Trans-SEC

Innovating pro-poor Strategies to safeguard Food Security using Technology and Knowledge Transfer

Contract number: 031A249A

Deliverable 2.2.1:
Reports on workshops and focus groups conducted

Deliverable 2.2.2:
Monitoring reports on stakeholder involvement and necessary adjustments needed over time

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Chapter 1

Organisation plan and responsibilities(Deliverable 2.1.1)

1. Background

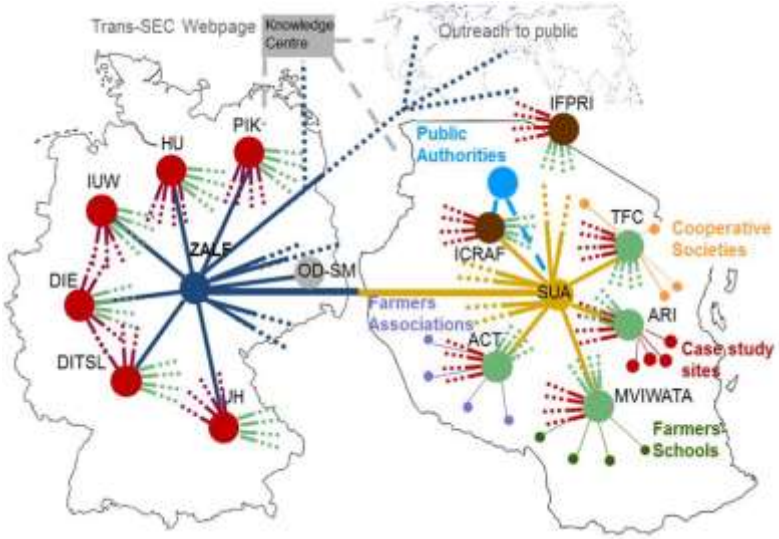
Trans-SEC is a five years (2013/2017) research project with the title "Innovating Strategies to safeguard Food Security using Technology and Knowledge Transfer: A people-centred Approach". It is implemented in Morogoro and Dodoma regions, specifically in Changarawe and Ilakala villages in Kilosa district and in Ilolo and Idifu villages in Chamwino district with the aim to improve the food supply for the most-vulnerable poor rural population in Tanzania, while focussing on the entire food value chain (FVC). Trans-SEC is made up of members from research organizations and NGOs from Germany, Tanzania and CGIAR-centres, involving approximately 90 researchers/scientists and nongovernmental professionals from the 14 partner organizations. A stakeholder involvement process has been set up from the beginning as an integral part of most analytical steps of Trans-SEC.

In Trans-SEC the FVC stakeholders distinguished are:
a) "primary users" at grass-root level such as farmers (and pastoralists), processors, millers, stockiest, traders, middlemen, transporters, and consumers, and
b) interested organizations & institutions (key informants) such as policy makers, extension officers, service providers, NGOs, churches, …

This report elaborates how multi-stakeholder' engagement has been planned and structured, and how it is implemented by Trans-SEC partners. Stakeholder platform performance in FVC was a specific topic for a PhD thesis for Mr Laurent Kaburire. However, the candidate was unable to continue with studies and the task is now being implemented by two MSc students.

2. Developing stakeholder involvement pathways

Stakeholder involvement in Trans-SEC happens upon various activities pre-defined from project start. However, stakeholder involvement also evolves and is refined during project lifetime based on ongoing activities. Both approaches are integral parts of Trans-SEC.
This is a selection of activities planned beforehand throughout the Trans-SEC project involving stakeholders:
1) Implementations and improvement of the planed action research; 2) realisation of a baseline survey and follow up survey to be conducted on September 2016; 3) refine roles of different stakeholders; 4) stakeholder consultations and/or focus group discussions; 5) Continue addressing identified food security constraints and upgrading strategies (UPS); 6) UPS implementation following developed food security criteria; 7) create awareness and preparation of training modules and materials for distributing to out-scaling communities; 8) develop knowledge sharing and communication plans on research findings; 9) Implementation of the developed monitoring and evaluation framework for stakeholder involvement; 10) monitoring and evaluation of UPS; 11) Fine tuning the developed



methodological UPS impact assessment tools and continue with its implementation; 12) field and other UPS training visits for CSS stakeholders and beyond to learn and assess project impacts; 13) developing dissemination strategies; 14) develop documentary videos.

3. Roles for stakeholder involvement among Trans-SEC partners

The Trans-SEC consortium consists of a) a central coordination (ZALF) and b) a Tanzanian sub-coordination (SUA) for operational management and synthesis (Figure 1). ZALF and SUA each coordinate their national partner cluster. ZALF and SUA do the overall planning for involving stakeholders at local, regional and national level. ARIs and MVIWATA are responsible for the local to regional stakeholder involvement, and TFC and ACT for the regional to national stakeholder involvement. German partners approach stakeholders through SUA, ARI, and together with the other Tanzanian partners. All Tanzanian partners feel responsible to disseminate Trans-SEC results, for instance, among farmer associations and schools as well as cooperative societies, public authorities and ministries.

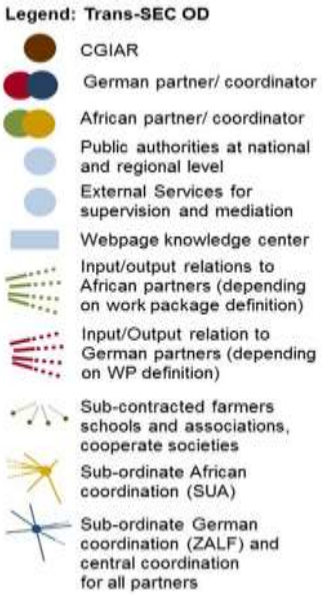


Figure 1: Mapping of the Trans-SEC partner organisations

4.0 Organisation plan for stakeholder involvement in Trans-SEC

Types of stakeholder involvements inter alia include their mapping, HH-survey, interviews, Focus group discussions (FGD), workshops, decision making in UPS implementation, practical testing of UPS, and assessing UPS impacts.

4.1 Stakeholder mapping in the four case study sites, at district, regional and national levels

This task involved interviews, FGDs and workshops of key actors in the FCVs at different levels conducted to identify potential stakeholders to engage in the FVCs upgraded through Trans-SEC interventions. This activity focused on generating in-depth information from important key stakeholders along FVCs who are operating their activities at main four levels i.e. case study sites, district, regional and national levels. The stakeholders involved were producers, stockists, processors/millers, agro-dealers, traders/buyers/exporters, middlemen, brewers, manufacturers of farm implements, service providers and policy makers. These stakeholders were visited and interviewed at all scale levels to get the full picture of existing FVCs in Tanzania (Deliverable 2.1.1).Tracking of the new stakeholderswill be done yearly as planned in Deliverable 2.1.1.

