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PHASE 2 SIX-MONTH PROJECT PROGRESS REPORT **EMERGENCY RESPONSE WITH POTATO AND SWEETPOTATO AMONG DROUGHT- AFFECTED FARMERS IN SNNP REGION ETHIOPIA**

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TABLE OF CONTENTS

List of Tables.....	ii
List of Figures.....	ii
ACRONYMS	iii
HIGHLIGHTS OF ACHIEVEMENTS	iv
1. INTRODUCTION AND BACKGROUND.....	1
1.2 GOAL AND OBJECTIVE OF THE PROJECT	1
1.2.1 Goal 1	
1.2.2 Objective.....	1
1.2.3 Project components	1
2. INTERVENTION AREAS.....	2
3. ACHIEVEMENTS	2
3.1 FOOD PRODUCTION.....	2
3.1.1 Potato 2	
3.1.2 Sweetpotato	3
3.2 RESTORATION OF THE LOST SEED/PLANTING MATERIAL	5
3.2.1 Potato 5	
3.3 CAPACITY BUILDING FOR SUSTAINABLE FOOD AND PLANTING MATERIAL PRODUCTION AND IMPROVED NUTRITION.....	7
3.3.1 Increased capacity of crop experts, development agents, and nutrition experts.....	8
3.3.2 Training of farmers	9
3.4 CAPACITY-BUILDING COLLABORATION WITH HAWASSA UNIVERSITY GRADUATE PROGRAM.....	11
4. IMPLEMENTATION APPROACH.....	11
4.1 PROJECT IMPLEMENTATION APPROACH AND ROLE OF PARTNERS	11
4.2 CREATING OWNERSHIP THROUGH INCEPTION WORKSHOP	12
5. CHALLENGES FACED	12
6. LESSONS LEARNED.....	13
ANNEXES 14	
ANNEX 1. AVERAGE ROOT YIELDS OF 'AWASSA-83' AND 'KULFO' IN PROJECT WOREDAS AND KEBELES, MEHER 2017.....	14
ANNEX 2. TUBER YIELD AND GROSS VALUE OF THE G3 SEED POTATO PRODUCED BY SEED COOPERATIVES FROM EARLY G2 SEED, BELG 2017.....	15
ANNEX 3. SWEETPOTATO VINE CUTTINGS PRODUCED FROM 'AWASSA-83' AND 'KULFO' VARIETIES AND THEIR GROSS VALUES IN INTERVENTION WOREDAS AND KEBELS, MEHER 2017.....	17

LIST OF TABLES

Table 1. List of project intervention zones, woredas, and kebeles by crop	2
Table 2. Average root yields of ‘Awassa-83’ and ‘Kulfo’ in project intervention woredas, meher 2017	4
Table 3. Number of cooperatives per woreda, amount of G2 supplied to cooperatives, amount of G3 harvested and sold for seed, and money obtained from sale by woreda, belg 2017	5
Table 4. Number of sweetpotato vine cuttings produced from ‘Awassa-83’ and ‘Kulfo’ varieties and their gross values in intervention woredas, meher 2017	6
Table 5. Vine cuttings of ‘Kulfo’ (basic seed) produced by farmer groups from three woredas who received foundation planting material, meher 2017	7
Table 6. Trainees of potato ToT by zone, woreda, and expertise; disaggregated by sex.....	8
Table 7. Farmers trained on potato production and postharvest technologies by zones and woredas; disaggregated by sex, belg 2018	9
Table 8. Farmers who participated in OFSP nutrition demonstration by zones and woredas; disaggregated by sex, in 2018	10

LIST OF FIGURES

Figure 1. Mr. Ato Yohannis, his wife, Faice Eurko, and their last child in their backyard.....	5
Figure 2. Seed potato stored by cooperatives in DLS to sale at a later stage.	6
Figure 3. ToT sessions for crop experts and DAs theoretical training (A&B) and hands-on practical training (C–F).....	8
Figure 4. Nutrition practical session for farmers with hands-on preparation of national dishes in mixture with OFSP leaves and roots.....	10
Figure 5. Beneficiary farmers discussing the project with OFDA team. Standing in the middle is an OFDA-Ethiopia staff serving as an interpreter.	11
Figure 6. Hawassa University graduate students interacting with communities (CIP staff in khaki jacket).....	11

ACRONYMS

BoANRD	Bureau of Agriculture and Natural Resources Development
CIP	International Potato Center
DAs	Development agents
DLS	Diffused light store
DRR	Disaster risk reduction
DVMs	Decentralized vine multipliers
ETB	Ethiopian birr
G2	Generation Two
G3	Generation Three
Q	Quintal (=100 kg)
HH	Household
mt	Metric ton (=1,000 kg)
OFDA	Office of Foreign Disaster Assistance
OFSP	Orange-fleshed sweetpotato
SNNPR	Southern Nations, Nationalities and Peoples' Region
ToT	Training of trainers
USAID	United States Agency for International Development

HIGHLIGHTS OF ACHIEVEMENTS

The cost extension (phase 2) of the “Emergency Response with Potato and Sweetpotato Among Drought-Affected Farmers in SNNP Region” project is funded by the Office of U.S. Foreign Disaster Assistance/United States Agency for International Development (OFDA/USAID). This is a 10-month extension for the period 1 September 2017–30 June 2018, funded for \$500,000.

The main objective of the project is to produce the most needed food for the communities that have been affected by drought since 2015/2016 and to restore potato and sweetpotato planting material that farmers lost due to drought with productive and adaptive varieties. The project is led by the International Potato Center (CIP) and is implemented in partnership with the Bureau of Agriculture and Natural Resources Development (BoANRD), Southern Nations, Nationalities and Peoples’ Region (SNNPR). Project activities were implemented in eight zones (four potato and four sweetpotato), 13 woredas (6 potato and 7 sweetpotato), and 45 kebeles (25 potato and 20 sweetpotato). The potato varieties distributed by the project were ‘Gudene’ and ‘Belete’; the sweetpotato varieties were ‘Awassa-83’ and the orange-fleshed (OFSP) variety ‘Kulfo’. CIP closely collaborated with woreda health offices and Hawassa University on acquainting graduate students with community OFSP utilization.

During the reporting period, the project made good achievements in the areas of food production, restoration of planting material, and capacity building.

Food production. The project helped 7,500 direct beneficiary farmers (2,500 potato and 5,000 sweetpotato), where a farmer represented a household, contributing to the improvement of food and nutrition security. Potato is currently in the field. Direct beneficiaries of sweetpotato gave planting material to other farmers through a farmer-to-farmer transfer, leading to the production of more nutritious food.

