FINAL EVALUATION REPORT

Calories and Household Income from Potato Subsector (CHIPS)

project in Tanzania

Kilimo Trust

Transforming Lives Through Agribusiness

COMIC RELIEF

Acknowledgements

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Table of Contents

List of figures

ACRONYMS

ARI	Agricultural Research Institute
CHIPS	Calories and Household Incomes from Potatoes Sub-sector
CIPP	Context, Input, Process, Product
FBOs	Farmer Business Organizations
FGD	Focus Group discussion
GAP	Good Agricultural Practices
GPS	Geographical Positioning System
KII	Key Informant Interview
KT	Kilimo Trust
KT-CA2VCD	Kilimo Trust Consortium Approach to Value Chain Development
NADO	Njombe Agricultural Development Organization
NGO	Non Governmental organization
OECD DAC	Organization for Economic Co-operation and Development OECD/ Development Assistance Criteria
SHF	Small Holder Farmer
SHG	Small Holder Group
SPSS	Statistical Package for Social Sciences
SRV	Small Retailers and Vendors
TAHA	Tanzania Horticultural Association
TARI	Tanzania Agricultural Research Institute
TOT	Trainer of Trainers
VC	Value Chain
VIBINDO	Vikundi vya Biashara Ndogo Ndogo

Executive Summary

Project Description and Purpose

The four-year Calories and Household Incomes from Potatoes Sub-sector (CHIPS) project funded by Comic Relief and implemented by Kilimo Trust in Tanzania aimed at enhancing incomes and accelerating wealth creation for Smallholder Farmers (SHFs) and Small Retailers and Vendors (SRVs) of round potato in Tanzania. It was steered by Kilimo Trust through matching grant fund business model to private sector and NGO partners.

The two main implementing partners are Agricultural Research Institute (ARI) Uyole and Tanzania Horticultural Association (TAHA) and nine matching grant partners. ARI Uyole did improve seed research and multiplication while TAHA did market linkages and business development focusing in the northern part of the country. Kilimo Trust did the grant management, administration, capacity building and coordination.

The business case submitted to the donor in 2015 indicated low returns/incomes from potato enterprise for farmers, although they sold 80% of what they produced. The business case urged that the cause was limited business partnerships in the value chain resulting in weak link to markets. Lack of markets had hindered production while offtakers (medium and large scale) risked failing to obtain adequate raw materials and/or on time deliveries, hence were reluctant to invest. Flexible funding was therefore necessary to support experimentation development of smallholder targeted business models attractive to other private agribusiness players in the sub sector before upscaling.

The purpose of the project was to increase productivity, efficiency, profitability and volumes of business involved in the round potato value chains. CHIPS was implemented in Tanzania, targeting to reach at least 17,500 SHFs and 12,500 SRVs. The evaluation was commissioned to assess the CHIPS project and inform Kilimo Trust and its stakeholders on the status with regards to project goal, objectives and outcomes of the project including how the results were achieved, lessons learnt and recommendations.

Methodology

The evaluator used a mixed methodology approach which includes the OECD DAC Criteria and borrowed heavily from Daniel Stufflebeam's CIPP. The evaluator further did a detailed desktop review of relevant documents, development of survey tools, sampling procedures and identification of best format of analysis and presentation of survey findings. Both participatory and consultative approaches including stakeholder and key informant interviews, focused group discussions, household surveys and observations were adopted.

In analysis descriptive statistics was adopted to present the data in form of frequency tables, mean values, mode and median. For data analysis, SPSS version 21 statistical software was used to generate results for ease of presentation. Upon establishing the various effects, discussion of the results was done in an attempt to draw conclusions, and identify recommendations arising from the results of the data analysis. The sampling frame used for the household survey was drawn from SHFs and SRVs who had been working with the partners as the beneficiaries of CHIPS project. A total of 131 households participated in a survey for SHFs (37 in Arusha, 52 in Njombe and 42 in Mbeya).

The household survey included **99** males and **32** female SHFs

The **52** vendors comprised of **22** males and **30** females

There were also 14 key informant interviews and 4 focus group discussions with farmers and implementing staff. Four districts were visited including Mbeya Rural, Arumeru, Njombe Town and Wanging'ombe.

Key Findings

A review of project implementation and status revealed that the project effectively identified matching grant partners who had experience and capacity to undertake the project. The model and the structure for implementation was inclusive given the representation of partners in different functional roles and the involvement of different stakeholders particularly the regional government officers. Partners used government and local community leaders to gain entry to the farmer groups and traders in the community which creates project ownership from the start of the project.

Analysis of the survey data set from 131 household heads and 52 small scale vendors interviewed and the various qualitative methods revealed interesting results and implications both for the project in the four regions.

Most of the farmers are growing potatoes on land sizes of 2 acres and below which is more pronounced in...

Mbeya at	Arusha at	Njombe at
86%	79%	68%

In Njombe the higher acreage is as a result of farmers' accessibility to clean potato seed and assured market after CHIPS Project intervention.

Farmers and vendors have been capacity build on production and storage techniques as well as business skills. The projects supported training on Good Agricultural Practices (GAP), Farmer Business School (FBS), Good Post-harvest handling (GPHH) and Good Food Handling Practices (GFHP) and increased accessibility of clean and market preferred potato seed. The project has trained 11,019 farmers on GAP, 8644 on GPHH, and 11,496 on FBS. In addition, 7730 SRVs have been trained on Business Skills and 4577 on GFHP. As a result, average yield has increased from 8.8 to about 13 metric tons per ha (approximately 51.1% increase), with potential of a maximum yield of up to 20 tons per ha. Traders have reported impacts from the project in terms of higher profits and enhanced lifestyles. However, challenges in production and marketing of potatoes still abound as the project time was limited to fully firm up linkages and address the issues comprehensively. Overall, the project has built sustainable structures using the consortium approach and business has taken off.

Some key achievements as calculated from responses from sampled interviewees as regards the indicators are as follows:

Indicator	Baseline (2017)	Target (%)	End line (2019)
SHFs Collectively marketing ware potatoes through AMCOS (capable of executing collective marketing and input procurement business contracts	10% members of AMCOS 2% undertake collective marketing	100%	16% farmers interviewed in the project areas belonged to cooperatives
# of small-scale food vendors who are members of trade associations	0	100%	42.5% of the vendors interviewed
# of small-scale food vendors who are members of trade associations and are procuring collectively from FBOs	2%	100%	10% of the vendors interviewed
# of SHFs implementing GAPs (planting quality seed potato)	21%	8%	81% of farmers interviewed
# of SHFs implementing GPHH	21%	80%	37.1%
# of SHFs implementing standard business practices (record keeping)	11%	100%	76.3%
# of VCAs implementing Good Food Handling Practices and standards business practices	12%	Not stated	56.1%
Volumes of potatoes meeting market preferences	1595 MT	100%	95,052.6MT
# of members of targeted SHFs. SSRs, SSV part of business consortia	10%	100%	SHFs – 16% SRVs – 56.1%
# of business consortia established	0	8	9
% increase in Profitability			
SHF	GBP 41/MT	100%	GBP 160/MT (290%)
Retailers	GBP 33/MT	100%	GBP 52 (52%)
Vendors	GBP 22/MT	100%	GBP 40 (82%)
# of women SHFs and SSRs who are members of Coops and TAs	3.4%	Not stated	21%
# of youth accessing financial products	7%	Not stated	56.6%
# of women accessing financial products	8%	Not stated	16%
KT and partners TOTs	2	7	14
MEL staff KT and Partners	0	10	30
Matching grant partners trained on MEL and finance management	0	8	53

NB: % figures calculated responses of interviewed farmers/vendors

Effectiveness of collective marketing/procurement of outputs and inputs by trading associations and cooperatives: Farmers have organized themselves into groups to do collective marketing and procurement of inputs. Farmers in Wanging'ombe under NADO for instance, have formed groups that are aggregating potatoes for sale through contract to Acla Honey Enterprise Limited who have in turn signed contracts with SRVs.

Collective buying of inputs is happening in some instances e.g. collective purchase of potato seeds at ARI Uyole and bulk buying of fertilizers by Lusitu from an input provider in Njombe, with saving costs reported by buying in wholesale since the wholesale price was GBP 21.46 instead of GBP 22.29 retail, saving GBP 0.83 per bag. This helps to reduce production cost and increase margins. Selling collectively by farmers is also taking place but aggregation at one point remains a challenge due to lack of sorting and packing centers. Nevertheless, the project has seen 2,787 small holder farmers collectively procure 2,279 MT of fertilizer and 2,950 farmers collectively procure 255 MT of clean seed potato. Since collective procurement was not a common feature before the project, this is a key outcome of the CHIPS project.

Access to market preferred potato or potato products: CHIPS interventions have enabled ARI Uyole triple its capacity to produce clean seeds from 30,000 to 90,000 plantlets per cycle. From project interventions targeting ARI- Uyole and Beula Seeds Co. Ltd, a total of 849,557 mini-tubers[1] have been produced since project inception, 2950 farmers have been supported to procure 254.56MT of clean seeds and 65MT seed potatoes distributed for further multiplication. Markets are getting preferred products with traders in Dar es Salaam reporting getting the new *Shangii* potato variety from Lusitu. They are satisfied with the quality of the products in producing chips. Large vendors such as Acla Honey, have been working with farmers who are trained and so get better or preferred potatoes. Most chips vendors prefer Acla Honey products and as they say, 'business is good'. However, farmers complain that some of the clean seeds such as *Sherekea* and *Tengeru* varieties from Uyole, though they have high yields, are unsuitable for the large chips market and are rarely sought for.

Business Consortia - Competitiveness and efficiency of trading in potato and potato products: A total of nine (9) business consortia with a total of 26,277 beneficiaries have been engaged. Thirty-two (32) Farmer Business Organizations (FBOs) have signed supply agreements with inputs suppliers to access fertilizer and agrochemicals and twenty-one (21) potato supply agreements to enable access to profitable markets. The project has also linked farmers, input providers, financing institutions and markets farmers with input suppliers. Everybody knows their role in the consortia and participates. Local government authorities at village level creates conducive environment and helps in mobilization of farmers, Farmers provide market for seeds and input providers supply inputs on credit to farmers. As explained above, under effectiveness, the results of these structured engagements have included costs savings when farmers buy inputs in bulk. There were enhanced traded volumes occasioned by the contracts where 207,365 MT[2] of potatoes meeting market preferences have been traded; contributing to building viable Trader Associations of SRVs and FBOs. Out of these volumes traded, 95,052.6MT are ware potatoes of market preferred varieties collectively aggregated and sold by farmers engaged in the project.

The project has also linked farmers, input providers, financing institutions and markets. The project has addressed the core issue in potato production by facilitating access to highly productive clean seed potato to farmers resulting in increased potato yields per acre. Input providers have been providing farm inputs such as fertilizers on credit. Input pre-financing worth GPB 19,649 were accessed by farmers. There have been attempts to link farmers and traders with lending institutions with equivalent of GPB 536,559 in loans accessed by SRVs. There has also been internal savings and credits within farmer-based organizations and SRV groups worth GPB 97,337[3]. Farmers and vendors have their capacity built on production and storage techniques as well as business skills. As a result, average yield has increased from 8.8 to about 13 metric tons per ha, with potential of a maximum yield of up to 20 tons per ha.[4] Traders have reported impacts from the project in terms of higher profits and enhanced lifestyles. However, more needs to be done to enhance farmer's product aggregation by providing pack houses to facilitate product collection by offtakers and processors who have signed contracts. Nevertheless, given that the project has been on for a short time, the success is considerable with linkages established to continue the business processes.

Due to adoption of the consortium approach where each partner plays its role, the project has achieved its objectives and will most likely achieve its targets by the end of the year 2019 when it officially ends.

[1] CHIPs Annual Report August 2019

[2] Ibid

[3] Ibid

[4] KII with Program officer 16 September 2019

However, more remains to be done to fully operationalize the consortia. Survey findings indicate the large-scale traders from big towns are popular with 67.2% of farmers saying they would prefer selling potatoes directly to them since they offer better prices, but traders usually prefer buying through middlemen due to difficulties of accessing farmers and aggregation from farmers. As a result, 80.6% of the farmers sell to middlemen, although only 7.8% said they prefer them due to their low prices. Key consortia players including processors such as Mamujee have delayed buying, despite supplying seeds to farmers due to delayed licensing issues by government. Some big buyers are also awaiting completion of pack centers as they incur heavy costs going to the different farms to collect enough potato load of preferred size and quality and the roads can sometimes get impassable.

Equitable involvement of women and youth in decision making and benefits of the potato value chain: From the data on training and other interventions, women and youth are the main project beneficiaries of the CHIPs project. Interviews with project staff and partners indicate that most small retail traders are women and many chips joints, the main outlets of potatoes, are run by youth. Of the 15,892 SHFs, 47% are women and 45% youths in consortia led by NADO, RECODA, LAG, ADP Mbozi, BEULA and ULT. On the 10,385 SRVs, 54% are women, 51% youth in consortia led by Acla honey, VIBINDO, YES I DO, NADO, ADP, Mbozi and RECODA.

The project has addressed key systemic issues for women and youth with regard to leadership, control over incomes and access to productive resources. Women make up 49% of the people engaged in project activities such as trainings and demonstrations and are participating as leaders and trainers of others in consortia. In addition, women are accessing finance and other credit services. They have utilized the loans received to enhance production and uplift their lives. They use the credit to i) buy seeds and other inputs collectively; ii) pay schools fees for children; and iii) start new and improve other enterprises such as poultry and cattle keeping. Youth (47% of all people engaged) are also actively participating in project activities such as trainings, demonstrations and are also participating as leaders and trainers of others in consortia. Youths engaged as SHFs and SRVs are accessing financial services through internal savings and credits and are increasingly getting involved in potato farming which is now more profitable with increased yield rather than migrating to towns to look for white collar jobs which are rare.

Capacity of KT and its partners in development of SRV businesses and trade associations: Partners were trained on Results Based Management, data collection, finance management (three trainings). The partners report they are better in report writing, finance management and data management. NADO staff report that before these trainings, they used to receive many queries in their reports, these have now reduced. Increased capacity of partners is, for example, evidenced by NADO which on being trained by CHIPS project on M&E can write proposals and have already written one proposal submitted to another donor which has already been funded. Their data management has also improved, and their data is disaggregated by age, gender and location. They also have an excel database created after the training and the idea has been exported to the new project. They are using GPS skills from the training to take measurement of land pieces and farmers are asking for the service.

Evidence of impact of capacity building on farmers and vendors include the finding that 76.3% of the farmers are now keeping records of their farming transactions, meaning they are viewing farming as a business. The training used TOT approach and stakeholder participation for ownership.

OECD evaluation criteria rating: The project scored above 4 on a rating of 1 to 5 (where 1 was the lowest on the scale) of the OECD evaluation criteria of relevance, effectiveness, efficiency, impact and sustainability. The relevance of the project is indicated by among other factors the demand for the highly productive clean seed and the need to enhance farmer incomes. The project was effective in enhancing potato production and incomes among farmers and increased access to preferred potatoes to vendors. The project was cost effective in using TOTs to reach many farmers and vendors and the fact that most activities have been implemented on time. There are some indications of impact, with farmers reporting enhanced lifestyles such as building better houses, connecting electricity, having less problems paying school fees and access to better health care. There are challenges facing the farmers related to pests, diseases, bad weather, transporting potatoes from farms, aggregation and grading, value addition of potatoes, credit to expand their farms and low prices offered when there is potato glut given the limited preservation (storage) infrastructure.

The sustainability is assured, as members of the consortia are linked for future business. However, there are challenges in that the project period was limited and the startup was hampered by the long period taken to access the clean seeds so that profits are realized. As the developed linkages firm up, middlemen are still doing most business at low buying prices.

> Other challenges are the few numbers of clean seed producers, inadequate number of credit providers and lack of value addition.

Recommendations

Public investment to unlock private sector investment: The project has proved that sustained "public" inavestment in the potato value chain was quite necessary to unlock private sector investment, with private sector actors such as Mamujee joining the organized potato value chain. More support from government is required including fast tracking of policy guidelines to continue with project interventions in line with the new agricultural strategy (ASDP II) to transform agricultural systems and increase the productivity and income of smallholder potato farmers.

Seed systems: Government should ensure more availability and accessibility of clean seeds by supporting the current potato research institutions to enhance capacity and farmers willing to invest in clean seed production.

Access to finance: Government should promote small holder group formation and promote the transition from producer groups to Cooperatives, Savings and Credit Organizations; promote innovative and improved credit delivery and management systems for producers and the private sector with longer term payment period, initiate a model that ensures farmers needs for ready cash after harvest is met, or a model that differentiates between premium price for stored products (higher buying price margins) and cash on delivery (lower buying prices).

Capacity building: Future interventions also needs to continue with the initiatives to enhance human capital through specific training to improve technical skills in business including accessing markets, financial literacy and new technologies. There is also need to strengthen capacity of extension services to improve farmer-extension ratio.

More project time for value chain projects: In future, such value chain projects need to be allocated more time, especially where production cycles are lengthy to ensure that all nodes of the value chain work efficiently and sustainably. There is also need for more work on linkages with financial institutions and more market linkages, mechanization as well as value addition to ensure farmers get more profits.

Tissue culture laboratory

1.0 Background

Kilimo Trust is an independent organization working to develop agriculture across the East Africa Community (EAC) Region - in Burundi, Kenya, Rwanda, Tanzania, Uganda and the Republic of South Sudan.

KT vision is to see "sustained and equitable wealth creation, food and nutrition security for smallholder farmers and other VC actors". Its mission is to make agribusiness a transformative tool for wealth creation, food and nutrition security for over 500,000 smallholder farmers and other VC actors in five years beginning 2018. The core business of KT is to structure national and regional trade in agricultural products for enhanced wealth, food and nutrition security for smallholder farmers and other VC actors.

