



Final Evaluation of Feed the Future Ethiopia-Innovative Potato Activities

Project, South Wollo Zone, Amhara National Regional State

(Final)

Oda Development Consultant

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Disclaimer: The project; Feed the Future Ethiopia-Innovative Potato Activities, financed by the USAID Feed the Future was implemented by Concern World Wide Ethiopia. The overall goal of the project was to contribute to the enhancement in the food and nutrition security and income level of 6000 PSNP and HABP targeted households in Tenta and Legambo Woredas in South Wello Zone of Amhara Region. The project ended on September 07, 2018 and this final evaluation report is produced by Oda Development Consultant. We would like to notify that views expressed in this final evaluation report are our balanced judgment and do not necessarily reflect the views of USAID and Concern World Wide-Ethiopia unless specified otherwise.

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Acronym

AARC:	Addet Agricultural Research Center
CSA:	Central statistics Agency
CWWE:	Concern worldwide Ethiopia
<i>Belg:</i>	Short rainy season in Ethiopia
DLS:	Defused Light Store
FF:	Follower Farmer
FGD:	Focus Group Discussion
FHH:	Female Headed Households'
GTP:	Growth and Transformation Plan
HABP:	Household Asset Building Program
HEW:	Health extension worker
HH:	House Hold
KII:	Key Informants Interview
LF:	Lead Farmer
<i>Meher:</i>	Long rainy season of Ethiopia
M&E:	Monitoring and Evaluation
MHH:	Male Headed Household
MoU:	Memorandum of Understanding
NB:	Non Beneficiary
NGO:	Non-Government Organization
PLA:	Participatory Learning and Action
PSNP:	Productive Safety Net Program
QDPM:	Quality Declared Planting Material
SDG:	Sustainable development Goal
SPPMC:	Seed Potato Producing and Marketing Cooperative
SPSS:	Statistical package for Social Science
USAID:	United States Agency for America International Development
USG:	United States Government

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Oda Development Consultant

Executive summary

CWWE is a non-government, international humanitarian organization which implemented development and emergency programs in Ethiopia for more than four decades. CWWE implemented the project called “ Feed the Future Ethiopia –Innovative Potato Activity” from September 07, 2015 to September 07, 2018 in selected 20 kebeles of Tenta and Legambo Woredas of South Wollo Zone of Amhara National Regional State. The overall goal of the project was to contribute to the enhancement in the food and nutrition security and income level of 6000 PSNP and HABP targeted households.

The project ended on September 07, 2018 and this final evaluation was conducted with objective of assessing the effectiveness, efficiency, impact, sustainability and relevance of the project. Document review, FGD, KII, case study and observation were main methodology employed for the evaluation. Moreover, the result of the end line survey was used as input. The findings of the final evaluation are as summarized below.

Project impact

The result of the evaluation showed positive outcomes have been brought as the result of the project implementation as shown below.

Table 1 summary of project impacts

Indicator	Baseline data	Target	End line data(actual)
Outcome 1. Improved the food and nutrition security of targeted HHs through promoting the production and productivity of Irish potato			
Quintal of Irish potato produced by targeted HHs (12 quintal/HH) from the amount of seed supplied(1 quintal)	0	12 quintal/HH from 1 quintal of seed	Year 1(2016/17) FHH= 6.76 Q/HH MHH=7.42 Q/HH Average = 7.25Q/HH from 0.98 Quintal of seed Year 2(2017/18) FHH= 1.57 Q/HH MHH=1.88 Q/HH Average = 1.77 Q/HH from 0.5 Quintal of seed
Percentage increase in average meal frequency by 50% from baseline at the end of the project (% of HH who took three meals yesterday)	MHH =8.6% Women in MHH= 3.0% FHH= 1.7% Children above 5 years old=53% Children under five years old=72.2%	50% increment MHH =12.9% Women in MHH 4.5% FHH= 2.55% Children above 5 years old=79.5% Children under five years old=100%	MHH =80.8% Women in MHH= 81.4% FHH= 76.3% Children above 5 years old=90.3% Children under five years old=95.7%
Number of months of food gaps reduced (by 4 months from the baseline)	Average = 7.85 months MHH =7.71 months FHH= 8.48 months Married women in Male headed HH= 7.92 months	Average = 3.85 months MHH =3.71 months FHH= 4.48 months Married women in Male headed HH= 3.92 months	Average = 3.50 months MHH =3.47 months FHH= 3.73 months Married women in MHH= 3.35 months
Number of vulnerable HHs benefiting directly from USG assistance	None	6000	6000
Outcome 2: Irish potato seed supply system in place in the project areas			
Guideline/protocol on QDPM) of Irish Potato developed and implemented (by producers and coops)	No guideline in place	Put the guideline in place and implement	Guideline developed and implemented
95% of targeted HHs using improved varieties of QDPM	None	95%	93% used improved variety of QDPM in the last 12 months
Number of farmers and others who have applied improved technologies or management practices as a result of USG	None		100%

assistance			
Outcome 3: Enhanced income of project targeted PSNP/HABP HHs (50% women) through promoting and marketing of seed and ware potato			
Increase in income of targeted households	None	25% increase	Birr 2708
Outcome 4: Learnings and innovative solutions extracted from operational research works and joint actions promoted and implemented			
Report on operational research findings	None	2	2
Platform of Irish potato value chain actors established and functional.	No platform	Platform in place	Platform established

Source: 2018 project end line survey and operational research reports

The intention of the project was to produce 12 quintal/HH from one quintal of potato seed. Accordingly, the seed received by the beneficiaries in 2016/17 was 0.98 quintal/HH and 0.5 quintal/HH in the second and third years. The quantity of Irish potato produced per household in 2016/17 was 7.26 and 7.12 quintals for *Belete* and *Gudene* respectively. Similarly, the production per HH in 2017/18 for *Belete*(unknown generation), *Belete* G2 and *Belete* G3 was 1.75 quintal, 7.52 quintal and 11.02 quintal respectively. The average production per household for the two varieties in 2016/17 and 2017/18 was 7.25 and 1.77 quintal respectively. The performance was above the baseline (zero) and below the set target (12 quintal per households). Here, it is important to note that the yield for the second year was from half quintal of seed that can reduce the yield/HH by half.

The productivity of the improved Irish potato in 2016/17 was 267 and 258 quintal per hectare for *Belete* and *Gudene* variety respectively. The average productivity dropped to 151.46 quintal per hectare in 2017/18 mainly due to poor rainfall performance. The average productivity of *Belete* variety in 2017/18 ranges from 153.96 to 389.76 quintal per hectare with significant difference among *Belete* variety generations. The productivity of *Belete* in the first year was close to the national on farm research result; 281-338 quintal/ha and above for *Gudene* 210/ha.

The percentage of target households (n=398) who ate three times in a day prior to the survey date increased and the performance was above the set target (50% increment from the baseline status). The increment was from 8.6% (baseline) to 80.8% (end line) for MHH, 3% to 81.4% for female in MHH, 1.7% to 76.3% for FHH, 53% to 90.2% for children under five years and 72.2% to 95.7% for children below 5 years old.

The number of months target household faced food shortage reduced over the last three years. The intention of the project was to reduce food gap by 4 months from the baseline level. In this regard, the number of months reduced from 7.85 months (baseline) to 3.5 months at the end of the project. The proportion of households who faced food shortage in the last 12 months of the survey date reduced from 99.8 % (baseline) to 81.2% (end line). The number of months with food gap was below the set target under all cases. Own production as sources of food increased from 37% to 47% over the project period and PSNP reduced from 30% to 21% while purchase as source of food remained same. The trend of food gap reduced over the last 5 years compared with the baseline data. The proportion of household who reported for increased food gap reduced from 99.5 % (baseline) to 16 % (end line).

The project facilitated the development of a customized QDPM guideline based on the national protocol which is in use by Woreda and cooperatives. Eight potato seed producers and marketing cooperatives have been registered of which seven received professional competency certificate from the Ethiopian Plant Seed and Other Agricultural Input Quality Control Quarantine Authority of Dessie branch to be engaged in marketing of improved seed of potato. The cooperatives collected and distributed 3068.98 quintal of certified improved seed potato in 2016/17 and 2017/18 production years. Of the sampled households, 93% used improved variety of potato in the last 12 months of the survey date which was comparable with the target; 95%.

The average income generated from sale of potato in the last 12 months was Birr 2,708 which was none during the base year. The average income from sale of seed and ware potato was Birr 2,544 and Birr 1,883 respectively. An average income of MHH, FHH and women in MHH was Birr 2928, Birr 1396 and Birr 2076 respectively. The result of the survey showed that increased income has been translated to improved asset holdings as shown by increased household asset and livestock holding compared with the baseline.

As part of learning, sharing and information dissemination, two operational researches were conducted by AARC and CWWE, learning sessions conducted and lessons were shared through brochures. The second operational research was done after some refinements of data collection tools of the first years and then finding of the researches shared with platform members and summary report distributed in the form of brochures. However, the research findings are not yet publicized as public journal or proceeding.

Project effectiveness

The evaluation confirmed that the project planning was participatory and its implementation involved all actors stated in the document. Moreover, the project operated as per the project agreement signed with regional sector offices. Targeting of Woredas, Kebeles and households was rational and neither inclusion nor exclusion error noted.

A total of 6000 households benefited from the project and survey showed that 90% are satisfied with the project service. HEWs and DA trained households on the nutrition importance of potatoes, food ingredients from Irish potato and provided cooking demonstrations as per the plan and cascaded the training to pregnant and lactating women.

The seed supply system has been put in place and is functioning. Moreover, 8 Defused Light Store (DLS) were constructed and in use. The membership outreach of the cooperatives increased from 582 in 2016 to 761 by 2018 though the increment was marginal. When asked about the reason why some are not a member of the cooperative, 30% said that we haven't seen members benefit out of the membership, 13% reported that the cooperative does not encourage others to become a member and 33% have no reason. Task forces mandated for monitoring and approving Quality Declared Planting Material (QDPM) of potato were established and are jointly working with zone respective sector offices. However, the participation of some members like trade office was passive. Despite of this, the task forces inspected the quality of seed three times per planting season and the quarantine agency provided approval letters for cooperatives based on the recommendation of the task forces.

As part of increasing the quantity of ware and seed potato supply to markets, a value chain study was conducted by Wollo University, and the potential value chain actors were identified and actors conducted a meeting. However, no subsequent action was done in terms of connecting the cooperatives with buyers and other actors. Regardless of this situation, there is growing demand for improved potato seed within the zone and Woredas, Tena Agriculture Office, World Vision Ethiopia, Kelala Agriculture Office and CWWE bought 70 MT of seed potato at the cost of one million birr in 2016/17 from the cooperatives. The Dessie FM radio station transmitted the program on improved potato for 40 minutes in two days in 2017/18 though the plan was to transmit for 12 months; four months per year. Moreover, brochures on topics such as; potato disease and pest control, potato benefits and food preparation, potato production and management, the humble of potato- perspective of livelihood winning crop highlanders, case studies and on cross cutting issues namely Gender and HIV and AIDS were produced and distributed to kebele offices, the beneficiary community and implementing partners. A total of 6 women groups were organized, trained on potato processing and six frying equipment were provided of which 3 groups were operating at time of the evaluation.

The technical application of the technology progressed well. The yield, adoption, disease and pest occurrence, nutrition and income aspects of the project piloted and tested, were verified and scaled up to larger beneficiaries (follower farmers). According to our judgment, the assumptions stated under the piloting and testing have been

proved. The operational research conducted and the gap observed was on the dissemination of the finding at the required level.

The adoption of the technology was so fast as compared to researcher's recommendation; 3-5 years. According to the household survey result almost all (98%) adopted the technology in less than a year time of which 89% adopted within 6 months. Respondents stated that the improved variety of seed, planting techniques and pest and disease control are major innovative practices introduced by the project. Moreover, 68% of the sampled households expressed their willingness to continue planting potato for the future. The transfer of the technology also performed well. The survey showed that close to half of the beneficiary households transferred the knowledge they gained and experience about the innovation/technology to other farmers. Similarly, 60% confirmed that their followers applied the technology.

Sustainability

The beneficiaries internalized the benefit of the technology as witnessed by the adaptation of the technology even by non-beneficiaries. Hence, the outcome of the project explained that increased production, productivity and income, reduced food gap and improved feeding practices are likely sustainable as far the existing seed supply system, support from the government and quality inspection and certification are maintained .

The sustainability of the seed supply system is a pillar that determines the sustainability of the project at large. It heavily depends on the existence and functionality of the task forces and the financial and material capacity of cooperatives. If these conditions are maintained, the system shall be sustainable. The experience from neighboring Woredas namely Dessie Zuria and Delanta showed that the SPPMC operated for years after the withdrawal of CWWE which is a green light about the sustainability of the system and benefits.

The sustainability of the platform is crucial for the continued interaction among the value chain actors and sustained service delivery. However, the platform is at infant stage and the bondage among actors is loose. Under such case, the sustainability of the platform is unlikely. Six women group were established to run chips preparation and marketing. Though they are generating income there is drastic increment in cost of inputs which might challenge the sustainability of their business.

Project relevance and appropriateness

The project falls within the first two goals of the SDGs namely end poverty in all form (goal 1) and end hunger, achieve food security and improved nutrition and promote sustainable agriculture (goal2). Similarly, increasing agricultural production and productivity and building a climate resilient green economy is one of the strategic directions of GTPII. The project is in line with the development direction and policy of CWWE and USAIDD since poverty reduction is the center piece of their policy. Beneficiary household's explained that the project was relevant to their needs and priorities. Hence, the evaluation concluded that the project was relevant and appropriate for implementation.

Lessons learnt, conclusion and recommendation

The implementation of the project came up with lessons that can be an input for future projects. The overall finding of the evaluation showed that the project was successful and attained the envisaged objectives as explained by the performance indicators. The innovative technology was introduced and adopted, beneficiaries income increased, the food gap was reduced, feeding practice improved, the potato seed supply system was established and research

findings documented. However, linking SPPMC with buyers, the documentation and dissemination of lessons, and the functionality of platform are at the middle of the journey. Details of the lessons, conclusion and recommendation is stated in the document.

1. Introduction

1.1. Back ground information

Concern World Wide Ethiopia is a non-governmental international humanitarian organization which envisions a world where no one lives in poverty, in fear of oppression, where all can access a decent standard of living and have opportunities and choice essential to a long, healthy and creative life. CWWE has implemented development and emergency programs in Ethiopia for more than four decades.

South Wollo Zone of Amhara National Regional State is one of the operation areas of CWWE. According to the livelihood zonation of Amhara National Regional State, South Wollo Zone at large and the project Woredas in particular are chronically food insecure areas. As per the December 2015 hot spot classification report of the Ethiopian Disaster Risk Management and Food Security Sector, Legambo and Tenta Woredas were within priority one and three respectively.

Reviewed documents showed that the farmers within the target Woredas are constrained by low productivity of crops and livestock, small land holding, degraded land, large family size and depleted productive assets because of shocks and stress. Due to these persistent production constraining factors 9,226 and 36,685 households were registered for the 2015 PSNP/HABP in Tenta and Legambo Woredas, respectively.

In response to the development needs of the areas, CWWE implemented ***Feed the Future Ethiopia –Innovative Potato Activity Project*** from September 07, 2015 to September 07, 2018 in selected 20 kebeles of Tenta and Legambo Woredas of South Wollo Zone of Amhara National Regional State. The project served 6000 [2900 and 3100 in Tenta and Legambo respectively] Productive Safety Net Program (PSNP) beneficiary households through production and promotion of ware potato and establishment of potato seed supply system. Of the total beneficiaries, 4107 and 1893 are male and female respectively.

The project was ended on September 07, 2018 and CWWE outsourced Oda Development consultant to facilitate the final evaluation. Accordingly, the survey was conducted and this final evaluation report has been prepared and submitted in line with the terms and conditions stated in the agreement. The report contains the snapshot about the project, methodology employed, findings and discussion and conclusion and recommendation. Supplementary information is annexed for reference.

1.2. Objective of the project

The overall goal of this project was to contribute to the enhancement in the food and nutrition security and income level of 6000 PSNP and HABP targeted households in Tenta and Legambo Woredas in South Wello Zone of Amhara Region. The specific objectives of the project was three folds; a) improving the food and nutrition security of 6000 targeted HHs through promoting the production and productivity of potato b) establishing seed potato supply system for the promotion of ware potato production and c) enhancing the income of PSNP/HABP HHs through promoting the marketing of seed potato

1.3. Objective of the final evaluation

The main objective of this final evaluation was to assess the effectiveness, efficiency, impact, sustainability and relevance of the project. The specific objectives were a) to provide an overview of the project intervention in terms of key achievements against planned project results in relation to objectives, b) assess the project intended/unintended and positive/negative impact on individual communities, systems, and institutions., c) gain an in-depth understanding of key project components successes and failure toward the achievement of project target and document evidences of coordinated efforts and results sharing between key partners and stakeholders.

2. Methodology employed

Qualitative methods were mainly employed to generate the required information from their sources. Document, review, end line survey report, Focus Group Discussion, Key Informants Interview, case study and observation and other PLA methods were employed. The details of the methodology employed are as follow.

Phase I. Document review and survey tool development.

Documents related to the assignment were reviewed from the onset. Project proposal, end line and baseline survey and annual project progress reports, proceedings, policy documents, minutes, memorandum of understandings and other scientific reports were reviewed. Based on the result of the documents review, survey checklists and guides were developed and used during the field work. The list of reviewed documents and survey tools are annexed. The quantitative data for this evaluation mainly came from the end line survey report which was submitted separately.

Phase II. Field assessment

The second phase of the assignment was focused on collecting data from the beneficiary and non-beneficiary community using the qualitative survey instruments. The details of the methods used at the field level are as summarized below.

- a) **Focus Group Discussion (FGD).** FGDs were conducted with the targeted beneficiaries, project task forces established at Zone, Tenta and Legambo Woredas and sector office staffs at different level. A total of 14 FGDs were conducted with the beneficiaries. Moreover, 2 FGDs were conducted with Woreda task forces and one with zone task force members.

It is known that the baseline and end line surveys were conducted in eight sampled kebeles(four per Woreda). Hence, the target kebeles were clustered to those kebeles covered by baseline and not to have additional kebeles for FGDs. The intention was to include kebeles not addressed by the household survey. Accordingly, FGDs were conducted in nine project target kebeles of which four were those not addressed by the baseline/ end line survey while the lastt five were covered by the baseline survey. This made the total number of kebeles covered either by qualitative or quantitative survey as 12 which is 60% of the total targeted kebeles. The arrangement gave an opportunity to explore specific information from kebeles not covered by the structured survey.

The FGD participants were selected in a representative form from the perspective of sex, adoption of the technology and the intervention. Accordingly, FGDs were done with lead farmers, follower farmers, cooperative (two strong and two less strong in terms of management and operation) and chips producing women groups. Two FGDs (one per Woreda) were conducted with the FHH to have an in-depth information about them.



Figure 1: FGD participants at Wertej kebele of Tenta Woreda

A total two FGDs were conducted with non-beneficiaries (mix of male and female) to understand the extent to which the technology was replicated and adopted by the non-beneficiaries within the target areas. Moreover, two FGDs were conducted with the women group engaged in the processing and marketing of potato (chips).

Two FGDs were conducted with the QDPM taskforces at Tenta and Legambo woredas. The task force members are representative of Woreda Agriculture, Cooperative, Health, Finance and Economic Development and Trade Offices. In cases where the taskforce members were unable to attend the FGD, separate KII sessions were arranged to capture their views. Furthermore, an FGD was conducted with the QDPM task force members of South Wollo Zone (Agriculture, Dessie Plant & Other Agricultural Inputs Quality Control and Quarantine Authority Sub Office and Cooperative). Those zone task force members who couldn't attend the FGD namely BoFED and Kombolcha Plant Clinic were covered through KII. The summary of FGDs conducted with the beneficiaries is as summarized below

Table 2 Number of FGDs by type

S/no	Woreda/Kebele	Baseline kebele	Type of FGD	Cooperative	Chip producing group
	Legambo				
1	023 Segno Gebeya	Yes	LF(mixed)	Strong	
2	027 Terad	Yes	FF(mixed)		
3	022 Sayida Korkura	No	NB(mixed), FHH	Less strong	
4	025 Chiro	No			Chips marketing group
	Tenta				
5	013 Wertej	Yes	LF(mixed)	Strong	
6	029 Kera Jima	Yes	FF(mixed)	Less strong	
7	010 Zakunat	No	NB(mixed)		
8	08 Kurkur	No	FHH		
9	011 Aba Boru Meda	Yes			Chip groups
	Total	4 NBL, 5 BL	8 FGD	4 FGD	2FGD
	Grand total	14			

NB- Non Baseline Kebele BL- Base Line Kebele LF-Lead Farmer FF-Follower Farmer NB-Non Beneficiary Mixed –participants are male and female

b) **Key Informants interview:** Interview sessions were conducted with the beneficiaries, technical personnel and other knowledgeable people who have detail information about the project. The KII was conducted with the following bodies.

- South Wollo Zone Finance and Economic Development Department
- Kombolcha Plant Clinic
- Addet Agricultural Research Center
- CWWE North Area Coordination Office
- CWWE Head Office
- Tenta and Legambo Woreda Agriculture Office(horticulture experts and heads)
- Legambo Woreda Trade office- Crop marketing team
- Legambo Finance and Economic Development Office
- Tenta Woreda Cooperative Office – head and experts
- Legambo Woreda Health Office
- Woreda administration(Tenta)
- Visited kebele Mangers
- Visited kebeles Development Agents- Crop production
- Visited kebeles HEW
- Rural town municipality(Chiro of Legambo)
- Other key individuals

The checklists developed for different key informants were used to guide the interview. The list of people contacted for KII is annexed for reference.