Potato. In belg 2018 (March–May) 125 metric tons (mt) of quality seed potato of ‘Gudane’ and ‘Belete’ varieties were distributed to 2,500 farmers in six woredas, with 50 kg per farmer. These varieties are high yielding and gave average yields of 36.3 mt/ha and 27.8 mt/ha, respectively, during phase I of the project (June 2016–August 2017), which is more than double the national average. Since this second phase is implemented in a similar agro-ecology to the first phase, we expect production of significant amount of food for an estimated 15,000 people. (Details will be given in the next report.)

Sweetpotato

- From the high-quality foundation seed of the ‘Kulfo’ variety (OFSP) 85.2 mt of roots were produced. From quality declared planting material of both ‘Kulfo’ and ‘Awassa-83’ varieties, 2,070 mt of roots were produced. This contributed to improving food and nutrition security of more than 30,000 people.
- At a farmgate price of ETB 3500/mt, the total produce (2,155.2 mt of roots) would have a gross value of Ethiopian Birr (ETB) 7,543,200.00, equivalent to \$277,323.53. This potential income would enable farmers to diversify their diets and meet other needs.
- The target farmers obtained significantly higher yields per hectare than the average of the country and the region because of the quality planting materials and the training they received on sweetpotato production and postharvest technologies.

- All farmers are now interested in the ‘Kulfo’ variety and are willing to give it the maximum care during both production and postharvest. For example, Mr. Desalegn Eramo said, “My family likes eating sweetpotato roots either alone or mixed with other foods and we know that it has vitamin A which is good for us. However, porcupines also like it very much, denying us the benefit. To deny porcupines access to it, I raised the ground around my OFSP plot, as they are not good at climbing. This way, I have been able to produce OFSP successfully.”
- An elderly woman, Mrs. Almaz Biru, who is a model farmer from Loko Abaya woreda, Doyadao kebele, said, “I will give farmers in my surrounding vine cuttings of ‘Kulfo’ and teach them how to produce and prepare it until they get it right. Eating OFSP leaves as a vegetable is a great innovation for me and many others. I now also know that eating OFSP roots and leaves gives us vitamin A.”
- A team from OFDA–Ethiopia and OFDA–Washington visited farmers’ fields in Amido kebele, Kedida Gamela Woreda and met with farmers in December 2017. Farmers expressed their appreciation for the strategic support during drought and asked for continued support to take the OFSP to scale so that many farmers in the area can benefit from it to improve their food and nutrition security.

Restoration of planting material. Restoring planting materials of potato and sweetpotato that farmers lost due to drought with productive and adaptive varieties improves food availability and helps in disaster risk reduction (DRR) going forward.

- Of the 29 seed producer cooperatives, 22 who received high-quality early generation seed produced 308.8 mt of Generation 3 (G3) seed potato, most of which was replanted to further increase quality seed. The cooperatives were extremely happy for renewing their seed stock, as the seed they had was old and losing its productivity.
- Of the 22 cooperatives 14 sold 123.3 mt of G3 seed to potato farmers, from which they got ETB 909,892.50 (\$33,451.93). The income can be used to improve input supply (e.g., fertilizer) to increase yield.
- The 5,000 direct beneficiary farmers produced 70,673,241 vine cuttings. At a farmgate price of ETB 0.2/cutting, this would have a gross value of ETB 14,134,648.18 (\$519,656.17). This amount would be sufficient to plant 1,272 ha with a potential to produce large amounts of food in subsequent seasons, improving food and nutrition security and DRR.
- Woredas suitable for sweetpotato growing, such as Demba Gofa, produced 26,093,543/ha, which would plant 469 ha. But the most drought-stricken woreda, Boricha, produced 2,413,130/ha, which is sufficient to plant 43 ha. Identifying potential woredas for vine cutting production is very important for commercializing planting material production going forward.
- Variety ‘Kulfo’ produced more planting material than ‘Awassa-83’, with average yield figures of 5,853,628/ha and 4,242,549/ha, respectively. These amounts would be sufficient to plant 105 and 76 ha, respectively.
- The farmer groups who received high-quality foundation vine cuttings of the ‘Kulfo’ variety produced 42m vine cuttings that could plant about 756 ha. Most of this is multiplied under irrigation that will give high yields of both roots and cuttings going forward, contributing to improving nutrition security.
- Direct beneficiary farmers share planting materials willingly, showing the interest to help each other and grow together as a community.

Capacity building for sustainable food and planting material production and improved nutrition. Capacity building is a foundation for a successful achievement of project objectives and their sustainability beyond a project's lifespan. To reach large numbers of male and female farmers in a short period, a training of trainers (ToT) approach was followed, whereby crop and nutrition experts were trained by BoANRD and CIP. These trainees in turn cascaded the knowledge to the beneficiary farmers.

- The positive effects of the systematic training we gave on yield increases has for the first time convinced the BoNARD to include training on potato and sweetpotato production and postharvest technologies in the government's regular belg and meher training programs.
- In the potato ToT, 31 participants composed of 25 development agents (DAs) and six crop experts (25 males, 6 females) were trained on seed potato management, agronomy, integrated pest management, and postharvest technologies in belg 2018. These trainees cascaded the knowledge to 2,500 (1,963 males, 537 females) farmers.
- Trainees of the nutrition ToT trained 3,233 (862 males, 2,371 females) in 20 project kebeles in December 2017.
- Farmer trainees were happy to learn that they could improve the health of their family with a diet containing OFSP leaves and roots. A 70-year-old woman from Aleta Sodo kebele, Loko Abaya Woreda, said, "I wish I got this training when I was still young so that I could feed my family better. Even now, I will assist my community to produce and consume OFSP leaves and roots."
- The widely demonstrated Triple S technology, which uses roots as a source of planting material, motivated farmers to grow more sweetpotato in drought-prone areas with a long dry spell, as it helps maintain planting material from one season to the next.

I. INTRODUCTION AND BACKGROUND

In 2015 Ethiopia experienced the worst drought in more than five decades, exacerbated by the weather phenomenon of El Niño. The drought caused significant crop and livestock losses, among others, in the Southern Nations Nationalities and People's Region (SNNPR). The region is characterized by food and nutrition security challenges, with 44% of children under 2 years chronically malnourished. The drought has continued in many districts (woredas) of the region.

