost minimization and determination of viability of the farming business. The availability of a buyer

(market) that guarantee the readiness to off take any quantity of paddy produced, motivated farmers to plan for advancement in production. As shown in table 4.13, farmers' gross margin before and after the consortium is US$1,046.74 and USD2,579.68 respectively indicating a positive change.

However, the increase in production outputs and income come with incremental costs reflected in the purchase of improved seeds, fertilizers, herbicides and use of technology (power tiller and combined harvester). As shown in table 4.12, the production recorded increase in outputs and yield in that before the consortium, the minimum size of farmland used was 0.20 hectare with outputs 0.72MT while the maximum farmland used was 8.90 hectares with outputs 26.40MT. After the consortium, the minimum farmland used was 0.40 hectare with 1.56MT and the maximum outputs recorded was 79.20MT on 8.90 hectares. Findings of the study indicated that increase in production was driven by combinatorial interplay of skills and knowledge, access to inputs and credit, availability of assured market complemented by collective action and management of farmers groups in addition to increase in farmland. Generally, results of cost-benefit analysis revealed positive increase, thus profitable. Also, farmers demanded that the price offered by the buyer reflect market reality.

As stated in the forgoing based on findings of the result, farmers should be encouraged and supported to farm more than 0.20 hectare given that 0.20 hectare is only enough to pay for loan, but not sufficient for farming as business.

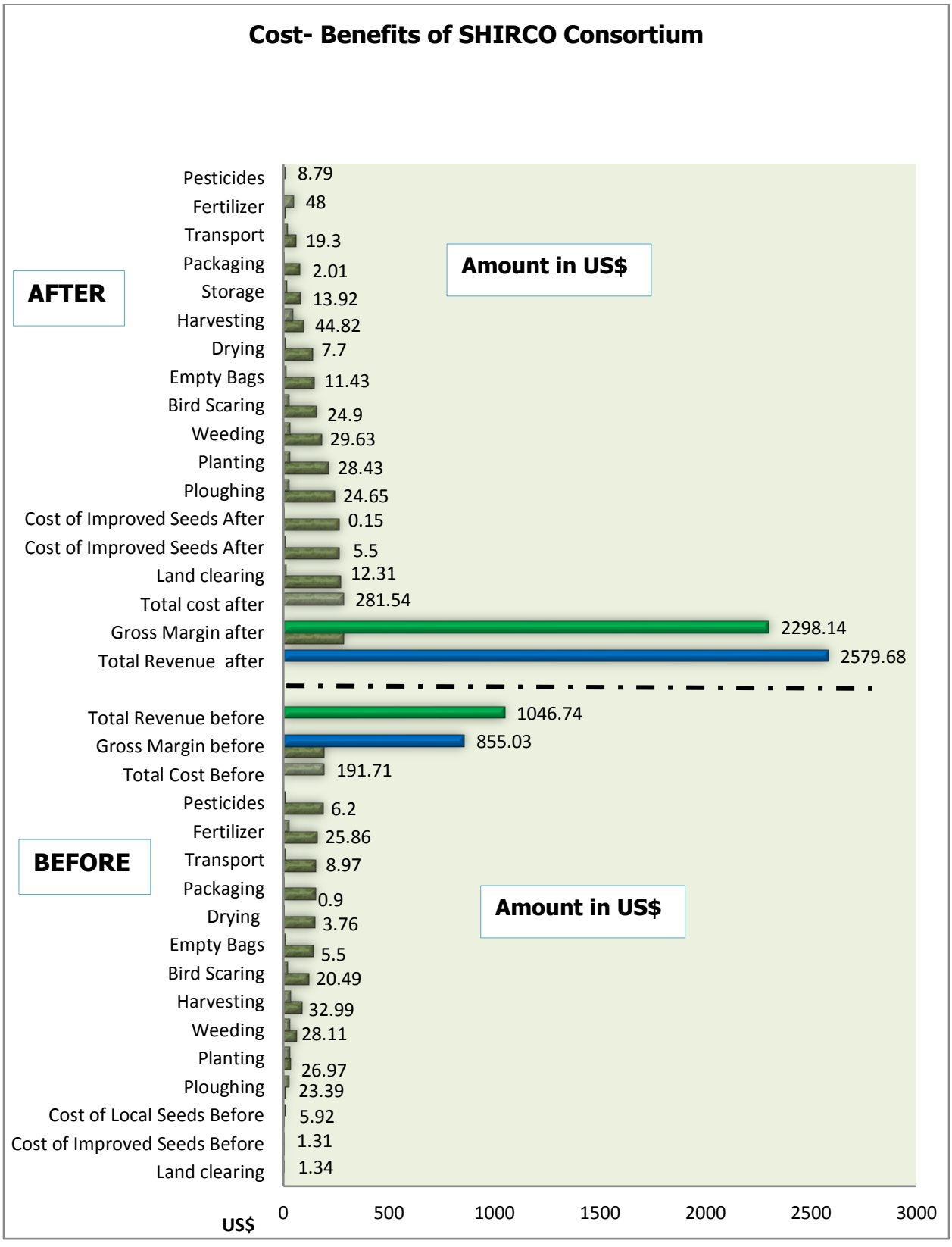


Figure 4.6: **Cost- Benefits Analysis of SHIRCO Consortium for Paddy Per hectare.**

4.6 Research Results on Objective 2:

To Determine Critical Success Factors for Sustainability of Consortium Approach

The increase in production and income recorded by respondents in the consortium are underpinned by critical success factors. The consortium is characterized by critical success factors such as commercialization of smallholder farmers through adoption of farming as business and market orientation (end-user market focus). The consortium have intervened on market access by inclusion of buyer (processor/lead firm) who is commit to off take any quantity of paddy produce by farmers. As a result of the assured market, farmers are motivated to increase production by improving on their farming practice in order to increase yield and outputs and expand the size of farmland cultivated together with increased investment in inputs. The results recorded give farmers the incentive to subscribe to farming as business rather than subsistence. The report found that the proceeds realized from output of one acre of farmland is sufficient to repay loan obtain from bank, but not adequate to provide investible capital. Hence, farm size of more than one acre will provide better income after loan deduction is made and this will promote farming as business. Therefore, farmers whose farmland are one acre and received credit from bank are subsistence farmers in view of the effect stated in the foregoing, even though they may be farming as business.

The supply of quality inputs by partnered inputs suppliers and access to financial services – bank loan, credit advance and financial literacy training offered by banks are critical to the consortium considering the direct impacts on production outputs and quantity off take by the buyer. The inclusion of input suppliers as partners in the consortium facilitates access to inputs – improved seeds, fertilizer and pesticides/herbicides. The access to inputs is reinforce by credit advance provided by banks whereby suppliers deliver inputs to farmers, collect invoice and approach bank for payment. The payment modality for inputs enables farmers to access inputs and repay credit advance granted after harvest and sales. Farmers' access to credit has improved unlike before the consortium. The loan is given on minimum farmland size of one acre (0.20ha) with other conditionalities already mentioned under source and type of inputs accessed on page 45.

