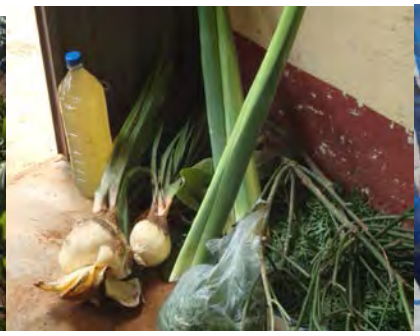
Enhancing Post Harvest and Seed System (EPHSS) Project in Ethiopia

Funded by USAID

Final Project Report, September 2009 – December 2011


PROJECT SUMMARY	
Award No.	DFD-A-00-09-000309-00
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Harar

1. Project Overview

Mercy Corps Ethiopia implemented the Enhancing Post Harvest and Seed System (EPHSS) project in *Babile, Gursum* and *Midega Tola* woredas of East Hararghe zone of Oromia Region State. The project ran for over two years from Sep. 2009 to December 2011. The principal aim of the project was to improve local seed and storage systems in order to increase household resilience to shocks and thus reduce the need for future relief-based interventions.

The project focused on improving crop productivity and reductions of post harvest grain/seed losses, through strengthening farmer led research and extension system on improved post harvest management, community based seed system and participatory research and extension approach. The project activities included provision of training to farmers and extension workers, and working with partners to design innovative household storage methods.

To ensure the sustainability of project interventions and facilitate a suitable exit strategy, Mercy Corps adopted the Farmer Field School (FFS) methodology which is a community led research and extension approach which provides farmers access to technical extension services, and promotes indigenous technical knowledge and solutions which are adaptable to the local social, technological, environmental and economic context of the farming communities.

Initially, the project period was for 18 months; however, Mercy Corps Ethiopia requested and received a no-cost extension (NCE) for an additional 9 months to enhance institutionalization of the project approach with in the existing research and extension system of the government.

The report highlight indicators/achievements, summary of main activities accomplished, successes and lessons learned and program issues/challenges faced during the project period.

2. Indicators and Achievements

Type of Activity	Plan		Total achievement		Percentage achievement		
	Unit	Target	Beneficiari	Result	Benefi.	Result	Benef.
1. Farmers are trained through Farmer Field Schools (FFS) on improved techniques for preventing grain and seed losses							
Establish and support FFS	# of FFS	15	n/a	14	n/a	93.3%	NA
* Number of farmers and extension workers trained on FFS concept and principles(including refreshment training)	# of farmers	360	2160	336	2,016	93.3%	93.3%
	# of extension workers	20	80	23	92	115%	115%
* Organize FFS cross visit (experience sharing program)	# of extension workers	17	48	18	72	105%	150%
	# of farmers	14	36	18	108	128%	300%
Comprehensive training on reduction of post-harvest losses	# of HH	450	2700	975	5,850	216%	216%
Training of Trainers of farmer facilitators	# of ToT	12	108	59	354	491%	327%
Dissemination of improved techniques through FFs	# of Farmers	1800	10,800	2,561	15,366	142%	142%
2. Farmers decrease post- harvest losses through rehabilitated and improved storage facilities							
Rehabilitate household pit storage	# of pits	450	2700	1,900	11,400	422%	422%
Identification and training of local tinsmiths	# of local smith	30	180	0	0	0	0
Dissemination of metal drum to vulnerable households***	# of drums	600	3600	0	0	0	0
3. Strengthen reliable supplies of quality seed at community level							
Support selected farmers to engage in seed production	No	225	1,350	1,467	8,802	652%	652%
Partnership with Haramaya University to link producers and extension agents with appropriate storage system and postharvest management information	# of post-graduate students	6	6	3	3	50%	50%
Establish market linkages for sustainable supply of quality seed	No of workshops	3	60	1	52	33%	87%