4.2 Inventorying priority commodities and constraints to address food security of farmers in the case study sites

This task involved FGDs and interviews with farmers in the case study sites (CSS) to capture views of local stakeholders on the existing food sub-sector commodities and their potentials on improving food security and livelihood of farmers in CSS. Six FGDs were conducted, 2 at district level and 4 at CSS level involving 15 – 20 grassroots level stakeholders each. The identification of food sub-sector commodities and FVCs was followed by a household baseline survey to understand better the social - economic and environmental conditions of people in the CSS at the start of the project.

4.3 Identification and validation of food security criteria for assessing the impact of UPS

This task involved FGD and workshops with stakeholders in the CSS to capture local criteria and indicators of food security. The criteria and indicators helped to measure the impact induced by Trans-SEC project on food security and livelihood of farmers in the CSS, specifically the changes that are associated with the UPS to be implemented in those CSS. The food security criteria were defined based on the experience and understanding of community members of the prevailing challenges regarding food security situation in the area.

4.4 Inventorying potential UPS based on priority commodities

This task involved FGDs and interviews with local stakeholders in the CSS to map out the potentially existing UPS addressing existing challenges along the FVCs of priority commodities. This task aimed to get perceptions and views from local stakeholders on existing crops, the constraints related to priority commodities grown by farmers in the CSS and the requirements and/or strategies they are using to address those constraints. The literature review, baseline information, household survey (HHS) and experience of experts in

the field of agricultural research on food security complement the information from FGDs and interviews. The inventorying process resulted into a number of potential FVC upgrading strategies suitable for the CSS and the selected FVCs. Both UPS and the requirements/UPS were shared among all stakeholders for validation, prioritisation and later decision making. Trans-SEC experts thereafter prioritised and specified the UPS, complementing information using sheets of facts and figures.

4.5 Decision making on UPS for implementation in each CSS

This task involved FGDs with local stakeholders in the CSS. The activity involved the presentation of all FVC upgrading strategies elaborated and defined by scientific experts (based on local constraints and requirements) to local stakeholders in all CSS to enable them to decide on UPS to be tested in each CSS during Trans-SEC lifetime. The decision making process included participatory impact assessments of the UPS. Altogether 10 UPS were selected (see Deliverable 2.2.1). This decision making was followed by a series of stakeholder workshops at CSS levels to share at larger scale (150 HH per CSS) the UPS prioritized for implementation. This was done in order to receive feedback and inputs for subsequent implementation.

4.6 UPS Farmer groups formation and dynamics in the four CSS

This task involved FGDs and workshops of all 150 grassroots level stakeholders in the CSS who participated in the baseline survey. The activity aimed to organise farmers into strong and sustainable groups around each prioritised UPS to ensure better and easy coordination, accessibility, monitoring and training of members on specific aspects related to the UPS they are engaged in. In each CSS, a two day workshop was organised for farmers to share the prioritized UPS for each specific FVCC together with proposed criteria for selecting members of different UPS groups for better decision making. This activity resulted into formation of 27 UPS groups: 7 in Ilakala, 7 in Changarawe, 7 in Ilolo and 6 groups in Idifu villages. After formation of UPS groups, MVIWATA organised workshops to facilitate formalization of groups in all CSS through establishment of UPS groups' leadership structures and strengthening to ensure that they are capable to manage themselves the activities and any business related to the group. The strengthening mission involves capacity building trainings to all group members on leadership skills, group dynamics and business model. Monitoring of group dynamics to see stakeholder drop outsandmovement between groups is a continuing process. Three groups out of 27 have terminated due to different reasons.

4.7 Implementing UPS in the CSS and on farm to test and validate prioritised UPS

The task involved participatory design and implementation of all UPS selected. The UPS selected carters' varieties of agricultural related fields and to implement them, farmers were organised in groups considering theprioritised UPS and their preference. Each farmer from specified UPSgroupis required to implement the selected UPS to verify its sustainability and the proposed management practices. All UPS within the CSS are supervised by ARIs and PhD students.

4.8 UPS monitoring

This task involvedparticipatory monitoring of impact of all Trans-SEC UPS tested along the selected FVCs in all CSS by all project partners. During this process, Trans-SEC partners with expertise in the 10 selected UPS jointly evaluate with grassroots level stakeholders (farmers) the UPS for their success, adaptability and adoption basing on pre-defined criteria and indicators of food security. This task aims to generate knowledge to support (1) capacity building and (2) decision making at community, regional, and national level and (3) other research networks active in Tanzania and East Africa. Promising UPS among the FVCs tested are demonstrated as central lesson learnt. Transferability and up-scaling of this system approach from one Tanzanian target region to the other and beyond will be tested and proved using a set of different present and future scenarios. Trade-offs of limiting resources, production factors and soft factors such as gender-relevant and/or cultural requirements have been identified through participatory monitoring process and several adjustments are ongoing.

4.9 UPS dissemination

This task includes the preparation of synopsis reports of the upgrading strategies identified, analysed and/or tested in Trans-SEC including the final conclusions and recommendations for dissemination to both decision makers and stakeholders. The findings from Trans-SEC interventions will be disseminated (1) at extension level using adequate communication channels of MVIWATA, TFC, ACT such as farmer schools, and (2) to regional and national policy programs (e.g. NAPA, NSGRP, ASDS, ASDP). To disseminate the knowledge generated, the following means and communication channels will apply: (1) publishing Trans-SEC results in peer-reviewed and preferably open-access journals and (2) involving partner NGOs to disseminate Trans-SEC results to farmer schools, governance groups and other associations. This task is relevant to stakeholders at multiple scales from local to regional up to national levels. The recommendations will be reported among policy makers and funding organisations Trans-SEC partners and experts from the Ministry of Agriculture Livestock and Fisheries and Tanzanian media to create avenues for outreach to other Tanzanian policy sectors.

Figure 2: Trans-SEC stakeholder activities, stakeholder categories involved, and methods of stakeholder involvements

Table 1: Organisation plan and time schedule for Trans-SEC activities

No.	Activity name	Tasks and activities	Responsible partner	Time schedule	Status
1.	Stakeholder mapping in the four case study sites, at district, regional and national levels	Conducting consultations with key actors at all levels to get an overview of stakeholders existing along the identified FVCs of prioritized commodities	ARI, MVIWATA, ACT	M6-10	1st mission-done, update missions planned
2.	Inventorying priority commodities and	Conducting workshops to understand the local context	SUA, NGOs and ARI	M8-12	Fully achieved

