



Support for Sustainable Development

Annual Report On Demale extension Project (January 1st, 2019 – December 31st, 2019)



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1. Project Overview

1.1. Background and Project Rationale

Demale Irrigation Project is found in Sebana-Demale kebele of Berhale woreda, in Afar National Regional State. It is located in an arid zone where drought is a major threat to the area. Unreliable rain is a major cause for the drought which has resulted in animal feed shortages and this entailed reduced livestock assets of the community. Due to this problem, the pastoralist communities of the area are obliged to keep few browsing animals such as camels and goats as they are relatively tolerant to the harsh environment as compared to the other species. Although livestock rearing is the main livelihood means for the majority of the Demale community; it is not enough to ensure the food security of the people in the area.

Households are using alternative livelihood opportunities to bridge the income gaps by practicing traditional irrigated agriculture by diverting the available river in the area. However, the traditional irrigation structure was damaged by flash floods repeatedly and causing wilting and drying of field crops. This challenge was brought to the attention of SSD for development assistance. Thus, the Demale project was launched to contribute to the improvement of food security through irrigated agriculture and other integrated interventions.

However, as the main canal geological structure formed from strong basaltic rock, the project extends for one year extension to complete all the planned physical activities and harvest the intended fertile soil from the river and grow crops and also consolidate and strengthen the irrigation scheme. In addition, building the capacity of the irrigation managing committee to insure the sustainability of the irrigation scheme was one of the activities included in the extension period.

This report summarizes Demale extension annual project accomplishment of 2019.

1.2. Update on the Food Security Situation

Sebana-demale kebele receives two flood seasons in a year from the Tigraye highland areas during the belg from March to April and main rainy season from July to September. In these two rainy seasons, the belg rain is failed but there were some floods during the main rainy season coming from the highlands. As per the announcement of the Afar government, the amount of rain expected in the Northwestern part of Afar (Berhale district) was below the normal year caused by the climate change effect. This weather change affects forced the government to continue food support to the community throughout the year. However, the small shower occurred in the area had favored the regeneration of shrubs which could be browsed by shoats and camels. As a result few households who have milking animals (goats and camels) at home could get milk and support their children with food for two months. The remaining household food deficit was fulfilled by the project and government support.

During the year, food support by the regional government to demale community was done. As per the information obtained from Brehale woreda government office food support was given to a total of 4,713 people (3,400 male + 1,313female)during the first semester and a total of 4,313 people (1,713 males + 2,600 female) were supported during the second semester.Total grain support done during the year by the regional government was 4,948.95 qtls (494.895MTs). Each food recipient has got 15kg wheat grain per month from the government food aid program.

2. Approved Changes to Project Proposal

For the extension project period, new proposal is developed as an extension to the previous Demale irrigation project by adding some activities and signed with the Afar government in a separate document. This new project agreement is made to start agricultural activities by harvesting fertile soil and grow crops during the Ethiopian rainy seasons. The other issue thatgot approved was the project handing over time. As the government partners are busy in December when planned to give the project for the community and the local government, the handing over ceremony is pushed by a week and carried out in January first week 2020. Because of this, SSD obliged to pay staff salary for the month of January 2020. For this, SSD pay the salary after gets approved by CLWR/CFGB.

3. Monitoring and Evaluation Methodology

Monitoring of the project is done regularly on monthly, quarterly, six month and annual basis as per the pre determined guideline included in the proposal. Accordingly, this report has taken into consideration of all the monthly and quarterly and six month project reports received from the project coordination office and quarterly monitoring reports prepared by the technical staffs from the head office who regularly visited the project to give technical backups. Daily followup and communication with the project staff how they are doing the planned activities and to know the work progress has been done through media like email and telephone services.

In the reporting periods, the household survey was conducted from 20 to 25December, 2019 to assess the project impacts in the second semester in 2019. From a sampling frame of 67 FFW participantswho have land from the project and participated in CFW in December, a sample size of 58 (41M+17F) FFW beneficiaries were randomly selected and interviewed based on a confidence interval of 5% and a confidence level of 95%. All the interviewed people are part of the FFW participant and land recipient and none of them got government aid. The other community members and land recipients are supported by the government food aid in the second semester of 2019 project year. The result of the second halfyear survey is analyzed her under in the table.

Table 1: Demographic of the sample people

Response	Sex		Relationship of the respondent to the HH				Marital status				Household Type		Male and female % of the surveyed households and household size		
	M	F	Head of HH	Husband/wife	son/daughter	other	Single	Married	Widow	Divorced	Male headed	Female Headed	Number of Male	Number of female	Total
Count	41	17	42	12	4	0	4	49	0	5	52	6	192	151	343
Sample size	58	58	58	58	58	58	58	58	58	58	58	58	343	343	
Percent (coverage) %	71%	29%	72%	21%	7%	0%	7%	84%	0%	9%	90%	10%	56%	44%	5.9

4. Input Summary

The project has used cash and grain as major inputs to implement various project activities. During the year, the project had planned to involve 405 people in the FFW program and distribute 80MT wheat grain (14.3MT carried forward from last year and 65.7MT purchased). However, the total unique FFW participants according to the payroll were 344 people (215 men and 129 women) and the rest 61 people (37 men and 24 women) had participated for more times in the year. Female participation in the total workforce accounts to 37.5% (129/344). The following table shows details of the FFW participants and the amount of grain utilized in the year. Other inputs for 2019 include; six staff with different technical skills and knowledge and one field vehicle.

Table 2: Wheat grain utilization in the year 2019

table 1 wheat grain distributed in FFW (January-December, 2019)											
Actual Vs planned	No of workers		Daily wage (kg/person/day)	#person days worked	MT wheat earned (#person days worked*Daily wage)	Beginning MT balance (Jan1, 2019)	MT purchased during period (Jan-December, 2019)	MT available (Jan-Dec, 2019)	Amount distributed (MT)	Spoilage (MT)	Ending balance on hand (MT)
	M	F									
Total Planned	251	154	8kg	10000	80MTs	14.3MT	65.7 MT	80MTs	80MTs	-	-
Total Actual	215	129	8kg	10000	80MTs	14.3 MT	65.7MTs	80MTs	80 MTs	0	Nil

The people who worked in the two semesters are different people from the Sabina Demalekebele. A total of 405 people (251M and 154W) participated (repeated 61 and unique 344) in the FFW activities of 2019. These participants were directly involved in the physical works and received wheat grain as wage payment

from the project. The total number of persons who directly and indirectly benefited from the FFW activities during the two semesters is shown in the table below;

Table 3: Direct and indirect FFW beneficiary of the project

Category	First semester beneficiaries (2019)		Second semester beneficiaries (2019)		Total direct & indirect individual beneficiaries	Land recipient	Total # of unique beneficiaries
	# of unique direct FFW beneficiaries	# of indirect FFW beneficiaries	# of unique direct FFW beneficiaries	# of indirect FFW beneficiaries			
men	114	58	101	62	335	457	215
women	65	150	64	184	463	53	129
boys	-	412	-	448	860		
girls	-	394	-	427	821		
total	179	1,014	165	1,121	2,479	510	344

Table 4; Land recipient and their family numbers

Participants type	Direct Land Recipient	Direct HH beneficiaries	Total beneficiaries
Male	457	396	853
Female	53	556	609
Boy children	-	785	785
Girl children	-	764	764
Total	510	2,501	3,011

5. Activity Summary

During the year, strengthening water user association to fair irrigation water distribution among target people, follow up of the safety of the canal structures and facilitation of community farming through acquisition of farm inputs from woreda pastoral agriculture office had been the supports done by the project. At this moment the project implementation period has been ended upon December 31st 2019 and handed over to the local community and district government on January 4, 2020.

Different activities were accomplished during the reporting period. The main focus was irrigation infrastructure construction. Apart from the construction activities: soil conservation activities, agricultural activities, community capacity building activities and experience sharing visits to other projects outside of Afar region was among the major ones. Detail of the accomplished activities vs. planned activities for the period is presented in the following table 5.

A. Beneficiary selection

Beneficiary selection for various activities implemented by the project has been done as per the selection criterion set for each activities. In the reporting semester, soil harvesting and crop marketing trainings, field day

and experience sharing visit programs and FFW activities conducted. The beneficiary selection criteria presented below was developed and provided to the community and government representatives as usual.

I. Criteria for FFW and land distribution

Criteria to select beneficiaries for activities in 2019	
Food for Work	Land ownership /irrigated agriculture
households severely affected by the recent drought	Poor households with food security problem
generally poor households (based on local wealth standards)	Resident in the project kebeles and member of the sub clans in the area
Widow women/ women headed households	willing to engage in farming Agriculture
Elderly headed households with an able-bodied member	physical capability to work in irrigated agriculture
Able- bodied; i.e. capability to engage in physical works	Sub clan quota sharing
Over 20 years of age	Over 18 years of age
Partner office experts	Resident of the kebeles

Based on the above-mentioned criteria, FFW workers were selected and involved on different project activities during the year. Furthermore, the target farmers, Kebele Administration and District Pastoral Office had implemented the farm land distribution. The total 170Ha of land has been distributed to 510 target households.