The warehouse facilities provided in the consortium enhance PHH and marketing. The warehouse supports delivery of both inputs from inputs suppliers and aggregation of produce by

buyer from farmers. Trust and collective action among actors help in joint planning and problem solving. The collective action among farmers is crucial for upgrading and capturing of more value in their horizontal integration for better vertical integration. The collective action and warehouse encourage farmers to aggregate paddy, bulk paddy and negotiate price. Equally, farmers group are working to reduce or avoid cost of default on loan repayment by some members and the cost of default on aggregating below contracted supplied quantity agreed with buyer. In the event of some farmers failing to meet the required amount of paddy that ensures meeting the minimum quantity demanded by the buyer, farmers group bear the cost of delivery of paddy to the buyer's premises. Normally, the contractual arrangement place the responsibility of transporting paddy from farmers warehouse to the buyers premises on the buyer on the condition that farmers meet a minimum supply quantity. Table 4.15 summarize key attributes and success factors before and after the consortium

Table 4.15: **Key Attributes/Success Factor of Conventional Approach (Before) and Consortium Approach (After) in Food Value Chain Development.**

Attributes	Conventional Approach (Before)	Consortium Approach (After)
Business focus	Support and risk management intervention	Commercialization of smallholder farmers
Orientation	Win-Lose (zero sum game)	Win-Win
Organization	Fragmented, less integrative	Integrative/Inclusive
Participants	Actors in some of the node	Actors in the entire nodes
Commitment	Public sector-dependent	Pushes for private sector ownership and commitment
Transaction Terms	Short- term transactions (individually)	Long-term transactions (group)
Market Decision	Made on price; personal bargaining	Made on value; joint- decision making
Partnership	Many	Fewer are selected
Level of Investments	Avoided /low level	Widespread/High level
Interdependence	Low	High
Activities	Separate	Engaged
Focus	Supply-driven	Demand-driven and High
Coordination	Limited	Strong
Communication	Limited	Open
Information	Proprietary	Shared
Improvement	Unilateral initiatives	Continuous joint activities
Interest	Act only in own interest	Act for mutual benefits

4.7 Research Results on Objective 3:

To investigate the Strengths, Weaknesses, Opportunities and Threats of Consortium Approach in Improving Income of Smallholder Farmers

The outcome of the consortium shows increase in production and income of respondents. The results underpin the strength of the consortium. However, in opposition to the strengths are associated weaknesses of the consortium. Nonetheless, there exist opportunities to spur growth and advancement and the knowledge and adoption of measures to delink or reduce exposure to threats will enhance the consortium. The approach has some number of strengths to build on, weaknesses to be mindful of, opportunities to harness and threats to mitigate, thus the SWOT Analysis of consortium approach to food value chain highlighted in table 4.16 reveals:

Table 4.16: **SWOT Analysis of Kilimo Trust Consortium Approach**

Strengths	Weaknesses
1. Market-orientation: Producing for end-user market focus. Production is driven by market demand and requirement. 2. Farming as business: The approach ensures the commercialization of smallholder farmers to farm as business and not for subsistence. This is reinforced by training, input access and market linkage. 3. Assured market and market networks 4. Private sector ownership and commitment. 5. Business stand of profit making by all actors. 6. Optimization of economies of scale 7. Trust and collective action 8. Joint decision making by actors 9. Partners share business opportunities among themselves available outside the consortium	1. Trust issues: Farmers and buyer not keeping to contractual arrangement. Limited transparency among partners on transactions. 2. Donor-driven 3. Difficulty in creating ease of inclusion of youths in agribusiness 4. Lack of gender-friendly labour saving technology

Opportunities		Threats
1. Replication potentials of the model: Ease of scaling up of approach is high 2. Demand-driven 3. Attractiveness of approach to financial institutions and suppliers of inputs. 4. Intra-Africa and regional trade 5. Growing middle class, urbanization and population growth		1. Climatic change condition: drought, flood, shortage of rainfall and vagaries weather effects 2. Politic of food: Inconsistency in policy and in implementation on food security e.g export ban 3. Market dynamics: Price fluctuation 4. Poor infrastructures e.g. irrigation facilities, road, etc. 5. Conflicts between herders and farmers 6. Long loan processing and disbursement coupled with high interest rate by bank 7. Low carrying capacity of available storage facility 8. Risk of depending on single buyer 9. Multiple cess (taxes) charged by tax authorities

5.0 Identified Challenges in SHIRCO Consortium

5.1 Farmers

Respondents acknowledged the impacts capacity building have on their farming business manifested in increase production. However, the need for more training was reported by farmers and observed by the study. Some of the respondents received little training. Climatic change condition evident in drought, flood and shortage of rainfall is a serious concern and would not only affect farmers' production outputs but also constrain the quantity supplied to buyer and in turn affect the inputs that would be required by farmers from input suppliers in the consortium, thereby affecting all the actors. Considerable numbers of farmers expressed dissatisfaction with delay in delivery of inputs from input suppliers. The time lag in loan processing and disbursement by bank coupled with high interest rate is a concern to farmers. Water management conflicts among farmers and between farmers and herders in the irrigation scheme persist. Conflicts between herders (Sukuma tribe and Maasai tribe) and farmers on gazing areas demands

proactive attention and the cause of the conflict is not unconnected with impacts of climate change. Cattles grazing on farmers' farmland is a driver of conflicts and there is likelihood of potential risk of conflicts in the ensuing farming season due to drought experienced in the year under review. Other issues are health challenges arising from water contamination with agrochemicals given that the irrigation water through the canals also serves some domestic use of some member of the communities. Poor infrastructure especially secondary irrigation canal persist and requires rehabilitation. The need for expanding the carrying capacity of warehouse facilities by constructing additional ones obtains in the consortium. Equally, rain-fed farming and its vulnerability together with effects of illegal importation of rice are current challenges farmers are facing in the consortium.

5.2 Input Suppliers

The inclusion of inputs suppliers as partners in the consortium not only enhance better access to quality inputs but also improve better application of inputs enhanced by trainings on application of inputs in production of paddy. Respondents (improved seeds supplier, fertilizer supplier and pesticides/herbicides supplier) in key informant interviews reported constraints experienced in the consortium namely delay experienced in delivery of inputs to farmers attributed to delay in bank process and partly to delay by farmers group in filling inputs requisition orders, unfavourable climate condition affects sale of inputs to farmers, high taxes (cess) leads to increase price of inputs, insincerity of some farmers to turned back loan, logistic issues in transporting inputs – delay due to distance from Dar es Salaam to farmers location which are distance apart, capital constraints for expansion and working capital needs. Similarly, some farmers harvest earlier than expected, thereby affecting seed efficiency and some farmers mixing up seeds varieties in planting. Likewise, supplier of improved seeds depends on foundation seeds from government and if delayed, the spillover affects the farmers, and the presence of many competitors of inputs in the market and some fake inputs were constraints indicated by suppliers.