To help restore the lost planting materials of potato and sweetpotato and to improve food security of the affected people of these two commodities, the International Potato Center (CIP) developed a proposal that was funded by the Office of U.S. Foreign Disaster Assistance/United States Agency for International Development (OFDA/USAID). Potatoes and sweetpotatoes are nutritious staples that produce more food per unit area of land, water, and time than do many other crops. They are suitable crops to feed the increasing population on dwindling arable land and increase household (HH) incomes. Moreover, they are resilient to climate change, as potato escapes droughts that occur late in the season because it is a short-cycle crop. Sweetpotato tolerates occasional drought once it is established.

Implementation of the project started in June 2016 and ran up to August 2017 (phase I). During this period, significant achievements were made in intervention areas in improving food and nutrition security and restoring planting materials, contributing to disaster risk reduction (DRR) going forward. However, this was limited to only 12,000 direct beneficiary farmers (where a farmer represented 1 HH); there was a need to reach more farmers. CIP therefore submitted a 10-month, \$500,000 cost-extension proposal to USAID/OFDA to reach another 7,500 farmers, starting in September 2017. This extension period was approved.

This first report in the cost-extension project presents progress on food production, restoration of planting material, capacity building to help sustain achievements, implementation approaches, and lessons learned for the period September 2017–March 2018.

1.2 GOAL AND OBJECTIVE OF THE PROJECT

1.2.1 Goal

To improve food and nutrition security of drought-affected farm HH by providing immediate access to seed potato and sweetpotato planting material of productive and locally adapted varieties.

1.2.2 Objective

To support 7,500 drought-affected potato and sweetpotato farmers (where a farmer represents 1 HH) in SNNPR through provision of emergency seed potato and sweetpotato planting materials and training on production and postharvest technologies.

1.2.3 Project components

The project sought to accomplish its goal and objective through two components: (1) emergency seed supply of potato and sweetpotato and (2) farmer training and awareness creation.

2. INTERVENTION AREAS

The extension phase of the project was implemented in eight zones (4 potato and 4 sweetpotato), 13 woredas (6 potato and 7 sweetpotato), and 45 kebeles (25 potato and 20 sweetpotato) (Table 1).

TABLE 1. LIST OF PROJECT INTERVENTION ZONES, WOREDAS, AND KEBELES BY CROP

Crop	Zone	Woreda	Kebeles
Potato	Gurage	Gumer	Abeke, B/ Mochiya, Armowa, Zizincho
		Geta	Wenziregot, Zara, Hembeyate, Werko
	Gedeo	Bule	Bule 02, 1st Okolu, 2nd Okolu, Yirede
		Gedeb	Dibandibe, Abel, Geshe, Moralayo
	Silte	Alichu wuriro	Kereso, Ensigne, Kechemo, Gedirat, Silo
	Hadiya	Misha	Abushura, Semen Wasgebeta, Ashiwalawache, Santo ambeka
Sweetpotato	Wolayita	Damot woyde	Adacha, Girara ambe, Chifsa, Tora sedebo
		Humbo	Fango lome, Bosa wanche
	Kembata Tembaro	Kedida gamela	Amido, Aze dobo'o, Bezena binara
		Hadero tunto	Lesho, Mugunja, Ameleka
	Sidama	Boricha	Konsore chafa, Sadamo Chala
		Loka abaya	Dese, Alata sodo
	Gemogofa	Demba Gofa	Suka, Tozza Seba, Turga, Karza

3. ACHIEVEMENTS

Since September 2017, the project made some achievements in food production, planting material restoration, capacity building, and renewal of degenerated seed stock of cooperatives and commercial farmers who are a source of planting material for farmers.

3.1 FOOD PRODUCTION

During the extension phase (phase 2), the project supported 7,500 direct beneficiary farmers (5,000 sweetpotato, 2,500 potato). Potatoes were planted recently and data on food production will be given in the next report. With sweetpotato, 5m cuttings of sweetpotato varieties 'Kulfo', an orange-fleshed sweetpotato (OFSP), and 'Awassa-83' (white-fleshed) were distributed to the beneficiary farmers. Each farmer received 1,000 cuttings (500 cuttings of each variety). A significant amount of food was produced as discussed below.

3.1.1 Potato

In belg 2018 (March–May), 125 mt of quality seed potato of 'Gudane' and 'Belete' varieties were distributed to 2,500 farmers in six woredas, 50 kg per farmer. These varieties are high yielding and gave average yields of 36.3 mt/ha and 27.8 mt/ha, respectively, during phase I of the project (June 2016–August 2017). Since Phase 2 is being implemented in a similar agro-ecology as phase I, we expect production of significant amount of food for an estimated 15,000 people (details of this will be given in the next report.)

3.1.2 Sweetpotato

Food from sweetpotato was produced in the form of roots and leaves.

Roots. Sweetpotato roots that contributed to food and nutrition security were produced by (1) two decentralized vine multipliers (DVMs) and 74 farmers organized in 10 groups in 10 kebeles from the 1.47m high-quality foundation planting material of 'Kulfo' they received, and (2) by the 5,000 direct beneficiary farmers who received both 'Awassa-83' and 'Kulfo'.

From foundation material

The foundation material of the OFSP variety was supplied to farmer groups and DVMs with the objective of renewing the stock they further multiply to sell to the wider sweetpotato farming community. Such high-quality planting material increases farmers yields. In the process, the recipient farmer groups produced 85.2 mt of roots that were used for family food and income generation. The produce at a farm gate price of ETB 3500/mt had a gross value of ETB 298,200.00 (\$10,963.24).

Mrs. Almaz Biru, a model farmer from Loko Abaya woreda, Doyadao Kebele, is a member of one of the farmer groups. She received foundation material and training on sweetpotato production and postharvest and nutrition technologies. We witnessed that the training helped her a great deal, as her field was one of the best and with labels showing the variety planted and date of planting.

She said, "I and my family enjoyed eating both OFSP leaves mixed with other vegetables, and roots mixed with maize flour. Since OFSP gives high yields and vitamin A, I decided to prepare it more often to feed my family. I also want people around me to benefit from it, so I will give them vine cuttings of 'Kulfo' and teach them how to produce and prepare it until they get it right. Eating OFSP leaves as a vegetable is a great innovation for me and many others; we are happy."