	constraints to address food security of farmers in the case study sites	in the regions and CSS regarding the existing food sub-sector commodities and potential F			
3.	Identification and validation of food security criteria for assessing the impact of UPS	FGD to define food security criteria and indicators for assessing the impact of the project on the target communities	ZALF, SUA, ARIs, MVIWATA	M13-15	Fully achieved
4.	Inventorying potential UPS based on priority commodities	FGDs at village and district levels and review of literature to map out potentially existing UPS	SUA, all partners	M14-M15	Fully achieved
5.	Decision making on UPS for implementation in each CSS	FGD for decision making on 6-7 UPS for implementation in all CSS; feedback sessions to share with all farmers in the HHS prioritised UPS for validation	SUA, ARI, MVIWATA	M15	Fully achieved
6.	UPS Farmer group formation in the four CSS	Setting criteria for forming farmer groups around UPS; Workshops to facilitate formation of farmer groups around prioritized UPS in each CSS	MVIWATA SUA, ARI,	M18	Fully achieved
7.	Implementing UPS in the CSS and on farm to test and validate prioritised UPS	Technical support to research groups and provision of inputs; Implementation of UPS in all CSS	ARIs, SUA, ICRAF, MVIWATA	M20	Ongoing
8.	UPS monitoring	All UPS related activities are systematically monitored and captured by stakeholders, assistants, and scientists	ARI, SUA, UHOH, ZALF, ICRAF	M20-M60	Ongoing
9.	UPS dissemination	UPS related results are disseminated to other Trans-SEC stakeholders and beyond, to policy, and scientists	ARI, SUA, MVIWATA, ACT, TFC, ZALF	M30-M60	Ongoing

Chapter 2

Elements of the participatory processand related activities

1. Mapping stakeholders across FVC: this identified all relevant key and grass-root level stakeholders and their functions along the FVCs on local, regional,and national scale. The exercise involved physically visit of stakeholders in their locations and enquired for information through FGD, interview or workshop. The various stakeholders consulted were categorized according to their activities on which eight categories of stakeholders were formed. These encompasses producers, agro-dealers, processors/millers, buyers/traders/exporters, manufacturers, service providers, marketing, non-governmental organizations.
2. Inventorying FVC constraints & strategies: priority commodities and FVC constraints to rural farmers in all CSS were inventoried. These were achieved through the use of FGD, Interviews and complemented by information from the HH survey.Stakeholders involved were 15 -20 key informantsand farmers from CSS.

3. Identifying local food security criteria: food security criteria for assessing the impact of UPS were identified using existing literature. This involved discussing with stakeholders in each CSS to pinpoint food security criteria according to their understanding in their community. In the process local focus group and panel discussions were conducted. They were validated and adapted with/to the local stakeholders' perceptions of food security.

4. Identifying 3-5 UPS/FVC component: potential UPS of priority commodities among each FVC component enhancing on food security were screened, described in detail using fact sheets, and an inventory established for the CSS in the target regions, and beyond. This was done using jointly defined selection criteria. They were then jointly analysed in-depth among scientists with regards to their selection criteria, for instance, expected positive impact on food and livelihood security, knowledge and data availability of previous implementations, and practicability. Finally 3-5 UPS were selected by scientists for subsequent prioritisation by the CSS stakeholders.

5. Prioritising UPS in CSS for testing: 2-3 UPS per FVC component for final field implementation were prioritised and decisions made anticipatively by stakeholder groups in all four CSS. Scientists accepted few more UPS for implementation and to merge few UPS, attaining a feasible number of 6-7 most promising UPS per CSS and an overall number of 10 UPS selected.

6. UPS groups formation: 6-7 UPS farmer groups per CSS with member sizes ranging from 10 to 50 members were formed from a household panel survey sample of 150 HH per CSS. In the group formation process some individuals joined the group without prior knowledge of what really the UPS requires. This led to drop outs of some members and also shifting between UPS groups.

7. UPS implementation, testing, adaptation: the 10 UPS prioritised were implemented and tested in the CSS. This included different processes with recurrent feedback and adaptation activities between local stakeholders and scientists extending over several months up to one year. Some of the adaptation procedures required trials and error which consumed time and resources before being accepted by stakeholders involved. Example, thePyrolyser (TLUD-reactor)facedvarious challenges(high temperature near it, size of the reactor) and to address them it has taken longer time.

8. Co-creation of potential future scenarios: futurescenarios were developed with researchers of all components of the FVC, stakeholders from the CSS, and Tanzanian meteorologists. The challenge here is to prove if the future climate conditions alter the performance of the UPS. Therefore, the UPS specific conditions are proven with bio-physical simulation models for large climate datasets. The output of these simulations models provide new insights to possible futures of the UPS and will be communicated back to farmers and researchers with no meteorological background.

9. UPS monitoring & impact assessment: the implementation and testing of the UPS is monitored by using generic and specific parameters collected during both UPS groups focus group discussions and visits of all involved households'. The monitoring is done in phases with weekly, monthly and in three months period. Once a year the UPS groups meet together to provide feedback to the scientists on the expected (ex-ante) and/or experienced (ex-post) UPS impact on food security.Challenges encountered during the implementation of this UPS include; in situation where there is low attendance of group members in the monitoring session, responses obtained do not represent the whole group.

10. UPS results dissemination: During the process of selecting, testing and assessing UPS, lessons learnt are prepared for dissemination and outreach. This is done via the research network (scientific papers, home page, movies) and stakeholder organizations through policy briefs and capacity-building workshops at the policy, extension and farmer school levels.Scaling out of UPS which have already shown scientific evidence has started through field days and farmers exchange visits within and in neighbouring villages.

Chapter 3

UPS overview

Table 2: Upgrading strategies across FVC components and their selection (✓) in different climate regions (Graef et al 2016)

FVC component and upgrading strategies	Description of upgrading strategy	Sub-humid region	Semi-arid region

Natural resource management/crop production			
1 Rainwater harvesting(RWH) andFertiliser micro-dosing	in-situ RWH using tied ridges in the sub-humid region and infiltration pits in the semi-arid region (Mahoo et al. 2012); microdose rates of 5-10 kg P/ha (1.2 g /hill as DAP) placed 4-8 cm close and lateral to the seeds, with higher rates in more humid climate (Bagayoko et al. 2011)	✓	✓
Post-harvest processing & biomass/energy supply			
2 Byproducts for bioenergy (pyrolisor)	low-cost (US$ 300) pyroliser (manufactured from 100-200 l oil barrel) producing charcoal from maize cobs and simultaneously used for cooking (Ikele and Ivoms 2014)	✓	
3 Improved processing: maize shelling; millet threshing	mobile maize shelling machines in sub-humid region and millet shelling machines in the semi-arid region, including participatory business plans for investment and pay-offs (Mejia 2003)	✓	✓
4 Improved wood supply	tree planting in various niches (farm boundaries, woodlots, natural regeneration in-field) using tree nurseries (Kimaro et al. 2007)		✓
5 Improved stoves	small scale stoves reducing energy consumption from loam for household use with one or two holes at US$ 3-5/stove, locally constructed by trainers training other stakeholders (Kshirsagar et al. 2014)	✓	✓
Markets and income generation			
6Sunflower oil production	enhanced horizontal and vertical coordination of sunflower oil production, including investment in sunflower oil press (RLDC 2008)		✓
7Optimised market oriented grain storage	storage using low cost IRRI airtight superbags (RohithaPrasantha et al. 2014) for a few months after harvest until grain market prices are higher	✓	✓
8 Poultry-crop integration and marketing	poultry keeping, disease management, utilisation of crop by-products in raising poultry, utilisation of poultry manure (Mlozi et al. 2003) and selling on local or regional markets	✓	
9 Market information access system (m-IMAS)	mobile phone based online market for farmers marketing their produce at better prices and for buyers (Kadigi et al. 2013)	✓	
Consumption			
10 Household nutrition education& kitchen garden training	Increasing the awareness of nutrient-rich including indigenous foods, and making better use of these crops to improve nutritional status especially of under-five children (Roy et al. 2005); cultivating indigenous fruits and vegetables at the homestead for dietary diversification (Galhena et al. 2013)	✓	✓