5.3 Service Providers

Support services in form of training, research, financial literacy and market preferences obtains in the consortium due to involvement of actors that offer such services and the services have contributed to strengthening the consortium. Some of the challenges faced by these actors include: (a) MATI: government staff – extension workers are constrain by field work resources (motorbikes, vehicles, staff budget), MATI not well integrated in planning activities and official timetable of MATI sometimes distort their participation in the timing of the consortium training programs. Attitude of some farmers toward training - some believed they have completed all knowledge in agriculture; others need DTA (daily training allowance) to cover for their logistics and time in attending trainings and difficulty of training of farmers in different districts at different times due to shortage of training staff.

5.4 Lead Firm

The presence of buyer/processor in the consortium offers direction on production since farmers know that any quantity of paddy produce would be off take by the buyer. The assured market enables farmers to plan for increase production and invest to achieve the increase. The buyer recorded increase in supply of paddy off take from farmers coupled with incremental sales of rice besides access to construction loan obtained from bank. Nonetheless, there are challenges constraining the buyer and include climatic change condition (drought, flood, variation in weather) affects farmers outputs and constrain supplies received by buyer, export ban, illegal importation of produce, working capital constrain, local way of drying paddy (use of tarpaulin), limited space for storage, multiple taxes (cess), limited access to major and big shops and supermarkets, trust issue on the part of some farmers, unscrupulous practice of some traders in the market, needs for better and close joint problem solving by partners, price fluctuation, infrastructure issues, cut down of electricity and distance to Dar es Salaam market with attributable cost.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Major Findings

The demographic characteristics of smallholder paddy farmers in the consortium in different farmers groups in the SHIRCO Consortium under the Competitive African Rice Initiative (CARI) project in Mbarali districts of Mbeya region in Tanzania cover both male and female farmers. The demography and socio-economic characteristics of farmers show variations in age, marital status, educational attainment and indicated that majority of the farmers are married, are adults and attained primary education.

The main planting season of the farmers is November – March and the minimum and maximum farmland cultivated before the consortium was 0.20 hectare to 8.9 hectares while 0.40 hectare to 8.9 hectares were the minimum and maximum farmland used after the consortium.

The skill and knowledge demonstrated by farmers before the consortium was not sufficient and yield more to traditional farming practice characterized with low yield and production. On the other hand, the intervention of consortium approach facilitated access for majority of the farmers to trainings on improved farming practice that is market driven. More farmers have access to trainings on GAP, PHH, financial literacy, record keeping and being profit minded. The adoption of practical training through demonstration plot coupled with farmers-field day enhanced capacity building of farmers. The consortium approach promotes commercialization of smallholder farmers to farming as business rather than subsistence farming. Access to inputs enabled by inclusion of input suppliers in the consortium reinforced by input credit and loan from bank have direct impact on production outputs. The adoption of technology - power tiller and combines harvester supports improvement in production outputs. The availability of warehouse and use of tarpaulin boost PHH of paddy and promote group action. Collective action as a result of farmers group stimulates coordination and joint decision making. The availability of assured market drives upward trajectory of production output and volume off take by buyer.

The mean harvest and mean income recorded in the consortium indicated strong significance change over what was recorded before the consortium and the result of production increase recorded is not mainly driven by increase in farmland cultivated. However, the increase in production outputs and income comes with incremental costs reflected in the purchase of

improved seeds, fertilizers, herbicides and use of technology (power tiller and combined harvester), but the cost-benefits shows increase margin. Findings show that farmers whose farmland are one acre and received credit from bank are subsistence farmers even though they may be farming as business.

The SWOT Analysis revealed that the strengths of the consortium are driven by private sector ownership and commitment reinforce in profit for partners. The integrative nature and win-win mentality of partners is a boost to the consortium. In opposition to the strength is the weakness of donor-driven approach underpin by difficulty in creating ease of inclusion of youths in agribusiness and lack of gender-friendly labour saving technology. The demand-driven nature of the approach together with replication potentials and attractiveness to financial services offers opportunity. Nonetheless, threat of climatic condition underlay with dependency on one buyer and politics of food are issues of concern for the consortium.

6.2 Conclusion

Largely, the approach has been effective in increasing productivity and income of smallholder farmers and sales and income of partners in the consortium as found by the study. The lessons learnt should be apply to strengthen the value chain and scale up of consortium approach to value chain development of SMEs in Tanzania and in the EAC and Africa.

The commitment of partners and result recorded shows strong evidence of sustainability and that would be better appreciated after 1-3 years from exit of the CARI project when a post monitoring and evaluation is conducted to ascertain the sustainability of post impacts of the consortium. The intervention of the consortium in the area of training, access to inputs, credit, delivery mechanism, payment modality and market linkage founded on collaborative value chain that yield to win-win partnership is relevant as a model in value chain development.

Value chain approaches vary in the problem they seek to address, the way they are applied and the actors involved. The exigency and impact of operating environment within which value chain approaches operate should be given attention keeping in view that no one approach is full proof of constraints and challenges. The challenges facing the consortium in the area of climatic change effect, delay in input delivery, delay in loan disbursement, high interest rate, poor

infrastructure, multiple taxes, trust issue, shortage of training staff and field resources, export ban, local way of drying paddy, lack of gender-friendly labour saving technology and working capital constrains are significant should be given due attention.

Addressing the identified challenges would make the approach to yield more value addition. The approach should be extended to other farmers, crops and regions. Due diligence is required in the selection of partners who are not only competent but committed to keeping to the contract and ensures that partnership is not a zero sum game but a win-win relationship that ensures smallholder farmers are well integrated to the extent that everyone in the chain is winning.

6.3 Recommendations

The report recommends targeted and collective actions in ameliorating and strengthening of the consortium:

(i) Farmers

Individual farmers should cultivate minimum area of more than one acre in order to achieve farming as business given that cultivation of one acre or less is only sufficient for loan repayment and subsistence. Groups should leverage the potential of SHIRCO consortium to catalyze social programs (storage, educational & health, etc.) from other institutions. Better schedule of water management to reduce conflicts arising thereto and better demarcation of plots between farmers to avoid conflict during harvesting with combined harvester. Foster cooperation among farmers and farmers group. To improve the level of default, farmers group should encourage and ensure members who receive loan payback. In facilitating loan repayment, groups should provide guarantee on the credit worthiness of members. Input suppliers should work with farmers to minimize water contamination with agrochemicals to reduce associated health challenges as well as adapt better ways of fumigating farms to reduce health implication on farmers. Farmers should weigh the cost-savings of transportation of inputs by comparing the effectiveness of either getting delivery direct from input suppliers or bearing the cost of transportation from input suppliers to farmers group. The option of bearing the cost of transportation would require farmers comparing the cost of hiring truck from the lead firm or other commercial transporters. Farmers group should pull resources (paddy) together by expanding production to take advantage of financing encapsulate in warehouse receipt system (WRS).

