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CARI

Competitive African Rice Initiative

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Competitive African Rice Initiative (CARI) Project

Tanzania Report






Report July 2014 to June 2018

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TECHNOSERVE
50 YEARS OF BUSINESS SOLUTIONS TO POVERTY

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CARI
SHAMBA DARASA LA MPUNGA
KUJI CHA. MABADAGA
KIKUNDI CHA. INUKA TUSONGE MBELE
AINA YA MBEGU. JET GOLD & SARO 5
MBOLEA YA KUPANDIA. YARAMILA CEREAL
MBOLEA YA KUKUZIA. YARAVERA AMIDAS & YARALIVA NITRABOR
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LIST OF ABBREVIATIONS

BRELA	Business Registration and Licensing Agency
CARI	Competitive African Rice Initiative
EAC	East Africa Community
ERPP	Expanding Rice Production Project
FBOs	Farmers Business Organisations
FBS	Farmer Business School
GAP	Good Agricultural Practice
GPHH	Good Post-Harvest Handling
MFCL	Musoma Food Company Limited
MGF	Matching Grant Fund
MRC	Mbarali Rice Consortium
NMB	National Microfinance Bank
PBR – DR	Promoting Bahi Rice in Dodoma Region
PPR	Program progress review
RCT	Rice Council of Tanzania
RIMAH	Rice Markets Hub in Rufiji
RUDI	Rural Urban Development Initiatives
SCF	Smallholder Crop Finance
SHIRCO	Southern Highland Rice Consortium
SHYRICE	Shinyanga Rice for Competitive Market
SRI	System of Rice Intensification
SURIPRO	Sustainable Rice Production in Singida
TADB	Tanzania Agricultural Development Bank
ZANRICE	Strengthen Rice Value Chain in Zanzibar

1. INTRODUCTION

The Competitive African Rice Initiative (CARI) is a Pan-African project implemented in Tanzania, Burkina Faso, Ghana and Nigeria to improve local rice productivity, production, and marketing, in order to improve the livelihoods of 120,000 smallholder rice farmers. CARI is a four-year partnership-based development project funded by the Bill and Melinda Gates Foundation (BMGF) and the German Federal Ministry of Economic Cooperation and Development (BMZ). The implementing agency is Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). In-country, GIZ is implementing the programme in Burkina Faso and Nigeria, Technoserve and John A. Kufor Foundation are implementing in Ghana and Kilimo Trust is implementing CARI in Tanzania.

The role of Kilimo Trust is to select, mobilise, and allocate resources to Partner consortia; allocate Matched Grant Funds (MGFs) designed to trigger further private investment; provide technical backstopping support and expertise in market linkages and improvement of milling efficiency; and create alliances with other value chain actors for implementation. Kilimo Trust also supports capacity building among smallholders and national organisations which advocate for an enabling socio-economic environment in which the rice sector can flourish.

This report describes the CARI project progress in Tanzania from inception in July 2014 up to June 2018. In Tanzania, CARI is designed to reach 30,000 smallholder farmers, including at least 9,000 (30%) women farmers, whose daily income is below US$2. The approach focuses on rice millers/processors as the entry point for interventions in the rice value chain and engages with selected Partner consortia comprising rice grower groups and processors/millers.

1.1. Background

Rice is the fastest growing food source in Africa. In Tanzania, rice is now the second most important food crop after maize. Average rice consumption exceeds 25 kg/person/year and is rising, as it is in most African countries. Consumption is higher in urban areas. In 2011, consumption of milled rice was 1.3 million MT[1]. Since 2000 and 2010 annual demand has grown at 4.6% per annum and this is expected to grow by 54% in 2020 due to population growth, urbanization, changing consumer preference and economic development (Kilimo Trust, 2017A). The national rice consumption is currently estimated at 1.8Million MT and is projected to reach 2.6million MT by 2025, and rice is one of the strategic crops in food security and incomes

[1] Stryker, Study of Policy Options for Increasing Tanzanian Exports of Maize and Rice in East Africa While Improving Its Food Security to the Year 2025 (2011). Also Coalition for African Rice Development (CARD) http://riceforafrica.net/

for smallholder farmers. Rice is the fastest growing food source in Africa. Since 2000 and 2010 annual demand has grown at 4.6% – faster than anywhere else in the World and far outstripping the sub-region's population growth of 2.6%. This trend is predicted to continue mainly due to population increase, urbanisation and changes in consumption patterns. The leading rice producing areas are Shinyanga, Tabora, Mwanza, Mbeya, Rukwa, Arusha and Morogoro.

There is considerable potential to increase rice production and productivity to meet the increasing demand in both national and regional markets for high quality local rice varieties, but there are a number of constraining technical and institutional factors.The main problem of the sector is low competitiveness of the locally produced rice, especially in terms of price and quality. The key causes of this problem include: (i) high costs of production as a result of low average yields; (ii) Limited product development due to poor processing quality, packaging and branding; (iii) inefficient post-farm gate trading and marketing that add costs to the consumers while lowering prices for farmers; (iv) inefficient milling and processing caused by both limited supply of raw materials and the unstructured trading, also adding to costs to the consumer; (v) limited operationalization of the EAC free trade area; and (vi) importation of rice.
The National Rice Development Strategies (NRDS) focused more on increasing productivity with no marketing strategy for capturing surplus produce as a result in good season farmers experience problems with marketing of paddy. On the other hand, non-tariff barriers imposed by government are also a constraint to farmers during bad seasons and thus disincentive for value chain actors to invest. This has caused limited trade among EAC countries and thus failing to tap the existing potential for rice self-sufficiency in the region.

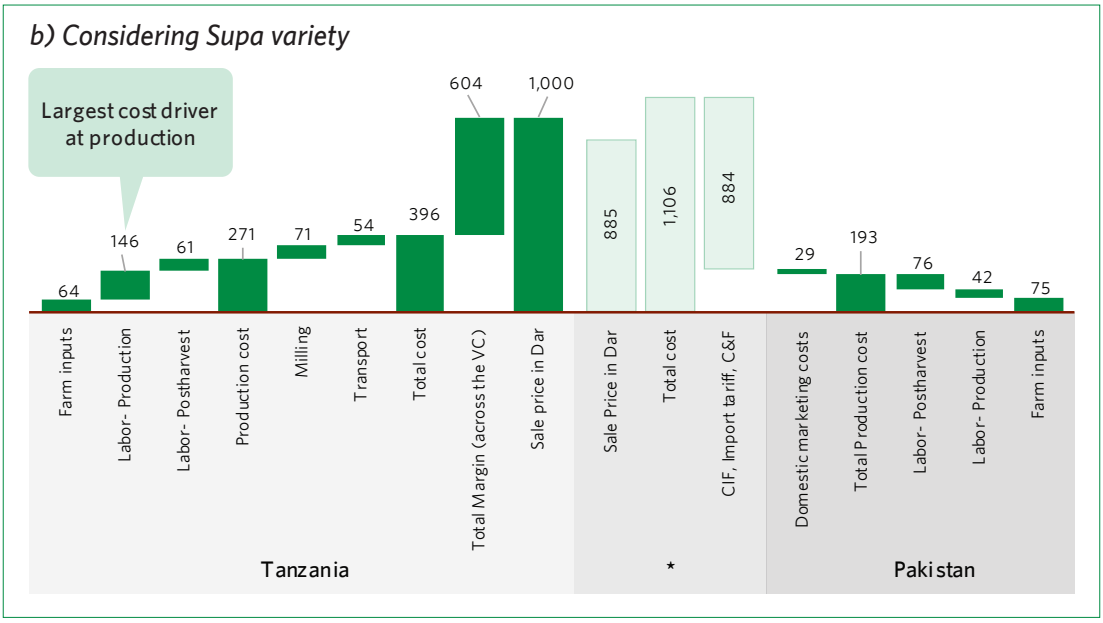

Figure 1: Rice cost of production in Tanzania compared with Pakistan rice causing low competitiveness

1.2. Objectives of CARI

CARI is an effort to address constraints that hinder development of the rice industry in Tanzania. The aim of the project is to work with rice processors and traders who are value chain anchors and provide the much-needed market "pull" to stimulate smallholder rice farmers to increase their productivity and production. Secondary beneficiaries are rural service providers, such as agronomic input dealers, suppliers and operators of agricultural machinery. The project is designed to foster cooperation with public and private sector partners to form effective and innovative Public Private Partnerships (PPP) in the rice sub-sector and seeks to strengthen existing sector alliances and develop new ones at national and regional levels. CARI approach focuses on interventions that will meet four main objectives. These are used as a basis for reporting progress.