One of the projects Kilimo Trust is implementing is the four-year Calories and Household Incomes from Potatoes Sub-sector (CHIPS) project (2016-19) funded by Comic Relief UK. CHIPs project, focusing on potato value chain on farm inputs, marketing and processing, is steered by Kilimo Trust through matching grant fund business model to private sector and NGO partners.

The two main implementing partners are ARI Uyole and TAHA and nine matching grant partners. ARI Uyole does improved seed research and production while TAHA does market linkages and business development. Kilimo Trust does the grant management, capacity building, administration and coordination.

CHIPS project aims to enhance incomes and accelerating wealth creation for Smallholder Farmers (SHFs) and Small Retailers and Vendors (SRVs) of round potato in Tanzania.

1.1 Situation/contextual analysis

Agriculture continues to play a dominant role in the Tanzania economy, accounting for 45 percent of Tanzania's GDP, as well as the livelihoods of some 80 percent of the country's population (WFP 2012). Among African countries, Tanzania has some of the highest levels of malnutrition. Approximately 42 percent of children under five suffer from malnutrition and stunting (WFP 2012).

The main food crops grown in Tanzania are maize, rice, sorghum, cassava and Irish potatoes among others. Irish potatoes in Tanzania take the 8th position in the record of most important food crops (FAO, 2009); although a study by Kilimo Trust (2012) found that consumption of potatoes in urban areas doubled between 1999 and 2010, a rate of growth in demand second only to rice. In Tanzania about 90% of Irish potato is produced by smallholder farmers in the Southern Highland where it is used as food and source of income. And apart from Southern Highland, other areas in Tanzania which produce Irish potatoes in large quantities are West Kilimanjaro, Arusha, Manyara and Kagera while minor production takes place in Mara, Tanga (Lushoto), Kigoma, Rukwa and Ruvuma regions (Nyunza and Mwakaje, 2012). Although the production and demand of the crop has been increasing, there are several challenges that farmers face, among them being: lack of certified seeds, limited access to credit and extension services, un-affordability of inputs like fertilizers, incidences of pests and diseases, inadequate good storage facilities and farming equipment (Namwata et al., 2010).

The potato seed producers include Mtanga Farm, a private seed potato investor, and Agricultural Research Institute-Uyole (ARI Uyole) both in the Southern Highlands and also the National Agricultural Research Service (NARS). ARI Uyole and NARS are both public institutions producing in-vitro material and mini-tubers. Their production commences from tissue culture, with mini tubers from green houses to 1st field generation, then 2nd field generation, and from there to potato seed producers. Therefore, every 4 cycle's producers get new seed resulting in limited amounts of clean seed for farmers.

In marketing of Irish potato, the main challenges among others includes: many actors along the value chain which lowers the sales margin for farmers. Muthoni and Nyamongo (2009) asserts that over 90% of Tanzanian farmers sell their potatoes through middlemen and brokers. Thus, most of the farmers are exploited because there is a wide fluctuation of farm gate and market potato prices (Kaguongo et al., 2008).

Lack of unified standards for Irish potato is one of the main problems in the farming and trading of the crop in Tanzania (Rahko, 2011). Farmers normally overfill bags that contain between 120 and 200 kg of potatoes depending on their target market (Kaguongo et al., 2008).

Mussei et al., (2000) claimed that, the main problems facing Irish potato farmers in Tanzania are low prices, unstable prices and unreliable markets due to lack of cold storage, poor transportation and limited market opportunities. This situation leads farmers to sell their produce even if the price is not competitive (Ferris et al., 2003).

With these challenges mentioned above there have been efforts by NGOs like Kilimo Trust through CHIPS project in partnership with ACLA Honey, VIBINDO, NADO, RECODA, ADP and Yes I Do, to implement activities that are focused on increasing agricultural productivity and profitability for actors along the potato value chain; building more resilient communities; improving access to clean potato seed; and soft market infrastructure such as access to credit, extension services, marketing information, and agricultural inputs (Temu and Temu, 2005).

1.2 CHIPS Project Objectives

CHIPS project is a four-year grant by Comic Relief UK. It started in January 2016 and has a completion date of 31st December 2019. Total Comic Relief contribution program cost was **GBP 1,718,139**. The project aims to enhance incomes and accelerate wealth creation for Smallholder Farmers (SHFs) and Small Retailers and Vendors (SRVs) of round potato in Tanzania.

The purpose of the project is to increase productivity, efficiency, profitability and volumes of business involved in the round potato value chains. CHIPS is implemented in Tanzania, targeting to reach at least 17,500 SHFs, 4,500 small scale retailers and 8000 small scale food vendors (Total 12,500 small scale retailers and vendors – SRVs).

The project utilizes the matching grant fund business model focused on potato value chain in terms of seed, marketing and processing. The improved seed component was originally not part of the design but was included when it was realized that there was acute shortage of improved seeds. The two main partners are ARI Uyole and TAHA who collaborate with KT and nine matching grant partners. ARI Uyole focuses on improved seed research and production while TAHA does market linkages and business development. Kilimo Trust does the grant management, capacity building, administration and coordination.

The Project has five major objectives:

1. Enhance effectiveness of collective marketing/procurement of outputs and inputs by trading associations and cooperatives of 175000 SHFs and 12,500 SRVs)
2. Increase supply of market preferred potato and potato products by 17,500 SHFs and 12,500 SRVs.
3. Increase competitiveness and efficiency of trading in potato and potato products through sustainable business consortia.
4. Increase equitable involvement of women and youth in decision making and access to resources and benefits of potato value chain.
5. Improve Capacity of KT and its partners in the development of SRVs businesses and trade associations for trade-based food security in the EAC

The CHIPS project is implemented using Kilimo Trust Consortium Approach to Value Chain Development KT-CA2VCD) with Matching Grants to efficiently link small and medium scale farmers (SMSFs) to input and output markets. Value chain champions include offtakers who serve as the consortium leaders, some being NGOs, CBOs or private firms. There are also input suppliers, financial institution and mechanization service providers.

1.3 Area of operation

The project targeted 4 Regions (Mbeya, Njombe, Iringa and Tanga). The CHIPS project targeted implementation in the districts in the Southern Highlands zone: Njombe, Wanging'ombe, Mufindi, Makete, Kilolo, Ludewa, Mbeya and Rungwe. In Northern zone were Arusha Rural, Meru, West Kilimanjaro & Lushoto. The evaluation was conducted in Mbeya, Njombe, Arusha, Iringa (YES I Do targeted farmers and retailers and vendors in Iringa) and retailers and vendors in Dar es Salaam.

Baseline data was collected at the beginning of the project. The evaluation makes reference to the findings in the baseline for instance the gross margins in assessing changes.

1.4 Project Beneficiaries

The key beneficiaries are some **14,000** Small Holder Farmers (women, men and youth) and **4,500** small scale retailers and **8,000** vendors. They also include bulk traders and processors and input suppliers. Apart from these, capacity building has targeted **10,500** SHF; **500** VC actors, **500** SS traders and **500** SS vendors, in total there were **16,500** beneficiaries in capacity building.

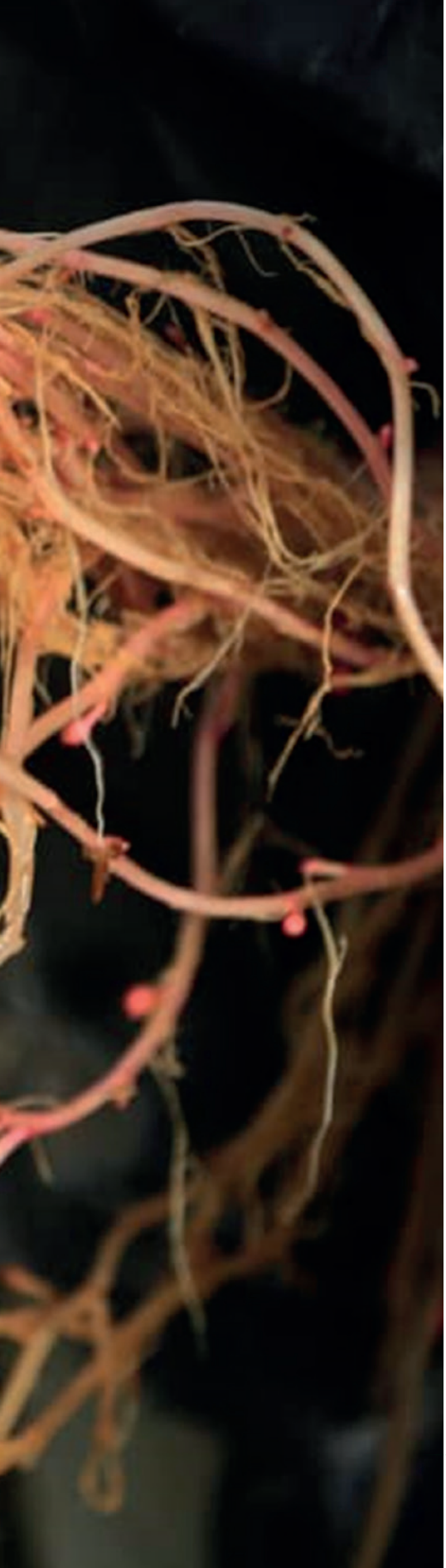
There are also the different consortium actors. The project has used the KT Consortia Approach to Value Chain Development (KT-CA2VCD) model with the aim of bringing together the different actors of the targeted value chains (farmers, input suppliers, off-takers, financial institutions, local government).

1.5 Purpose of Assignment

Objectives of the evaluation were:

- To inform Kilimo Trust and its stakeholders on the status with regards to project goal, objectives and outcomes of the project including how the results were achieved
- Assess the intended and unintended outcomes of the project
- Assess the actual outcomes (yield, sales, gross margins) of the project to beneficiaries
- Identify key success factors arising from the strategies and approaches utilized during project implementation
- Analysis of project sustainability
- Assess and document how Comic Relief and Kilimo Trust grant management approaches helped or hindered the smooth implementation of the project
- Establish how Value for money was realized both in the implementation of the project and the overall outcomes and benefits to stakeholders. Was the investment financially, socially and economically sound?
- Draw Lessons learned to be utilized for development of the potato sub - sector in Tanzania.

Potato plantlets



2.0 Evaluation Methodology

2.1 Evaluation Plan

The consultant used a mixed method approach for the evaluation, combining qualitative and quantitative measurements. The research process involved a detailed desktop review of relevant documents, development of survey tools, sampling and data collection, data analysis of both qualitative and quantitative data, triangulation and presentation of evaluation findings. Consequently, both primary and secondary data sources were used. Data collection included stakeholder and key informant interviews, focus group discussions, household surveys and observations. Samples of the data collection tools used are annexed in this report.

The evaluator made use of the OECD DAC Criteria (Relevance, impact, efficiency, effectiveness and sustainability of the project) in assessing the implementation process, the final outcome, and the impacts of the project and provide recommendations to inform similar initiatives. In implementing the assignment, the evaluator borrowed heavily from Daniel Stufflebeam's CIPP (Context, Inputs, Process and Product) evaluation model, focusing on both process and the product (outcomes and impact).

2.2 Secondary Data Review

The evaluator carried out a thorough review of project documents, including log frame, reports, and case studies, etc. The desk review supported the design of the evaluation tools and provided valuable data and project context to the evaluation.

2.3 Quantitative Data collection

The evaluator carried out a survey of 183 respondents, including 67 with female beneficiaries and 129 with male beneficiaries. Respondents were randomly selected from the beneficiary list provided to the consultant by the matching grant partners. During sampling the consultant had a deliberate inclusion of women and youth in order to deduce their empowerment through CHIPS project in accessing resources and decision making in the potato value chain. Further the consultants weighted the results based on gender and age as part of the analysis.

The respondents composed of 131 small holder farmers (37 in Arusha, 52 in Njombe and 42 in Mbeya), and 52 vendors. The farmers belonged to 29 farmer groups spread in the four districts.

2.4 Qualitative Data collection

Key Informant Interviews (KIIs)

The consultant conducted 18 Key Informant Interviews (KIIs):

- **For Kilimo Trust staff:** Three KIIs, one staff in Dar es Salaam and two in Kampala (by phone)
- **Main partners:** One KII with ARI Uyole and TAHA each, the two main partners in Mbeya and Arusha respectively
- **Matching grant partners:** Nine KIIs with the matching grant partners.
- **Other stakeholders:** Two KIIs; one with the Akiba Commercial bank credit officer, and the other with Community Development Officer, Ukonga in Dar-es-Salaam
- **Vendors:** Two KIIs; one with TOT beneficiary in Kilombero Market Arusha and the other one in Buguruni Market in Dar es Salaam.

Focus Group Discussions (FGDs)

The consultant organized 5 Focus Group Discussions across the four regions:

- One FGD with 4 CHIPS project staff from TARI Uyole on seed production process in Mbeya
- One FGD with NADO staff in Njombe (Wanging'ombe)
- Three FGDs each with farmers groups from: Sogoro Arusha through RECODA, Njombe through NADO and LUSITU Agribusiness Group

The FGD for farmers groups composed of eight to ten members composing of men, women and youth.

Actor	Type	District	Area visited and method data Collection
Kilimo trust	Grant management, capacity building	Dar es salaam	KIIs with Tanzania Team leader, M&E and quality assurance manager and Program Officer
ARI Uyole	Key partner (Research and Seed production)	Mbeya	KII with Zonal Director ARI Uyole FGD with 4 CHIPS project staff Observation of seed production process
TAHA	Key partner (Marketing)	Arusha	KII with staff
YES I DO	Youth CBO	Morogoro	Phone KII with Management staff
RECODA	NGO	Arusha	KII for implementing staff, TOT, and Leaders at Kilombero market, FGD and farmer survey at Sogoro
NADO	Development organization	Njombe (Wanging'om be)	KII with CEO FGD with NADO staff FGD with farmer group leaders Questionnaire survey with farmers
VIBINDO	Small scale traders Association	Dar es salaam	KII for implementers staff and leaders at Buguruni market Questionnaire survey with traders
	Farmers Agribusiness group	Njombe	KII with manager and committee members FGD with Farmers Household survey
Acla Honey Enterprises	Agribusiness Company	Dar es salaam	KII with CEO and implementing staff, KII with Akiba Commercial bank, SRVs, CDO Ukonga Traders survey
BEULA SEEDS CO. LTD	Seed company	Mbeya	KII with CEO and implementing staff, Farmers survey and Observation of seed production

2.5 Data Analysis

Data collected was cleaned and organized into a Database in Excel format, coded for ease of filtering and analysis. Descriptive statistics was adopted to present the data in form of frequency tables, percentages and mean values. For data analysis, SPSS version 21 statistical software was used to generate tables, pie charts and graphs on results for ease of presentation. Upon establishing the various effects, discussion of the results was done in an attempt to draw conclusions, and identify recommendations arising from the results of the data analysis.

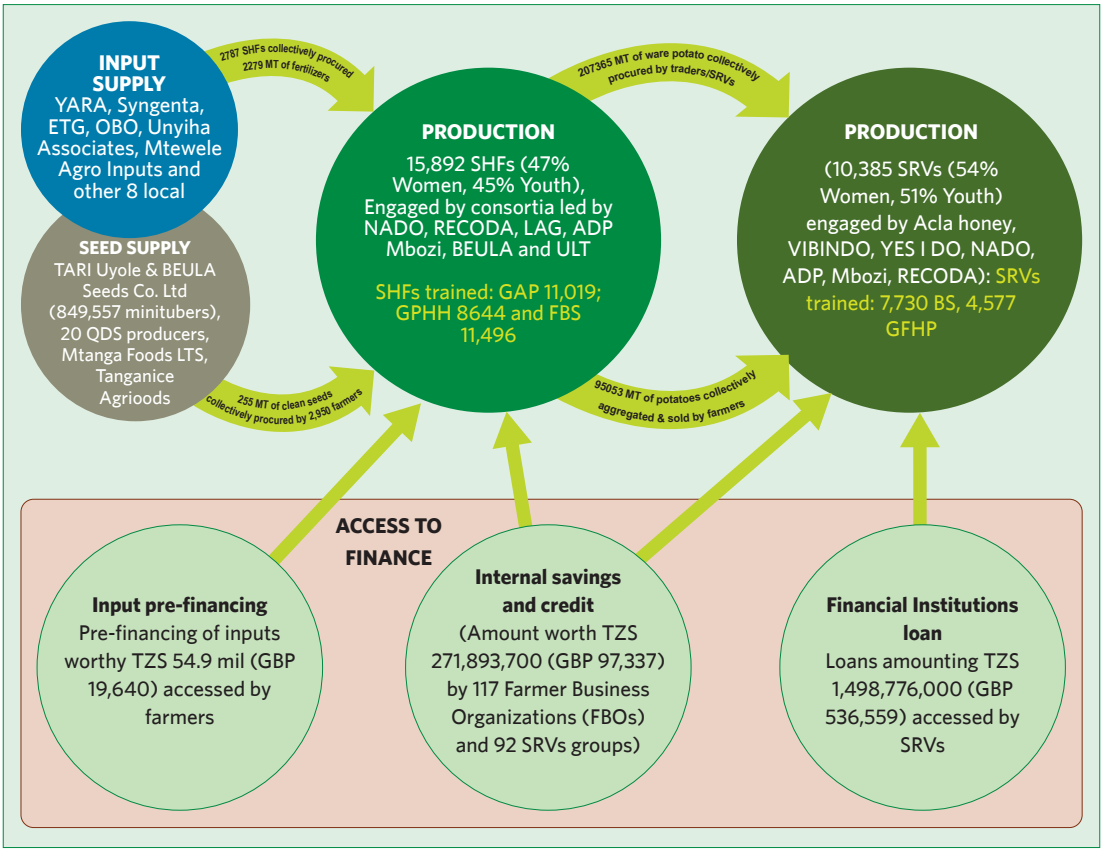

NGAMIA HATISHIWI UKAME

3.0 Findings

The following part of the report presents a summary of the main achievements, an assessment of the project institutional and management arrangements, community entry and capacity building activities with farmers and traders. It also presents findings per objective.