(ii) Inputs Suppliers

Timely supply of inputs to farmers in line with farming calendar and timely delivery to farmers groups to avoid associated costs of untimely delivery on production outputs. Farmers should not be at the receiving end of delay in processing of input credit advance from bank by input suppliers. To boost timely delivery of inputs, input suppliers should provide input credits to farmers and get reimbursement from bank through the existing payment arrangement. Farmers should be given trade discount for bulk purchase of inputs from input suppliers. There should be increase education and follow up/through with farmers on better use and application of inputs. Training of farmers on better application of inputs as indicated by farmers and observed in the study. The training should ensure timeliness and frequency. Work with other actors including farmers to incorporate drought tolerant, early maturing and pest resistant improved seeds variety as a mitigating measure to climatic change conditions in line with climate smart agriculture.

(iii) Financial Institutions: Bank

Timely processing and disbursement of loan to farmers and release of payment for input credit advance to input supplier. Provide concessionary interest rate to consortium farmers. Provide special bonus package to farmers to offset the burden of the interest charge. Work with Bank of Tanzania to provide one-digit interest rate to farmers in line with poverty reduction and growth enhancement of micro, small and medium enterprises (MSMEs) programs. Provide corporate social responsibility to SHIRCO farmers' communities (conditional or non-conditional social programs) by providing social services. Provide equipment loan facilities to farmers to procure gender-friendly labour saving technologies to mechanized and reduce workload of farmers especially women. Promotional advertisement contract should be awarded to best performing farmers as brand ambassadors. Provide trainings on financial-related training needs expressed by farmers indicated in the study. Similarly, support Upendo Women Group to achieve their vertical integration advancement plan with financial facility.

(iv) Lead Firm

Expand the financial access net to attract more financial institutions (banks) to be partners in the consortium. Expand the net of the consortium to accommodate other farmers, region and other crops by replicating the approach. Set up a monitoring and evaluation framework integrated with gender specialist for the consortium in line with sustainability plan. Institute a revolving fund to

provide for training needs, coordination and internal finance strengthening to provide for input credit needs of farmers so as to minimize delay of loan processing from bank. Adapt more technology in the area of modern equipment of drying of paddy as against using local way of drying paddy on tarpaulin. Work with key stakeholders in rice food subsector leveraging on networking to attract development program interventions and funding to strengthen the business and impact on rural poverty reduction and commercialization of smallholder farmers. Strengthen the firm's competiveness, improve on product standardization and promotion and ensure that price negotiation with farmers reflect market reality in addition facilitate improvement on joint planning of partners. Gradual exit of CARI with sequential programs involving full participation of SHIRCO partners

6.4 Policy Implication: Creating Enabling Environment

Need to develop crop or rain insurance for small scale holder producers (DRT, 2012)

- Government should benchmark policy impacts on rural areas especially on smallholders (rural lens concept). While politics of food will continue to be there, the outcome should not be at detriment of commercializing smallholders. Effort should be increased in tackling smuggling of rice into the country with institutional strengthening and citizens' enlightenment.
- Develop and promote crop and rain insurance for smallholders to ameliorate the risk of climate change effect (DRT, 2012). GOT should work out an insurance package for smallholders and also develop PPP on agricultural insurance.
- The GOT should work with the EAC Partner States to operationalize the EAC Climate Change Fund to leverage on the Green Climate Fund and other climate finance mechanism to mitigate climate change effects.
- Provision and improvement of infrastructural facilities - irrigation, canals/drainages; provision of alternative water (down water). Provision of gender-friendly, labour saving equipment and technology. Provision of weather forecast infrastructure to disseminate information through two-way communication to farmers to reduce loss associated with climatic change condition. Infrastructure should prioritize linking smallholders to market, in order to close the gap of low productivity and income (SID, 2016).

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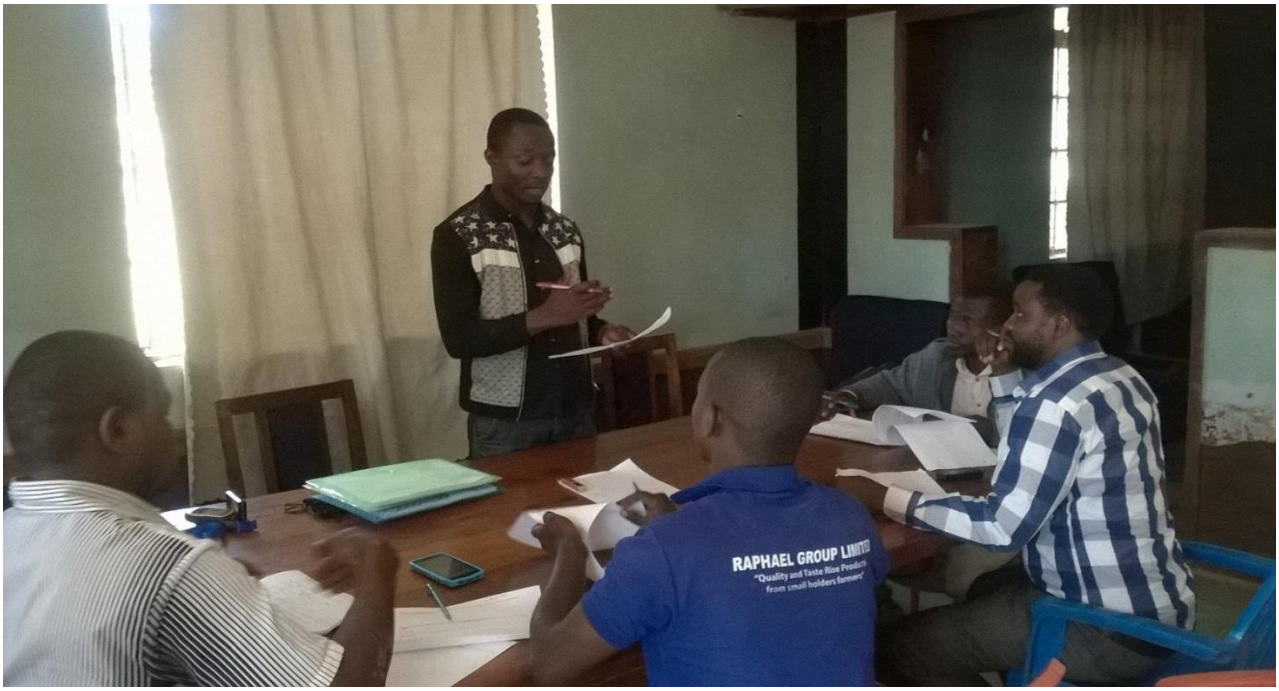
APPENDICES