Objective 1	Objective 2	Objective 1	Objective 1
Increase the productivity and quality of paddy rice based on sustainable and competitive rice production systems.	Increase efficiency of local rice sourcing, processing and marketing through structured value chain linkages, improved technology and process management	Improve access to financial services for all value chain actors	Improved enabling environment at national and regional level including the policy framework and strengthening of rice sector initiatives.

CARI project is contributing to the Government's commitment to address food and nutrition security issues as reflected in the Agricultural Sector Development Plan (ASDP) thus contributing to the National Agricultural Policy (2013); Long term Perspective Plan (LTPP); National Five Year Development Plan (FYDP) 2011/12-2015/16 and 2016/17 – 2021/22.

1.3. Approach

CARI is designed to foster cooperation with public and private sector partners to form effective and innovative Public Private Partnerships (PPP) in the rice sub-sector and seeks to strengthen existing sector alliances and develop new ones at national and regional levels. CARI in Tanzania encourages Partners to form consortia among those working in the rice value chains that are committed to implementing a business model that achieves increased profitability for all actors involved. The approach is to provide Matching Grant Funds (MGF) to selected Partners as a development incentive and to ensure high ownership and commitment. BMGF provides the seed funding for the MGF scheme. The grants are a means of triggering additional private sector investments to upgrade less competitive business models and to up-scale existing successful ones.

Kilimo Trust's role is to mobilise and jointly allocate resources, provide technical backstopping and expertise, create alliances for implementing projects, and set up mechanisms for monitoring and evaluation for all MGF sub-projects. Kilimo Trust will also support capacity building among local organisations, such as the Rice Council of Tanzania (RTC), to effectively advocate among decision-makers for an enabling environment in which the local rice sector can flourish. The Trust is providing expertise all along the rice value chain. Rice millers are the key anchor partners linking consumers with service providers and producers. Building relationships between rice farmers and rice millers so they can work for mutual benefit as equal agri-business partners forms an important part of this initiative.

The project will contribute to these objectives through interventions that are market-driven, implemented/led by the private sector, and focusing at enhancing competitiveness at every stage of the value chain, using the Consortium approach supported by a Matching Grant Fund. CARI focuses on rice millers/processors as the entry point for interventions in the rice value chain. Partners are expected to form consortia and submit proposals for consideration through a competitive process.

2. ACHIEVEMENTS

2.1. Objective I: Increase the productivity and quality of paddy rice

2.1.1. Contracting Partners and farmers engaged

CARI was implemented through seven consortia led by private rice millers in the Mainland Tanzania and one led by a pubic organisation (Table 1). The Partnerships are spread across the country in areas suitable for rice production (Figure 2). A total of 44,538 farmers were engaged into the project and 31,118 signed supply contracts with millers to supply paddy out of which 18,626 farmers integrated into the project were women representing about 41.2% of the total integrated farmers.

Partner	Consortium* and Districts**	Area target (ha)	Farmer target	Farmer Archieved
Southern Highland Rice Consortium (SHIRCO)	**Raphael Group Ltd,** Farmers, YARA Tanzania, Agriseed Technologies, Rogimwa Agrochemical Company (Kyela, Momba, Mbarali, Busokelo)	5,201	6,159	6,154
Promoting Bahi Rice in Dodoma Region (PBR – DR)	**Kimolo Super Rice,** Farmers, YARA Tanzania, Bahi District Council (Bahi)	3,722	4,634	5,115
Sustainable Rice Production in Singida (SURIPRO)	**Biosustain Tanzania Ltd,** Farmers, Ikungi District council (Ikungi)	5,246	5,229	5,362
Rice Markets Hub in Rufiji (RIMAH)	**Mamboleo Farms Ltd,** Farmers and Namburi Seed Company (Ikwiriri)	2,750	5,500	3,816
Strengthen Rice Value Chain in Zanzibar (ZANRICE)	**Ministry of Agriculture Natural Resources Livestock and Fisheries** and Farmers (Kilombero; Kaskazini B, Zanzibar West District, Kaskazini Unguja)	1,692	4,573	8,565
Shinyanga Rice for Competitive Market (SHYRICE)	**Musoma Food Company Ltd,** Farmers, (Mbogwe, Igunga, Kahama, Shinyanga Rural); Kibo investments Ltd, Rural Urban Development Initiatives (RUDI)	10,447	5,521	5,733
Mbarali Rice Consortium (MRC)	**G2L Company Ltd,** Obo Investment Ltd, Farmer AMCOS Apex (Mbarali)	6,866	6,000	6,564
Smallholder Crop Finance (SCF)	**Kilombero Plantations Ltd,** Farmers Apex organisation	1,875	2,000	3,229
	Total (Initial target 30,000)		**39,616**	**44,538**