3. Summary of Activities Accomplished

3.1. Establish and Support Farmers Field School (FFS)

The EPHSS project used the FFS approach to increase farmers' access to extension services and promote their indigenous technical knowledge as a means to solve their priority problems. To this end, on the basis of selected criteria like interest to participate in FFS activities, willingness to share and disseminate knowledge/skill obtained to other farmers, acceptance by the community, proximity to Farmers Training Center (FTC), innovativeness and gender, 14 FFS with a total of 336 members (14% women) were established, supported and under operation in the project woredas. Initially a Training of Trainers (ToT) session was organized and then provided to FFS members, experts and development agents of the project areas on concept, principles and applications of the methodology. An experience sharing visit was also organized for experts, development agents and FFS representatives to complement the theoretical trainings and make them understand the practical application of the FFS approach. Besides, FFS were also supplied with protective clothing like goggles, hand gloves and plastic shoes to safeguard them from any hazard while preparing botanical pesticides and during spraying.

Members of the FFS identified their priority crop production problems and started experimentation to solve the problems using local resources and indigenous knowledge. The result of the experiments showed good progress in controlling the identified insect/pest problems like control of maize and sorghum stock borer, ground nut root rot, chat beetles, weevil, termite, rodents, fruit flies causing mango flower abortion and livestock ecto parasites using different parts of various plant species/botanicals. The experiment was designed so that farmers could validate and compare the conventional practices vs. improved agronomic practices (integrated crop management systems) adapted for the production of the major crops.

The FFS experiment showed that pesticides tested and developed by FFS members from extracts of different plant parts and cattle urine largely contributed to reduced costs (vs. chemical pesticide purchase) and their effect on human health and bee colonies of the area. Members of the FFS have started to share experiences, knowledge and skills obtained to other farmers of the project area.

Photo: FFS experimentation on locally identified crop production problems

3.1.1. Refresher Training for Extension Workers and FFS Members

A refresher training was organized for 22 extension workers and development agents of the project woredas to update their knowledge/understanding on the concept and objective and methodologies of the project. The project achievements and processes followed in the first year were reviewed to identify and bridge the technical gaps observed in each project intervention activities such as FFS, seed multiplication and post harvest grain management.

In order to update their understanding and further strengthen the local level experimentations, a refresher training was also given for 316 members of the already organized FFS groups.

3.1.2. FFS Experience sharing Visit

Two rounds of FFS cross visits and experience sharing programs were carried out to the northern part of Ethiopia specifically the North Wollo administrative zone of Amhara regional state and 36 beneficiaries represented each of FFS sites, respective development agents and woreda experts participated in the visiting program. The visit was arranged to share experiences on practical application of the FFS approach for solving area specific problems, their learning methods, and planning and on ways of sustaining the approach.

Discussions were also held with woreda office of agriculture, research centers and other government offices that have direct roles in supporting FFS for future sustainability and institutionalization of the approach within the existing government research and extension system. The visiting team gained knowledge which could be used as an input in the course.

FFS cross visit experience sharing program, North Wollo zone

3.1.3. Farmers Facilitators Training

During implementation, the project faced various problems including frequent government structural change and staff turnover. Cognizant of this problem the project organized frequent farmers facilitator training so as to narrow down the gap. A total of 59 farmers who were drawn from 14 FFSs were intensively trained on the fundamental knowledge of IPM – FFS, post harvest

management, seed systems and other development approaches. As a result, the facilitators have demonstrated and rendered their unreserved efforts to promote the project approach and its application to the large community. Moreover, they also act as front line development agents whenever there is staff turnover in their respective kebeles. It was witnessed that farmers' facilitators reported the first prevalence of pests and their activity progress to government agricultural offices. Thus, sustainability and institutionalization were more consolidated at the grass root level.