- c) **Household survey.** The end line household survey was conducted by CWWE and the result of the survey was used as input for this report. The end line survey deployed similar methodology with the baseline survey since the result of similar methods are comparable. The survey was administered on 398 households who were considered during the baseline survey. The sampling methods was similar with baseline survey and hence the same beneficiaries and kebeles were considered under both base and end line survey. The end line survey report has been submitted separately and all information contained in this report is taken from the end line survey report unless and otherwise specified.
- d) **Case study:** Case studies are instrumental in terms of understanding the in-depth situation of the beneficiaries. To this end, case studies that can best describe the situation of the project participants were conducted and documented.
- e) **Observation:** Personal observations of the project area, beneficiaries' situation, infrastructures constructed by the project like the DLS were conducted to have impressions about the project.
- f) **Other PLA methods:** Other participatory learning and action methods including ranking, trend analysis, history telling and others were applied as required.

Phase III. Data validation, analysis and report writing

Data validation was started at the field level by triangulating information generated from different sources. Data collected from the targeted community was reviewed on daily base by summarizing findings and checking for any

overlooked and or inconsistent information. Moreover, there was on spot feedback for discussion and interview session participants to make sure that their opinion has been properly captured.

A feedback session was conducted for both Woreda sector offices and the preliminary findings and impressions were shared. Moreover, a half day exit workshop was conducted at CWWE North Area Coordination Office and the preliminary findings and impression from the assessment was presented. The exit workshop was instrumental in terms of bringing the consultant and the area coordination office on the same wave length regarding the major findings.

The end line survey report was the main document for an in-depth analysis. In this regard, the household data collected by CWWE was analyzed and the result was used as an input for the preparation of this report. The findings of the household and qualitative surveys result was triangulated for consistency and validity, The methodology employed for the project end line survey is as discussed in the end line data analysis report submitted separately. Based on the findings of the end line household and qualitative survey, this report has been prepared.

3. Findings and discussion

The project was implemented by CWWE in partnership with the government sector offices namely Amhara Region Agriculture and Cooperatives Bureaus and Addet Agricultural Research Center. The performance of the project was reviewed using DAC criteria namely effectiveness, efficiency, relevance, impact and sustainability. Moreover, the coherence, integration of the project with ongoing programs, cross cutting issues and accountability was assessed. The findings are as discussed below.

3.1. Project impact

The performance of the project toward the stated objectives was assessed using objectively verifiable indicators stated in the revised project log frame. The four outcomes namely: improve the food and nutrition security of the target beneficiaries, Irish potato seed supply system put in place in the target area, enhanced income of target households and learning and innovative solutions extracted from operational research works and joint actions promoted and implemented were the major area of review to gauge changes. Moreover, indicators stated in the project M&E plan were brought to picture to gauge changes. Hence, the progress of the project toward the stated outcomes is as discussed below.

Outcome1. Improved the food and nutrition security of targeted HHs through promoting the production and productivity of Irish potato

The quantity of Irish potato produced by target households, increase in average meal frequency, number of months with food gaps, and number of vulnerable HHs benefiting directly from USG assistance, were indicators meant to measure changes in the food and nutrition security of the target households. The result obtained is summarized below.

Table 3 Summary of project performance –Outcome 1

Indicator	Baseline data	Target	End line data
Quintal of Irish potato produced by targeted HHs (15 quintal/HH) from the amount of seed supplied(1 quintal)	0	12 quintal/HH from 1 quintal of seed	Year 1(2016/17) FHH= 6.76 Q/HH MHH=7.42 Q/HH Average = 7.25Q/HH from 0.98 Quintal of seed Year 2(2017/18) FHH= 1.57 Q/HH MHH=1.88 Q/HH Average = 1.77 Q/HH from 0.5 Quintal of seed
Percentage increase in average meal frequency by 50% from baseline at the end of the project (% of HH who took three meals yesterday)	MHH =8.6% Women in male headed HH= 3.0% FHH= 1.7% Children above 5 years old=53% Children under five years old=72.2%	50% increment MHH =12.9% Women in MHH 4.5% FHH= 2.55% Children above 5 years old=79.5% Children under five years old=100%	MHH =80.8% Women in MHH= 81.4% FHH= 76.3% Children above 5 years old=90.3% Children under five years old=95.7%
Number of months of food gaps reduced (by 4 months from the baseline)	Average = 7.85 months MHH =7.71 months FHH= 8.48 months Married women in Male headed HH= 7.92 months	Average = 3.85 months MHH =3.71 months FHH= 4.48 months Married women in Male headed HH= 3.92 months	Average = 3.50 months MHH =3.47 months FHH= 3.73 months Married women in MHH= 3.35 months
Number of vulnerable HHs benefiting directly from USG assistance	None	6000	6000

Source: 2018 End line survey and operational research reports

Indicator 1.1 Quintal of Irish potato produced by targeted HHs (12 quintal) from the amount of seed supplied (1 quintal)

The baseline data shows that none of the targeted households produced improved variety of Irish potato in the last 12 months preceding the survey date. The project supplied about a quintal (98 kg/HH) of improved potato seed called *Belete* and *Gudene* type on loan base in the first year and then 50 Kg/HH in the subsequent years. The seed supply was made through SPPMCs established as part of putting the seed supply system in place. The production and productivity of the crop was assessed under two conditions; production per beneficiary household and productivity per hectare and the result is portrayed below.

→ **Production per household**

The project conducted two operational researches to understand the performance of the project in relation to the identified thematic areas namely yield, adoption rate, diseases and pest, income and dissemination of information. Accordingly, the yield of the improved Irish potato was collected from sampled households through measurements. The yield from the sampled plot was converted to total household production and productivity. The detailed findings are presented in the operational research reports. This report fully relied on information contained in the operational research with further analysis using the row data of the research entered to SPSS. The finding is as summarized below.

Table 4 Harvest of both ware and seed potato quintal per HH (2016/17) from 0.98 Quintal of seed

Woreda	HH category	Variety								
		Belete			Gudene			Total		
		Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum
Legambo	FHH	6.03	16.30	.47	.	.	.	6.03	16.30	.47
	MHH	6.80	21.69	.49	.	.	.	6.80	21.69	.49
	Total	6.62	21.69	.47	.	.	.	6.62	21.69	.47
Tenta	FHH	7.48	18.36	1.61	7.19	11.55	2.91	7.42	18.36	1.61
	MHH	8.18	26.11	1.75	7.07	10.10	3.67	8.04	26.11	1.75
	Total	8.01	26.11	1.61	7.12	11.55	2.91	7.87	26.11	1.61
Total(average)	FHH	6.70	18.36	.47	7.19	11.55	2.91	6.76	18.36	.47
	MHH	7.44	26.11	.49	7.07	10.10	3.67	7.42	26.11	.49
	Total	7.26	26.11	.47	7.12	11.55	2.91	7.25	26.11	.47

Source: CWWE 2016/17 operational Research Report/row data

Table 5 Harvest of both ware and seed potato quintal per HH (2017/18) from 0.5 quintal of seed

Woreda	HH category	Variety									
		Belete(unknown)		Belete G2		Belete G3		Gudene		Total	
		Mean	Maximum	Mean	Maximum	Mean	Maximum	Mean	Max	Mean	Maximum
Legambo	MHH	1.85	9.53	5.33	5.33	18.94	18.94	.	.	1.94	18.94
	FHH	1.52	4.28	.	.	.	.	.	.	1.24	4.28
	Total	1.77	9.53	5.33	5.33	18.94	18.94	.	.	1.75	18.94
Tenta	MHH	1.66	18.58	8.62	13.05	5.67	5.67	1.91	2.61	1.81	18.58
	FHH	1.79	5.65	.	.	8.44	8.44	1.63	2.96	1.77	8.44
	Total	1.72	18.58	8.62	13.05	7.06	8.44	1.80	2.96	1.79	18.58
Total	MHH	1.77	18.58	7.52	13.05	12.31	18.94	1.91	2.61	1.88	18.94
	FHH	1.69	5.65	.	.	8.44	8.44	1.63	2.96	1.57	8.44
	Total	1.75	18.58	7.52	13.05	11.02	18.94	1.80	2.96	1.77	18.94

Source: CWWE 2017/18 operational Research Report/row data

As shown above, the average produce of seed and ware potato per household in 2016/17 was 7.26 and 7.12 quintals for *Belete* and *Gudene* respectively from 0.98 quintal of seed. The average produce for the two varieties was 7.25 quintal/households. In the case of *Belete* variety, the average produce for growers in 2016/17 was 6.62 and 8.01 quintals per household for beneficiaries at Legambo and Tenta Woredas respectively. The difference in the average yield per household between the two Woredas is statistically significant at 95% degree of confidence. The minimum and maximum production per household in the first year was 0.47 and 26.11 quintal per household respectively. The wider range in production was due to crop failure as the result of frost, poor farming practices, soil and others as the detail stated in the operational research. Similarly on the second year, the maximum production/household was 18.94 quintal using 0.5 quintal of seed. The result of the measurement showed that the second year (2017/18) crop performance was poor due to poor rainfall performances. The poor performance was mainly manifested in Legambo as they planted during the *Belg* season where the rainfall performance was poor in terms of timely on set and irregularity.

The average yield per household in the 2017/18 was lower than 2016/17. According to the operational research report (additional summary generated from the row SPSS entered data), the average yield per household for *Belete* (unknown generation), *Belete* G2 and *Belete* G3 was 1.75 quintal, 7.52 quintal and 11.02 quintal per household respectively. Similarly, the production of *Gudene* variety was 1.80 quintal per household. As indicated in the operational research report, the maximum yield by lead farmers from *Belete* variety of unknown generation in 2017/18 was 18.58 quintal per 295 m² or 629.71 quintal per hectare. Such extreme production data might affect the average produce per household data where the average for *Belete* G3 yield per household in 2017/18 was 11 quintal which was higher compared to the first year

In a nutshell, the average production per household for the two varieties in 2016/17 and 2017/18 was 7.25 and 1.77 quintal per household respectively. The performance was above the baseline (zero) and below the set target (12 quintal per households). It was assumed that the project would supply a quintal of seed to harvest 12 quintals per HH. However, the seed supplied was 0.98 and 0.5 quintal which has implication on lower production per households. The production and productivity of the crop was better in the first year due to favorable weather conditions.

→ **Productivity of improved Irish potato per hectare**

Though the indicator stated in the project proposal was the level of production per households, it is imperative to assess the productivity of the crop per hectare and compare with the national and international levels to make objective judgments. In view of this, the productivity of the improved Irish potato was computed and summarized below.

Table 6 Productivity of Irish Potato by variety, year and project Woredas (quintal/ha)

Woreda	HH Category	2016/17			2017/18				
		<i>Belete</i>	<i>Gudene</i>	<i>Average</i>	<i>Belete</i>	<i>Belete</i> G2	<i>Belete</i> G3	<i>Gudene</i>	<i>Average</i>
		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Legambo	FHH	235.78	.	235.78	141.13	.	.	.	115.21
	MHH	256.26	.	256.26	154.43	237.00	422.73	.	151.31
	Total	252.27	.	252.27	151.26	237.00	422.73	.	141.70
Tenta	FHH	270.15	248.81	265.53	177.17	.	239.87	186.35	170.25
	MHH	289.14	263.78	285.94	142.08	317.86	506.67	207.26	154.09
	Total	284.51	258.08	280.55	156.89	317.86	373.27	199.22	160.86

Average	FHH	251.86	248.81	251.51	163.45	.	239.87	186.35	149.34
	MHH	271.59	263.78	271.10	149.37	290.90	464.70	207.26	152.56
	Total	267.26	258.08	266.56	153.96	290.90	389.76	199.22	151.46

Source: Projects' Operational Research Report for the year 2016/17 and 2017/18

As shown above, the productivity of the improved Irish potato was 266 quintal per hectare in 2016/17 with the average productivity of 267 and 258 quintal per hectare for *Belete* and *Gudene* variety respectively. The productivity of *Belete* variety was higher at Tenta than Legambo Woreda. The average productivity of the Woredas in 2017/18 was 151.46 quintal per hectare. The average productivity of *Belete* variety ranges from 153.96 to 389.76 quintal per hectare with significant difference among *Belete* variety generations.

The result of the operational research (annexed) showed that the productivity of the crop on followers' farmers land was comparable with lead farmers. Discussion made with the follower farmers also confirmed same findings.

The FGD participants (follower farmers) at Kara Gimba kebele of Tenta Woreda explained the production of the Irish potato on their plot comparing with their leaders as follow. "We were not targeted by the project in the first year but we noted the performance of the crop and benefit obtained by our follow farmers. We were attentively following their day to day activities and learnt a lot from them. In the second year of the project, we were targeted by the project and produced potato. Our yield was better than our front-runners as we learn a lot from their mistakes and successes. They say that wise men learn from others". They concluded.

FGD participants at Kara Gimba Kebele.

The yield and productivity of potato under FHH farm for both years and Woredas was lower compared to their MHH counterpart. The FGDs and interviews made with the beneficiaries confirmed that the Irish potato is labor intensive and wild animals including porcupines and fox are attacking the crop which resulted in yield reduction. Interviewed FHH explained that they run in short of family labor particularly those who can patrol and protect the wild animals during the night from attacks.

The productivity of the crop within the project area was compared with the national and global productivity level. According to the information obtained from Amhara Agricultural Research Institute, the national average productivity of *Gudene* and *Belete* varieties under farmers land trial is 210 and 281-338 quintal per hectare respectively. The productivity of *Belete* and *Gudene* varieties on research plot is 471.9 and 291.7 quintal per hectare respectively.

The operational research conducted by CWWE and Addet Agricultural Research Center uncovered that the average productivity of *Belete* and *Gudene* was 267 and 258 quintal per hectare in 2016/17 respectively. The report indicated that the Woreda average productivity for *Belete* variety in 2016/17 outside of the project beneficiaries was 99.3 quintal per hectare. In view of this, the recorded potato productivity under the project trail; 267 q/ha for *Belete* was close to the national on farm research result while the productivity of *Gudene* variety was higher (258 q/ha) than the national research average on farm trial. Closely observing the result of the operational research, we noted that *Gudene* was planted only in Tenta where measurements were taken on only 7.6% (n=21) of the sampled households. Such a small size sample can distort the figure which might exaggerated the performance of *Gudene* variety under the project compared to the national figure

Data collected from the project beneficiaries indicated that the 2017/18 crop performance was poor due to poor performance of the rain in the year which resulted in lower yield. Interviewed National Potato Research Coordinator explained that the potato production data of at least three consecutive years is required to judge the productivity of

the crop under the stated condition. Hence, the productivity figures stated above can show the general direction but not fully explain the production and productivity of the crop within the project area.

Closely observing the production and productivity of the improved potato within the project area, the following points have been noted.

- The pilot testing result demonstrated that the project area has untapped potential for the production of improved potato. Addet Research Center and the highest yield obtained confirmed that the temperature and the soil of the project area are suitable for the production of potato. The good performance of the crop, less occurrence of pest and diseases, high adoption rate and the translation of the production to consumption as discussed in this report was mentioned as justification.
- According to the Operational Research Report of 2016/17, the average productivity of the improved potato (*Belete*) for project non-beneficiaries was 99 quintal per hectare while the average yield from the project participants was 267 quintal per hectare. The result obtained from the project intervention was so significant.
- Though the introduction of the technology came up with positive results, some implementation impediments were identified for future action and or lessons learned. Some of the noted challenges are as follows.
 - Community discussion and the operational researches identified that frost is the leading production limiting factor within the project area. According to the 207/18 operational research result, 45.9% of the sampled households reported that frost was the primary production limiting factor. The manifestation of the frost was common at Legambo than Tenta Woreda where 30.4% and 15.5% of respondents reported respectively. It was noted that Addet Agricultural Research Center considered frost as one the research agenda and commenced working on it. Discussion with the community also uncovered that target beneficiaries are coping with the problem using different traditional practices including adjusting cropping calendar, understanding the history of the area and identifying pocketed areas along with the duration of frost occurrences and making necessary adjustments. The stated research center uses similar approaches to manage frost problem until the research came up with possible solution. The stated practices were communicated with target households as a feedback of the research by the researchers and project staff.
 - Wild animals including porcupines and foxes are the other production limiting factor within the area. Communities are using traditional measures like digging holes around the farm and patrolling during the night. It was learnt that FHH are facing serious problem as they run short of family labor to patrol particularly during the night time.
 - The improved variety of potato can be produced under *belg* and *meher* season. Accordingly, beneficiaries at Legambo cultivated the crop mainly under the *belg* while Tenta did under the *meher* season. As indicated above, the productivity of the crop was higher at Tenta and the main reason aired was the dependability of rainfall during *meher* than the *belg* season in the stated production years particularly the second year. The community explained that late onset and early withdrawal of rainfall particularly during the *belg* season affected their production.

Indicator 1.2 Percentage increase in average meal frequency (by 50% from the base line) at the end of the project life

One of the intentions of the project was to increase average meal frequency through increasing production and productivity of improved potato. In this regard, the result obtained is as depicted below.

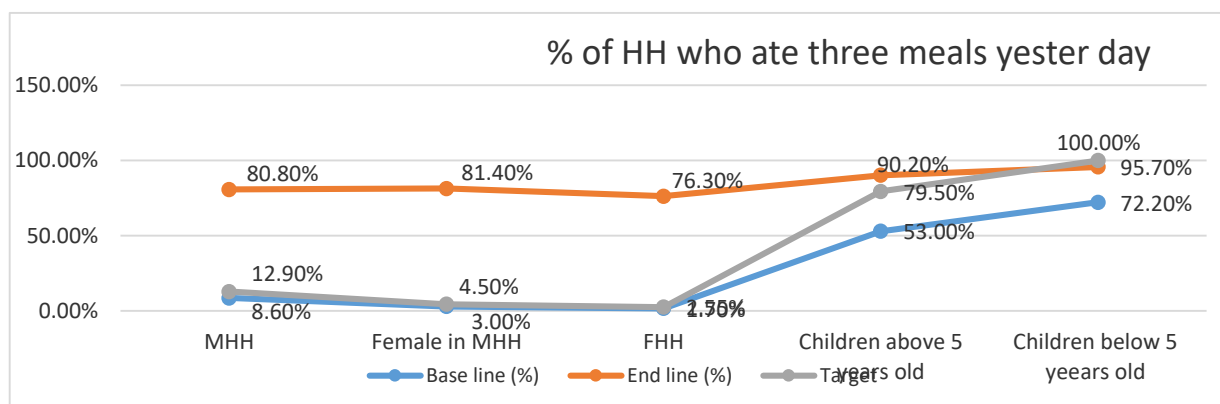


Figure 2 Percentage of households who ate three meals yesterday by category

The percentage of target households who ate three times in a day prior to the survey date increased significantly as compared to the baseline data. The increment was above the set target (50% increment over the baseline data) for all categories and the magnitude of change is statistically significant at 95% degree of confidence. The change for children below five years considered those who ate more than three as there was a significant change in the move to higher number of meals per day. The performance of the project under all cases was above the set targets.

Information collected on the production-consumption pattern of the target households showed that 23% of the total produce of the last 12 months was consumed. The proportion of potato consumed out of the produce in the two target Woredas was comparable for target Woredas; 26% and 21% for Legambo and Tenta respectively. The proportion of potato produce consumed by FHH was slightly lower compared with MHH and women and male headed households.

The FGDs and key informants interviewed confirmed that yield of potato is higher than barley, the commonly grown and staple crop in the area. Consequently, food supply to the household increased significantly which is explained in terms of increased number of meals.

Intra household category comparison shows that the proportion of FHH who ate three times was relatively lower than other groups and the finding is in line with the level of production which was lower for FHHs. The proportion of households who ate three meals was higher at Tenta than Legambo under all household categories.

W/ro Kemila Ali; 30 is a mother of four children (3 female) and living in Segno Gebeya kebele of Legambo Woreda. She explained the improvement in meal frequency as follows. "I am PSNP beneficiary and there was food shortage in my family for longer time. The meal frequency for my family member was lower and irregular. We used to reduce number of meals in addition to reducing quality of food. I was growing mainly barley before the project and its productivity was lower as compared to Irish potato. I am now the beneficiary of the project and cultivating potato. Moreover, I trained in food preparation from potato including chips and organized to group. I can now cook potato and prepare it in different forms. Consequently, the food menu of my family has increased.

My family used to eat two times before the project intervention and now we comfortably eat three times per day". She explained that without the higher production from the introduced potato variety which is the source of income and food, we would continue starving even in the good year of harvest". She thanked CWWE for the introduction of the improved potato and all support that made her life easy.

Indicator 1.3 Number of months of food gaps reduced (by at least 4 months from the baseline)

The result of the household survey, discussion and interview with the beneficiaries showed that the number of months of food gap reduced over the project period as shown below.

