DELIVERING THE PROMISE:

IMPACT OF
'KILIMO TRUST CONSORTIUM APPROACH TO VALUE CHAIN DEVELOPMENT'
ON DELIVERING PROJECT RESULTS

A Case of the 'Competitive African Rice Initiative' Project in Tanzania

Kilimo Trust
Transforming Lives Through Agribusiness

BILL & MELINDA GATES *foundation*

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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SHAMBA DARASA LA

EXECUTIVE SUMMARY

Context

Given the importance of rice in Tanzania including being grown by 20% of farmers and the sector employing 1.5 – 2 million people, current initiatives to transform the sector are timely. Competitive African Rice Initiative (CARI) project is one such initiative commissioned by Gesellschaft für Internationale Zusammenarbeit and co-funded by Bill and Melinda Gates Foundation. The Tanzania component of the project was implemented by Kilimo Trust. CARI-Tanzania used a consortium approach where rice processors were linked to farmers to address market demand for quality and affordable rice. Other crucial actors in the value chain including input suppliers and business development service providers were invited on need basis. The approach formally referred to as Kilimo Trust Consortium Approach to Value Chain Development (KTCA2VCD) model being new, evaluation of its performance in delivering project results had not been studied in depth. Thus, this necessitated commissioning of this study by Kilimo Trust.

The purpose of this study was to evaluate impact of the KTCA2VCD model in delivering project results. Specific objectives were to assess the model's relevance, efficiency, effectiveness and sustainability. The evaluation also documented key lessons and areas of improvement and made actionable recommendations. The study used secondary data and primary data from 402 respondents (farmers, processors, finance, input and extension providers, focus group discussions and key informants) and employed a quasi-experimental design to enable with and without evaluation.

Using project targets as desired results, three evaluation criteria were used: i) achieved criteria where delivered result was equal to planned target; ii) under achieved where delivered result was less than planned target; and iii) over achieved where delivered result was greater than planned target. Moreover, the extent to which a result was under/over achieved was evaluated using quantile criteria as explained under each aspect below. With and without project evaluation was also used to enable attribution of results to the model.

Relevance.

Three indicators were used to assess the model's relevance: i) alignment to national policies, ii) alignment to beneficiaries' needs and iii) involvement of crucial stakeholders. Quartiles were used to conclude on each of the indicators as: 0-25%=grade D (not

relevant); 26-50%=grade C (relevant to a limited extend); 51-75%=grade B (relevant to a large extend); 76-100%=grade A (relevant); and >100%=grade A+ (surpassed target). The first 2 indicators scored an A implying that the model was relevant while the 3rd indicator scored a B implying that the model was relevant to a large extend. Overall, the model scored an A indicating that it was relevant.

Effectiveness.

Effectiveness was evaluated at the three levels: farmers' level, processors' level, and policy level. Indicator performance were scored as follows: 0-25%=grade D (not effective); 26-50%=grade C (effective to a limited extend); 51-75%=grade B (effective to a large extend); 76-100%=grade A (effective); and >100%=grade A+ (surpassed target). At farmer level, the following indicators were used: total number of farmers reached, proportion of total farmers who were women, paddy productivity, paddy profitability, linking farmers to finance providers, adoption of good agricultural practices (GAPs), membership to Rice Council of Tanzania (RCT) and growing of a complimentary crop to rice by farmers for income and nutrition.

Through the consortium model, the total number of targeted farmers was surpassed by 15% and the proportion of women indicator was also surpassed by 14% respectively both indicators scoring A+. Among beneficiaries, productivity of irrigated paddy was 4.86 MT/Ha and that for partially irrigated paddy was 4.24 MT/Ha surpassing the 4 MT/Ha target by 22% and 6% respectively (grade A+) for both sub-indicators. Productivity of rain fed paddy was 3.63 MT/Ha translating to a score of A. Productivity of non-beneficiaries was significantly lower compared to beneficiaries for all the production systems: 3.89 MT/Ha for irrigated paddy, 3.63 MT/Ha for partially irrigated paddy and 2.67 MT/Ha for rain fed paddy. For beneficiaries, profitability of irrigated and partially irrigated paddy was 1,390 US$/Ha and 1,303 US$/Ha. Not only did the two indicators surpass the target of 800 US$/Ha (grade A+) but profitability of the beneficiaries was significantly higher than that of non-beneficiaries of 1,097 US$/Ha for irrigated paddy, 1,017 US$/Ha for partially irrigated paddy and 692 US$/Ha for rain fed paddy.

Only 35% of beneficiaries were linked to finance providers and acquired a loan. Therefore, the model was effective only to a limited extent in this indicator scoring a C. However, these percentage points were significantly higher compared to the 9% of non-beneficiaries. On average, beneficiaries acquired a loan amount of 291 US$ suggesting that the consortium model was 11 times more effective in enhancing access to finance among beneficiaries compared to non-beneficiaries who acquired average loan of only 26 US$. The consortium

model was effective to a large extent in promoting good agricultural practices (GAPs) because, beneficiaries adopted significantly more (57%) GAPs scoring a B, compared to 14% adoption rate of non-beneficiaries. Although the model persuaded only 7% of beneficiaries to register with RCT, these percentage points were higher compared to non-beneficiaries where none were members. However, the model was not effective in persuading farmers to register with the council having scored a D. Indicator on farmers growing a complimentary crop to rice was not achievable because the indicator was not clearly defined by the project team. It was therefore concluded that the model was not effective in this indicator.

At processor level, two indicators were evaluated: i) quantity of paddy supplied through the model against expectation; and ii) quality of paddy supplied. The model attained 81% effectiveness in quantity of paddy supplied by consortium farmers against the volume expected with some consortia surpassing their targets by 20%. Through the model, no paddy was of poor quality thus, no paddy was rejected. This was commendable compared to non-beneficiaries who reported that up to 30% of the paddy they procured was of poor quality Consequently, it was concluded that the model was effective with respect to the two indicators.

At policy level, two indicators were evaluated for effectiveness: i) 3 policy briefs targeting rice sector in Tanzania developed; and ii) recommendations of the 3 briefs adopted. The model was effective because the 3 briefs were developed scoring an A. Recommendations of 2 briefs were adopted by Government of Tanzania translating to a score of 67% (grade B). Overall, the model was effective scoring grade A in contributing to improving policy environment targeting rice in Tanzania.

Efficiency.

Efficiency was evaluated using two perspectives: i) financial efficiency where a benefit cost ratio (BCR) was computed. The decision criteria was that a BCR>1 meant the model was financially efficient; ii) timeliness in results delivery. Evaluation criteria of time efficiency was as follows: 0-25%=grade D (not efficient); 26-50%=grade C (efficient to a limited extend); 51-75%=grade B (efficient to a large extend); 76-100%=grade A (efficient); and >100%=grade A+ (surpassed target).

The average cost of establishing a functioning consortium by the CARI project was estimated to be US$ 1,069,392.68. This relatively high initial cost was driven by high set up costs such as capacity building of the partners and overheads. Over time, this cost would significantly reduce as the consortia mature. The model's financial efficiency was 115% surpassing target by 15% (grade A+) implying value for money. Eighty percent of

the grants had been disbursed by end of the project period although consortia efficiency with regard to this indicator varied greatly. The KTCA2VCD model reached 97% of target farmers, thus efficient. It surpassed target in increasing paddy productivity by 3% and was efficient in increasing volume of paddy traded on time by scoring an A. The model was efficient only to a limited extent in linking farmers to finance providers scoring 35% (C).

Impact.

Impact was evaluated using rice availability, perception of consortium partners about the model, allocation of income from paddy, access to shelter and education, and women empowerment. Increased paddy productivity resulted in increased rice availability and the consortium model led to accessible rice markets explaining the observation that consortium farmers sold 41% of their paddy compared to the 34% sold non-beneficiaries. Perceptions by consortium members were positive about the model. Farmers understood the advantages of committing to business agreements while processors viewed farmers as equal business partners. Increased income from paddy sales was reinvested in paddy production including access to inputs but was also diversified to non-farm enterprises including motor-cycle transport business as a way of spreading risk. Improving shelter and accessing education were common impact points for beneficiaries including construction of permanent family houses and paying school fees for children. The number of women targeted was surpassed by 15% indicating that more women were integrated into the rice value chain which is otherwise dominated by men although the percentage of women among the model beneficiaries were not significantly different from the number of women among non-beneficiaries suggesting that the targeted number of women was small. Moreover, all consortia partners were willing to continue participating in the models' operations because it is financially beneficial to them.

Sustainability.

Through evaluation findings in this report, it was concluded that the model's results were sustainable. First, the model leveraged private sector resources at 60% showing a high level of commitment. Second, the model leveraged on government resources especially warehouses, irrigation schemes used by all the consortia and extension services. Hundred percent of processors and 98% of farmers were willing to continue their operations within their respective consortia because it was financially viable. Processors had plans to recruit more farmers into the consortia. This will lead to growth in number of active consortium farmers and possibly volume of paddy traded. Growth in volume of rice paddy through

the model will further be boosted by the fact that paddy productivity has increased significantly. With 3 policy briefs developed and recommendation of 2 briefs adopted, the rice sector in Tanzania is expected to remain stable and vibrant ensuring sustainability of the results achieved by the KTCA2VCD model. Despite the project's unique design that its activities become redundant leaving behind a committed and vibrant private sector, the model did not put in place precise indicators that could be evaluated to inform whether this assumption is likely in future. For example, it is not clear how the 40% project grant will be compensated for considering that grants are a special form of funding not available in commercial financial markets. Moreover, there was no formal evidence of commitment by consortia partners beyond the project other than verbally reporting their willingness to continue their operations within the model. These weakens the assumption that the model will ensure sustainability.

Lessons Learnt.

Farmers learnt that:

1. Farming is a business in addition to producing paddy for home consumption. Capacity building through the consortium model changed farmers' perception about paddy production where currently, farmers consider the enterprise as a business.

2. Use of improved inputs such as seed is profitable for commercialized farmers including smallholders. Although cost of improved inputs is high, farmers noted that the returns are worth the investment because use of improved inputs is a major driver of increased productivity reaffirmed (1) above.

3. Committing to business agreements is beneficial to partners in the agreement. Farmers have been known to be deal breakers e.g. breaching contracts by side-selling, etc. However, through the consortium model, they have learnt that committing to business agreements is key to the success of their farming businesses.

Processors learnt that:

4. Farmers are equal business partners and it is possible to reduce cost and time of sourcing paddy while improving quality and quantity by working with them. This led to processors planning to recruit more farmers to their consortium.

5. Through capacity building, farmers can be transformed into trustworthy and loyal clients. This was shown by farmers' loyalty in supplying paddy to processors who had contracted them with minimal side selling even when that option was available.

BDS providers learnt that:

6. Through capacity building, farmers can be transformed into trustworthy and loyal clients. Through the consortia, payment rate of inputs improved because supply and payment of input loans was through the processor and farmers did not default supplying to those processors.

The lessons notwithstanding, the following areas need improvement:

1. Competition for BDS providers within the model should be allowed to increase bargaining power of farmers. Having a single BDS provider such as input provider per consortium led to delays in the supply of services. It also made it difficult for farmers to negotiate for better terms because they had limited options.
2. Financial organizations observed that some crucial partners were missing in the consortia especially insurance given the high risk of agribusiness. Going forward, all crucial partners should be invited in the consortia.
3. Government extension officers reported that during initiatives such as CARI, their workload increases with no extra facilitation especially transport to cover expansive locations. If government extension officers are required, they should be integrated into the model design and supported with transport in order to meet projects objectives. Otherwise, government extension officers perceived the model as an appropriate way of reaching the otherwise left out farmers.

Conclusions and Recommendations.

1. KTCA2VCD model is relevant

Overall relevance score of the model was A indicating that the model was relevant. However, none of the three indicators scored 100% showing that there is potential to improve.

> ***#1: Consequently, it is recommended that the model should be comprehensive in its identification and targeting of stakeholders and alignment to national food policies.***

2. KTCA2VCD model is an efficient project implementation tool.

By attaining incremental 115% financial efficiency, KTCA2VCD model is a financially efficient project implementation tool. Likewise, the model scored an A as an efficient tool in delivering project results and on time. Evidence from other KT evaluation reports such as Regional East African Community Trade in Staples (REACTS) is consistent with the findings of this evaluation.

> *#2: It is recommended that the consortium model is an efficient results delivery approach for agricultural development projects and should scaled up. To further refine the model in addressing the ever evolving agricultural needs, KT should continue with its efforts of using the model other settings such as rice value chains in other countries. This will eventually make the model a game changer in transforming food value chains.*

3. KTCA2VCD model is effective in delivering project results.

Overall, the consortium model deviated from target by -17% only. In other words, on average, 83% of the planned results were delivered. Indicators such as profitability, number of farmers reached and number of women integrated into the model surpassed expectation. In addition, more than half (>50%) of planned results for productivity and adoption of GAPs were delivered.

> *#3: As a result, it is recommended as #1 above.*

4. The model's sustainability strategy is unique and worth pursuing.

The model was innovative in leveraging private sector resources at the rate of 60% and using the 40% difference as an incentive for private sector investment. The implementer also used a hands-off implementation style implying that the consortium approach will go a long way in ensuring that partners carry on their responsibilities after the project period. It was also noted that the model leveraged on public resource especially warehouses and irrigation schemes that are constructed and managed by government further strengthening the sustainability of the model's results. It is also assumed that with each consortia partner understanding their business benefit from participating in the consortia, it would only be rational for them to keep operating within the consortia. However, the partners for all the consortia didn't have formal plans and strategies of sustaining the momentum set by the model after the end of it period. This weakens the otherwise unique design and implementation style.

#4: It is recommended that the model should continue with its core creativity of using private sector as change agents in transforming agricultural value chains. It is also recommended that KT should strengthen its hands-off project implementation style as a way of weaning consortia partners. To enhance sustainability even further, it is important to build the capacity of partners in developing their own formal strategies of operation beyond project period.