Population of East African Community (EAC)										
Country	**2017**							**2030**	**2050**	**2100**
	Age Group (percentage)				**Gender**		**Total**	Total	Total	Total
	0-14	15-24	25-59	60+	Male	Female				
Burundi	45	20	31	4	5 347	5 518	10 864	15 799	25 762	54 514
Kenya	40	20	35	4	24 701	24 999	49 700	66 960	95 467	142 124
Rwanda	40	19	36	5	5 987	6 222	12 208	16 024	21 886	28 185
South Sudan	42	20	33	5	6 301	6 275	12 576	17 254	25 366	42 794
Tanzania	45	19	31	5	28 342	28 968	57 310	83 702	138 082	303 832
Uganda	48	20	28	3	21 321	21 542	42 863	63 842	105 698	213 758
Group Total					91 999	93 524	**185 521**	263 581	412 261	785 207

Source: UNDESA, 2017; aggregated by Author

Picture Gallery

- **Pre Field Picture**



Emmanuel Ejewule (Researcher) with Field Assistants during Pre Test Training, **Tanzania**

❖ **On Field Picture**

Emmanuel Ejewule (Researcher) on Combine Harvester at Mbuyuni District, Mbeya, Tanzania

Emmanuel Ejewule (Researcher) on Power Tiller (used for Plough and Transport), Mbarali

Adam (Field Assistant) administering questionnaire to farmer at Mbarali district, Mbeya region, Tanzania

Field Assistants (L-R: Williams and Adam) with farmers in Mbuyuni, Mbeya, Tanzania

Emmanuel Ejewule (Researcher) administering questionnaire at Mbarali district, Mbeya, Tanzania

Emmanuel Ejewule (Researcher) administering questionnaire to Mary Kayanda flanked by her husband

Emmanuel Ejewule (Researcher) conducting Key Informant Interview with Dr. Ambonesigwe M. Mbwaga, MD of Agriseed Co. (Researcher of improved seeds varieties), Mbeya, Tanzania

Emmanuel Ejewule (Researcher) with farmers bagging Paddy after drying at Mbarali, Tanzania

Field Assistants (L-R: Kelvin and Stephen) with farmers in Mbuyuni, Mbeya, Tanzania

(L-R) Prof Nuhu (CEO), Salum (M&E Officer), Emmanuel Ejewule (Researcher), Field Officer & Dr. Mary Shittu (Tanzania Team Lead), Kilimo Trust, East African Community

Preliminary Presentation of Findings to Kilimo Trust, Tanzania office by Emmanuel Ejewule

DATA COLLECTION TOOLS FOR TANZANIA

ASSESSMENT OF IMPACT OF CONSORTIUM APPROACH IN FOOD VALUE CHAINS DEVELOPMENT ON INCOMES OF SMALLHOLDERS FARMERS IN TANZANIA, EAST AFRICA (CARI PROJECT FOR IFAD).

You have been selected to be one of the respondents and as a beneficiary of the Competitive African Rice Initiative (CARI), we would like to ask you some questions to better understand the impact of the Consortium Approach in food value chain development on incomes of smallholder farmers in Tanzania under the Regional East African Community Trade in Staples (REACTS) implemented by Kilimo Trust. Your participation is completely voluntary and all information provided will be kept confidential and strictly be for research purposes. Please study the research questions carefully and respond accordingly. The researcher is a graduate student of the University of Ibadan, Nigeria. The study is in partial fulfillment of the award of Masters in Development Practice of the Development Practice Programme of Centre for Sustainable Development, University of Ibadan, Nigeria.

Name of Enumerator:……. Date of Interview:……

GPS: Longitude:…….. Latitude:……. Questionnaire ID:……

Are you willing to participate in this interview? Yes:…… No:…….

Please tick the Consortium you belong (SHIRCO Consortium)

PART A: Background Information.

General Characteristics of Respondents

(a) Country (b) Nationality	
(c) Location	Region: District: Ward: Village:
(d) Name of the Respondent (e) Respondent's Contact	Phone Number:
(f) Gender: Male ☐ Female ☐	(g) Religion: Christian ☐ Traditionalist ☐ Muslim ☐

(h) Ethnic Background:	(j) Respondent's Age (in years):
(j) (i) Marital Status: Single ☐ Married ☐ Divorce ☐ Separated ☐ Widowed ☐ (ii) If married, how many wives do you (or your Husband) have?	(k) (i) Are you a native of this community? Yes ☐ No. ☐ (If **NO,** move to ii, iii, iv) (ii) If No, State your place of Origin (iii) How long have you lived here (in years)? (iv) What is your reason(s) for coming here?
(l) Level of Education: (Please tick the **highest educational qualification you obtained**)	No formal ☐ Adult literacy ☐ Primary ☐ Secondary ☐ Tertiary/University ☐ Advanced Level ☐ Others (specify e.g vocational)……
(m) Do you belong to a farmer group? Yes ☐ No ☐	(ii) If Yes, What is the name of your Group?
(n) List the commodities grown on your farm:	(o) Which of the commodity is traded in SHIRCO Consortium?
(p) (i) Which is your main planting season? November-March ☐ July-September ☐	(ii) Why is that your main planting season?
(q) (i) What is the source of your farm land(s)? Self-owned ☐ Inherited ☐ Leased/borrowed ☐ **(Multiple Responses Allowed)**	(ii) If it is Self-owned, did you buy the land? 1. Yes…….. 2. No……... (iii) If it is leased/borrowed, what is the price in (Tshs)?
(r) What is the total farm land owned by the respondent (in **acre** specify)	(s) How much of the **farm land** do you dedicate to the commodity you trade in the **SHIRCO Consortium**?
(t) What is the total **farm land** rented by the respondents since join the SHIRCO Consortium and the price in (Tshs)?	(u) What are your **specific roles** in the value chain mode? Producer ☐ Trader ☐ **(Multiple Responses Allowed)**

PART B: Training

1. Have you received any training (skills and Knowledge) because you are part of SHIRCO Consortium? 1. Yes…… 2.No……

2. What kind of new skills and knowledge have you acquired being a member of SHIRCO Consortium? **Please tick**

Skills and Knowledge Acquired	**Before the SHIRCO Consortium (Yes /No)**	**After the SHIRCO Consortium (Yes /No)**	**Describe what you are doing differently after receiving the training?**
1. Good Agricultural Practices-GAPs (land preparation, plant spacing, etc)			
2. Post-Harvest Handling			
3. Farming as a Business			
a. Record keeping			
b. Minimizing cost			
c. Financial literacy			
d. Being Profit Minded			
4. Others specify			

3. How have the skills and knowledge acquired through the SHIRCO Consortium make your business as a farmer more effective?