From quality planting material distributed to 5,000 farmers

The 5m cuttings (2.5m/variety) given to 5,000 farmers were planted on 90 ha. Farmers obtained an estimated 2,070 mt of roots, with an average yield of 23 mt/ha for both varieties in all woredas (Table 2). This contributed to improving food and nutrition security for 30,000 people in the intervention kebeles. The produce had a gross value of ETB Birr 7,245,000.00 (\$266,360.00).

Table 2 also shows that the highest average root yield of 61.4 mt/ha was obtained in Demba Gofa woreda with the variety 'Awssa-83' yielding 74.2 mt/ha and 'Kulfo' 48.7 mt/ha, followed by Hadero Tunto woreda with an average yield of 26 mt/ha for the two varieties. The lowest average yield of 10.9 mt/ha for the two varieties was obtained in Boricha woreda, followed by Loka Abaya with 12 mt/ha. Generally, yields were lower during the reporting period compared with the previous seasons because of continued drought. Woredas and kebeles that gave very low yields were particularly

hard-hit. Overall, 'Awassa-83', which is more drought tolerant and more adapted, gave higher yields of 25.2 mt/ha than did the OFSP variety 'Kulfo', which averaged 20.3 mt/ha. However, 'Kulfo' in Humbo woreda (Table 2) and in some kebeles of Hadero Tunto (Annex 1) gave higher yields than 'Awassa-83'. This clearly shows that it is imperative to release more OFSP varieties that are resistant to drought and suitable to the different agro-ecologies to improve the vitamin A intake of the communities that suffer from its deficiency. The project is collaborating with another CIP project funded by the European Union in developing such varieties.

TABLE 2. AVERAGE ROOT YIELDS OF 'AWASSA-83' AND 'KULFO' IN PROJECT INTERVENTION WOREDAS, MEHER 2017

Zone	Woreda	Variety	Average Root Yield (mt/ha/mt)
Sidama	Boricha	‘Awassa-83’	10.1
		OFSP	11.7
	Loka Abaya	‘Awassa-83’	14.1
		OFSP	9.9
Wolayta sodo	Humbo	‘Awassa-83’	14.1
		OFSP	17.1
	Damot Woyde	‘Awassa-83’	20.1
		OFSP	18.1
Kembata Tembaro	Hadero Tunto	‘Awassa-83’	29.5
		OFSP	22.5
	Kedida Gamela	‘Awassa-83’	17.2
		OFSP	14.4
Gamgofa	Demba Gofa	‘Awassa-83’	74.2
		OFSP	48.7
Average		23.0	

Mr. Desalegn Eramo, a father of six from Bezena Benara Kebele, Kedida Gamela woreda, spoke about his innovation: "My family likes eating OFSP roots either alone or mixed with other foods and we know that it has vitamin A which is good for us. However, porcupines were selectively damaging it, denying us the benefit. A collective action to control porcupines did not work, so I knew I had to take own action. I constructed a fence in the form of raised ground/earth around my OFSP field to deny them access, as they are not good at climbing. This way, I have been able to produce OFSP successfully.



Ato Dessalegn and his son near his OFSP field with raised ground.

Sweetpotato leaves as a vegetable

Farmers' enthusiasm for using OFSP as a vegetable continued by those who had never eaten it. For example, a couple, Mr. Ato Yohannis Uoltei and Mrs. Faice Eurko from Humbo woreda, Fangolomae Kebele said, "We are new to the project and have not yet eaten either leaves or roots of the new type of sweetpotato which is orange in color. However, we are excited by what we heard and learned about the nutritional value of this sweetpotato because it can improve the health of our seven children. As you see, we have different vegetables in our backyard (Fig. 1) and we look forward to consuming leaves and roots mixed with these vegetables and our staple food."



Figure 1. Mr. Ato Yohannis, his wife, Faice Eurko, and their last child in their backyard.

3.2 RESTORATION OF THE LOST SEED/PLANTING MATERIAL

Seed potato producer cooperatives and sweetpotato farmers and DVMs restored their lost seed with better quality planting material, which is a prerequisite to higher productivity.

3.2.1 Potato

In the phase I final report (June 2016–August 2017), we reported that 29 seed producer cooperatives received 52.6 mt of high-quality generation 2 (G2) seed potato to renew their seed stock, which they further multiplied and sold to potato farmers. In that report, we did not give yield data, as they were not yet collected. Since then, yield data have been collected from 22 of the 29 cooperatives; they produced 308.8 mt of G3 seed potato (Table 3). The cooperatives themselves planted most of the seed to further increase good quality seed, 14 cooperatives sold 123.3 mt of G3 seed to farmers in their surroundings and obtained ETB 956,970.00 (\$35,182.72). The cooperatives also kept small amount of seed in diffused light stores (DLS) (Fig. 2) to sell later. Seed prices varied with woredas, with highest prices obtained in Gumer and lowest in Geta and Merab Azernet woredas. Prices also varied between kebeles within a woreda (Annex 2). All the cooperatives gave their members small quantities of under- and oversized tubers (for seed) for consumption.

TABLE 3. NUMBER OF COOPERATIVES PER WOREDA, AMOUNT OF G2 SUPPLIED TO COOPERATIVES, AMOUNT OF G3 HARVESTED AND SOLD FOR SEED, AND MONEY OBTAINED FROM SALE BY WOREDA, BELG 2017

Woreda	No. of Cooperatives	G2 Seed Provided (mt)	G3 Seed Produced (mt)*	Quantity Sold as Seed (mt)	Gross sale [†] (ETB and \$) [‡]
Cheha	2	6.00	65.0	-	-
Gumer	5	13.00	83.1	28.05	275,025.00 (10,111.21)
Geta	7	10.60	52.7	29.30	198,095.00 (7,282.90)
Merab Azernet	5	7.00	5.0	2.50	14,750.00 (542.28)
Misha	4	6.50	46.0	37.20	273,600.00 (10,058.82)
Lemo	4	5.50	37.5	26.20	195,500.00 (7,187.50)
Doyogena	2	4.00	14.5	-	-
Total	29	52.60	303.8	123.25	956,970.00 (35,182.72)

*Since all planted potato was not harvested, it is not possible to calculate yield per ton of potato planted. [†]Gross sale value is before deducting costs. [‡] USD equivalent shown in parentheses at an exchange rate of \$1 = ETB 27.2.



Figure 2. Seed potato stored by cooperatives in DLS to sale at a later stage.