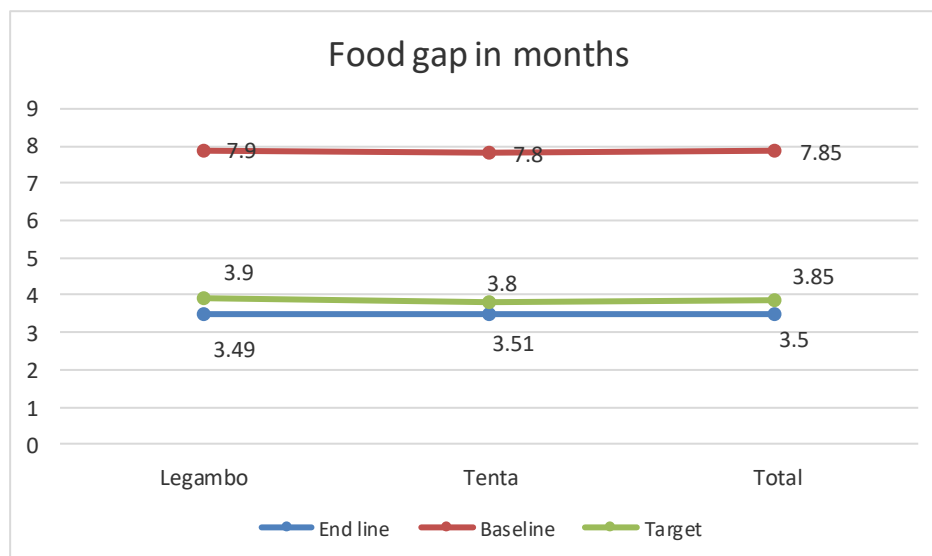


Figure 3 Number of months with food gap by Woreda

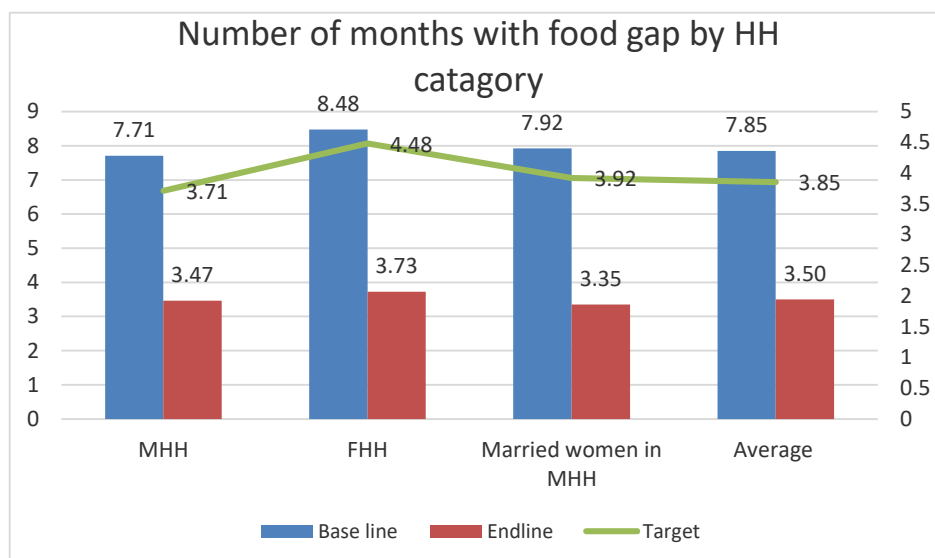


Figure 4 Number of months of food gap by household category

As indicated above, the number of months target household faced food shortage reduced over the last three years. The number of months reduced from 7.85 months (baseline) to 3.5 months at the end of the project. The reduction within the target Woredas was comparable; the food gap at Tenta reduced from 7.8 months to 3.51 months while the reduction at Legambo, was from 7.9 to 3.49 months. The reduction in duration of food shortage over the last 12 months was 4.24 months, 4, 15 and 4.57 months for MHH, FHH and women in male headed households respectively. The number of months with food gap in the last 12 months of the survey date was lower than the set target and baseline data.

The results of the operational researches, the baseline and end line survey was compared to have a detailed understanding on the trend of the food gap. The trend in the food gap showed a reduction over the first two years 2016/17 and 2017/18 with slight increment at the end of the project period (September 2018) as shown below. The poor performance of 2017/18 crop was raised as reason for such irregularity.

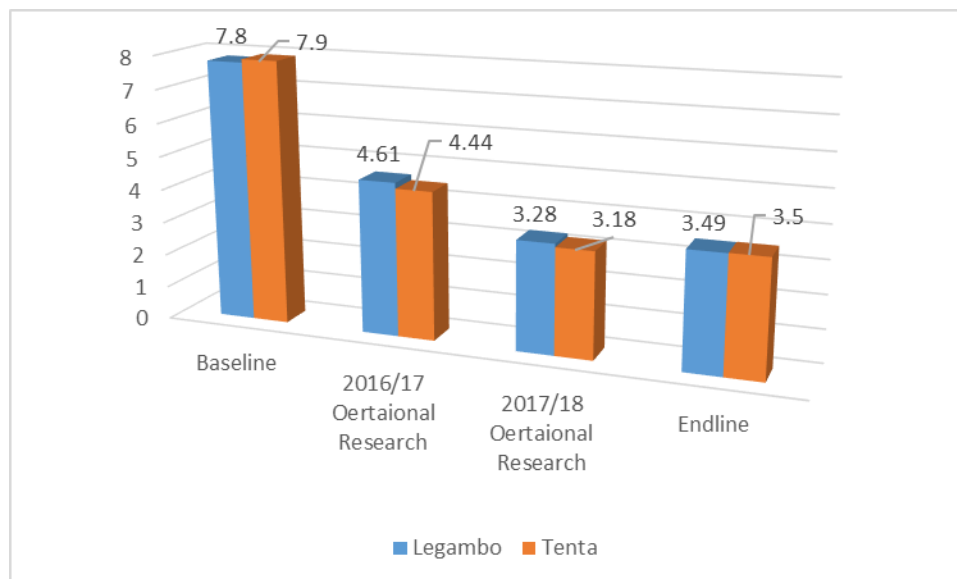


Figure 5 Number of months with food gaps over the project periods

The result of the end line survey showed that the proportion of households who faced food shortage in the last 12 months prior to survey date reduced from 99.8 % (baseline) to 81.2% (end line). The reduction was significant for male headed households and women in male headed households but marginal for FHH; from 98.4% to 96.8%.

Intra target Woredas comparison shows that the reduction was higher for Legambo [from 99.5% to 76.5%] while the reduction at Tenta was from 100% to 85.4%. The reduction in food gap except for FHH is significant at 95% degree of confidence.

The result of the survey showed that own production as sources of food increased from 37% to 47% over the project period and PSNP reduced from 30% to 21% while purchase as source of food remained same. The

increment in share of own production and reduced PSNP share is a positive step that shows improvement in self-reliance over the last three years. The increased in production and productivity of the improved potato contributed for such improvements. The survey also showed that a quarter of the product was consumed by households. Moreover, interviewed beneficiaries explained that the increased income has bridged the gap of food shortage since they purchase food items at time of shortage. The finding is as shown below.

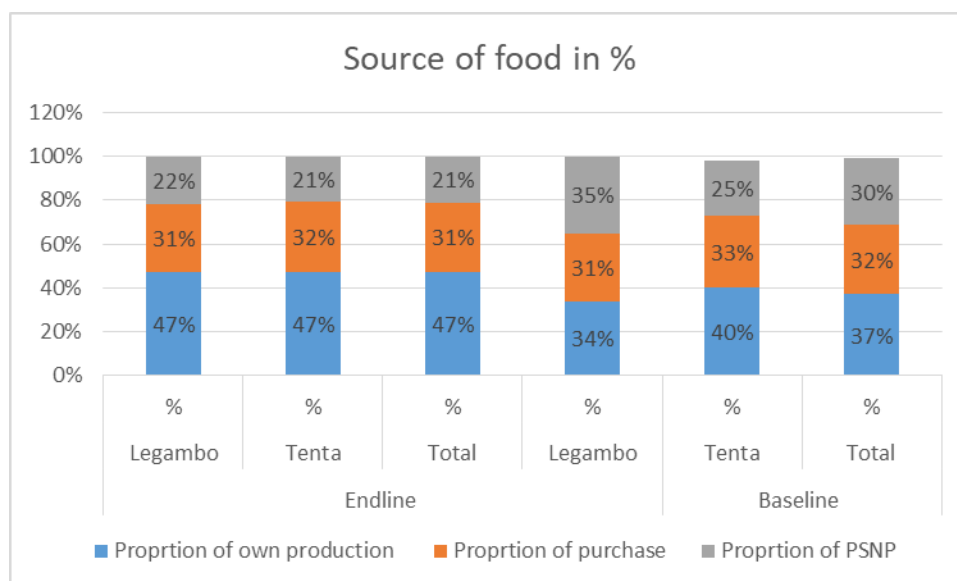


Figure 6 Source of food for HH in %

The other indicator that can show the economic changes of target households is the graduation of project beneficiaries from the PSNP program. The result of the household survey showed that the proportion of PSNP beneficiaries as of September 2018 reduced from 100% to 97.5% indicating the improvement in their economic status.

The trend in the food gap was reduced over the last 5 years compared with the baseline data. Almost all baseline survey participants reported that the food gap increased over the last 5 years preceding the survey date. On the other hand, the end line survey result showed that the proportion of household who reported for increased food gap over the last five years reduced to 16%. Similarly, 59% of the respondents responded that the gap decreased which was 0% during the baseline year. The summary is as shown below.

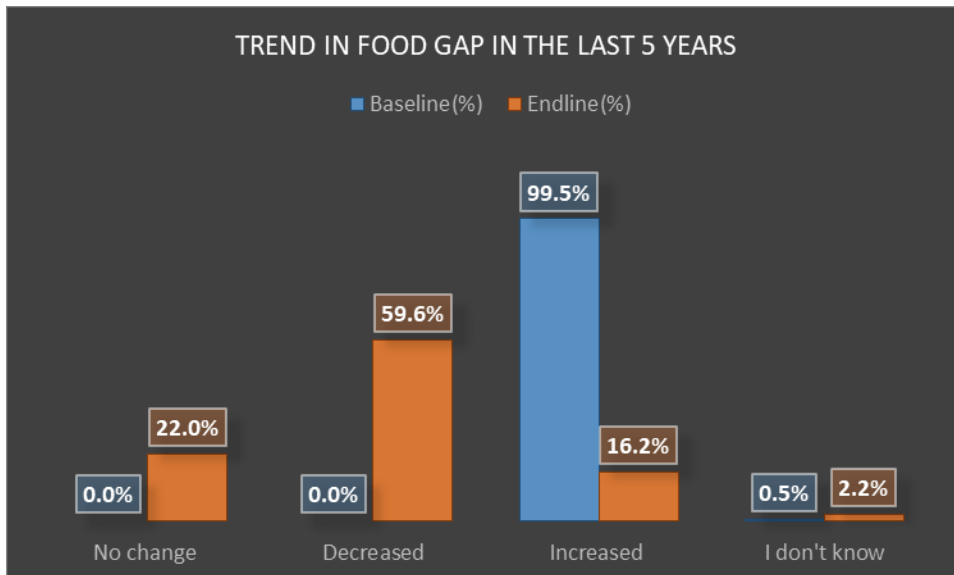


Figure:7 Trend in food gap over the last 5 years of the survey date

Discussions and interviews held with the project beneficiaries confirmed that the project contributed positively towards the reduction in the food gap mainly due to the following reasons.

- The productivity of improved potato is higher compared to the commonly growing cereal (barley) in the target area. According to Ethiopia Central Statics Authority (CSA) 2016/17 Meher production report, the national average productivity of barley was 17.76 quintal per hectare. On the other hand, the yield obtained from potato as discussed above (267 and 258 quintal/ha for *Belete* and *Gudene* varieties in 2016/17) clearly shows the improved supply of food for the household that has an impact on reducing the food gap.
- The improved potato variety is fast growing compared to other local crops mainly barley. *Belete* and *Gudene* varieties take 110 and 120 days respectively for harvest while barley takes 6 months at the project area. The fast growth and maturity of potato bridged the food gaps.
- The income generated from sale of potato is higher as compared to other crops due to better yield. The income enabled them to purchase other food items that has a positive contribution toward the reduced food gaps among project participants.
- Potato production requires small plot of land compared to other cereal crops mainly barley which is a popular crop within the project area. According to the end line survey, the average land holding is 0.69 hectare per household which is 0.74 and 0.64/HH for Legambo and Tenta respectively. Potata best fits for such small land holders than barely.

Indicator 1.4 Number of vulnerable HHs benefiting directly from USG assistance

The total number of beneficiaries served by the project was as summarized below.

Table 7 Number of HHs benefited directly from USG assistance

	Year	Legambo	Tenta	Total
1	2015/16 (Year 1)	500	500	1000
2	2016/17(Year 2)	1646	1911	3557
3	2017/18(Year 3)	620	823	1443
	Total	2766	3234	6000
	Plan	3100	2900	6000
	%	89%	112%	100%

Source: CWWE Quarter reports and project proposal

The project planned to benefit 6000 PSNP/HAB beneficiaries of which 2900 and 3100 from Tenta and Legambo respectively. Accordingly, a total of 6000 beneficiaries (2766 and 3234 from Legambo and Tenta respectively) benefited from the project. In terms of sex, 68% are male and the rest 32% are female.

The number of beneficiaries is skewed toward male though the intention of the project was to serve equal number of male and female (50%). Moreover, the enrollment of beneficiaries extended over 3 years though the plan was to recruit all in the first two years. The project was supposed to supply the seed from procured and the repaid seed from the seed revolving. But due to the increased price of the seed, the project couldn't afford to buy the amount required and supply 5000 HHs in the second year. Consequently, of the 5000 HH targeted for second year 1443 households rescheduled to third year.

Outcome 2: Irish potato seed supply system in place in the project areas

One of the expected outcomes of the project was to put the seed supply system in place within the project area. The development and implementation of QDPM/ Irish potato guideline, the percentage of project targeted households using improved variety of QDPM of potato seed and number of farmers who applied improved technology or management practices were identified as indicators to measure the outcome of the project. In this regard, the performance of the project was as discussed below.

Table 8 Summary of outcome 2- Irish potato seed supply system in place in the project areas

Indicator	Baseline data	Target	End line
Guideline/protocol on QDPM) of Irish Potato developed and implemented (by producers and coops)	No guideline in place	Put the guideline in place and implement	Guideline developed and implemented
95% of targeted HHs using improved varieties of QDPM	None	95%	93%
Number of farmers and others who have applied improved technologies or management practices as a	None		100%

result of USG assistance			
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Indicator 2.1 Guideline /protocol on QDPM/ of Irish Potato developed and properly implemented (by producers and cooperatives)

The development of QDPM for potato in Ethiopia goes back to 2012 when the manual was developed by Holeta Agricultural Research Center by a team of researchers. This manual contains standards including the good potato seed production system and internal quality control, quality declaration and the standards, inspection procedures, labels and tags, authentication and registration and communication and partnership. As a follow up of the effort, Technical Guidelines for the Inspection of Potato Quality Declared Seed Manual was developed by the Ministry of Agriculture in March 2015 which is currently in use.

The intention of the project was to develop QDPM protocols based on the national manual and standards and implement accordingly. In relation to this, the project customized the guideline and distributed it to the potato QDPM task forces. Moreover, the project developed a guideline on potato production and management in collaboration with the Addet Agricultural Research center. The guideline contains all in one document which are technical guides on potato production, management and post-harvest handling. We confirmed that the guideline is documented at kebele level and used as a reference material.

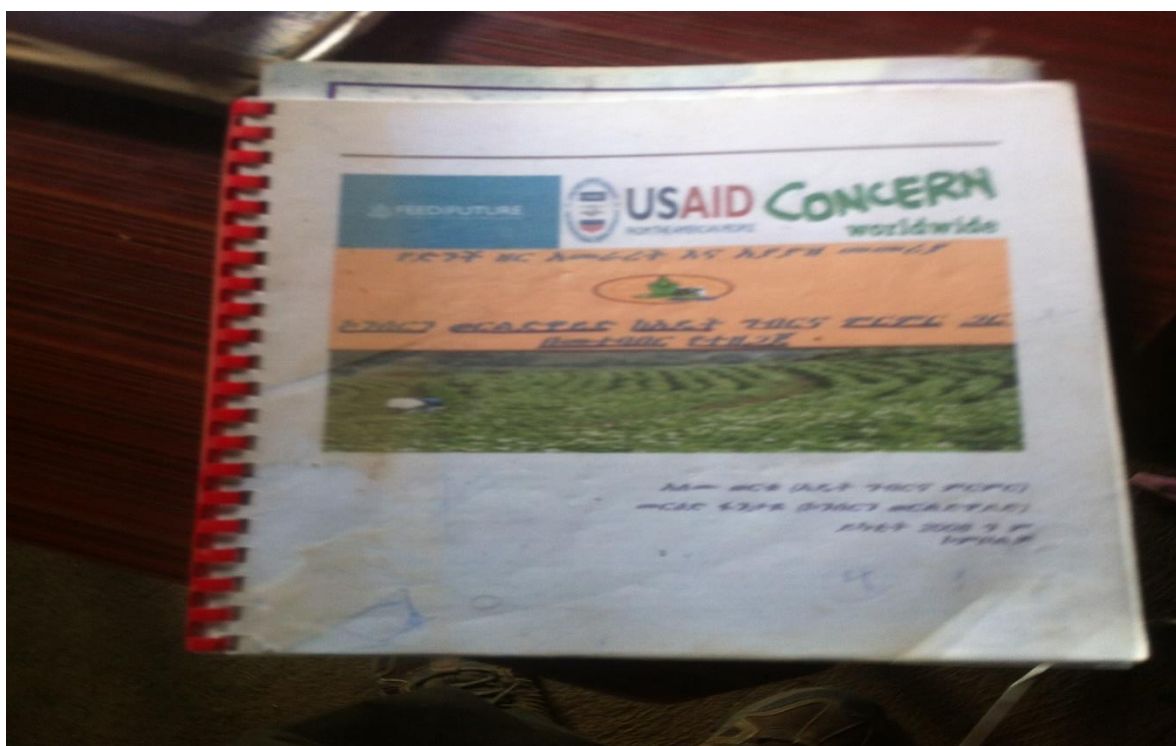


Figure 8 Guideline on potato production and management developed by CWWE and AARC

The development of the manual contributed towards maintaining the quality of the seed in the seed supply system. The task force members confirmed on the use of the guideline as a reference document during the quality inspection. Moreover, cooperative leaders are evaluating the quality of the seed with task forces and during procurements to maintain the seed quality. The household survey result showed that 13.5% of the household reported that their potato produce was rejected by cooperatives upon purchase due to inferior quality. The average amount of potato seed rejected was 109 kg which shows the application of the manual and standard by the cooperative procurement committee. The task force members also mentioned the cases when they discarded the produce from the supply system at field due to substandard operation.

Indicator 2.2 95 % of project targeted HHs using improved varieties of QDPM of potato seed

According to the Ethiopian Proclamation and Technical Guidelines for the Inspection of Potato Quality Declared Seed, producers are expected to use seed produced by a registered seed producer which conforms to the minimum standards for the crop species concerned and which has been subjected to the quality control measures. In light of this, the project supported the establishment and operation of eight Seed Potato Producing and Marketing Cooperatives in the target Woredas. The intention of the project in this regard was to supply quality declared seed for the target households in a sustainable manner. Moreover, the project assumed that the target households shall use improved variety seed supplied by the certified suppliers once the supply system is put in place and functional. In this regard, the performance of the project is as summarized below.

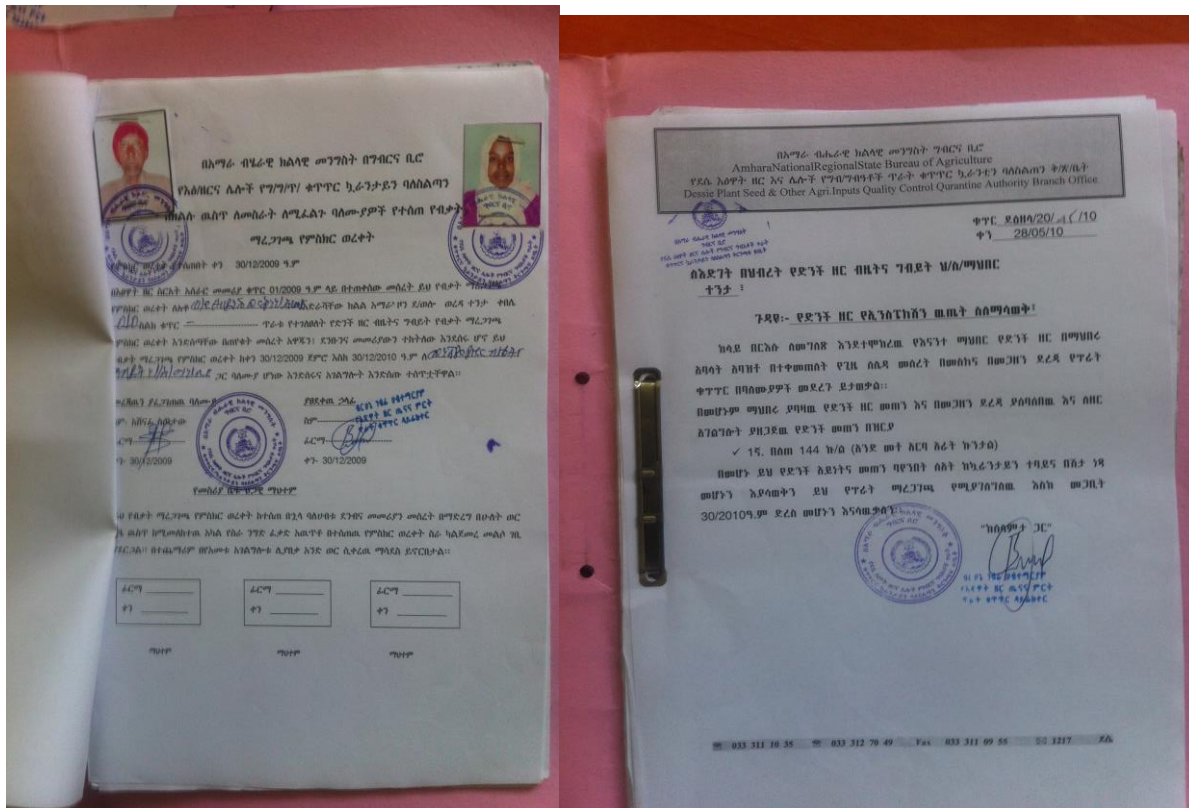
- A total of eight quality declared seed potato producer and marketing cooperatives have been established of which seven received professional competency certificates from the Ethiopian Plant Seed and Other Agricultural Input Quality Control Quarantine Authority of Dessie branch. The cooperatives collected 3068.98 quintals of certified improved seed potato in 2016/17 and 2017/18 production year in the form of loan collection and purchase. They redistributed the collected improved seed to project beneficiaries and others. Consequently, the number of households using quality seed increased as summarized below.