SECTION ONE:
BACKGROUND INFORMATION

1.1 Introduction.

Rice is the second most important food crop in Tanzania after maize grown by 20% of all farmers (United States Department of Agriculture [USDA], 2017; Government of Tanzania [GoT], 2016). In addition to production, Tanzania leads in per capita rice consumption in the East African Community (EAC) region at 25-30 kg/person/year compared to 7.55 kg/person/year in Kenya, 5.88 kg/person/year in Rwanda and 4.71 kg/person/year in Uganda (Lewis, 2012; EUCORD, 2012).

Rice is more commercialized with 42% of the produce being marketed compared to 28% of maize and 18% of sorghum (Food and Agriculture Organization of the United Nations [FAO], 2015). The enterprise is also more profitable compared to maize. In Mbeya region estimated gross margin of rice using traditional practices is 207 US$/Ha and 643 US$/Ha if production utilizes improved technologies comparing to maize profitability of only 29 US$/Ha (FAO, 2015). At macro level, rice sector in Tanzania contributes about 2.7% of gross domestic product (GDP) (Trading Economics, 2017) and employs about 1.5 – 2 million people (RCT, 2015).

Success of the rice sector in Tanzania is driven by several opportunities including high local rice demand due to population growth coupled with high per capita consumption. Likewise, rice demand is increasing in the EAC region. In 2011-2015, the EAC Partner States (other than Tanzania) imported rice averaging US$ 276.5 million per year and Tanzania's share of this market value was only 4% (ITC, 2017). Despite the opportunity in the rice value chain, a sizeable potential remains untapped due to numerous constraints including reliance on rainfall for rice production which leads to seasonal demand of inputs.

Rain-fed rice farm

Irrigated rice farm

Other constraints include low paddy price during times of harvest, food export bans, non-tariff barriers (NTBs) and limited access to market (Gustafson, 2016; Mwatawala et al. 2016; Ngailo et al. 2016; FAO, 2015; Tanzania Chamber of Commerce, Industry and Agriculture [TCCIA], 2014; Porteous, 2012).

To relax some the above constraints, the Competitive African Rice Initiative (CARI[1]) project was developed with an overall goal to improve the livelihoods of 120,000 smallholder rice farmers in Tanzania, Nigeria, Ghana and Burkina Faso. CARI-Tanzania targeted to contribute to the overall project goal by reaching 30,000 rice farmers in Tanzania with a daily income below US$ 2.

The four specific objectives of CARI-Tanzania were to: i) improve productivity and quality of paddy; ii) increase efficiency of local paddy sourcing, processing and marketing; iii) improve access to financial services; and iv) improve policy framework targeting rice.

Based on its experience of transforming agricultural value chains in the EAC, Kilimo Trust (KT) was in-charge of the Tanzania component. In CARI-Tz, KT worked with rice millers and traders as value chain anchors who provided the "pull" needed to stimulate rice production and trade.

[1] http://cari-project.org/about-cari/our-concept/

1.2 Models of Developing Agricultural Food Chains.

Agricultural food chains are at the core of agricultural transformation because they ensure timely delivery of the right quantity, quality and form of agricultural produce to consumers. With globalization, agricultural food chains have become competitive, characterized by high standards. However, agricultural food chains in sub-Saharan Africa (SSA) lag behind the rest of the world in many aspects including efficiency (Webber and Labaste, 2007). This has made most smallholder farmers in SSA less competitive (Alliance for a Green Revolution in Africa [AGRA], 2017).

The challenges of smallholder farmers notwithstanding, there is a huge opportunity in SSA considering that Africa imports food stuffs estimated at US$ 30 – 50 billion per year (AGRA, 2017). To improve performance of agricultural chains in SSA and tap into the existing opportunity, different models have been developed aiming to improve the performance of agricultural chains. These include: i) Supply chain model, ii) Value chain model, iii) Out-grower schemes, and iv) Consortium model.

The supply chain model (SCM) refers to sequence of steps and actors involved from the point of production to delivery of a product to the market. The model focusses on reducing cost of operation and increasing supply efficiency (Feller et al. 2006). This primary focus of SCM is also its main limitation where the focus doesn't consider consumer needs. Also, supply chains are natural business phenomena and exist whether they are managed or not (Collins et al. 2016). Other limitations of SCM include actor disintegration and poor information flow (Bala, 2014). The SCM evolved into the value chain model.

The value chain model (VCM) integrates demand and supply chains (Feller et al. 2006). The model focuses on innovation, product development and marketing to meet consumer needs. A main strength of VCM is the creation of value as a product 'moves up' the chain guided by consumers' needs. It also emphasizes on chain management (Collins et al. 2016). However, VCM is constrained by difficulties of managing relationships. Techno Serve successfully applied the value chain development model in coffee farming in Kenya, Ethiopia, Rwanda and Tanzania targeting to improve productivity and prices of coffee (for details, see Table 5).

Out grower schemes (OGS) model is anchored on a major activity (processing, aggregation, capacity building, and nucleus farm hub management) with an aim to improve market access (Fisher, 2017). Fisher (2017) argues that the success factors of OGS include; i) ready demand, ii) appropriate input support system, iii) business viability, iv) potential for sustainability and growth and v) capacity building. Actors participating in OGS use contracts (contract farming) as the means of commitment. East African Breweries Ltd (EABL) implemented such a model by contracting Sorghum farmers in Kenya. EABL trained the farmers and also linked them with input providers (for details, see Table 5).

1.3 Kilimo Trust Consortium Approach to Value Chain Development (KTCA2VCD).

The KTCA2VCD model is summarized in Figure 1

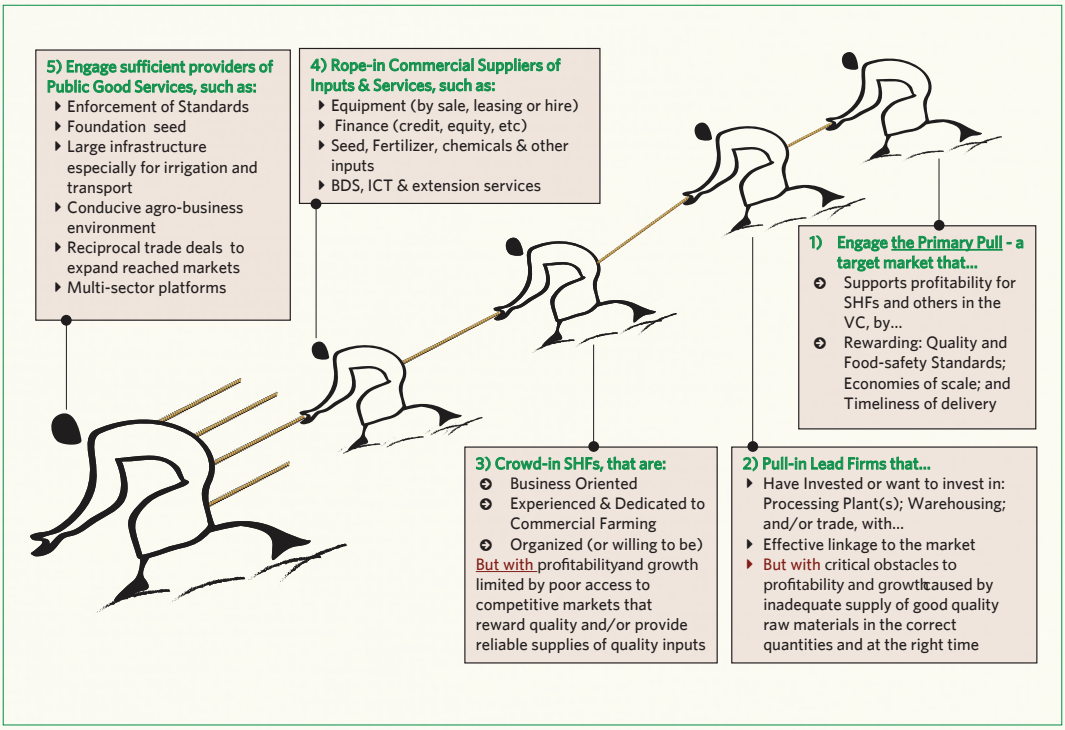

Figure 1: Kilimo Trust Consortium Approach to Value Chain Development model
Source: Kilimo Trust

The model borrows heavily from the VCM and the OGS model in that the main driver is consumers making product value central to its success. However, it has innovative characteristics that distinguish it from other models in that actors in a consortium are linked by a memorandum of understanding (MoU) and joint business planning. The model is driven by a lead link comprising a private lead firm (rice processor) and smallholder farmers' cooperative(s) who are committed to the MoU and the joint plans. In addition, the model uses supply contracts to commit business partners even further.

The lead link is supported by other value chain operators (VCOs) such as input suppliers, equipment service providers, business development service (BDS) providers, etc, which are invited to address specific constraints identified partners in the lead link. These VCOs also must have substantial investments in the agricultural sector and are required to identify business opportunities in supporting the consortium.

The KTCA2VCD was first tried by KT in 2015 in implementing the CARI project. Since the inception of the CARI project, the model is being tried in implementing other projects such as the Calories and Household Incomes from Potato Subsector (CHIPS) Project. Despite the current indications that the model has delivered positive results, no in-depth analysis has been conducted to assess its performance as an effective and efficient project implementation model. As a result, it is largely hypothetical to attribute any observed results to the model.

This gap in knowledge limits the scalability of the model to other projects and settings within and outside KT. To test the hypothesis that the KTCA2VCD model is an effective and efficient project implementation tool requires a comprehensive analysis of selected project indicators justifying the timely commissioning of this study by Kilimo Trust and using CARI-Tanzania as a case.

1.4 Purpose and Specific Objectives.

The purpose of this study was to assess the impact of KTCA2VCD model on delivery of project results using CARI-Tanzania as a case. The specific objectives were to undertake an in-depth review of the models:

i. Relevance,
ii. Efficiency,
iii. Effectiveness,
iv. Impact, and
v. Sustainability.

1.5 Deliverables

This study yielded three outputs:

i. An inception report;
ii. Final validated report; and
iii. An annex of primary data used in the analysis.

1.6 About Kilimo Trust

Kilimo Trust is a project implementer since 2011 working in the East African Community (EAC) region. The Trust has a core business to structure national and regional trade in agricultural products for enhanced wealth, food and nutrition security among smallholder farmers and other value chain actors. KT has employed two main models in its project implementation work: the VCM and the KTCA2VCD model. Under the VCM, the projects that were implemented include Development of Inclusive Markets and Trade (DIMAT) in Uganda and Beans Enterprises and Structured Trade in the EAC (BEST-EAC). Owing to the several limitations of the VCM, as earlier discussed, KT developed the KTCA2VCD which is has been applied in implementing CARI-Tanzania and CHIPS projects.

For more information about KT and its development work, visit https://www.kilimotrust.org/.

SECTION TWO:
EVALUATION METHODS

2.1 Study Area, Data Sources and Sampling Procedure.

This study was conducted in Tanzania in the areas shown in Figure 2.

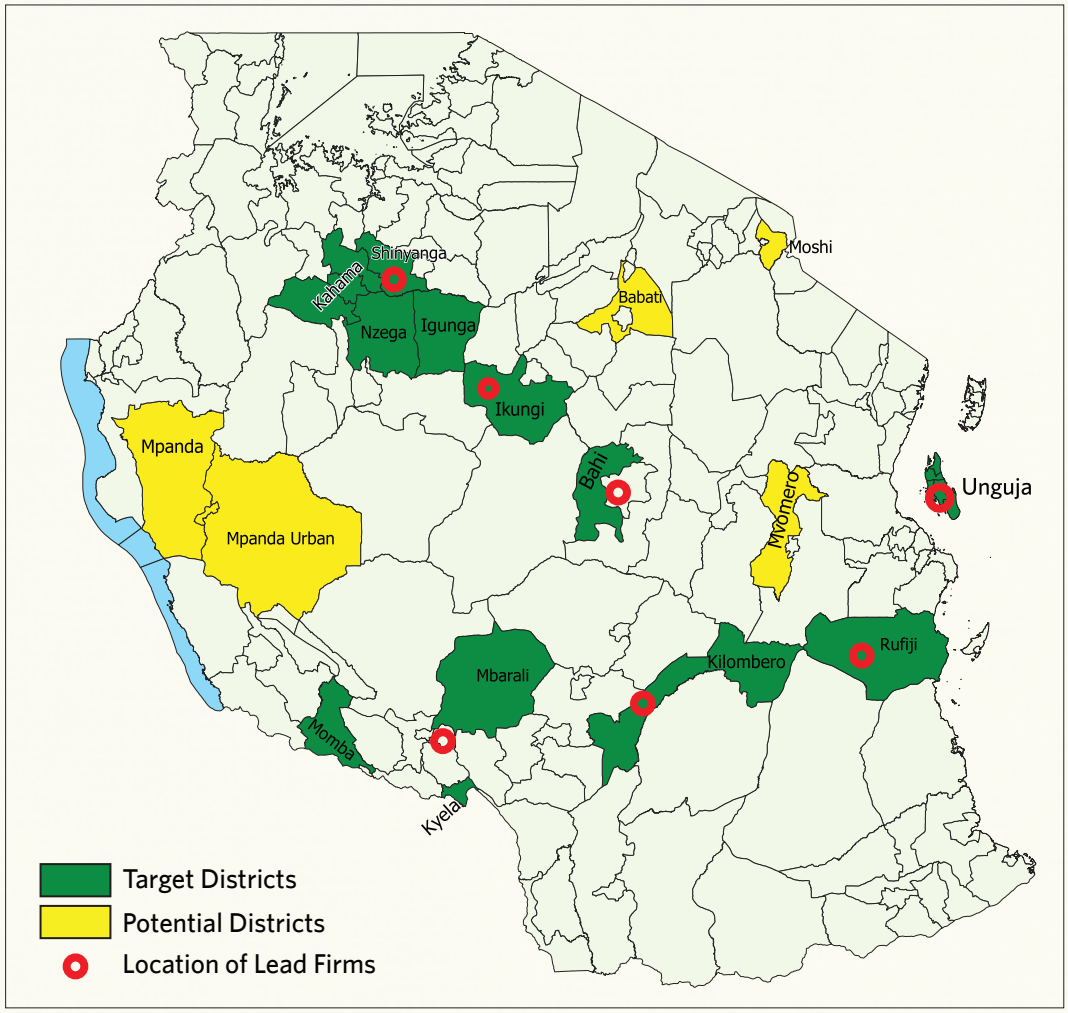

Figure 2: CARI project areas

Source: Kilimo Trust

Both secondary and primary data were used in the evaluation. Sources of secondary data included: i) CARI-Tanzania project documents; ii) policy documents by the Government of Tanzania; iii) published papers; and iv) literature on value chain development. Primary data were collected through surveys from: i) consortium partners (lead firms, farmers, and BDS providers); and ii) key informants.