Sweetpotato planting material (vine cuttings) production

The 5,000 beneficiary farmers in the cost-extension phase (phase 2) produced 70,673,241 vine cuttings from the 5m they received. At a farmgate price of ETB 0.2/cutting, this would have a gross value of ETB 14,134,648.18 (\$519,656.17) (Table 4). This amount would be sufficient to plant 1,272 ha with a potential to produce large amounts of food in subsequent seasons, improving food and nutrition security.

Vine cutting production per hectare varied between woredas, whereby the highest amount (26,093,543/ha) was produced in the newly added Demba Gofa woreda in Gamogofa zone and the lowest (2,413,130/ha) in Boricha woreda in Sidama zone. Boricha and Loka, Abaya, both in Sidama zone, have a chronic drought problem that threatens food self-sufficiency. The lowest amount of vine cuttings produced in Boricha could plant more than 43 ha, whereas the highest amount produced in Dumba Gofa could plant more than 469 ha. Averaged overall woredas, 'Kulfo' produced 5,853,628/ha and 'Awassa-83' produced 4,242,549 vine cuttings/ha.

Number of vine cuttings produced by each variety differed between kebeles within a woreda (Annex 3). This shows that it is not only the amount of rainfall received that matters, but also the care that is given by each farmer to the production of sweetpotato. We observed that some farmers do not weed on time, which can significantly affect sweetpotato growth, especially at early stage. To increase sweetpotato planting material and root production, training farmers in good agricultural practices is of vital importance. It is interesting to observe that the OFSP variety 'Kulfo' produced the highest number of vine cuttings (7,580,949.50/ha) in Suka Kebele in Demba Gofa woreda. Identifying such high-potential areas for vine cutting production is important for targeting commercial planting material production going forward.

TABLE 4. NUMBER OF SWEETPOTATO VINE CUTTINGS PRODUCED FROM 'AWASSA-83' AND 'KULFO' VARIETIES AND THEIR GROSS VALUES IN INTERVENTION WOREDAS, MEHER 2017

Zone	Woreda	Variety	No. of Vine Cutting/ha	Gross Values at ETB 0.20/cutting
Sidama	Boricha	'Awassa-83'	977,563	195,512.68 (7,187.97)*
		OFSP	1,435,567	287,113.40 (10,555.64)
	Loka Abaya	'Awassa-83'	1,429,248	285,849.5 (10,509.17)
		OFSP	1,364,525	272,904.96 (10,033.27)

Zone	Woreda	Variety	No. of Vine Cutting/ha	Gross Values at ETB 0.20/cutting
Wolayta sodo	Humbo	‘Awassa-83’	1,771,570	354,313.94 (13,026.25)
		OFSP	4,035,588	807,117.58 (29,673.44)
	Damot Woyde	‘Awassa-83’	9,857,857	1,971,571.32 (72,484.24)
		OFSP	9,216,518	1,843,303.62 (67,768.52)
Kembata Tembaro	Hadero Tunto	‘Awassa-83’	1,246,677	249,335.32 (9,166.74)
		OFSP	1,360,566	272,113.28 (10,004.16)
	Kedida Gamela	‘Awassa-83’	4,107,737	821,547.3 (30,203.94)
		OFSP	7,776,284	1,555,256.88 (57,178.56)
Gamgofa	Demba Gofa	‘Awassa-83’	10,307,194	2,061,438.72 (75,788.19)
		OFSP	15,786,348	3,157,269.68 (116,076.09)
Total			70,673,241	14,134,648.18 (519,656.18)

* Amount in parenthesis is the USD equivalent at an exchange rate of \$1=ETB 27.2

The farmer groups who received high-quality foundation planting material produced over 42m high-quality vine cuttings (Table 5), successfully renewing their seed stock that they will further multiply and sell to farmers going forward. The renewed seed will result in both increased production of planting material and roots at farmer level, contributing significantly to food and nutrition security and also to DRR. For successful production of OFSP in areas chronically affected by drought, such as Loka Abaya, using irrigation is recommended.

TABLE 5. VINE CUTTINGS OF 'KULFO' (BASIC SEED) PRODUCED BY FARMER GROUPS FROM THREE WOREDAS WHO RECEIVED FOUNDATION PLANTING MATERIAL, MEHER 2017

Woreda	Kebele	No. of cutting/ha
Loka Abaya	Doya Dao	321,298.87
Humbo	Abala Farecho	2,407,753.70
Damot Woyde	Demba Girara	19,811,091.30
	Oloba	6,064,808.75
	Motala	13,811,097.30
Total		42,416,050

3.3 CAPACITY BUILDING FOR SUSTAINABLE FOOD AND PLANTING MATERIAL PRODUCTION AND IMPROVED NUTRITION

Capacity building is a foundation for a successful achievement of project objectives and their sustainability beyond a project's lifespan. It is important for a sustainable intensification of crop production and nutrition promotion, leading to improved food and nutrition security. To reach large numbers of male and female farmers in a short period, a training of trainers (ToT) approach was followed. In this approach crop and nutrition experts were trained by the Bureau of Agriculture and Natural Resources Development (BoANRD) and CIP. In turn these trainees cascaded the knowledge to the beneficiary farmers.

The systematic and consistent training we gave using manuals has convinced the BoNARD for the first time to include trainings of potato and sweetpotato production and postharvest technologies in the government's regular belg and meher training programs. Previously, potato and sweetpotato

were not included. This is a big achievement of this and other CIP-led projects being implemented in the SNNPR.

3.3.1 Increased capacity of crop experts, development agents, and nutrition experts

Crop experts and development agents (DAs)

Thirty-one participants composed of 25 DAs and six crop experts (25 males, 6 females) from four zones and six woredas were given a ToT course on potato agronomy, seed management, integrated pest management, and postharvest handling in belg 2018 (Table 6). The training consisted of theory and extensive hands-on practical sessions (Fig. 3) that included land preparation, planting, and fertilizer application with emphasis on type, rate, and method. Cascading this knowledge to farmers will bring about a sustainable increase in potato productivity. Since the sweetpotato training was given in July 2017, it was included in the phase I report.

TABLE 6. TRAINEES OF POTATO ToT BY ZONE, WOREDA, AND EXPERTISE; DISAGGREGATED BY SEX

Zone	Woreda	ToT Trainees			
		Crop Experts	DAs	Sex	
				Male	Female
Hadiya	Misha	1	4	5	-
Silte	Alichu Weriro	1	5	5	1
Gurage	Geta	1	4	3	2
	Gumer	1	4	4	1
Gedeo	Bule	1	4	3	2
	Gedeb	1	4	5	-
Total		6	25	25	6



Figure 3. ToT sessions for crop experts and DAs theoretical training (A&B) and hands-on practical training (C–F).