Chapter 4

Specific UPS implementation narratives

1. Rain water harvesting and micro dose fertilizer

Introduction: This innovationaddresses soil fertility constraints andlow soil moisture supply due to inadequate and erratic rainfall. It involves the use of tie ridging, Chololo pitsand micro dose fertilizer to address the constraints in the CSS. The cross-ties (tied ridges)allow water ponding thus conserve moisture for longer periodafter it rains. A Chololo pit is a technology which collects both rainy water and surfacerunoffsimultaneously, and the spaces between the pits act as micro-basins.The extra moisture captured in both technologies is vital during the initial establishment of crops and production stages of plant growth.Micro dose fertilizer aimed at enabling the households with low income to improve their soils by using the suitable rates below the recommended rates in increasing productivity. The approach used to implement this UPS follows a mother and baby plots arrangement whereby mother plot contains all sets of the treatments while baby plots consists of one or two treatments being tested in the mother trial/plot.

Time frame: This UPS has been implemented for two consecutive seasons2014/2015 and 2015/2016during the long rains for all the CSS.Involvement of farmers in planning of activities startson October and the implementation of activities on the ground followedon November each year.

Meetings held: Several meetings have been held by the household members practicing different trials under this UPS either with or without researchers to discuss different matters on implementation, challenges and adaptation of the technologies under trials. Some of the meetings conducted aimed at 1) informing farmers on the approach to be used to address the named constraints, 2) selectinghousehold specific best fit innovation to implement in the baby plots, 3)demonstrating how to implement the technologies, 4) sharingfeedback on findings by researchers and experiences of farmers, and 5) planningfor next season trial activities and farmers' field days to share the experience with the farmers in the entire village.

Trainings: To ensure smooth running of activities in the fields, several trainings have been conducted. These includes, i) practical demonstration on how to prepare tied-ridging, pit infiltration and fertilizer application, ii) training on how to record rainfall data, iii) training on best bet agronomic practices and iv) group management and leadership skills.

Investments made: The project provides a starter-kit namely fertilizer, seeds and expertise while participating farmers provide land and overall management of trials. All harvests from baby plots belong to the hosting farmer after sampling.

Challenges: Despite the success there are few challenges which have been encountered during the implementation process. These include; prolonged drought in almost all case study sites, flood in Changarawe in 2015/6 season, livestock invading crop plots and absence of agro-stockist in some CSS to supply fertilizer and seeds.Due to fact that these technologies are labour intensive and time consuming, its uptake has been slow among communities where ridges and pits are introduced for the first time like in Chamwino case studies. This is the same applied to fertilizer application, in using micro dose the fertilizer should be placed beside the seed for basal fertilizer or just next to each plant stand for top dressing fertilizer for

effective use of the smallest amount placed, which make the job tedious. Low willingness of farmers to participate in these trials was among the challenges in implementations where by some of farmers decide to give abandoned and less fertile land for experiments. Implementation of microdosing innovation was not easy for Chamwino district due to the myth that chemical fertilizers destroy their soil when used for long time. Having a very short rain season in Chamwino district, the implementation of this UPS became challenging for farmers who own relatevelybig farm plots as it is too time consuming to catch up with the season. Besides that, this technology is appropriate for smallholder farmers, the families with less labour power like old and female headed families may become difficult.

Adaptation::There were few adjustments made on implementing innovations. Sesame was removed from the list of experimental crops in Kilosa CSS due to some challenges in planting date where it required to be planted in short rains and deviates crop calendar of main crops. The Chololo pits was hardly or not implemented in baby plotsin both years (2015 and 2016) because farmers even though they had decided to implement this UPS they found it to laborious after finishing some cultivation area with the pits. They decided to drop that UPS. Despite that infiltration pits suit best in sandy soils and have the highest yield comparing to other tillage systems, it demands a lot of labour power and time to prepare. Few farmers were able to implement the technology in 2014/2015 season but this season haveshifted to other tillage systems due to underlined reasons. Now it is on hand of researchers to find the labour saving technologies that will accompany achievement of Chololo pits regarding its impacts on yield. However, after realizing the yield increase on using these technologies in the first season majority of farmers decided to shift the baby plots to better soils.Adjusting the planting calendar has resulted to good crop performance in this year 2015/6 comparing to the last season where the trials were planted later than farmers practice. Post emergency ridges might be a better solution for areas with short rains, also emphasize on residual ridges will help those families with less labour power.

Lesson learnt: In situ water harvesting may save crops from prolonged drought compared to conventional method. When this technology is accompanied with fertilizer use it increases crops yield compared to when either of the technology is used alone. It has been realized that fertilizer use on cereals even below the recommended rate can cause a significant yield increase. However, fertilizer placement method can be detrimental to the seed depending on moisture level at seeding. Placement of basal fertilizer where a hole is made and fertilizer is placed and covered with little soil followed by placing the seed on top and cover with soils, caused burning of seed and seedling when there was prolonged drought immediately after planting.

Expansion of baby plots in Chamwino district is very limited. This may be due to the fact that, researchers help farmer layout the plot something that will not give the researchers to learn farmers' perception and adoption. As long as they already know how to make ridges and spacing, researchers only need to encourage using the technology and seeing what will happen. About the data, a 10x10m area will be mapped out and yield measured during harvest because by layout it sounds like restricting them the area to apply the technology.

Table 3: Implementation assessment

	NRP	BIOENERGY	ICS	IWS	SHELLER	THRESHER	SUNFLOWER	STORAGE	POULTRY	iMAS	KGN
Implementation Time (months):	2	1	2	4	2	1	1	2	1	0	2
No. group Meetings held:	2	1	3	2	3	3	4	1	1	1	2
No. Trainings :	3	1	3	2	1	3	3	1	2	1	3
Budget Investment: (0-4)	2	2	1	2	3	3	4	2	3	1	1
Intensity of Challenges (0-4):	3	3	1	3	3	3	4	2	3	3	1
Adaptation requirements (0-4):	2	3	2	1	2	2	0	3	3	0	2
Farmers' interest(0-4)	2	1	4	3	3	3	4	2	4	2	4
Likelihood of adoption (0-4)	1	0	4	4				2	4	1	4
Gender limitations(0-4)	0	1	0	0	1	0	0	0	0	1	0

* ratings: 0: none; 1: low; 2: medium; 3: high; 4: very high;

2. Energy supply – byproducts of crops for bioenergy (pyrolysis)

Introduction: On-farm crop residues are normally left to decompose for additional soil biomass and some are utilized by livestock *in situ*. Similarly residues from threshing and shelling like maize cobs are normally thrown away and few are used directly as firewood. These materials are usually high in highly lignified structural components and therefore most suitable for thermo-chemical conversion. A pyrolysis-treatment of these (already dry) residues will provide thermal energy for drying, roasting or cooking applications as well as charcoal, which can be used as energy carrier or for soil amendment. Development of Pyroliser was designed by the project to facilitate better utilization of the crop byproducts.