Summary of main achievements

The following chart illustrates the main achievements of the project.



Source: Final Revised CHIPS project Annual report August 2019

The chart shows the actors and achievements at different levels of the value chain, input and seed supply, production, marketing, as well as access to finance. There are remarkable results indicating the reach in terms of collective procurement of inputs (fertilizers and clean seeds), capacity building of SHFs to increase production, collective aggregation by SHFs, collective procurement by offtakers/traders and their capacity building in order to take more produce. There are also results from access to finance especially input pre financing from input providers to farmers, internal savings and credit by FBOs and CRVs, and financial institutions to vendors. These figures illustrate the enhanced business partnerships in the value chain and enhanced links to markets, providing a key solution to the problem highlighted and targeted during baseline.

3.1 Community Entry

Partners used Local government authorities (LGAs) and local community leaders to gain entry to the farmer groups and traders in the community. Partners like Acla Honey linked with community development officer under the Ministry of Health, Community Development, Gender, Elders and Children, to call farmer groups/SRV and sensitize them about the CHIPs

project. The Community Development Officer took the members through the process of formation of self-Help Groups (SHG), membership and the advantages. Other partners also planned and held the meetings through community leaders for a smoothing landing to the villages to access the groups. The partners explained the CHIPS project as a potato value chain and informed the members that the groups will not receive any loans or grants from the project. The partners went further to introduce their roles in the project and stakeholders involved like the financial institutions and what is expected of the beneficiaries. This helped to enhance better understanding of the scope and manage expectations of the beneficiaries.

3.2 Training for SHFs and SRVs

A key component of the project was training or capacity building of the SHFs and SRVs. Approaches used in the training included:

Tours: The leaders of SHFs and SRVs were taken for learning tours to different places practicing the potato value chain. Over 80% of leaders interviewed went to ARI Uyole to learn quality potato seed production and storage and Lushoto for potato seed bulking.

On-farm Demonstration: Partners used farm demonstration to introduce the certified potato seed varieties (for instance those sourced from ARI Uyole) to the farmers. In Arusha, some varieties demonstrated were *Shangii* and Asante. The demonstrations were done on ¼ an acre plots where farmers were involved from planting to harvesting. The results where one bag of potato seed produced 20 bags of potatoes were overwhelming to an extent where SHGs ordered more seed than what ARI Uyole seed unit could supply. A KII with a TOT at Sogoro in Arusha confirmed these.

Seminars/In class trainings: Partners organized five days training seminars in halls for the SHFs and SRVs. The facilitators used a combination of different training methods and approaches to adult learning to ensure every participant understood and contributed to the training objectives and expected output. The facilitation methods used included presentations by facilitators, brainstorming, case studies, group work and plenary discussions.

As informed by a KII with RECODA Director, *'we held a seminar for TOT in Arusha at KKK hall –Tengeru from 6th to 10th May 2019 for 30 farmers on potato production. The training included field visits to learn on potato production in ARI Selian research station, Construction of Diffuse Light Store, preferred fresh potatoes in Kilombero market and potato products after processing. The trainers were from ARI Uyole and included an experienced farmer in seed potato bulking who has been working with ARI Uyole'*

Experiential/participatory methods of training were very effective for the farmer and the trader. As will be reported later, training of farmers has had many impacts including better crop husbandry, record keeping, harvesting and post harvesting practices. Traders are also keeping records of their transactions. In Njombe, for instance, quality of potatoes used to be poor as they were muddy. Now they don't harvest during rains. They wait until it is dry to harvest. They also don't leave a lot of potatoes in the ground during harvesting. Buyers used to complain a lot due to small sizes as the potatoes that were not graded. Now the different sizes are sorted, and each size has its own market and price.

3.3 Household Characteristics

3.3.1. Gender and age Categories

In terms of gender distribution, 75 % of the Small Holder Farmers (SHF) interviewed were male while 25% were female. For vendors it was the opposite where female were 67% and male 33%. In terms of age 22.1% were under 35 years both for SHFs and SRVs but more men dominated the youthful category than women. This is well illustrated in figure 1 below where SHFs and SRVs for 25-34 age category men are 74% against 26% and 45% against 29%.

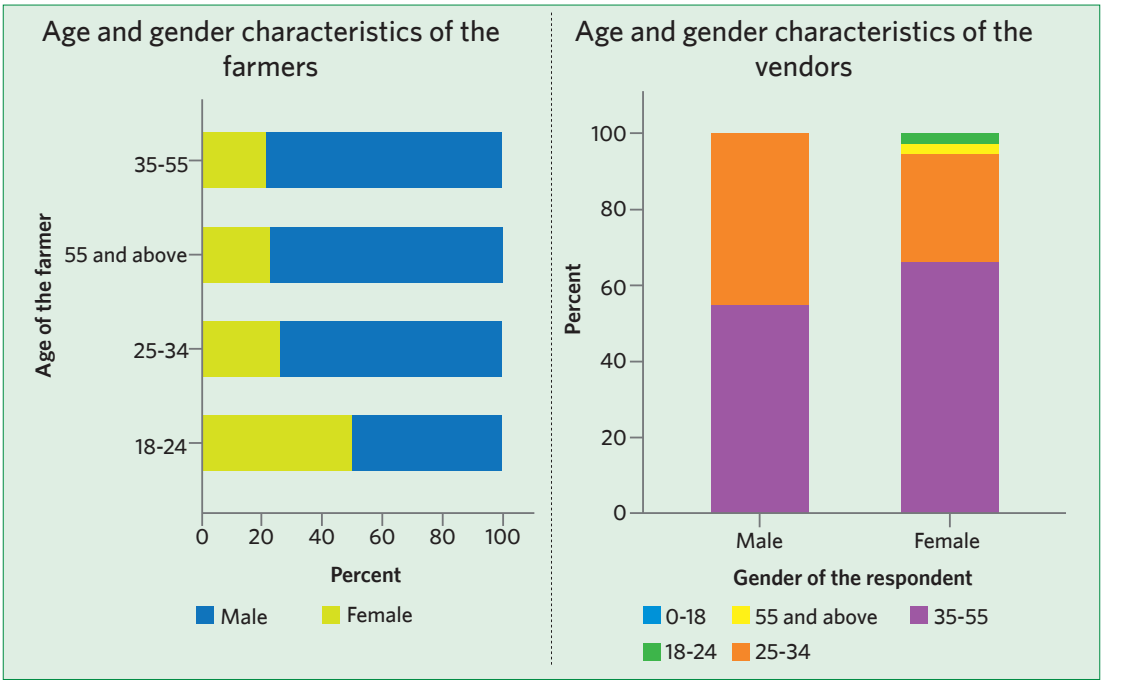


Figure 1: Age and Gender of farmers and vendor respondents

3.4 Agricultural Practices and Status of Production

3.4.1 Land use and Potato production

Most of the farmers are growing potatoes in land sizes of 2 acres and below which is more pronounced in Mbeya with 86% (blue and green colour), Arusha 79% and Njombe 68%. In Njombe the large acreage and also high volume of potato produced (red and yellow colour below for 11-30 tons) can probably be attributed accessibility of clean seed and assured market where farmer groups have adopted collective marketing and procurement of inputs after training through NADO, Lusitu agribusiness group and Acla honey enterprise limited.

Evaluation survey findings indicate farmers have increased production, for instance, SHFs harvesting 0-10 tons of potato per harvesting season increased from 48% in 2016 to 63% in 2017[5]. According to the KT program officer in charge, the average yield has increased from

[5] The ranges 0-10, 11-20 tons etc were informed by the production that went up to 80 tons

8.8 metric tons per ha to 13 metric tons per ha during the project period, with maximum being 20 metric tons per ha. Factors related to enhanced production included seed quality and knowledge of GAP. 35% of the farmer respondents blamed low production in 2016 on poor quality seeds and inadequate knowledge of GAP (also by 35% of respondents). In 2018, the blame on poor quality seeds for low production reduced to 17.2% probably because they got good quality seeds from the clean seed producers. Inadequate GAP was reduced to 20.7% in 2018 attributed to the training received by the farmers on GAP. From the survey, the SHFs earning GBP 332.82 to GBP 1,664.09 increased from 41.2% in 2016 to 58.8% in 2017, and 57.3% in 2018. Those earning between GBP 1,663.32 to GBP 3,327.14 increased from 1.5% in 2016 to 3.1% in 2017 and 4.6% in 2018. The project can be said to have contributed to this rapid increase in incomes, as it is the main interventions related to the potato value chain in the regions assessed.

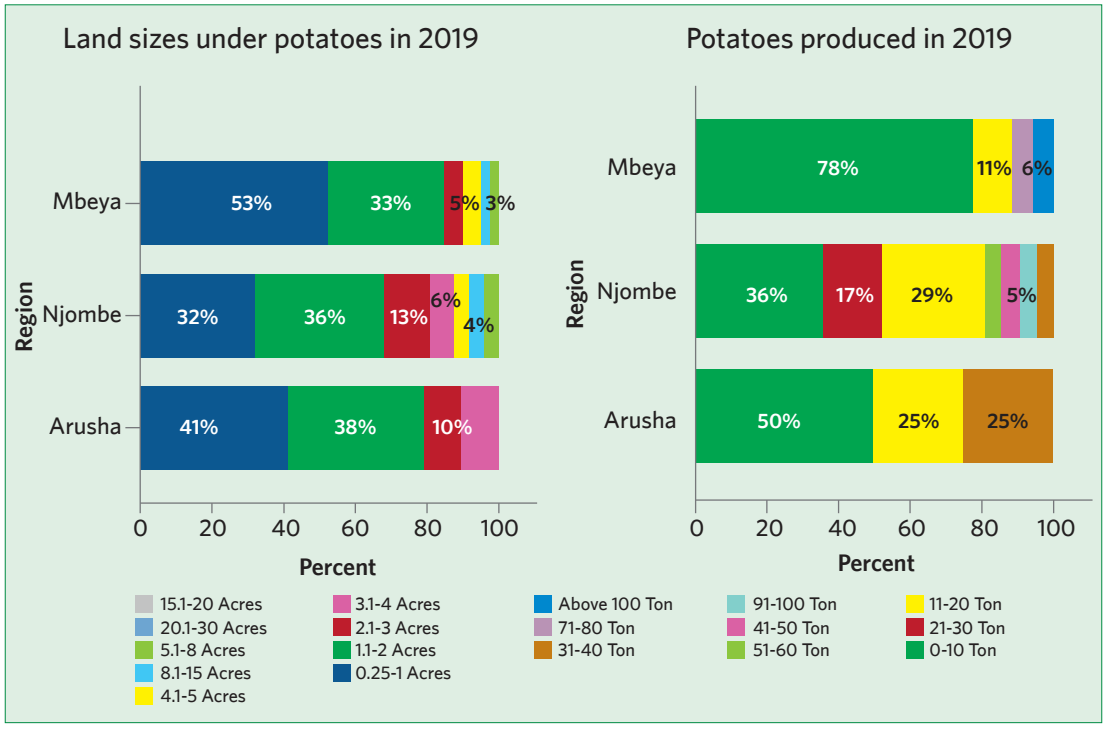


Figure 2: Land sizes and production of potatoes

3.4.2 Status of Post-harvest

There was limited usage of modern technologies for post-harvest management of potatoes in Njombe and Arusha region where about 94% and 82% of farmers respectively reported using no preservation method. In Mbeya region, a few, 16% reported using warehouse and majority 71% reported storing in an airy dark room. Adoption of the modern technologies in potato storage such as warehouse and storing in airy dark room are some of the outputs of the ARI Uyole trainings funded through CHIPs project. An FGD with farmers at Sogoro Arusha region indicated they do not own a store. Thus, majority harvest their crops during the period when the buyers are coming.

3.4.3 Challenges and Opportunities in Production and Marketing

The CHIPS project has attempted to significantly address issues of production and marketing, through collective procurement and marketing of produce. However, given that

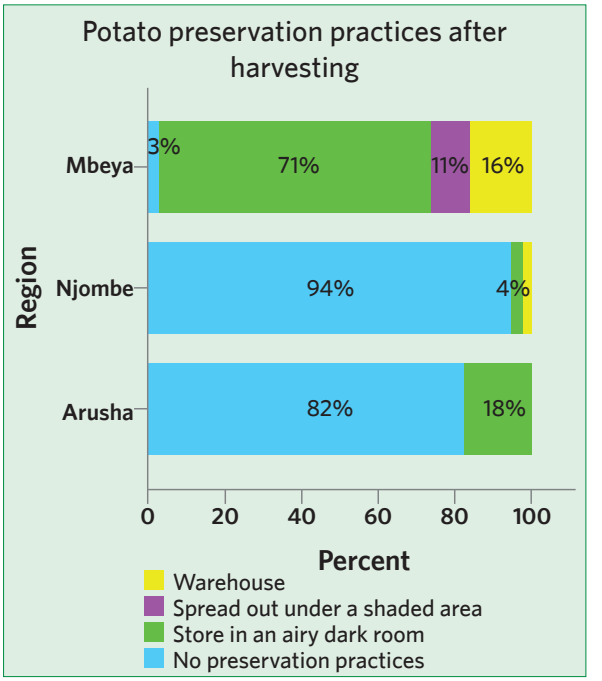


Figure 3: Potato preservation practices after harvesting

it was a pilot that is yet to be scaled up, farmers interviewed indicated they face some challenges that hinder maximum profitability. These include pests and diseases, lack of adequate quality potato seed (less affected by pests and diseases), lack of access to quality inputs, low and highly volatile market prices, and lack of reliable marketing channels and high cost of inputs among others.

Some challenges in production of potatoes are as shown, with pests and diseases taking the lead at 13.3%. Availability of clean seed is meant to reduce pests and diseases, and this is happening where farmers have adopted their use (Interview with Beula seeds).

Challenges	N	%
Pests and diseases	59	13.3
Low market prices	58	13.1
Lack of reliable marketing channels	49	11.1
Climate change leading to loss of produce	41	9.3
Inadequate capital	40	9.0
Lack of adequate quality seeds	39	8.8
Lack of access to quality inputs	37	8.4
High costs of inputs	31	7.0
Lack of standardized measuring and packaging techniques	22	5.0
Lack of storage facilities	21	4.7
Inadequate knowledge of GAP	16	3.6
Poor road network	11	2.5
High cost of transportation	10	2.3
Destruction of produce by animals	4	0.9
Soil erosion	3	0.7
Discrimination of farmers at the market	2	0.5

3.5 Results by Objective

3.5.1. Effectiveness of collective marketing/procurement of outputs and inputs by trading associations and cooperatives

By the time of the evaluation, a total of 15,892 small holder farmers (90.8% of target, 47% being women), 4963 small scale retailers (110% with 45% women) and 5,422 small scale food vendors (68% with 61% women) had so far been reached directly by the project and more were expected to be reached by the time of the evaluation.. Of the total, 49% were women. In addition, 14,170 farmers (43% women) against 5000 and 903 small scale retailers and value chain actors (47% women) against 500 were have been reached indirectly. Frontline workers were 345 (41% women) including core and part time staff of Kilimo Trust, TAHA, ARI Uyole and MGF partners. The reach is impressive and has potential to trickle down as evidenced by the indirect beneficiaries, enhancing the sustainability of the project. The project's reach on women is also quite impressive, with nearly half of the beneficiaries being women and over 60% of the small-scale food vendors being women.

Farmers have organized themselves in groups to do collective marketing and procurement of inputs. Farmers in Wanging'ombe under NADO, for instance, have formed groups that are aggregating potatoes for sale to traders and vendors. According to the managing director, Acla honey has also been buying from farmer groups who are selling collectively. In Njombe, Lusitu agribusiness group is also selling collectively as they await their pack center built in collaboration with Kilimo Trust to be operational. A focus group discussion with a group of farmers indicated that much more is happening than is reported, for instance, some farmers are selling to traders but not reporting to NADO for data aggregation. Farmers in Arusha have also been saving and accessing good amount of credits through their groups.

Collective purchase of seeds is happening at ARI Uyole. Kilimo Trust has supported ARI Uyole with screen house, chemicals and an irrigation scheme to enhance clean seed production. The consortium members who buy from ARI Uyole and produce/multiply clean potato seeds for sale to farmers include Beula seeds, NADO and RECODA from Arusha. ARI Uyole has also trained farmers to farming practices especially on multiplication of seeds under Quality Declared Seed arrangement.

In Dodoma, Iringa and Singida, by the time of the evaluation 3,649 SRVs and food vendors had been trained by YES I DO. Communities were mobilized to form ward level networks for savings groups. The vendors were trained on entrepreneurship for 5 days maximum in groups of 50 to 200. The group leaders would be oriented separately in the evenings to act as mentors for their group members.

Collective buying of inputs is happening in some instances e.g. bulk buying by Lusitu from input providers in Njombe, Mtewele General Traders for chemicals and EALA for fertilizer, saving costs by buying in wholesale. Selling collectively by farmers is also taking place but they do not aggregate in one point, it is done in turn for the members within the group. As NADO farmer FGD says *'a trader comes with a lorry and passes each Shamba for potato supplies'*. However, the farmers in Wanging'ombe assert that the offtakers/big traders identified and linked through the project have not been aggressive. At NADO they only came

once. The farmers also indicated NADO also does not have links with financial institutions which would have facilitated accessing credit and as such farmers depend on themselves for inputs. **On banks, the Wanging'ombe farmers say,...**

'their requirement are too demanding. They need too many documents and security and the monthly payments are difficult for farmers to fulfil'.

Without credit, it becomes difficult for farmers to access adequate inputs and expand their farming businesses.

Linkages for the Small retailers and food vendors were centered on access to potatoes and microfinance. They were linked with farmers in Lusitu and NADO. They signed contracts with leaders of networks and Lusitu Agribusiness for supply of potatoes. So far business has been going on and many traders are buying as individual or in groups. However, it is difficult to track purchases as some buyers and farmers do business without informing the partner's office.