Nutrition experts

A ToT to nutrition experts composed of zonal- and woreda-level health experts, rural women extension experts, and kebele health extension workers was given in July 2017 (phase I) and was included in the annual project report submitted. These trainees were used to train farmers during the current reporting period.

3.3.2 Training of farmers

The trained experts cascaded the knowledge about potato production and postharvest technologies, including seed management, integrated pest management, and postharvest handling to 2,500 (1,963 males, 537 females) (Table 7) in the project potato woredas. This training was given before the distribution of seed potato to ensure that care is exercised not to desprout the tubers and plant tubers with sprouts facing upwards to increase number of stems and hence tuber yield.

TABLE 7. FARMERS TRAINED ON POTATO PRODUCTION AND POSTHARVEST TECHNOLOGIES BY ZONES AND WOREDAS; DISAGGREGATED BY SEX, BELG 2018

Zone	Woreda	Farmers Trained	Sex	
			Male	Female
Hadiya	Misha	400	301	99
Silte	Alichu Weriro	500	373	127
Gurage	Geta	400	262	138
	Gumer	400	341	59
Gedeo	Bule	400	339	61
	Gedeb	400	347	53
Total		2,500	1,963	537

Mrs. Ayelech Dukamo, a 70-year-old resident of Aleta Sodo Kebele, Loko Abaya woreda (raised hand) said, “I wish I got this training that has the potential to change our health, especially the health of our children, when I was still young so that I could feed my family better. Even now, I will assist my community to produce and consume OFSP leaves and roots mixed with various local foods; thank you so much.”



Nutrition training to farmers

Nutrition and health experts who got a ToT training in phase I supported by CIP staff provided theoretical training on nutritional values of OFSP roots and leaves and hands-on demos on their preparation mixed with locally available foods in each woreda. The number of farmers trained was 3,233 (862 males, 2,371 females) in 20 project kebeles in December 2017 (Table 8). This was 65% of the targeted 5,000 because of other overlapping agricultural events organized by the woreda agricultural offices in which farmers were asked to participate. However, agreements were reached that the trained farmers would train those who could not attend. Theoretical training was supplemented with intensive hands-on demos of preparing traditional foods in mixture with locally available dishes (Fig. 4).

TABLE 8. FARMERS WHO PARTICIPATED IN OFSP NUTRITION DEMONSTRATION BY ZONES AND WOREDAS; DISAGGREGATED BY SEX, IN 2018

Zone	Woreda	Farmers Trained	Sex	
			Female	Male
Wolayta Sodo	Damot Woyde	690	503	187
	Humbo	167	142	25
Kembatana Tembaro	Kedida Gamela	411	149	262
	Hadero Tunto	590	419	171
Sidama	Boricha	369	367	2
	Loka Abaya	464	249	215
Gamgofa	Dembagofa	542	542	-
Total		3,233	2,371	862



Figure 4. Nutrition practical session for farmers with hands-on preparation of national dishes in mixture with OFSP leaves and roots.

Visit by OFDA team

In December 2017 an OFDA team composed of OFDA–Addis and Washington staff visited sweetpotato farmers’ fields in Kedida Gamela woreda and talked with the beneficiary men and women farmers (Fig. 5). The visitors were impressed with the sizes of the roots produced. During the discussion, farmers explained how happy they were with the project and expressed their gratefulness to the donor and government. They said that they were able to get higher yields from the sweetpotato they received, and for the first time they ate sweetpotato leaves as a vegetable, which they liked. The new sweetpotato (i.e., OFSP) helped them to improve their food security; from what they learned, they believed that they got vitamin A, too. They promised to continue producing OFSP even after the project ends and share its planting material with their family members and near-by residents. However, they underscored that this would not suffice to take it to scale. They requested the project to continue to reach out to many other farmers so that others can also improve their food and nutrition security.



Figure 5. Beneficiary farmers discussing the project with OFDA team. Standing in the middle is an OFDA-Ethiopia staff serving as an interpreter.

3.4 CAPACITY-BUILDING COLLABORATION WITH HAWASSA UNIVERSITY GRADUATE PROGRAM

In phase I this project collaborated with Hawassa University on training nutrition experts on theory of nutrition and OFSP as a source of vitamin A. During the reporting period, the Hawassa University's School of Nutrition and Food Sciences, together with a lecturer and nutrition specialist from the University of Wisconsin, School of Human Ecology, collaborated with Boricha Woreda Agricultural Office, Shelo Belila Kebele Women Development Army leaders, and CIP to expose MSc students to practical activities on OFSP nutrition and community demos of preparing foods containing OFSP leaves and roots. This collaboration helped the graduate students to interact with communities and develop skills in working with farmers (Fig. 6). Students, guided by their teacher, developed questionnaire for a survey to track changes in consumption of OFSP and other related issues in intervention woredas without charges.



Figure 6. Hawassa University graduate students interacting with communities (CIP staff in khaki jacket).

4. IMPLEMENTATION APPROACH

4.1 PROJECT IMPLEMENTATION APPROACH AND ROLE OF PARTNERS

The cost-extension project was designed to support 7,500 direct beneficiary farmers (2,500 potato and 5,000 sweetpotato) and 45,000 people (30,000 sweetpotato and 15,000 potato) in SNNPR who have been affected by drought since 2015/16. The project focused on two important aspects: (1)

making available nutritious food with short production cycle crops—potatoes and sweetpotatoes—and (2) restoring the lost planting material with productive varieties of the two crops to ensure sustainable food production going forward. To reach 7,500 farmers, representing 45,000 people in just 10 months, a partnership approach was followed. CIP partnered with the BoANRD, with their woreda and kebele staff actively involved in implementation of the project, from seed distribution to postharvest. These staff were supported by a focal person from regional BoANRD and CIP staff. The project also partnered with the woreda health staff in disseminating nutrition education, with the Southern Agricultural Research Institute, seed producer cooperatives, and with private seed producers in acquiring quality planting material.

4.2 CREATING OWNERSHIP THROUGH INCEPTION WORKSHOP

To ensure that the project achieves its objectives, increasing ownership and commitment of zonal and woreda agriculture officials was essential, as they would facilitate and support implementation of project activities. To realize this, an inception workshop was conducted on 24 February 2018 for officials from the new potato-producing kebeles that were included in the project during the extension period. The inception workshop for sweetpotato was given in July 2017 and a report submitted to the donor.