Time frame: Modification of UH Pyroliser design started on February 2015 at SUA. Establishment of the operating parameters of the reactor was done from March to June 2015. On station testing of the reactor was conducted at SUA on August, 2015.

Meetings held: Few meetings were held for introducing the implement to the group, and demonstrate its function andoperation.

Training: One training was done to group members on how to operate the pyroliser

Investment: The project funded manufacture of pyroliser. Also it facilitates trainings.

Challenges: Last year (2015) the harvest was not good and materials to be used in the machine were scarce. High temperature near the pyroliser restricts other operations. Some members have not used the implement and its products so they don't understand how it

works. The machine had required some modification which took long time. This has caused some group members to lose morality. Movement of the machine among group members is difficult as they are scattered at a relatively greater distance in the whole village.

Adaptation: Reducing height of the machine for easy handling and placement of pots, insulating the side walls of the reactor to reduce temperature, directing smoke away from the operator by bending chimney end and addition of second hole to serve extra pot.

Lesson learnt: Waste products from crops can be processed to produce charcoal and along the process energy produced can be tapped and used for other purposes. Innovating new technology and involving stakeholders in testing it along the way helps to incorporate consumer's preference hence its acceptability.

3 Maize Sheller and Millet thresher

3a. Maize Sheller

Introduction: Traditionally threshing and shelling of maize and millet methods are performed in a labour-intensive way, the produce are of low quality and usually with dust, animal litter and insects. Interestingly proper threshing and shelling technology is already in place, however, implementation and awareness of added value is lacking in CSS.In order to unravel threshing and shelling constraints, Trans-SEC project researchers together with farmers in the processing group purchased the maize sheller and millet thresher during 2015/2016 season.

Time frame: Planning of the activities for this UPS started on January 2015. Implementation of the UPS was due on July 2015. In between there were several activities which includes review of the business plan, discussion on management innovation funds, collection of farmers contribution for machine purchase.

Meetings held: there were several meetings namely review of the business plan, discussion on management of innovation fundsand collection of farmers' contribution for machine purchase.

Trainings: Enterprise and financial management, group leadership and management, development of business plan, machine operation and simple maintenance.

Investments: The project has invested expertise and innovation funds while farmers invested their shares, labour and machinery shed.

Challenges: Transportation of the machine and operators from one location to another, mistrust between some group members, spare parts are not in close vicinity, noise and dust, intensive manual involvement in feeding maize cobs into the machine and moving filled grain sacks away from the machine, refrain women from operating the machine.

Adaptation: While working on means of moving machine from one location to another, group members of this UPS decided to pull it by hand for short distances but for longer distances they hire atractor.

Lesson learnt: Threshing maize using machine is fast and has been accepted by many farmers in CSS village and neighboring villages despite price being the same as using hand threshing. The group can do a lot of work iftransport of the machine can be easened.The

technology has been known to some farmers in CSS for some time even before the Trans-SEC project started but lack of capital has been a major limitation to engage in business.

3b Millet thresher

Introduction: Traditionally threshing is performed in a labour-intensive way, the products are of low quality and contaminatedwith dust, animal litter and insects. This innovation will help farmer to thresh fast, in simple way and produce good quality produce to capture better markets.

Trainings: Multiple workshops about advantages, disadvantages and benefits of this machine were conducted. Enterprise and financial management, group leadership and management trainings were conducted. Farmers will also learn how to operate themachine and simple maintenance after operation starts.

Time frame: Planning of the activities for this UPS started on January 2015 and machines was bought on July 2015. Machines are expected to start operations on this season 2015/2016.

Meetings held: Business plan and discussion on management innovation funds meetings were held together with researchers, collection of contribution for machine purchase meetings was also conducted among famers themselves.

Investments: The project has invested expertise and innovation funds while farmers invested their shares and labour.

Challenges: Movement of machine from one place to another is still a problem. High cost of purchasing machine with regards to farmers' income has been limiting the contribution of shares. Despite that the thresher has an additional component of winnowing, farmers should expect a competition from threshers that are used to operate in the village from neighboring villages. Being new in providing this service and lack of experience in running business, it may pose challenge in smooth running of the business and technical management.

Adaptation :No adjustments have been done yet, as the operation is expected to start this season.

Lesson learnt: There has no lessorn learnt so far because machine has not started to operate

4. Improved wood supply

Introduction: This UPS is addressing key constraints on natural resources and consumption components of food value chains. The acute shortage of cooking energy; high harvesting pressure on native woodlands for wood extraction to supply fuelwood, poles, timber and other wood products, and malnutrition related to eating half-cooked food can be solved under this innovation. Tree planting in various niches (farm boundaries, woodlots or retention of naturally regenerating tree species) in farmlands and at homestead to provide alternative source of wood biomass for supply of cooking energy (firewood and charcoal), wood products (e.g., poles & timber), fodder and other environmental benefits (e.g. prevention of soil erosion). Capacity building on tree nursery and environmental education to farmers (individuals and farmer groups), religious and academic institutions (especially primary

schools) have been conducted prior to implementation to ensure smooth running of the project.

Time frame: This UPS is implemented in one of the project case study sites; Ilolo village at Chamwino district.Preparation of nurseries started in mid 2014 and transplanting was done in the rain season 2014/2015. In the following season 2015/2016 farmers continued to plant more trees while engaging their fellow farmers by selling the tree seedlings.

Meeting held: Under this UPS the groups have divided into two subgroups for easy management and involvement everyone in nurseries management and distribution of seedlings among members. Sub groups and general meeting are held to discuss several matters including; nurseries irrigation shifts, other nurseries management, distribution of seedlings and group matters like attendance and participation of members in group works. In others matters meetings with researchers are held to solve critical problems like vermin problems affecting trees after transplanting, water bills and other technical assistance.

Trainings: both technical and group management trainings were conducted**.**

Investment: both project and farmers have invested in this innovation to achieve the objectives. From project side, technical assistance, irrigation facilities, water bills and tree seeds was contributed while farmers dedicate their labour and land. However, whatever the products from trees planted will be solely owned by the involved farmers.