II. Criterion for training programs

During the year different trainings and experience sharing visit were performed, details are given under their specific activity line item. Training participants were selected using the criterion below: In this reporting Period, four types of trainings were conducted; hence relevant participants to the types of trainings and knowledge exchange programs are selected based on the criterion set here under.

Soil harvesting technique training	Water management training	Crop marketing	Food preparation and demonstration training	Educate farmers how to construct farm basin for soil harvesting
Resident of the kebele	Resident of the kebele	Resident of the kebele	Resident of the kebele	Resident of the kebele
One who received irrigated lands from the project	Land recipient	Land recipient	owner of farm land or be a spouse	Land recipient
One who can be model to others in soil harvesting & crop development	Widow women/ women headed households	One who practice crop production for household food as well as for market	Willing to diversify the household food consumption culture	Eager /willing to learn new skills in soil harvesting techniques
One who is eager to learn & adopt the knowledge and skill to change his life	physical capability to work in irrigated agriculture	One who is more interested in growing market oriented crops	Willing to demonstrate the acquired food preparation skill to others /neighbors	Volunteer to show the acquired skill to other farmers
Influential to be heard by others	Volunteer to model farmer	Influential to be heard by others	Willing to learn	Influential to be heard by others
Over 18 years of age	Over 18 years of age	Over 25 years of age	Over 18 years of age	Over 18 years of age

III. Criterion for field day and experience sharing programs

In the semester two farmer to farmer knowledge transfer i.e. field day and exposure visit programs have been carried out by the project to practically demonstrate and learn from others. The criterions used were lined under.

Criteria to select beneficiaries for activities in 2019	
Field days	Experience sharing visit
Anticipated Land recipient or target farmer	Land recipient
Interested to be a model farmer	One who started crop farming
Eager to receive new working techniques & technologies.	One who is eager to learn & adopt the knowledge and skill to his farm
Cooperate with other farmers	Interested to be a model farmer
One who can be able to share the knowledge to others	One who can be able to share the knowledge to others
Over 18 years of age	Over 18 years of age
Resident of the kebeles	Resident of the kebeles

During the year, a total of 344 people (129 women) addressed by FFW as seen in the table below. These programs were implemented so as to equip the project beneficiaries with different knowledge and skills on crop production and scheme management. All these people are part of the target beneficiaries, 510 farmers(457M and 53F) and FFW participants.

Table 4: Shows support program executed for target community

Beneficiary disaggregated	Beneficiaries/Activity							
	FFW	Farmers	Soil harvesting technique training	Water management training	Food preparation from own product	Crop marketing	Field days	Experience sharing visit
Men	215	457	54	33	0	53	82	36
Women	129	53	26	17	40	27	34	19
Total	344	510	80	50	40	80	116	55

Note:- the unique FFW beneficiaries are 344 people (215 men and 129 women) but the number of FFW beneficiaries in the table above holds both the unique and repeated FFW beneficiaries.

Table 5: Activities annual plan and accomplishment details for the year 2019

Item no	Description	Unit	Plan For 2019	Annual accomplishments in 2019		Remake
			Project annual plan	Quantity	%	
1	Irrigation canal extension ,maintenance& protection					
1.1	Secondary canal excavation	km	2	2	100%	
1.2	Drop structure construction on the secondary canal	No	8	8	100%	
1.3	Division box construction on the s. canal	no	9	9	100%	
1.4	Road and drainage culverts on the secondary canal	no	3	3	100%	
1.5	Gate purchase and installation on division boxes	no	27	28	104%	
1.6	Main canal clearing from stones and other debris	M3	3200	3200	100%	
2	Agricultural development and extension					
2.1	Cereal seed provision to the farmers	qts	30	32	107%	
2.2	Different vegetable seeds provisions	kg	50	20	40%	As the price of vegetable seeds is doubled at the market, 40% of the plan is achieved.
2.3	Provision of improved fodder/forage seeds	kg	40	60	150%	20kg additional seed could be purchased with available budget
2.4	Educate farmers how to construct farm basins for soil harvesting	people	480	480	100%	
2.5	Facilitate primary tillage by purchasing oxen with accessories	no	10	10	100%	
2.6	Provide hand tools to facilitate farming activities	pcs	100	133	133%	More hand tools could be purchased with allocated budget
2.7	Provision of pesticides	lit	10	10	100%	
2.8	Provision of knap sack sprayer	pcs	2	2	100%	
3	Natural Resource conservation and management					
3.1	Construction of soil and stone bunds	km	5	5	100%	

Item no	Description	Unit	Plan For 2019	Annual accomplishments in 2019		Remake
			Project annual plan	Quantity	%	
3.2	Construction of stone check dams	M3	200	200	100%	
3.3	Construction of cut off drain	M3	300	300	100%	
3.4	Production of multipurpose tree seedlings	no	1500	1500	100%	
3.5	Plantation of seedlings	no	500	500	100%	
3.6	Facilitate production & plantation of vetiver grass along the canal	Slips	2000	2000	100%	
3.7	Nursery & demonstration site management	sit	1	1	100%	
3.8	Provision of fruit seedlings and banana cultivar	no	300	300	100%	
4	Community Capacity building					
4.1	Provide training on soil harvesting technique	no	80	80	100%	
4.2	Train farmers on marketing of crops	no	80	80	100%	
4.3	Refreshment training on water management	no	50	50	100%	
4.4	Organize and conduct farmers field day on field crops	sessions	2	2	100%	
4.5	Organize and conduct food preparation and demonstration training	no	40	40	100%	
4.6	Organize experience sharing visits for WUA,SAC 7 other community members	farmers	40	55	138%	
4.7	Provide handing over workshop	Session	1	1	100%	

6. Results Summary- Outputs and immediate outcomes

6.1. Outputs

6.1.1: Output 1: Wheat paid to FFW participants as wage for labor

Similar to the first phase of the project, SSD had used wheat grain to pay for daily laborers as wage for their labor contribution. Men and women had participated to implement project activities. In the reporting period, the project had planned to distribute 80 Mt of wheat grain to 405 FFW program participants (of which 154 were women). However, 344 community members (129 women and 215 men) were jointly selected by kebele administration and project committee and were involved in food for work program at different times and they are paid a total of 80 MT of wheat grain as wage for the labor they rendered to implement project activities.

6.1.2. Output 2: Irrigation canal extension, maintenance and protection works completed

A. Main outlet gate installed

The main gate is the key water controlling system which is part of the river diversion work at the project. In the reporting period, the region and district government officials discussed with SSD during project monitoring about the installation of the main gate while they monitored the project outputs. They didn't need it to be installed during the first phase but through time they claimed it that SSD should do it before project closing in December 2019. Thus, SSD design the gate and order to the metal workshop and when it gets finished SSD fixed it at the retaining wall and at the same time trained the WUA committee members how to operate and manage it while opening and closing the gate.



Figure 1: Installed Main canal gate at the retaining wall to control water diversion to the canal

B. Secondary canal excavation

The plan for the year was to excavate 2 Km of secondary canal; accordingly 2km or 1,954.62m³ soil was excavated to irrigate 10ha of more lands in the extension period. Thus, the accomplishment was 100% and the total irrigable land size has reached 170 ha (160ha + 10ha). The secondary canal is used to take water from the main canal through the division boxes and feed to the farm channels.



Figure 2: Secondary canal excavated

C. Drop structures constructed on the secondary canal.

These structures are very vital on the canal routes to maintain the smooth flow of water with in the secondary canal. It helps to reduce the water flow speeds in the canal by dropping it with some height and also to keep the water level into the canal while flowing below the free board. A free board is the space or height of the canal above the water level that used to direct the water flow in the canal. As per the plan for the year, 8 drop structures were constructed and the accomplishment is 100%.



Figure 3: Drop structures constructed

D. Division boxes constructed on the secondary canal

Division boxes are used to divide the water into two or three directions and to convey it to the farm blocks through the farm channels. The annual plan was to construct 9 division boxes; accordingly the accomplishment was also 9 division boxes which were constructed in combination with the drop structures and alone as well at required locations.



Figure 4: Division boxes constructed

E. Road and drainage culverts constructed on the secondary canal.

It was planned to build 3 road & drainage culverts and 3 culverts were constructed as per the plan .This structure is used to serve as a bridge for animal and human to cross the main canal. In addition it will serve as to collect and drain excess overland floods during rainy time to the natural water routs. As a result students could able to cross the main canal to their school and people drive their animals to the farm areas.