Table 9 Number and percentage of households used improved potato seed variety in the last 12 months

		Wereda					
		Legambo		Tenta		Total	
		Number	%	Number	%	Number	%
Have you used /improved potato seed Variety / QDPM / during <i>belg</i> ?	Yes	122	83.0%	82	43.9%	204	61.1%
	No	25	17.0%	105	56.1%	130	38.9%
	Total	147	100.0%	187	100.0%	334	100.0%
Have you used /improved potato seed variety / QDPM / during <i>meher</i> ?	Yes	12	9.1%	97	61.4%	109	37.6%
	No	120	90.9%	61	38.6%	181	62.4%
	Total	132	100.0%	158	100.0%	290	100.0%
Have you used /improved potato seed Variety / QDPM / for irrigation?	Yes	2	1.5%	1	.6%	3	1.0%
	No	130	98.5%	153	99.4%	283	99.0%
	Total	132	100.0%	154	100.0%	286	100.0%
Have you used /improved potato seed variety	Yes	132	89.8%	180	94.7%	312	92.6%

/ QDPM / either under <i>belg</i> , or <i>meher</i> or irrigation?	No	15	10.2%	10	5.3%	25	7.4%
	Total	147	100.0%	190	100.0%	337	100.0%

- As shown above, 93% of the target households used improved variety of potato either under *belg* or *meher* or irrigation cultivation. The performance was close to the set target (95%) and above the baseline (zero). There is variation among Woredas in use of the improved seed under different rainy seasons. The use of improved potato seed at Legambo was mainly under *belg* season but during *meher* at Tenta. It is noted that farmers in Tenta are producing under the *meher* season where the rain fall was relatively dependable. Due to the water logging problem HHs at Legambo are mainly depending on the *Belg* season
- The result of the survey showed that women in male headed household and MHH used the improved variety of potato better than the FHHs. Of the responded households, 100%, 92.6% and 87.3% of the women in MHH, MHHs and FHHs used improved variety of seed either during the *belg* or *meher* or through irrigation in the last 12 months prior to the survey date.
- The *Belete* variety is widely growing in both Legambo and Tenta. Of the sampled households, 83.4% and 88.4% planted *Belete* variety during the *belg* and *meher* seasons respectively. The variety is welcomed by beneficiaries due to its higher yield.
- The Seed Potato Producing and Marketing Cooperatives are the major supplier of the improved seed for the target community. According to the result of the household survey, 87% and 90% received improved seed from the cooperatives respectively which they call CWWE. The remaining households received the seed from the government; as they stated.
- The SPPMCs received professional competence certificates and are engaged in the marketing of certified potato seed. Similarly, they received approval letters from the authority based on the result of the inspection done by the task force members. This is noted as instrumental and breakthrough in terms of establishing the seed supply system in the target area.



Professional Competence Certificate Letter on result of inspection and approval for distribution
Figure 9 Sample professional competency certificate and letter

- The availability of seed at the required amount and time is one of the important precondition for the sustainable use of the technology. In this regard, interviewed cooperative management and the beneficiaries confirmed the availability of the improved seed of potato at the required amount. Rather their concern is about the availability of market for the seed they collected in the form of loan repayment and purchase. The result of the household survey is also in line with the beneficiaries' opinion. According to the household survey, 90% of the respondents confirmed that the seed is available at the required level. However, there is gap on market information and a loose link with potential buyers from the cooperative side. Hence, cooperative drag time on procurement until they received ample information on the demand while beneficiaries raised cases where potato perished in their hands while waiting for the action of the cooperatives. The producers said the potato is bulky and difficult to transport to distant areas for sale. They mentioned that selling to SPPMC is the best scenario from the perspective of distance to market, transport facilities availability and fair price.
- The affordability of the improved potato seed price is one of the areas that can determine the replicability of the technology. In this regard, beneficiaries confirmed that the seed cost is affordable as the return from cultivating the improved seed potato is paid. The household survey result is in line with this opinion where 81% said that the cost is affordable while 17.3% and 1.6% replied that the seed cost is expensive and very expensive and not affordable respectively.
- Community mentioned that the availability of seed on loan base strengthen the use of the technology, It reduces the possibility of loan diversion and ups and down to procure the improved seed.

Indicator 2.3 Number of farmers and others who have applied improved technologies or management practices as a result of USG assistance

According to the definition of indicators within the context of Feed the Future- Innovative Ethiopian Potato Activity, improved technologies are defined from the perspective of crop genetics, cultural practices, soil-related fertility and conservation, climate mitigation and adaptation, marketing and distribution, post-harvest handling and storage and other including improved physical land preparation, improved record keeping, budget and financial management and better stakeholders participation on monitoring and implementation process. In this regard, the project developed improved potato production and a management guideline and the implementation of the project was guided as per the guideline. The thematic areas listed above are majorly stated in the guideline and implemented accordingly. The scope of the definition of the improved technology management is wider and under this particular case the proportion of households who grow improved potato variety is used to measure the performance of the project. In this regard, all the beneficiaries (6000) received improved variety of potato seed at least once and hence, the proportion of beneficiaries who applied the stated technology and practice was 100%. However, there is difference in the application of the technologies and management across the beneficiaries.

Outcome 3: Enhanced income of project targeted PSNP/HABP HHs (50% women) through promoting and marketing of seed and ware potato

Indicator 1 25% increase in average annual income of 6000 targeted HHs

The base line survey report showed that none of the sampled households generated income from sale of Irish potato seed and or ware at time of the survey. Discussions had with the beneficiaries and the result of the end line household survey showed that the income of the target households increased over the project period as summarized below.

Table 11 Average income from sale of potato in Birr

HH category	Average income	Woreda		
		Legambo	Tenta	Total
		Mean	Mean	Mean
MHH	Average income from sale of seed potato	1905.71	3506.03	2773.18
	Average income from sale of Ware potato	1619.68	2386.84	1975.20
	Average income from seed and ware potato	2224.36	3502.82	2928.01
FHH	Average income from sale of seed potato	637.50	1685.71	1304.55
	Average income from sale of Ware potato	.	1266.67	1266.67
	Average income from seed and ware potato	637.50	1733.33	1396.15
Married women	Average income from sale of seed potato	852.14	2655.56	1866.56
	Average income from sale of Ware potato	1833.33	1000.00	1500.00
	Average income from sale of seed and ware potato	1273.89	2877.78	2075.83
Average	Average income from sale of seed potato	1698.25	3230.41	2544.37
	Average income from sale of Ware potato	1645.32	2131.25	1883.33
	Average income from seed and ware potato	2014.48	3260.67	2707.68

As indicated above, the average income generated from sale of potato in the last 12 months prior to the end line survey date was Birr 2,708. The average income from sale of seed and ware potato was Birr 2,544 and Birr 1,883 respectively. The level of income was higher at Tenta as compared to Legambo. The average income is higher for MHH followed by Women in MHH. As stated in the production part of this report, the yield obtained at Tenta was higher and this has been reflected in the level of income.

The result of the household survey showed that the level of income was higher for MHH followed by women in Male Headed Households. The income level of FHH under both Woredas was lower but significantly lower in Legambo. The difference in income among the different households category is statistically significant. The finding is as shown below.

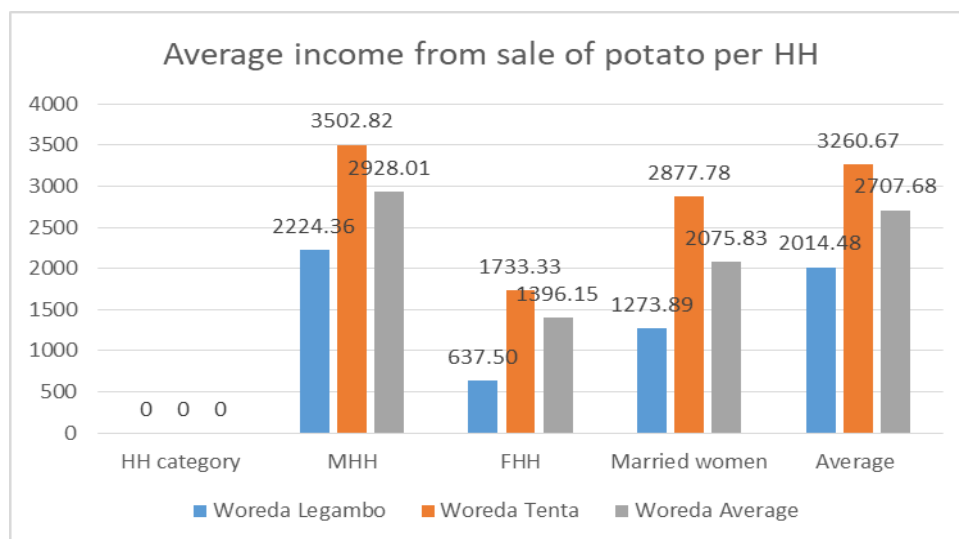


Figure 10 Total income from seed and ware potato

There is a growing interest from the beneficiaries' side to produce and sell potato as they aired in discussion and findings of the end line survey. However, the need for the seed is around planting time after some months of collection and hence the SPPMC are worried due to the delay of selling. According to the result of the structured survey, 53% of the responded households sold improved potato seed produced either under the *belg* or *meher* or irrigation in the last 12 months to the cooperatives.

Information collected from the beneficiaries was further analyzed to check whether the income generated was translated to asset building or not. In this regard, the result of the study showed that the household asset and livestock holding position of the beneficiaries have been improved over the last three years as shown below.

Table 12 Average Asset holding by Woreda

Asset	End line			Baseline			% increase		
	Woreda			Woreda			Woreda		
	Legambo	Tenta	Total	Legambo	Tenta	Total	Legambo	Tenta	Total
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Number of bed/local material	1.12	1.09	1.10	1.07	1.00	1.03	104%	109%	107%
Number of bed/improved	1.33	1.00	1.17	.	.	.			
Number of chair/local	3.20	2.00	2.43	1.00	1.24	1.21	320%	161%	201%

Number of chairs improved	3.00	4.00	3.50	12.00	1.13	2.33	25%	354%	150%
Number of table	1.40	1.25	1.33	1.00	1.00	1.00	140%	125%	133%
Number of radio/cassette	1.00	1.00	1.00	1.00	1.00	1.00	100%	100%	100%
Number of cooking equipment/posts, pan	2.53	2.74	2.64	2.58	3.03	2.81	98%	90%	94%
Number of bicycle	.	1.67	1.67	.	.	.			
Number of sewing machine	4.00	1.33	2.00	2.00	.	2.00	200%		100%
Number of tools like hoe, axe, sickle, spade	2.76	2.73	2.75	2.00	3.00	3.00	138%	91%	92%
Number of plow	1.13	1.02	1.07	1.00	1.00	1.00	113%	102%	107%
Number of animal cart	1.00	1.00	1.00	.	.	.			
Number of threshing machine	2.00	1.00	1.50	.	.	.			
Number of water pump	.	1.00	1.00	1.00	.	1.00			100%
Number of beehives-modern	2.00	.	2.00	1.00	.	1.00	200%		200%
Number of beehives-traditional	1.60	2.17	1.91	2.00	2.00	2.00	80%	108%	95%
Number of beehives-total	1.67	2.17	1.92	2.00	2.00	2.00	83%	108%	96%
Number of storage made of local materials	1.06	1.10	1.08	1.00	1.07	1.06	106%	102%	102%
Number of improved storage/tin	1.06	1.06	1.06	1.00	1.13	1.11	106%	94%	95%

Community discussions confirmed that an increase in income has been translated to increased livestock number. The finding was triangulated with the findings of the household survey and the results are in conformity. According to the result of the end line survey, the average number of livestock owned by beneficiary households has been increased as compared with the base line situation. The summary of the finding is as indicated below.

Table 13 Average livestock holding by HHs

Livestock	End line			Baseline			Difference(End-baseline)		
	Legambo	Tenta	Total	Legambo	Tenta	Total	Legambo	Tenta	Total
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Chicken	5.27	7.06	6.18	2.62	3.12	2.85	2.65	3.94	3.33
Goat	3.29	5.08	3.92	1.29	2.13	1.4	2.00	2.95	2.52
Sheep	6.32	8.47	7.26	4.3	5.07	4.62	2.02	3.40	2.64
Calf	2.27	2.44	2.33	1.1	1.06	1.08	1.17	1.38	1.25
Heifer	2.00	3.04	2.22	1.14	1.04	1.1	0.86	2.00	1.12
Cow	2.05	2.26	2.16	1.06	1.05	1.06	0.99	1.21	1.10
Ox	2.37	2.15	2.33	1.27	1.09	1.19	1.10	1.06	1.14
Bull	2.08		2.04	1.3	1.18	1.26	0.78	-1.18	0.78
Donkey	1.04	1.19	1.12	1.06	1.18	1.11	-0.02	0.01	0.01
Horse	1.22	1.15	1.19	1.08	1.05	1.07	0.14	0.10	0.12
Mule	1.05	1.00	1.03	1	1	1	0.05	0.00	0.03

Mohamed Beshir, 45 is a father of 3 children and residing in kebele 023 of Legambo Woreda. He was targeted as

lead farmer in 2015 and engaged in the production of improved potato, He explained the benefit he got from the project as follows. "I received about a quintal of improved potato seed called Belete variety in 2015 and planted on 300 m² plot of land. I harvested 10 quintal and sold 8 quintal at Birr 8,000 and bought 3 sheep and a horse at Birr 2400 and 2000 respectively. I bought food items and covered the expenses of my child education and other expenses with the income I earned. Currently, the number of sheep reached 9 and I sold 3 at Birr 2900. Consequently, availability of food for my family improved and the feeding practice of my family improved. I used to face food gap for four months. Thanks to CWWE and the government, I didn't face food shortage in the last 12 months". He concluded.

Outcome 4: Learnings and innovative solutions extracted from operational research works and joint actions promoted and implemented

One of the expected outcomes of the project was the extraction and dissemination of lessons generated from the implementation of the project. In this regard, the dissemination of operational research findings and the establishment and functionality of the platform by Irish potato value chain actors were defined as indicators. The performance of the project in this regard is as explained below.

Indicator 1 Report on operational research findings

CWWE in collaboration with the Addet Research center conducted two operational researches as per the plan in the area of improved potato yield, diseases and pest, adoption rate, food and nutrition and income.

The findings of the operational research report was reviewed. The report is to the standard and contains thematic areas stated in the project proposal. The sample size is statistically significant, the sampling method sounds and the analysis was detailed. The reports contain findings which are instrumental to promote production, productivity and utilization of the improved potato within the project area. Generally, the following major points have been noted from the operational research works.

- Two operational research reports dated February 2017 and April 2018 were produced and are available at CWWE and Addet Research Center.
- The operational research findings were presented to zone and Woreda concerned sector offices and other marketing actors.
- The findings of 2016/17 operational research was summarized and prepared in brochure. It is noted that documentation and information sharing within the government sector office is fragile and hardly institutionalized. Consequently, most of the interviewed sector offices not received or accessed to a copy of the brochure. It is also noted that the brochure containing summary of research findings was prepared in English which might not fit the capacity of some users like seed producing cooperatives and farmers.
- The operational research reports are not yet published or copies duplicated and shared with possible users. There is no clear action plan on the publication and dissemination of the finding to the larger audience. AARC explained the possibility of publishing the document as journal or proceeding though there is no clear plan on this.

Indicator 2 - Platform of Irish potato value chain actors established and functional.

One of the intentions of the project was promoting a platform consisting of potato value chain actors which include producers, the advisory service providers, researchers, traders and consumers found in South Wollo Zone. In this regard, the potato value chain study was conducted by Wollo University and the final report was produced in October 2016.

The platform was established in December 2016 and conducted its first meeting on same date. It consists of actors operating in South Wollo zone namely Wollo University, CWWE, South Wollo zone government sector offices (Agriculture, Cooperative, Trade, Dessie Plant & Other Agricultural Inputs Quality Control and Quarantine Authority Sub Office), Wollo Fruits and Vegetables Marketing Union, seed producers' cooperatives, Sirinka Agricultural Research Center and whole sales engaged in marketing of potato, potato producing farmers and Seed Potato Producing and Marketing Cooperatives..

The platform members chaired by the Zone Department of Agriculture discussed the findings of the value chain study conducted by Wollo University and identified project implementation impediments related to production and marketing of potato. Moreover, the platform members organized under two groups, selected the coordinator and shared responsibility. The South Wollo Zone Agriculture Department and Trade Office took the lead role on production and marketing aspects respectively.

The establishment of the forum is appreciable and a positive step toward bringing value chain actors on board and functioning. However, discussions had with the actors namely Woreda and zone sector offices showed that their activity was limited to a one day discussion. Interviewed platform members couldn't explain the role they played in terms of sharing finding, identify challenges, propose solution and facilitate the smooth interaction among actors. The leading offices also did not push the process forward.

3.2. Project effectiveness

The effectiveness of the project was assessed from the perspective of implementation arrangement, targeting, attaining the stated outputs, the progress in piloting, and verification of results and scaling up and dissemination of research findings and the robustness of the M&E undertaking. The major findings are as summarized below.

3.2.1. Project planning and implementation arrangement

3.2.1.1. Project planning

We had discussions with the beneficiary community, government sector offices and the implementing organization to understand the planning process. Targeted households witnessed that they were consulted about the project from the outset and their priorities were considered and implemented. Moreover, sector offices notably agriculture and cooperative at Woreda and zone level and the Addet Agriculture Research Center actively participated in the formulation and implementation of the project. Related regional bureaus reviewed the project proposal, approved and signed a memorandum of understanding for its implementation, monitoring and evaluation. CWWE signed an MoU with the Addet Agricultural Research Center on top of the agreement signed with the Bureau of Agriculture, Cooperative and Finance and Economic Development. Moreover, the project launch workshop that was conducted brought all actors on the same wave length; as explained by local government and representatives of the beneficiary community. Hence, we concluded that the planning process was participatory.

3.2.1.2. Implementation arrangement

The project was implemented in partnership with government sector offices notably Agriculture, Cooperative, Finance and Economic Development and the Addet Agriculture Research Center. The agriculture and cooperative bureaus have a structure which is stretched from the region to the kebeles. Both deployed their staff along the structure for

the implementation of the project. Moreover, other actors notably respective Woreda Health Offices, the Sirinka Agricultural Research center, Wollo University and other potato value chain actors were brought on board to platform.

The project operated as per the project agreement signed with the Bureau of Agriculture, Cooperative and Finance and Economic Development and the MoU signed with AARC. Hence, the implementation arrangement was supportive and participatory.

3.2.1.3. Targeting

Information was collected on how Woredas, kebeles and beneficiaries were targeted to assess the targeting mechanism and its effectiveness.

According to the December 2015 report of Disaster Risk Management and the Food Security Sector of the ministry of agriculture, Legambo and Tenta Woredas were food insecure and in the priority list (one and three respectively) which need timely emergency interventions.

Information collected from the Addet Agricultural Research Center showed that both Woredas are at the corridor of Sirinka, Sheno and the Addet Reach Centers and not properly addressed by research works. Moreover, the center explained that the two Woredas are within the priority research areas on potato. Accordingly, there is a plan to establish a research center within the GTPII period. The newly established Mekdella University is located within the project Woredas and there is a possibility of linking the research works with the universities. Hence, we fairly concluded that the selection of Tenta and Legambo Woredas for piloting, testing and scaling up of potato production was rational.

Interviewed Tenta and Legambo Woreda Agriculture Office staff confirmed that the target kebeles were selected based on their potential for potato production. Interviewed, beneficiaries, kebele managers, development agents and chair persons also confirmed that their respective kebeles have potential for the production of potato and hence the selection of kebeles was in line with the proposal and the implementation was rational.

Project beneficiary households were defined from the outset as PSNP beneficiaries. It is confirmed that all beneficiaries were selected from the roster of PSNP participants. Hence, no problem was noted on the selection of Woredas, kebeles and households for the implementation of the project.

3.2.2. Performance of the project toward the stated outputs

The expected outputs of the project are listed in the project proposal and the revised M&E Plan. However, we noted the differences in the list of outputs stated under the revised M&E plan and the project proposals. We also noted that quarter reports were prepared in line with the outputs stated in the project proposal. Hence, we reviewed the outputs stated under M&E plan in addition to the lists contained in the proposal to respond to different expectations. The details of the performance of the project in terms of attaining the stated outputs is annexed and the summary is presented below.

Outcome 1: Improved food and nutrition security of targeted HHs through promoting production and productivity of Irish potato

Output 1.1: 6,000 targeted HHs engaged in potato production

As part of introducing improved potato seed to the targeted households, the project procured a total of 198.5 MT (150 MT, 35.4MT and 65.1 MT in year 1, 2 and 3 respectively) which was 132% of the plan and provided to cooperatives. Moreover, 4.5 MT was donated by a member of the Board of Trustees of the Concern US office. The seed was procured from the neighboring Woreda; Dessie Zuria for the first time and then from the producers and marketing cooperatives in year 2 and 3 in line with the regional agriculture bureau directive. All the targeted households produced the seed potato at least once which is higher than the set target; 800 farmers as indicated in the revised log frame.

The production of potato was mainly under the *belg* and *meher* seasons in Legambo and Tenta Woredas respectively. Interviewed households expressed their satisfaction with their engagement in the production of potato. The result of 2017/18 operational research confirmed same where 60% and 30% of the respondents replied as satisfied and highly satisfied with the production of potato respectively. The comparative advantage of improved potato variety over their major crop notably barley in terms of yield, growth period and its role in gap filling was mentioned as some of the reason for satisfaction.