Challenges: Low capacity and motivation to plant trees by farmers due to low awareness. The effect of low willingness and awareness has gone far to the extent that, some community member attempt to uproot the trees planted nearby their farms by fellow farmers. The length of time need to realize benefits, worries on reduced crop yield due crops and trees competitionover moisture and nutrients and constant maintenance efforts has discouraged other farmers to involve in tree planting program. Limited land owned by individual farmers has also affect the speed of tree planting. Other challenges include destruction of animals and persistent drought which affect the trees growth at its early stages of growth.

Adaptations: Formation of subgroups from main group has been helpful for group management and membersinvolvement in nurserymanagement. For sustainabilityof the UPS, farmers has been encouraged toplantlocal tress which are more adaptive to their environments and easy getting the seeds for reproduction.

Lesson learnt: Since tree planting has public interest than personal benefits, its implementation has to involve more of village government.Village leaders have to establish bylaws to enforce the planting and maintenance of trees in the village.

5. Improved cooking stoves (ICS)

Introduction: Improved Cook Stoves UPS was initiated for the aimof technology transfer, diffusion and adoption to reduce the firewood problem to communities and environmentaldestruction at four selected villages, two villages in Chamwino, Dodoma and two villages in Kilosa, Morogoro. It was noted that, farmers especially women are spending a lot of time in collecting firewood that investing their time into farming. Along with the objective of improving household food security, improved stoves were introduced to save

time for women spent collecting firewood, conserve environments that determines availability of rains and allow farmers to grow and cook anytime of food regardless of its requirement of fuel to get cooked. The uptake of this technology differs from one case study site to another depending on availability of firewood in a particular area. Place with limited availability of firewood like Chamwino has faster technology uptake compared to places with higher availability of firewood like in Kilosa. The efficiency of this stoves in terms of energy serving has receive a lot of attentions by farmers than its ability to control smoke in the kitchen and cook two pots at a time.

Time frame: Preparation of these activities started on February 2014 by engaging the farmers from neighboring village of Chololo trainers of of Idifu. The trainers from Idifu then trained their fellow farmers of Ilolo village. Later, few trainers from the two villages of Idifu and Ilolo were selected and conducted training at Kilosa CSS.. After all the trainings of trainers, the obtained trainers in each village became responsible to train their respectivegroupsmembers and started implementation right away.

Meetings: Number of meetings is continuously held to review the implementation and dissemination strategies by group members. Researchers are periodically called for meeting to review adaptation and sharing experience with group members on challenges and achievements. The issue of stove modifications, firewood management and storage, smoke management, combustion and gas emissions and fuel consumption of the fuel as compared to three stones fire has been the main agenda in their meetings. The group has form sub groups for easy meetings and management towards achievement of their goal of construction the stove in the entire and neighboring villages

Trainings: Both practical and theory technical trainings on usefulness and construction of improved stoves were conducted to champion farmers in every case study sites. After implementation more technical trainings on modifications of the stoves, group management and entrepreneurship were conducted. Farmer to farmer trainings is continuously conducted in case study sites to create awareness and spread the knowledge on stove construction.

Investments: The project providedexpertise, PVC pipes for shaping entrances, brick making instruments, tape measure, weighing scale and counter books for data recording. Farmers provided bricks, insulation materials, labour and land.

Challenges: Lack of seriousness of some members within groups as some members maintained their group membership because of the money provided during workshops and training. Low adoption rate is due to several factors including scarce of raw-materials for ICS construction in some villages, social interfering activities such as agriculture and also lack of motivated members to inseminate more knowledge to non-members. In addition there is easy availability of firewood and charcoal in Ilakala and Changarawe villages respectively, which makes farmers laggard in adopting this technology.

Adaptation: Reduce combustion chamber height from 35cm to 25cm to facilitate easy spread of heat for both pots. Change shape of heat entrance from main pot to the next pot from horizontal to diagonal. Reduce the stove size by 25% to keep heat. The costs of constructing the stove are keeping changing due to demand. The rise of price for constructing

the stove is a good sign of increasing in demand for improved stove and future adoption as it is witnessed in Idifu village.

Lesson learnt: Adoption of the ICS has been wide in areas where wood supply is very scarce compared to areas where wood materials or charcoalare available.

6. New product development: Sunflower oil pressing

Introduction: New product development and diversification of tradable commodities enhance horizontal and vertical coordination (for high value crops, surplus cereals, and livestock and livestock products). Lack of strong farmers' organizations, low negotiation power, low market linkages, poor market arrangements of produce and low prices, limits the scope of products diversity and diversification options. Therefore, this UPS aimed at strengthened farmers' organization through group management and leadership training in order to have reliable inputs, extension services, better negotiation power and competitive prices from buyers, increased competitiveness through linkages with reliable markets, especially for surplus produce and proper marketing arrangements and availability of price information, increased farmers' income through improved product quality and value addition for existing products and development of new products to new identified niche markets. This UPS is implemented in Chamwino district whereby farmers opt to add value to sunflower buy pressing oil in older to capture better prices than selling raw sunflower.Achievement of this UPS will stimulate production, productivity and volumes produced of targeted products and livestock due to availability of reliable markets; increase processing of farm produce; and increase consumption of targeted products through market requirements, quality issues, new products improvements and diversity of consumption.

Time frame: Planning of the activities for this UPS started on January 2015 including review of the business plan, discussion on management innovation funds, collection of farmers' contribution for purchasing the machine and other arrangements like building the machine structure.The purchase of machine for Idifu village was done in July 2015, and other arrangements are still in progress for machine to start operation in this harvesting season June 2016.

Meetings held: Number of meeting were arranged between farmers and researchers to agree on the business plan, management of funds and other meetings among themselves to collect contribution shares and division of labor for various group tasks.

Trainings: Training on entrepreneurship, group management and leadership was conducted. More trainings on technical aspects and training on market availability and reliability, better negotiation, price determination and better pricing arrangements are still needed. Training on product improvements through value addition, quality management, sorting and grading for farmers, village processors and livestock keepers are also need after the operation started.

Investments: The project has invested expertise and loan to purchase the machine and build the structure while farmers invested their shares as part of capital, land and labour on construction of building.

Challenges: The prolonged intra-seasonal drought encountered during 2014/2015 cropping season resulted into low yield and hence low contribution of shares from members to facilitate the investment of the machine. The low sunflower yield was also contributed by the use of local varieties producing multiple heads with low oil content. To addressedthis challenge, improved sunflower variety was introduced in Idifu during 2015/2016 cropping season.

Regarding the raw materials to feed the machine in 2014/2015 season, it came from own production and farmers were unable to produce enough to run a profitable business considering the outstanding debits from the innovation fund. Other challenges include arrangements with technicians.

Adaptations: Due to underlined challenge, it was revealed that it was not viable to invest in sunflower oil pressing machine in Ilolo for the first season 2014/2015 and the group opted for sunflower trade (buying and selling sunflower seed to the Dodoma market). This business was also not successful because of low moral among famers and limited supply of sunflower due to low production that year.

Lesson learnt: Involving farmers in planning, and use the share contribution system has equipped farmers with enough knowledge and sense of ownership. This can ensure success of this UPS and its sustainability.