Enumerator interviewing a rice farmer in Zanzibar

Field supervisor conducting a focus group discussion

Identification of respondents was stratified by consortia. This ensured that project beneficiaries and non-beneficiaries were clearly identified and surveyed for comparison. Several sampling frames were constructed as follows: 8 lead firms, 17,283 farmers and 24 BDS providers (8 respondents for each of finance providers, agro-input providers and extension providers). Simple random sampling technique was used to select respondents. Because of their large number, sample size of farmers was determined using Israel's (1992) formula as shown in equations 1.

$$n_0 = Z^2pq/e^2 \quad \text{.....(1)}$$

Where; n0 is the sample size, Z2 is a constant (1.96), e is the desired level of precision (0.5 for this case), p is the estimated proportion of an attribute that is present in the population (0.5 for maximum variability), and q is 1-p. At 95% confidence interval, the estimated sample size of farmers was 370. Two thirds of the estimated sample (250) were interviewed from project beneficiaries and the remaining 120 from non-beneficiaries.

To determine the sample sizes for the rest of the respondent categories, the first step was randomly selecting 50% of the lead firms benefiting from the model. Four lead firms *(Southern Highlands Rice Consortium [SHIRCO] comprising of Raphael Group Limited (Lead firm), Farmers, YARA Tanzania, Agriseed Technologies, Rogimwa Agrochemical Company; Shinyanga Rice Consortium [SHYRICE] comprising of Musoma Food Company Limited (Lead Firm), Farmers, Kibo investments Limited, Rural Urban Development Initiatives (RUDI); Promoting Bahi Rice in Dodoma Region [PBR-DR] comprising of Kimolo Super Rice (Lead firm), Farmers, YARA Tanzania, Bahi District Council; and Zanzibar Rice Consortium [ZANRICE] comprising of Ministry of Agriculture Natural Resources Livestock and Fisheries, Farmers and Yusuf Faki Enterprises, a miller)* were sampled. Four non-beneficiary processors were also sampled to act as control. Other respondents were: Representatives of NMB and CRDB banks were interviewed. Input providers and extension service providers were also interviewed. In addition, 4 farmers' focused group discussions (FGDs) were conducted targeting project beneficiaries. Key informants were also interviewed including CARI team leader (1), CARI M&E officer (1), Rice Council of Tanzania officer (1) and GIZ representative in CARI (1).

2.2 Data Collection, Quality Assurance and Data Analysis.

Data collection process involved two phases. First phase involved review of secondary data. Literature review process involved reading of multiple documents and synthesizing the information using content analysis technique. The second phase involved collection of primary data. Responses by farmers, processors and BDS providers were captured using semi-structured questionnaires while focused group discussions and key informants were interviewed using guides.

To ensure data quality (completeness and accuracy), three approaches were employed: i) use of electronic questionnaire that was appropriately programmed not to capture obvious outliers and other errors such as string variables for integers. Moreover, filling of the questionnaire doubled as the data entry process eliminating second level human error that is often introduced during data entry; ii) possible responses were hypothesized based on literature and own experience and coded prior to data collection in order to improve accuracy. Open ended responses were coded before analysis; and iii) data collection was supervised in Situ.

Data analysis was conducted using STATA (13) at two levels. Level one involved use of descriptive statistics: mean, mode and frequencies to establish status quo for project beneficiaries and non-beneficiaries. Level two used quantitative techniques (t-test, chi-square test and analysis of variance (ANOVA) to establish associations and test for differences between outcomes of project beneficiaries and non-beneficiaries.

2.3 Results Measurement and Evaluation Criteria.

To measure results, three evaluation techniques were used: i) quantile grading system, ii) the most important change among target beneficiaries, and iii) 'with and without project' comparative evaluation. For each of these criteria, grading of results was conducted as described further below.

The quantile grading system divides observations into equal segments and each segment is interpreted depending on the aspect being analyzed e.g. higher percentage is desired for profit but vice versa for costs. To apply the quantile grading system, achieved results for a particular indicator were used to calculate percentage performance points against target result. The percentage points were then graded and a logical conclusion made.

The most important change technique is a qualitative criteria based on direct responses of interviewees with a goal to understand their perception regarding project results on their livelihoods. Respondents were asked how they perceived changes brought about by the KTCA2VCD model. Responses were analyzed using descriptive statistics and conclusions reached regarding change of livelihoods.

With and without project technique was used to compare mean outcomes between beneficiaries and non-beneficiaries to test for significant difference. The decision criteria was: if a test for outcome difference between beneficiaries and non-beneficiaries was significant, the model had an impact (positive or negative), otherwise the model had no impact. Three conclusions are possible for each of the criteria: i) underachieved if result was below target; ii) achieved if result was equal to target; and iii) overachieved if result was greater than target. The consortium model was evaluated on the following aspects: relevance, effectiveness, efficiency, impact and sustainability.

2.3.1 Relevance.

Model relevance was the extent to which its design was consistent with recipients' needs, KT vision and mission as well as overarching rice policies in Tanzania. Consistency of the KTCA2VCD model with recipients' needs was measured by answering the following: i) did the model address beneficiaries' needs? ii) did the model involve other stakeholders other than the direct beneficiaries? and iii) to what extend was the model aligned to food policies in Tanzania? The decision criteria is summarized in Table 1.

Table 1: Quintiles evaluation criteria

Performance score	*Grade*	*Decision criteria*
>100%	A+	Surpassed target.
76 – 100%	A	Model was relevant.
51 – 75%	B	Model was relevant to a large extent.
26 – 50%	C	Model was relevant to a limited extend.
0 – 25%	D	Model was not relevant.

2.3.2 Effectiveness.

Model effectiveness was the extent to which it delivered planned results. Effectiveness was assessed by answering the following: i) how many of the targeted beneficiaries were reached? and ii) to what extend were planned results achieved. Effectiveness was evaluated using with and without project technique. In cases where means of an indicator between beneficiaries and non-beneficiaries were significantly different, it was concluded that the model was effective, otherwise it was not.

2.3.3 Efficiency.

Model efficiency measured conversion of resources to results. Money and time spent were used to assess efficiency of the KTCA2VCD model. For financial efficiency, a benefit to cost ratio (BCR) was computed. Total project costs were calculated by summing total value of grants extended to the 8 consortia, total contribution by partners and project overheads such as salaries for the entire project period. Project benefits were calculated by valuing the volume of paddy traded through the consortia since project inception. The decision criteria was that if BCR>1, the model was efficient, otherwise it was not. For time efficiency, timeliness in delivery of results was assessed as at December 2017 and evaluated using criteria in Table 2.

Table 2: Quintiles evaluation criteria for model efficiency

Percentage score	*Grade*	*Interpretation*
>100	A+	Result surpassed target and on time.
76 – 100	A	Model was efficient.
51 – 75	B	Model was efficient to a large extend.
26 – 50	C	Model was efficient to a limited extend.
0 – 25	D	Model was not efficient

2.3.4 Impact.

For this study, impact was measured by comparing selected indicators under the following expected social and economic changes: food availability (rice for this case), income security (income from sale of rice per household per year) and income allocation. Change in perceptions due to the consortium model was also captured e.g. perception on investing in improved agricultural technologies such as seeds.

2.3.5 Sustainability.

Model sustainability was concerned with measuring whether project results were likely to continue after the end of the project period. The decision criteria were; i) were beneficiaries willing to continue participating in the model after project period ends? ii) were private and public resources leveraged? iii) do consortia members have continuity plans after CARI? iv) had beneficiaries identified potential risks that may negatively affect relationships within the model and developed management strategies? v) was policy environment for rice conducive? If the answer to any of the above questions was yes, the conclusion was that results by the model were sustainable, otherwise they are not.

2.3.6 Lessons learnt and areas of improvement.

Lessons learnt were captured by asking the respondents 'what positive and negative lessons did you learn by participating in the consortium'. Responses were summarized into thematic areas. To evaluate areas of possible improvement, respondents were directly asked the areas they recommended for improvement.

2.3.7 Limitation.

The main limitation of this study was insufficient time. It is 'technical injustice' to evaluate a 4 year project worth about US$ 8,555,141.47 in 15 days. It was also noted that some respondents were not prepared for the survey as they were unable to provide responses to some of the questions asked especially a thorough breakdown of how they used finances from loans and the project grant citing that they could not remember or had to confirm with another party such as the accountant. Efforts to follow up with these respondents who promised some information after the survey were futile.

Evaluations should be allocated sufficient time as suggested in Table 3. The suggested time frame is a bare minimum and may vary depending on the sample size, terrain to be covered and the number of indicators being measured that in turn influence the length of the interviews among other dynamics. The suggested days excludes travel days. Moreover, respondents should be prepared way in advance to enable them provide timely and accurate responses.

Table 3: Suggested minimum time frame of conducting evaluation similar to the one contained in this report

Phase	*Suggested number of days*
Inception and acclimatization period	5
Inscription of a single E-questionnaire	2
Enumerator training per questionnaire	1
Questionnaire testing	1
Correction of the questionnaire to develop a final copy	1
Data collection (excluding travel days)	5
Data analysis	5
Report writing	5
Total	**25**


DRY POWDER
FIREX

SECTION THREE:
FINDINGS

3.1 Typology of Actors in the KTCA2VCD Model.

3.1.1 Farmers.

Characteristics of smallholder farmers surveyed are summarized in Table 4.

Table 4: Characteristics of farmer beneficiaries of the KTCA2VCD

Indicators of interest	Beneficiaries n=245 Mean	Non-beneficiaries n=129 Mean
Farm size under rice (Ha)	1.57	1.45
Rice consumed (kg/household/ month)	8.00	8.08
Price of paddy (US$/Kg)**	0.42	0.40
Paddy productivity irrigated (MT/Ha)***	4.86	3.89
Paddy productivity rain-fed (MT/Ha)**	3.18	2.67
Paddy productivity irrigated/rain fed (MT/Ha)***	4.24	3.63
Paddy profitability irrigated (US$/ Ha/Yr)**	1,390	1,097
Paddy profitability rain fed (US$/Ha/Yr)*	714	692
Paddy profitability irrigated/rain fed (US$/Ha/Yr)***	1,303	1,017
Loan Access (2015-2017 in US$)***	291	26
Value of inputs (US$/Ha)***	129.61	81.61
Intensity of GAP adoption (Number)***	4	1
	Percent	**Percent**
Gender (1=Female 0=Male)	27	29
Training (1=Yes 0=No)***	96	59
Consume import rice (1=Yes 0=No)	22	20
Time in farming (1=fulltime 0=otherwise)***	90	75
Member of RCT (1=Yes 0=No)***	7	0
Aware of market rice standards (1=Yes 0=No)***	46	20
Formal Agreement (1=Yes 0=No)***	31	0.8

*Notes: ***, ** and * denotes significant differences at the 1%, 5% and 10% levels respectively.*

Although land under paddy was not significantly different between beneficiaries and non-beneficiaries, there was a 57% increase of farm land allocated to paddy by beneficiaries compared to the 1 Ha reported in the baseline report. Paddy productivity of model beneficiaries was significantly higher compared to non-beneficiaries for all the production systems. Yield of irrigated paddy was 4.86 MT/Ha among beneficiaries compared to 3.89 MT/Ha attained by non-beneficiaries, whereas beneficiaries producing paddy under rain fed and partial irrigation systems attained 3.18 MT/Ha and 4.24 MT/Ha compared to 2.67 MT/Ha and 3.63 MT/Ha attained by non-beneficiaries respectively (Table 4). Also, consortium beneficiaries received significantly higher paddy prices (0.42 US$/Kg) compared to non-beneficiaries (0.4 US$/Kg).

Moreover, beneficiaries acquired more loans (291 US$/year) compared to non-beneficiaries (26 US$/year). Ninety six percent of beneficiaries were trained compared to 59% of non-beneficiaries. On average, model beneficiaries adopted 4 practices compared to the 1 adopted by non-beneficiaries and the difference was significant at the 1 percent level.

Rice consumed in households was not significantly different between beneficiaries and non-beneficiaries possibly because farmers can substitute own production with purchases. Ninety percent of beneficiaries were full time farmers compared to 75% of non-beneficiaries and the difference was significant ($P<0.01$) (Table 4). Almost half (46%) of beneficiaries were aware of rice standards relative to 20% of non-beneficiaries.

While 31% of beneficiaries had formal supply contracts, only 0.8% of non-beneficiaries had contracts with the rest of non-beneficiaries having their paddy milled for a fee and selling the rice themselves. Differences in respondents' characteristics pointed to the important role the consortium model played such as increasing paddy productivity and profitability. Furthermore, the assurance of a market as a result of participating in the model led to increased adoption of GAPs and access to agricultural loans. It is also clear that through the model, more beneficiaries became aware of market standards about rice and were assured of a market for their paddy through formal contracts. These observations can be attributed to the model directly given that non-beneficiaries were randomly sampled from the same localities as beneficiaries indicating that they would have been similar without the model.