.....

.....

.....

4. Was it easy for you to acquire the skills and knowledge under the training? 1. Yes…… 2. No……..

5. How did the trainers made it easy for you to acquire the skills and knowledge?

……

……

……

6. How many trainings have you had through SHIRCO Consortium?

.....

.....

.....

7. When do you always have such training? 1. Beginning of the season ……..2. After planting season…….. 3. Before harvesting ……..... 4. After harvesting …….. **(Multiple Responses Allowed)**

8. Please **rate your satisfaction** in the **Skills and Knowledge** acquired **before/after** through SHIRCO Consortium? 1= Very Satisfactory 2=Satisfactory 3=Fair 4=Poor

Skills and knowledge	**Before**	**After**
i. Ease of acquiring		
ii. Timeliness		
ii. Frequency		
iv. Cost effectiveness		

9. What are you **doing differently in making decisions** as a result of the **skills and knowledge** acquired through SHIRCO Consortium?
   .....
   .....
   .....
10. Do you think you have enough **Skills/Knowledge** to continue benefiting from SHIRCO Consortium in the production of your commodity? 1. Yes……..... 2. No……....
11. What new skills and knowledge do you still need to be more profitable/effective in your business and working in SHIRCO Consortium?
    .....
    .....
    .....
12. (i) Would you say you have benefitted from SHIRCO Consortium? 1. Yes……. 2.No……
    (ii) If Yes, in what ways have you benefited?
    ……
    ……
    ……..
13. (i) Is there any other intervention you are involved in during SHIRCO Consortium? 1. Yes…….. 2. No…….
    (ii) If Yes, please state it:……...……
    ……...……
    ……...……

Part C: Inputs and Technologies

14. What inputs and technologies have you accessed being a member of SHIRCO Consortium?

Inputs accessed	Tick (Multiple Responses Allowed)
1.Improved Seeds	
2.Fertilizers	
3.Pesticides/herbicides	
4.Plough	
5.Tractor	
6.Combine harvester	
7.Tarpaulins'	
8. Others (specify)…….	

15. What is the **quantity and price of inputs** you buy? (improved seeds, fertilizers, pesticides/herbicides, Tarpaulins)

Inputs	Quantity bought before SHIRCO Consortium (Kg/ Litres)	Price of Quantity bought before SHIRCO Consortium	Quantity bought after SHIRCO Consortium (Kg/ Litres)	Price of Quantity bought after SHIRCO Consortium
1.Improved Seeds				
2.Fertilizers				
3.Pesticides/herbicides				
4.Tarpaulins'				
5.Combine harvester				
6. Others (specify)……..				

QUANTITY OF INPUTS BEFORE & AFTER:	Yes	No	If NO, Give Reason(s)
16. The **quantity (volume) of inputs** bought **before** being a member of SHIRCO Consortium**,** was it the quantity you required			
17. The **quantity (volume) of inputs** bought **after** being a member of SHIRCO Consortium**,** was it the quantity you required			
QUALITY OF INPUT BEFORE & AFTER:			
18. The **quality of inputs** bought **before** being a member of SHIRCO Consortium**,** was it the quality you required			
19. The **quality of inputs** bought **after** being a member of SHIRCO Consortium**,** was it the quality you required			

20. From who were these inputs and technologies sourced?

Inputs Sources: (1= Own farm; 2= Off-taker/ buyer; 3= Commercial inputs supplier; 4= Fellow farmers; 5= Service providers; 6= Others specify)	**Pick Options (Multiple Responses Allowed)**	**Comments**
1.Improved Seeds		
2.Fertilizers		
3.Pesticides/herbicides		
4.Plough		
5.Combine harvester		
6.Tractor		
7.Tarpaulins'		
8. Others specify…….		

21. How are these Inputs and Technologies delivered to you?

Inputs Delivery (1= farm premises 2= Group/ Cooperative Store 3=Inputs Shop 4= Off-taker Premises 5= Others specify)	**Pick options (Multiple Responses Allowed)**	**Comments**
1.Improved Seeds		
2.Fertilizers		
3.Pesticides/herbicides		
4.Plough		
5.Tractor		
6.Tarpaulins'		
7.Combine harvester		
8. Others specify……		

22. Did you **access** these **inputs timely**? Please specify **which inputs** were received and **when**.

Inputs	**Time Needed (1=Yes 2=No)**	**Specify When Received (1= Before planting season 2= Middle of planting season 3=After planting season)**	**Comments**
1. Improved seeds			
2. Fertilizers			
3. Pesticides/herbicides			
4. Plough			
5. Tractor			
6. Combine harvester			
7. Tarpaulins'			
8. Others specify			

23. Have you been satisfied with the quality of inputs and technologies received?

Inputs	**Satisfied with Quality (1=Yes 2=No)**	**Comments**
1.Improved seeds		
2.Fertilizers		
3. Pesticides/herbicides		
4. Plough		
5. Tractor		
6. Tarpaulins'		
7.Combine harvesters		
8. Others specify		

24. How did you **pay** for these inputs and technologies?

Inputs Payment Modality (1=.Cash at the point of purchase 2=Advanced payment 3=Credit)	**Pick Options (Multiple Responses Allowed)**	**Comments**
1.Improved seeds		
2.Fertilizers		

3. Pesticides/herbicides		
4. Plough		
5. Tractor		
6. Tarpaulins'		
7.Combine harvester		
8. Others specify		

25. How much does it cost you to produce per acre of the commodity?

Cost Items/Activity (e.g. clearing, ploughing, planting, weeding, harvesting etc)	**Quantity per Acre**	**Unit Cost**	**Total Cost**
Totals			

Part D: Production Outputs

26. How much are you harvesting per season on the farm cultivated **before/after** SHIRCO Consortium? Please specify the weight per bag in (Kg)?

Commodity	**BEFORE**		**AFTER**	
	Total land Cultivated in (Acres) Before the SHIRCO Consortium	**Total Harvest per season (Bags) before the SHIRCO Consortium**	**Total land Cultivated in (Acres) After SHIRCO Consortium**	**Harvest per season (Bags) after the SHIRCO Consortium**

27. Did you have **access** to a **Storage facility before** SHIRCO Consortium? 1. Yes…… 2. No……...
28. Did you have **access** to a **Storage facility after** SHIRCO Consortium? 1. Yes…….. 2. No…….
29. How much of this Storage capacity is utilized per season (in bags) before SHIRCO Consortium? Please specify the weight per bag (e.g. 25kg, 50kg, 100kg, 120kg, etc)……..
30. How has SHIRCO Consortium encouraged you to bulk your produce?