7. Optimized market oriented storage

Introduction: Storage of harvested farm products for smallholder farmers faces a lot of challenges. Among the challenges includes poor storage facilities caused by lack of farmers' based proper storage facilities to cater for different crops and to be used in price stabilization, or collateral or for household food security. To address this challenge Trans-SEC project conducted storage trials to investigate the effectiveness of improved air-tight storage bags. This was accompanied by capacity building on farmers' practices regarding market-oriented storage practices in order to engage in profitable and sustainable storage.

Time frame: Activities of this UPS started on February 2015 by training on the available storage options. Actual implementation started on March 2015 where different types (Per-due Improved and Super bags) were given to farmers in terms of loan or on cash.

Meetings held: Meetings involving all 150 surveyed hh in each CSS, were held forawareness creation on improved storage options and introduction of airtight storage bags. One meeting involving storage group members wasalso held at Changarawe village to nominate members who will conduct storage trial.

Training: Trainings stakeholders on; how to use air tight storage bags, storage principles and benefits of storing harvests in relation to markets.

Investment: The projects purchased air tight storage bags (Super bags), then issue them to farmers on credit. Also the project provided expertise while farmers refunded project money after selling their harvest.

Challenges: The price of the air tight bags is a bit higher for poor resource smallholder farmers. Regarding the cost for super bags, the concern had driven researcher to look for alternatives storage bags whereby, the PIC and other bags was consider for household level experiments at Kilosa district before drawing the recommendations.

Adaptation: In the beginning 2014/2015 season this UPS was implemented in both districts, later it has been noted that it was not worth to invest in storage in Chamwino district because the main food and cash crops are not vulnerable to storage pests. Farmers were reluctant to buy super bags to the higher cost compared to the storage losses that are trying to prevent. Pearl millet, sunflower and groundnuts are less affected by storage pest compared to sorghum and maize which are less produced in Chamwino. Therefore the groups that were implementing this innovation agreed to join other farmers testing other UPS and discard this innovation.

Lesson learnt: The cost sharing system is the best way to assess the appropriateness of the technologyintroduced in the village. Farmers were able to show up their real demands after introduction of cost element in buying storage bags. The assessment of willingness to pay for the bags noted that, the super bag technology was not appropriatein Chamwino district as most crops produce were not vulnerable to storage pest. However, in the beginning when farmers thought that bags will be offered for freethey expressed the need.

8. Poultry crop integration

Introduction: This UPS addresses the issue of low integration of crop-livestock systems for improved livelihoods. It was introduced due to lack of utilization of products from both the livestock and crop sectors produced under integrated livestock-cropping system. It aims at capacity building on utilization of crop by-products in raising poultry, increased utilization of poultry manure in crop production and increased household income and nutritional security through optimized integration of poultry-cropping system at the household level.

Time frame: Farmers started meetings for preparation of receiving chicks in April, 2015. First batch of chick was delivered in August, 2015. The time from decision making to implementation took long due to preparation of chicken ban and identifying appropriate chick supplier.

Meetings held: Several meetings were held including providing information on how to build chicken ban, scheduling who receives first batch, second batch and other batches, review members who are to receive named batches if they completed building ban discuss group issues.

Trainings: Farmers were trained on poultry house buildings based on pre-defined requirements, feed formulations, diagnosis of common diseases and market issues.

Investments: The project invested on expertise and innovation fund while farmers invested on building chicken ban, feeds and labor.

Challenges: Unavailability of suitable chick supplier. The project intended to supply one month old chicks to farmers but ended up supplying three weeks old chicks due high cost of buying one month old chicks. Delay on supplying chicks according the agreed schedule due

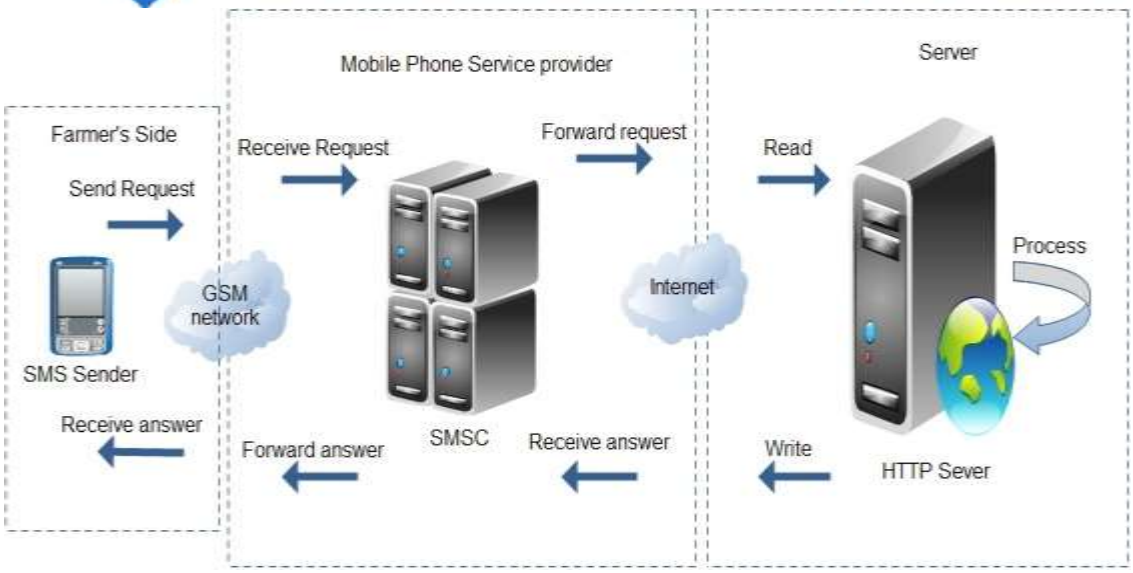
to failure of the first supplier to supply remaining chicks. Increased feeds cost due to high cost of protein source (fish meal). High mortality rates for some farmers due to poor management. Difficulties on selling chickens due to the myth of the chickens being not local breed. Flood has destroyed some of the existing build chicken ban. Chicks of some farmers were stolen with the intention of obtaining the improved breed bythe thieves.

Adaptation: The project has contracted a new chick supplier; however the supplier will supply day old chicks. The chicks will be raised at the village by one of the group members up to three weeks and then distributed to farmers as per schedule. The project has also motivated farmers to grow soybean as an alternative cheap source of protein.

Lesson learnt: Efficient implementation of some UPS like poultry requires enough knowledge, experience and commitment. From the experience obtained in other UPS example maize sheller and storage bags, prior contribution from farmers increases commitment. During project planning, all innovations which requires capital investment from farmermust define/establish criteria for farmers involvement.Also, this UPS has faced some challenges in marketing chicken due to the stigma of colour uniformity and zero grazing method.