Figure 5: Road & Drainage culvert constructed

F. Canal gates were purchased and fitted to division boxes

Wooden gates were prepared from lumber and fitted into the division boxes slits prepared for this purpose. This would help to convey water to irrigable fields on both direction of the canal as required. Accordingly a total of 28 gates were prepared and fitted to the division boxes as per the plan for the year.



Figure 6: Wooden canal gates fixed into the division box slots

G. Main canal clearing from stones and other debris

Clearing of the main canal from different material that impedes the smooth flow of water in the canal was done in this reporting period. Accordingly a total of 3,200m³ different kinds of materials, silt and stones were removed from the canal. Plan is 100% accomplished. Thus, the water could safely reach the irrigable plots without interruption.



Figure 7: Main canal cleared from silt and debris

6.1.3. Output 3: Target farmers adopted sustainable irrigation farming practices

A. Cereal seed was purchased and provided to the farmers

Farmers engaged in irrigation farming have been using their local seeds for longer period. Thus it was important to replace them with productive seeds which are selected to suit the environment. Thus, the project had purchased different types of cereal seeds such as 14 quintal sorghum, 1.5 quintal mug been, 15 quintals maize, 1.5quintals groundnut and a total of 32 quintals of various kinds of seeds were purchased and distributed to 127 target farmers who are engaged in crop farming in the year and each received on average 25.2kg of different seeds. The farmers were determined from their active performance at their farm areas. They were selected together with the pastoral and SSD experts. The first sorghum and the second maize crops are planted after the fertile soil harvesting is end up since October 2019 and currently found on vegetative stage as it can be seen under. They will be harvested since third week of January 2020.



Figure 8: Sorghum and maize crops planted by the farmers

B. Different vegetable seeds were purchased and provided to the farmers

To motivate the target farmers, the project purchased some improved vegetable seeds from Mekele for distribution. Accordingly, in this reporting period 8kg tomato, 5kg onion, 3kg carrot and 2kg lettuce, 1kg pepper, 1kg cabbage, totally 20 kg of vegetable seeds were purchased and distributed to 80 farmers those who are committed to exercise the required cultural practices of vegetable growing and each received on average 250 gram vegetable seeds from the project. Therefore, a total of 50kg of vegetable seeds planned to purchase and distribute to target farmers but due to the price increase for vegetable seeds at the market it was only possible to buy 20kg with the planned budget and distributed to 80 target farmers.

C. Improved fodder and forage seeds were provided to farmers

In Demale area out of the irrigation areas, there is nothing grown except some acacia shrubs for the livestock to browse. However, the project intervention had creates good opportunities for the target people to use the only resource Demale river water for crop production and led to better hopes in their life. The project helps them not only for crop production but also for growing fodder for their animals. In this extension period, the project had purchased different types of fodder seeds and distributed to farmers so that they can grow it adjacent to their crop field. Accordingly, 25kg Rhodes grass, 25kg panicum grass and 10kg leucaenia a total of 60 kg (forage shrub) seeds were purchased and distributed for 40 target farmers and each received on average 1.5kg seeds. These farmers were selected based on their interest to develop fodder grass around their farm borders and those who have cow and oxen and also active participants on crop production. Here the price of these fodder grasses and plants at the market is reduced due to their availability and hence more amounts are purchased with the planned budget for the year. The seeds have been given to these farmers for the purpose of harvesting seeds and also collect biomass to feed their animals.

D. Farmers education on basin construction for harvesting fertile soil completed

In order to effectively harvest the fertile soil that coming from Tigraye highlands, farmers should be alerted and technically demonstrated on their farm plots before the expected floods coming. Taking this into consideration, SSD create awareness by educating about 510 project farmers (53 women) who have got irrigable lands from the project. The awareness program is supported with explanation and field demonstration as to how to make soil collecting structures by soil ridges backed with stone bunds. In addition to this, the participants visited the traditional farm areas and discussed with them on how they reached and maintain the fertile soil and able to grow crops.

The entire awareness creation workshop, participants were very much inspired and committed to start the job. Every canal structures are made ready for harvesting floods to the farm areas so as to retain fertile soil for crops growing.



Figure 9: Farmers education on basin construction

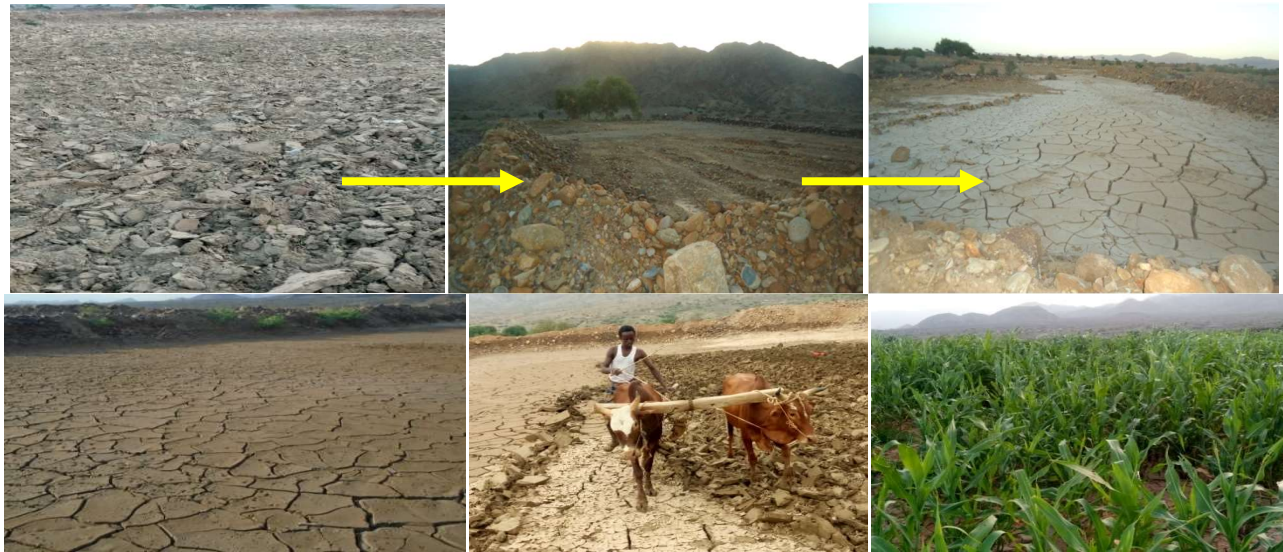


Figure 10: Fertile soil collected for crop production

The above picture shows that how the alluvial fertile soil eroded from the highlands and trapped and accumulated in the farm basin from the river at Demale in one flooding season. It is a great hope for the target people created to change the stony land into agricultural fields and using this opportunities drought risks that repeatedly and negatively affects their livelihoods could be avoided by growing food crops.

E. Ten Oxen were purchased and given to the farmers to facilitate farming

In this extension period, a total of 10 oxen with five local plough accessories were purchased and handed over to the water user's association committee. They have taken responsibility to properly manage and feed the oxen and also fairly assign to the need farmers to cultivate their land. Farmer's representatives, kebele leaders and Veterinary assistant from the woreda agricultural office have participated in the oxen purchasing process. Prior to purchasing the oxen, the health status of the oxen was checked by the Vet – Assistant assigned by the woreda pastoral development office right in the market. These oxen are given to the target farmers to use in groups and also to show and instigate the beneficiaries and the local government that this is a sample done by the SSD and

the beneficiaries should buy and increase their numbers from their own account or money. On this government should also assist them technically or financially if needed.



Figure 11: Oxen purchased to support farming business

F. Farm hand tools were purchased and distributed to target farmers

The main aim of hand tools provision is to fill the gaps seen at the farming communities and facilitate effective land preparation, crop watering and harvesting operations while doing at their farm areas. In this reporting period, different types of hand tools were purchased and distributed for 127 HHs who have started irrigation farming in the year. Accordingly, 50 pick axes, 50 shovels, 20 sickles and 13 flat hoes a total of 133 different small farm tools were handed over to farmers. Some farmers who are model farm among have received two types of hand tools like flat hoe and sickles the rest only received one type per household. The achievement is greater than by 30% from the plan due to the hand tools price is reduced and help us to buy more and reached more people. The farm tools were distributed based on the type they need, however they can use interchangeably by borrowing from other farmer as required of farmers.



Figure 12: Hand tools distribution to farmers

G. Pesticide was purchased and provided to farmers

Crops grown using irrigation in hot climate is always vulnerable to insect pest attack unless necessary precaution measure is taken. Hence, different types of chemical pesticides were purchased and distributed for project beneficiaries so as to protect their crops from pest invasions. To this end a total of 10 liters of different kinds of pesticides and insecticides were purchased and distributed to the WUA to easily manage the distribution process to farming beneficiaries. The types of pesticides distributed were 2kg mancozeb, 50% 4 liter of

Malathion, 2liter ride, 1liter profin and 1kg co-oxide which is a total of 10kg or liters used to support farmers to spray their crops to protect from crop pests.