……

Part E: Meeting Market Requirements

31. Do you know who (the buyer) you will sell to? 1. Yes …….. 2. No……..
32. If Yes, what are you doing/plan to do differently in these aspects (e.g planning for volume to produce, safety issues, varieties of inputs to buy, financing needed, timing of harvest, when & how to deliver to buyer, and price to sell) after understanding who you are producing for?

    ……
    ……
    ……
33. How much does the buyer require from you per season vis a-vis how much you deliver and how much of what you actually deliver per season is of the grade most preferred by the buyer? Please specify the weight per bag……. (kg)

Commodity	Required volumes by the Buyer (bags)	Actual Volumes supplied to the buyer (bags)	Actual volume that met the Grade of the buyer (bags)

34. How does your product reach the buyer?

Commodity	Pick from these Options 1=buyers picks from individual farmers 2=buyers picks from cooperative aggregation centers 3= cooperatives delivers to buyers premises 4=farmers sells to middlemen who takes to the buyer.	
	Before the SHIRCO Consortium	After the SHIRCO Consortium

Part F: Access to Finance

35. Do you access external financing (micro credit) for your farm business? 1. Yes…… 2. No…… If **No**, ignore question 36 to 39 start from 40.
36. If Yes, from where?

    .....
37. What is the money (micro credit) you accessed used for?

    ……

    .....

    ……
38. Is the financing you access suitable for your business as farmer? 1. Yes…… 2. No…….

39. Please provide the details of the finance accessed

Suitability of the Finance Accessed to the Nature of your Business	Details	Comments
1. Ease of Access		
2. Timeliness of Disbursement		
3. Amount disbursed		
4. Repayment schedule		
5. Interest rate		

40. What are the reason(s) for not accessing external financing?

.....

.....

Part G: Partnership Modalities

41. How do you determine the **contractual arrangements** with these partners; inputs supplier, buyer, bank and service provider? (Please select from these options and comments)

Partners	Pick the Options 1=Yes, 2=No	Describe the Contractual Arrangements	Comments
a. Buyers			
b. Inputs Suppliers			
c. Financial Institutions (Banks)			

42. Do both parties (buyer and farmer) keep to the demand of the agreement? 1. Yes…… 2. No……...
43. Has there been incident where either the farmer or buyer fails to keep to the agreement? 1. Yes……. 2. No……
44. If Yes, why did it happen?.....

……

……

45. If Yes, what has been the cost suffered by you or your farmer group? (Please comments)

……

……

Part H: Assessment of the SHIRCO Consortium on Incomes.

46. Do you keep records for your farming and selling activities? 1. Yes…… 2. No…….
47. Please rate your income situation through being a member of SHIRCO Consortium**.** 1. Better off……. 2.The Same……..
    3. Worse Off……..
48. Have you been able to make **savings** from the **income**? 1. Yes…… 2. No……...
49. Have you been able to increase your production being a member of SHIRCO Consortium? 1. Yes…….. 2. No…….
50. How much **income** are you making from the commodity **per season before** SHIRCO Consortium? (Please specify in Tshs).....
51. How much **income** are you making from the commodity **per season after** SHIRCO Consortium? (Please specify in Tshs).....

52. What other enterprise are you engaged in outside the SHIRCO Consortium?

Enterprise	**Tick (Multiple Response Allowed)**	**Rank in order of Importance to Income 1, 2, 3…**
Crops (Specify the crop) ……		
Livestock rearing/Fishing		
Hunting		
Processing of farm produce		
Hired labourer		
Petty trading		
Others**(specify)**: _____		

***Rank in other of Importance: 1=most important, 2=second most important etc**.

53. In what ways has being a member of SHIRCO Consortium helped to make your business as farmer more profitable?
    .....
    .....
    .....
    .....
54. Please rate your level of satisfaction as a beneficiary of SHIRCO Consortium 1. Very Satisfactory..... 2. Satisfactory .....
    2. Fair..... 4. Poor.....

55. Please rate the SHIRCO Consortium activities (**tick as appropriate**)

Activities	Highly helpful	Helpful	Not helpful	Comments
a. Access to input (in terms of desired quality, quantity and timeliness)				
b. Access to technology (plough, Tractors etc)				
c. Access to training activities				
d. Access to bulking and group marketing system				
e. Access to finance				

56. What are the challenges you are experiencing being a member of SHIRCO Consortium?	57. What are your recommendations towards these challenges?

58. What are the challenges you are facing in your relationship with these partners that constitute SHIRCO Consortium (SHIRCO, financial institution, fellow farmers, Input supplier)?

……

……

……

……

……

59. What needs to be done differently to improve your relationship with partners under the consortium?

Partners	Suggested Solution
Buyer	
Fellow farmer	
Financial Institution	
Input Supplier	

Thanks for your cooperation

KEY INFORMANT INTERVIEW (KII) GUIDE: TANZANIA

ASSESSMENT OF IMPACT OF CONSORTIUM APPROACH IN FOOD VALUE CHAINS DEVELOPMENT ON INCOMES OF SMALLHOLDERS FARMERS IN EAST AFRICA

TARGET RESPONDENTS: The Registered Trustees of Kilimo Trust (KT), Agricultural Research Institute (ARI – Uyole), Ministry of Agriculture Training Institute (MATI) – Competitive African Rice Initiative (CARI) project and Khebandza Marketing Company Ltd.

Name of Organisation_____

S/N	ISSUES FOR EXPLORATION	KEY AREAS OF INTEREST
1	**Background of the Consortium Approach**	1. Conceptualisation of the project – what inform the project? 2. Were multistakeholders involved in the project design? Who and How? 3. What role did they play in the project design phase? 4. How realistic are the Project Objectives? 5. How relevant is the project to your development program and focus? 6. What did the reception look like (by farmers, lead firms, households, community heads, local authority etc.?
2	**Implementation of the REACTS project**	1. What are your roles and responsibilities in implementing the REACTS project? 2. To what extent have you performed these roles specifically to smallholder farmers? 3. Do you think the project was efficiently implemented? 4. What unexpected impacts were noticed in the implementation? 5. What were the unexpected impacts noticed compared to the conventional approach? 6. Were bottlenecks encountered in the implementation process? 7. At what stage did you encounter the bottlenecks? 8. What were the causes? 9. What were the actions taken to overcome those bottlenecks? 10. What is the suggestion towards avoiding such in future projects? 11. What lessons were learnt from the implementation so far?
3	**Market Linkages**	1. What are the interventions put in place to support/enhance market-responsiveness and competitiveness? 2. Who are the identified and profile key off-takers/lead firms engage with the projects for linking smallholders to regional cross-border trade?