3.1.2 Processors.

Beneficiaries had a wide range of installed milling capacity (3,650 MT/year – 50,540 MT/year) whereas, non-beneficiaries had installed capacity ranging from 3,650 MT/year – 13,400 MT/year. It was also evidenced that the average installed milling capacity increased by 29% since inception of the CARI project. Based on the installed capacity, interviewed rice processors were categorized as medium sized. Considering the upper limit, installed capacity by model beneficiaries was 377% larger relative to non-beneficiaries. This observation could be due to project design to work with processors with large installed capacity as opposed to start ups.

Large miller loading bags of rice to supply to market

Large rice processor with an install ed capacity of 15 M T per day.

Capacity utilization among model beneficiaries doubled (grew by an average of 101%) with the capacity utilization of Kimolo Super Rice growing by 456%. For beneficiaries, utilization capacity ranged from 20% - 75% compared to a range of 3% - 20% for non-beneficiaries. This improvement in capacity utilization among beneficiaries can be associated with the increase in paddy productivity and as a result production, organized bulking of paddy and delivery of quality paddy enhancing the overall efficiency of paddy sourcing.

Analysis of paddy supply through consortia and other sources revealed that in 2017, model beneficiaries expected paddy supply of between 20 – 32,000 MT/year while non-beneficiaries expected 100 – 5,000 MT of paddy. ZANRICE is the consortia on the lower and 210% of the paddy it expected was supplied by consortium farmers and only 10 MT were supplied by other farmers probably because the expected volume was already too small making it easy to surpass.

Although the upper limit expectation of 32,000 MT/year was not met, 81% of the paddy was procured from consortium farmers. This is a gesture that consortia farmers have the potential to meet millers' demand for paddy. The 7 interviewed processors reported that they did not expect paddy during offseason (June – December) largely due to the rain fed rice production system in Tanzania. Nevertheless, ZANRICE procured 9 MT because the consortium relies mostly on irrigated rice. Thus, the offseason period presents a golden opportunity for farmers to irrigate paddy albeit partially.

Four out of the 7 processors had accessed loans (2 beneficiaries and 2 non-beneficiaries). Lead firm for ZANRICE consortium did not access loans in the reference period. Most (75%) of the loans were acquired from commercial institutions and the average loan acquired by beneficiaries was 720,720.72 US$/year whereas for non-beneficiary it was 81,081.08 US$/year. This difference in the amount of loan acquired may not be due to the model but rather the ability of a processor to pay. The processors interviewed reported that consortium financial providers did not have special products for consortium beneficiaries and that access to loan depended on one's ability to pay. All processors who acquired loans alluded to high interest rate ranging from 18% to 23% as a major limitation in accessing finance. Nonetheless, it came out that bigger loans attracted lesser interest rate but on negotiation terms, for example lead firms that applied for loans greater than Tsh 1 billion were able to negotiate interest rates of between 17% - 19% whereas loans less than Tsh 1 billion were charged at the maximum interest rate of 23%. The banks interviewed explained that larger loans enjoys economies of scale in their management like any other market good purchased in bulk. Processors who did not acquire loans cited lack of collateral and risk averseness as the main reasons.

Of the 4 beneficiary processors interviewed, Raphael group and Musoma food provided a breakdown of how they allocated the project grant they received raising concerns about accuracy of financial records kept by processors. One of the respondents used 70% of the matching grant in purchasing paddy and the remaining 30% for recurrent expenditure such as paying salaries. The trend was the same for the second respondent where 80% of the grant was used in purchasing paddy and 20% for recurrent expenditure. Half (50%) of the loan acquired by beneficiaries was used in purchasing paddy with one processor using 10% of the loan to purchase transport infrastructure and 30% for recurrent expenditure. Processors also used part of the grants advanced to them for trainings on good agricultural practices, conducting farmers' business schools, good post-harvest practices, hiring aggregation centres and paying for extension services and water pumps.

Non-beneficiaries had not acquired loans during the period under review with one having defaulted on an earlier loan. The conclusion was that finance enabled rice processors to purchase paddy which is their core raw material. A plausible explanation of the low investment in infrastructure may be due to underutilization of already installed capacity as earlier reported. Moreover, all the processors were existing long before the model implying that they had invested in infrastructure as a first step in establishing their processing businesses. In fact, one of the criterion for becoming a lead firm in any consortium was the evidence that a company had significant investment in rice processing infrastructure.

All (100%) interviewed processors sold their rice locally and white rice was the common form of rice traded with only one processor selling brown rice. The two main reasons of not venturing in exporting rice were inadequate volumes and frequent export bans. Rice price at local markets was 450.45 - 900.9 US$/MT with prices quoted by bigger processors tending towards the lower limit probably due to economies of scale.

It was also observed that rice price quoted by two beneficiaries was 450.45 - 810.81 US$/MT compared to 900.9 US$/MT reported by non-beneficiaries signifying that the consortium model was succeeding in making rice from Tanzania competitive by delivering relatively cheap rice in the local market. With making rice produced in Tanzania competitive as one major objectives of the CARI project, it was encouraging to observe that price of locally produced rice was starting to match price of imported rice (at least on the lower limit) e.g. in 2016, the price of Thailand rice in Tanzania was 500 US$/MT (ITC, 2017).

3.1.3 Business development services providers.

Input suppliers

Input suppliers covered an average of 13% of the 31 regions in Tanzania showing that they were small enterprises and implying that numerous input suppliers should be invited to join the consortia otherwise relying on a single supplier may limit timely delivery of inputs. They mostly supply seed, fertilizer and agro-chemicals. Growth in value of inputs supplied to consortium farmers could not match the total value of inputs supplied to other farmers due to difference in number (consortium farmers are expected to be few). In 2015 and 2016, total value of inputs supplied to consortium farmers accounted for 1.74% and 1.82% of all inputs sold but dipped by 64% in 2017 probably due to the drought experienced in that year. Even then, the value of improved inputs used by beneficiaries (US$ 129.61) was significantly higher compared to the value of inputs used by non-beneficiaries (US$ 81.61).

Agro-chemical shop

Extension services providers

Government extension is still dominant as reported by 92% of respondents. The most common extension method was training and visit (T&V) among beneficiaries and farmer field schools (FFS) among non-beneficiaries (Figure 3). The least common extension method was E-extension probably because use mobile phones and internet as extension methods is still a new approach.

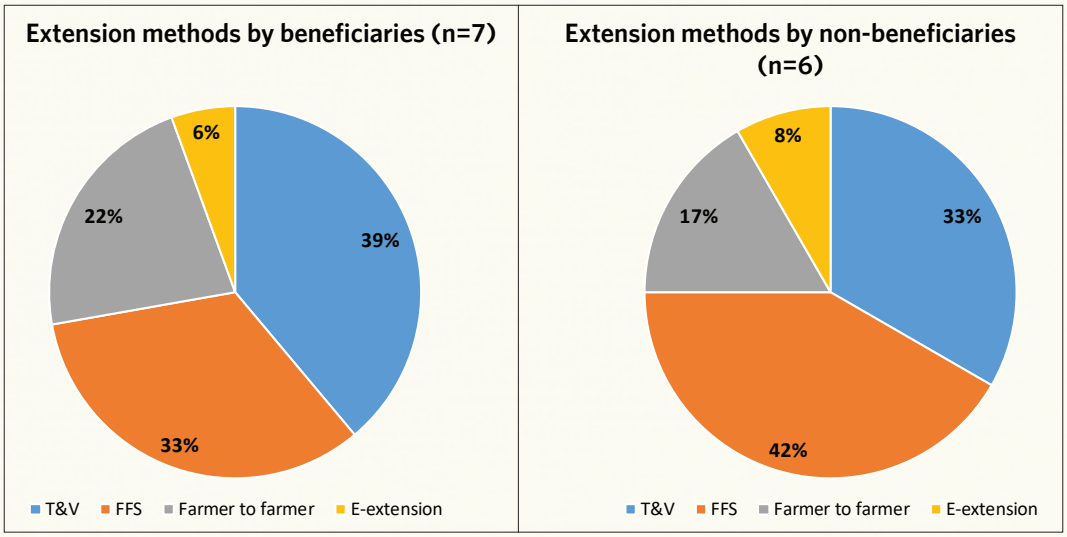

Figure 3: extension methods used by respondents

Use of agricultural technologies such as improved seed was the most common information as reported by 46% and 55% of beneficiaries and non-beneficiaries respectively (Figure 4). The least common information extended was farming as a business while the least common information extended by the non-consortium providers was market information. Despite market information and information on farming as a business being the least common information extended, they are higher (19% and 16% respectively) for beneficiaries compared to non-beneficiaries (9 and 14% respectively).

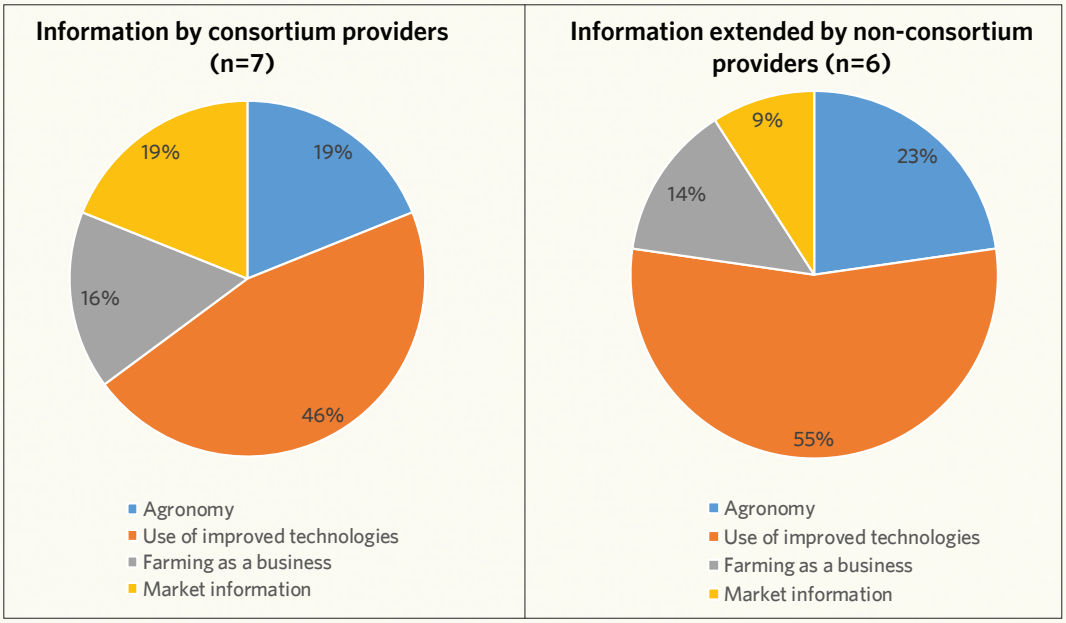

Figure 4: Information extended to farmers

Finance providers

Banks interviewed were NMB and CRDB and they provide loans, financial training and savings service to clients. All the finance institutions interviewed didn't have special products for agriculture as long as loan applicants qualified for the amount they applied for. To access loans, applicants should have an active account with the bank, the business should not be a startup and farmers should be members of registered groups. Collateral is a requirement which included title deed, guarantor and sometimes warehouse receipts. The banks were against advancing loans to individual farmers citing that it was risky and expensive to monitor. Preferring to advance loans to registered farmers' groups, the maximum loan reported per group was 135,135.14 US$/group whereas for processors, it was 220,720.72 US$/processor although these values can be higher depending on applicant's credit worthiness.

All the respondents perceived the interest rate they charged (17 – 23%) as fair considering the risks inherent in agribusiness. However, 69% of farmers and 100% of the processors interviewed perceived loan interest rates as too high. A question on the liquidity of the banks surveyed to meet the financial needs of consortia partners revealed that the banks were liquid enough to meet all the financial needs of the consortia partners suggesting that a single finance provider can sufficiently service multiple consortia.

Banks that participated in the survey, NMB and CRDB

3.2 How different are Models of Developing Agricultural Chains?

We compared the KTCA2VCD model with the SCM, the VCM and the OGSM using two parameters: i) structure; and ii) results delivery.

3.2.1 Structure wise.

The SCM, VCM, OGS and KTCA2VCD model are different but also have substantial similarities as summarized in Table 5.

Table 5: Structural differences and similarities among agricultural chain models

Aspect	SCM	VCM	OGSM	KTCA2VCD
Differences				
Main driver	Supplier	Consumer	Supplier	Consumer/market
Main objective	*Reduce cost of supply*	*Create value, innovate, product development, and marketing*	*Market access for farmers, risk sharing between farmers and buyer*	*Increase efficiency of production, sourcing, processing and marketing in line with market requirements*
Business model	Individual business plans for each actor	Individual business plans for each actor & sometime contracts	Contracts between producers and buyers	Joint planning among actors with a memorandum of understanding as well as supply contracts
Chain management	*Chain not managed – each component is independent*	*Requires collaborative management to deliver value*	*Chain is managed to honor contracts with stringent penalties for those who breach contracts*	▪ *Chain management required to ensure the joint plans are adhered to and the contracts are honored.* ▪ *Consortium members are equal business partners*
Knowledge management	Little or no knowledge beyond ones immediate suppliers and customers	All actors are knowledgeable about the value chain	All actors are knowledgeable about the value chain with the supplier as the 'information custodian'	Actors develop knowledge about the value chain guided by market needs
Similarities				
1. *Actors* in the four models are the same including farmers, buyers and consumers being the main drivers of the models. Support actors include input, extension and finance providers. 2. *Motivation* of all the models is to maximize profit for the actors involved. 3. *Business environment* of the models is similar including climatic environment, policy environment and target markets.				