H. Knapsack sprayer was provided to farmers

In order to apply the pesticides to the affected crops, farmers will use a sprayer to easily manage pests from their crops. Thus, two knapsack sprayers were purchased and handed over to the water user's association committee to properly handle and access to each target farmers on demand. Filling of adequate water for the required amount of chemicals and how to mix the chemicals with water and spray with care is properly demonstrated at field level to the model farmers and WUA committee members. These two groups will ensure the safe handling, maintenance and fair use of sprayers to members, correct dosage and timely application of pesticides. With the knapsack sprayer appropriate protecting masks were also availed to the farmers. The accomplishment is 100%.

6.1.4. Output4: Retention bunds, check dams & cut off drains constructed and vetiver planted

A. Soil and stone bund constructed

Bunds are constructed to protect the head work and the canal from flash flood while raining above the catchment found above the farm and canal areas. In doing this, water will be retained in the bunds and the soil moisture will be improved so as to favor good grass and shrub developments in the trenches for the animals. In this reporting period, 5 km soil and stone bund had been excavated with recommended depth and width in selected catchment that was exposed to erosion. The accomplishment of this activity is 100%.



Figure 13: Soil & stone bunds constructed

B. Stone check dams constructed

The year plan was to construct 200m³; accordingly, 200m³ check dam was constructed at places where small gullies and ravines are dissecting the catchment above the main and secondary canal. The accomplishment is 100%. The purpose of constructing this structure is to prevent further gully formation and reclaim the eroded land by reducing its slope and by then to deposit the soil in the gully.



Figure 14: Stone check dams constructed

C. Cut off drain structure was constructed

The main purpose of cut off drain construction is to protect the main and secondary canals and also the terraced lands from flood damage and silt deposition in the systems. In addition to that, it helps to drain the flood into the natural routes of gullies or river. This cut off structure is done at where high overland flood is expected in the year and considered to be cause for structure damages. To this end, it was planned to construct 300m³ for the reporting period. Accordingly it was accomplished 100% as per the plan.



Figure 15: Cut off drain excavated

D. Multipurpose tree seedlings were produced

Besides irrigation structure construction and farming, seedling productions are one of the project concerns to demonstrate and motivate local community to change their environment by planting as well as protecting trees together with their crop farming. The project was expected to produce 1,500 multipurpose tree seedlings for plantation and to distribute to farmers and institutions found in the project kebele. Accordingly, 1,500 multipurpose tree seedlings like melia, moringa, etc have been raised in plastic pots and distributed to the beneficiary farmers to plant along with the farm channels to stabilize it and also to create favorable environment to them. They were distributed to 50 farmers and each received 30 seedlings. Seedling distribution is done to those who are volunteer to plant and care them until established well by watering, weeding and hoeing them. It is 100% achieved.



Figure 16: Seedling production at the nursery site

E. Production and plantation of vetiver grass completed

It is planned to transport from other SSD sites rather than producing it and to plant around the main canal. To this end, a total of 2000 splits of vetiver grass were transported from other SSD projects distributed to 40 farmers and each received 50 vetiver splits to plant around their farm edges to stabilize the bunds constructed for soil harvesting purposes. The selection of farmers was volunteers and interest based as the vetiver needs care and good management until it establish well.

F. Nursery and demonstration site well managed

The project has established one multipurpose nursery and demonstration site on 0.25 ha of land around first drop structure. The main aim of establishing this site is to practically train the target farmers and to use it as a multiplication center for grass seeds and groundnut to later distribute to 10 target farmers. The seedlings demonstrated were maize, mung bean (masho) and different vegetable crops and their proper cultural practices. The project uses this demonstration site while conducting practical training sessions on different crop production practices. The project collected fertile soil for demonstration site from the canal while flooding; this is another good practice which could motivate farmers that it is possible to change gravel land to crop land.



Figure 17: Fertile soil harvested & crops and grass grown at the demonstration site

G. Provision of fruit seedlings

In order to diversify farmers food variety and income source, the project aware the target farmers about the benefit and managements of the fruit plants besides the usual crop farming around their farm areas. As the project site demale is found in the lowland agro-climatic zone, the weather suites for the development of fruit plants which needs hot weather, water and soil. In Demale area all these are available to promote fruit farming.

In this reporting period, 200 avocado and 100 Apple mango fruit seedlings were purchased and distributed for 50 target or model farmers. They have each received 6 improved varieties of these plants and planted around their farm areas.



Figure 18: Provision of Avocado & Apple Mango seedlings to farmers

6.1.5. Output 5: Farmers training, experience sharing and on-farm demonstration completed

A. Training on soil harvesting technique provided

The project has organized training on soil harvesting techniques for 80 people in two rounds. Out of the training participants 26 were women. The training was conducted at Sešana–Demale kebele. The training had focused on soil harvesting techniques on their farm land during flood season by constructing soil ridges in rectangular system so as to harvest the fertile soil and plant crops in the basin when the required soil depth is attained. This is the main and very important activity for the farmers at Demale project, because their agricultural activity is mainly dependant on the soil captured on their plot of land from the flood coming. Thus the farmers have attentively followed the training. In addition to theoretical explanation, they have visited the practical work done on the field how soil could be retained by doing soil conserving techniques. Other farmers can learn from these trained farmers while doing at their farm and farmer to farmer experience sharing system.





Figure 19: Farmers training & on field demonstration

During the training session farmers well discussed comparing their traditional way of soil collection and the current better technique was envisaged for them to convey flood water through division boxes and secondary canal structures. The trainer advised them to eagerly wait and collect fertile soil from the flood when there is full fertile soil in the river during flood time. In the dry periods the river has soil free water flowing throughout the year which helps to water the crops rather than expecting to harvest fertile to the farm.

B. Crop marketing training conducted

The main purpose of conducting crop marketing and market development training is to enhance the farmer's ability to find market and negotiate better prices for their products. A total of 80 target farmers (out of which 27 were women) have been participated on the training. SSD organized this training for those who have received irrigable land from the project to motivate them to focus on market oriented crops and equip them with necessary skill when, where and how to market their crops to fetch good income to the households. The trained farmers can share this with other target farmers by their farmer to farmer communication and during their meeting and any other occasions.



Figure 20: Farmers training on crop marketing

The training topics covered in this session included:-

- The need to produce diversified food and cash crops for consumption and market
- How to maintain quality of seed products (minimizing storage loose of seeds) prior to sale.
- How to negotiate price for products and timing (Scheduling) of marketing crop products.

-
- Linking /establishing communication with neighbor woreda marketing agents
 - Attention that should be given to perishable crops such as vegetable, and fruits (post harvest handling).

C. Refreshment training on water management was conducted

In this reporting period, the project has facilitated three days training session for 50 people (17 female). The community members comprise of from WUA executive committee, community leaders, irrigation users and development agent from the government office. The training has focused on how to carry out equitable water distribution and how to manage conflicts, canal clearing, maintenance of canal and other parts of the scheme by users and water management.



Figure 21: Irrigation water management training participants

The need for this refreshment training that was planned to discuss how the WUA executive committee work after they are being trained and if some weakness is identified to support or give direction to them to improve their performance of irrigation water distribution and management services expected of them. Training participants openly discussed and committed to correct the misuse, such as flooding the crops and frequent watering beyond the crop water needs and develop mutual help and cooperation among them when using the only and common resource i.e. diverted water. During the second semester of the year, the already started WUA legal registration process was finalized at Afar Regional State (Samara). The name of the cooperative is ‘MORROI WUA’ and the cooperative received certificate from the government. After fulfilling the necessary formalities and legalization process the association has opened a bank account at Barahale woreda Commercial Bank of Ethiopia.

D. Farmers field day was organized

Two field day sessions were organized at the project demonstration site in the two semesters. On this program 116 community members (34 women) participated on the field day sessions organized during the first and

second semester of the year. The project community development worker had briefed the participants on the type of crops suitable for the locality and its appropriate cultural practices, water requirements of the crops grown and frequency of watering of each type of crop. The crops demonstrated include Beet root, onion, tomato, papaya and cabbage. On this occasion, apart from agronomic practices of the crops, the food values of the crops was also explained and demonstrated. The visiting groups were encouraged to prepare food from these crops and consume at household level to improve their dietary.



Figure 22: Farmers field days

In order to disseminate the knowledge and technical skill on crop production at pastoral areas, these practical demonstration sessions at the field level is the prerequisite and most important knowledge transfer tool ever tested by SSD during its long years of experience. Farmers can easily catch up and transfer the practice to their farm plots after learning by doing.