The evaluation assessed the effectiveness of vendor training. According to YES I Do, the groups were trained in groups of between 50 and 200. These numbers of participants are high for a training to be participatory and effective. Again, according to one trainer interviewed, some of the books provided to participants were suitable for facilitators as they were complex, and some trainees could not read much. As one respondent put it, 'they were too theoretical with lots of calculations'. Materials for local beneficiaries should be made as simple as possible by involving their representatives during design, development and production of these materials.

3.5.2. Supply of market preferred potato or potato products

Figure 4: Members of Amani group, in Mkeha village in Njombe showing crisps, the business started after training by CHIPS project.

From the latest report, the project has produced a total of 849,557 mini-tubers since inception and 319MT of clean seed potatoes produced and distributed by TARI- Uyole and Beula Seeds Co. Ltd. The CHIPS project has supported the collective procurement of 254.56MT of clean seeds accessed by 2,950 engaged farmers and 65MT seed potatoes for further multiplication accessed since inception of the project.

This information was verified during field visit and meetings with SHFs, SRVs, partners and stakeholders. An interview with potato wholesale traders in Kilombero market in Arusha and Buguruni Market in Dar-es-Saalam rated *Shangii* as the preferred variety followed by CIP. Chairman Buguruni market said...

"Shangii ni Kiazi Kinene, ni kama Jiwe na hakina mabonde mabonde"

meaning *Obama/Shangii* potato is big, hard and has no deep eyes. When asked about their main customers, his colleague was quick to answer about 70% of customers who buy from them do chips business along the road. During the time of the interview, three Lorries were on site with a mixture of *"Shangii"* and CIP which had come from Lusitu, Njombe. The farmer's survey conducted verified that *"Shangii"* was most preferred variety with 50.8% of farmers planting it, followed by CIP at 17.8% and Meru at 11%.

Figure 5: Potato mini tubers harvested from green house at ARI Uyole

Acla Honey Enterprise Ltd shared with the Consultants copies of contracts to buy potatoes signed in August 2018 for ADP Mbozi from Mbeya and NADO, where both are planting clean potato seed from ARI Uyole through the CHIPS project.

The main role of ARI Uyole in the CHIPS project was to enhance seed supply in the project and provide knowledge and information about potato production to matching grant partners and farmers. Towards this endeavor, CHIPS project enhanced ARI's capacity for seed production by providing screen houses, water tanks, (10,000 litres), chemicals for tissue culture and two hydroponics green houses. From the CHIPS interventions, the capacity to produce tripled from 30,000 to 90,000 plantlets per cycle. They have a capacity to produce over 120,000 plantlets. Plantlets have been supplied to ADP Mbozi and Beula Seeds who have further reproduced them for clean seed production and distribution. On the other hand, Acla Honey Enterprise Ltd has been working with farmers who are trained so get better or preferred potatoes. Most retailers prefer her products.

On the flip side, some farmers have planted the new varieties from ARI Uyole but they complain that though they produce more, some have no market.

'We got Sherekea and Tengeru varieties from Uyole, good harvest but not preferred in the market. Consumers don't like them as chips. These are suitable for boiling' (NADO farmer FGD).

As a result of this project there have been a number of results that have happened among others, 26,277 beneficiaries engaged in a total of nine (9) business consortia and 254.56MT of clean seeds accessed by 2,950 farmers since inception of the project through ARI Uyole, Beula Seeds, Tanzanice Agri foods LTD, and Quality Declared Seed (QDS) producers in Njombe and Lushoto. Thirty-two (32) Farmer Business Organizations (FBOs) have signed supply agreements with inputs suppliers to access fertilizers and agrochemicals and Twenty-one (21) potato supply agreements.

From KIIs and FGDs with beneficiaries in the CHIPS project areas, there is a consensus that without CHIPS project; the benefits that have resulted would not have been experienced by those involved.

"We used to source for recycled potato seed individually from Lushoto through middlemen but now can order highly productive clean potato seed and procure collectively as a group from ARI Uyole" (KII with Mr Peter Mbissi, Arusha).

A household survey done by consultants enquired from the farmers on the source of potato seed and from the response, all the regions implementing CHIPS project have to a certain extent adopted the use of clean potato seed in planting (Figure 1). Mbeya had the highest adoption rate with 64% of the farmers using the technology followed with Arusha with 41% and Njombe 20%

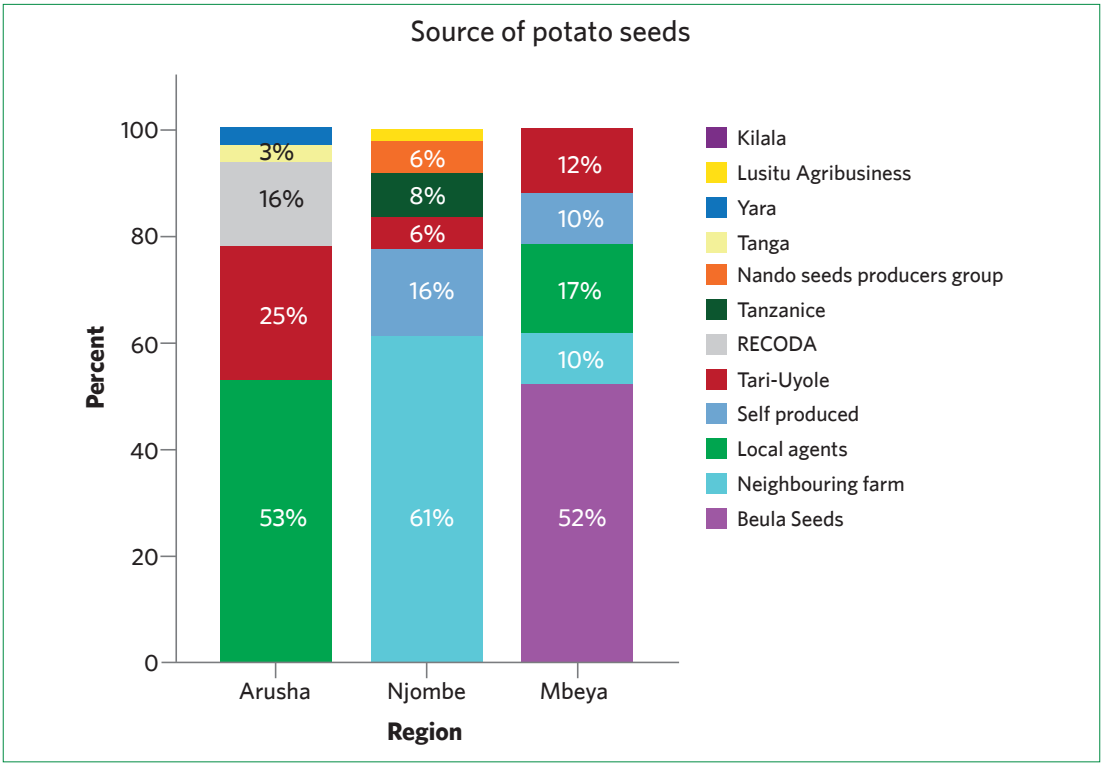


Figure 6: Sources of potato seeds

From the survey responses, some 13% of the respondent farmers had obtained seeds from ARI Uyole, 16.8% from Beula seeds and 9.8% self-produced. However, most farmers obtained seeds from neighboring farms (26%) and local agents (19.5%). Cost of clean seed and unavailability of credit could be constraining farmers from accessing the seed. CHIPS project assumed most of the consumers of potatoes are the young people estimated to account for >70% of urban population. Most of them are in schools, colleges and low-income employment, and consider potato chips a staple food, providing them with food and nutrition security in terms of quality protein. A follow up on this confirmed potato products like chips, 'Kacholi' and 'Chips Mayai' prepared by SRVs are a delicacy for young men and women.

In a KII, a TAHA staff indicated...

"Since CHIPS project focus on Irish potato value chain, the project showed high positive correlation with food security in terms of overall Dietary Energy Consumption (DEC). This indicates that dietary energy from potato has high relationship with food security since it is eaten daily in a variety of dishes"

3.5.3. Business Consortia: Competitiveness and efficiency of trading in potato and potato products

Nine (9) business consortia with a total of 26,277 beneficiaries have been engaged. Thirty-two (32) Farmer Business Organizations (FBOs) have signed supply agreements with inputs suppliers to access fertilizer and agrochemicals and twenty-one (21) potato supply agreements to enable access to profitable markets. These includes:

- Four (4) MoUs signed between consortia partners for market facilitation between i) Acla Honey Enterprises and NADO, ii) LAG and YES I DO and iii) ADP Mbozi and Acla Honey Enterprises;
- Fourteen (14) contracts between FBOs and Traders were signed between (i) LAG and Mabibo market traders of Dar es Salaam ii) LAG and Mamujee Africa LTD and (ii) seventeen (17) FBOs engaged by ADP Mbozi and SRVs and traders from Dar es Salaam and traders based in Tunduma border (Tanzania-Zambia boarder) town.

Through these contracts 207,365 MT of potatoes has been traded; contributing to building viable Trader Associations of SRVs and FBOs. Out of these volumes traded, 95,052.6MT are ware potatoes of market preferred varieties collectively aggregated and sold by farmers engaged in the project. There is some ripple effect where the key partners such as ARI Uyole have built capacities of stakeholders who have then gone ahead to establish their own consortia for seeds. Examples include Beula Seeds, Mtanga Seed, ADI Farm, NADO and RECODA.

Beula Seed Company, with branches in Mbeya and Arusha leads a consortium which has OBO Investment as input suppliers, farmer groups and government extension officers. It has produced clean seed, by buying plantlets from TARI Uyole and growing them in green houses to produce mini tubers or pre-basic seeds. They then plant them in the Shamba to produce basic seeds and then certified seeds. In the first cycle, Beula produced 6 metric

tons and then 27.3 tons in the second cycle. The seeds reached 41 farmers directly but have also sold the seeds to ADP Bose who have sold to other farmers.

The advantages of the consortia are that the members share opportunities, challenges and learn together. Everybody knows their role and participates. Government creates a conducive environment and helps in mobilization of farmers; Farmers provide market for seeds and input providers provide inputs on credit to farmers to pay later. As a KII with NADO staff indicates,...

*'there is benefit in buying inputs as a group because we buy at wholesale price after taking orders from farmers. We are able to save **GBP 1.33** to **GBP 2.66** per bag. Mtewele also provides free transport for bulk orders'.*

As a result of the trainings conducted, different SHFs are doing collective marketing in procurement of farm inputs like fertilizer and clean planting potato seed from ARI Uyole. Acla Honey project coordinator shared with the evaluation consultants sample contracts to buy potatoes signed in August 2018 for ADP Mbozi from Mbeya and Njombe agricultural development organization. They indicated the volume required, weight per bag and prices.

Advantages of collective buying are also illustrated during the KII with Yara Fertilizer agent Mr. Timothy Samuel. An agronomist by training, Timothy indicated he has been working with CHIPS project since 2017 and supplies fertilizer to 24SHGs in Meru. He has a store with storage capacity of 100 tons located at Kilala which is nearer to Meru. In 2018 he sold collectively 27 tons (540 bags of 50kg) of planting fertilizer at GBP 21.62 wholesale price instead of a retail price of GBP 22.63 with farmers saving GBP 1 per bag. For top dressing he sold 440 bags at a wholesale price of GBP 14.34 instead of GBP 11.64 saving GBP 0.67 per bag. In 2019 he also sold 30 tons (600 bags of 50kg) of planting fertilizer at GBP 21.46 wholesale price instead of a retail price of GBP 22.29 saving GBP 0.83 per bag. For top dressing fertilizer he sold 500 bags at a wholesale price of GBP 10.98 instead of GBP 11.64 saving GBP 0.67 per bag. Timothy has benefited by selling in large volumes hence more sales while farmers benefit by saving on costs of fertlizer.

An FGD at Sogoro with farmers stated that Yara agent was one of the stakeholders in potato seed on farm demonstration. Also, a household survey done by consultants for farmers within the project showed 32% of the respondent's sourced fertilizer from Yara fertilizer agent.

Farmers have formed groups that are selling potatoes collectively though most of these groups are not registered, hampering their efforts to get credit from banks. For those who are registered, lack of collection establishments where potatoes can be aggregated, stored and cleaned has been a problem. Buyers have to move from farm to farm collecting potatoes or

Figure 7: Yara Fertilizer Agent storage facility at Kilala Meru

ask farmers to transport them to a central point for collection. NADO created collective market centers in 6 locations and their use depends on orders from buyers.

Lusitu agribusiness model of an aggregation and pack center through not fully complete and its operationalization would be a solution to this problem for its members. CHIPS project has funded them in the construction of the pack center and purchase of a weighing machine, Lusitu FGD members assert,...

*'With KT linking us and facilitating contracts with buyers, and fertilizer and chemical companies such as EALA, who supplied fertilizers worth **GBP 11,641.52** which we have repaid. For chemicals, as Lusitu we have partnered with Mtewele General Traders and have so far bought chemicals worth **GBP 4,989.13**'.*

They have also been trained on soil health, keeping records, using better seeds, and have received reference books from Kilimo Trust on GAP.

VIBINDO has been able to form groups, reason being they are based in Dar es Salaam which has many markets. Groups under VIBINDO has traded over 200,000 metric tons of potatoes. Acla Honey has a few women groups, mostly food venders. Acla honey has also been buying potatoes from farmers collectively from farmer groups in Lusitu and NADO. However, Acla Honey is much smaller than VIBINDO and has traded about 10,000 metric tons. The large-scale traders from big town are popular with 67.2% of farmers saying they would prefer selling potatoes to them since they offer better prices, but they are not yet consistent in buying. Thus, 80.6% of the farmers sell to middlemen, although only 7.8% said they prefer them.

Acla Honey has introduced its small-scale trader groups to a bank in Dares Salaam which is providing credit. So far, the repayment rate is 75% with no defaulters. This case study may encourage other banks to provide similar facilities to the small-scale traders. In Njombe, Lusitu had borrowed GBP 4,989.13 from Njombe Co-operative Bank (NJOCOBA) as credit to farmers and repaid, but the bank collapsed, with Lusitu losing GBP 1,662.89. Now Lusitu is talking to NMB and TADB to provide credit to farmers though TADB is expensive at 10% interest.

Consortia meetings have been held with buyers from Dodoma, Singida, Dar es Salaam, Morogoro and Zanzibar. Some of the buyers signed contracts but have not gone back, 'they only came once' (NADO). At Lusitu, most buyers say they fear going to the farms and they are awaiting pack center to be operational. Only Acla Honey and Mabibo traders have bought and many farmers are selling to brokers. One buyer, Mamujee from Dares Salaam started a factory to process potatoes and has plans to buy Sagitta variety, even provided seeds worth GBP 2,661.02 to farmers in Lusitu but has not been licensed by

Figure 8: Seed delivery to farmers in Arumeru from TARI Uyole

government. The farmers are multiplying the seeds as they wait for Mamujee to return. The farmers at Lusitu have the ability to produce 100 tons per day and when Mamujee factory is ready, farmers are set to benefit greatly.

3.5.4. Equitable involvement of women and youth in decision making and access to resources and benefits of potato value chain

From the data on training and other interventions, women and youth are key project beneficiaries of the CHIPs project. Interviews with project staff and partners indicate that most small retail traders are women and many chips making joints which are the main outlets of potatoes are run by youth.

Of the 15,892 SHFs, 47% are Women and 45%Youths in consortia led by NADO, RECODA, LAG, ADP Mbozi, BEULA and ULT. On the 10,385 SRVs, 54% are women, 51%Youth in consortia led by Acla honey, VIBINDO, YES I DO, NADO, ADP, Mbozi and RECODA.

Women (49% of people engaged) have been actively participating in project activities such as trainings, demonstrations and are also participating as leaders and trainers of others in consortia. In addition, 16% up from a baseline of 8% of women are accessing finance and other credit services. They have utilized the loans received to; i) buy seeds and other inputs collectively, ii) pay schools fees for children and iii) start new and improve other enterprise such as poultry and cattle keeping.

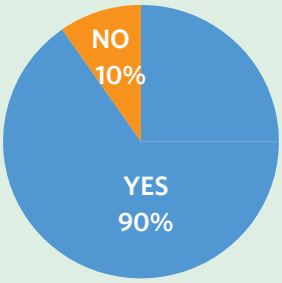
Youth (47% of all people engaged) are actively participating in project activities such as trainings, demonstrations and are also participating as leaders and trainers of others in consortia. Engaged SHFs and SRVs youths are accessing financial services through internal savings and credits. Percent of youth accessing credit increased from 7% at baseline to 56.6% by the time of the evaluation, meaning the project has satisfactorily engaged the youth.

A KII with CDO Ukonga informed that about 30 SHGs acquired municipal loan equivalent of GBP 60,198.11 and the beneficiaries about 33% were youth and 67% were women. According to him 55% of the activities financed were on potatoes value chain where majority of the groups were doing chips while others were doing potato retailing and selling of crisps along the road. He said most women are very active when the schools are operating because the pupils and students are the main market.

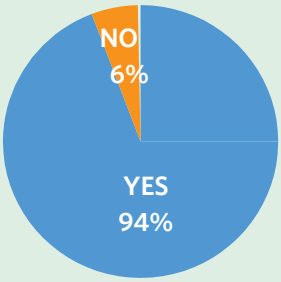
A KII with Portfolio officer Akiba Commercial Bank, Ilala Municipal Council confirmed that through linkage with Project Coordinator Acla Honey, about GBP 9,312.418 has been accessed by SRVs through credit.

In a household survey done in Arusha, Mbeya and Njombe for the farmers implementing CHIPS project, it was enquired if women are involved in trainings and demonstrations, as leaders and trainers and make decision along potato value chain. The results are shown below.