Business motivation, actors and the environment under which the 4 models operate are similar implying that the difference in results they deliver is largely due to their differences including main model driver, business objective and design, chain and knowledge management. Novelty of the KTCA2VCD model is in its design. It has a central link between consumers (ready market) and buyers (lead processors for the case of this study). Consumers' needs form the business basis of discussion between buyers and farmers. Buyer-farmer agreement is *cemented* with a joint plan which culminates with a *modus operandi* in form of a memorandum of understanding (MoU). This is an innovation of its kind in developing agricultural chains that lacks in earlier models. Gaps in the joint plans dictate other crucial actors needed by the already budding farmer - buyer consortium and become consortium members by invitation sealing loopholes of missing links such as limited access to finance and extension services. Through specific supply contracts, members commit to the business goals of the consortium. The envisaged end

result of the KTCA2VCD model is increased productivity, improved quality, and efficiency of paddy sourcing, processing and rice marketing to meet consumer needs as initially defined in the joint plans.

3.2.2 Results wise.

Table 6 presents comparison of the KTCA2VCD model with other models being used in modern times in project implementation. For all the models, improving farmers' livelihoods mostly through the income pathway is the goal perhaps because of the large number of poor farmers in SSA. However, most goals of the models reviewed were not fully SMART (they were not specific and measurable making them not attainable and not realistic although they were time bound). In terms of key actors participating in the models, farmers are the ultimate beneficiaries with non-governmental organizations (NGOs) and private sector operators playing a major implementation role of the projects.

All models reviewed seemed effective in delivering project results as shown by their performance of >100% for most indicators (Table 6). Nevertheless, none other than the KTCA2VCD model reports on the performance of indicators at goal level. This can be associated with their lack of defining the goal indicators. The KTCA2VCD model presents a rare but ideal case for projects to borrow in terms of defining SMART indicators at all levels (activity, output, outcome and impact levels) to enhance results based evaluation.

The comparison of model results has two limitations: i) projects rarely make their financial performance public. This makes it difficult to determine whether the results reported under different models were worth the investment made. Also, it is difficult to make any logical conclusion as to whether set targets were realistic; and ii) projects reviewed literature focused on value chains other than rice limiting direct comparison of the results. These limitations indicate that conclusions reached from the comparisons in Table 6 should be applied with caution. An ideal comparison would have been between KTCA2VCD model and other models all targeting rice value chain in Tanzania. This literature is not available.

Table 6: Models comparison by results

Aspect	Coffee VCD in Kenya, Ethiopia, Rwanda and Tanzania, implemented by Techno serve (Techno Serve. 2013)	Sorghum contract farming in Kenya implemented by East African Breweries Ltd (EABL)[1]	Pepper consortium model in Togo implemented by Forum for Agricultural Research for Africa (FARA) (Mugabe & Warinda, 2018)	KTCA2VCD for rice in Tanzania implemented by Kilimo Trust
Goal	*To turn coffee farmers from commodity producers into integral part of a high-value specialty coffee chain, thereby increasing their incomes.*	*Increase farmer income, improve food security while helping the EABL meet its demand for sorghum*	*To Enhance livelihoods of small scale hot pepper farmers through partnerships for germplasm improvement and adaptation*	*Double income from rice for small and medium holder farm enterprises*
Key actors	▪ Farmers' cooperatives ▪ Agricultural research organizations ▪ NGO	▪ Individual farmers and farmer groups ▪ Aggregators ▪ Input providers ▪ Finance providers ▪ Private company	▪ Farmers ▪ Processor ▪ A university (research) ▪ NGO	▪ Farmers' groups ▪ Processors (Lead firm) ▪ Input suppliers ▪ Finance providers ▪ Extension providers ▪ NGO
Targets	▪ *Support 182,000 farmers with new/ improved mills.* ▪ *Train 20,000 farmers on agronomy* ▪ *50% of farmers participating in agronomy training to adopt at least half of the practices* ▪ *42% increase in coffee productivity* ▪ *US$ 0.5 increase in price per kg of green coffee.* ▪ *US$ 0.30 increase in price per kg of exported coffee.*	▪ *Increase incomes of 12,000 smallholder farmers* ▪ *Assist farmers to form farmer groups comprising between 19-50 members per group* ▪ *Conduct agronomy training to the 12,000 contracted farmers* ▪ *Ensure farmers cultivate at least 1 acre of sorghum* ▪ *Increase sorghum productivity per acre* ▪ *Purchase 30,000 MT of sorghum per year* ▪ *Increase price per kg to KES 33*	▪ *Train 10,000 farmers on GAPs and GPHHPs.* ▪ *25% reduction in amount of water used in pepper production.* ▪ *30% reduction in post-harvest loses.* ▪ *20% increase income of smallholder farmers* ▪ *15% increase in pepper productivity.* ▪ *35% and 50% reduction in drying time of pepper in wet and dry periods respectively.*	▪ *Train 30,000 farmers of which 30% are women.* ▪ *Double paddy productivity to 4MT/Ha* ▪ *Train 30,000 farmers on GAPs, GPHHPs and Farming as a business* ▪ *Link 20,000 farmers to finance* ▪ *100% of processors are confirming benefits of being consortium members* ▪ *90% of buyers report improved paddy quality*
Results against target	▪ 107% of farmers were supported with new/ improved mills. ▪ 180% of farmers were trained. ▪ 79% of farmers trained in agronomy ▪ 42% increase in productivity ▪ 100% increase in price of green coffee ▪ 320% increase in exported coffee	▪ 125% of smallholder farmers benefited from the project ▪ 125% of small holder farmers were trained and linked to input providers ▪ 100% increase in improved sorghum acreage ▪ 195% increase in price	▪ 25% of farmers trained.	▪ 495% increase in profitability. ▪ 135% increase in paddy productivity ▪ 115% farmers reached ▪ 93% SHF trained ▪ 35% of farmers accessed loans ▪ 81% paddy supply through the consortium

3.3 Performance of the KTCA2VCD Model.

3.3.1 Overall performance

The overall efficiency of the KTCA2VCD model was 96% although it overachieved with regard to financial efficiency where for every 1 US$ invested, 1.15 US$ were generated in return (Figure 5). However, the model underachieved marginally in effectiveness and relevance by 17% and 19% only indicating that it was 83% effective (a score of A) and 81% relevant (a score of A).

Effectiveness of the KTCA2VCD model was compared to effectiveness of two other models but similar comparison for efficiency and relevance was not possible owing to dearth of information. As per this analysis, the KTCA2VCD was still more effective compared to contract farming and value chain models. A caveat in the comparison is that the contract farming model was applied on sorghum in Kenya while the value chain model was applied in coffee making a direct comparison not obvious.

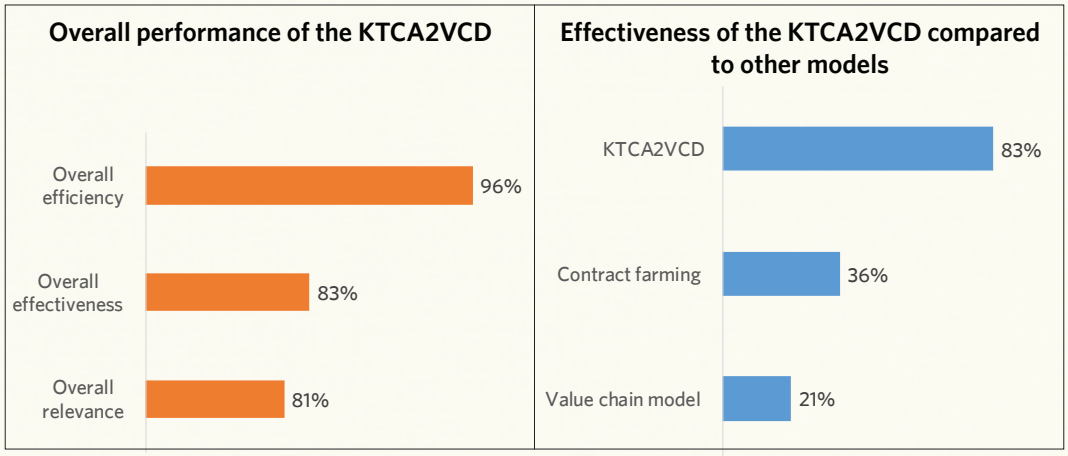

Figure 5: Overall performance of the KTCA2VCD model versus other comparable models

2 http://www.dhahabu.co.ke/2016/10/24/eaml-offers-smallholder-sorghum-farmers-better-prices/
http://m.eabl.com/news/184/26/12-000-Small-Holder-Cereal-Farmers-To-Benefit-From-EABL-KCEP-Collaboration
http://www.theeastafrican.co.ke/business/2560-919328-ymq7xw/index.html
http://m.eabl.com/news/184/47/12-000-Small-Holder-Cereal-Farmers-To-Benefit-From-EABL-KCEP-Collaboration
https://sokodirectory.com/2017/07/empower-sorghum-farmers-to-benefit-from-the-ksh-15b-brewery-project/

Leveraging private sector resources at 60% and applying a hands-off implementation approach as well as leveraging public resources such as warehouses and irrigation schemes assured sustainability of the model results after the project period.

3.3.2 Specific performance.

a) Relevance.

> ***Score 81% (grade A) – the KTCA2CVD model was relevant. The model aligned well with national, continental and global food policies. The model also addressed beneficiaries 'needs and involved a wide spectrum of stakeholders.***

To analyze relevance of the KTCA2VCD model, 3 indicators were considered: i) alignment to food policies; ii) alignment to beneficiaries' needs; and iii) involvement of stakeholders in addition to direct beneficiaries.

Indicator 1: alignment to food policies.

Eight policy and strategy documents were reviewed: Sustainable Development Goals Report (2016); Comprehensive Africa Agriculture Development Programme (CAADP, 2003); Tanzania National Rice Development Strategy (2009); National Agriculture Policy (2013); Agricultural Sector Development Programme II (2015); the Rice Council of Tanzania Strategic Plan (2015); National Trade Policy (2003); and Kilimo Trust mission statements. A 15 point score card was developed (Table 7). The goal and specific objectives of the KTCA2VCD model were weighed against themes in the score card. Out of the 15 themes, the model responded to 13 (directly or otherwise) translating to an overall score of 87%. Performance of indicator 1 was graded A implying that the model was relevant.

Table 7: Relevance of the KTCA2VCD model against major food policies

Thematic areas	Addressed by KTCA2VCD?	Addressed through
1. End hunger/poverty alleviation/improve livelihood	✓	Paddy sales
2. Food/nutrition security	✓	Paddy production and sales
3. Sustainable use of resources	✓	GAP adoption
4. Increased productivity	✓	Use of improved technologies
5. Functioning markets/M4P	✓	Linkage with lead firm/buyer
6. Focus on small-holder farmers/women	✓	Farmer profiling
7. Export agricultural produce	✓	Efficient supply of quantity and quality paddy
8. Use of modern technology/improved inputs	✓	Linkages to input suppliers & project grant
9. Commercialization	✓	Market linkages
10. Profitability/increase income/wealth creation	✓	Paddy and rice sales
11. Access to BDS (finance/extension)	✓	Direct linkage with providers
12. Competitiveness	✓	Increased productivity
13. Improve institutional performance	✓	Evidence based policy briefs
14. Improve value addition other than milling	✠	Not addressed
15. Access to market information	✠	No addressed

Notes:
✓ *theme explicitly addressed by KTCA2VCD model objectives;*
✓ *theme implied in the model objectives;*
✠ *theme neither explicit nor implied in the model objectives.*

Indicator 2: alignment to beneficiaries' needs?

The CARI proposal, Tanzania chapter highlights the needs of farmers and processors as the primary beneficiaries of the model. Thirteen needs were listed and 11 of them were targeted by the model (Table 8). The score for indicator 2 was 85% (A) thus, the model was relevant.

Table 8: Needs targeted by the KTCA2VCD model along the rice value chain

Needs	Targeted by KTCA2VCD?	Targeted through
Farmers		
1. Poor/ineffective extension	✓	Linkage to extension providers
2. Limited use of productivity enhancing inputs	✓	Linkage to input suppliers and
3. Limited accessing to credit	✓	Linkage to finance providers
4. Market information asymmetry	✠	Not targeted
5. Increase competitiveness	✓	Increased productivity
6. Unstandardized weighing equipment	✠	Not targeted
Processors		
7. Low capacity utilization	✓	Efficient sourcing of paddy
8. Poor investment decisions due to lack of facts	✓	Not targeted
9. Poor quality of paddy	✓	Adoption of GAPs
10. Insufficient modern equipment	✓	Grants and linkage to finance providers
11. Inadequate transport and storage capacity	✓	Grants and linkage to finance providers
12. Limited access credit	✓	Linkage to finance providers
Kilimo Trust		
13. Capacity of KT enhanced	✓	Leading CARI-Tz

Notes:
✓ *theme explicitly addressed by KTCA2VCD model objectives;*
✓ *theme implied in the model objectives;*
✠ *theme neither explicit nor implied in the model objectives.*

Indicator 3: did the model involve other stakeholders than direct recipients?

Partnerships are key to the success of agricultural projects. Out of the 10 stakeholders considered crucial in the transformation of the rice value chain in Tanzania, 9 were involved translating to a score of 90% (grade A) indicating that the model was relevant (Table 9).

Table 9: Involvement of necessary stakeholders

S/No.	Stakeholder	Score	S/No.	Stakeholder	Score
1	Smallholder farmers	✓	6	Rice sector apex bodies	✓
2	Rice processors/millers	✓	7	Government agencies	✓
3	Input/equipment suppliers	✓	8	NGOs other than KT	✓
4	Finance providers	✓	9	Donors	✓
5	Extension providers	✓	10	Civil society	✠

Notes: ✓ stakeholder was involved, ✠ otherwise

b). Effectiveness.

> ***Score 83% (grade A) – the KTCA2CVD model was an effective project implementation tool. The model delivered the targeted results at farmer, processor and policy levels. In some instances such productivity and profitability for irrigated and partially irrigated rice, the model surpassed expectations.***

Effectiveness at farmer level

Overall, the model targeted to integrate 30,000 smallholder farmers into the consortia. By the end of 2017, 34,577 smallholder farmers had been registered with various consortia, surpassing the target by 15%. Of the 30,000 smallholders targeted, 30% were supposed to be women. This evaluation established that 44% of farmers registered with various consortia were women surpassing the target by 14%. The model scored A+ in both indicators (surpassed expectations), thus it was effective.