* Lead firm in bold **Districts in bracket

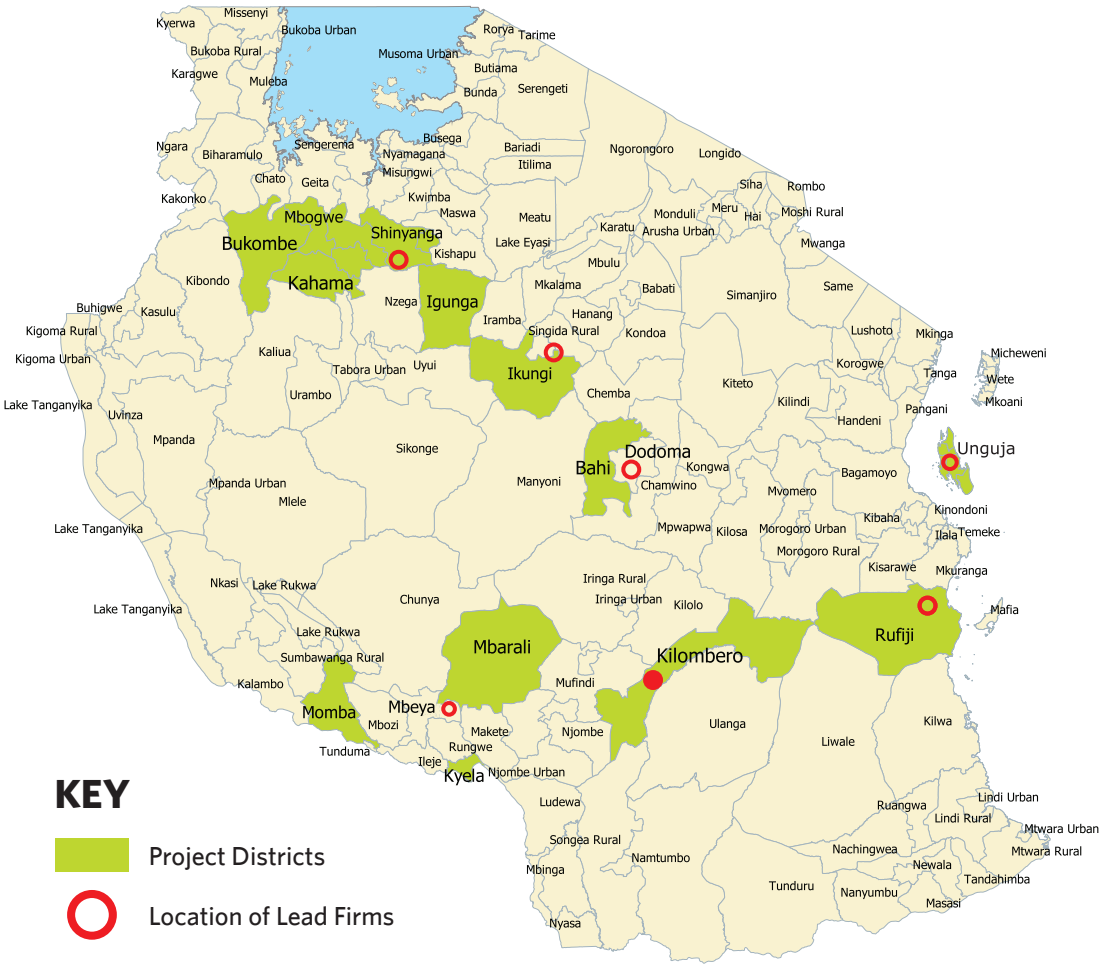

Figure 2: CARI Partnership intervention districts in Tanzania

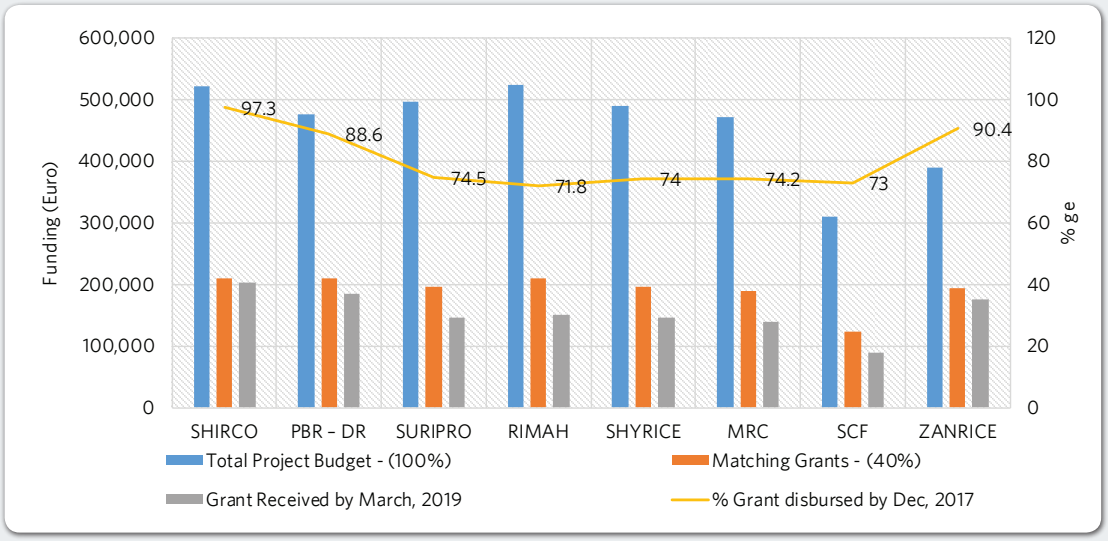

Figure 3: Project Partner budgets, MGF allocated and the amount received by March 2018

Table 2: No. of target farmers and contracted

Consortium	Targeted Farmers	No. of FBO engaged	Farmers integrated	No. of Female registered	%ge registered female SHF	Farmers Contracted	%ge registered SHFs
RGL	6,159	30	6,154	4,752	77.0	6,357	99.9
KSR	4,634	7	5,115	1,737	33.9	4,891	110.4
SURIPRO	5,229	15	5,362	1,658	30.9	5,161	102.5
RIMAH	5,500	194	3,816	1659	43.4	855	69.4
ZANRICE	4,573	87	8,565	4181	49	1,670	62.1
SHYRICE	5,521	14	5,733	1,920	33.5	5,521	103.8
MRC	6,000	6	6,564	1,549	23.5	5,807	109.4
SCF	2,000	7	3,229	1170	36.2	856	161.1
Total	39,616	360	44,538	18,626	41.2%	31,118	102.3

2.1.2. Evidence of improved yields

There was significant increase in yield over the baseline average yield of 1.8 MT/ha. At the end of the project average yield reached 3.8 MT/ha (4.06 Mt/ha - rain-fed with supplementary irrigation and 3.6 Mt/ha -purely rainfed). The average yield target achieved by the project was 97% of the targeted yield but more than double from the baseline. This was mostly due to supplementary irrigation. Rainfed yields were much lower, ranging from 1.35 MT/ha to 4.5 MT/ha.

Table 3: Average rice yields and targets Yield in MT/Ha

Consortium	Overall Targeted Yield in Mt/ha	Production System, 2017		Average Yield	%ge achieved
		Purely rain-fed	Rain-fed with supplemental irrigation		
SHIRCO	3.6	4.05	3.53	3.8	105.6%
PBR-DR	4.5	1.35	1.82	1.6	35.6%
SCF	5.0	3.06		3.1	62.0%
MRC	3.0	3.97	3.65	3.8	126.7%
RIMAH	3.0	6.13	6.19	6.2	206.7%
ZANRICE	6.0	2.29	3.7	3.0	50.0%
SURIPRO	2.8	3.37		3.4	121.4%
SHYRICE	4.0	3.92	4.46	4.2	105.0%
Total	3.9	3.6	4.06	3.8	97.4%

Success story: Smallholder farmer increases productivity through GAP training

Flora Thomas Kapela is 49 years old married woman with three children (one girl and two boys), living in Mwanzugi village in Igunga district working under Shyrice consortium. Flora is a member of Mwamapuli AMCOS owning 2.2 hectares for growing paddy in Mwamapuli irrigation scheme. Flora says that "I have been producing rice for more than 20 years. Before CARI I could only get 60- 80 bags of paddy per season."

"But since 2016 when Musoma Food Company an off-taker introduced CARI project, we were trained on system of rice intensification (SRI) as one of the modern good agricultural practices. We were trained on proper selection and application of improved seeds of TXD 306, proper application of inorganic fertilizer, herbicides and water management and farm levelling in our farms. In the first season 2015/16, it was a bit difficult for most of us to believe that we can improve our harvest by adopting this new technology of SRI. But through established demo plots we were able to practice and witness the yield from that small area, I was really surprised."

Demo plots in Mwamapuli and Nyida irrigation schemes which were used to train farmers on good agricultural practices for paddy production.

"In 2016/17 production season, I decided to adopt new technology so that I can harvest more as I witnessed in demo plots. I made all important preparations as learned from the demo plot and followed all given good agricultural practices. One of the remarkable practices which was challenging me, was the use of little water in the field at early stage of growing paddy as I was used to filling too much water in my farm".

Flora adopting new farming technology learnt from CARI project (as little amount of water is applied in the field) in 2016/17 production season.