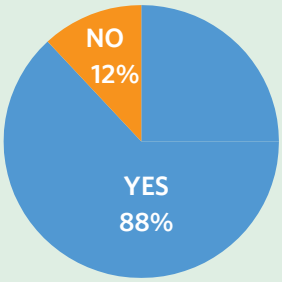
Responses to whether women were involved in training and demonstration in Njombe Region



Responses to women being involved in training and demonstration in Arusha Region



Responses to whether women were involved in training and demonstration in Mbeya Region



In response to whether women are involved as leaders and trainers; it was in the affirmative at **91%** in Arusha, **88 %** Mbeya and **85%** Njombe. On whether women are involved in making decision along potato value chain, it was again in the affirmative at **71%** yes in Arusha, **81%** Mbeya and **87%** Njombe. The survey results have been supported by comment from program manager TAHA.

"Women are mainly doing farming, processing and trade at the markets around Irish potato activities, they benefited a lot from the project implementation, they have raised their income, supported their families and some were involved in decision making as bread winners are honored. The project has empowered women who were previously not involved in decision making, did not own resources since tradition and culture denied them"

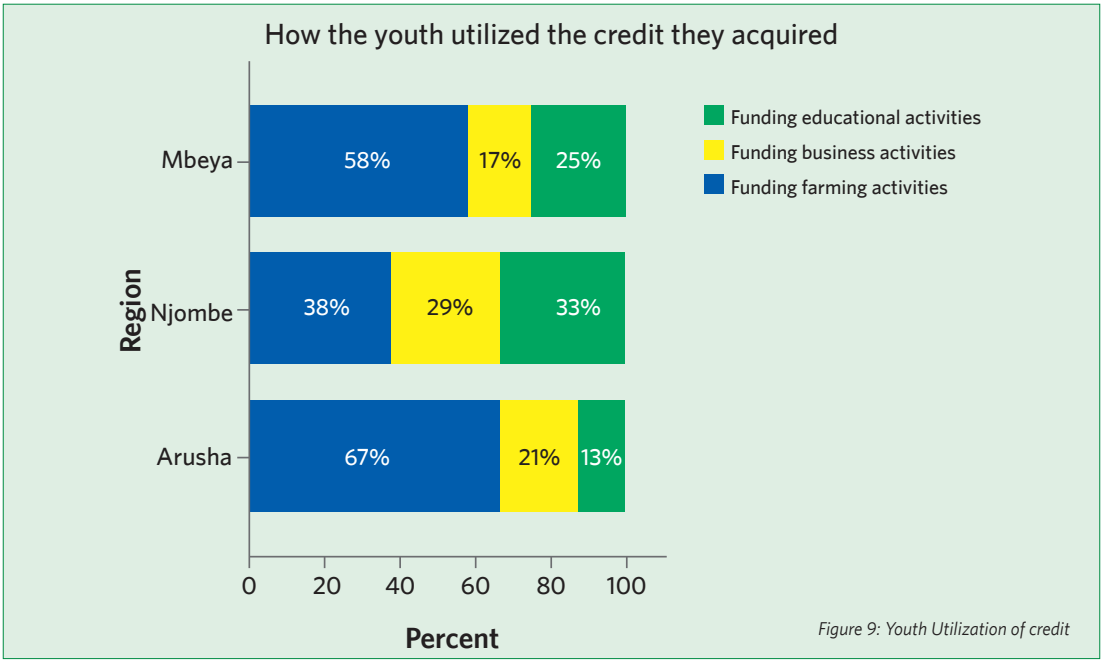


Figure 9: Youth Utilization of credit

The confidence of females who participated in the project has increased and they are involved in decision making compared to others. Men's attitude towards women is changing and they start valuing women who involve themselves in various income generating activities.

When the same questions were enquired for the youth involvement, it was in the affirmative at 94% for trainings and demonstrations in Arusha, 86 % Mbeya and 74% Njombe. As to whether youth are involved as leaders and trainers; it was in the affirmative at 71% in Arusha, 83 % Mbeya and 77% Njombe. On whether they are involved in making decision along the potato value chain it was in the affirmative at 66% yes in Arusha, 81% Mbeya and 67% Njombe.

When it was enquired how the youth utilized the credit the responses indicate in Arusha 67% and 58% in Mbeya were investing in farming activities.

3.5.5. Capacity of KT and its partners in development of SRV businesses and trade associations

Partners were trained on Results Based Management, data collection, finance management (three trainings). The partners reported that they are better in report writing, finance management and data management after project interventions. NADO staff reported that before these trainings they used to receive many queries in their reports, these have now reduced. NADO on being trained on M&E can write proposals and have already written one to Agricode which has already been funded. Their data management has also improved, and their data is disaggregated. They also have an excel database created after the training and the idea has been exported to the new project. They are using GPS skills from the training to take measurement of farm fields and farmers are very happy, with many asking for assistance.

All the partners had allocated at least two staff members to oversee project implementation among them a monitoring and evaluation staff. KII with the partners reviewed that majority of them were either linked directly to SHFs or SRV or both in potato or other value chains, hence had a comparative advantage in implementing the CHIPS project through the KT Consortia Approach to Value Chain Development (KT-CA2VCD) model.

Partners who are linked directly include among others, RECODA a local NGO with the aim of bridging the technology gap in community development through research, consultancy, capacity building and facilitation of community-based projects. The organization aims at reducing food insecurity and poverty in Tanzania. Acla Honey Enterprises, a limited company has been working with farmer groups, a financier and SRVs in potato value chain. Acla honey has its own unique model where the company buys potatoes from individual farmers and distributes to SRVs who sell and pay later during the day. It has linked traders with a financier for credit.

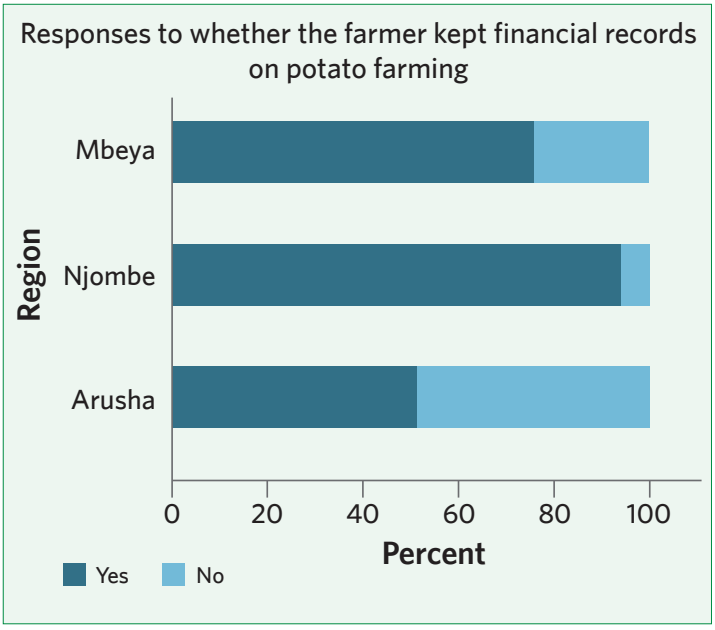


Figure 10: Record Keeping by Farmers by Region

Another partner is VIBINDO Society, which is an umbrella organization for the informal economy operators in Dar es Salaam. It's a membership-based organization and membership fee is the major source of income. The main objective of VIBINDO is to be an instrument responsible for creating good interrelationship among members, representing them to the government and other stakeholders/authorities dealing with informal sector development in order to safe guide their rights for their development, politically, socially and economically.

VIBINDO formed a *Wauzaji Viazi Buguruni* consortium. A KII with the Chairman Buguruni Market confirmed he was nominated to go to Dodoma for a tour to represent Buguruni market traders where they were informed of an upcoming consortium. In credit finance, VIBINDO has been using the VIBINDO SACCOS and Finance Company Limited established in 2007 and with more than 3,000 members accessing loans from GBP 66.5262 to GBP 4,987.92. For the purpose of increasing its financial muscles, VIBINDO SACCOS borrows money from CRDB Bank, DUNDULIZA and NSSF. The SACCOS have accessed loans from DUNDULIZA amounting to between GBP 3,324.64 and GBP 16,625.69 from CRDB and GBP 99,480.76 from NSSF respectively. VIBINDO reports at least 100 groups of 40 members comprising of SRVs are assured of accessing credit from VIBINDO developed financing packages (VIBINDO Finance Limited). The SRVs members are part of the SACCOS.

From the training received, farmers are keeping record with 76.3% of the respondents in the evaluation saying they do so on average. Njombe leads the pack with 94% followed by Mbeya at 76%, perhaps due to intense training by ARI Uyole. As an interview with Lusitu Agribusiness chair reveals, 'if you asked a farmer the cost of production, they can easily tell you'. This is collaborated by the data on the gross margins where farmers could easily remember costs incurred.

However, limited field presence of KT for closer mentoring has limited the opportunities for closer linkages and networking with other stakeholders in the sector. However, this is by design since KT is a market facilitator and the MF partners are on the ground.

From the evaluation survey, 82.5% said they have been trained through the project interventions, but of the trained vendors, only 42.1% said they belong to a trading association, meaning many prefer conducting business alone. This is mainly due to because of lack of credit and lack of storage facilities at the small-scale vendor level.

3.6 Results of OECD evaluation criteria

FGDs and KIIs were used to rate the various OECD criteria. In general, the ratings were good in all the criteria and explanations for the ratings have been provided below.

Ratings by implementers and beneficiaries per OECD criteria

Criteria	Relevance	Effectiveness	Efficiency	Impact	Sustainability
Rating	4.9	4	4.5	4.1	4.4

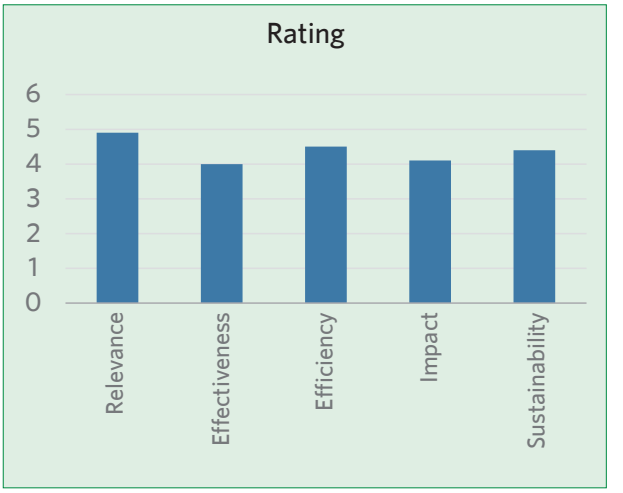


Figure 11: Ratings by implementers and beneficiaries per OECD criteria

From the chart, relevance was rated highest, followed by efficiency, sustainability, impact and effectiveness. However, it is important to note that all the criteria were rated highly at 4 and above with the maximum being five. This implies that the project was a relevant endeavor, was implemented effectively and efficiently, has impacts for beneficiary and is likely to continue providing benefits in future after KT pulls out. The justification for these ratings is provided below.

Figure 12: Nyari in his potato farm

3.6.1 Relevance

Responding to the needs of target beneficiaries

As part of the process to know the needs of beneficiaries for this project, KT commissioned a baseline study on Respondent's characteristics, namely: Women and Youth Participation in potato production Activities; Potato Production and use of Improved Technologies; Storage Technologies and Postharvest Losses; Collective marketing and selling of potatoes by SHFs; Potato retailing among others, in order to assess the status and subsequently measure the outcome/impact upon the beneficiaries after project implementation.

To verify how well CHIPs project responded, the consultant asked survey respondents similar questions to test some of the above indicators. From the baseline and interaction with the beneficiaries during evaluation it was noted that different partners were able to respond and meet the beneficiaries' needs when implementing project activities. For example, during selection and group formation the partners prioritized towards getting the women and youth engagement.

Potato production and use of improved seeds and technologies has improved: During an FGD at Sogoro in Meru it was evidence that the demand for clean planting materials for Irish potatoes is higher than the supply. After group formation and training, the group ordered and paid for a deposit of 140 bags of *Shangii/Obama* through the partner but received only 62 bags which was a mixture of *Asante* and *Obama.* During the FGD the members could not hide the loose linkage the group developed during the last minute with RECODA staff for failing to deliver the amount of Irish potato seed ordered. The group has gone to the extent of linking with the manager TARI Uyole which is a plus for them. For this season, the group needs 500 bags of *Obama* but TARI Uyole can only supply 300 bags because of the high demand.

In terms of productivity a farmer in Arusha (Mr. Paul Nanyaro) confessed that he planted 2.5 bags of Obama per acre, clean seed potatoes and got 50 bags with 44 bags in grade 1 and 6 bags in grade 2. A further explanation on the reason for the very high yield revealed that other than the farmer using the recommended clean potato seed and the recommended amount of fertilizers for the clean potato seed, the farmer had planted some in the forest through Shamba system, an area with virgin soils that receive very good rainfall where opportunities for clean seed potato bulking for selling by the group can be further exploited.

In terms of potato quality preferred in the market, KII with Mood Jeifo, a retailer in Buguruni market Dar es Saalam informed that consumers require very big size of potatoes and a variety that use very little oil during cooking which corresponds very well with *'Shangii'* characteristics. *Shangii* potato variety preference was also ranked number one in Arusha market"

Beneficiary involvement

To enhance relevance, beneficiaries were involved in the project at all multiple stages with selection done in a participatory manner. In stakeholder meetings, FBO and SRVs had representation through their leaders.

According to interviews conducted with RECODA Director in Arusha, the beneficiaries were selected based on the criteria stipulated in the RIPAT (Rural Initiatives for Participatory Agricultural Transformation) manual which is the extension approach used to implement the project i.e. each beneficiary should be in a group, come from the same village, one person per household and own land. During an FGD in Sogoro village Meru the members ascertained the RECODA staff called a meeting for all villagers which composed of about 200 households where they discussed the challenges in potatoes production and opportunities, incoming CHIPS projects and criteria to join. It is from this meeting that a group such as Kyuta Heshima was formed and registered (2018) with the aim of growing Irish potatoes using clean planting materials.

Acla Honey Enterprises Ltd (AHEL) linked with community development officer under the Ministry of Health, Community Development, Gender, Elders and Children to call farmer groups and sensitize them about the CHIPs project. AHEL trained the groups on financial literacy, business skills, entrepreneurship and Village Savings and Loan Association (VSLA)

and opportunities in potato value chain. They were given the requirement for registering with the Ministry for them to benefit from CHIPs. Interview with Community Development officer Ukonga in Dar es Salaam indicated the project was timely because the government was introducing a loan package targeting SHGs. The SHGs used to operate without registration.

Beneficiaries were also involved in formation and strengthening of the SHGs, leading the election of officials including chairman, treasurer and secretary for each SHG or association. The Chair lady of Tumaini SHG was very happy to state,...

'we removed all the officials and the inactive members during the registration and now we are not experiencing problems like before'.

Assessment of needs led the Government of Tanzania through Njombe Town Council to support the construction of the pack house after contributing GBP 3,277.95 to Lusitu Agribusiness Group (LAG) and also provided a tractor loan worth GBP 24,918.48 through Youth and Women Fund where KT supported LAG to develop business plan.

It is apparent that partners had led a successful beneficiary engagement process, involving them at different stages of the project enhancing the relevance of the project. It was this level of beneficiary engagement that drove the strong ownership shown by respondents, and ultimately the successful implementation of the project. Moreover, community leaders, TOT, and government representatives, remarked that they were happy with how they had been engaged in the Project, more so because of the in-built sustainability.

"Consulting with community leaders/government representatives to design project activities created sense of ownership and contributed to the sustainability of the project as these community /government leaders will stay in the community for the rest of their life while project has settled duration to be ended" (KII TAHA Program coordinator).

In summary, CHIPS project links the actors in the potato value chain and has opened doors for other stakeholders such as Stawisha to also focus on potato as a value chain to enhance farmer livelihoods. The project has been and is still relevant as there is demand for clean seeds which have high productivity and less prone to diseases. In a short survey conducted by ARI Uyole in August 2019, farmers were asking for the clean seeds wherever the team went. Farmers from as far as Kigoma, a distance of 858km, have been calling asking for the seeds.

However, although training for SRVs, vendor and farmers has been taking place, access to finance as a result of difficulties in micro lending for them to start or advance their business has been a key issue. Micro creditors have their own terms and conditions which might not be friendly to the smallholder farmers as farming is considered risky and farmers do not have collateral that is demanded by financial institutions. However, there have been instances of linkages and successful lending especially in Dar- es-Salaam to SRVs. Relevance could still be improved through more farmer linkage to the market, construction of potato processing plants, and construction of storage facility for Irish potatoes at the farmer's field.

3.6.2 Effectiveness

Figure 11: Mosotwa group members in potato Good Agricultural Practices demonstration site at Sugumen-Imbibia, Arusha district

The CHIPS project has largely managed to achieve its objectives and will most likely achieve its targeted numbers by the end of the project. Clean seeds have been produced, capacity building for matching grant partners (NADO, RECODA, ADP, etc.) and farmers has taken place using a TOT approach. Partners with training targets have largely achieved them e.g. Beula targeted 2,500 farmers and have reached 2,766 through training and access to seeds. Training was on Farmer Business School, Good Agricultural Practices (GAP), Good Post-harvest handling (GPHH) and Good Food Handling Practices (GFHP). Yes I Do has reached 3,649 out of targeted 4,500 but still has time to complete the rest. Most importantly, the farmers are using the skills to improve yields and income.

There have been other results from the training, for instance, most farmers are keeping records, which show profit/loss and practicing GAP e.g. spacing, chemical application, applying fertilizer, ridging, etc. Survey findings indicate farmers have increased production. For instance, those harvesting up to 10 tons increased from 48% in 2016 to 63% in 2017. This increased further to 67% in 2018. Low production in 2016 was blamed on poor quality seeds by 35% of respondents and inadequate knowledge of GAP (35%), in 2018, the blame on poor quality seeds reduced to 17.2% probably because they got good quality seeds from the clean seed producers. Inadequate GAP was reduced from to 20.7% probably because of the training received by the farmers on GAP. The survey results also indicate income has increased from 2016 as shown below.