During the reporting period, 11 agriculture officials from the region (1), zones (8), and woredas (2) participated in the inception workshop. At the workshop, the officials resolved to fully support the project in their respective woredas. The deputy head of the BoANRD emphasized that the officials would be held responsible if the project fails to achieve its objective in their respective areas, and that their performance rating, among other factors, will depend on it. This triggered support of the project. In all project woredas focal persons (one per woreda) were appointed to manage project activities from seed distribution to postharvest handling and reporting.

5. CHALLENGES FACED

- The continued drought in Sidama zone, especially in Loko Abaya and Boricha woredas, significantly reduced planting material and root production.
- Overlap of our nutrition training program in some project woredas with other government events which farmers were required to attend decreased the number of attendees to 65% of the target.
- Public unrest that prevailed during the growing season disrupted demo of Triple S in some affected areas.
- During the reporting period our regional focal person, who was very influential and active, was promoted to another office. This temporarily affected our activities until his replacement got up to speed.
- Poor communication means between kebeles, woredas, and regions, coupled with public unrest in some project areas, negatively affected timely data collection and inspection of potato produced by commercial producers against quality declared seed criteria. Delayed inspection delayed potato planting by about a week. Now, however, peace has been restored and normal activities resumed.

6. LESSONS LEARNED

(We have tried not to repeat those reported before.)

- Training zonal rural women extension experts, gender experts, and health extension workers on nutrition was very strategic because nutrition trainings and practical demos in project intervention and non-intervention kebeles are now being handled by these experts. This is a very good example of sustainable development. They are now being invited as resource persons by public organizations, nongovernmental organizations, and community associations that organize nutrition training in collaboration with BoNARD and Bureau of Health.
- Involving zonal agricultural departments in an inception workshop and beyond was found to be important, as they help in motivating and monitoring the involvement of woreda agricultural staff in the project for better achievement.
- Renewing the stock of potato seed producer cooperatives and sweetpotato DVMs should be done regularly to improve productivity of the two crops. Commercial sweetpotato producers should follow suit so that productivity at farmer level increases.
- The level of acceptance of OFSP by farmers has shown an increasing trend after the introduction of Triple S technique because the biggest problem for the farmers has been maintenance of planting material from one planting season to the next. Triple S has been found as an important method to partially reduce the problem.
- Effective nutrition training that has both theory and hands-on practical sessions keeps on motivating both existing sweetpotato producers as well as new ones, who are introduced to OFSP for the first time.
- Direct beneficiary farmers have willingly shared the new potato and sweetpotato varieties they got from the project with others in their surroundings, showing that communities want to grow together. Project spillover effects can be significant, so there is a need to capture and document them.

ANNEXES

ANNEX I. AVERAGE ROOT YIELDS OF 'AWASSA-83' AND 'KULFO' IN PROJECT WOREDAS AND KEBELES, MEHER 2017

Woreda	Kebele	Variety	Root Yield/ha (mt)
Boricha	Qonsore chefa	'Awassa-83'	8.8
		OFSP('Kulfo')	12.4
	Sedamo chala	'Awassa-83'	11.3
		OFSP('Kulfo')	11.0
Loka Abaya	Aleta sodo	'Awassa-83'	16.9
		OFSP('Kulfo')	9.6
	Dese	'Awassa-83'	11.2
		OFSP('Kulfo')	10.1
Humbo	Fango lome	'Awassa-83'	14.5
		OFSP('Kulfo')	14.5
	Bosa wanche	'Awassa-83'	13.6
		OFSP('Kulfo')	19.6
Damot Woyde	Tora Sedebo	'Awassa-83'	20.7
		OFSP('Kulfo')	15.5
	Girara Amba	'Awassa-83'	17.6
		OFSP('Kulfo')	18.8
	Adacha	'Awassa-83'	22.9
		OFSP('Kulfo')	19.2
	Chisisa	'Awassa-83'	19.1
		OFSP('Kulfo')	19.0
Hadero Tunto	Lesho	'Awassa-83'	25.3
		OFSP('Kulfo')	14.3
	Mugunja	'Awassa-83'	36.0
		OFSP('Kulfo')	41.1
	Amelka	'Awassa-83'	27.1
		OFSP('Kulfo')	12.1
Kedida Gamela	Bezena benara	'Awassa-83'	19.6
		OFSP('Kulfo')	20.9
	Amido	'Awassa-83'	13.8
		OFSP('Kulfo')	9.6
	Aze doboho	'Awassa-83'	18.2
		OFSP('Kulfo')	12.8
Demba Gofa	Tozza seba	'Awassa-83'	67.7
		OFSP('Kulfo')	77.4
	Karza	'Awassa-83'	138.1
		OFSP('Kulfo')	75.3
	Suka	'Awassa-83'	
		OFSP('Kulfo')	21.4
	Turga	'Awassa-83'	16.9
		OFSP('Kulfo')	20.7

ANNEX 2. TUBER YIELD AND GROSS VALUE OF THE G3 SEED POTATO PRODUCED BY SEED COOPERATIVES FROM EARLY G2 SEED, BELG 2017

Woreda	Cooperative	Quantity Provided (t)	Total G3 Production (mt)	Sold as Seed (mt)	Unit Price ETB/mt	Cash Income Obtained (ETB) and (\$ in parentheses)
Cheha	Yseresh potato seed producer Hibret sira maheber	4	43			
	Goryo potato seed producer Hibret sira maheber	2	22			
Gumer	Edget Besira Burda and Denber Youth's Seed Potato Producer Cooperative	6	50	10.95	9,500.00	104,025.00 (3,824.40)
	Zeginet Buchucha Yewech Seed Potato Producer Cooperative	4	22.6	17.1	10,000.00	171,000.00 (6,286.82)
	Tefadr potato seed producer Hibret sira Mahiber	2	6			
	Chocem Ysery potato seed producer Hibret sira Mahiber	0.5	3			
	Nmaje potato seed producer Hibret sira Mahiber	0.5	1.5			
Geta	Ajamazer Geta Yfze Atkiltina Firafire zer Amrach Mahiber	4	20	10	10,000.00	100,000.00 (3,676.50)
	Yekebul Kebele A/A Mahber	2	7.5	7.5	6,050.00	45,375.00 (1,668.23)
	Geribo Atikiltina Firafire Amirachochi Mahiber	1				
	Wurbazer Yeset Arso aderoch seed potato producer Hibret sira maheber	2	15.2	3.8	4,400.00	16,720.00 (614.69)
	Amuro seed potato producer Hibret sira maheber	1	5	4	4,500.00	18,000.00 (661.76)
	Ediget Hulegeb seed Amrachoch Hibret sira maheber	0.6				
	Tach fereze seed potato producer Hibret sira maheber	1	5	4	4,500.00	18,000.00 (661.76)
Merab azernet	Amardu seed potato producer Hibret sira maheber	1	5	2.5	5,900.00	14,750.00 (542.28)
	Basote liqot seed potato producer Hibret sira maheber	1				
	Halal seed potato producer Hibret sira maheber	1				
	Shmagne potato seed Amrachoch Hibret sira maheber	1.5				
	Birki seed potato producer Hibret sira maheber	1.5				
Mihsa	Bueuma kebele mirte zer bzyte producer Hibret sira maheber	2.5	26	25	8,000.00	200,000.00 (7,353.00)
	Bueuma kebele burgoso A/Frafrie zer bzyteproducer Hibret sira maheber	1	10	6.2	8,000.00	49,600.00 (1,823.54)
	Shiro kebele Mirt zer Bezet Hibret sira maheber	1				
	Morsito kebele kalta A/frafrei zer bzyteproducer Hibret sira maheber	2	10	6	4,000.00	24,000.00 (882.36)