"Finally, in this season 2016/17, I managed to expand my land from 2.2 ha to 2.8 ha, and subsequently attain increased harvest from initially 60 bags to 325 bags (80 kg each). I am very proud for setting this new record in my life, I am really grateful to CARI project and Musoma Food Company, they have taken me to the higher level where I can enjoy and regard farming as an important economic activity. With the use of combine harvester, I was able to reduce huge loss of paddy grain in the field, but the cost and harvesting workload have been reduced."

A combine harvester harvesting Flora's paddy in Mwamapuli irrigation scheme

Flora is now respected as one among few women who are big paddy producers in Mwamapuli scheme, the achievements of paddy production are well reflected in Flora's life. She testifies that "I am now capable of paying school fees for my three children. Even though I am already living in a decent house but due to this high yield of this season, I am planning to build a new modern house for my family. I already own power tiller and motorbike which help me in daily and agricultural activities."

Flora on her motorbike and in front of a bulk of 325 bags of paddy harvested from her 2.8ha in 2016/17 production season

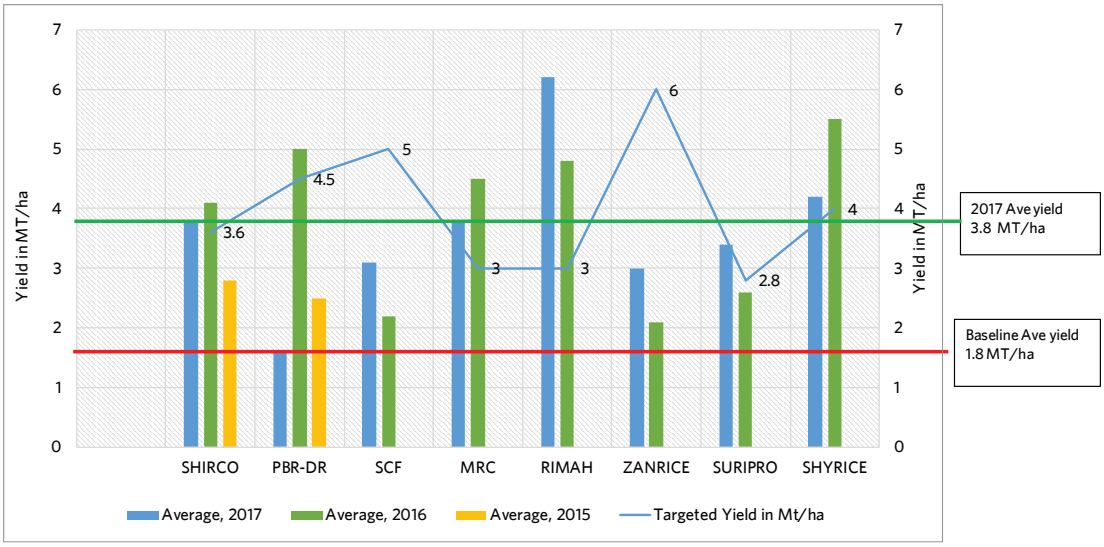

Figure 4: Average rice yields and targets for wet-season

The project targeted to raise smallholder farm profits from USD 174/ha (baseline) to USD 633/ha. CARI partners reported an average profitability of USD 838/ha with ZANRICE consortium raising up to USD 1,184/ha surpassing all other partner's profitability. This is due to a premium price that Zanzibar farmers are getting from their buyers. Also, the government of Zanzibar through the Ministry of Agriculture and Natural Resources has a system of buying back paddy from farmers partly as seed hand out for the next season. Zanzibar has two paddy production seasons; plus, efforts made to renovate their irrigation infrastructure.

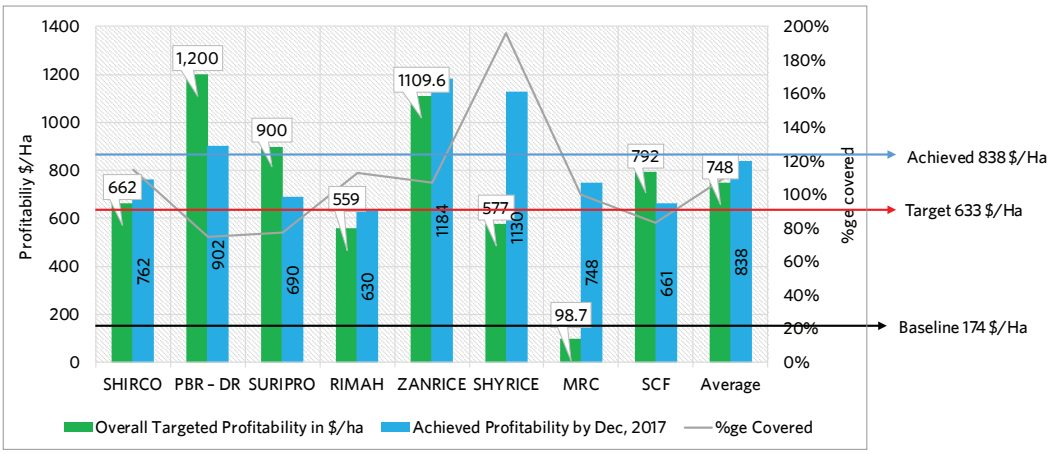

Figure 5: Gross margins per hectare for irrigated (supplementary and total) and rainfed rice production.

2.1.3. Good agricultural practices and Post-harvest handling

Good Agricultural Practices (GAPs) and Good Post Harvest Handling (GPHH) practices and standards were introduced to smallholder farmers to produce quality paddy in order to meet the product quality standards expected in the commercial rice market. The project targeted to train up to 400 extension staff and lead farmers, and up to 30,000 farmers by 2017. Until end of the project, June 2018, a total of 287 extension staff and lead farmers were trained in GAPs who in turn trained 38,970 (102%) of target farmers.

Demonstration plots complement farmer training and show what can be achieved in practice with careful crop agronomy and management. The project target was to establish 210 paddy demonstrations spread across the Partnerships. A total of 698 paddy demo plots were established which was 481% of the target. Only RIMAH and ZANRICE managed to establish dry season demo plots. RIMAH exceeded the target because many farmers hosted mini-demo plots to deal with the challenges of wide spread of farmers over a large area in the Rufiji valley. Close to 80% of those trained were observed putting their GAP training into practice, such as preparing the land for cultivation, managing water, selecting seeds, preparing nurseries, transplanting at recommended spacing, timely weeding, and fertiliser and pesticide use (refer data in Table 11 Annex I).

Figure 6: (a) Nursery preparation at RIMAH (b) Women line transplanting at Nganyanga (c) Farmers learning at demo plot in SCF-Kilomero (d) Weeding using weeders in Zanzibar

For good postharvest handling practice (GPHH), a total of 38,278 farmers were trained in GPHH, this is 128% of the project target of training 30,000 farmers. Yield survey conducted showed that close to 78.5% of the farmers have adopted GPHH techniques which leads to higher and better-quality paddy sold to private companies.

2.1.4. Promoting labour-saving technologies

Labour-saving technologies are expected to reduce drudgery, time spent on farming operations, and post-harvest losses. A mechanisation study was undertaken to assess why smallholders seem reluctant to take up labour-saving devices for rice cultivation. The study aimed to identify the mechanisation needs for rice growers, assess the domestic availability of suitable mechanisation solutions, validate possible mechanisation packages, and carry out economic analyses of potential business models and identify financial needs and financial sources for mechanisation service providers.