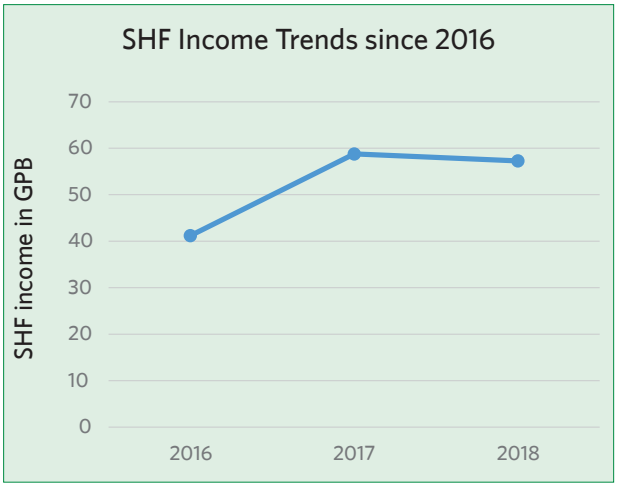


Figure 14: SHF Income Trends since 2016

The graph on SHF trends indicates that SHFs earning GBP 9.95 to 1,662.55 increased from 41.2% in 2016 to 58.8% in 2017, remaining nearly the same at 57.3% in 2018. Those earning between GBP 1,662.64 to 3,325.29 increased from 1.5% in 2016 to 3.1% in 2017 and 4.6% in 2018. The project can be said to have contributed to this rapid increase in incomes can be attributed to the project, as it is the main interventions related to the potato value chain in the regions assessed.

YES I Do has been implementing training for SRVs in Dodoma, Iringa and Singida. The training sessions have had between 50 and 200 participants per session. The latter is too high for effective training. The materials they use for training are also a bit complicated for the level of participants. According to a KII with one interviewee who was involved as a facilitator...

'we would provide the trainees with books and notes provided by TAHA and Kilimo trust, which are well prepared but good for facilitators but too technical for trainees'.

The participants may not read or understand them after the sessions. Effectiveness of the training may also be affected by lack of consistency in attending the training as according to NADO, they keep migrating and are not always available for the sessions. However, YES I Do would hold separate mentoring sessions with group leaders for deeper understanding of the content so that they can assist their members later. Also, according to a KII with the staff, of those trained, some 70% are implementing the skills they gained and getting more profits. However, some have improved on their equipment, volumes and sales (for instance selling the 70kg sack of potatoes in one days when previously they were taking 3 days).

There is good knowledge in terms of GAP and GPHH but low uptake of storage technology. Low storage technology adoption is due to high cost of construction (at GBP 665.068 for a 7-ton store). However, storage is more for seed potatoes than ware potatoes. . Most farmers sell immediately and only store for household use, as they depend on potatoes for a livelihood. In the evaluation survey, 94% of farmers in Njombe and 82% in Arusha said they did not preserve the potatoes but sold immediately on harvesting.

There have also been linkages with financial institutions for financial support. A KII with Portfolio officer Akiba Commercial Bank Ilala Municipal Council confirmed she has been training SRVs in the meetings convened by CDO Ukonga and CHIPS Project partner Acla Honey. Some have accessed credit for their businesses and repayment rate is good. Apart from banks, many farmers and vendors obtain credit from VSLAs or VICOBA.

Project use of learning to improve delivery of project results

Throughout the project life cycle, partners undertook efforts to improve delivery of the project in different ways, they compile their quarterly reports using a uniform template and share with the project team. The partners also conducted their quarterly monitoring during which the work plan, challenges, and key lessons learnt were discussed and reviewed. The approach of group formation by partners which involve first, they mobilize to create community groups with members who support each other, save together and learn together to form Village Savings and Loan Association (VSLA). Next, they train group members to develop small business plans that make the most of their skills and potential along the potato value chain. Finally, they help entrepreneurs scale up their businesses by connecting them to larger markets through a consortium which includes all players in the potato value chain.

In this case the project has used an approach that is more community focused which will help ensure its sustainability now that CHIPS project is coming to an end. An FGD in Sogoro revealed that group dynamics have improved especially as a result of VICOBA, creating an atmosphere of cooperation and reliance.

"The table banking project has been in operation for just nine months and the group kit has GBP 2,994.63 and the members are currently loaning themselves up to GBP 166.365 for potato production among other things". Chairman Mr. Ephata Mbise said.

KT organized for annual meeting with partners, TOTs and representatives from FBOs and business consortia where annual reports were presented. Representatives from FBOs and business consortia were given opportunities to provide suggestions and feedback during consortium. According to partners, this was a key element of the KT approach in team building between beneficiaries and partners which strengthen project's community engagement process.

The TOTs were trained on how to obtain feedback (both positive and negative) from the beneficiaries, which can be done after trainings, meetings, and mentoring sessions between the trainer and beneficiary, which could then be fed back to partners to improve delivery.

Key drivers and barriers affecting the delivery of results for the project

The project became very popular amongst FBOs in production of potatoes because of availability and accessibility of clean potato seed which is preferred in the market. This made the FBOs to order more than the capacity of TARI Uyole which was working with the project in seed production.

The approach of group formation by partners, training and formation of active Village Savings and Loan Association (VSLA) which has saved enough to start loaning its members motivated FBOs members to stay engaged.

The partners nominated lead farmers at grass root level from the CHIPS target areas to attend Training of Trainers (ToT) by KT and later lead the trainings at FBO levels. This meant that not only were beneficiaries better able to connect and engage with their trainers, but the capacity would remain in the community, after the project had finished. The trust enjoyed by the trainers within their own communities also meant that the project benefits could be better accepted, as ownership of the project became a key factor within the communities.

The trainings provided were also a key factor in driving the success of the project. For example, those who received training remarked that they could apply the skills into other aspects of their lives. This was noted during the KII with community development officer Ukonga where Gerald, Acla Honey staff, had accompanied the consultants.

KII with project coordinator Acla Honey Enterprises Ltd revealed that most SRV are rigid to adopt changes in doing their business and had the notion that the project will pay off their debts. From experience, the SRV expect 'hand outs', not just training and empowerments as given by partners. The partners had to overcome these expectations and change SRVs mind-sets through regular visits and mentoring them to adopt changes.

VIBINDO led in formation and operationalization of a consortium in Dar es Salaam. A KII with chairman Chawavibu *(Chama cha wana Viazi na Vitunguu Buguruni)* market confirmed representatives for different markets like Buguruni, Mabibo, Ilala, Mbagala and Temeke were once taken for training in Dodoma, Mbeya and other places at different times. They were facilitated to form a consortium as potato wholesalers to link up and sign contract with FBO producing clean *Obama* seed potatoes in Njombe and Mbeya which has come to pass.

Adaptive management

ARI Uyole: Some activities have been implemented according to the work plan, but some activities were changed e.g. installed irrigation equipment earlier to produce more seeds before rains came in order to shorten the seed production cycle. This improved performance. For Beula, there were some minor modifications to suit the project for instance used fewer out growers (10 instead of 20) due to the high inspection costs by Tanzania Official Seed Certification Institute (TOSCI).

Lusitu agribusiness has constructed a potato pack center, trained 2,000 farmers in 6 wards and has brought in Njombe Town Council which has supported the group with 10 million Tanzania shillings (equiv. to GBP 3,325.44) for sanitation works.

In terms of effectiveness, the project did some work to link farmers with markets, but more work needs to be done in terms of linkages with financial institutions and institutionalizing marketing/contract farming. Despite the success of M&E training, there is also need for partners to track and report all results especially purchases and sales for better estimates of the reach.

3.6.3 Efficiency

The evaluation sought to assess to what extent the program delivered results on time and on budget against agreed plans. According to interviews conducted with partners, all activities were completed on time as planned within the quarters, without any major delay. However, there were some minor delays during the project implementation which slowed progress, but ultimately did not restrict the overall delivery of the project. For example, delaying in

quarterly release of matching grant funds from KT which normally came in the second month and also delays experienced in the delivery of clean potatoes seed from TARI Uyole.

FBOs in KII with KT staff confirmed the delay in disbursement of funds from KT was necessitated by the lead partners delay in reporting and accounting for matching grant disbursed in the previous quarter. The wide spread of the project areas and limited monitoring staff affected KT monitoring efforts, focus being when there are specific issues or assessments.

Resources have been used efficiently and there is demonstration of value for money by partners' e.g. Beula has been combining use of demo plot and GAP training. They have also trained 12 TOTs and use them to reach 2,766 people against the target of 2,500 farmers, thus using little resources to reach many people.

Some partners such as NADO have demonstrated efficiency and value for money by having more persons trained with few resources e.g. training in good food handling practices they trained 21 instead of 10, and on financial literacy they have had 21 trained instead of 6. With three months to go, they have reached 4,407 farmers out of a target of 4500, meaning they will train many more with the same resources.

Using of matching grant where matching grant partners contributed 50/50 was an efficient way of investing for KT and create ownership of the project.

3.6.4 Impacts

Use of clean seed has enhanced production and thus profits. Some farmers have doubled their profits (e.g. a farmer in Umalila, Sanje using the clean seed is now harvesting 40 tons per acre, up from 18 tons per acre. Even for famers planting the local variety according to Beula, training farmers on good farming practices has resulted in an improvement from 5 metric tons to 25 metric tons per acre. The enabling factors have been the clean seeds, training of farmers on GAP and specifically disease control and GPHH. According to Beula Seeds Director,

'previously when there were no certified seeds, potatoes used to be affected by viruses and bacterial wilt but these no longer disturb the farmers who have planted clean seeds'

Seed Potato storage has been enhanced. Previously farmers would store potatoes in the open fields or plan to sell immediately but are now making use of stores and the seeds last longer. Anecdotal information from FGDs with farmers indicated that GAP training has reduced cost of production with less spraying and better packing in grades thus more income as every potato size (small, medium, large, very large) has a buyer, meaning there is less wastage compared with the time before the project.

The measures used in selling potatoes have changed for the better. Before farmers were selling their potatoes in over packed sacks (Lumbesa) but now 85% have adopted use of kilograms.

Figure 15: Potatoes aggregation by Mshikamano group at Ng'anda village

Through use of contracts where they have worked, farmers are eliminating brokers and are selling their potatoes at about GBP 0.13 per kg where brokers buy as low as GBP 0.0842 per Kg (Interview with Government extension staff).

Farmers have gotten more money which they are using to take children to school, and less people are taken to court due to failure to take children to school and buy school uniform. Farmers also construct new houses, connected solar power, opened businesses e.g. shops or stores to sell farm inputs and gotten better clothes for family. Some have bought motor bike, replacing the bicycle. Some have dug wells at home (Wanging'ombe).

Beno Mgaya, a farmer in Lusitu used to live in a dilapidated house and could hardly afford to educate his children. When the CHIPS project was introduced, he started planting the clean potato variety from Beula and ARI Uyole. His potato production increased from 30 to 180 sacks per acre and he increased the acreage. Using his proceeds from potatoes, Beno is currently constructing a modern house worth GBP 16,625.82 and his children are in college with one in a boarding school which he comfortably affords. He has also bought a generator and is pumping water from the river to irrigate his farm. He has also planted 700 avocado trees to supplement his income.

Many youths have gone into the potato business thus reducing unemployment in the target areas. Due to the recognition of youth and to motivate them further, the Njombe town council has provided a tractor under the youth fund from transporting potatoes from the surrounding farms to the grading and packing center. In terms of reach, specific implementers' report high numbers of women and youth, for instance, NADO project target had 30% women and 45% youth thus 75% of their beneficiaries were to be women and youth. Currently, it is 59.9% women and 39.3% youth thus 99.2%.

In leadership, there are more women as chairpersons, secretaries and treasurers of groups. Women are selected as treasurers due to their trustworthiness compared to men.

Trained vendors have reported that the skills have helped them improve in business for instance they have improved in terms of volumes of potatoes sold.

'Some are selling 70kg in a day instead of 3 days'

We can conclude the project interventions contributed to the CHIPS project outcomes due to the absence of other livelihood support and capacity enhancement projects in the target areas and also comparing evaluation results with baseline survey. Quantitative and qualitative findings identify observed changes in beneficiary's socio-economic status and there is strong indication of success and Value for Money in the project.

3.6.5 Sustainability

Sustainability has been built into the project through several ways. There is the ability to develop seeds through ARI Uyole trickling down to seed companies and farmers. TOTs will continue training farmers who will continue using the skills in potato farming and getting profits; buyers and input providers who are all trading and getting profits. NADO, for instance, has facilitators at village level who will continue to be used by the farmers. According to an interview with one of the researchers at ARI Uyole, who said that,...

'you can't go wrong with the potato value chain, it is just successful'.

ARI Uyole has irrigation system and equipment so they will continue producing and selling. Farmers have continued to show interest, and some have started to produce the clean seeds using Quality Declared Seed (QDS) approach. The system has attracted interest from Universities who have been sending their students for attachments to learn the system.

CHIPS project has also established good linkages with the government and government institutions including TARI Uyole, District Councils such as Njombe Township, local government extension officers some of whom were trained as TOTs, and village extension officers. Business linkages between farmers and buyers have been established. One of the KT staff said,

'VIBINDO are going to farmers directly and middlemen are being avoided to the benefit of the farmer who gets a better price. The business linkages are beyond what we can trace'.

4.0 Unexpected Results

Some unexpected results which positively will impact the potato value chain include the following:

- Crop insurance: Lusitu has started to make arrangements with an insurance company. They have done field assessments and are ready to get on board.
- Linkages with government for co-funding: Njombe town council leading to plans for financing to purchase sorting machine and tractor for transporting (youth project) for Lusitu Agribusiness
- Government plans to scale up successful cases: Njombe council plans to build a pack house similar to Lusitu's at Utalingolo.

5.0 Challenges

Figure 16: Mini tubers multiplication in ARI Uyole

i. **Slow return on investment in potato seed production:** The benefit from clean potato seed production takes 18-24 months which is a longer period compared to most other businesses with immediate profit. Thus, seed production has remained at low scale and supply is below demand as explained in the next point below.

ii. **Low availability of clean seed:** The demand for clean potato seed is higher than the supply as portrayed by most of the SHG linked to clean seed producers by CHIPS, who complained of receiving less quantity than what is ordered. ARI Uyole is producing only 30% of demand, producing 50 to 70 tons and managing to sell all. ARI Uyole notes the high cost of operation and maintenance in seed production units. It is expensive to maintain the seed production equipment, with some machines being too old for instance the sterilizing media. Maintenance costs for old machines are high. Also, some greenhouse chemicals are not available locally, so they have to be ordered from Nairobi thus increasing cost of tissue culture and causing delays in the production cycle. Production cost for seed production is also increased due to fuel costs of generators as there are frequent power cuts.

iii. **Timing availability of seeds as farmers depend on rains.** ARI Uyole delayed in giving plantlets to seed producers who are under rainfed production system, so they lost six months of the cycle. Also seed producers such as Beula said getting the variety they need in required quantities is a problem, so they propagate stem cuttings to expand more.

iv. **Farmers low purchasing power.** Most farmers cannot afford to pay cash for the clean potato seed because of low purchasing power and high cost of seed compared to recycled seed. This explains why in Mbeya, Beula Seeds is offering the clean seed potatoes on credit and farmers are also recycling the clean seed. Given the higher productivity of clean seed, government needs to support farmers to access clean seeds.

v. **Adulterated chemicals:** The farmers complained of non-working pesticides as one farmer puts it, 'I sprayed, and potato still got damaged'. This tend to increase cost of production where farmers are required to spray again of loss of crop due to infestations.

vi. **Lack of mechanization:** In almost all the region covered by CHIPs, farmers are using manual labour for operations other than ploughing which increase the cost of production drastically.

vii. **Higher level of potato waste:** Farmers reported that 15-20% of potatoes remain in the soil because of the use of traditional harvesting methods. This is also attributed to low use of mechanization especially in harvesting.

viii. **Lack of cropping programme:** Farmers plant and harvest at the same time increasing supply glut in the market causing price reduction.

ix. **Limited extension services:** Farmers complained of few field extension staff which meant they lack adequate technical support in the field

x. **Rampant informal marketing:** Marketing is mainly informal and creates room for middlemen (Dalali) who oppress farmers by paying low prices. Prices fluctuate from GBP 11.64 per 80 kg bag to GBP 6.65 per 80kg bag. During the research, an 80kg potato sack was sold for GBP 12.64 at Singida but brokers were buying from farmers at GBP 6.65. The cost drivers include transport costs and the perishability of the produce. Thus, a farmer has to produce a lot in order to break even. The project sought to solve this problem but there is still a long way to go.

xi. **Delay in contracts:** Contract farming has not taken off effectively due to lack of aggregation and grading centers for value addition. The project funded some farmers in Lusitu but this is not yet complete although the project has ended. However, the local council is working with the farmers group to complete the remaining bits mainly sanitation system connections and clearing ground for access by vehicles. The center is likely to stabilize prices with sorting and storage and cleaning. Buyers will be assured of getting adequate amounts of products in one place, hence motivating them to come. In other places, farmers who have visited Lusitu on exchange visits are planning to replicate the grading centers in their areas.