E. Food preparations and demonstration sessions organized for project women

The main purpose of transforming pure pastoralist community to agro-pastoralist status is to support and diversify their food consumption habit which mainly depended on livestock product. Thus, following the production of different kinds of cereals and vegetable, women are given training on how to prepare food for the household from what they have produced. The women are more responsible to care for the growth and health of their children; hence the food preparation training is accompanied by briefings on the nutritive value of vegetables, pulse and cereal crops. During the year, a total 40 women from the project area were selected and given 3 days intensive training on the topic. The women are selected from each village where Afar collectively

live in and also one who is volunteer to be trained and can pass the knowledge gained to her villagers. We took from 10 villages 4 women from each village.



Figure 23: Food preparation training participants

F. Experience sharing visit was organized for WUA, SAC leaders and community members

Experience sharing visit was arranged for community leaders and irrigation user's association members in the reporting period. The experience sharing tour participants were taken to Tigray region, wuekero district genefele kebele and werire dam irrigation cooperative. A total of 38 people were included in the visit and 14 of them were women, this experience sharing visit was conducted in the first semester of the year. During this visit they were able to see different vegetable crops, such as potato, onion and different fruit trees produced by the farmers. On top of that, the visiting group was explained about the well organized farm management and marketing mechanisms they have developed through time.

The different cropping patterns adopted by the farmers and the systemic crop rotation methods and its advantages were also explained to the group. It is understood that this is the final year for the project to phase out its program, so it was decided to farther aware and strengthen the executive management committees of WUA, WSCA and the kebele leaders on the irrigation management, bookkeeping and financial management and collaboration to be established with concerned government offices. In order to facilitate this experience sharing visit was arranged during the second semester of the year for 17 people out of whom 5 were women. The executive committee members were taken to Aba'ala where they could acquire some management skills and also discuss with the Zonal concerned office leaders and staff for some collaboration and assistance needed from them. Thus, the total experience sharing participant during the year was 55 people which make it 138% accomplishment. The second round experience sharing visit was managed by available budget without incurring extra cost.

This experience sharing visit program is not only to learn from others but also help the visiting team to create good communication for future information sharing among the two communities, Afar and Tigre peoples.



Figure 24: Experience sharing tour participants

G. Women SAC groups strengthened

In the year 2019, there was no new IGA's or saving groups established but those previously established were strengthened through meetings and discussions and also home visits. During this period, even though the saving and credit scheme was handed over to the district cooperative office, the project supports the credit groups on cash collection and depositing it into the bank by facilitating transportation means. Currently, the women saving groups are actively run their businesses and linkage or communication with district as well as with the regional cooperative bureau have been created and also future support thoroughly discussed.

G. Project handing over workshop was conducted

The one year extension period of the project has come to an end as of December 31st, 2019. Taking into consideration, SSD had organized a handing over workshop by involving the regional government officials the project beneficiary communities, kebele and community leaders. This was conducted on January 04, 2020 in the presence of SSD general manager. On this occasion, thorough discussion was held and different issues were raised by Berhale woreda administrator and the community on the possibility of extending this fruit full project to other needy people of the woreda. The general manger has responded to their questions in a way that " this project has completed its period and for the new development interventions they could have submitted their appeal to the regional government to SSD.

During the workshop, SSD not only hand over the physical structures but also gave the project technical document design and the document which consists of project reports including irrigation and saving and credit beneficiary lists to the Berhale government and the beneficiary communities for future references.

Finally the government official and the community representatives have expressed their heartfelt thanks to the Donor (CLWR/CFGB) for their financial support and also for SSD who implemented a wonderful project which can benefit and change the life of the community at large.



Figure 25: Demale project handing over ceremony

6.2. Immediate outcomes

6.2.1. Immediate Outcome 1: Increased availability of food at household level from FFW

The indicator for this immediate outcome is the amount of wheat received by FFW participant households. The plan for the reporting period was to distribute 80MT of wheat to 405 FFW participants. The actual amount of wheat distributed was 80 MT (65.7MT purchased and 14.3MT carried forward from 2018) which was received by unique 344 FFW participants (215men and 129 women) in the year. The target was 40% female participants but only 37.5% was achieved. The number of women to be selected is given for the targeting committee but during any new registration time they brought less number to SSD to be registered and work. The other reason was as the temperature raise the committee prefers men than women to select to save women from hardship and let them to household chorus or work.

6.2.1. Immediate Outcome 2: Increase in fertile and cultivable land for crop production

The indicator for this immediate outcome is “Annual ha of land covered by fertile soil”. In the reporting period, some farmers have collected fertile soil in the two flood times which occurred in April and July - September. The collection of fertile soil is dependent on the volume and duration of the flood that comes from the highlands. In the year, about 3ha of land which was covered with soil gravel mix is by now covered with fertile alluvial soil harvested from the river during July and August main rainy season. Up to now, farmers covered 5ha uncultivable gravel mix farmlands with fertile soil so far, and farmers have started planting sorghum, maize and ground nut.

There are 45 more ha that need to be covered by fertile soil. Everything that needs technical skill and necessary hand tools are already supported by the project before phase out and also the government is fully involved on assisting the farmers besides SSD during the extension period and finally they know it is their responsibility to be there and help them forever. Therefore, the rest 45ha will be covered through time by the beneficiaries with the backups from the government.

6.2.2. Immediate Outcome 3: Increase in irrigated and cultivated land for crop production

This immediate outcome has three indicators ‘Hectares per household of irrigated and cultivated land’, “Number of households with irrigated & cultivated land” and “Total hectares of irrigated & cultivated land”. A total of 10ha of farmlands have been distributed to 30HH from the newly added farm areas. So far all the

proposed or planned 170ha of farmlands have been distributed for 510HH and each received 0.33ha of lands from the project.

Currently, 60ha of lands are by now found on planting with crops. The cropping season for crop farming at Demale area will be continued up to February and hence until then 60ha additional farmlands will be covered by using irrigation. The rest 50ha of farmlands will be developed by harvesting the fertile soil from the river during raining season in April (small rain) and from July to end of August (Big rainy season). The remaining ha will be developed by the farmers with the help of the government.

Indicator	Baseline	Achieved Jan - Dece 2018	Achieved January –Dec 2019	Targets For the project
Hectares per household of irrigated and cultivated land	0.05ha/HH	0.33ha/HH	0.33ha/HH	0.33ha/HH
Number of households with irrigated & cultivated land	75 HH	81 HH	180HH (127 harvested their crops and the rest 53 farmers planted but not harvested upto end of december)	510 HHs
Total hectares of irrigated & cultivated land	25	27	60	170 ha

6.2.3. Immediate Outcome 4: Increased adoption of irrigation farming

The indicator for this outcome is “Number of farmers properly using irrigation farming practices”. During the baseline assessment, 75 farmers were properly using irrigation farming practices by traditional means. To date a total of 170 ha of land was distributed to 510 beneficiaries. Out of the total users, about 127 target farmers cultivate and plant maize, sorghum and groundnut at 60ha of farmlands since October 2019. The newly land recipients are waiting for fertile soil to be deposited before they can start irrigation farming. Covering the irrigation lands with crops is continued after the project phased out. Thus, the main agricultural adoption work like proper land preparation, water application, and crop rotation, and pest, weed and disease control is effectively practiced by the farmers. Using improved seed varieties is also well adapted by the target farmers.

6.2.4. Immediate Outcome 5: Functioning and sustainable community management system for irrigation infrastructure

There are four indicators identified to measure this outcome, “Water Users Association collects the required user’s fees on time”, “Irrigation scheme functioning well”, “Percentage of complaints over water and soil access resolved by WUA,” and “Level of satisfaction of participants with the irrigation scheme and its management.”

In the reporting period, no fee collected as few (127) people are involved in crop production from 510 target farmers and as per the agreement they made no fee collection in the first two harvesting seasons, but they will do starting from the third season. As per the designed parameters, 3.15lit/sec/ha water can be discharged from the river through the main canal to the farm areas to address all the farm lands i.e. 510ha. 75% of complaints over water access are resolved by WUA during irrigation time. The WUA committee tried to share the canal water equally to the users upon keeping their turns. But sometimes, due to the harsh weather they are not always present at the farm areas to oversee the water utilization by the farmers. Then during this

time disagreement on water sharing has observed and denuding others crop fields with water by taking excess water is also reported from those whose crops are affected. Hence, these complaints resolved through discussion with the WUA executive committee and farm owners. The irrigation scheme is constructed by keeping its standard and quality to give and attain its life years (25 year services) with minimum maintenance if minor damage is occurred around the canal areas. So that the scheme is functioning well by providing the designed water amount to the farm areas and in addition no damage happened to any structure in the extension period. With regard to level of satisfaction, the participants said that they are fully satisfied by the irrigation scheme implemented. Main gate is installed or fixed so as to control the amount of water to be conveyed to the farm while harvesting the fertile soil. Operating of the main gate is demonstrated or shown to the water committee members how to manage and control the system while diverting the river water to the farm areas and then its distribution to the farm areas.

In order to make the community management system strong and sustainable for the scheme, capacity of the irrigation cooperative managing body is built and checked during the second semester in 2019. They well managed and proved their responsibility enthusiastically and with strong dedication or commitment.