Lead farmers were trained on improved potato production practices as per the plan. Moreover, the agriculture development agents 56 % (of the planned 55) were trained on husbandry of Irish potato production. The training was facilitated by Woreda Agriculture Office, Adder ARC and CWWE. The potato production and management guideline developed by CWWE and AARC was the main document used for the training. Interviewed farmers and development agents explained their pleasure with the training which was instrumental to strengthen their knowledge base and support them with the required technical assistance.

Sixty nine farmer field days (77% of the plan) were conducted and the findings of the research and lessons were disseminated. Moreover, the field days served as a forum for cooking demonstration of potato. It is noted that the participants on cooking demonstration were male dominated (68%).

As discussed above all targeted households planted the improved potato varied introduced by the project which is 100% of the plan. On the hand, of the respondents (n=81), 32% reported the progressive increase of their farm land covered by Irish potato over the seasons (either during *belg* or *meher* or under irrigation in the last year). The performance is below the set target 70% and above the baseline as none produced the crop during the startup of the project. Beneficiaries explained that the poor crop performance in 2017/18 emanated from poor rainfall refrained them from expanding their farm land covered by potato in the last 12 months. Despite of this, 68% of the sampled households expressed their willingness to continue cultivating potato and 60% are willing to expand cultivating the crop in the future. The summary of the finding is shown below.

Table 14 Number and percentage of HH with progressive increase in seed potato farm land in the last year

	Wereda					
	Legambo		Tenta		Total	
	Yes		Yes		Yes	
	Nr	%	Nr	%	Nr	%
MHH	27	27.0%	37	39.8%	64	33.2%
FHH	2	14.3%	5	26.3%	7	21.2%

Married women	5	35.7%	5	33.3%	10	34.5%
Total	34	26.6%	47	37.0%	81	31.8%
Baseline						0%
Target						70%

Data was collected on the *area of land brought under improved technologies or management practices* as a result of USG assistance in the last 3 years. According to the project annual reports, an average land covered by a household was 275 m² and a total of 63.504 ha brought under the crop in the second year. Moreover, the average land covered by the crop in year 3 was 250m². This makes the total land brought under the potato about 127 hectare in the last three years. The reduction in quantity of seed supplied from a quintal to 0.5 in the second and third year reduced the size of land brought under potato cultivation.

Improved ways of land preparation, planting techniques (spacing between rows and plants), pests and disease control techniques and post-harvest handling system (DLS system) were major *agronomic practices introduced* by the project. The baseline survey report is silent on this as none was engaged in the production of the crop. As of the end of the project, the lead farmers acquainted with the improved agronomic practices of which 93%, 81%, 40% and 39% transferred the technology/practice namely planting techniques, land preparation, pest and disease control and post-harvest handling to their follower respectively. The detail of this is discussed under adoption of the technology part of this report.

Output 1.2 Promote Utilization of Irish Potato for Improved HH Nutrition

Train Health Extension Workers on nutrition importance of potato, food ingredients from Irish Potato and cooking demonstration in targeted kebeles were the planned interventions under this output. In relation to this, 42 HEWs and Woreda staff (120% of the target) were trained. The training was facilitated by the Woreda Health Offices and the training document was customized the Ethiopian Health and Nutrition Research Institute manual on cooking demonstration. Interviewed HEWs confirmed that the training was relevant and supplemented with practical session.

Though the training was appreciated by trainees, a challenge was faced on cascading cooking demonstration to the target households particularly in Legambo. Interviewed HEWs and Woreda health office confirmed that beneficiaries received theoretical training in Legambo. They cited lack of potato for demonstrations as the reason though it is not convincing since they can align demonstration with production season. In the case of Tenta they demonstrated cooking using the food provided by Save the Children as part of the Integrated Young Child Feeding project.

Information was collected on the consumption practice of the target households to understand the extent to which production and demonstrations translated to practices. In this regard, the proportion of households who consumed potato on daily meal increased from 4.3 %(baseline) to 72 %(end line). The performance is comparable with the set target; 75%. The level of consumption was higher in Tenta and the proportion of married women in MHH which included to their daily meal was higher compared to others. The summary is indicated below.

Table 15 Number and percentage of HH who consumed potato in their daily meal

HH category	End line						Baseline		Target
	Legambo		Tenta		Total		Total		
	Yes		Yes		Yes		Yes		
	Nr	%	Nr	%	Nr	%	Nr	%	
MHH	93	62.4%	121	81.8%	214	72.1%	13	4.5%	
FHH	15	51.7%	23	74.2%	38	63.3%	2	3.3%	
Married women	14	82.4%	17	94.4%	31	88.6%	2	4.2%	
Total	122	62.6%	161	81.7%	283	72.2%	17	4.3%	75%

Generally, the intervention was appropriate as it promotes utilization of potato which shall result in improved household nutrition. However, the possibility of availing demonstration materials and covering nominal running cost and or aligning demonstrations with the harvest season should be considered for effective implementation of this intervention.

Outcome 2: Irish potato seed supply system in place in the project areas

Output 2.1 Seed Potato Producers and Marketing Cooperatives (SPPMC) established and operational

Putting the potato seed supply system in place and functioning was one of the prime purposes of the project. In relation to this, the project supported the establishment of 8 seed producing and marketing cooperatives, two task forces and the construction of 8 Defused Light Store (DLS). The result of the evaluation showed that the project was successful in putting the seed supply system in place which is a role model for the zone. The detail is as discussed below.

- A total of eight potato seed producers and marketing cooperatives are established and functioning. The care taken in pairing kebeles as per their geographical proxy and physical accessibility is appreciable for smooth flow of produce to the ware houses. All cooperatives are registered at Zone Cooperative Bureau and seven received certificates to operate the improved potato seed marketing. Discussion made with zone sector offices uncovered that the potato seed supply system introduced by CWWE is the first in its kind for the zone though CWWE did similar task at Dessie Zuria and Delanta. They mentioned the existence of seed supply system for wheat, Teff and Sorghum while that of Potato was introduced by CWWE. It is noted that potato is bulky and the transportation and storage is difficult which makes the potato seed supply system cumbersome. The establishment of SPPMC and associated capacity buildings are the center of gravity for the installation and operation of the potato seed supply system.

Legambo and Tenta Woreda Agriculture offices explained the potato seed supply system as follows." We were supplying improved seed potato to the households in our Woredas. The farmers are producing the seed and ware potato but the seed never revolved since there was no system for the collection and distribution of improved seed before the establishment of the seed producers and marketing cooperatives. The seed distributed for a household in past remained within the same household till its productivity exhaust. The establishment of seed producers and marketing cooperative is a step toward sustainable seed supply in our Woredas which was not the case before".

→ The membership outreach of the cooperatives increased from 582 in 2016 to 761 by 2018 with better increment at Tenta project area. All beneficiaries (6000) were supposed to be the member of cooperative while most are not a member. Asked about the reason why they are not be a member of the cooperative, 30% said that we haven't seen members benefit out of the membership and 13% reported that the cooperative does not encourage others to become a member while 33% have no reason. Discussion had with the community also indicated that the failure of the 2017/18 *belg* production in Legambo refrained most households from registration. Some cited the par value of share (Birr 120) as costly to pay at a time and become a member of the cooperative.

Table 16 Number of members of the SPPMC

		Year 1			End of year 3			% increase in members
Woreda	Name of the Cooperative	Member of cooperative			Member of cooperative			
		Male	Female	Total	Male	Female	Total	
Tenta	Edget-Behibiret	76	25	101	110	40	150	149%
	Amechachi	87	29	116	83	28	111	96%
	Ababoru	32	10	42	65	35	100	238%
	Meneshaye	41	14	55	70	40	110	200%
Legambo	Sada-Kurkura	37	13	50	37	13	50	100%
	Segno-Gebeya	48	16	64	56	20	76	119%
	Antot	56	19	75	68	17	85	113%
	Teradi	60	19	79	55	24	79	100%
Total		437	145	582	544	217	761	131%

→ The target of the project was that the SPPMC shall collect and supply 200 metric ton of certified improved potato seed variety to producers within and outside of the project areas. In this regard, the 8 cooperatives collected 306.9 MT (153% of the target) of certified seed and supplied to the producers within and outside of the target Woredas. Despite of this excess supply, there is ample demand for the certified seed from producers within the Woreda and neighboring woredas and zones. The summary is as shown below.

Table 17 Certified potato seed collected and supplied by SPPMC

S.N	Woreda/ Name of cooperatives	2015/16			2016/17			Total			
		Quantity	farmers that sold seed		Quantity	Farmers that sold seed		Quantity	Farmers that sold seed		
		(MT)	M	F	(MT)	M	F	(MT)	M	F	Total
	Legambo										
1	Sada Kurikura	20	25	20	2.2	38	7	22.2	63	27	90
2	Terad	33.4	29	6	9.546	117	52	42.95	146	58	204
3	Gimba	26	45	20	4.8	74	25	30.8	119	45	164
4	Antot	15.8	13	0	8.03	160	130	23.83	173	130	303
Total Legambo		95.2	112	46	24.58	389	214	119.8	501	260	761
	Tenta										
5	Amechach	26.4	32	6	4.35	67	32	30.75	99	38	137

6	Ediget-Behibiret	43.6	52	10	14.32	196	72	57.92	248	82	330
7	Ababoru-Meda	20.5	23	18	10.18	147	50	30.68	170	68	238
8	Meneshaye	45.7	30	16	22.08	161	128	67.78	191	144	335
Total Tenta		136.2	137	50	50.92	571	282	187.1	708	332	1040
Grand total		231.4	249	96	75.5	960	496	306.9	1209	592	1801
Target								200.0			
Baseline								0			

Source: Quarter and annual reports of the project

- The availability of seed and ware potato in the local market for at least four months around the local markets was one of the targets of the project. In this regard, discussion participants confirmed the availability of potato for more than 4 months. The result of the household survey is also in line with this where 90% of the sampled households reported the availability of potato at the required time. .
- Task forces mandated for monitoring and approving Quality Declared Planting Material (QDPM) were established at Legambo and Tenata Woredas and functioning. The task force members are representatives from respective Woreda Agriculture, Cooperative, Health, Finance and Economic Development and Trade offices. There is a task force at zone level consisting of South Wollo Zone Agriculture, Cooperative and Trade Departments. Woreda and zone task forces are working jointly and all task forces are led by respective Agriculture Offices. The MoU was signed among task force members namely CWWE, Zone Agriculture containing Kombolcha Plant Clinic and Dessie Plant Seed and other Agricultural Input Quality Control Quarantine Authority Branch Office, Zone and Woredas Cooperative Promotion Offices and Health Offices. Closely reviewing the task forces, the following have been noted.
 - The task forces are functional. They are regularly inspecting seed quality and monitoring the performance of the crop three times per session; during vegetative, flowering and post-harvest stages. According to the Ethiopia Technical Guide on the Inspection of Potato Quality Declared Planting Material, authorized seed inspectors should carry out the seed inspection on a minimum of 10 per cent of the fields under QDS production. Under this case, the sample coverage of the taskforce (which was about five plots) was minimal compared to the set standard.
 - The involvement of task members in the monitoring of the seed quality varies across the board. The involvement of Agriculture, Cooperative and Finance and Economic Development offices at all levels was significant. On the other hand, the involvement of Trade Office at both zone and Woreda level was passive. The thought of the task force members was that Woreda cooperative office marketing section/experts can handle the responsibility of linking market actors with the SPPMc. However, we noted that the effort made by both Woreda cooperative offices in promoting marketing and networking with actors was minimal. Moreover, there is a section in Trade Office availing market information and networking. The crop marketing section of Trade Office collect, compile, store and disseminate market information to users. Moreover, they link actors' which are engaged in production, processing and marketing of pulses, cereals, vegetables and fruits and spices and oil crops. The offices explained their willingness to support the cooperatives for the future.
 - The result of the evaluation showed that the task force is playing a key role in terms of ensuring the quality of seed and sustainability of the seed supply system. Moreover, it was noted that CWWE played the lead role in motivating and initiating the task force meetings and monitoring. With the withdrawal of CWWE, there is a fear that the task force might lose its momentum.

- Though trainings and experience sharing visits were made by SPPMC leaders, still the capacity of the cooperative is lower and needs subsequent supports. They have no office, working documents and vouchers are in the hands of individuals, their technical knowhow on book keeping and accounting, management and the like is limited.
- A total of eight DLS with the capacity of 30 MT were constructed and in use by Seed Potato Producers and Marketing cooperatives. Each SPPM Cooperative received seed capital amounting to USD 19,352 as a grant, committee of the cooperatives trained and made experience sharing visit to Dessie Zuria Woreda as per the plan. They confirmed that the training and visit was supportive to discharge their duties.
- It was noted that the DLSs were not formally handed over to the cooperatives and the grant fund not acknowledged. On the other hand, six model farmers were selected per kebele and were provided industrial material (corrugated iron sheet) for the construction of store at household level. However, of the responded households 39% and 33% stored the seed potato produced under the belg and meher season respectively at their house.
- The practice of storing ware potato is not common among the program participants. Of the sampled households, 7% and 5% of households who produced ware potato under belg and meher season in the last 12 months stored the ware potato.
- Storage made of up local materials is the major type in the project area. Of the sampled households 89% and 93% of the producers under *belg* and *meher* use storage made up of local material. The rest 6% and 8% stored the potato in the soil. In the case of belg produce, 5% stored in the storage made up of modern materials. Availability of local materials, cost of modern materials and low level of community awareness or appreciation about the store was raised as a major reason for not constructing the store.

Outcome 3: Enhanced income of targeted PSNP/HABP HHs (50% Women) through promoting and marketing of seed and ware potato

Output 3.1 Increased quantity of ware potato and seed potato supplied to market

As part of increasing the supply of ware and seed potato to the market, the project planned to link seed potato producing cooperatives with potential buyers, promote market for ware and seed potato using local FM radio, circulate brochures which indicate the location and source supply of ware and seed potato, train women on the business of potato processing and techniques operating frying equipment and provide frying equipment for trained women. The result of the review of this component is as summarized below.

- ***Link seed producing cooperatives with potential seed potato buyers***

Discussions had and documents reviewed showed that the value chain study was conducted. The potential value chain actors identified in the report conducted a meeting with the intent of establishing linkages among them. However, no subsequent action was made in terms of connecting the cooperatives with buyers and other actors. The good thing we noted was the growing demand for improved potato seed within the zone and target and neighboring Woredas. The Tenta Agriculture Office, World Vision Ethiopia, Kelala Agriculture Office and CWWE bought 70 MT at the cost one million birr in 2016/17 which can be mentioned as an example. Despite of such self-initiated demands, interviewed seed producers and marketing cooperative raised market linkage as a gray area which can possibly erode their confidence on marketing of the seed unless and otherwise reversed.

- ***Market promotion for ware and seed potato using local FM radio station***

The result of the survey showed that Dessie FM radio station transmitted the program for 40 minutes in two days in 2017/18 though the plan was to transmit the program for 12 months which was four months per year. Some of the interviewed key informants and FGD participants confirmed hearing the program which was transmitted from 10:00 AM to 1:00 PM.

The transmission of key messages on improved potato production and management is appreciable from the perspective of reaching wider listeners'. However, it was noted that the cost of transmission was higher and the time selected was working hours particularly for farmers.

- **Affordability of the improved seed**

The availability of improved seed for the growers was checked. According to the results of the structured survey, 90% confirmed the availability of the improved seed as required while the rest 10% declined. In relation to the cost of improved seed, 81% responded that the cost is affordable while 17% reported that the seed is expensive. The finding shows that the seed supplied is affordable to the majority of the beneficiaries.

- **Circulation of brochures about the location and source supply of ware and seed potato**

As part of promoting potato production and marketing, the project intended to develop and circulate brochures about the location and supply sources of ware and seed potato. In this regard, the project developed brochures on potato disease and pest control, potato benefits and food preparation, potato production and management, the humble of potato- perspective of livelihood winning crop highlanders and on cross cutting issues namely Gender and HIV and AIDS. The brochures were distributed to kebele offices, beneficiary community and implementing partners. Some of the brochures have been posted at kebele head quarter while some are in the hands of beneficiaries.

Project participants were asked whether they had information about market for seed potato along with its sources. The result of the household survey showed that 74% of the sampled household [61% and 82% at Tenta and Legambo) got market information about potato in the last 12 months of the survey date. Of those who received market information, SPPMC was the source of market information for 72% of the farmers. The rest 27% heard the information from cooperative office and local traders. The finding shows that producers have some information about the market.



Figure 11 Broacher's posted at Kebele 13 head quarter and on hands of kebele 08 beneficiaries, Tenta Woreda

- **Train women on the business of potato processing and techniques operating frying equipment and provision of the equipment**

The result of the evaluation uncovered that a total of 6 women groups (three per Woreda) consisting of 5 women each were organized and six frying equipment were provided. Of the six groups, FGD was done with two groups and members of other groups participated in other two mixed group FGDs. From the discussion and observation we noted that the women group at Tenta(3) are operating while none of Legambo's has been engaged in the business so far. Different reasons was raised including lack of market for the chips, high running cost and loose bondage among group members to work as a team. We noted the following points.

Women Group at Tenta demonstrated the possibility of operating the business and generating income though there are challenges which are affecting their business like the cost of inputs notably oil, workplace (rent) and power.

Nigat Chips producing group is organized in Ababoru Kebele of Tenta Woreda by 5 interested women to run the business. The group received training, frying equipment and associated accessories from the project. They are preparing and selling chips, asambussa, and spaghetti to the local community. They rented in a room within the village at Birr 170/month. They prepare the stated foods and sale their two days in weeks in their village. Their average income per day was Birr 70 which was Birr 560/month or Birr 6,720 per year. On top of the income, the business created job opportunity for members and enhanced their social bondage. They expressed their business as better but facing challenge due to increased price of oil and flour which might affected their business in the future



Figure12 : Nigat Chips producing groups with the donated equipment and accessraies

Outcome 4: Learnings and innovative solutions from operational research works and joint actions promoted and implemented

As discussed above, the project conducted two operational researches in collaboration with Addet Agricultural Research center and support the establishment of potato value chain actors' platform though the effort was limited to the establishment. The other outputs achieved under this outcome include the following.

- Five case stories on innovative potato project developed as a brochure and distributed to different users including government sector offices and private actors engaged in production and marketing of potato.
- Three case studies developed and presented as part of the two operational reports.
- One innovation which was the introduction of improved variety of potato supported through USG assistance

3.2.3. Monitoring, evaluation and learning

The result of the evaluation confirmed that CWWE developed a log frame along with the definition of each indicator, baseline data established and project launch workshop conducted. As per the M&E plan this final evaluation was also conducted. The issue we noted was the alignment of output indicators along with the proposed outputs stated in the proposal.

CWWE has the organizational structure which is stretched from the national office to kebele level development agents. The national office is staffed with qualified personnel including the program Director, Livelihood Senior Officer, M&E coordinator, M&E Officer and other technical personnel who played a key role through technical back stopping and conducting enhanced monitoring. The North Area Coordination Office monitored project activities with its staff. The project technical officer was also recruited as per the approval of USAID and stationed close to the project area (Guguftu) sub branch and participated in M&E undertaking on top of technical support. The project was staffed with 10 front line development agents stationed at kebele level. It was noted that the geographical area coverage for Development Agents (one DA for two kebeles) found wider to be covered by a single development agent.

The signatory sector offices (Agriculture, Cooperative and Finance and Economic Development) confirmed that they conducted joint monitoring and shared the findings with task forces for implementation. Moreover, no complaint heard on quarter and annual reports as CWWE submitted reports to regional bureaus with copy to zone and Woreda respective offices. Interviewed USAID staff (focal person) also explained the satisfaction of his office with the project performance in terms of the selection of the technology, implementation and the results obtained. The only concern raised from his side was noncompliance on timing of financial report submission which was late in most cases.

3.2.4. Review of technical application and its phases

The project was implemented in three phases; initial piloting and testing, refining and preparing for scale-up', and 'full scale up and each phase has its own purpose, timeframe and budget. The technical application research was implemented in collaboration with the Addet Agricultural Research Center and guided by the Memorandum of Understanding signed between AARC and CWWE in February 2016. The performance of the project in this regard was reviewed and the result is as summarized below.

The piloting phase of the project was centered on five thematic areas namely yield, diseases and pest occurrence, adoption rate in technology and improved practices, food and nutrition and income. As stated above, the pilot test was conducted on the thematic areas and two operational researches were conducted and findings were communicated with the audience; though the level of dissemination was limited. The result of the pilot test showed that the piloted variety of potato; *Belete* and *Jalene* performed better where the yield obtained was close to the national and above Woreda Average. Moreover, the operation research result indicated that the occurrence of

diseases and pest was minimum and at the acceptable level. As discussed in this report, the food gap among project participants reduced and frequency of having meal by households and income increased. The major limitation observed on the piloting and testing phase was the duration of the project to make objective judgments. According to the information obtained from AARC, three years yield is required to conclude about the production and productivity of the piloted varieties under this particular case. However, the project life was three years and yield was measured for two years which limits the objective judgments. Similarly, 3-5 years testing is required to conclude about the adoption rate of the technology while the test was done for three years.

The intended implication of pilot testing has been well addressed. Beneficiaries trained in technical application of the technology, DLS constructed and are in use, seed producing and marketing cooperatives established and functioning, availability of food to households improved and income level increased. Moreover, asset holding of the beneficiaries improved and the vulnerable segment of the target population served.

According to our judgment, the assumptions stated under the piloting and testing have been proved. The potato improved seed supply system which was never tested in the zone except by CWWE at Dessie Zuria and Delanta, introduced and operating (assumption one), expertise in agriculture such as sector development offices, Addet research center, CWWE and other stakeholders worked together with poor farmers, selected improved varieties of potato, introduced the technologies and provided the advisory services which resulted in improved food and nutrition security of the beneficiaries as explained in the results using the indicators related to income, food gap and consumption and others discussed in this report (assumption 2). Moreover, productive assets of the poor household built as explained by increased livestock and household assets as the result of adopting the technology to increase productivity and improve access to market by putting infrastructure in place and capacity building (assumption 3).