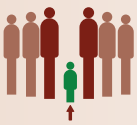
xii. **Low adoption of storage technology:** Storage technology has not been adopted widely due to high cost of construction at GBP 664.770 for a 7-ton store. Also, many farmers do not want to store but to sell immediately as they depend on potatoes for a livelihood. In the survey, 62.9% of the farmers said they did not do preservation of potatoes.

xiii. **Poor transport infrastructure.** Lack of all-weather road in the field affects transportation especially during rainy season. It is hard for farmers to access markets as Lorries take long or are unable to reach the potato fields. This also increases transportation costs and rate of post-harvest losses

xiv. **Lack of credit.** It is difficult for farmers and traders to access credit in form of loans to expand their enterprises or land size under potatoes. The problem is the bank requirements which are prohibiting. However, there were cases where farmers were able to access some credit from financiers, since bank agents looking for business interact and negotiate with farmers and traders directly, a good example being the trading groups formed by Acla Honey.

xv. **Lack of irrigation facilities by farmers and dependence on rain fed agriculture.** With climate change taking effect this makes the farming business high risk. This could be disastrous to the farming business in future.

xvi. **Few clean seed producers:** there are limited number of private seed multipliers and as a result many farmers are still using the traditional seeds which have low production.



xvii. **Kilimo Trust has limited presence on the ground and monitoring is not adequate.** This affects technical backstopping. Also due to business secrecy, a lot of data is not reported, so there could be a lot of results on the ground not reported. KT is working with private sector to facilitate marketing through linking farmer to traders. Consortium has solved this problem by engaging MF partners

xviii. **Delays in disbursements.** There were delays in disbursements as they depend on review and approval of reports done every three months. Sometimes the reviews are back and forth, hence taking more time. The problem was the capacity of the MF partners which in a long run during project implementation was improved tremendously. Accountability is key in MG management

xix. **Kilimo Trust Visibility.** To ensure sustainability, Kilimo Trust let the MF partners run the show on the ground. As an organization had very low visibility for Kilimo Trust in the field or on the ground as partners are the ones who directly link with farmers and traders. However, branding of materials and infrastructure assisted in visibility.

6.0
Outcome in Yield, Sales and Gross margins

6.1 Improvement in Yields and Potato Marketing margins

On-farm performances at evaluation stage

Indicator	On farm Mean	Target (On farm Mean in Africa)	Achieved
Yields – MT/ha	7	20	39
Total production Mt/Ha	2	13	-
Cost of production £/MT	156	98	56
% use of quality potato seed	5	10	41
Farm-gate price – £/MT	125	170	120
Farm-gate prices as % of urban retail prices	30	52	36

On-farm performances had six indicators at baseline which would change with CHIPS intervention as per the targets shown in the table above. The evaluation study failed to collect reliable data on the achievement in total production Mt/HH because the demand for the certified seed was more than the supply and most farmers were receiving seed for a quarter an acre and having paid more.

The data from the evaluation indicated from the table was compared with baseline from the business case and market analysis for CHIPS project. Participating farmers in the target areas on average surpassed the targets (On farm Mean in Africa) except for the farm gate price and the farm-gate prices as % of urban retail price. The high achievement could be attributed to the high attention given to the small portion of land planted with certified Irish potatoes which was easier to manage. The overall increase in adoption of certified seeds and yields for participating farmers in groups was also confirmed from different FGDs. Generally, the overall diffusion of these technologies, however, remains limited to the target areas and additional effort is needed for scaling up results to wider areas.

The marketing margin which is the difference between the price paid by the ultimate consumer and the price received by the farmer was calculated with two different marketing channels as noted from Njombe region.

Channel 1: Farmer -Middlemen -Consortium—retailer-Consumer

Channel 2: Farmer—Consortium—retailer-Consumer

The margins were calculated by finding the price variations at different segments and comparing them with the final price paid by the consumer. The consumer price was the base or the common denominator for all marketing margins. The Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end consumer and then expressed as a percentage. When TGMM is deducted from 100% it gives the farmers' share of the consumer price (GMMP). Under marketing channel 1, the farmers sell to the middlemen at GBP 0.084 per kg and the wholesalers buy from middlemen at GBP 0.13 per kg who later sells to retailers at GBP 0.18 per kg while the final consumer pays GBP 0.33 per kg.

With the introduction of the consortium by the CHIPS project (marketing channel 2), the price received by the farmers improves from GBP 0.084 per kg to GBP 0.12 per kg while the consortium sells GBP 0.1759 per kg to retailers while the final consumer pays GBP 0.3289 per kg. From the data received, the price paid by retailers and consumers does not change.

The marketing margins for the farmers, middlemen and the consortium for both channels have been calculated as shown below:

$$TGMM\ Farmer = \frac{Consumersprice - Farmersprice}{Consumersprice} \times 100$$

$$TGMM\ middlemen = \frac{Middlemenprice - Farmersprice}{Consumersprice} \times 100$$ (which is the percentage of the total gross marketing margin received by the middlemen.)

$$TGMM\ Consortium = \frac{Consumersprice - Farmersprice}{Consumersprice} \times 100$$ (which is the percentage of the total gross marketing margin received by the consortium.)

Farmers' share of the consumer price (GMMP). = 100% - TGMM

The Total Gross Marketing Margin (TGMM) for Marketing channel 2

		Price per kg	Marketing Margin	%
TGMMf	Farmers	0.165	0.270	62
TGMMmm	Consortium	0.239	0.074	17
TGMMr	Retailers	0.435	0.196	45

From the tables above, the Total Gross Marketing Margin (TGMM) of potatoes for channel I gained by the farmer, middlemen, wholesaler and retailer were estimated at the rate of 74.7%, 13.8%, 15.9% and 45% respectively. In marketing channel 2, the TGMM for potatoes gained by the farmers, consortium and retailers were computed as 62%, 17%, and 45% respectively; while, the corresponding figures for the GMMP for marketing Channel 1 and 2 are 25.3% and 38% respectively. The 2nd marketing channel is relatively more efficient than channel 1 because the farmers sold directly to consortium and also received a higher price compared to when they were selling through brokers who would late sell to wholesalers. These calculations show that the number of market segments involved in various marketing channels has a strong effect on the marketing margin which indicates the importance of chips project in linking the farmers to the market through the consortium which reduce the number of market segments.

6.2 Improvement in Yield and Gross Margins for SRV and SFG

Data sourced through KII with Mr. Nanyoro a farmer from Arusha and Mr. Ismael Siraji (SRV) from Dar es Salaam was used in showing the changes in gross margin as result of CHIPS project intervention. Mr. Nyanaro had planted 250 kg of clean potato seed from ARI Uyole and the cost of production and the returns from his part of his farm are as tabulated below.

Table Gross Margin analysis for Mr. Nanyoro's Farm using 250kg of clean potato seed.

Items	Unit	Quantity (bags)	Price/Unit (GBP)	Amount (GBP)
Gross sale	Grade 1	44	23.27	1,024.03
	Grade 2	5	11.63	58.19
				1,082.24
Land preparation	Man days	12	1.65	19.95
Planting				
Diggings Holes	Man days	5	1.66	8.31
Planting	Man days	2	1.66	3.33
Potato clean seed	Bags	2.5	31.57	78.91
Fertilizers TSP	Bags	1	19.94	19.93
Fertilizer application	Kg	5	0.32	1.66
Insecticide	Liters	0.25	6.64	1.66
Insecticide	Kg	0.5	2.99	150
Fungicide	Kg	0.5	7.31	3.65
1st application of chemicals	Pumps	3	0.33	0.99
1st Weeding	Man days	4	1.66	6.64
SA for topdressing	Kg	50	0.52	19.93
CAN for topdressing	Kg	25	0.52)	9.97
Fertilizer application	Man days	2	1.66	3.33
2nd Weeding	Man days	6	1.66	9.97
2nd application of chemicals		6	0.33	2
Fungicide	Kg	0.5	7.31	3.65
Foliar	Kg	1	2.49	2.49
Application in pumps 2 times @1000 per pump	Pumps	14	0.33	4.66
Fungicide	Kg	0.5	7.31	3.65
Foliar	Kg	1	2.49	2.49
Application in pumps 2 times @1000 per pump	Pumps	14	0.33	4.66
cutting foliage	Man days	4	1.66	6.64
Harvesting for 12 man-days	0.25	12	1.66	15.24
Transporting from farm		1000	0.0168	16.61
Grading		1000	0.0168	16.61
Total cost of production				277.81
Net revenue				**803.85**

Mr. Ismael Siraji from Dar es Salaam who buys a bag of 140kg and sell within 3 days was able to narrate the cost involved in processing of potatoes to chips which are as shown below.

Table: Gross Margin analysis for Mr. Ismael (SRV)

Items	Unit	Quantity	Price/unit (GBP)	Amount (GBP)
No of chips plates in a bucket	No	27		
No of chips bucket in a bag	No	4.5		
Total chips plates sold	No	121.5	0.50	20.19
Purchase of potatoes	Bags	1	18.28	6.09
Transport from the market	bags	1	0.99	0.99
Charcoal		3	0.67	1.99
Salt				0.066
Cooking oil	liters	2	1.33	2.66
Peeling	Man days	1	1.66	1.66
Cooking oil	Man days	1	1.66	1.66
Water		2	0.067	1.13
Rent per day		0.033333	43.21	1.44
Total cost				**16.71**
Net revenue				**3.49**

Summary of Gross Margins by SHG and SRV

	Base line (GBP)	Evaluation stage (GBP)	% Change
Small holder farmers (per year) per Ha	81.05	6433	7800%
Small scale vendors (per year)	2637	3065	16%

The gross margin analyses shown above indicates an increase in 7800% change from the baseline GBP 81.05 to GBP 6,424 per ha for SHF. The calculations assume that an acre will need 800kg of clean potato seed and if 250kg of clean potato seed has given a gross margin of GBP 803 then a hectare will proportionately require 2000kg of clean seed which when extrapolated will give a gross margin of GBP 6424.00. In SHF, change in yield as an effect of use of clean potato seed has contributed to the high performance while the change in SRVs can be attributed to the good quality of potato which are big in size.

A bag of potato was weighing 140kgs produces 7 buckets (of 20kg each) with each bucket giving four and half buckets after peeling and after slicing 121plates. Compared to the baseline where the same bag produced four buckets after peeling and after slicing 112 plates, this shows that the clean seed potato has a higher production.

7.0 Lessons Learnt

Lessons that need to be reflected on from the program include:

Efficiency

Profits for farmers can be enhanced though organizing smallholders into larger producer groups, which benefit the entire value chain as collective organization and post-harvest strategies, such as storage, significantly increase the bargaining power of producers while reducing transaction costs. The Ministry of Agriculture needs to continue organizing smallholders into larger producer groups and cooperatives and provide necessary support in terms of knowledge on GAP and GPHH.

Farmers bulking quality declared seed are the major supplier of seed to fellow farmers and linking them to the formal seed system will ensure the benefits of good quality clean seed that trickle down to the farming community. The Ministry of Agriculture therefore needs to support farmer seed bulking.

Effectiveness

Improved technologies and infrastructure support in storage and irrigation, are key to enhancing marketing and an effective value chain. There is more impact if a technology is disseminated through producers' groups. Again, the Ministry of Agriculture can continue supporting the dissemination of already existing knowledge and information.

The use of experts and professionals such as ARI Uyole and TAHA in the project implementation contributed to realization of high product quality. The Ministry need to scale up engagements between these research bodies and producers for enhanced knowledge and skills dissemination and use.

The methods of training like the use of on-farm demonstrations, tours and experienced farmers in adult learning creates a participatory environment and higher spillover effect.

Use of the local bank agents is more effective in assisting small traders and farmers' and small traders access bank loans as they understand the operations and source customers at the grassroots. The grassroots agents understand the dynamics of small businesses.

Sustainability

Private sector support is a viable and sustainable path to improving agricultural production/sector, with financiers getting attracted once the sector is well packaged as a profitable value chain.

Use of contact/experienced farmers in farmers' training to share their successes motivates the producer groups. Also use of community leaders and government officers during the project sensitization, create project ownership and strengthens the sustainability.

Creation of stable Village Savings and Loan Association (VSLA) helps in affordable and accessible credit, unifying the beneficiaries and project sustainability.

Brokers are a key factor in marketing thus a key player in the potato value chain. They could be organized and integrated formally in the value chain for a win-win solution in their relationship with the farmers.

8.0 Recommendations

1. There is need to upscale the availability of and accessibility to good quality clean seed potatoes. More support to the main seed production partners to upgrade their production capacity is necessary. Small holder farmers should also be supported to engage in commercial seed production.

2. Continue to promote small holder group formation and promote the transition from producer groups to cooperatives and Savings and Credit Cooperative Organizations (SACCOs) to formalize them, enhance their saving and credit worthiness, effectiveness and sustainability.

3. Promote Innovative and improved credit delivery and management systems for producers and private sector with longer payment period. Short payback period of loans compels farmers to sell at glut period.

4. Promote a model that ensures or meets farmers need for ready cash after harvest, or a model that differentiates between premium price for stored products (higher buying price margins) and cash on delivery (lower buying prices).

5. Continue with the initiatives to increase human capital through specific training in improving technical skills and in business training including accessing markets, financial literacy and new technologies. Also strengthening of capacity of extension service to improve farmer-extension ratio

6. There is a need to recognize the farmers who produced bulk quality declared clean potatoes seed, since they are the major suppliers of seed to farmers, hence linking them to the formal seed system. Due to this the benefits of good quality clean seed can trickle down to the farming community.

7. There is need to organize informal marketing systems (like brokers) into viable and supportive actors (marketing agents) to support the value chain.

8. Advanced processing will increase shelve life of potatoes, so as to achieve better farmer profits. Products can include crisps, frozen chips, potato wine and animal feed. Cleaning the potatoes can be done to avoid transporting soiled potatoes which fetch lower prices.

9. There is need for intensive and frequent training of TOT who should later be supported with transport and communication facilities to reach the farmers and vendors.

10. Develop storage structures including cold stores to preserve potatoes for some months to fetch better prices. This will solve the current problem where everybody harvesting at the same time increasing supply hence process reduction.

11. Production can be increased through use of irrigation to reduce dependence on rain. In this case farmers do not have to plant and harvest at the same time, and market issues can be less of a challenge.

12. Government and local councils should continue to enforce policies to sell the potatoes in standard weights and packages established by the law to save farmers from exploitation by buyers/middlemen (dalali), as one farmer put it 'they buy in Lumbesa (overfilled sack) but in the market they sell in kilograms, with flat sacks'.

13. A future potato value chain project needs more time. The project needed more time to achieve results since according to ARI Uyole a seed generation project needs time, it may take 3 years to produce and supply seeds to the farmers. Beula for instance ended up in basic seed production, it invested some money in production but has not yet made any profit by the time the project ended. As Lusitu Interviewee said, 'the problem was the price not the market. The project ended after training and construction before we got stable markets' However, it is important to note that the base has been set through market linkages.

14. There is need for public funds to pilot insurance products for farmers in order insurance to cushion the potato farming business from risks especially in the wake of climate changes.

15. In terms of effectiveness, there is need for more work to be done in terms of linkages with financial institutions and institutionalizing marketing/contract farming. There is also need for more effective tracking of results by partners for better estimates. Future interventions should look into this.

16. Although reporting in three months is good for financial controls and risk mitigation, KT can consider reporting every six months to provide adequate time for implementation. Reviewing reports takes many days (15 to 20 working days for review and feedback). Also, for such a program, KT should also hire grants staff rather than accountants for more effective sub granting processes.

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Annexes

i) People Benefitting

Type of people benefiting	Narrative description	Grant duration target			People helped to date		
		Total	Male	Female	Total	Male	Female
People directly benefiting	Smallholder farmers	17,500	11,725	5,775	15,892	8,479	7,413
	Small scale retailers	4,500	3,015	1,485	4,963	2,717	2,246
	Small scale food vendors	8,000	5,280	2,720	5,422	2,093	3,329
	Total number of people directly benefiting	**30,000**	**20,020**	**9,980**	**26,277**	**13,289**	**12,988**
	Core and short term staff of Kilimo Trust	12	7	5	79	41	38
	Core and short term staff of partner organizations (TAHA, ARI-Uyole and MGF partners)	84	47	37	182	104	78
	Consultants and enumerators	56	40	16	84	60	24
	Total number of frontline workers	**152**	**94**	**58**	**345**	**205**	**140**
Other people benefiting	Other smallholder farmers	5,000	3,500	1,500	14,170	8,073	6,097
	Other small scale retailers and value chain actors	500	300	200	903	481	422
	Other small scale food vendors	1,500	1,100	400	2,618	1,215	1,403
	Total number of other people benefiting	7,000	4,900	2,100	15,693	9,769	7,922

The number of people helped are those who have participated directly in CHIPS project activities; e.g. trainings, construction of storage/warehouses, multiplication of seed; and those who are staff in organizations CHIPS have partnered with as their matching grant partners.

The number of people helped to date are the cumulative sum of all project beneficiaries since the beginning of the grant.

i) CHIPS Individual Farmer mini questionnaire

Date: .....

Region/District/Location: .....

Preamble

CHIPS project is to enhance incomes and accelerating wealth creation for Smallholder Farmers (SHFs) and Small retailers and Vendors (SRVs) of round potato in Tanzania. Kilimo trust is currently conducting an evaluation that will be used to gauge achievement of its objectives and effectiveness of its interventions with targeted beneficiaries (farmers, traders, input suppliers and other relevant value chain actors).

.....

Checklist of CHIPS Projects Income and Marketing

1. Name of the Farmer: .....
2. Gender of the respondent .....
3. Age category
   - a. 0-18 ☐
   - b. 18-24 ☐
   - c. 25-34 ☐
   - d. 35-55 ☐
   - e. 55 and above ☐

4. Name of FBO:..... Membership (#s) in the FBO.....
5. Total land owned by the respondent.....
6. Total land hired last season.....
7. Total land under potatoes.....
8. Which variety of potato do you mainly plant?.....
9. Where do you get your potato seeds from?.....
10. Details on potato production volumes in the table below

	Land size dedicated to potato (Ha)	Potato volumes produced (e.g. Bags/Tons, etc.)- *In case of a bag, specify weight.....*	

2016			
2017			
2018			
2019			

11. What are the varieties of the potato that you grew last season and what are the reasons? (Specify)

12. Details on total revenue/sales since 2016

Potato Variety	Amount sold (e.g. Bags/Tons etc.) - *in case of a bag, specify weight.....*	Price range (TSH)	Cost of production
2016			
2017			
2018			
2019			

13. Were all your products accepted? If no reason? If no what percent was rejected? Why?

14. Please tick the 2 most commonly used and preferred marketing channels or buyers and why

Buyers	Most used channels (Tick)	Most preferred channels (Tick)	Reasons (why)
Middlemen			
Small retailers/vendors			
Large scale farmers			
Traders from big towns			
Processors			
Others Specify			

15. Provide details of the most commonly used marketing channels mentioned above

Commodity	Details of buyers/people or companies whom the farmers sell their produce		
	Name of trader of company	Located at (e.g. Dar es Salaam etc.)	Contacts – Telephone

16. How do you preserve your potatoes after harvesting?

17. Are you a member of a cooperative/Trading association?

18. a. Have you accessed any financial products e.g. loan to support your farming?