Specifically, paddy price among consortium beneficiaries was significantly higher by 0.02 US$/MT compared to non-beneficiaries. Likewise, paddy productivity was significantly higher among beneficiaries relative to non-beneficiaries in all production systems. Productivity of irrigated paddy was 4.86 MT/Ha among beneficiaries compared to 3.89 MT/Ha among non-beneficiaries and the difference was significant at the 1% level. Productivity for partially irrigated paddy was 4.24 MT/Ha for beneficiaries and 3.63 MT/Ha for non-beneficiaries with productivity for rain fed paddy trailing at 3.18 MT/Ha for

beneficiaries. The consortium model attained 122%, 106% and 90% effectiveness in increasing productivity among beneficiaries for irrigated, partially irrigated and rain fed paddy. The productivity indicator scored an A+ for irrigated and partially irrigated paddy indicating that it surpassed and A for rain fed paddy showing that it was effective.

Profitability of irrigated paddy was 1,390 US$/Ha among beneficiaries and 1,097 US$/Ha among non-beneficiaries. Partially irrigated paddy generated profit of 1,303 US$/Ha and 1,017 US$/Ha for beneficiaries and non-beneficiaries respectively. Rain fed paddy was the least profitable attaining 714 US$/Ha and 692 US$/Ha for beneficiaries and non-beneficiaries respectively. Difference in paddy profitability was significantly different and can be explained by higher productivity coupled with higher paddy prices of 0.42 US$/Kg among consortium beneficiaries compared to 0.4 US$/Kg among non-beneficiaries. For irrigated and partially irrigated production systems, the model surpassed profitability target of 800 US$/Ha while for rain fed production system, the model scored an A meaning that it was effective.

The model was but effective to a limited extent in linking farmers to finance providers because only 35% of beneficiaries acquired loan. However, this percentage was significantly higher compared to 9% of non-beneficiaries who acquired loans in the reference. Comparing the average amount of loan between beneficiaries and non-beneficiaries, consortium farmers acquired an average of US$ 291 per year compared to US$ 26 that was acquired by non-beneficiaries suggesting that the CARI model was 11 times more effective in enhancing access to finance.

Almost all (96%) beneficiaries were trained on GAPs compared to 59% of non-beneficiaries and the difference was significant ($P<0.01$). Of the 7 GAPs promoted, (land preparation, use of improved inputs, transplanting, water management, post-harvest handling, farming as a business and use of improved rice seed), the average adoption rate among beneficiaries was 57% compared to 14% among non-beneficiaries meaning the model was effective to a large extend scoring grading B. Forty six percent of beneficiaries were aware of market standards regarding paddy compared to 20% of non-beneficiaries and the difference was significant ($P<0.01$). The model scored C indicating that it was effective to a limited extent in awareness creation. More efforts are required to ensure all farmers are aware of market standards in order to enhance their market participation. A significantly higher percentage (31%) of beneficiaries had supply contracts relative to only 0.8% of non-beneficiaries showing that the model was effective to a limited extent in linking farmers to markets pointing to potential area of improvement.

Effectiveness at processor level

On average, beneficiaries procured 81% of their paddy through the consortia with one processor surpassing target by 220% compared to non-beneficiaries who managed to procure 50% of their paddy requirement. Moreover, all the paddy supplied through the consortia was rated as fair to good quality and none was rejected. The case was different for non-beneficiaries who reported that up to 30% of the paddy supplied was of poor quality. Two of the 4 beneficiaries reported that it was very easy to source paddy through the model while another 2 beneficiaries cited that it was easy as opposed to all non-beneficiaries who reported that sourcing paddy was difficult.

The difference in processor perception on ease of sourcing paddy can be explained by the fact that through the consortia, farmers are in groups and are able to bulk paddy as opposed purchasing paddy in the open market where farmers are widely spread and individually handle small volumes. The conclusion was that the model was effective in increasing the quantity and improving quality of paddy supplied.

Effectiveness at policy level

To improve the policy framework for rice in Tanzania, 3 policy briefs were developed as planned. Through the model RCT was financially supported to develop 1 position paper against rice smuggling in Tanzania. Recommendations of the position paper were adopted by the GoT by strengthening surveillance to minimize rice smuggling. Other 2 policies: effects of food export bans on availability, farm gate and consumer prices of rice in Tanzania and implication of non-tariff barriers on rice profitability and market access among rice processors in Tanzania were developed. Recommendations of the export bans brief were adopted leading to lifting of the 2017 food export ban. The first brief was a direct contribution to improved policy environment through financial and technical support through the model while the other two contributed indirectly because they were developed outside the model. As a result, it was concluded that the KTCA2VCD was effective in contributing to better policy environment based on the number of briefs developed. Considering the number of briefs adopted, the model scored 67% (B) meaning it was effective to a large extend.

c) Efficiency.

> *Score 96% (grade A) – the KTCA2CVD model was efficient and surpassed expectation with regard to financial efficiency. The model delivered results on time and for every US$ invested, US$ 1.15 were generated as return on investment.*

The overall timeliness efficiency of the KTCA2VCD model was 77% and ranged from 39% - 115% (excluding access to finance) translating to grade A (Figure 6). This shows that the model was efficient. Access to finance (red bars) had a negative change for years 2016/2017 indicating that farmers and processors acquired less amounts of loan in 2017 compared to 2016. This observation can be interpreted in three ways: i) farmers and processors had outstanding loan balances in 2017 brought forward from 2016 reflecting burden of payment; ii) enterprises were making sufficient profits and beneficiaries did not have pressing needs for more loans. The reduction in access to loans in 2017 could also imply inadequate finance access due to low repayment rate and therefore banks were not willing to advance more loans. The three pathways makes it difficult to grade access to finance.

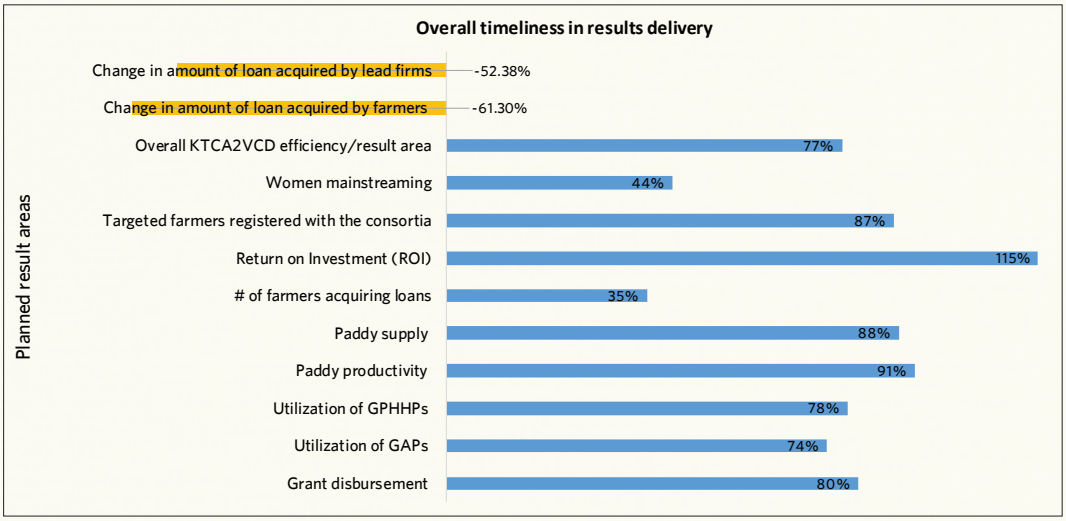

Figure 6: Overall model efficiency in results delivery

Financial efficiency of the model is presented in Table 10. The average cost of setting up a functional consortium was estimated at US$1,069,392.68. To justify the costs, BCR was used. The resulting quotient was 1.15, an equivalent of 115% incremental return on investment (RoI). This was value for money given that for every 1 US$ invested in a consortium, 1.15 US$s were generated as incremental returns. Although the RoI may seem unconvincingly high, plausible explanation is that earnings of smallholder famers in SSA are often low making it possible to increase them exponentially, at least initially. It is no surprise because other studies have reported similarly high RoI on agricultural enterprises such as Economists at Large (2014) who reported a RoI of 920% among livestock keepers in Kenya and Ewbank *et al*. (2007) who reported a RoI of 1600% among chicken keepers in Uganda.

Conclusively, *the KTCA2VCD model was financially efficient*. As the consortia mature, they tend to become more efficient by reducing costs while increasing benefits. Consequently, the costs presented in Table 10 are expected to reduce with time.

Table 10: BCR of investing in the KTCA2VCD model

Consortia	*(A) Partner contribution (US$)*	*(B) Grant received 2017 (US$)*	*(C) Actual project cost (US$)*	*(D) Value of rice traded (US$)*
SHIRCO	583,623.88	233,450.00	817,073.88	8,424,202.57
PBR – DR	483,521.53	212,750.00	696,271.53	2,346,615.95
SURIPRO	424,924.02	166,750.00	591,674.02	530,925.97
RIMAH	431,357.32	172,500.00	603,857.32	111,089.99
SHYRICE	416,874.57	166,750.00	583,624.57	4,375,662.21
MRC	402,499.57	161,000.00	563,499.57	2,354,119.56
SCF	258,751.25	103,500.00	362,251.25	215,957.48
ZANRICE	403,881.27	201,941.15	605,822.42	10,509.94
E: Total cost/benefit (US$)	3,405,433.42	1,418,641.15	4,824,074.57	18,369,083.69
F: Overheads (US$)			3,731,066.90	
G: Total project cost (US$)			8,555,141.47	
H: Total cost/consortium			1,069,392.68	
I: Incremental benefits (US$)				9,813,942.22
J: Benefit-Cost Ratio (BCR)				1.15

Notes: Exchange rate, 1 US$ = Tsh 2,220. E=sum of columns A, B, C and D. G=cell (CE) + cell (CF). H=G/8. I=cell (DE)-cell (CG). J=I/cell(CG)

To assess the model's efficiency with respect to timeliness in results delivery, 6 indicators were used: timeliness in grant disbursement, number of farmers trained, number of farmers utilizing GAPs promoted, paddy traded through the consortia, increase in paddy productivity and access to finance.

Indicator 1: Timeliness in grants disbursement

Eighty percent of grants had been disbursed to different consortia by end of 2017 translating to grade A. For specific consortia, time efficiency varied. Grant disbursement to SHIRCO consortium attained an efficiency level of 81% in 2016 while SCF was inefficient. In 2017, disbursement to SHIRCO consortium remained the most efficient although disbursement to ZANRICE consortium recorded the highest improvement of 54%. The efficiency recorded regarding disbursements to SHIRCO consortium were due to the consortium's high absorption capacity given the large size of the lead firm with an installed capacity of 50,540 MT/year and 6,154 farmers. Overall, the consortium model was efficient (Figure 7).

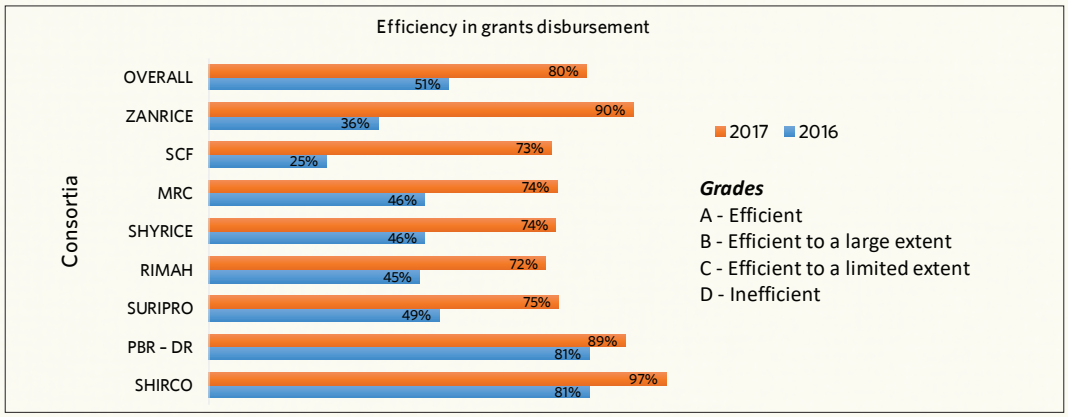

Figure 7: Efficiency of the KTCA2VCD model in grant management.

Indicator 2: Farmers reached using farming business schools (FBS)

Through the KTCA2VCD model, 31,320 farmers were targeted for training applying farmer business schools (FBSs) approach. The model attained 97% efficiency by end of 2017 (Figure 8). Consortium wise, SCF, PBR-DR and SHIRCO consortia surpassed targets by 12, 2 and 1 percent respectively with the rest of the consortia scoring an A. This finding denotes that the model was efficient.