6.2.5. Immediate Outcome 6: Increase in women's engagement in new income generating activities

The indicator for this outcome is "Number of women engaged in new IGA's". In 2019 there was no new IGA's established but they are the year two and three beneficiaries (i.e. 100 women who organized before the year 2019 project periods). In the reporting year, 41 women are received revolving money for the second time from WSAC cooperative and currently their number who run their business under WSAC cooperative are 91 (50 in 2018 and 41 in 2019) women. The others 9 were not continued for the 2nd time to take money from the WSAC. During this period, even if the saving and credit scheme is handed over to the district cooperative office, the project supports the district government experts and WSAC executive members to collect the cash and depositing it into Berhale commercial bank by providing logistic service i.e. transportation means.

6.3. Intermediate Outcomes

6.3.1. Intermediate outcomes1: Increased food consumption by 630 FFW participant households

The indicator for this outcome is "average number of meals per day and percentage of received grain consumed directly by recipient households". Survey was conducted for 58 (41 men and 17 women) sample households from the sample frame of 67 FFW users based on a confidence interval or margin of error 5% and a confidence level of 95% at the end of December 2019. All the survey participant households were asked how many meals the HH has consumed during the past 24 hours recall period. Almost all the respondents explained that morning, midday and evening meals were consumed. It should be noted that the anticipated irrigation users did not fully start land cultivation as a result of waiting for fertile soil depositing on their farm field; hence, the HH food was secured from the FFW payment to those who participated on FFW of the project activities.

None of the 67 FFW participants got food aid from the government in the second semester because they were already assumed to be supported by SSD and due to this the government gives their support to other community members.

Table 5: shows meal time/day

Baseline March 16-25 2016		2016 Annual survey January 11-16, 17		2017 Annual Survey (January 22-26, 2018)		2018 Annual survey (January 1- 5, 2019)		Midyear survey July 1 – 6, 2019		2 nd half year survey result December 25-30 2019		
Meal time /day of house holds	Responses (n=214)		Response(n=86)		Response (n= 110)		Response (n= 56)		Responses (n=68)		Response =58	
	Yes count	%	Yes Count	%	Yes count	%	Yes count	%	Yes Count	percent	Yes count	Percent
Any food before a morning meal	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
A morning meal	212	99%	86	100%	110	100%	56	100%	64	94%	54	93%
Any food between morning and midday meals	0	0%	0	0%	0	0%	3	5.4 %	0	0%	3	5.2%
A midday meal	80	37%	82	95%	90	81.8%	54	96.4%	66	97%	55	95%
Any food between midday and evening meals	3	1%					5	8.9%	2	2.9%	0	0%
Any evening meal	214	100%	86	100%	110	100%	56	100%	68	100%	58	100%
Any food after the evening meal	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Total	509		254		310		174		200		170	
Average Meals /day	2.38		2.95		2.82		3.11		2.94		2.93	

The assessment finding indicated that for the sample households the average number of meals is 2.93. There is a change as compared to the baseline data collected which shows average meals of 2.38. This change is brought about by the SSD FFW program carried out at the project during the year.

Table 6: Analysis of Meals per day

Baseline survey (March 16-25, 2016)			2016 Annual survey (January 11-16, 2017)		2017 Annual survey (Jan 22-26,2018)		2018 Annual survey(January 1 – 5, 2019)		Midyear survey (July1-6, 2019)		2 nd half year survey result December 25-30,2019		change
N=214			N= 86		N= 110		N = 56		N = 68		N=58		
MPD	n	%	n	%	n	%	n	%	n	%	n	%	
0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0%
1	0	0%	0	0%	0	0%	0	0%	2	2.94%	1	1.7%	-42.2%
2	134	63%	4	5%	20	18%	2	4%	6	8.82%	7	12.1%	37.2%
3	79	37%	82	95%	90	82%	46	82%	58	85.3%	47	81%	-5.0%
4	1	0.50%	0	0%	0	0%	8	14%	2	2.94%	3	5.2%	76.9%
5	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0%
Total	214	100%	86	100%	110	100%	56	100%	68	100%	58	100%	
Total meals	509		254		310		174		196		168		
Avg.MPD	2.38		2.95		2.82		3.11		2.9		2.9		0.52
%≥3MPD		37.50%		95%		82%		96%		88.24%		86.2%	

The MPD 2nd semester target of the FFW participants in 2019 was 3 MPD or 100% but the achievement is 2.9 MPD which is less than the plan and in terms of % that is greater or equal to 3 meals is 86.2% achieved. The %≥3MPD for the 2nd semester is increased by 129.9% from the baseline result.

$$\%_{\geq 3MPD} \text{Increased} = (y_2 - y_1) / y_1 * 100 = (86.2 - 37.5) / 37.5 * 100 = 129.9\%$$

The second indicator assessed for this outcome is “end use of the wheat received in FFW”. The survey respondents were asked as to how they have used the FFW received from the project. The plan was assumed to consume 75% however, the response given showed that 89.9% of the grain obtained through FFW payment was consumed, This result show that there was food shortage problems in the households. 3.4% was shared with relatives, 1.8 % was stored for future

use and 4.9% was sold to purchase some industrial materials such as salt, sugar, soap and others. Details of the semester assessment and comparing against the prior result are stated in the table below.

Table 7: Shows the use of FFW grain

2016 Annual survey (Jan11-16,2017)				2017 Annual survey (January 22-26,2018)			2018 Annual survey (January 1- 5, 2019)			2019 midyear survey (July 1- 6)			2 nd semester HH survey December 25-30,2019		
Use of the FFW grain	Count	Sample size N=86	%	Count	Sample size N=110	%	Count	Sample size N=56	%	Yes count	Sample N= 68	%	Yes count	Sample N=58	%
Consumed	6,990	86	81.3%	9570	110	87%	4839	56	86.4%	5746	68	84.5%	5214	58	89.9%
Sold	0	86	0.0%	165	110	1.5%	395	56	7.1%	630	68	9.3%	284	58	4.9%
Shared with relatives /needy.....%	1610	86	18.7%	1067	110	9.7%	199	56	3.6%	184	68	2.7%	197	58	3.4%
Stored	0	86	0.0%	198	110	1.8%	161	56	2.9%	239	68	3.5%	104	58	1.8%
Other /specify %															
Total	8,600		100%	11,000		100%	5,594		100%	5,746		100%	5799		100%

During the second semester there was an increase in the amount consumed by HHs. The drought is continued in Berhale due to shortage of adequate rain. This forced the FFW participants to consume what they have rather than kept a portion of the grain received for another time.

6.3.2. Intermediate Outcome 2: Increased household food self-sufficiency from own crop production

The indicators for this outcome include “Average number of months per year land recipient households are food self-sufficient from own crop production” and FFW payment. “Tones of different food crops produced per season per household”. In the semester farmers could harvest 435qtl of maize, 50qts of sorghum, 80qtl of onion, 2 qtl of sweet potato and 35qtl of onion. As a result, the crop yields collected was 0.12 ton/HH/ in the second semester. The plan was 1.2 tones/hh/season. During the survey some sorghum field was not harvested as it is not ripped or matured to harvest. This reduces the amount of yield obtained in tones per household in the second semester. The irrigation canal is already completed and each farm plot is in access of the irrigation water, however, majority of the farm land will require more time to deposit fertile soil which can properly support the growth of crops.

Table 8: Shows food adequate month

Food adequate months			Yes count for food adequate months												
Response	Yes	No	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Total
Count	31	28	32	29	26	38	24	22	26	28	25	28	34	38	350
Sample size	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
Percent (coverage)	53%	48%	45%	43%	38%	52%	33%	31%	36%	38%	34%	40%	45%	48%	6

Therefore MAFP for the reporting period is:-

$$\text{MAFP} = \text{Total "yes" count} / \# \text{ of HHs} = 350/58 = 6 \text{ months of adequate food provisioning}$$

The above result of 6 months of adequate food provisioning was achieved from crop harvest and FFW program implemented in the year. The target planned for months of adequate food provisioning was 8 months but due to drought effect and less yield harvest from the farm during the semester the MAFP is reduced by two months which is 6 months from the 12 months of the year.

6.3.3. Intermediate Outcome 3: Improved dietary diversity of targeted households

The indicators for this outcome are: "Number of food groups consumed by households" and "% of households consuming 6 or more food groups". To assess household dietary diversity, the survey participants were asked if they or anyone in their households had consumed the different food groups listed below in the previous one-week period.