Yes ☐ No ☐

b. If yes from whom?

19. Do you keep records?

Yes ☐ No ☐

If yes which/on what?

20. a. Is there an arrangement for you to get inputs for farming?

Yes ☐ No ☐

b. From whom do you get your inputs?

21. Are you part of a consortia for aggregation and joint marketing?

Yes ☐ No ☐

22. Knowledge of market requirements for potatoes

Market requirements	Local markets requirements–what do you know?	What do you need to do to meet these requirements
Quality specifications		
Volumes required (for farmer group leaders)		
Which period of the year is supply required (months)		
Most preferred varieties		
Preferred modes of delivery by buyers		
Price ranges offered by buyers		

23. List down the major challenges you are faced in production and marketing your potatoes. Also provide strategies you used overcome the identified challenges

Challenges faced in Production and marketing	Strategies used to overcome

24. What % of the group you belong to are **i)** women and **ii)** youth? .....
.....

25. How are women and youth encouraged to participate in the potato value chain?

Administered by (enumerator's names): .....
.....

Tel: .....

Email: .....

ii) KIIs with CHIPS project staff /key implementers

Name:.....

Date:.....

Title:.....

Location:.....

Question 1: What key interventions were undertaken by the project to enhance livelihoods of small scale farmers?

.....

Question 2: How relevant were these interventions when they were conceived? Explain and rate the relevance on a scale of 1 to 5. Explain your score.

.....

.....

Question 3: What were the achievements against targets? Fill Table below and comment on reason for under or over achievement

Target/indicator	Achievement and comments

Question 4: Would you say the project achieved its objectives? Were available resources used effectively and according to the plan? Rate the effectiveness from a scale of 1 to 5.

Question 5: Has the planned implementation methodology been followed as planned? Explain. If not, why?

Question 6: Were resources used efficiently in terms of value for money? Explain or give examples where this was achieved. Rate the efficiency on a scale of 1 to 5.

Question 7: What do you consider to be the main project successes? What has changed (impact) in terms of livelihoods among the beneficiaries? What are the socio-economic benefits on beneficiaries at household level? Unplanned effects?

Question 8: How would you rate the impact on a scale of 1 to 5? Explain your score

Question 9: What factors have hindered the project implementation?

Question 10: Which copying mechanisms have been developed?

Question 11: Were the coping mechanisms effective?

Question 12: How did you select the targeted groups/beneficiaries i.e. what criteria was used? Were these the expected ones?

Question 13: How are women and youth encouraged to be part of the potato value chain?

Question 14: Describe the partnerships in the project and their roles. Has the partnership worked well? Is the division of labour among partners effective and efficient? If not, why? What could be done to improve it?

Question 15: In your opinion, are the interventions sustainable? Explain or give examples where sustainability will be achieved. Rate the sustainability on a scale of 1 to 5.

Question 16: What is the key advantage of the KT consortium model in view of other similar models? What are the key lessons of the model? What challenges were experienced with the model?

Question 17: What external factors influenced the outcomes/impacts of the projects (assess assumptions) – other actors, business climate, weather, trade regulations/policies etc.

Question 18: Describe the M&E system of the project, design and capacity. Any recommendations for improvement?

Question 19: What assumptions, risks etc. didn't hold true in the design and implementation of CHIPS?

Question 20: What have been the project challenges? (Consortium partners, project management,

Question 21: Any other comments on what worked well and why? What did not work well and why?

Question 22: Were there other interventions outside of the project (e.g. other government projects, other organizations working on the same) that contributed to these outcome results?

Question 23: What recommendations would you make for improving future business linkages with farmers/farmers groups in the future? Any ideas for scale up or future programming?

iii) KIIs with the CHIPS key partners

Name:.....

Date:.....

Title:.....

Region/Location:.....

Question 1: What was your main role in the CHIPS project to enable it achieve its objective to enhance livelihoods of small scale farmers and traders?

Question 2: How relevant were these interventions when they were conceived? Explain and rate the relevance on a scale of 1 to 5. Explain your score.

Question 3: What were the achievements against targets? What factors contributed to the achievement/non-achievement of your targets?

Question 4: Would you say the project achieved its objectives? Were available resources used effectively and according to the plan? Rate the effectiveness from a scale of 1 to 5.

Question 5: Has the planned implementation methodology been followed as planned? Explain. If not, why?

Question 6: Were resources used efficiently in terms of value for money? Explain or give examples where this was achieved. Rate the efficiency on a scale of 1 to 5.

Question 7: What organizational capacities have been developed? (Probe for M&E system, financial management etc.). Any recommendations for improvement?

Question 8: What has changed (impact) in terms of livelihoods among the beneficiary communities?

Question 9: How would you rate the impact on a scale of 1 to 5? Explain your score

Question 10: What factors have hindered the project implementation?

Question 11: Which copying mechanisms have been developed?

Question 12: Were the coping mechanisms effective?

Question 13: Describe the partnerships in the project and their roles. Has the partnership worked well? If not, why? What could be done to improve it?

Question 14: In your opinion, are the interventions sustainable? Explain or give examples where sustainability will be achieved. Rate the sustainability on a scale of 1 to 5.

Question 15: What worked well in the project and why?

Question 16: What did not work well and why?

Question 17: Were there other interventions outside of the project (e.g. other government projects, other organizations working on the same) that contributed to these outcome results?

Question 18: If other projects/interventions were present, what percentage of the observable results/outcomes can be attributed to this project alone?

iv. FGD with FARMER BUSINESS ORGANIZATIONS

Region/District:

Location:

Date:

Name of FBO:

Question1: When was the FBO formed?

Question2: What motivated you to be members of this FBO?

Question3: How many active members does the FBO have? In 2016 and Now?

Question 4: What is the composition (men, women and youth)?

Question5: What varieties of potato do your members grow under this project?

Question 6: What support have you received under this project? (For training e.g. GAP, post-harvest handling, linkages etc.)

Question 7: Are you implementing what you were trained on? If yes what? If no why?

Question 8: What has changed as a result of the project in terms of potato farming (whole VC?)

Question 9: Are you members of a consortium: If yes, what are the benefits of being in a consortium?

Question 10: How much produce was bulked annually (metric tons) in 2016, 2017, 2018, 2019?

Question 11: What is the estimated shilling value of the amount bulked annually? As above

Question 12: Who have been your major input suppliers under CHIPS?

Question 13: Who have been your main customers (off-takers) under CHIPS? What are the advantages compared with the situation before they came in?

Question14: What have you learnt from CHIPS to help you produce more and access markets?

Question 15: How many of your members have opened bank account as a result of this project?

Question13: How many of your members have accessed bank loans to support project activities?

Question16: How many of you are receiving inputs through the project input supplier

Question 17: Which banks/ financial institutions have extended loans and other agricultural services to members? Were there such arrangements before? What has changed with the current arrangement?

Question 18: What has changed in your households as a result of the project? (Household items, lifestyle, savings?)

Question 19: How often are you invited for meetings with the consortium members? What is discussed?

Question 20: What have been the main challenges experienced by your group?

Question 21: What recommendations would you make to improve the support provided to farmers under similar projects in future?

v. KII with Retailers/vendors/Off takers

Region/District/Location:.....

Name of Retailer/vendor:.....

Type: Small/Big:.....

Date:.....

Question 1: How were you identified to participate in the project?

Question 2: What has been your role in the project?

Question 3: What products do you deal with?

Question 4: How many farmers/ FBOs do you deal with?

Question 5: How much produce have you bought from these farmers under the project arrangements? Provide figures since 2016 to date

Question 6: What is the estimated value of the produce bought per year? Figures since 2016 to date

Question 7: Do you have a formal contract with the farmers/farmers group?

Question 8: What varieties of potato/potato products do you sell? Probe on the program value chain

Question 9: Where are your main markets?

Question 10: How would you characterize these different markets in terms of demand?

Question 11: What do you see as the competitive advantage of the potato variety you sell in production and the markets (weather, price, quality, volumes, demand, utility, seasonality)?

Question 12: What do you see as the trend in terms of changes in demand for the product?

Question 13: Do you own the trucks used to transport the produce?

Question 14: Do you own storage facilities?

Question 15: Do you own processing facilities?

Question 16: What support have you received from the project? Have you benefited from the project (e.g. reduced transaction costs, increased profits etc.?)

Question 17: What support do you provide to farmers?

Question 18: Comment on the consortium coordination. How often do you meet as a consortium and what is discussed?

Question 19: What factors have contributed to the success as a vendor?

Question 20: What have been your challenges?

Question 21: What recommendations would you make for improving future business linkages with farmers/farmers groups in the future?

Source of produce

Whom you buy from	Quantity (tons)			Quantity (tons)		
	2015	2019	% of Total volume	2015	2019	% of Total volume
Individual farmers						
Cooperative (CHIPS)						
Brokers						
Producer groups						
Own plantations						

vi. KII with Financial institutions

Region/District/Location:.....

Name of Finance Institution:.....

Title of respondent:.....

Date:.....

Question 1: Are you familiar with the CHIPS project?

Question 2: If yes, what services do you provide under this project?

Question 3: What support have you received from the project? Have you benefited from the project? How? (E.g. more customers, increased profits etc.)

Question 4: What is the estimated value of the services provided under the project from 2016 to date?

Question 5: Comment on the repayment rate

Question 6: Comment on the coordination. How often do you meet as a consortium and what is discussed?

Question 7: What are the key challenges faced in the partnership?

Question 8: What recommendations would you make to strengthen the business relations with farmers?

Question 9: What recommendations would you make to strengthen such a future projects?

vii. Government Extension Staff

Region/District/Location:.....

Office:.....

Question1: Are you familiar with the CHIPS project?

Question 2: How has CHIPS contributed in implementation of the government's food security agenda

Question 3: What is your role in the project?

Question 4: What successes have been achieved so far? What could be the reason for the successes?

Question 5: What challenges continue to affect the potato value chain?

Question 6: What lessons has the government learnt from the CHIPs project?

Question 7: What recommendations would you make for improving future business linkages with farmers/farmers business organizations in the future?

viii. KII with Cooperative

Region/District/Location:.....

Name of cooperative:.....

Date:.....

Question 1: When were you formed as a cooperative?

Question 2: What are your functions?

Question 3: How many active farmers/ FBOs do you have?

Question 4: How much produce have you aggregated from these farmers under the project arrangements? Figures since 2016 to date

Question 5: What is the estimated value of the produce per year? Figures since 2016 to date

Question 6: Do you a formal contract with the farmers/farmers group?

Question 7: Are there other cooperatives practicing or copying your model gained from CHIPS intervention? To what extent are they coping?

Question 8: Comment on the consortium coordination. How often do you meet as a consortium and what is discussed?

Question 9: What are the key challenges faced in the partnership?

Question 10: What recommendations would you make to strengthen the business relations with farmers?

ix. KII with Input Suppliers

Region/District:.....

Name of Input Supplier:.....

Location:.....

Date:.....

Question1: How were you identified to participate in the project?

Question 2: What has been your role in the project?

Question 3: What products do you deal with?

Question 4: How many farmers/ FBOs do you deal with?

Question 5: How much have you provided under the project arrangements? Figures since 2016 to date

Question 6: What is the estimated value of the inputs per year? (Figures since 2016 to date to see trend)

Question 7: Do you a formal contract with the farmers/FBOs?

Question 8: Do you own the trucks used to transport the inputs?

Question 9: Do you own storage facilities?

Question10: What support have you received from the project?

Question 11: Do you provide any of the following support/services to your clients:

- Information (on the use of your products)
- Technical assistance or demonstration (on the use of your products)
- Credit for purchases

Question 11: Are you interested in increasing this kind of support/assistance? If so, what keeps you from doing so?

Question 12: Looking to the future, where do you see potential for increasing profits?

Question 13: Are there other input suppliers practicing or copying your model gained from intervention from CHIPS intervention? To what extent are they coping?

Question 14: Comment on the coordination. How often do you meet as a consortium and what is discussed?

Question 15: In your opinion what have been the main challenges in the project?

Question 15: What recommendations would you make for improving future business linkages with farmers/farmers groups in the future?

Sales in order of importance

Product	Before project (Nov 2015)			After project intervention (Aug 2019)			
Name	Potato variety	Sales	Comments	Name	Potato variety	Sales	Comments

x. Template for Gross Margins (Farmers)

Potato Variety: Region/District

ENTERPRISE OUTPUT			Unit	Quantity	Price	Total Revenue
Yield:						
TOTAL VARIABLE COSTS						
Intermediate inputs						
Hiring land						
Ploughing						
Planting						
Seed potatoes						
Fertilizers TSP						
Fertilizer CAN						
Fungicide						
Insecticide						
Weeding						
Spraying						
Harvesting						
Ridging						
Sub-total input costs						
Labour Costs	**Hired**	**Family**	**Quantity**	**Rate**		
Sub-total labour costs						
Marketing Costs						
Pricing per bags						
Amount sold						
Net profit						
Total Variable Costs						
Gross Margins						
Total fixed costs						
Total costs						
Net Profit/Loss						

Case study guide (for success stories with farmers)

The project personnel on the ground will be involved in identifying success cases. Some can also be identified during the FGDs with Farmers.

Key questions

What was your situation before the project?

What happened during the project that changed your state of affairs?

What is the situation now (financial, capacity, etc.) in comparison?

(Take an activity photo of the respondent and remember to ask for consent to use it)

Schedule

Activity	Timelines (Date and time)	Persons interviewed	Status
Discussions with M&E manager and CHIPS TZ focal point through skype and developing schedule	Sep 4 2019	M&E manager Andrew Cheboi Owen Nelson Rachel Ajambo	Done
Finalizing and sending inception report with tools	Sep 5 2019		Done
Draft Inception report delivered	Sep 9 2019		Done
Consultant 1 arrives in Arusha. Meetings with TAHA and some farmers, input providers, off takers	Sep 10	Eliancha Yeriko , Programs manager TAHA, Mr Nanyaro TOT, Mr Timothy Samuel, Yara Fertilizer agent,	Done
Meeting with farmers, off takers	Sep 11 morning	Elia G Mlambo - Kilombero Market Potato whole seller (Arusha), Household surveys	Done
Meeting with farmers	Sep 11 mid- morning	Household surveys	Done
Meeting with RECODA	Sep 11 afternoon	Mr Theophil Tarmo, Director,	Done
Flight to Dar es Salaam (early morning)	Sep 12		
Meeting with KT staff, KII with VIBINDO and ACLA Honey in Dar	Sep 12	Ms Claudia morand – Director Acla Honey	Done
KIIs with VIBINDO	Sep 13	Mr Gaston Kikuwi – Chairman VIBINDO	Done
		Mr Jonathan Karuguru, M&E coordinator VIBINDO, Mr Nguti, Accountant VIBINDO	
VIBINDO and Acla Honey	Sep 14 morning	Trader/vendor questionnaires	As above
KIIs with traders/vendors	Sep 14 afternoon	Ismael Sirai, SRV Tambata Dar es Salaam, Sebastian Marota, SRV Mwenge Dar es salaam, Mr Ije, Chairman/Potato wholesaler Buguruni Market Dar es salaam, Mr Mood Jeifo, Potatoe retailer Buguruni Market Dar es Salaam	
KII with government staff	"	Mr Danford Moya, Community officer Ukonga Dar es Salaam	
KII with Akiba Bank Rep		Ms Hawa Karagwe, Portfolio officer Akiba Commercial Bank	
Consultant 2 arrives in Dar es salaam	Sep 10		
Flight to Mbeya	Sep 11		
Meeting BEULA	Sep 11 mid-morning	Zablom Mbwaga (Director), Christopher Mwakagugu, Charles Bogore, Naomi more	Done
Meeting Tari Uyole CEO	Sep 11 mid-morning	Tulole Bucheyeki (CEO),	Done

Meeting Tari Uyole staff	Sep 11 afternoon	Juma Kayeke, Catherine Kabungo, Dr Dorah Mende, John Kalo	Met staff
Travel to Njombe	Sep 12 Morning		
Meeting with Lusitu	Sep 12 afternoon	Beno Mgaya (Chair) Constansia Sanga, Shamin Msigwa,Benson MgayaEmlam Mtego, Stephen Charles, Henry (Extension)	Done – both staff and farmers
Meeting with NADO	Sep 13 mid- morning	Jonathan Ngirangwa (Director), Ernest Ngumbi, Faraja, Judith, Teresia	Done
Meeting farmers	Sep 13 afternoon	Isaac Muhome, Huruma Mgaya, Godson Jemere, Ojen swaga,	Done
Back to Mbeya	Sep 14 morning		
Flight to Dar es Salaam	Sep 14		
KII with Yes I Do	Sep 15	Nenelwa Kushoka, Yes I Do	Done on phone
Compiling findings	Sep 15		Done
Meeting with KT staff	Sep 16 morning	Owen KT	Done
Back to Nbi	Sep 17		
Call with Team leader	Sep 18		(Talked to Rachel and Owen)
Draft shared with Kilimo Trust	Sep 30		Done
Feedback received from Kilimo Trust	Oct 6	Andrew	Done
Final report	Jan 31		Done

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