(A) PUSH-WEEDERS

In May 2016, farmers tested five prototypes of push-weeders designed by Africa Rice in the Segeni Irrigation scheme in Rufiji, Igunga and Zanzibar (Figure 6) to reduce labour required in weeding of paddy. Farmers, mostly women, preferred the simple rotary weeder.

Figure 7: (a) Weeding using push-weeder at Segeni (b) Weeding at Igunga scheme

(B) REDUCING HARVEST AND POST-HARVEST LOSSES USING COMBINE HARVESTERS

Combine harvesters and improved post-harvest handling skills have reduced post-harvest losses by 90%. For example, under SHIRCO consortium in Mbarali District, farmers experienced reduced losses of 2 bags in 2016, compared to 3 bags in 2015 during harvesting because of use of small combine harvester.

Figure 8: Combine harvester at Mamboleo Farm Ltd, Rufiji

2.1.5. Farmer business schools training

Farmer Business Schools (FBS) complement technical training by improving rice growers' entrepreneurial and management skills and addressing supply chain issues faced by smallholder farmers. A total of 83 trainers were trained as trainers of trainees. In-turn these trained a total of 31,642 farmers under the project surpassing the targeted number of trained farmers by 101%.

Table 4: Farmer business school trainings up to March 2018

Consortium	Total Trainers	Active trainers	Overall target	Trained,2016	Trained 2017	Trained 2018
SHIRCO	13	8	3,080	1550	3,098	2,960
PBR - DR	8	5	2,317	320	2,370	2,370
RIMAH	5	5	2,750	0	2,546	2,778
SURIPRO	13	13	5,229	120	4,588	4,588
ZANRICE	9	7	4,573	333	2,232	2,355
SHYRICE	12	10	5,521	90	5,803	5,998
MRC	13	9	6,000	180	5,478	5,581
SCF	10	8	2,000	284	4,217	5,012
Total	**83**	**65**	**31,470**	**2,877**	**30,332**	**31,642**

FBS training under different consortia partners

2.1.6. Knowledge products produced and disseminated

To support farmer knowledge management, 21,821 GAP manuals, 21,341 GPHH books, 32,580 FBS manuals, 85 FBS posters and 29,840 FBS certificates were developed, customised, printed, shared and distributed to all 8 Partners (refer data in 13 Annex I).

2.1.7. Study tours, learning and exchange visit

Study tours enable farmers to see and learn from the experience of others facing similar problems and help to build producer networks across the sub-sector. CARI organized study visits to Thailand where partners visited the Better Rice Initiative (BRIA) in 2016 and 2017 to exchange knowledge, skills and ideas between CARI and BRIA projects. CARI and BRIA Projects are Rice Value chain projects implemented by GIZ. In this study visit, Tanzania was represented by three partners from SHIRCO, SURIPRO, RIMAH, G2L, PBR-DR, and ZANRICE consortia. The team drew several lessons from different rice value chain actors of Thailand and on return they shared information with other partners who are implementing CARI project. Among the knowledge learnt is organic farming for high value aromatic rice, like Super India: planting legumes as a complementary crop in rotation, drying paddy using air pumps, and coping with the issues of growing rice for export. Other exchange visits were organised in the country where farmers from Bahi irrigation scheme visited Mbarali to learnt about the System of Rice Intensification (SRI).

2.1.8. National and Regional learning Events

Several learning events was organised and attended by project partners to share knowledge and experience during implementation of CARI. The main focus areas were on Policy environment; improved milling efficiency; access to finance for rice value chain actors. Among the key lesson learnt were:

i. Input financing makes farmers eager to know the effective usage of them, thus making them prioritize the GAP trainings and other trainings hence improving productivity and quality of paddy

ii. Working capital financing assures the business between Off-takers and farmers. Farmers quickly get paid after sell of the produce.

Two national learning events was conducted in country with main objective of the learning events was to bring together CARI value chain consortia to review the progress, key successes, challenges, experiences and plans for future interventions.

2.2. Objective II: Improve sourcing capacity through structured markets

2.2.1. Collective marketing of paddy through supply contracts

Farmer Business Organisations (FBOs) are an essential part of the institutional structure which links producers in groups with rice millers and others in the rice value chain actors.

CARI project adopted a contract farming model to increase efficiency of local sourcing of paddy. One master trainer was trained in contract farming by GIZ. The master trainer managed to train 11 extension staff. The training aimed at increasing capacity of partners to administer contracts with farmers. Until the end of the project MF partners signed contracts with 31,118 (98%) with 104 farmer groups for aggregation and supply of paddy.

A total of 176,770 MT of paddy was collectively marketed and supplied to the processors over the life of the project against the targeted volume (117,828 MT).

Consortium	Target	Cumulative Paddy (MT) Sourced by MGF partners since inception		Total Volume Paddy from all Sources	%ge Covered
		CARI Farmers	Other source		
SHIRCO	31,920	56,769	26,841	83,610	262%
PBR – DR	16,000	12,822	10,618	23,440	147%
SURIPRO	16,000	2,901	0	2,901	18%
RIMAH	5,200	607	1,638	2,245	43%
SHYRICE	20,800	16,678	6,455	23,133	111%
MRC	13,241	12,863	3,549	16,412	124%
SCF	10,167	1,180	23,770	24,950	245%
ZANRICE	4,500	76	4	80	2%
Total	117,828	103,896	72,875	176,770	119%

Figure 9: a) CARI farmers with extension officer assessing paddy before harvest, b) Truck uploading paddy, c) Paddy in store

2.2.2. Rice quality

The eight (8) Lead Firms (RGL, MFL, BCL, Faki, KPL, MFCL, G2L & KSR) have confirmed that they have received paddy that is in line with market requirements. Monitoring of attributes related to quality was benchmarked against EAC standards for milled rice. They reported that the quality of paddy bought from contracted farmers has improved with respect to: i) Moisture contents ii) foreign matters content, iii) colouring, and iv) percentage of broken grains. The processors produced several rice products such as Bran, broken rice, also different quality rice in grades (i.e. 1, 2 and 3) which are consumed by customers depending on their preferences. Table 7 shows rice quality analysis conducted by millers after milling 1 MT.

Parameters	EAC	RGL	KSR	Musoma Food Ltd	G2L	Mamboleo	KPL	Zanrice	BCL
Whole grains (%)	75 - 95	90	96.5	85	75	78	65-75	65	70
Broken grains (%)	5 - 25	5	3.5	15	15	22	20	20	5
Coloured (%)	Shall be white or creamy	0	5	0	5		5 - 15		
Foreign contaminated (%)	0.1 – 0.5			0.4					
Moisture contents (%)	12 - 14			11-13					

It should be noted that Zanrice (Faki enterprise) and Mamboleo Farm Limited experienced high percentage of broken rice of the dry season paddy being harvested in Dec/January which is the start of the long rain season which pose challenges in drying of paddy adequately and timely.

2.2.3. Expanding the market using trading platforms

Processors under CARI project were encouraged to join and sale rice through G-soko platforms being promoted by EAGC. The platform aims to regulate and administer an electronic network of automated grain bulking/aggregation centres and certified warehouses, linked to a virtual trading platform. Raphael Group registered for this online platform in March 2016 and EAGC have trained their staff to use it. Raphael Group has exported more than 200MT of rice to Zambia, Malawi, and Zimbabwe.

Furthermore, Zanzibar Rice consortium managed to establish an ICT-based marketing platform that registered farmer groups and other stakeholders into the platform database.