Table 9: Shows food groups taken by the respondent

Types of food groups consumed by sample households in past 24 hours	Baseline Survey (March 16-25, 2016) N=214		2016 Annual Survey (Jan 11-16, 2017) N=86		2017 Annual survey (January 22-26, 2017) N = 110		2018 Annual Survey (January 1-5, 2019) N=56		2019 Midyear Survey (July 1-6, 2019) N=68		2 nd semester HH survey December 25-30, 2019 N=58	
	Yes count	percent	Yes count	percent	Yes count	percent	Yes count	percent	Yes count	percent	Yes count	Percent
Cereals (maize, rice, wheat)	213	100%	86	100%	110	100%	56	100%	67	98.5%	58	100%
Roots/Tubers (potato, cassava)	34	16%	16	19%	45	41%	23	41%	15	22%	26	44.8%
Legumes (lentils, beans, peas)	70	33%	43	50%	60	55%	10	18%	10	14.7%	32	55.2%
Milk/Milk Products (milk, yogurt, cheese)	52	24%	68	79%	70	64%	56	100%	60	88.2%	48	82.7%
Meat/offal	5	2%	0	0%	0	0%	0	0%	0	0%	0	0%
Eggs	0	0%	0	0%	0	0%	8	14%	10	14.7%	0	0
Fish/Seafood	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Oil/Fat (butter, vegetable oil, palm oil)	43	20%	41	48%	60	55%	55	98%	66	97%	42	72.4%

Sugar/Honey	205	96%	74	86%	105	95%	56	100%	67	98.5%	48	82.8%
Fruits (banana, orange, mango)	1	0%	0	0%	0	0%	7	13%	5	7.4%	8	13.8%
Vegetables (spinach, onion, carrot)	65	30%	35	41%	56	51%	5	9%	22	32.4%	18	31%
Miscellaneous (e.g. tea, coffee etc)	207	97%	81	94%	76	69%	45	80%	56	82.4%	48	82.8%
Total	895		444		582		321		378		328	
Average food groups consumed by HH	4.18		5.16		5.29		5.7		5.56		5.7	

The household survey revealed that the average number of food groups consumed by HHs during the past one week was 5.7. The result obtained is greater than the result of the first semester (5.7vs 5.56). Awareness raising and knowledge development of the target community through trainings and demonstration help the community to diversify their food variety and consumption in the households.

$$\% \text{ change} = \frac{V2-V1}{V1} * 100$$

Table 10: Shows analysis of food diversity

No of food diversity	Baseline Survey (March 16-25, 2016)		2016 Annual survey (Jan 11-16, 2017)		2017 Annual survey (January 22-26, 2018)		2018 Annual survey (January 1 - 5, 2019)		2019 midyear survey (July 1 - 6, 2019) (A)		2 nd half year HH survey result December 25-30,2019 (B)		Change (A-B)/B*100
	N= 214		N= 86		N=110		N=56		N = 68		N= 58		
Food Groups	n	%	n	%	n	%	n	%	n	%	n	%	%
0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0%
1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0%
2	3	1%	0	0%	0	0%	0	0%	0	0%	0	0%	0%
3	84	39%	8	9%	2	1.82%	0	0%	0	0%	0	0%	0%
4	50	23%	27	31%	14	12.7%	5	9%	8	11.8%	7	12%	1.7%
5	34	16%	19	22%	56	50.9%	15	27%	24	35.3%	17	29.3%	-17%
6	35	16%	12	14%	29	26.4%	6	11%	26	38.2%	23	39.7%	3.9%
7	7	3%	15	17%	6	5.45%	10	18%	10	14.7%	11	19%	29.3%
8	1	0%	5	6%	3	2.73%	20	38%	0	0%	0	0%	0%
Total	214	100%	86	100%	110	100%	56	100%	68	100%	58		

Total food groups	895		444		582		321		378		328	100%	
AVG Groups	4.18		5.16		5.29		5.7		5.56		5.7		2.5%
%≥6 Groups		19%		37%		34.5%		67%		52.9%		58.7%	

The above table shows that majority of the respondents reported that an average of food groups consumed by the family members during the second semester in 2019. The result obtained during this semester is greater than the first semester as well as the base line result (5.7 vs 5.56 vs 4.18).

6.3.4. Intermediate Outcome 4: Increased household income from sale of crops produced and women income generation activities

The two indicators for this intermediate outcome are: “Average household income per cropping season from sales of crops” and “Average women’s income from income generating activities”. The farmers at the previous farm land have practiced crop production like maize, vegetables (tomato, onion, sweet potato) and fruits like banana and water melon. Thus, the numbers of farmers who harvested the following crops in the 1stsemester were 81 and in the 2nd were 29. All farmers who harvest these crops were all male farmers. This might be due to the fact that initially the farm areas needs more labor force to level the land and make ridges to collect water. Thus, during the year 110 farmers harvest different crops from the irrigated farms using canal water from the project. However, there are 17 farmers who do not harvested their crop sorghum as it was not ripped or matured to be harvested during the survey time in the end of December 2019.

Types of crops harvested in the year and their results are shown in the table below.

			Quantity	Birr	Quantity	Birr
No	Name of crops harvested	unit	1 st semester		2 nd semester	
1	Maize	qtl	315	-	435	-
2	Tomato	“	120	120,000	35	31500
3	Onion	“	100	160,000	80	96000
4	Sorghum	“	-	-	50	-
	Sweet potato	quintal	3	15,000	2	6000
	Water melon	no	114	5,700	120	6000
	Banana	no	5000	15,000	4000	12000
	Total income			315,700		151,500

Therefore the average income per household from sell of the above crops is amounting as 619 birr ($315,000/510\text{HHs}$) in the 1stsemester and 297.06 ($151500/510$) in the second semester. Thus, 916 birr income is fetched per the household in the year. On the other hand the average household income for 110 farmers who produce these crops is 4,247.27 birr ($35700+151500=467,200/110$). Therefore, the plan for generating income was 1000 birr/HH/cropping season and hence therefore the achievement in 2nd semester is by far below the plan 1000 birr/HH/season. The reason is in the 2nd semester the vegetable production is reduced as the time is giving by the farmers for more attention to collect fertile soil and grow or covered the farm lands with cereal crops like maize and sorghum.

In the end of 2019, a revolving money amounting 300,000 birr is found in the hands of the 100 women who are organized into WSAC. In the reporting year, 123,000 birr have been collected and redistributed for 41 SAC women as the second round in the first semester by the SAC executive committee in collaboration with district cooperative desk. This revolving money and the SAC cooperative in the extension period is mainly managed by the district cooperative office and SSD support the logistic and other supports to facilitate the saving and credit business. With regard to income generation from SAC business a total of 30,000 birr saved by 100 WSAC scheme and deposited in Bhehaile commercial bank.

7. Cross-cutting Themes and principles

7.1. Gender related issues

SSD has long experience in all its project interventions in addressing gender issues. Due attention was given for gender sensitive issues during Demale project formulation. Accordingly, all the activities, trainings, workshops, experience sharing visits, women participated to raise their knowledge and skill as do for men in agriculture. Chances for women have created to work at the project and get food for their family from the project and also visit and get experience from other areas that have better experience on agriculture and marketing mechanisms. In addition WSAC executive members have shared experience on cash management and book keeping while visiting Tigraye cooperative service organizations.

7.2. Beneficiary involvement

During project identification, planning implementation and monitoring beneficiaries are involved in different ways. Community elected leaders were responsible to select and mobilize the required workforce for the project activities, in addition to that, they also work closely with the project management as a project committee. Beneficiary representatives are involved in the project plan reviewing and monitoring process.

7.3. Environment

The environment of the project area is very hostile. The temperature is very hot, the land is degraded and the vegetation coverage is almost none, there are only some scattered endogenous trees and shrubs in the area. Although it is not easy to bring a change within this short period of project life, we have invested in awareness rising of the community on the need to develop and protect the environment. In addition to that, with the help of the diverted river the communities have started planting some multipurpose shrub trees and grass. This will gradually increase the biomass along the water canal and farm areas.

7.4. Capacity building

Community capacity building was simultaneously started with diversion scheme construction. The water users association was formed and they were intensively trained on as to how they can sustainably manage and fairly use the irrigation water, maintenance of the scheme. In addition to that, the executive committee members of water users and women save and credit members were taken to other project area for experience sharing visit. This visit program has contributed significantly to the capacity building interventions of the beneficiaries.

7.5. Sustainability

The irrigation scheme constructed its self is technically manageable by the skill of the community, it has no technical complications. The scheme construction was done by employing the local community who own the scheme, thus they have acquired reasonable skill which can enable them for maintenance and protection. On top of that, various trainings and workshops given to the beneficiaries can raise their interest and ownership feeling to care for the scheme and ensure its sustainability even after the project phase-out. The district government and the regional pastoral office have taken initiative and responsibility to sustainably make continue the project outputs after SSD left the project. This was discussed well repeatedly with them at regional as well as district level and also jointly at the project during monitoring visits. SSD organized WUA, train them on water and scheme management, provide the necessary farm inputs like hand tools and oxen and above all construct irrigation scheme and make water to be accessible for crop production. Fertile soil harvesting mechanism from the river is well demonstrated to the beneficiaries together with the district pastoral office.