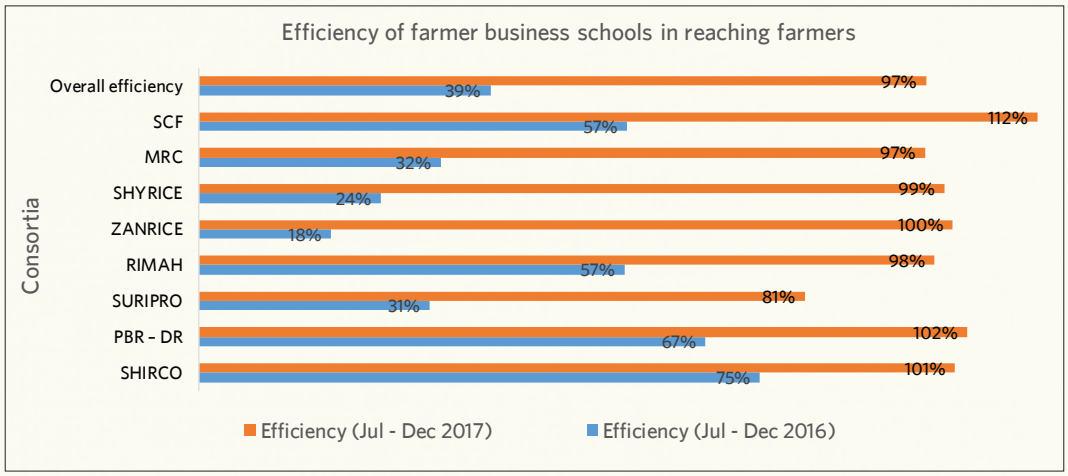

Figure 8: Efficiency of KTCA2VCD model in farmer training

Indicator 3: Transforming GAP & GPHH training into adoption

Through GAPs and GPHHPs training, 78% and 74% of the trained farmers adopted at least one practice (Figure 9). The difference in the two levels of efficiency could be because some GAPs such as planting in rows are simple and affordable relative to some GPHHPs such as purchasing tarpaulins for paddy threshing. Data on adoption of GPHHPs was missing for MRC, ZANRICE and RIMAH consortia. The efficient consortia were SHIRCO (A+) and PBR-DR (A+) respectively surpassing their targets. Available data shows that the model was efficient in promoting GAPs and efficient to a large extend in promoting GPHHPs.

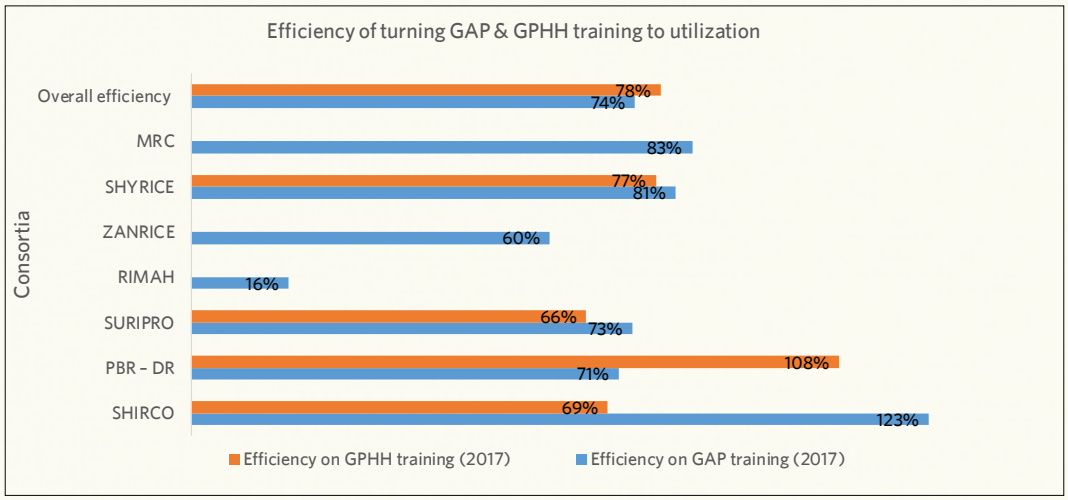

Figure 9: Efficiency in converting training into GAPs and GPHHPs utilization

Indicator 4: Increase in quantity of paddy supplied to lead firms.

Volume of paddy targeted to be supplied though the model was 117, 828 MT. By end of 2017, efficiency ranged from 2% – 178% (Figure 10). Specifically, ZANRICE, SCF, RIMAH and SURIPRO were inefficient while SHIRCO surpassed expectations. Overall, the model was efficient having attained an efficiency level of 88% (grade A).

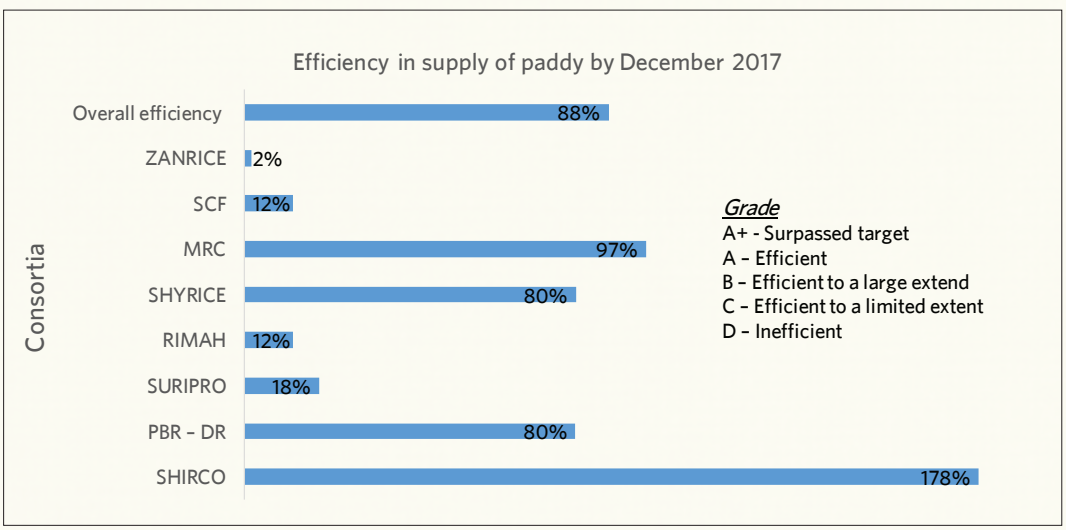

Figure 10: Efficiency in paddy supply

Indicator 5: Increase in paddy productivity.

Overall, the consortium model was efficient in increasing paddy productivity on time attaining overall efficiencies of 122%, 106% and 79.5% for irrigated, partially irrigated and rain fed paddy respectively (Figure 11). Efficiency ranged from 36% (effective to a limited extent) to 207% (surpassed target). The high levels of efficiency can be attributable to adoption of GAPs as well as access to inputs and finance. It is also common for projects to realize higher levels of efficiency due to the supportive environment they create enabling beneficiaries to over-deliver.

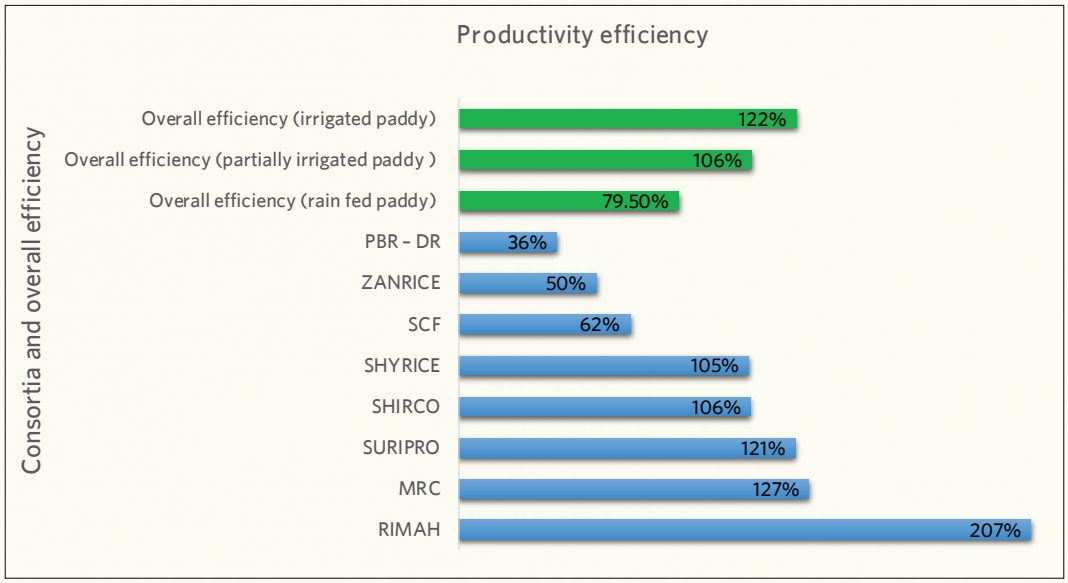

Figure 11: Efficiency in improving paddy yields by end of project period

Indicator 6: Increase in number of farmers and processors accessing loan.

The CARI model targeted to link 24,000 farmers to financial institutions by end of 2017. This target was later revised to 17,634 farmers to make it more realistic. Available data for 5 consortia shows a 53% increase in the number of farmers accessing loan in 2016-2017 and the increase was significant. Given that 6,934 farmers accessed loan by end of 2017, the model attained efficiency of 39% (Table 11). A score of C meant that the model was efficient only to a limited extent.

Table 11: Number of farmers accessing loans and amount (US$) accessed

Consortium	*# of farmers 2016*	*# of farmers 2017*	*% change (2017-2016)*	*US$s accessed (2016)*	*US$ accessed (2017)*	*% change (2017-2016)*
SHIRCO	2,000	2,680	34	280,642.55	241,696.58	-13.87
SCF	478	516	8	342,357.30	33,291.03	-90.28
MRC	1,865	3,387	82	156,400.00	22,736.58	- 85.46
RIMAH	176	351	99	9,225.30	7,492.69	-18.78
TOTAL	**4,519**	**6,934**	**53****	**788,625.15**	**305,216.88**	**-61.30**

*** Increment in # of farmers accessing finance was significant at 5% level.*

The overall amount of loan accessed by lead firms decreased by 52% in 2017 compared to 2016 (Table 12). Musoma food, KSR and Biosustain did not acquire loans in 2017. It was not logical to compute the percentage change in the amount of loan acquired by G2L and Faki enterprise because they did not acquired loans in 2016.

Table 12: Amount of loan (US$) accessed by lead firms

Consortium - lead firm	*US$ accessed (2016)*	*US$ accessed (2017)*	*% Change (2017 - 2016)*
SHYRICE – Musoma Food	517,500.00	0	-100
SHIRCO - RGL	956,739.05	599,999.85	-37.29
PBD-DR - KSR	153,077.65	0	-100
MRC - G2L	-	222,681.40	-
SURIPRO - Biosustain	184,632.50	0	-100
ZANRICE – Faki enterprise	-	40,250.00	-
OVERALL	**1,811,949.20**	**862,931.25**	**-52.38**

d). Impact.

Score 100% (grade A) – the KTCA2CVD model had a positive impact on the 5 basic human aspirations (food, shelter, clothing, education and health). Farmers demonstrated how they had used money from the rice enterprise in improving their livelihoods through the 5 impact areas.

Participation in the consortium model was associated with several societal changes among beneficiaries. Areas that recorded positive changes were: i) ease of doing business, ii) improved shelter, iii) access to education, iv) diversification to non-farm enterprises and v) savings. The most direct change was increased paddy productivity and as a result, rice availability. In fact, farmer beneficiaries consumed 171% more of their own produced rice compared to non-beneficiaries. This observation was linked to rice availability and therefore the consortium model.

Processors and farmers reported that it was easy to do business within the model. All the processors interviewed reported that sourcing paddy through the model cost less time and money while all the non-beneficiaries perceived paddy sourcing as costly. Processors benefiting from the model reported improved quality of paddy supplied with no paddy rejected while at the same time, processors who were not benefiting from the model reported that up to 30% of paddy supplied to them was of poor quality. Processors benefiting from the model procured 81% of their paddy requirement through consortium farmers. Non-beneficiaries managed to procure only 39% of the paddy they required.

Farmers reported that the consortium model improved market access with 31% of beneficiaries having supply contracts compared to <1% of non-beneficiaries. In addition, farmers preferred to trade through the contractual agreement as opposed to open markets. In addition to recorded increase in quantity of paddy supplied by consortium farmers, their quality of paddy met market requirements explaining the zero rejection by processors. Non-beneficiaries complained that up to 30% of the paddy supplied to them was of poor quality e.g. had high moisture levels requiring further drying.

Paddy being sun dried before milling

Housing was a common impact area among beneficiaries. Income from paddy sales was used in constructing permanent family houses. Shelter being a basic human need, this was a major impact for CARI to contribute to among beneficiaries (Photo 2).

Left: Beneficiary almost completing the construction of his main house.
Centre/right: Couple of beneficiaries who have set foundation to construct a permanent house.

During FGDs, paying schools fees was also mentioned as a main impact area by parents with children in secondary schools. The only challenge was rice production is a seasonal venture (for rain fed production system) meaning that sometimes income from paddy was not available suggesting irrigation system can be a long term solution to seasonal paddy income.

Farmers are risk averse and tend to diversify. Farmers used money from paddy sales to diversify to motorcycle public system business locally known as bodaboda business (Photo 3). The explanation was that during offseason, farmers earn supplementary income from the bodaboda business. It was also reported that other farmers are diversifying to other enterprises such as keeping shops and livestock as a way of spreading risk

A beneficiary who diversified to bodaboda transport business

For farmers to acquire loans, one of the requirements is to open a bank account and actively operate it for at least 6 months. During this period, banks educate farmers on finance management with the hope that their repayment rate will improve. This has changed the way farmers manage finances. Farmers reported that they currently keep their money in banks reducing impulse spending and enabling them to plan.

In terms of gender mainstreaming, the project reached 44% of women against a target of 30%. This observation is important because it shows that women can be and are being integrated into high value chains such as rice that were traditionally dominated by men. Also, consortium members are more positive about the model and are willing to commit to its operations even after the CARI project period ends. This was the perception of 100% of processors who led various consortia and 98% of farmers who benefited.

The most important positive change among processors was that they now view farmers as equal business partners as opposed to poor and helpless paddy producers. This enabled them to negotiate and dialogue for win-win agreements, perhaps explaining the high supply rate of quality paddy. None of the lead firms reported a negative impact of the model, an indication that the model brought only positive changes to the processors. On the other hand, farmers understand the role of contracts and advantages of honoring them. Additionally, farmers were able to acquire loans and inputs making paddy production easier for them, no wonder the improved productivity. If it were not for the consortium model, these changes would not have been realized within such a short period of time as illustrated in earlier sections.

e) Sustainability.