2.3. Objective III: Improving access to financial services for all value chain actors served

2.3.1. Access to finance by FBOs

CARI aimed to improve access to finance for lead firms and smallholder farmers through their FBOs. Access to finance by smallholder farmers has been a challenge due to uncertain weather conditions and low capability of SHFs to meet eligibility requirements by banks. Key eligibility requirements include i) proper record keeping, ii) registered FBOs and iii) a clear understanding of loan terms and conditions and assurance to market access. Only 14,847 farmers have benefited from input financial arrangements, which is 72% of the project target of 20,634 farmers. A total of USD 1,197,646 worth of inputs credit was accessed by smallholder farmers. The finance was mainly from NMB and other farmers especially in Singida under the SURIPRO consortium received inputs from government subsidy (NAIVS) program (Table 7 below). Processors initially worked as a conduit to chanel credit and assured Banks of repayment as they provide market to farmers which worked well under the consortium led by Raphael Group Limited in Mbeya, Musoma Food Company in Shinyanga and G2L Company in Mbarali.

Unfortunately, farmers in Kilombero under the consortium led by KPL due to weather changes that caused lower yield and experienced low repayment of the loan and thus NMB refrained from giving another. Generally, banks were reluctant to finance smallholder farmers who are under rainfed system and risk averse. It is worth noting that two-year period is short for achieving considerable impact in financial access due to nature of the service. Normally an increase in access to working capital follows later (in the second or third round) an increase by lead firms to FBOs. Also, the direct engagement of banks with FBOs increases only when lasting business linkages have been established.

Consortium	Source	Targeted farmers	Cumulative No. of Farmers	Type of Credit Accessed	Total Credit Amount ($) since inception
SHIRCO	NMB & Offtaker (RGL)	5,000	2,680	Inputs & operations	532,786
SCF	NMB	4,634	516	Inputs & operations	321,314
SURIPRO	NAIVS	3,000	4,612	Inputs	236,610
SHYRICE	Offtaker (MFCL)	n/a	2,400	Inputs	22,870
MRC	Offtaker (G2L)	2,500	3,387	Inputs	68,400
RIMAH	Offtaker (MFL)	5,500	1,252	Inputs	15,666
Total		**20,634**	**14,847**		**1,197,646**

2.3.2. Access to finance by Off-takers and other value chain actors

CARI MGF partners received a total of USD 2,793,049.3 as working capital from financial institutions including NMB, CRDB, Grofin Tanzania Bank and EFTA. The working capital was used for expanding storage/warehouses, upgrading milling machines and paddy procurement.

Consortium	Year/Seasons	Source	Total Loan accessed (TZS) in Mil	Total Loan accessed ($)
SHYRICE – Musoma Food	2016	NMB	1,000	448,430.5
SHIRCO - RGL	2017	NMB	1,200	538,116.6
	2016	NMB	2,000	896,861.0
	2015	NMB	500	224,215.2
PBD-DR - KSR	2016	CRDB	320	143,497.8
	2015	CRDB	350	156,950.7
MRC	2017	EFTA	64	28,699.6
	2017	Grofin Tanzania Bank	364.5	163,452.9
SURIPRO - Biosustain	2016	Revolving	350	156,950.7
ZANRICE – Faki enterprise	2017	MIVARF	80	35,874.4
Total			**6,228.5**	**2,793,049.3**

Access to improved mechanization and milling technology through ZANRICE in Zanzibar

Mr. Yussuf Faki Yussuf started his company (Faki Enterprises) informally in 2008, with a small milling machine (SATAKE SB 10) in Kisongoni, North A district – Zanzibar. Faki's milling machine had low capacity, no de-stoner, cleaner or grader leading to low quality milled rice.

(a) Mr. Yussuf with the old milling machine

(b) Faki with his new modern milling machine

Through ZANRICE project had an opportunity to learn from the experience of bigger millers on milling and improved mechanization in rice business and successfully awarded 80% grant by MIVARF Project, which he matched with 20% contribution for purchasing a modern milling machine. In addition, farmers acquired a small combine harvest, therefore making the mill capable of producing high quality rice which can compete with imported rice in Zanzibar. Since then his market share is regularly expanding to retailers, government institutions and ordinary consumers.

2.4. Objective IV: Shape and strengthen the enabling environment at national and regional level

In addition to the more specific and important project targets of building value chain structures, and increasing rice yields, production, and farm incomes, CARI seeks also to influence the development of a strong and favourable enabling environment across the East African Community (EAC) in which the rice sub-sector, and in particular smallholder rice growers can flourish. This means being aware of national and regional trade policy, import/export rules, taxes and subsidies which can promote local rice production and import substitution, and the status of production infrastructure including irrigation systems, rice aggregation centres, new rice mills, and roads.

Factors which limit inter-regional trade range from low regional production, the competitiveness of imports despite high import tariffs, variations in consumer preferences across the region, and policy restrictions on intra-regional trade. The Common External Tariff (CET) is in place in order to protect growth in domestic rice

production. In practice, the system has a number of exceptions and variations which limit its impact. An example is Kenya's 35% tariff. It is low because Kenya imports rice from Pakistan which is one of the main buyers of Kenya's tea production.

Tanzania maintained the full tariff on imports, but rice imports are also dependent on permits, which enable duty-free rice to be imported under special quotas, particularly when there are concerns about food security and local market prices are high. This and other political decisions to adjust the CET can distort the market for rice and encourage informal exports/imports.

Another important driver in the rice market is quality. Imported rice is much cheaper than locally grown rice. But wealthier East Africans prefer locally grown aromatic rice to the imported varieties, which offers a significant market advantage for local suppliers.

2.4.1. Changes in the trade policy and other important developments from 2014 - 2018

Trade Policies

At the start of CARI implementation in 2014, the ban on food export was lifted and rice was imported. This enabled cross-border trade and was expected to boost the market for rice grown in Tanzania. Raphael Group Company was able to export rice to Zambia and DRC Congo. During the implementation, the government re-instated tariffs on rice imports which increased competitiveness of the domestically produced rice on the national market.

The government also launched the Rice Council of Tanzania (RCT) strategic plan at the grassroots together with a drive to recruit RCT members in the CARI project. This included creating awareness RCT and the benefits of joining/being a member of the Council. RCT is better known as a rice platform to rice value chain actors and recognised as a suitable 'vehicle' to drive non-state actors to advocate for improving the rice policy landscape.

Actions taken to support CARI

(a) The RTC worked with government through the EAC Secretariat to advise Rwanda to stay with the CET for imported rice and to advise Uganda not to continue with imposition of VAT on imported rice.

(b) Rice stakeholders and the RCT have approached government with concerns over alleged illegal imports of Asian rice. The problem was exacerbated by traders who allegedly mix imported rice with local rice because of local

customer preferences for aromatic varieties. The mixed rice distorted the market as traders from Uganda, Rwanda, and Kenya stopped buying rice from Tanzania.

(c) RCT and other players worked to address fertilizer shortage worries by farmers: Due to an outcry of several farmers (e.g. southern highland), regarding availability of fertilizer in the market, RCT together with other players in the rice value chain, have started to undertake an analysis of fertilizer availability in several parts of the country to present/address the issue by government.

Other important developments

1. Under the Agricultural Sector Development Programme (ASDP) Government continued to support improvement of smallholder rice irrigation which increased resilience of farmers to produce rice. The government also rehabilitated and constructed new storage facilities for cereals and this is seen as an opportunity for farmers growing paddy. For example, in Kasyabone and Kisegese under Busokelo District, a storage facility and a collection centre have been constructed and SHIRCO used this in 2015 to aggregate paddy. The government has also distributed 3 combine harvesters and 4 threshers to Uturo schemes in Mbarali District in order to increase paddy mechanisation, improve rice productivity and quality.