The second phase of the technical application was **refinement and preparation for scale-up** under which the methodology and tools refined, gray areas from the first operational research retested and the performance of the project in relation to thematic areas like yield retested. Under this phase, it is confirmed that the implementation of the project was guided by the findings from the first operation research. According to the result of the operational research, the performance of the yield, adoption of the technology and the changes was significant. Accordingly, the project provided advisory service for both lead and follower farmers with more attention on agronomic practice notably land preparation, planting, management and post-harvest handling, how to manage the challenges identified in the first year research which include frost and wild animals. The lessons from the piloting phase of the project was incorporated to the training curricula and findings disseminated on meetings and the brochures though the intensity of information dissemination was limited. The limitation of the operational research under this case was the scope of the study. Though the operational research was supposed to respond to nine research questions, the work related to SPPMC capacity assessment, the demand and supply capacity of cooperative and market linkage assessment for future scaling up were overlooked in the report.

The third stage was **full scale up** focused on consolidating the research findings of phase I and II, articulate and stipulate the findings to action guide document, and bring the findings to public validation in the sort of public journal through leveled and diversified validation forums. The prime responsibility of managing this phase was devoted to AARC. In this regard, the result of the operational research was validated by concerned stakeholders through a workshop setting and summary of finding from the first operational research prepared in broacher (English) and distributed. The operational research report was neither published as public journal nor proceeding. Moreover, the anticipated action guide document was not developed. We also noted that documentation and information sharing

within the government sector offices is poor as witnessed by newly joined task force members that lack information about the project.

3.2.5. Farmers adoption towards the introduced innovations and technologies

The implementation of the project was based on three interrelated strategies; piloting and testing, verification and scale up and dissemination of innovations. One of the three assumption under piloting and testing phase was the adoption of smart agriculture practice to improve production, marketing and finally improve the food security and income which will eventually builds productive asset base of the poor households. In this regard, improvement in asset holding, income and food security has been recorded as discussed under the outcome section of this report.

The other important aspect of the project that should not be overlooked is the adoption of the technology by the target households. It is known that adoption of technology is a change in attitude and practice that takes times. Information related to adaptation of the introduced crop namely potato was collected and the finding is as presented below.

Respondent's prior experience in production of potato

Both Woreda Agriculture Offices were supplying improved potato seed before the project implementation though none of the sampled household during the baseline reported prior experience in improved potato production. The result of the end line survey showed that 73% of the sampled households have a maximum of 4 years of experience in the production of potato and 19% don't have any experience while only 8% of the sampled households had 5 and above years of experience in the production of potato. The result showed that potato is the newly introduced crop to the target households particularly by the project.

Comparison of the prior experience among household categories showed that FHH had limited experience than MHH and Women in male headed households. Of the sampled MHH, FHH and women in MHH 29%, 41% and 21% had 1-2 years of experience on the production of potato. On the other hand, 8%, 4% and 12% of MHH, FHH and women in MHH had more than 5 years of experience in the production of potato.

Table 18 Number of year's households engaged in the production of potato

How long experience did you have in the production of potato of your own and improved varieties other than this cropping year?	Year	Wereda					
		Legambo		Tenta		Total	
		No	%	No	%	No	%
1-2 years		56	36.6%	41	24.4%	97	30.2%
3-4 years		55	35.9%	83	49.4%	138	43.0%
5-6 years		9	5.9%	6	3.6%	15	4.7%
More than 6 years		10	6.5%	1	.6%	11	3.4%
I didn't have any experience before		23	15.0%	37	22.0%	60	18.7%
I only have some experience for ware potato, using my own and improved varieties		0	.0%	0	.0%	0	.0%
Total		153	100.0%	168	100.0%	321	100.0%

Source: Project end line survey

According to the discussion made with the beneficiaries and household survey, the project supported the introduction of the technology to the area. The summary is indicated below.

Table 19 Number and percentage of households supported by the project on the introduction of innovative practices

		Wereda					
		Legambo		Tenta		Total	
		Nr	%	Nr	%	Nr	%
Introducing new seed variety	Yes	129	89.6%	142	100.0%	271	94.8%
Improved ways of land preparation	Yes	97	67.4%	112	83.0%	209	74.9%
Planting techniques (spacing between rows and plants)	Yes	118	81.9%	135	96.4%	253	89.1%
Pests and disease control techniques	Yes	34	23.6%	45	43.3%	79	31.9%
Introduction of seed supply system through producers and marketing cooperatives	Yes	47	32.6%	63	58.9%	110	43.8%
Food processing as income generation (by women groups)	Yes	23	16.0%	21	29.6%	44	20.5%
I didn't receive any support	Yes	8	5.6%	1	1.4%	9	4.2%
I can't say anything	Yes	3	2.1%	3	4.2%	6	2.8%

Source: Project end line survey

The result of the survey showed that the introduction of the improved variety of seed, planting techniques, pest and disease control and land preparation were major innovative practices introduced by the project. Discussion made with the community confirmed that the project introduced the improved variety of potato and they received support from the development agent hired by CWWE and respective Woreda Agriculture Offices. Moreover, they conformed that they were trained by CWWE, respective agriculture office experts and Addet Agricultural Research Center researchers. It is also noted that the findings of the operational research on the introduction and adoption of the technologies were included to the training topics. Planting techniques, adjusting cropping calendar, mapping frost pocket area and techniques on disease and pest control were some of the points included to the training topics based on the research findings.

Adoption/duration

One of the assumptions under the introduction of the technology is that target households adopt the technology which will finally be reflected in their food and nutrition security. Adoption as the concept is wider in scope. The adoption theory assumes that there are multiple influencing factors responsible for the decision of the producer which might include the producers' knowledge and awareness of the commodity, his acceptance of innovation, as well as experience in producing such products. In light of this the analysis made here is just to capture their opinion about the acceptance of the technology and put in to action.

The project provided seed potato to targeted HHs right at the planting time and all HHs who received the seed had planted it. There was no resistance on the use of the seed supplied by the project target HHs. Information was collected from the HH to understand, the duration taken to adopt the improved variety and the result of the survey showed that almost all (98%) lead farmers adopted the technology in less than a year time. Interviewed follower farmers explained the same, that it took only one season to be convinced and start production.

Willingness to continue planting potato

The continued application of the technology is important for the sustainability of the project outcomes. In this regard, 68% of the sampled households expressed their willingness to continue planting potato for the future. The level of willingness is higher for MHH (72%) followed by Women in MHH (67%) and FHH 51%. Asked about the reasons for the continuation of plating the crop, 79% and 72% argue for the contribution of potato to reduce food gap and increase income respectively. About half of the sampled households cited better yield as major factor for the continuation of planting potato.

Table 20 Reason for continue planting Irish potato

Reasons		To what category of HHs does the HH belong?(							
		MHH		FHH		Married women		Total	
		No	%	No	%	No	%	No	%
I have better yield and enabled me to store some seed for this or the upcoming cropping season	Yes	77	52.0%	8	44.4%	8	47.1%	93	50.8%
	No	71	48.0%	10	55.6%	9	52.9%	90	49.2%
I have good private storage	Yes	27	18.6%	2	11.8%	1	7.7%	30	17.1%
	No	118	81.4%	15	88.2%	12	92.3%	145	82.9%
I have good income	Yes	120	73.2%	15	75.0%	11	61.1%	146	72.3%
	No	44	26.8%	5	25.0%	7	38.9%	56	27.7%
Helps me to minimize food gap	Yes	130	76.9%	22	88.0%	19	86.4%	171	79.2%
	No	39	23.1%	3	12.0%	3	13.6%	45	20.8%
Other	Yes	7	5.3%	1	5.9%	1	7.7%	9	5.6%
	No	125	94.7%	16	94.1%	12	92.3%	153	94.4%

Source; Project end line survey

Information was also collected on the willingness of the beneficiary households to expand Irish potato cultivation for the upcoming season as the result summarized below.

Table 21 Number and percentage of households willing to expand cultivating Irish Potato in the upcoming seasons

HH category		Wereda					
		Legambo		Tenta		Total	
		Nr	%	Nr	%	Nr	%
MHH	Yes	74	58.7%	90	67.7%	164	63.3%
FHH	Yes	2	8.3%	19	65.5%	21	39.6%
Married women	Yes	10	62.5%	12	70.6%	22	66.7%
Total	Yes	86	51.8%	121	67.6%	207	60.0%

Source; Project end line survey

The result showed that 60% are willing to expand the cultivation of the Irish potato for the upcoming seasons. The willingness to expand cultivation was higher for women in MHH and MHH but lower for FHH. Interviewed FHH explained that cultivation of the potato is labor intensive which is cumbersome for them. Moreover, one should

protect the crop from wild animals attack particularly during the night which is difficult for FHH. Furthermore, the poor performance of the 2017/18 rain refrained some households from expanding cultivation of the crop.

Additional information on the reason behind for their interest to expand cultivation was collected and analyzed. The result of the survey showed that filling food gap and increased income are the major reasons for the expansion of the cultivation in both Woredas and across the household categories. The reasoning as increased income and fill food gap is profoundly reported by FHH than others. The result showed that frost and problems of wild animals are major problem affecting the expansion of the cultivation. The result is as summarized below.

Table 22 Reason for expanding cultivation of Irish Potato in the upcoming seasons

Reason for expanding cultivation		Wereda					
		Legambo		Tenta		Total	
		Nr	%	Nr	%	Nr	%
I have enough seed stored	Yes	25	29.8%	52	68.4%	77	48.1%
I have enough land for expansion	Yes	28	33.3%	33	44.0%	61	38.4%
I don't have enough land, but try to expand by renting from other	Yes	2	2.4%	10	16.9%	12	8.4%
I don't have enough land, but try to increase my productivity from that limited land	Yes	12	14.3%	7	11.5%	19	13.1%
I do because of no frost problem	Yes	0	.0%	0	.0%	0	.0%
I do because of no or managed porcupines and foxes problems	Yes	1	1.2%	0	.0%	1	.7%
I do because I have got good income	Yes	39	46.4%	63	67.7%	102	57.6%
I do because minimizes my food gap	Yes	42	49.4%	77	74.8%	119	63.3%
Other reason	Yes	0	.0%	0	.0%	0	.0%

Source; Project end line survey

Table 23 Reason for expansion of cultivation of potato by HH category

Reason for expanding cultivation of potato		To what category of HHs does the HH belong ?(					
		MHH		FHH		Married women	
		Nr	%	Nr	%	Nr	%
I have enough seed stored	Yes	64	48.1%	6	50.0%	7	46.7%
I have enough land for expansion	Yes	49	37.1%	3	27.3%	9	56.3%
I don't have enough land, but try to expand by renting from other	Yes	11	9.1%	0	.0%	1	7.7%
I don't have enough land, but try to increase my productivity from that limited land	Yes	14	11.8%	2	18.2%	3	20.0%
I do because of no frost problem	Yes	0	.0%	0	.0%	0	.0%
I do because of no or managed porcupines and foxes problems	Yes	1	.9%	0	.0%	0	.0%
I do because I have got good income	Yes	84	57.9%	10	71.4%	8	44.4%
I do because minimizes my food gap	Yes	96	63.6%	13	81.3%	10	47.6%
Other reason	Yes	0	.0%	0	.0%	0	.0%

Source; Project end line survey

Transfer of technology

The project commenced its work on lead farmers with the intent that lead farmers adopt the technically quickly and then transfer knowledge to follower farmers. The result of qualitative and quantitative survey showed that there was transfer of the innovation from lead to follow farmers as envisaged. Summary of the finding is as shown below.

Table 24 Number and percentage of HH who transferred the technology to other farmers.

HH category		Woreda					
		Legambo		Tenta		Total	
		Nr	%	Nr	%	Nr	%
MHH	Yes	58	49.6%	70	54.3%	128	52.0%
	No	59	50.4%	59	45.7%	118	48.0%
FHH	Yes	5	26.3%	12	41.4%	17	35.4%
	No	14	73.7%	17	58.6%	31	64.6%
Married women	Yes	5	31.3%	7	41.2%	12	36.4%
	No	11	68.8%	10	58.8%	21	63.6%
Total	Yes	68	44.7%	89	50.9%	157	48.0%
	No	84	55.3%	86	49.1%	170	52.0%

Source; Project end line survey

As shown above, close to half of the beneficiary households transferred their knowledge and experience about the innovation/technology to other farmers. The proportion of MHH who transferred the knowledge to others was higher compared with others. On the other hand, the proportion of FHH and Women in MHH who transferred the technology to others was comparable. The project trained lead farmers and the subsequent transfer was made in the form of farmer-to-farmer extension method.

The introduction of new seed variety, planting techniques, and improved way of land preparation were the major practices of the technology transferred by lead farmers to others. The project organized chips producing and marketing groups and support the cooking demonstration sessions at least on the farmers' day as part of knowledge transfer. The technical assistance provided by CWWE and Woreda Agriculture and HEW contributed for better transfer of the technologies. The detail is shown below.

Table 25 Technologies transferred to follower farmers

Technology transferred to other farmers		Wereda					
		Legambo		Tenta		Total	
		Nr	%	Nr	%	Nr	%
Introducing new seed variety	Yes	65	95.6%	87	100.0%	152	98.1%
Improved ways of land preparation	Yes	53	77.9%	71	83.5%	124	81.0%
Planting techniques (spacing between rows and plants)	Yes	61	89.7%	81	95.3%	142	92.8%
Pests and disease control techniques	Yes	17	25.0%	37	54.4%	54	39.7%

Post-harvest handling system (DLS system)	Yes	24	35.3%	24	42.9%	48	38.7%
Introduction of seed supply system through producers and marketing cooperatives	Yes	18	26.5%	35	61.4%	53	42.4%
Food processing as income generation (by women groups)	Yes	9	13.2%	15	36.6%	24	22.0%
I didn't receive any support	Yes	0	.0%	0	.0%	0	.0%
I can't say anything	Yes	0	.0%	0	.0%	0	.0%

Source; Project end line survey

Asked whether the farmers to whom they transferred the technology applied on their farm, 60% confirmed that their followers applied and the figure was 65% and 55% for Tenta and Legambo Woredas respectively. The proportion of follower farmers who learnt the technology from the MHH was higher (63%) followed from FHH (51%) and women in male headed household (48%).

Discussion was made with the non-beneficiary households residing in the project kebeles and they confirmed the transfer of the innovation to non-beneficiaries as well. In this regard, of the 10 FGD participants conducted in kebele 22 Sayida Korkura of Legambo Woreda, 6 non beneficiaries which is 60% engaged in the production of improved potato variety in the last 2 years. Similarly, of the 10 FGD participants in 010 Zakunant kebele of Tenta Woreda 30% cultivated the crop in the last two years. The finding shows the transfer and replicability of the technology/innovation within the target kebeles. However, non-beneficiaries cited that the scale of operation was small and the technical assistance they received was not as satisfactory as other project beneficiaries.

Ato Seid Kashun; 35 is a resident of 013 Wertej kebele of Tenta Woreda. He was selected as lead farmer in the first year of the project and harvested 17 and 18 quintals of potato in the first and second year. He explained about adoption of the technology as follows. "I am a foreman of PSNP program in my village and supervising 50 PSNP beneficiaries. We discussed on the comparative advantage of plating potato, my team members visited my farm and I shared with them my experience. One day I invited my team members, cooked potato and gave them seed amounting to 3 kg/person. They start planting potato and 25 of them become a beneficiary of the project in the next season"

Hussen Hassen; 45 is the resident of kebele 22 .Sayida Kurkura at the village called Alite. He is non beneficiary of the project but live in project target kebele. He adopted the technology and explained his situation as follow. "I saw my neighbor who cultivated the improved potato in 2016 and decided to cultivate. The change in the life of my neighbor in terms of availability of food for his family and the income he generated motivated me to grow the crop. Accordingly, I purchased 10 kg of improved potato variety seed and planted. I don't know the exact amount of yield I got but I generated Birr 2000 from sale of the produce and my family consumed the potato for 3 months. The number of meals in my family improved from two to three times per day and the food gap in my family reduced from 7 to 2 months. I have been encouraged by the result and will continue cultivating potato. I will increase the land plot size, buy additional seed and increase my income and availability of food to my family in the coming seasons". He raised the limitation on the technical assistance he received from Development Agents as they were focused on proejct beneficiaries.

Discussion made with the seed producers and marketing cooperatives and sector offices showed that the technology has been transferred to other neighboring Woredas. The seed was purchased by NGO and Agriculture office of Guba

Lafto(north Wolo) Kelala, Tenta and Legambo Woredas. Moreover, interviewed farmers mentioned that some farmers from the neighboring Woreda Mekdela start growing the crop.

3.2.6. Accountability

Complaint Response Mechanisms were put in place and implemented. Beneficiaries confirmed the existence of the system and explained the channel they can follow for reporting any complaints. The project signed agreement with government sector offices and reported the progress accordingly and no complaint was raised on this.

Subsequent consultation was made with community during the project planning and project launch workshop was conducted during the kick off the project. Documents at South Wollo Zone Finance and Economic Development Department were checked and the project regularly communicated annual plans, budget and progress reports.

3.3. Project efficiency

The efficiency of the project was assessed in light of the extent to which the outcomes justify the cost, adequacy of the budget allocated, cost saving nature of the institution arrangement, the added value to the government effort and time line. The findings are as summarized below.

Table 26 Budget utilization in USD

	Budget Items	Approved budget	Total Expenditure	Unexpended balance	% of expenditure
1	Program Staff Cost/Direct Labor	212,139.32	170,740.15	41,399.18	80%
2	Program Staff - Fringe benefit	64,753.74	56,643.69	8,110.05	87%
3	Materials/service (i.e. Provide seed capital in Cash & Cooking demonstration)	21,320.00	20,100.68	1,219.32	94%
4	Travel (i.e.Perdiem)	4,050.00	12,976.50	- 8,926.50	320%
5	Proposed Technology Application/ supply/ (i.e. Purchase improved seed & Transportation Cost)	92,500.00	98,311.77	- 5,811.77	106%
6	Other program costs (Learning & documentations, Trainings, workshops, Project Monitoring & Evaluations)	107,462.65	103,413.15	4,049.50	96%
7	Office expenses (i.e. Stationary & utility)	3,000.00	4,469.48	- 1,469.48	149%
8	Other direct costs (i.e. vehicle purchase & running cost)	62,351.52	100,921.82	- 38,570.29	162%
9	NICRA (9.22%)	52,330.76	52,330.76	0.00	100%
	Total	619,908.00	619,908.00	- 0.00	100%

Source Concern World Wide Ethiopia

As shown above, a total of 619,908 USD was allocated and utilized. Of the total expenditure 33% was incurred for the application of the technology and learning which includes documentation, trainings, workshops and others. Similarly, 37% of the total cost was for program staff salary and benefits. The financial report showed cost over running and underspending per major line items. Closely observing the financial performances of the project the following have been noted.

- The whole budget allocated was utilized and the expected outcomes achieved as stated in this report. In light of this, the budget allocated at large was adequate to generate the stated changes. However, the report shows cost over running and underspending per major line items which implies planning problem. According to the reports from the Central Statics Agency of Ethiopia, the inflation rate for 2016,2017 and 2018 as of June was 7.5%, 7.2% and 13.1% respectively and such price increments and other factors has impact on cost over Runnings which should be considered from the outset
- The project was streamlined to the existing structure and programs of CWWE. Moreover, the implementation of the program involved government sector offices, university and research center. Each actors deployed their staff and efforts at different level as discussed in this report. Such arrangement is instrumental in saving cost.
- The leverage from implementing partners is the other point which justifies the project in this regard. Addet Agricultural Research Center provided 10,000 tuber of potato seed which can cost Birr 100,000 in year 2. Moreover, the center provided 15,000 seed tuber in the third year and the private donor (member of the Board of Trustees of the Concern US) donated the fund for the procurement of 4.5 MT of improved potato seed. As part of overcoming the cost increment in the construction of DLS, CWWE contributed 880 pieces of corrugated iron sheets, 144 kg of nails and 49.6 MT of cement for the construction of eight DLS which can cost 12,176.64 USD (261,798 Birr). Such additional resource mobilization is appreciable from the perspective of increasing the resolution of the impact.
- According to the midterm evaluation report of Feed the Future Ethiopia report; May 2015, the goal of the Ethiopians FtF program is to sustainably reduce poverty and hunger in USG-assisted areas. The program builds up on investment under asset and livelihood in transition which parallel the government PSNP. Interviewed USIAD focal person also explained in similar manner and the intention of his office to supplement PSNP through innovative works. Hence, the project added value to the efforts of the government of Ethiopian and the funding agency.
- The cost per beneficiary was USD 103.32 which is about Birr 2,850. Considering the impact brought in terms of introduced new technology, higher production and productivity, reduced food gap, increased feeding practice and increased income and lessons generated, the impact justifies the cost.

3.4. Project sustainability

The sustainability of the project was assessed in light of continued service provision and maintained benefit after the withdrawal of the project. The findings are as summarized below.

- The beneficiaries internalized the benefit of the technology as witnessed by the fast adoption of the technology and replication by non-beneficiaries. Hence, the outcome of the project explained as increased income, reduced food gap and improved feeding practice is likely sustainable as far the existing seed supply system, support from the government and quality inspection and certification maintained .