Woreda	Cooperative	Quantity Provided (t)	Total G3 Production (mt)	Sold as Seed (mt)	Unit Price ETB/mt	Cash Income Obtained (ETB) and (\$ in parentheses)
Lemo	Yemaschafa A/frafrei zer Amrachoch Hibret sira Mahber	2	20	11.6	6,000.00	69,600.00 (2,558.84)
	Hundedo Timr Gibrna Amrachoch Hibret sira Mahber	1	7.5	6.7	7,000.00	46,900.00 (1,724.25)
	Btimisha Timr Gibrna Amrachoch Hibret sira Mahber	1.5				
	Godisso Atkiltna Firafire A/H/S/M	1	10	7.9	10,000.00	79,000.00 (2,904.44)
Deyogenea	Ydiniqa kebele seed potato producer Hibret sira maheber	2	7.5			
	Yewenjela Brhan selam kebele potato mirt zer bzet Hibret sira maheber	2	7			
Total		52.6	303.8	123.25		956,970.00 (35,182.72)

ANNEX 3. SWEETPOTATO VINE CUTTINGS PRODUCED FROM 'AWASSA-83' AND 'KULFO' VARIETIES AND THEIR GROSS VALUES IN INTERVENTION WOREDAS AND KEBELS, MEHER 2017

Woreda	Kebele	Variety	No. of Cutting/ha	Gross Values in ETB 0.20/cutting and (\$ in parentheses)
Boricha	Qonsore chefa	'Awassa-83'	144,445.60	28,889.12 (1,062.10)
		OFSP('Kulfo')	561,115.60	112,223.12 (4,125.85)
	Sedamo chala	'Awassa-83'	833,117.80	166,623.56 (6,125.87)
		OFSP('Kulfo')	874,451.40	174,890.28 (6,429.79)
Loka Abaya	Aleta sodo	'Awassa-83'	327,502.60	65,500.52 (2,408.11)
		OFSP('Kulfo')	208,612.80	41,722.56 (1,533.92)
	Dese	'Awassa-83'	1,101,744.90	220,348.98 (8,101.07)
		OFSP('Kulfo')	1,155,912.00	231,182.4 (8,499.34)
Humbo	Fango lome	'Awassa-83'	1,057,786.20	211,557.24 (7,777.84)
		OFSP('Kulfo')	2,393,352.50	478,670.5 (17,598.18)
	Bosa wanche	'Awassa-83'	713,783.50	142,756.7 (5,248.41)
		OFSP('Kulfo')	1,642,235.40	328,447.08 (12,075.26)
Damot Woyde	Tora Sedebo	'Awassa-83'	2,592,909.60	518,581.92 (19,065.51)
		OFSP('Kulfo')	2,076,905.50	415,381.1 (15,271.36)
	Girara Amba	'Awassa-83'	1,532,901.20	306,580.24 (11,271.33)
		OFSP('Kulfo')	1,862,237.10	372,447.42 (13,692.92)
	Adacha	'Awassa-83'	2,971,579.30	594,315.86 (21,849.85)
		OFSP('Kulfo')	2,481,797.60	496,359.52 (18,248.51)
	Chisisa	'Awassa-83'	2,760,466.50	552,093.3 (20,297.55)
		OFSP('Kulfo')	2,795,577.90	559,115.58 (20,555.72)
Hadero Tunto	Lesho	'Awassa-83'	536,893.20	107,378.64 (3,947.74)
		OFSP('Kulfo')	725,005.80	145,001.16 (5,330.93)
	Mugunja	'Awassa-83'	331,558.20	66,311.64 (2,437.93)
		OFSP('Kulfo')	362,225.10	72,445.02 (2,663.42)
	Amelka	'Awassa-83'	378,225.20	75,645.04 (2,781.07)
		OFSP('Kulfo')	273,335.50	54,667.1 (2,009.82)
Kedida Gamela	Bezena benara	'Awassa-83'	1,948,163.70	389,632.74 (14,324.73)
		OFSP('Kulfo')	2,134,461.50	426,892.3 (15,694.57)
	Amido	'Awassa-83'	1,490,234.10	298,046.82 (10,957.60)
		OFSP('Kulfo')	4,978,262.00	995,652.4 (36,604.87)
	Aze doboho	'Awassa-83'	669,338.70	133,867.74 (4,921.61)
		OFSP('Kulfo')	663,560.90	132,712.18 (4,879.12)
Demba Gofa	Tozza seba	'Awassa-83'	3,357,360.20	671,472.04 (24,686.47)
		OFSP('Kulfo')	4,260,478.50	852,095.7 (31,327.05)
	Karza	'Awassa-83'	4,440,480.00	888,096.0 (32,650.59)
		OFSP('Kulfo')	1,184,453.90	236,890.78 (8,709.22)
	Suka	'Awassa-83'	2,047,571.90	409,514.38 (15,055.68)
		OFSP('Kulfo')	7,580,949.50	1,516,189.9 (5,5742.28)
	Turga	'Awassa-83'	461,781.50	92,356.3 (3,395.45)
		OFSP('Kulfo')	2,760,466.50	552,093.3 (20,297.55)
Total			70,673,240.90	14,134,648.18 (519,656.18)

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