3.2. Comprehensive Training on Reduction of Post Harvest Losses

Studies revealed that a majority of farmers in eastern Hararghe store sorghum grain in underground pits. These pits usually elevate grain moisture and storage temperature to a level that favors insect pests and fungi development, causing grain spoilage. The project in collaboration with Haramaya University and woreda office of agriculture has delivered training for farmers on three areas of post harvest losses management practices that includes

- Seed selection, harvesting and drying
- identification of insect pest and fungus damage and
- Storage methods

Accordingly, 975 (15% women) beneficiary farmers from FFS, seed producers and non target farmers received the training. The training was facilitated by project team and government staffs who received a training of trainer course. During the training session both theoretical and practical aspects were covered. The training increased farmers' knowledge on concept of seed selection, harvesting, seed drying and basic causes of grain or seed spoilage during pre and post harvest stages of the crop which in turn helped farmers to ensure better grain handling and management.

3.3. Dissemination of Improved Technologies

Despite evidence over decades of small-scale farmers' ability to experiment and innovate, most agricultural scientists continue to do research on behalf of farmers rather than in ways that stimulate and strengthen the capacity of farmers linked with other actors to adapt to changing conditions. In many cases, small-scale farmers do not adopt technologies developed by scientists and disseminated through extension, because the technologies do not meet the farmers' needs or suit their conditions. This may be because the introduced technologies do not focus on farmers top priorities, or because the results of formal research were assessed on the basis of criteria that are not relevant to the family members that were meant to adopt the technologies. In contrast to the conventional research and extension system, EPHSS project adapt farmers led research and extension approach (FFS). To influence the behavior of target farmers and key partners, a number of field days and experience sharing programs were organized which highly publicized FFS approaches and enable demonstrate/disseminate the methods and results to other group of farmers.

Therefore, improved techniques developed by FFS and skills/knowledge obtained from various training organized was disseminated to 2561 households (25% women) in the project sites. Project achievements and experiences were also presented at a national workshop organized jointly with Haramaya University, Rural Development and Extension Department and shared to organizations engaged in implementing similar projects/activities like GOAL Ethiopia who are implementing the same project in West Hararge program office.

To enhance the diffusion of the project successes, documentation of project activities, process, achievements, benefit and impacts were recorded through an independent professional consultant and a 45 minute DVD audiovisual material was produced to enhance dissemination of best practices and lessons of the project to a wider community.

3.4. Rehabilitation of Household Pit Storage

In Ethiopia, as in many parts of the world, large numbers of poor and food insecure farmers store their grain in underground pits that are characterized by different shapes and sizes having a capacity that ranges from 0.25 to over 2 tons. They are rarely lined with any protective material resulting in spoilage of 30-40% due mainly to moisture and insect infiltration after burying. The result is that already vulnerable families lose an additional one third of their meager harvests. Farmers and the global development community have long recognized this problem endemic to Ethiopia and much of the World's food producers. While attempts at addressing it with affordable, scalable and locally available technologies have been large in number, truly effective and universally appropriate solutions have been elusive.

Mercy Corps introduced pit storage plastic bags to use as a lining material in traditional grain storage pits to protect the grain from moisture. The storage liner for underground pit grain stores that is effective, affordable, adaptable to almost any sized/shaped pit, easily and cheaply transportable and installable, culturally acceptable, and appropriate for scaling efforts using a markets facilitation inputs supply chain approach. Impact analysis of the technology indicates it almost entirely eliminates losses, and for the first time grain stored in the ground using the new technology was able to be sown with a 90% germination rate.

The plastic bag is locally called a Pit Storage Bag (PSB). The PSB looks like a giant sock with a draw-string closure at the top. Made of a highly durable, readily available plastic coated canvas (the material often used to produce awnings or large billboards/banners), PSBs of any size can be sewn using basic manual sewing machines employed by village-level tailors, or industrially produced by large, commercial sewing factories. At a retail cost of roughly USD 32, a 2 ton pit storage bag is demonstrated to have annual gross revenue of roughly USD 104 (USD 72 net profit). With an estimated lifespan of over 2 years, the return on investment is about USD 176 (over 5-fold), roughly the value of over 1,200kgs of grain on the local market.