- The seed supply system is a pillar that determine the sustainability of the project outcomes and interventions. In this regard, the sustainability of the seed supply system depends on capacity of the cooperatives and subsequent support from the government offices. The fulfillment of the following precondition determines the sustainability of the seed supply system.
 - The existence of the task force is important as they are inspecting the quality of potato seed on regular base and certifies. With the withdrawal of the project, respective Woreda Agriculture Offices are expected to play the coordination role and mobilize members for the inspection as per the plan. The continuity and functionality of the task force is one of the key factors which determine the continuity of the seed supply system.
 - The financial and technical capacity of the SPPMC is the other determinant factor. With the growing demand for improved seed, cooperatives are expected to purchase a bulk of seed which demands capital. Similarly, their technical capacity and ability to penetrate the market and enhance marketing are the determinant factor. The growth in capital and capacity of the cooperative is the other factor that can determine the fate of the seed supply system.
 - The introduced improved variety of potato will lose its efficiency with time. Under such case, the cooperatives are expected to replenish the exhausted seed with the new generation to ensure the continuity of the project outcome. This requires money and hence the financial position of the cooperative in the coming years shall be a factor for the sustainability. The data obtained from the cooperative office showed that the capital of the 8 cooperative increased from Birr 47,560 to Birr 2,548,765 within the last 3 years which is a green light toward the financial sustainability.
 - Opinion collected from the beneficiary community skewed toward the sustainability of the seed supply system. Of the respondents, 73% have trust in the sustainability of the seed supply system while 16% are not sure on the sustainability of the system. The rest 11% declined and said that the system shall not be sustainable from their perspective.
 - Information collected from South Wollo Zone Cooperative office showed that those SPPMC supported by CWWE a Dessie Zuria and Delanta before three years are still functioning properly. This is a green light and hope on the sustainability of the SPPMC under consideration.
- The sustainability of platform is crucial for the continued interaction among the value chain actors and sustained service delivery. In this regard, the platform is at infant stage and not progressed well during the project period. Moreover, the bondage among actors is loose as explained by limited follow up actions of the two team leaders (zone agriculture and zone trade department) to coordinate the production and marketing actors respectively. Under such case, the sustainability of the platform is unlikely.
- Six women group were established to run chips preparation and marketing. Half of the groups (50%) are functioning while the rest not engaged in the business. Though they are generating income, an increment in running cost notably oil is putting their continuity in question.
- The Ethiopian Agriculture Research has a plan to establish research center around the project area under GTPII. If the plan actualized, there is a possibility that the commenced research work shall be re-enforced and continue in the future.

3.5. Project relevance and appropriateness

The relevance of the project to global, national and regional policy, funding and implementing agency policy and development direction and target beneficiaries needs and priorities was assessed. The finding is as presented below.

The relevance of the project toward Sustainable Development Goals was assessed and the result showed that the project is aligned with the SDGs. The project falls within the first two goals of the SDGs namely end poverty in all form (goal 1) and end hunger, achieve food security and improved nutrition and promote sustainable agriculture (goal2). Similarly, increasing agricultural production and productivity and building climate resilient green economy is one of the nine pillars and the centerpieces of the GTPII of Ethiopia. In this regard there is an intention to reduce total poverty head count from the estimated 23.4 % (2014/15) to 16.7% by 2019/20 at the national level. There is also a plan to increase the production of major crops from 270.3 million quintal/year in 2014/15 to 406 million quintal/year by the end of GTPII.

The project is in line with the development direction and policy of CWWE and USIAD since poverty reduction is the center piece of their policy. The result of the household survey also showed that the project interventions were relevant to the majorities' beneficiaries need and priority as depicted below.

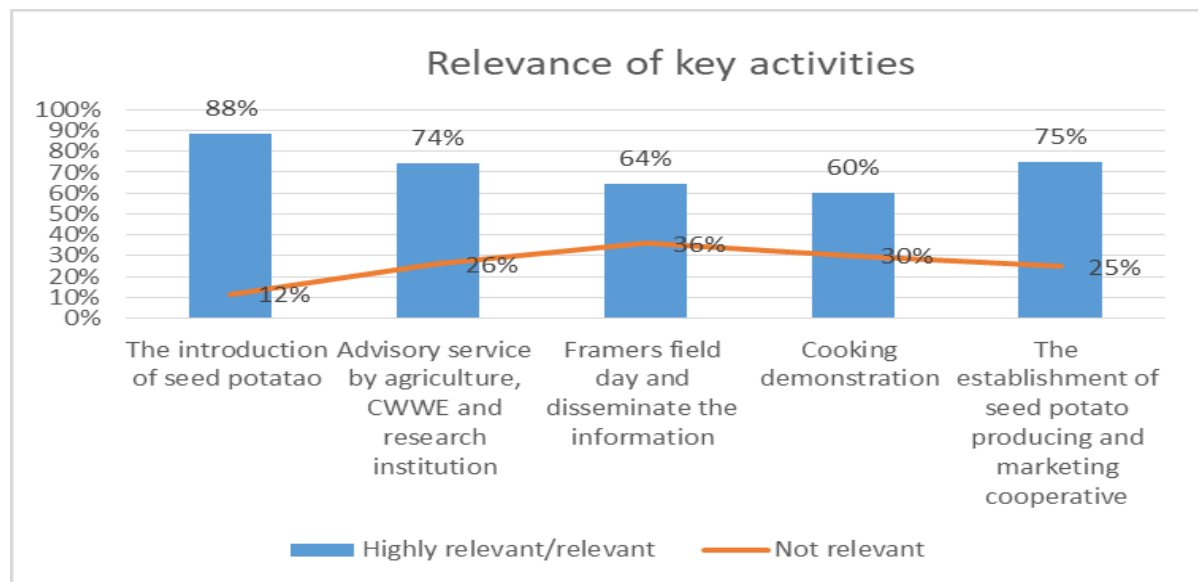


Figure 13 Relevance of selected project interventions to the needs and priorities of beneficiaries

The appropriateness of the project in view of adherence to the program participation policy was assessed. In this regard, beneficiaries were kept on board at all stage (need assessment, criteria setting, selection, implementation and monitoring). The project gave due consideration for the needy households and cross cutting issues including HIV and AIDS and child rights were brought as agenda item.

In nutshell, the project falls with the global development goals/ SDG, GTPII of Ethiopia, USAID and CWWE development policy and direction and the beneficiary community felt needs and priorities. Hence, the evaluation concluded that the project was relevant and appropriate for implementation.

4. Lessons learn

The implementation of the project came up with important lessons that can be an input for the future similar projects. Major lessons learnt from the project are as summarized below.

- The project integrated the efforts of researchers, NGOs, government organization and private sectors. The arrangement is welcomed by the actors and the funding agency (USAID) as it was participatory and created fertile ground for project implementation. The experience of working together and increased resolution of impacts was noted as the results are stated in this report. Moreover, such active participation of the stakeholders is a cornerstone for project sustainability.
- The project strengthen the research-extension linkage. Though research institutions are piloting research findings on farm land at small scale. Under this case, the project brought the researchers and the farmers on board on large scale (6000 beneficiaries. Moreover, the arrangement gave interface interaction among researchers and farmers at larger scale.
- The organizational structure of CWWE is stretched from the head office in Addis Ababa to target kebeles. The structure goes parallel with the government structure which was instrumental to interact at different level and implement the project. It created a chance to interact with parallel government structures, smooth flow of information.
- According to the "big push' theory of Professor Paul N. Rosenstein-Rodan, high minimum amount of investment is required to overcome to obstacles of development in an underdeveloped economy and to launch it in the path of progress. In view of this, the introduction of improved potato is a step toward enhancing household food and nutrition security and finally break the vicious circle of poverty. However, the single commodity approach can contribute for the stated objective but multiple commodity approach is preferable for big push and bring optimal changes. In light of this, agro ecologically suitable high yielding crops like apple, garlic and spices can be introduced as package with the potato to bring the envisaged changes.
- Researchers are advising 3-5 years to make objective judgments on yield and adoption. Moreover, beneficiaries and sector offices commented on project period as short. Operational research was also conducted for the first two years and the third year harvest will be after the completion of the project. Under such case, extra time at least for research and compilation works like 6 months seems rational and hence reviewing the project duration for future similar project is picked as a lesson.
- The result of the evaluation clearly showed that FHH are still at lower position in terms of access to food and nutrition security. Hence, targeting Women Headed Families as much as possible is taken as a lesson.
- Bringing value chain actors on board and their functionality is instrumental for the success of the project. In this regard, bringing actors on board is the necessary condition but not sufficient to realize proper interaction of the actors. Hence, the need for continued interaction among actors, subsequent follow up and support is required. This is a process which requires a day to day follow up and should not be considered as a one day task.
- Platforms are instrumental in terms of identifying challenges, propose solution and support the implementation of recommendation. The presence and functionality of platform should be throughout the

project period and even continue after the withdrawal of the project. Hence, the need for giving due care for continuity and functionality of the platform is taken as lesson.

- The adoption of the technology was faster compared to other similar experience. AARC said that the adoption can take 3-5 years while 89% of the targeted households adopted the technology in 6 months and 98% within a year.
- The provision of improved seed in the form of loan is appreciated by beneficiaries for its simplicity and flexibility of loans. Under such case, the problem of loan diversion, searching cost for seed and price fluctuation are not common. Moreover, the distribution points are at the nearby area mainly kebele head quarter. Hence, provision of loan in kind is taken as suitable operation.
- Cooking demonstration on farmers' days is welcomed by project participants as it promote optimal utilization of potato. In this regard, the need for inclusion of more women if possible wives of the male project participants is considered as lesson since women are responsible for cooking at home under the project area community setting.
- Potato for cooking demonstration might not available throughout the year due to shortage of fund to purchase from the government side. Consequently, the effort was limited to theory. Under such case, the need for mobilizing the beneficiaries to come up with own produce(potato) or align the demonstration with production season is taken as lesson
- The establishment of taskforces at Woreda level and joint monitoring with respective zone offices is considered as lesson. The need for active participation of all task force members is noted Moreover, institutionalizing the role of task force in such a way that each office assume the task as own plan is so important to ensure its continuity.
- The construction of store at household level is at initial stage. On the other hand, households are expected to use own seed for the subsequent years. Hence, the quality of the seed saved by households much depend on the quality of the stores at household level and the commitment of households like avoiding adulteration. Therefore, the availability of stores at household level should be considered as one of the key areas to maintain the quality of seed for subsequent plantings.
- Cooperatives are skeptical on the availability of market due to lack of experience since they expect immediate sale of what they procured. However, seed buyers start to look for seed when the planting time is approaching. Consequently, they operate with reservation on purchase of seed potato. They slow down the procurement process as they are searching for markets side by side. Under such case the introduction of demand driven production in the future is taken as a lesson. In this regard, cooperatives can make rapid market assessment within and neighboring Woredas and zone on the demand for seed which can dictate their production. At this juncture, the support from Woreda cooperative and trade offices is highly required due to the limited capacity of cooperative to undertake such demand assessment.
- Transmission of messages through radio is important from the perspective of wider coverage. However, the need for selecting appropriate time for listeners and the cost implication should be worked out from the outset.

- The resource, time and energy invested on research works is fruitful if and only if the findings of the research is disseminated to the public at large.

5. Conclusion and recommendation

The performance of the project was reviewed using qualitative and quantitative data collected from the target community notably beneficiary households. The overall finding of the evaluation showed that the project was successful and attained the envisaged objectives as explained by the performance indicators. The innovative technology introduced and adopted, beneficiaries income increased, food gap reduced, feeding practice improved, the potato seed supply system established and research findings documented. However, the documentation and dissemination of lessons learnt phase of the project and the task of bringing all value chain actors on the platform and interconnect value chain actors are at the middle of the journey. Furthermore, the potato seed supply system is operating but needs support particularly in the area of strengthening the market linkage, capacity building for seed producers and marketing cooperatives and keeping task force on the existing momentum. Specific conclusion and recommendations made out of the review are as follow.

- The selection of target kebeles and beneficiaries was based on the set and agreed criteria and transparent. Moreover, the establishment of compliant reporting mechanism enhanced the transparency and accountability among actors. Hence, neither inclusion nor exclusion error was noted or reported. .
- The result of the evaluation showed that FHH are positioned at lower status in terms of food and nutrition security as explained by production level, food gap, feeding practice and others. Hence, targeting women particularly FHH and support them as much as possible is highly recommended for similar project.
- The implementation of the project proved that the project area is suitable for the production of improved potato varieties witnessed by the productivity of the crop which was close to the national average in good year. However, it was noted that frost, water logging, wild animals and erratic rain fall are major production limiting factors where the former (frost) is the leading. The decision made by AARC in putting frost as one of the research agenda is highly appreciable.
- The adoption took shorter time as all lead farmers who received the seed planted in same season.
- The culture of using certified improved seed by the target households is cultivated. The result of the survey showed that 93% of the sampled households used improved seed of potato in the last 12 months. Moreover, 81% reported that the cost of improved seed is affordable. This is the encouraging result which was not the case before the project that needs maximum care and support to maintain the practice.
- One of the intention of the project was linking the seed potato producing and marketing cooperatives with possible markets and actors. Unfortunately, the effort made by the project was limited to platform establishment and a meeting. Hence, maximum effort is expected from respective Woreda Cooperative Office in linking the cooperatives with buyers as early as possible.
- The project proposal indicated that Woreda Trade offices shall be a member of the task force and support the beneficiaries in market linkage. We noted that Woreda Trade Office is supporting producers and consumers through availing market information and networking. Unfortunately, no linkage was established among the SPPM cooperatives and trade office (except for a platform meeting). Moreover, the linkage among Woreda cooperative and trade office is loose. This is the lost opportunity toward supporting the cooperative in terms of availing market information and link with potential buyers and input suppliers.
- The capacity of SPPMC to run the business is limited. Hence, continued technical assistance by respective Woreda Offices and encouraging them to construct office is recommended.

- The operational researches are instrumental for the promotion of knowledge and best practices. In this regard, the project conducted two operational researches in collaboration with AARC and shared findings with platform members. However, the level of research finding dissemination is limited. There is an opportunity window for AARI to publicize the research paper in the form of journal or proceeding.
- The platform was established as per the plan. However, its functionality was a gray area where the platform not conducted subsequent meeting, review challenges, propose technical solution, disseminate findings and support the beneficiaries. The visibility of the platform was found minimal as most of the interviewed personnel or FGD participants couldn't explain about it.
- The project intended to promote potato utilization by educating households as part of the health extension work and on farmers' field day. In this regard, HEWs at Tenta conducted cooking demonstration since there was supplementary feeding program supported by Save the Children Fund. However, the effort at Legambo was limited to theory and no practical demonstration was done by HEWs. At both Woredas, cooking demonstration was conducted on farmers' days though participants on farmers' day were mainly male. In this regard, the need for involving more female by encouraging males to come with their partner is recommended for the future projects. The recommendation is in light of effective targeting and optimal utilization of the potato since cooking is the primary responsibility of women in a target area community.
- Active participation of task force members is instrumental to ensure quality of seed production, processing and marketing. In this regard, support from Trade office in promoting marketing was the lost opportunity that shall be considered for the future similar projects.
- Linking seed producing and marketing cooperatives with market was one of the overlooked areas of the project intervention. Hence, maximum effort is expected from respective Woreda cooperative offices in linking them with buyers. In this regard, cooperative offices are advised to work with trade offices as they have expertise, experiences and willingness to support the cooperative through availing market information and linking with value chain actors.
- Dissemination of information to the larger audience is imperative for optimal use of research findings. In this regard, the findings of the operational researches were minimally promoted which requires follow up actions from AARI and CWWE even if the project is ended. Joint effort by CWWE and AARI toward publishing the research report as proceeding of journal is highly recommended.

Annex

Annex 1 List of documents reviewed

- a) Potato Initiative For Food and Nutrition Security Project proposal; USAID Innovation Fund for Improving Food Security In Ethiopia; 2015
- b) Updated log frame of the project
- c) Project annual reports for year 1,2, and 3
- d) Project Operational Research Report, February 2017
- e) Project Operational Research Report; April 2018
- f) Potato Initiative For Food and Nutrition Security; USAID Innovation Fund for Improving Food Security In Ethiopia; 2015; Baseline Survey Report; March 2015
- g) Ministry of Agriculture, Technical Guidelines for the Inspection of Potato Quality Declared Seed; March 2015
- h) Learning Review Meeting Report of the FEED THE FUTURE-Ethiopia Innovative Potato Activity; November 2017
- i) Memorandum of Understanding among Zone Agriculture Department, Zone Trade and Industry Department, Wollo University, Sirinka Agricultural Research Centre, and Concern Worldwide-Ethiopia for Joint Actions and Networking on Potato
- j) Memorandum of Understanding between Potato Promotion Task Forces and CWWE for Joint Actions on Potato Seed system improvement and Nutrition Security
- k) Memorandum of Understanding (MoU) between Amhara Regional Agricultural Research Institute/ Adet Agriculture Research Center and Concern Worldwide; February 2016
- l) Report on Workshop Proceedings of Irish Potato Value Chain Analysis Validation and Establishment of Potato Platform; December 2016
- m) Report on Irish Potato Operational Research Validation and Marketing Development Workshop; May 2017
- n) Final Evaluation of Promoting Potato for Food and Profit Project funded by ICCO and implemented in selected kebeles of Dessie Zuria and Delanta; October 2016
- o) Final Evaluation of Deesie Zuria Livelihood Program(2006-2010)
- p) Improved potato seed(Belete) productivity status assessment in Dessie Zuria
- q) Value chain analysis of Irish Potato in case of Dessie Zuria and Legambo Woredas of South Wollo Zone; by Wollo University and sponsored by CWWE; October 2016
- r) Potato value chain analysis and development in Ethiopia; the case of Tigray and SNNPR; 2011
- s) Best practices for handling of seed potatoes; Potatoes aartapples, South Africa. February 2015
- t) Improving potato production in Kenya, Tanzania and Ethiopia; A system diagnosis
- u) Sustainable seed potato production in Ethiopia; from farm saved to quality declared seed by International Potato center; Addis Ababa
- v) Growth and Transformation Plan II
- w) Ethiopia Rural Development Policy and Strategy
- x) Ethiopian Agriculture Sector Policy(2010-2020)
- y) Proclamation on establishment of Cooperative
- z) External midterm performance evaluation of the Feed the Future Ethiopia; May 2015

Annex List of people contacted

S/No	Name	Office/Kebele	Position
1.	Mr Alessandro Bini	CWWE	Country Director
2.	Abreham Menber	CWWE	Program Coordinator
3.	Mulugeta Terfa	CWWE	Program quality Coordinator
4.	Mengistu Arba	CWWE	M&E Officer
5.	Dereje Jeba	CWWE	Livelihood Senior Officer
6.	Endalemaw Belay	CWWE	Area Coordinator
7.	Endris Feyisa	CWWE	Livelihood Manager
8.	Natnael wasse	CWWE	Innovation Advisor
9.	Meried Fentaw	CWWE	Former Project Manager
10.	Moges Worku	USAID	Advisor
11.	Alemu Worku	Addet Agricultural Research Center	National potato Research Coordinator
12.	Tesfaye Merkoriyos	South Wollo Zone Agriculture	Irrigation Agronomist and Task force (TF)member
13.	Yimer Ali	South Wollo Zone Agriculture	NGO desk head
14.	Alemu Chane	South Wollo Zone Agriculture	Horticulturalist and TF
15.	Ashenafi Sitotaw	Ethiopian Plant Seed and Other Agricultural Input Quality Control Quarantine Authority of Dessie branch.	TF member and Expert
16.	Girma Haile	South Wollo Zone Cooperative	Task force focal
17.	Endalkachew Zewude	South Wollo Zone Finance and Economic Development	M&E and task force member
18.	Seid Edris	Kombolcha Plant Clinic	Taskforce and expert
19.	Tadiwos	Kombolcha Plant Clinic	Head
20.	Getachew Mohammed	Legambo woreda Agriculture Office	Horticulture Expert
21.	Ibrahim Mohamed	Legambo woreda Agriculture Office	Extension expert
22.	Hussen Yesuf	Legambo woreda Coopererrtive Office	Cooperative expert
23.	Serkalem Getcahaw(F)	Legambo Woreda- Chiro Kebele	HEW
24.	Erist Mengistu(F)	Legambo Woreda- Chiro Kebele	HEW
25.	Alebachew Abebe	Legambo Woreda –Chiro Kebele	HEW
26.	Hussen Aragaw	Legambo Woreda –Chiro Kebele	Development agent –Crop
27.	Adem Mohammed	Legambo Woreda –Chiro Kebele	Mayer- municipality
28.	Kemila Ali(F)	Legambo Woreda – Segno Gebeya kebele	Chips producing group member
29.	Moahmed Beshir	Legambo Woreda – Segno Gebeya kebele	Lead Farmer
30.	Mohammed Ali	Legambo Woreda – Segno Gebeya kebele	Lead farmer
31.	Ayalew Belayneh	Legambo Woreda – Segno Gebeya kebele	Development Agent-Crop
32.	Jemal Beshir	Tenta Woreda Agriculture Office	Horticulturalist
33.	Mulu Tilahun(F)	Tenta Woreda Trade Office	Task force member
34.	Tiruye Ali (F)	Tenta Woreda Finance Office	Task force member
35.	Ahmed Hassen	Tenta Woreda Cooperative Office	Task force member