> ***Score 80% (grade A) – the KTCA2CVD model's results are sustainable but there is room for improvement. Out the 5 expected sustainability indicators, 4 were achieved.***

Five aspects of sustainability were considered important in this study: i) willingness of partners to continue participating in the consortia, ii) potential for consortium growth, iii) leverage of private and public resources, iv) enabling policy framework and v) presence of an exit strategy.

Respondents were asked of their willingness to continue participating in their respective consortia after CARI period ends. All the processors were willing to work with consortium farmers to increase paddy supply and improve quality even more. Likewise, 98% of farmers reported that they are willing and will continue to actively participate in their respective consortia after the project period ends. With the will of the two partners who form the backbone of the KTCA2VCD model, it will be easy for other stakeholders to join the consortia (by invitation) including BDS providers. The main incentive for BDS providers to continue supporting the consortia was that they are assured of business growth through increased sales. The willingness by consortia partners to actively contribute to the operations of the consortia assures that the already achieved results will be sustained in the long run.

On one hand, processors are intending to recruit more farmers into the consortia they lead in addition to their willingness to continue procuring paddy from current consortium farmers with an aim to procure all the paddy they demand from consortium farmers. This was after the processors realized that sourcing paddy through the consortia makes it possible to manage productivity, quality and timeliness in production and supply as well as costs. On the other hand, consortium farmers have increased paddy productivity to 4.86 MT/Ha for irrigated, 4.24 MT/Ha for partially irrigated and 3.18 MT/Ha for rain fed systems. They have also increased their profitability to 1390 $/Ha, 1303 $/Ha, 714 $/Ha in irrigated, partially irrigated and rain fed systems respectively.

Higher profitability can lead to enterprise growth through reinvestment. With higher profits, farmers can access improved inputs sustaining the already high yields. This will ensure that the consortia grows both in number of active partners especially farmers and volume of paddy traded. Growth of the consortium backbone link (farmers-buyers) will stimulate growth of support links especially BDS providers as demand for extension services, finance and improved inputs grow leading to downstream and upstream growth of the consortia.

Given that the consortium model leveraged 60% of private resources shows that consortia members face a high opportunity cost if the model collapses. This was innovative on the part of the project implementers and assures model sustainability as partners are more likely to safeguard the already high investments in building the consortia. At the worst, the consortia would only lack the 40% grant provided by CARI. In this study, it is confidently concluded that with 60% investment, it is relatively easy to attract private sector finance to fill the gap left after the grant funds. This increases the chances of the consortia succeeding. However, there was no evidence of public resources that were leveraged especially provision of public goods such as roads, electricity and water. This may limit the sustainability of the model results in the long run.

Policy is important in ensuring growth and sustainability of agri-businesses. The CARI Project targeted to improve policy framework for rice in Tanzania by developing high impact evidence-based policy briefs to kindle debate about crucial issues limiting the rice sector. The two policy briefs developed are starting to bear fruits. The one against food export bans contributed significantly to the lifting of the 2017 export ban on food. With efforts to lobby government underway, evidence on the effect of NTBs will see some of the barriers eliminated but more importantly, emergence of new ones stopped.

Exit strategies are key to sustainability of project results. The main exit strategy of the CARI project was in its innovation to support the consortia hands-off, where private sector business partners managed their business affairs. This made the project activities redundant once the project period comes to an end because the consortia are managed

by the private and public sectors and not NGOs. Despite this strategy, there are concerns that the consortia partners themselves did not have a sustainability plan post project period. Risk management plans, conflict resolution mechanisms and power control strategies were lacking. This may jeopardize the sustainability of the model results in the long run.

3.3.3 Lessons learnt and areas of improvement.

Farmers learnt that:

1. Farming is a business in addition to producing paddy for home consumption. Capacity building through the consortium model changed farmers' perception about paddy production where currently, farmers consider the enterprise as a business.

2. Use of improved inputs such as seed is profitable for commercialized farmers including smallholders. Although cost of improved inputs is high, farmers noted that the returns are worth the investment because improved inputs are a major driver of increased productivity. This point reaffirmed point 1) above.

3. Committing to business agreements is beneficial to partners in the agreements. Farmers have been known to be deal breakers e.g. breaching contracts. However, through the consortium model, they have learnt that committing to business agreement is key to the success of their farming businesses.

Processors learnt that:

4. Farmers are equal business partners and that it is possible to reduce cost and time of sourcing paddy while improving quality and quantity by working with them. This led to processors planning to recruit more farmers to their consortium.

5. Through capacity building, farmers can be transformed into trustworthy and loyal clients. This was shown by farmers' loyalty in supplying paddy to processors who had contracted them with minimal side selling even when that option was available.

BDS providers learnt that:

6. Through capacity building, farmers can be transformed into trustworthy and loyal clients. Through the consortia, payment rate of inputs improved because supply and payment of input loans was through the processor and farmers did not default supplying to the processors.

The lessons notwithstanding, the following areas of improvement were identified going forward:

1. Competition for BDS providers should be allowed. Having a single BDS provider such as input provider per consortium led to delays in the supply of services. It also made it difficult for farmers to negotiate for better terms because they had limited options. Going forward, multiple suppliers per consortium should be allowed. This would increase bargaining power of farmers possibly leading to lower prices of services.

2. The financial organizations observed that some crucial partners were missing in the consortia especially insurance given the high risk of agribusiness. Going forward, these need to be invited as a risk management strategy in the value chain.

3. Government extension officers reported that during initiatives such as CARI, their workload increases with no extra facilitation especially transport to cover expansive locations because government has limited funds. Going forward, if government extension officers are needed by projects, they should be integrated into the model design and supported with transport in order to meet projects objectives.

SECTION FOUR:
CONCLUSIONS AND RECOMMENDATIONS

1) KTCA2VCD model is relevant

Overall relevance score of the model was A indicating that the model was relevant. However, none of the three indicators scored 100% showing that there is potential to improve.

> *#1: Consequently, it is recommended that the model should be comprehensive in its identification and targeting of stakeholders and alignment to national food policies.*

2) KTCA2VCD model is an efficient project implementation tool.

By attaining incremental 115% financial efficiency, KTCA2VCD model is a financially efficient project implementation tool. Likewise, the model scored an A as an efficient tool in delivering project results and on time. Evidence from other KT evaluation reports such as Regional East African Community Trade in Staples (REACTS) is consistent with the findings of this evaluation.

> *#2: It is recommended that the consortium model is an efficient results delivery approach for agricultural development projects and should scaled up. To further refine the model in addressing the ever evolving agricultural needs, KT should continue with its efforts of using the model other settings such as rice value chains in other countries. This will eventually make the model a game changer in transforming food value chains.*

3) KTCA2VCD model is effective in delivering project results.

Overall, the consortium model deviated from target by -17% only. In other words, on average, 83% of the planned results were delivered. Indicators such as profitability, number of farmers reached and number of women integrated into the model surpassed expectation. In addition, more than half (>50%) of planned results for productivity and adoption of GAPs were delivered.

> *#3: As a result, it is recommended as #2 above.*

4) The model's sustainability strategy is unique and worth pursuing.

The model was innovative in leveraging private sector resources at the rate of 60% and using the 40% difference as an incentive for private sector investment. The implementer also used a hands-off implementation style implying that the consortium approach will go a long way in ensuring that partners carry on their responsibilities after the project period.

It was also noted that the model leveraged on public resource especially warehouses and irrigation schemes that are constructed and managed by government further strengthening the sustainability of the model results. It is also assumed that with each consortia partner understanding their business benefit from participating in the consortia, it would only be rational for them to keep operating within the consortia.

> *#4: It is recommended that the model should continue with its core creativity of using private sector as change agents in transforming agricultural value chains. It is also recommended that KT should strengthen its hands-off project implementation style as a way of weaning consortia partners. To enhance sustainability even further, it is important to build the capacity of partners in developing their own formal strategies of operation beyond project period.*

SECTION FIVE:
REFERENCES

African Union [AU], 2003. Comprehensive Africa Agriculture Development Programme (CAADP). Accessed at http://www.nepad.org/cop/comprehensive-africa-agriculture-development-programme-caadp.

Agricultural Sector Development Programme II [ASDP-II], 2015. Accessed at http://extwprlegs1.fao.org/docs/pdf/tan160643.pdf.

Alliance for a Green Revolution in Africa [AGRA], 2017. Africa Agriculture Status Report 2017. The Business of Smallholder Agriculture in Sub-Saharan Africa.

Bala, K., 2014. Supply chain management: Some issues and challenges-A Review. International Journal of Current Engineering and Technology, 4(2), pp.947-953.

Collins, R. C., Dent, B., & Bonney, L. B. (2016). A guide to value-chain analysis and development for overseas development assistance projects. A guide to value-chain analysis and development for overseas development assistance projects.

Economists at Large, (2014). A Benefit-cost analysis of WSPA's 2012 Intervention in the Dhemaji district of Assam, India. A report for The World Society for the Protection of Animals, prepared by Economists at Large, Melbourne, Australia.

EUCORD, 2012. Rice Sector Development in East Africa. Accessed at http://common-fund.org/fileadmin/user_upload/Illustrations/CFC__Rice_Sector_Development_in_East_Africa_2012.pdf.

Ewbank R., Nyang M., Webo C. and Roothaert R., (2007). Socio-Economic Assessment of Four MATF Funded Projects. FARM-AFRICA WORKING PAPERS. Available on http://www.farmafrica.org.uk/view_publications.cfm?DocTypeID=11.

Feller, A., Shunk, D. and Callarman, T., 2006. Value chains versus supply chains. BP trends, pp.1-7.

Fisher R. and Roberts S., 2017. Smallholder Outgrower Schemes: Principles of Success.

Food and Agriculture Organization [FAO], 2015. The rice value chain in Tanzania. A report from the southern highlands food systems programme.

Government of Tanzania [GoT], 2016. 2014/15 Annual Agricultural Sample Survey Report. http://www.nbs.go.tz/nbstz/index.php/english/statistics-by-subject/agriculture-statistics/774-2014-15-annual-agricultural-sample-survey-report

Israel, G.D., 1992. Sampling the evidence of extension program impact. University of Florida Cooperative Extension Service, Institute of Food and Agriculture Sciences, EDIS.

ITC, 2017. International trade statistics 2001-2017 http://www.intracen.org/itc/market-info-tools/trade-statistics/

Lewis I., 2012. Tanzania's Rice Sub-Sector and Value Chain- Analysis & Review and Proposed Vision & Strategy for Improved Competitiveness & Growth.

Mugabe, J., & Warinda, E. (2018). Report of Monitoring Visits to 8 Projects Conducted from August to December 2017.

Mwatawala, D, Mwang'onda, E. and Hyera, R.N., 2016. Paddy Production in Southern Highlands of Tanzania: Contribution to Household Income and Challenges Faced by Paddy Farmers in Mbarali District.

National Agriculture Policy, 2013. Accessed at http://www.tzdpg.or.tz/fileadmin/documents/dpg_internal/dpg_working_groups_clusters/cluster_1/agriculture/2._Ag_policies_and_strategies/National_ag_policies/1._2013_NATIONAL_AGRICULTURAL_POLICY_-_FINALFebruari_2013.pdf

National Rice Development Strategy [NRDS], 2009. Accessed at https://www.jica.go.jp/english/our_work/thematic_issues/agricultural/pdf/ghana_en.pdf

National Trade Policy, 2003. http://www.tzonline.org/pdf/tradepolicyforacompetitiveeconomy.pdf

Ngailo, J.A., Mwakasendo, J.A., Kisandu, D.B. and Tippe, D.E., 2016. Rice Farming in the Southern Highlands of Tanzania: Management Practices, Socioeconomic Roles and Production Constraints. European Journal of Research in Social Sciences, 4(3).

Porteous, O.C. 2012. Empirical Effects of Short-Term Export Bans: The Case of African Maize. Working Paper, Dept. of Agricultural Economics, University of California Berkeley.

Rice Council of Tanzania [RCT], 2015. RCT's Strategic Plan 2015-2019. Accessed at http://rct.co.tz/Documents/RCTS-STRATEGIC-PLAN-2015-2019.pdf

Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA, 2014). http://www.tccia.com/tccia/wp-content/uploads/2011/07/TOP-5-NTBs-IN-TANZANIA.pdf.

Techno Serve. (2013).The Coffee Initiative. Phase One Final Report 2008 to 2011

Trading Economics, 2017. Accessed at http://www.tradingeconomics.com/tanzania/gdp.

United States Department of Agriculture [USDA], 2017. Tanzania Corn, Wheat and Rice Report. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Grain%20and%20Feed%20Annual_Dar%20es%20Salaam_Tanzania_3-29-2017.pdf

Webber M and Labaste P. 2007. Using Value Chain Approaches in Agribusiness and Agriculture in Sub-Saharan Africa. http://www.ruralfinanceandinvestment.org/sites/default/files/vcguidenov12-2007_pdf.pdf.

Kilimo Trust Head Quarters
Plot 42 Princess Anne Drive, Bugolobi,
P.O.Box 71782, Kampala Uganda
Tel: +256 392 264 980/1 , +256 200 926 498,
Email: admin@kilimotrust.org

Kilimo Trust Kenya
P.O. Box 12261-20100, Nakuru, Kenya, Ravine road, opposite Kenya Medical Supplies Authority (KEMSA) Nakuru Depot
Office: Smallholder Dairy Commercialization Programme - Programme Coordination Unit
Tel: +254 721 748 056
Email: admin@kilimotrust.org

Kilimo Trust Tanzania
Plot 455, Avocado Street, Kawe
P.O.BOX 106217, Dar-es-Salaam, Tanzania
Tel: +255 22 278 1299,
Email: admintz@kilimotrust.co.tz

Kilimo Trust Rwanda
P.O Box 5448 Kigali – Rwanda
Magerwa Street, KK 6 Avenue, House NHOB 10, inside NAEB
Tel: +250 788 874 901
Email: admin@kilimotrust.org

Website: www.kilimotrust.org