2. EU provides financial support with a total of 4.5 Million Euros (Approx. 12.5 billion Tanzanian Shillings) to three SAGCOT rice projects for Morogoro and Iringa regions addressing post-harvest losses and value chain weaknesses. European Union, the East African Community, and representatives from FAO Tanzania, HELVETAS Swiss Interco-operation and the Aga Khan Foundation (AKF) presented three projects supporting the rice sector. http://www.fao.org/tanzania/news/detail-events/en/c/1104630/

3. The second phase of the Agricultural Sector Development Programme (ASDP II) was officially launched: The President of the Republic of Tanzania, H.E. Dr. John Pombe Magufuli officially launched the second phase of the Agricultural Sector Development Programme (ASDP II) on 4th June 2018. ASDP II is a flagship programme under Tanzania's development agenda. http://foodsecuritypolicy.msu.edu/news/aspires_supports_tanzanias_agricultural_sector_development_program_ii_adsp

4. Tanzania government has approved the use of Urea Deep Placement (UDP), an innovative technology, which research indicates can increase rice productivity per hectare by 20%. The system allows farmers to use

less fertiliser and cuts nitrogen losses by as much as 40% (Source: http://nannewsnigeria.com/tanzania-ventures-new-farming-technology-boost-rice-production).

5. The launch of Tanzania Agricultural Development Bank (TADB) means that it has now officially begun providing credit to smallholder farmers (including rice farmers) who are working through FBOs. So far a loan of US$385,281 (TZS 890 million) was allocated to 350 rice farmers in Kilombero Districts; and a loan of US$432,900 (TZS 1 million) was allocated to 89 FBOs comprising 21,526 farmers in Iringa Region.

6. Tanzania has launched a 5-year rice project – Expanding Rice Production Project (ERPP) – supported by Global Agriculture and Food Security Program (GAFSP) under the World Bank and aims to double national rice production by improving irrigation infrastructure and promoting System for Rice Intensification (SRI). In Zanzibar, ERPP complemented and upscale the interventions made by CARI with the ZANRICE consortium.

7. World bank funded the project in Accelerating Solar Water Pumping via Innovative Financing: The government of the United Republic of Tanzania applied for financing from the World Bank towards the cost of the Accelerating Solar Water Pumping via Innovative Financing (ASWPTIF) project. http://documents.worldbank.org/curated/en/712681512485972951/pdf/Plan-Archive-1.pdf

8. Tanzania Goes for Climate Smart Agriculture: The government is implementing the Climate Smart Agriculture (CSA) initiative that improve land and water management, with experts urging its speeding up to enable farmers shift from traditional to improved mode of farming. Source: http://allafrica.com/stories/201709060138.html

9. Bulk procurement system decreases fertilizer prices: Tanzania Fertilizers Regulatory Authority were successfully managed to reduce fertilizer prices between 15 and 40 per cent through new bulk procurement system, codenamed Bulk Procurement System (BPS) for DAP and UREA fertilizers. http://allafrica.com/stories/201708220216.html

10. Government removes 108 levies from farmers, herders, and fishermen: The Ministry directives follow complaints by traders that despite the abolishment of various taxes and levies, some of them were still forced to make the payments. This has reduced nuisance taxes to farmers and may lead to increase margin from paddy income. Source:www.dailynews.co.tz/index.php/home-news/52328-minister-warns-councils-over-scrapped-nuisance-levies-defiance

11. RCT and other players are working to address fertilizer shortage worries by farmers: http://www.dailynews.co.tz/index.php/home-news/55234-fertiliser-shortage-worries-rukwa-residents

2.5. Other achievements

Consortium approach received international recognition

In November 2015, Raphael Group Ltd won the Africa Finance Investment Entrepreneurship Award 2015. The advantage over other competitors was the consortium approach promoted by Kilimo Trust, which enables smallholder farmers to link to critical services, especially finance.

Figure 10: Raphael Group Ltd receiving Africa Finance Investment Entrepreneur award 2015

Studies Conducted to support CARI Implementation

a. **CARI assessment in Tanzania by Program progress review (PPR) mission:** Program progress review (PPR) mission of CARI in Tanzania was done in March 2016. The review aimed at evaluating the progress of CARI implementation to date in achieving deliverables according to Results Framework. Tanzania was rated high in terms of performance and according to DAC criteria's (Relevance, Effectiveness, Efficiency, Impact and Sustainability).

b. **Mechanization of Small Holder Rice Production in Tanzania was done:** The study recommended Use of power tillers is becoming more popular in the small holder rice farming, Machinery Hire Service provision is a profitable business but need to be organized, Farmer groups are still weak to venture into mechanization.

c. **Determining Household Dietary Diversity Score (HDDS) and Individual Dietary Diversity Score (IDDS) study was conducted in Bahi-Dodoma Mbarali-Mbeya regions:** recommended to implement a program to promote awareness on malnutrition, dietary diversification strategies to the farming households.

d. **Milling Efficiency study:** A study to assess processing efficiency of SME rice mills in Tanzania was conducted in September and October 2016. The study was carried out with 8 Rice mills (7 Mainland and 1 in Zanzibar). The study identified the major challenge facing rice mills as: poor record keeping; poor hygiene; process management, quality of paddy collected. In addition, rice mills in Tanzania experience electricity shortage or unforeseen power shedding. Key lessons learnt drawn were most of processors don't have the system of keeping records, incorrect readings/calibration. As a way forward, the study recommended that processors should introduce simple and effective system of recording correct data and make them available for making informed decisions. It was suggested for processors to adopt Good Manufacturing Practices (GMPs) that will improve process management at the factory.

e. **Rice Husk Management study (2016):** was conducted to understand and develop a strategy for economic utilization of rice husk and polish was conducted. Involving four rice mills. The survey revealed that, the mills established several ways to deal with the husk. All of them found to be selling and using the bran/polish for animal feeds. The study concluded that heat from burning the husk could be used for drying that would provide more hygienic condition. For better usage of rice husk and as a tool to use renewable energy for rice drying, a flatbed bin dryer has been designed for construction by CARI MG partners.

f. **Cost benefit analysis study:** Cost benefit analysis of CARI out grower programs for partners in Tanzania, Ghana and Nigeria was carried out during the reporting period. In Tanzania KSR and RGL were visited by Sense Consultant. The objectives of the evaluation was to determine the financial benefits of the CARI program for the program partners, in most cases the rice mill, and thus the likelihood they will continue the out-grower programs once CARI has ended and the mill and partners bear 100% of costs. In addition, determine the financial benefit for farmers in the out-grower program, and thus the likelihood they are continuing farming along the new methods after the project.

3. CHALLENGES DURING PROJECT IMPLEMENTATION

Project implementation faced with several challenges which include:

1. Limited access to financial credit by SHFs; Access to finance pace continued to be slow because weather changes increased the risk for the bank to lend more to farmers, of which majority didn't complete their loans payback of the previous season.
2. Complementary crop promotion did not do well as expected due to little rains.
3. Prolonged drought spell
4. Complementary crop promotion.
5. FBS Trainers dropout/High training cost
6. SHFs' low adoption rate of agribusiness skills trained under the FBS approach
7. Adhoc export bans

4. LESSONS LEARNED

1. **Access to market:** Smallholder farmers will not invest in productivity enhancement technologies and products unless they are have quantifiable guaranteed markers for their product. The investment into understanding markets and buyers for farmers product is a critical one as this enables farmers to have the necessary motivation to engage in commercialized production.