36	Alebachew Ali	Tenta Woreda Health Office	Task force member
37	Mohamed Alebachew	Tenta Agriculture Office	Head
38	Seid Ebire	Tenta Agriculture Office	D/Head
39	Selaman Mohammed	Legambo Finance and Economic Development	Head
40	Ketema Tadesse	Legambo trade office	Trade License Process owner
41	Fanaye Alebachew(F)	Legambo trade office	Crop marketing process owner
42	Yimam Muhie	Legambo trade office	Market information analyst
43	Abubeker Kassaye	Legambo trade office	Market networking expert
44	Jemal Sindew	Legambo trade office	Industry development expert
45	Temir Edris(F)	Legambo trade office	Marketing expert
46	Amare Fantaye	Legambo Health office	Health officer and task force
47	Ahmed Muhiye	Legambo- Sayida Korkura Kebele	Manager
48	Yimam Indris	Legambo- Sayida Korkura Kebele	Development Agent-Crop
49	Meka Ahmed(F)	Legambo- Sayida Korkura Kebele	HEW
50	Hussen Hassen	Legambo- Sayida Korkura Kebele	Non beneficiary
51	Seid Getaneh	Tenta Wertej Kebele 013	Manager
52	Kebede Tefera	Tenta Wertej Kebele 013	Development Agent-Crop
53	Shibure Hassen (F)	Tenta Wertej Kebele 013	Development agent-NR
54	Shibire Arega(F)	Tenta Wertej Kebele 013	HEW
55	Tayitu Ahmed(F)	Tenta Wertej Kebele 013	Chair –Chips producing group
56	Seid Kassahun	Tenta Wertej Kebele 013	Lead farmer
57	Abebaw Assefa	Tenta Wertej Kebele 013	Lead farmers-private store
58	Ayelew Kassa	Tenta Zakunat 010 kebele	Non beneficiaries
59	Ahmed Ali	Tenta Zakunat 010 kebele	Manager
60	Zeyneb Yimer(F)	Tenta Zakunat 010 kebele	HEW
61	Tsehay Workneh(F)	Tenta Zakunat 010 kebele	Development Agent- Crop
62	Kasahun Wodaje	Tenta Zakunat 010 kebele	Development Agent-NR
63	Adane Abegaz	Tenta Woreda Cooperative Office	Head
64	Usman Mohamed	Tenta Woreda Cooperative Office	Expert
65	Omar Edris	Tenta Woreda Cooperative Office	Expert
66	Ali Berehe	Tenta Woreda Administration	A/Head

Annex List of FGD conducted

S/No	FGD	Type
1	Legambo Woreda Chiro Kebele (women group)	Chips producing group
2	Legambo Woreda Terade kebele 27 mixed group	Follower farmers
3	Legambo Woreda Segno Gebeya 023 Mixed Group	Lead Farmers
4	Legambo Gimba SPPMC management	Cooperative management- Strong
5	Legambo- Sayida Korkura Kebele Mixed group	Non beneficiaries
6	Legambo- Sayida Korkura Kebele SPPMC management	Cooperative management –less strong
7	Legambo- Sayida Korkura Kebele	FHH

8	Tenta Wertej Kebele 013 Mixed group	Lead farmers
9	Legambo Kera Gimba 029 kebele	Follower farmers
10	Tenta Ababoru 011 Kebele	Chips producing group
11	Tenta Zakunat 010 kebele	Non beneficiaries
12	Tenta Kurkur Kebele	FHH
13	Tenta Wertej	Cooperative- strong
14	Tenta Kara Gimba CPPMC	Cooperative- less strong
15	Legmabo Woreda QDPM task force	Potato QDPM Task force
16	Tenta Woreda QDPM task force	Potato QDPM Task force
17	South Wollo Zone QDPM	Potato QDPM Task force

Annex 2 Productivity of Irish Potato on lead and follower farmers plot (per HH)

Group	Category of HHs	Variety				
		Belete	Belete G2	Belete G3	Gudenie	Total
		Mean	Mean	Mean	Mean	Mean
Follower farmers	MHH	151.00	.	.	209.30	155.24
	FHH	173.01	.	.	175.67	173.23
	Total	158.74	.	.	196.49	161.60
Lead farmers	Man Headed	144.03	290.90	464.70	198.43	145.42
	Woman Headed	106.07	.	239.87	229.06	73.84
	Total	135.40	290.90	389.76	210.68	122.78
Total	Man Headed	149.37	290.90	464.70	207.26	152.56
	Woman Headed	163.45	.	239.87	186.35	149.34
	Total	153.96	290.90	389.76	199.22	151.46

Annex 3 performance of the project toward the stated output

			Year 1(Sep 15- August 16)			Year 2(Sep 16- August 17)			Year 3(Sep 17- August 18)			Total		
S/No	Outcomes/outputs	Unit	Plan	Actual	%	Plan	Actual	%	Plan	Actual	%	Plan	Actual	%
I	Outcome 1: Improved food and nutrition security of targeted HHs through promoting production and productivity of Irish potato													
1.1	Output 1.1: 6,000 targeted HHs engaged in potato production													
1.1.1	Introduction of improved seed potato to target HHs	HH	1000	1000	100%	5000	3528	71%		1472	#DIV/0!	6000	6000	100%
	Procure and supply improved irish potato seed	Kg	150	98	65%		35.4			69.6		150	203	135%
	Train/provision of advisory service to Lead Farmers on potato production, pest & disease control, harvesting and storage management	No	1000	1000	100%							1000	1000	100%
	Conduct farmers field days and research result dissemination forums	Event	20	20	100%	20	40	200%	50	9	18%	90	69	77%
	Train agriculture extension practitioners on the husbandry of Irish potato	No	55	31	56%							55	31	56%
1.1.2	Promote Utilization of Irish Potato for Improved HH Nutrition													
	Train Health Extension Workers on nutrition importance of potato and food ingredients from Irish Potato	No	35	42	120%							35	42	120%

	Conduct cooking demonstrations to project targeted women and men in different kebeles	session	50		0%	50		0%	50	20	40%	150	20	13%
II	Outcome 2: Irish potato seed supply system in place in the project areas													
2.1	Potato seed producers cooperatives (PSPC) established and operational													
2.1.1	Establish Irish Potato Seed Producers' Cooperatives	No	8	8	100%							8	8	100%
2.1.2	Establish task forces monitoring and approving Quality Declared Planting Material (QDPM)	No	2	2	100%							2	2	100%
2.1.3	Train task force members of QDPM on monitoring & approving processes	No	12	13	108%	20	19	95%				32	32	100%
2.1.4	Exposure visits by coops leaders for experience sharing to other similar coops	No	24	23	96%							24	23	96%
2.1.5	Train committee members of 8 SPPC on seed potato business management	No	68	47	69%	16	27	169%	24	24	100%	108	98	91%
2.1.6	Provide seed capital and dissemination forum support for eight SPPC to procure seed potato from producers s	USD	20000	19352	97%							20000	19352	97%
2.1.7	Support HHs to construct low cost private DLS and ware potato store to demonstrate others as model	No	75	120	160%	25	40	160%				100	160	160%
2.1.8	Construct Defused Light Stores [DLS] (one for each	No	8	8	100%							8	8	100%

	cooperative)													
III	Outcome 3: Enhanced income of targeted PSNP/HABP HHs (50% Women) through promoting and marketing of seed and ware potato													
3.1	Increased quantity of ware potato and seed potato supplied to market													
3.1.1	Link seed potato producing coops with potential seed potato buyers	Coop #	8	0	0%	8		0%	8		0%	8	0	0%
3.1.2	Market promotion for ware and seed potato using local FM radio station	Months	4	0	0%	4		0%	4	2	50%	12	2	17%
3.1.3	Circulation of brochures about the location and source supply of ware and seed potato	# prints	300	0	0%	500	1412	282%	200	1242	621%	1000	2654	265%
3.1.4	Train women on the business of potato processing and techniques operating frying equipment					16		0%	64		0%	80	0	0%
3.1.5	Provide trained women with frying equipment					16	29	181%	64		0%	80	29	36%
IV	Outcome 4: Learnings and innovative solutions from operational research works and joint actions promoted and implemented													
4.1	Workable innovative solutions obtained from operational research													

	conducting operational research on productivity, crop protection, adoption rate, food availability, income and marketability while studying the performance of innovative practices													
4.1.1		No	1	1	100%	1	1	100%				2	2	100%
4.1.2	Promote platform of potato value chain actors at woredas, zone, region and Federal levels	meeting#	1	0	0%	1	1	100%	1	1	100%	3	2	67%
4.2	Monitoring and evaluation													
	undertaking baseline survey	No	1	1	100%							1	1	100%
	Undertaking project launching workshop	No	1	1	100%							1	1	100%
	Undertaking terminal evaluation	No							1	1	1000%	1	1	1000%

Annex 4 Number and percentage of households who constructed store at household level

		Wereda					
		Legambo		Tenta		Total	
		Number	%	Number	%	Number	%
Have you stored seed potato produced during belg?	Yes	45	38.8%	31	38.3%	76	38.6%
	No	71	61.2%	50	61.7%	121	61.4%
Have you stored seed potato produced during meher?	Yes	5	10.6%	32	49.2%	37	33.0%
	No	42	89.4%	33	50.8%	75	67.0%
Have you stored seed potato produced during irrigation?	Yes	0	.0%	0	.0%	0	.0%
	No	41	100.0%	25	100.0%	66	100.0%

Annex 5 Number and percentage of household sold ware potato

		Wereda					
		Legambo		Tenta		Total	
		Nr	%	Nr	%	Nr	%
Have you stored ware potato produced during belg?	Yes	6	10.7%	0	.0%	6	7.4%
	No	50	89.3%	25	100.0%	75	92.6%
Have you stored ware potato produced during meher?	Yes	1	2.2%	3	10.3%	4	5.4%
	No	44	97.8%	26	89.7%	70	94.6%
Have you stored ware potato produced during irrigation?	Yes	0	.0%	0	.0%	0	.0%
	No	41	100.0%	22	100.0%	63	100.0%

Annex 6 FGD and KII checklists

FGD with beneficiaries

1. Were you participated in the planning of the project?
2. Was the project as per your needs and priority?
3. How was the targeting done? Did the project considered women and most vulnerable groups?
4. How you evaluate the improved seed potato introduced to your community? Quality, time, production
5. How lead farmers trained, adopt the technology and others learn from them?
6. How you evaluate the advisory/technical service you received from agriculture, CWWE and research center?
7. Any assistance from HEW and how do you evaluate it?
8. Was the cooking demonstration important? What you learn from the event?
9. How you evaluate farmer's day and dissemination of research results? Was it relevant?
10. Any comment on the established cooperative to improve seed supply system?(their strength and limitations)
11. Any comment on the storage and the replication of stores at household level
12. What did the taskforce established to monitor quality of seed is doing and how do you evaluate their work?

13. How you evaluate the women training on the business of potato processing and techniques operating frying equipment?
14. How you evaluate the market linkage amount input suppliers and marketing agents?
15. Do you think that you continue producing and selling/consuming the seed and ware potato after the withdrawal of the project? Any threat or fear on the continuation of the service?
16. Was there any feedback mechanism on complaints to CWWE or government ?
17. What are major impacts/changes brought on your life?
18. Major strengths of the projects?
19. Major limitations of the project?
20. What should be improved for the future?
21. Any comment

FGD with task forces

1. Who are the members of the task force?
2. Is there any MOU for the Task force?
3. What did the task force do so far?
4. How woreda and zone level task forces are working together?
5. Did the task force trained in potato QDPM?
6. Have you guideline for the inspection?
7. What was the coverage of your sampling during inspection?
8. What are major challenges you faced so far?
9. What are lesson the task force can share?
10. What you recommend for similar projects in the future?
11. Any comment

FGD with SPPMC management

1. What are the role of the cooperative in seed collection and distribution?
2. How are you managing the DLS?
3. What is your capacity in terms of capital, office and working documents?
4. What was the amount you collected and distributed?
5. How was the seed loan repayments?
6. How is your cash management- bank account, collection, deposit, etc
7. How you evaluate the capacity of cooperative management body?
8. How you managed the procurement of quality seed? Any skill you have on detecting less quality seed?
9. What was major strength and limitation of the project?
10. Any recommendation for the future similar projects?

FGD with chips producing women group

1. How was the group selected and organized?
2. Was there any training you received on potato processing and marketing?
3. What are you producing and selling?
4. How is the availability of inputs like oil, house rent, flour, etc at the locality?
5. Is there market for your products?
6. What are your costs for a month? Average income you earned per month?
7. What are major challenges to run your business?

8. What are the opportunities or favorable conditions?
9. Do you think that the group continue processing potato and sale in the future?
10. What you recommend for future similar projects?
11. Any comment

KII with Woreda Agriculture Office

1. Did your office participate in project planning? In what form?
2. What project activities you implement jointly with the project?
3. How you selected target kebeles? What criteria were considered?
4. What was the source of Irish Potato seed for the target community before the project? What are the sources currently?
5. How do you evaluate the seed supply system?
6. Do you think that the project improved supply of potato seed in the last years? How?
7. Do you think that the supply system shall continue after the withdrawals of the project?
8. Is the seed supplied affordable by farmers?
9. How was the seed supply in terms of quality and time line?
10. The task force establishment and what did they do?
11. How you evaluate the potato platform establishment and their performance?
12. How do you evaluate the strategy employed to improve the seed supply?
13. Do you think that the project improved the knowledge and practice of producers in terms of producing quality declared seed?
14. How was the integration of your office, CWWE, Addet research center during the implementation of the project?
15. How did development agents promote the potato and nutrition education?
16. What advisory service was provided?
17. Do you data on number of PSNP beneficiaries' enrolled by the project and graduate from the PSNP in the last 3 years?
18. How do you evaluate the operational research conducted so far?
19. What appropriate technologies were tested and introduced?
20. What were the process, result and outcome on the following operation research?
 - i. Yield
 - ii. Disease and pest occurrence
 - iii. Adoption rate in technologies and improved practices
 - iv. Food and nutrition status
 - v. Income
 - b. Major results of the operational research in phase II
 - i. Yield per unit?
 - ii. Cost benefit analysis
 - iii. Enabling environment situation
 - iv. Food intake particularly by children?
 - v. Capacity of cooperative leaders
 - vi. Users demand and supply capacity
 - vii. Change in income
 - viii. Market linkage
21. How was the lesson from phase I applied in phase 2 and prompted under phase III
22. Any case where the results/lessons scaled up and disseminated to neighboring kebeles and Woredas?

23. What are the three major strength of this project?
24. What were the three major limitations of the project?
25. What lessons you got from the implementation of the project?
26. Any recommendation for similar project?

KII checklists with Woreda Cooperative Offices

1. What is the status of potato producers and marketing cooperatives?
2. How was their establishment?
3. How is their performance?
4. Are there other similar cooperatives and if yes how you compare them with others?
5. What are major strengthens of the cooperatives?
6. What are major limitations?
7. Is there any lost opportunity or that should be considered but overlooked?
8. If CWWE or other agency wants to support the establishment of such cooperatives, what should they do?
9. Any comment

KII Addet Agriculture Research center

1. What was the role of the center in the project formulation and implementation?
2. How was the integration of your office, CWWE, agriculture office and beneficiaries during the implementation of the project?
3. What was the operational research strategy you followed?
 - a. What methodology you applied?
 - b. Were the assumptions made by the project valued?(sustainable seed supply, joint work of actors and enhance food security and adapting CSA and promote income)
4. What appropriate technologies you piloted, tested and introduced?
5. What were the process, result and outcome on the following operation research?
 - i. Yield
 - ii. Disease and pest occurrence
 - iii. Adoption rate in technologies and improved practices
 - iv. Food and nutrition status
 - v. Income
- b. What can we learn from this?
6. What was done as part of refinement and scaling up(Phase II)
 - a. What methodology was refined and verified?
 - b. Gray areas examined?
 - c. Lessons from rechecking supply systems, knowledge and skill transfer, farmers adaptation rate
 - d. Yield level impact?
 - e. Major results of the operational research in phase II
 - i. Yield per unit?
 - ii. Cost benefit analysis
 - iii. Enabling environment situation
 - iv. Food intake particularly by children?
 - v. Capacity of cooperative leaders
 - vi. Users demand and supply capacity
 - vii. Change in income

viii. Market linkage

7. How was the lesson from phase I applied in phase 2 and prompted under phase III?
8. What advisory service was provided?
9. Was there any problem related to pests and diseases? Was the occurrence of pest and diseases significant, if any?
10. Was the time allocated for piloting and testing (phase I) appropriate, lengthy or in short?
11. Was it adequate to accomplish your piloting work?
12. What were major lessons and innovations of the project?
13. Any overlooked issues in the project formulation, implementation and sharing lessons
14. Any comment

KII with CWWE Area Coordination office

1. How you select the target kebeles?
2. Do you think that the selected kebeles are appropriate in terms of weather and other factors you consider for potato production?
3. How was the beneficiary targeting? Did the project considered women and most vulnerable groups?
4. Any lesson you import from Dessie Zuri and Delanta potato project?
5. How findings from monitoring, review, etc was applied or considered?
6. What technologies was tested and introduced?
7. How was the supply of seed for farmers and 125% repayment progressed? Any challenge and lesson on loan and repayments?
8. How you evaluate the strategy followed for testing and piloting the technologies?
9. Major tasks done by the task force and any lesson
10. What were the process, result and outcome on the following operation research?
 - i. Yield
 - ii. Disease and pest occurrence
 - iii. Adoption rate in technologies and improved practices
 - iv. Food and nutrition status
 - v. Income
- b. Major results of the operational research in phase II
 - i. Yield per unit?
 - ii. Cost benefit analysis
 - iii. Enabling environment situation
 - iv. Food intake particularly by children?
 - v. Capacity of cooperative leaders
 - vi. Users demand and supply capacity
 - vii. Change in income
 - viii. Market linkage
11. How was the lesson from phase I applied in phase 2 and prompted under phase III
12. Was success results obtained from the project implementation and research work?
13. What were market linkages created so far with different input suppliers and buyers?
14. Was there any scaling up/replication within and outside of the project area?
15. How you evaluate the promotion work done using the FM radio?
16. Where and how did you disseminate about seed and ware potato using brochures?

17. How was the performances of different forums (research institution and individual researches, beneficiary community level forum, district level actors forum, zone and region forum, national forum) Any lesson from such arrangements?
18. How do you evaluate the potato promotion forum?
19. What are key changes/results obtained from the project implementation?
20. Any sustainability mechanism built to sustain the platform for potato value chain actors?
21. Was there feedback mechanisms for the beneficiaries?
22. Any lessons that we can consider
23. Strengths of the project
24. Limitation of the project
25. Any comment

KII with Kombolch plant clinic

1. What was your role in the implementation of the project?
2. What quarantine procedure you followed to minimize risks in diseases, pest and quality?
3. What was your work relation with the forces established for monitoring and approving Quality Declared Planting Material (QDPM)?
4. How you evaluate the quality of the seed supplied and under circulation?
5. Any linkage for sustained supply of quality seed
6. Are there any overlooked points in the design and implementation of the project?
7. What are major strengths of the project?
8. Major limitations?
9. Major lessons?
10. Any comment

FGD with beneficiaries

22. Were you participated in the planning of the project?
23. Was the project as per your needs and priority?
24. How was the targeting done? Did the project considered women and most vulnerable groups?
25. How you evaluate the improved seed potato introduced to your community? Quality, time, production
26. How lead farmers trained, adopt the technology and others learn from them?
27. How you evaluate the advisory/technical service you received from agriculture, CWWE and research center?
28. Any assistance from HEW and how do you evaluate it?
29. Was the cooking demonstration important? What you learn from the event?
30. How you evaluate farmer's day and dissemination of research results? Was it relevant?
31. Any comment on the established cooperative to improve seed supply system?(their strength and limitations)
32. Any comment on the storage and the replication of stores at household level
33. What did the taskforce established to monitor quality of seed is doing and how do you evaluate their work?
34. How you evaluate the women training on the business of potato processing and techniques operating frying equipment?
35. How you evaluate the market linkage amount input suppliers and marketing agents?

36. Do you think that you continue producing and selling/consuming the seed and ware potato after the withdrawal of the project? Any threat or fear on the continuation of the service?
37. Was there any feedback mechanism on complaints to CWWE or government ?
38. What are major impacts/changes brought on your life?
39. Major strengths of the projects?
40. Major limitations of the project?
41. What should be improved for the future?
42. Any comment

KII for Potato promotion platform members (with value chain actors at Woreda and Zone level namely Zone and Woreda agriculture offices, Kombolcha plant clinic, office of trade and market development, cooperative and traders)

1. Who were members of the platform?
2. Frequency of meeting and its regularity?
3. Any linkage established among actors so far?
4. What are best practices identified and disseminated? How?
5. Any challenge faced during the joint actions?
6. What lessons were gained out of the discussions?
7. What opportunities emerged?
8. Do you think that the platform continue after the withdrawal of the project? How?
9. What lesson can generate from using platform for the integration of efforts, maximize outcomes and generate lessons and disseminate?
10. How innovations can be scaled up?
11. Any lesson from the forum?

KII - Development agents/manager and kebele chair

1. Did you participate in the project implementation?
2. How the operational research was done and results disseminated?
3. What went well in the research? Piloting- model farmers-dissemination/adaptation etc
4. How was the work relation of DAs and HEW?
5. What were successes of the project?
6. What lessons have been generated?
7. What should be modified or changed if similar project is to be implemented?
8. Any comment

KII - Health Extension workers

1. How you evaluate the training provided by the project on nutrition importance of potato?
2. What you did on the promotion of Irish potato for nutrition security?
3. Your comment on cooking demonstration of the potato?
4. Have you integrated this with the IYCF demonstration in your daily work?
5. What result you noted from the intervention? Is there change in the nutritional status of children over the last three years?
6. What are major lessons you got?
7. What are the strengths of the project?
8. What are major limitations?
9. Recommendation to improve for the future?

KII with Potato seed producers cooperative management

1. Is the cooperative legalized?
2. Number of members of the cooperative
3. Your current capital and assets
4. How the cooperative, purchase, store and sale seed potato?
5. Amount of seed potato procured in the last 12 months?
6. How you are working with the task force monitoring the quality of the seed?
7. Any market linkage established with the input suppliers and marketing agents?
8. How are you managing the store? Its storage capacity and the amount stored tally
9. What are benefits you get from the training and experience sharing visits?
10. Any challenge on the procurement, storage and sale?
11. Any technical assistance from cooperative office and agriculture?
12. What are major changes you noted due to the implementation of the project?
13. Do you think that you continue with the service
14. What are the three strength of the project?
15. Any limitation of the project to be improved for the future
16. Recommendations for future projects