9. Mobile phone based Integrated Market Access System (m-iMAS)

Introduction: This UPS is designed to link smallholder farmers to food markets among themselves and with external food traders. It works by requesting agricultural marketing information fromthe system. The sketch below narrates how the system works.This UPS is implemented in both of the districts and expects farmers will start using this system for selling and buying products starting the 2015/2016 harvest season. The system was introduced to representatives of different group of people from different sub villages including producers, buyers, middle men, UPS groups' members, and village leaders. This representatives are expected to teach the fellows in their respectively groups. Posters with steps to follow on selling or buying were spread in the village and contacts were provided. To access this service it require farmer to have an airtime bundle with not less than ten messages.



Time frame: Activities on this UPS started on July 2015 but its actual implementation on transaction of goods is yet to start. The system has been tested in the CSS between April and May 2016 and worked.

Meetings held:Convened at SUA to design a poster explaining procedures to be followed by farmers (buyer and/or seller) to interact with the system. Call farmers to participate on testing the m-iMAS.

Training: Training of trainers on operating the system was conducted at SUA on March, 2016. Trainers trained farmers between April and May, 2016 on how the system works and facilitate them on testing it.

Investment made: The project invested the knowledge while farmers invest their airtime in attaining the services.

Challenges: The problem of slow response from the system to reply messages was observed in both districts. In Chamwino district, majority of farmers do not own mobile phone to facilitate the transactions. For those who have phone are not conversant with texting. However few who have conversant with mobile texting are facing the challenge of buying airtime bundle and charging their phones as some villages has no electricity power. Furthermore, some village like Idifu is located in remote where mobile phone network is still a challenge. They usually receive low network signals. The combination of all this challenges made the implementation difficult right from training.

Adaptation : The project has facilitated the purchasing of modem to facilitate internetconnection speed.

Lesson learnt:

Some farmers are not able to write messages due to illiteracy and vision as a result of aging.

10 Household nutrition education& kitchen garden training

Introduction: This UPS aimed at increasing the awareness of nutrient-rich including indigenous foods, and making better use of these crops to improve nutritional status

especially of under-five children; cultivating indigenous fruits and vegetables at the homestead for dietary diversification. Two types of kitchen gardens; pocket gardens and tray gardens were introduced in all case study sites. Famers were trainedto use plastic bags to establish pocket gardens and ground traysfor planting vegetables around the homestead.Implementation of this UPS started on 2014/2015 season.

Time frame: Planning of activities of this UPS started on February 2015 while implementation of activities on the ground started on April 2015 by training of farmers. However famers have keep establishing new gardens in neighborhood household over the year as the gardens are not depending on the rain seasons or have specific limitation to time of planting in a year. One pocket garden can stay more than a year depending on the durability of the bag and harvesting period of the type of vegetable planted. This is the same applies to tray gardens however; the tray gardens can last even longer than pocket gardens. These gardens can be reestablished or added anytime whenever needed by the household.

Training and meetings held: A number of meetings and trainings were held to facilitate operation of activities in this UPS. These are 1) awareness creation on health issues, 2) formation of women groups, men groups and joint groups (men and women) where training were conducted, 2) Face to face training at a centre, 3)Participatory training using appropriate developed training curricular, 4) training and demonstration on how to make pocket garden, transplant seedlings and their management.

Investment made: In this UPS, the project supports UPS group members by providing initial pocket bags, vegetable seeds, trainings and expertise. Farmers are responsible in providing materials (gravels, manure), nurseries plots and labour for establishment and management of the pocket garden. After they have tried and realized its potentials farmers continue to supports themselves, as well as new adopters received no support from the project.

Challenges: During implementation of this UPS, a number of challenges were encountered. These include insect and vermindamage, water scarcity and limited availability gravels in some areas of Kilosa.Pest was among major challenge faced which is achieved controlled by using botanical extracts such as neem plant extracts. In Chamwino district the major challenge was long distance to water sources and willingness to pay for water to irrigate by majority of household, something that have been overcome after realizing the harvest by members. The problem of vermin like chickens become serious during dry season where the only green available in household surroundings are vegetable in either tray or pocket gardens and every domestic animals are attracted by it.

Adaptation: Direct seed planting on the pocket bags has proven higher chances of plant survival than transplanting seedlings from nurseries especially for places with high temperature like Chamwino district. Currently, famers are using the direct planting with less complains of low plants survival. The use of worn-out mosquito nets to surround and protect vegetable bags from chicken damage has been successful and used by majority of farmers in case study sites. Majority of household who established a tray garden abandon them as its performance is poor compare to pocket gardens. All new adopters are opting for pocket over tray gardens.

Lesson learnt: The use of organic pesticide to control pest is more of a preventive measures compared to curative. That is it must be used before the threshold pest level has been attained. Also planting one pocketbag per household will not ensure constant supply of vegetables throughout the week. In Chamwino where water is really scarce, the implementation and adoption of this UPS has been very well compared to Kilosadistrict where there is plenty vegetables grown along the river or other water sources.

Chapter 5

Participatory monitoring activities (Deliverable 2.2.1)

Introduction: Monitoring and evaluation is important to enable collection information about the progress of such development programs tostakeholders whether implementation is going as planned or redesigning or readjustment measures are needed considering the emergent circumstances. To come up with best conclusion M&E needs active participation of all stakeholders, that's whyTrans-SEC conducts monitoring and evaluation sessions in a participatory way. A group based M&E sessions are carried in every three monthsand household level monitoring once a month. Both types of monitoring and evaluation of UPS aimedat capturing the overview performance of tested technologies, feed backing the researchers and draw lessons with farmers for adaptation of technologies implemented in different conditions. These monitoring activities allow farmers who are testing different upgrading strategies in the CSS to witness on the progress of project implementation and share their feelings on the benefits they are recording from their participation in various activities for learning purposes. It helps stakeholders in the consortium to learn from farmers' experiences for better improvement.

Methodology: Monitoring of UPS group and activities implemented under Trans SEC project case study sites stated in March, 2015. Trans-SEC adopt the participatory monitoring and evaluation that emphasizes direct involvement of key stakeholder in the processso as to ensure the system is applicable in a wide range and sustainable the monitoring sessions are divided into two categories; group monitoring done in focus groups discussions and household level monitoring which is done by personal interviews with household members. However these monitoring have again two main focuses; the group dynamic and the technical details. So far four months monitoring mission have already been conducted. **.**Weekly monitoring visits is done by ARIs in each CSS by observation and informal discussions,Monthly intensive week of monitoring mission is done through interviews in both CSS (3 days per CSS) by ARI and every three months monitoring is done by focus group discussions in both CSS (3-4 days per CSS) by ARI and MVIWATA

Monitoring Procedures

Development of indicators: aiming to measure the effectiveness of different UPS groups and stakeholder engagement processes on the UPS groups was developed
Development of checklist: to guide the interviews with participating farmers for each UPS
Administering of questionnaires: to collect intended information from farmers
Challenges in the monitoring activities: low attendance of UPS group members during monitoring activities particularly in peak season. This affects information gathered as it does not represent majority.

Way forward

The monitoring mission is an ongoing process and it will continue until the end of the project.