   Recommendation: Ensure farmers know and can access the buyer's premises and be able to negotiate for favourable terms of supplying the buyer

2. **Access to Finance:** For financial institutions to work with smallholder farmers they need guarantees that the lead firms will provide markets for smallholder produce and hence repay the loans. Lead firms act as "gateway" for financial institutions to access more business from smallholder farmers and other partners. Therefore, relationship building needs to be supported by allowing financial institutions to monitor farmers' activities on regular basis. These activities could include conducting annual general meetings, preparing season planning, conducting relevant trainings, bulking and marketing of produce. This will build confident and trust among value chain actors and eventually develop suitable financial products for them.

   Recommendation: Always ensure financial institutions are involved in interventions from the get-go and that the financial products available are farmer and SME friendly

3. **Capacity building is MSMEs:** MSMEs engagement requires a lot of capacity building to make them attractive not only to donors but also to financial institutions.

   Recommendation: MSMEs capacity strengthening in the Business skills and Good Manufacturing Practices (GMP) will increase Milling efficiency and reduce production cost.

4. **Earlier crops planning reduces climate vulnerability through risk diversification:** Climate variability has always made agricultural planning difficult, but the effects of climate change are making it increasingly important to enhance risk mitigation in agriculture. Through measures such as crop diversification and rotation and use of improved water management (climate smart) technologies, and improved seed varieties.

   Recommendation: Promoting early maturing rice varieties has been found effective for ensuring a quick harvest after cyclones and floods. Homestead vegetable cultivation as a complementary activity can be an important contribution to reduce vulnerability through risk mitigation and ensure food and nutrition security.

5. **Risk management and early warning systems are key in reducing the impacts of climate-related disasters:** In order to adopt adaptation measures effectively, communities need information to assess current vulnerabilities and future climate variability. Risk management and early warning systems are key in reducing the impacts of climate-related disasters.

   Recommendation: Indigenous early warning systems, farming practices and coping mechanisms used by local people are important factors that should be scientifically documented, analysed and considered for replication. By integrating local and scientific knowledge, through collaboration of academic and development actors, projects have been successful in strengthening the knowledge of farmers with science-based support.

6. **Relying on rain fed farming system** is still a big challenge for transforming small holder farmers and development of the rice value chain. The impact of rainfall variability in this season has heavily affect the yield, and volume traded among other project indicators.

   Recommendation: More initiatives in water management are still required from different stakeholders to help actors within rice value chain to rectify key huddles that hinder the development of rice small holder farmers. CARI project has seen farmers who have privileged to access irrigation facilities benefit the most.

7. **FBS Trainings impact on farmer's income:** FBS training are turning subsistence farmers into commercial farmers. Majority of the FBS trained farmers were reluctant to sell their paddy soon after harvest, stating that the prices were very low for positive returns to their farming investments. Also, some farmers in search of profit decided to sell processed rice instead of paddy – which is what farmers have been practicing for years.

   Recommendation: Scaling up of FBS to more rice farmers will stimulate changes in the rice value chain.

8. **The potential for scaling/impact/sustainability of consortia and contract farming approach:** CARI partners has expanded the supply contract approach to other crops like maize, beans, sunflower and sorghum by signing contract with farmer groups. The idea has been given fully support by local government by allowing village extension officers to work together with MGF partners in building production and business skills of the farmers. This shows the possibility of the consortium and contract farming model to continue even after the end of the project.

   Recommendation: LGAs should facilitate Contract farming model with guidance so that rules of the game are adhered to.

ANNEX

Annex 1: Tables with supporting data

Table 9: CARI Partner budgets and MGF allocation

Consortia	Total Project Budget - (100%)	Matching Grants - (40%)	Grant Received by Dec, 2017	% Grant disbursed by Dec, 2017
SHIRCO	521,749	208,700	203,000	97.3
PBR – DR	474,592	208,821	185,000	88.6
SURIPRO	496,245	194,738	145,000	74.5
RIMAH	522,500	208,948	150,000	71.8
SHYRICE	489,537	195,815	145,000	74
MRC	471,692	188,677	140,000	74.2
SCF	308,394	123,357	90,000	73
ZANRICE	388,289	194,145	175,601	90.4
Total	3,672,998	1,523,201	1,233,601	81%

Table 10: Gross margin analysis based on demonstration yields

Consortium	Profit (€ net income)			Average net profit (€)
	Rainfed	Supplementary Irrigation	Irrigated	
SHIRCO	358	908		633
PBR – DR	442			442
SURIPRO	295			295
RIMAH			1,352	1352
ZANRICE	-256	1,060		402
SHYRICE	580	1,116	1,627	1107
MRC	418	1,068		743
SCF	483			483
Average	**331**	**1,038**	**1,489**	**682**

Table 11: GAP training and use

Consortium	Extension staff/lead farmers ToT		Farmers GAP training			Farmers using GAP,2018		
	Target	Trained	Overall Target	Trained 2016	Trained, 2018	Overall Target	Actual, 2016	Actual, 2018,
SHIRCO	50	50	4927	2,784	6038	4927	2,784	6038
PBR – DR	150	74	4634	3,018	4695	3707	1,806	2632
SURIPRO	50	48	5229	1,871	4414	5000	846	3664
RIMAH	50	30	5500	200	5500	4400	38	1849
ZANRICE	25	34	4573	1,283	4275	3658	1,090	4036
SHYRICE	30	36	5521	2,462	5663	4500	1,350	4643
MRC	15	15	6000	2,754	6099	4800	1,400	5470
SCF	0	0	2000	972	2286	0	478	0
TOTAL	**370**	**287**	**38384**	**15,344**	**38970**	**30992**	**9,792**	**28332**

Table 12: No of demonstration plots established

Consortium	Paddy Demo plots					Complimentary Crops Demo plots		
	Targeted	Actual established	2018	2017	2016	Target	2018	2016
SHIRCO	20	35	0	20	15	20	20	Nil
PBR – DR	28	53	0	25	25	20	15	Nil
SURIPRO	30	41	11	15	15	12	30	15
RIMAH	10	259	32	196	31	5	2	2
ZANRICE	50	126	14	75	37	56	58	1
SHYRICE	56	71	0	41	30	40	39	20
MRC	16	45	0	28	17	80	42	4
SCF	0	68	28	10	10	25	32	0
Total	**210**	**698**	**83**	**410**	**180**	**258**	**238**	**42**

Table 13: Knowledge Products

Consortium	FBS manual book	FBS posters	FBS Certificates	GAP books	GPHH books	Tablets
SURIPRO	5,229	10	5,229	3,200	3,040	2
RIMAH	2,920	9	2,920	5,500	5,500	2
ZANRICE	4,710	9	4,710	4,400	4,280	2
SHYRICE	5,521	11	5,521	5,521	5,521	2
MRC	6,000	9	6,000	3,200	3,000	2
SCF	2,420	10	2,420	0	0	2
SHIRCO	1,740	15	1,740	0	0	2
PBR - DR	1,300	12	1,300	0	0	2
Total	**29,840**	**85**	**29,840**	**21,821**	**21,341**	**16**

Table 14: Supply contracts signed by June 2016

Consortium	Overall target	Contracts for 2016	Contracts for 2018
SHIRCO	34	30	
PBR – DR	14	7	
SURIPRO	6	11	
RIMAH	10	2	
ZANRICE	N/A	0	
SHYRICE	14	10	
MRC	6	3	
SCF	20	10	
Total	**104**	**73**	

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