		3. What are the identified market challenges in the REACT project? (**Specify in terms of Local, EAC or International**) 4. What are the market risks noticeable so far? 5. What market risks are likely to occur in the REACT project in the foreseeable future? 6. What are the agreed plans for dealing with operational obstacles in cross-border trade? 7. Has there been an establishment of strong network for cross-border trade within the ministries and other institutions responsible for trade? 8. What measures are in place to ensure smallholder farmers are not shortchanged?
4	**Gender Equality: Women and Youth Empowerment**	1. Any specific effort (in design) targeted towards gender equality and women and youth empowerment? 2. Has the efforts achieved the intended purpose? (What are the achievements specifically)? 3. What are the gender-based issues envisaged and incorporated in the REACT project? 4. State the gender issues identified in the REACTS project so far? 5. Did any of the activities give rise to unintended consequences on gender equality, women and Youth empowerment? 6. What do you think can be done or what future adjustments are needed in respect of the project design? 7. To what extent is the Approach helping to mainstream gender especially women and youth in empowerment, particularly in access to land, finance, decision making and entrepreneurship?
5	**Environment Concerns and Climate Change Adaptation**	1. What are the issues of climate change effects envisaged by the REACTS projects? 2. Has there been climate change effects noticed in the REACTS project so far? 3. What are the effects on the smallholder farmers and rural poor? 4. What is the specific climate change adaptation activities put in place? 5. Are there activities targeted towards enhancing food safety concerns? 6. What is the knowledge of smallholder farmers on the issues?
6	**Partnerships**	1. To what extent did IFAD participate in the design process? 2. Has IFAD, together with the Government, contributed to planning an exit strategy to ensure continued funding and sustainability of results? 3. What level of participation in the project design would you have suggested to be included at the conceptualization stage? 4. Has the Government been fully supportive of project goals? 5. How has the partnership experience among the actors been so far? 6. What areas need improvement in the partnership among the actors?

7	**SWOT Analysis**	1. What do you think are the Strengths, Weaknesses (internal), Opportunities and Threats (external) to the project? 2. What are your Success factors? 3. Please mention the constraints that need to be overcome? 4. What are the ways of overcoming the constraints? 5. In what ways do you think the REACTS project can make impact to national food security?

KEY INFORMANT (KII)/FOCUS GROUP DISCUSSION (FGD) INTERVIEW GUIDE: TANZANIA

TARGET RESPONDENTS: Input Suppliers, Lead Firms Partners in Tanzania and Market Actors
Name of Organization:_____

1. How did you come into the REACTS project? Please mention how you got to know of the REACTS project?
2. How is your experience so far?
3. What are your responsibilities in the Value chain?
4. What are the things you supply **to/buy from the farmers**?
5. How was the price determined?
6. What are the market requirements for the commodity you buy from the farmers?
7. What kind of support is needed to be consistent with the relationship between you and the farmers?
8. Has there been training organized for firms by REACTS project? How has the skills acquired help in meeting your market requirements?
9. Is the REACTS project leaving the door open for crowding - in of other actors?
10. Do you think the way the REACTS project is structured puts some actors at a disadvantage position? How?
11. Are you able to meet the demand for inputs by the farmers?
12. Are there formal contractual agreements between the farmers and Off-takers?
13. How is the delivery mechanism of supply to farmers structured? And what are the factors that influence the delivery mode?
14. How responsive and timely is the delivery of supply to farmers?
15. Are the farmers able to meet your demand for commodity?
16. Are you able to meet the demand of the up-takers/lead firms?
17. What is the average supply of the farmers produce or commodity per annum (quantity in tons)?

18. What is the average demand by the up-taker per annum (quantity in tons)?
19. Who do you supply to at present?
20. What are the other potential market/demand sources?
21. Giving unlimited availability, can you give an estimate of potential demand per annum (quantity in tons)?
22. What storage arrangement do you have for warehousing commodities?
23. What is the capacity of the warehouse (in tons)?
24. Has there been increase, decrease or no change in supply capacity during the project?
25. What was the capacity supplied last year (quantity in tons)?
26. What is the current capacity supplied this year (quantity in tons)?
27. How is the **quantity of seed** bought **before** and **after** the REACT project? (a) higher (b.) lower (c) unchanged
28. How many farmers were reached through farmers-producer groups?
29. What have been the benefits of the approach compared to other conventional value chain approaches?
30. How has it created or supported micro businesses?
31. How can it improve youth and women participation in agribusiness?
32. What are the Strengths, Weaknesses, Opportunities and Threat of this project?
33. What are your Success factors?

KEY INFORMANT (KII)/FOCUS GROUP DISCUSSION (FGD) INTERVIEW GUIDE: TANZANIA

PARTICIPANTS: TARGET RESPONDENTS-FARMERS

1) What do you think about the Regional East African Community Trade in Staples (REACTS) project and what was your main attraction?
2) In **what ways** has the REACTS project **increased your access to credits?**
3) In **what ways** has the REACTS project **increased your access to seeds?**
4) In **what ways** has the REACTS project **increase your access to fertilizer?**
5) In **what ways** has the REACTS project **increased your access to technology?**
6) In **what ways** has the REACTS project **increased your access to Good Agricultural Practices (GAPs)?**
7) Through the REACTS project, how has **collective selling improved your income**?
8) Through the REACTS project, how has **aggregator market system linkage improved your income**?
9) Through the REACTS project, how has **delivery mechanism improved your income?**
10) Through the REACTS project, how has **payment modalities improved your income?**
11) Through the REACTS project, how has **access to inputs improved your income**?
12) What are your plans to continue the agribusiness after the REACTS project timeline?
13) Please tell us your knowledge of food safety? Have there been incidences where the buyers complain or reject your commodity due to food safety issues? How did you respond to that?
14) Do you think the project has helped you to identify profitable and major local, EAC and international markets outside EAC?
15) Do you think the project has helped you to meet the market requirements (local, EAC and Countries outside EAC) for the major commodity produce?
16) What are the **most common markets channels** or buyers **used** and **why**?
17) Is the **market demand beyond current production capacity**? What are you doing to meet the capacity?
18) What are the **major challenges** faced during the **production of your commodity?**
19) What are the **major challenges** faced during the **marketing of your commodity?**
20) The **challenges you encountered in the project**, what **measures have you taken to overcome** them?
21) What are the **recommendations** to overcome these identified challenges?
22) What are the **main sources of income on the average** in a normal year?
23) Has this recently changed, why and how?
24) What income differences are there?
25) After feeding, if there is surplus income, what do people use it to buy? List. Why is that so?
26) Are there **challenges the project has brought** to farmers and the community? **Please mention**
27) What are the things you will rather want the project to do differently?
28) Please **state the impacts** the REACTS projects has made in your lives and the community?
29) What are your coping strategies in an event of climate change effects?