8. Challenges and lessons learned

8.1. Challenges

- The canal excavation took more time than expected due to the hard rock soil formation of the area. This challenge delayed the implementation of other activities which are connected to the canal opening and flow of water to the command area.
- Due to the difficulty of the canal excavation work in the first semester, heavy duty machinery was required to break the hard-basaltic rock.

- The harsh environment and high temperatures in the year impeded some labor activities.
- Due to the hardship of the canal and its structures the project couldn't help all the target farmers to grow crops in this final year.

8.2. Lessons learned

- Good lesson and experience was acquired from this project intervention. This project had witnessed that; there is a possibility of changing a degraded stony land in to productive through capturing of fertile soil that is coming as flood.
- The good lesson of the intervention has motivated the community and the local government leaders for further expansion of the intervention.
- The livelihood of the pastoralist community can be gradually changed to agro-pastoralist nature even in an area where it seems impossible by harnessing rivers and capturing the fertile soil that is coming as a flood from the highland.

10. Annex 1: Indicator tracking table for 2019 mid-year plan

Indicator	Baseline	2016 Target	2016 Achieved	2017 Target	2017 Achieved	2017 Achieved	2018 target	2018 Achieved	2019 target	2019 Achieved	Variance
Intermediate Outcomes											
Number of meals per day (Average MPD)	2.4	3 meals/day for 250 FFW participants	2.95 meals/day for 226 FFW participants	3 meals/day for 250 FFW participants	2.82 meals/day for 310 FFW participants	2.82 meals/day for 310 FFW participants	3MPD for 250 FFW participants	3.11 MPD for 172 FFW participants	3 meals/day for 405 FFW participants	2.94 meals /day for 344FFW participants	
Percentage of received wheat consumed directly by recipient households	N/A	At least 75% wheat received is directly consumed by recipient households	81.3% wheat received is directly consumed by recipient households	At least 75% wheat received is directly consumed by recipient households	87% wheat received is directly consumed by recipient households	87% wheat received is directly consumed by recipient households	75% wheat received is consumed by the recipients	87% of the FFW wheat received was consumed	At least 75% wheat received is directly consumed by recipient households	89.9% wheat received is directly consumed by recipient households	
Average number of months per year land recipient households are food self sufficient	4.7	no plan		No plan	-	-	No plan	-	8 months starting from year 2	6 months	

Tones of different food crops produced per season per household	0.19 ton/HH/year	no plan		No plan	-	-	No plan	-	HH produce 1.2 tons of different crops per seasons	0.23 tone/HH/year	In 2 nd semester 43.5MT maize, 8MT onion , 3.5Mt tomato, 5MT sorghum & 0.2MT sweet potato are harvested
Average number of food groups consumed by households	4.2	Households consume at 6 food groups	5.16 food groups consumed	Households consume at least 6 food groups	5.29 food groups consumed	5.29 food groups consumed	HH consumes at least 6 food groups	6.4 food groups were consumed	HHs consume at least 6 food groups	On average 5.7 food groups were consumed	During the 2 nd semester, fewer vegetables produced and sold at the market & hence the income is reduced highly from the plan.
Average household income from sale of crops.	85birr/HH/year	no plan	no plan	No plan	-	-	No plan	-	2000 birr/HH/year	91606 birr/HH/year	SAC beneficiaries with their revolving money has been handed over to the district cooperative office
Average household women income from income generating activity	N/A	no plan	no plan	No plan	275 birr/month/woman	275 birr/month/woman	500birr/month/woman	350 birr/month/woman	250 birr/season	300 birr/season	
Immediate outcome											
Amount of wheat received by FFW participant households	N/A	200Mt for 250 FFW participants	200.1Mt for 226 participants	250Mt for 250 FFW participants	210MT for 310 participants	210MT for 310 participants	240MT	225.7MT	80Mt for 405 participants	80Mt was distributed to 344 participants	
Annual ha of land covered by fertile soil	N/A	At least 50ha /year	no plan	at least 50ha/annual	0	0	10ha	2ha	20ha	3ha	Due to less rain or flood target was not fully achieved
Hectares per household of irrigated and cultivated land	0.05ha	no plan	no plan	0.3ha	0	0	0.33ha	0.33ha	0.33 ha/HH	0.33 ha/HH	Waiting for the fertile soil to accumulate on the field
Number of households with irrigated & cultivated land	75	no plan	no plan	150	0	0	90	81	150HH	180HH	The land is already distributed,however cultivation is not yet started

Total hectares of irrigated & cultivated	25	no plan	no plan	50ha	0	0	30	27ha	50 ha	60 ha	In the semester 10ha new land is distributed to 30 farmers. Thus a total of 170ha (160+10) is owned by 510 farmers
Number of farmers properly using irrigation farming practices	75	no plan	no plan	50	0	0	90	81	150 farmers	127 farmers	The newly land recipients are waiting for fertile soil to be deposited
Water Users Association collecting the required user's fees on time	N/A	no plan	no plan	no plan		0	24,000	6,600 birr collected from 80 farmers	One association	The association was formed and got legal certificate but not yet started fee collection	
Irrigation Scheme functioning well	N/A	no plan	no plan	no plan				-	3.15lit/sec/ha of water is diverted and delivered to farm	3.15lit/sec/ha of water is diverted and delivered to farm	Water delivery to the farm field is accomplished as per the farm areas under cultivation
Percentage of complaints over water access resolved by WUA	N/A	no plan	no plan	no plan				-	100% complaints	75% complaints solved by WUA	
Level of satisfaction of participants with the irrigation scheme and its management	N/A	no plan	no plan	no plan			-	-	100%	100%	
Number of women engaged in new IGA's	N/A	50 women	50 women	50 women	50 women	50 women	-	-	50	41	
Outputs											
Number of FFW participants	N/A	250 participants	226participants	250 participants	310participants	310participants	380	1,060 participant	405 participants	344 participants	
Annual quantity of wheat	N/A	200Mt	200.1 Mt	250MT	210MT	210MT	240MT	225.7 MT	80Mt for 405 participants	80Mt distributed to	

distributed per participant group											344 participants	
Annual quantity of wheat distributed in total	N/A	200 Mt in 2016	200.1Mt	250MT	210MT	210MT	240MT	225.7MT	80MT	80 MT		
No. of diversion weirs	N/A	1	1	1		1	No plan	-	-	-		
Km of primary canals	N/A	0.1	1.26km completed	1.74km	1.74km	1.74	1.5km	1.5km	-	-		
Km of secondary canals	N/A			1km	0	0	1.2km	1.5km	2km	2km	100% accomplished	
No. of drop and division boxes	N/A			6	8	8	4 drops	6drops	22	17		
No. of culverts	N/A			3	2	2	2 culverts	3 culverts	4	3		
No. of HH's who own at least 0.33 ha of irrigated land	N/A			150	-	-	480 HH	480HH	30	30		
Km of bunds constructed	N/A	3	2	6km	5km	5km	5km	4.6km	5.5	5		
Km of cut off drains constructed	N/A	100	100	456m ³	428m ³	428m ³	198.5m ³	198.5m ³	300	300		
m ³ of check dam constructed	N/A	100	44	200m ³	200m ³	200m ³	200m ³	200m ³	200	200		
No. of tree seedlings planted	N/A			2300	-	-	5400tree seedlings	2000	500	500		
No. of vetiver seedlings planted	N/A			2000	-	-	4000vetiver	0	2000	2000		
No. of trainings conducted	N/A	No plan		6	2	2	6	6	3	3		
No. of training participants	N/A	No plan		285	100	100	640	634 participants (386 male +248 women)	200	200 participants (107male +70 women)		
No. of workshops conducted	N/A	2	1	No plan	-	-	2workshops	2 workshops	2	2		

No. of workshop participants	N/A	55	55	No plan	-	-	180 participants	167 participants (42women)	450	510 (457M +53F) participants	farmers education workshop
No. of experience sharing visits	N/A	No plan		No plan	-	-	2visits	2 visits	2	2	
No. of visit participants	N/A	No plan		No plan	-	-	80 participants	80participants	50	55 (36 Males+19 females)	
No. of field days	N/A	1	1	3	3 times	3 times	2times	2times (100community members participated)	2	2 (44 males and 16 females)	
Number of WUA established	N/A			1	-	-	1	1	-	-	
No. of WUA executive leaders trained	N/A			40	-	-	7	The number of trainees included other 80 (59M+21) relevant community leaders and block leaders.	50	50 (33M + 17 W) people including other block leaders & users	
No. of women's savings and credit/IGA groups established	N/A	10	10	10	10	10	No plan	-	-	-	
No. of women participants	N/A	50	50	50	50	50	No plan	-	-	-	
Legal registration of the WUA facilitated							1	1	-	-	
Follow up and strengthen women SAC group							20 groups	20 groups	20 groups	20 groups	