Using a participatory approach the project team started its intervention by identifying the root causes of post harvest losses; identifying possible alternative solutions to overcome the problem and selecting the most feasible and best intervention activity-- which is use of plastic bag lining to solve the problem. To build in an exit strategy from the start, private sector actors who could manufacture, market and disseminate the PSBs were identified and developed sample plastic bags for on farm demonstration before their wider production and distribution to interested project beneficiaries. Based on feed back from farmers and extension experts, the plastic bags were modified, produced and delivered to 1900 interested households through a chain of plastic bag producers and sales agents in this case the FFSs. During the first round beneficiary farmers contributed 20% of the retail bag price while the remaining 80 % was covered with the project through a voucher system. In the second year based on the increased demand for the technology the contribution of farmers was increased to a 50:50 cost sharing.

In order to measure impact of the PSBs and accompanying training on post-harvest storage loss reduction, an assessment was made in the targeted project areas. During the assessment multiple participatory data gathering methods were utilized including focus group discussions, observation, and individual interviews of 109 PSB users (7.8% of the beneficiary households). The results of the assessment indicated use of PSBs had both a quantitative and qualitative impact on grain losses, as compared to grain stored in traditional pits during the same period. A summary of the findings include:

- Quantitatively, all PSB users reported losses to be zero or nearly zero. However, farmers who stored grain using tradition methods (i.e. no PSB) during the same period in the same areas reported an average of 31.4% losses, predominantly attributed to weevils and grain molding;
- Quality (viability) of grain stored using PSBs was found to have roughly 90% germination rates leading it to be used for seed, home consumption and marketing (selling) purposes;
- Quality (appearance) of grain stored using PSBs was found to be almost as high as when first stored in the PSB. The PSB-stored grain was found to be free of odor, soil, and mold or color adulteration. In addition to having obvious culinary and health appeal, the PSB-stored grain eliminated the tedious work of cleaning and sorting stored grain which normally would consume much of the day for women and girls. Conversely, grain stored in traditional pits was found to be unappetizing and time consuming to clean as it was mixed with soil, discolored from mold, and smelled rancid; and
- Economically, it was also found that farmers who used PSB benefited from an average annual gross and net profit of 104 USD and 72 USD against the un-subsidized cost of the PSB.

From this activity, three key lessons were learned:

(1) Improving grain pit storage by the use of PSBs and training of farmers on post-harvest, pre-storage grain management can significantly reduced both qualitative and quantitative grain losses, as compared to traditional grain storage pits;
(2) Even poor farmers saw and understood the value of PSBs, and were already willing to pay for the technology designed to address one of their greatest food security needs; and
(3) The private sector is an efficient and effective means to disseminate new technologies and practices to rural communities, even poor farmers.

Therefore, in order to scale up the activity to the wider community, and other regions experiencing similar post harvest problem, the following are recommended:

- Eliminate unnecessary subsidies: the initial phase of the project clearly demonstrated the effectiveness of the PSBs. Subsidies were utilized in Phase 1 to buy down farmers' risk to adopt a new technology with untested and undocumented return on investment. With those now established, and farmer purchasing habit demonstrated, disruptive subsidies may only further distort the market and hold back entrepreneurial PSB manufactures, retailers and agents.

- Add more decentralized PSB manufacturers: include small-scale, more rurally located tailors at the manufacturer level of the supply chain strengthening activity;
- Involve additional inputs retailers: include other private sector agricultural inputs retailers in the supply chain ensuring they get trained how to train farmers to appropriately install the PSB, and
- Support broad awareness building/marketing campaigns: support manufacturers and retailers to design and undertake effective marketing aimed to build farmers awareness of and demand for PSB.

Grain physical appearance before and after use of PSBs

3.5. Dissemination of Metal Drum to Vulnerable Households

Introduction of alternative improved storage structures such as metal drums to the farming community was one of the intervention areas of EPHSS project as a means to overcome existing grain/seed losses. To this end, the project team developed 14 sample metal drums and demonstrated them at farm level through FFS. However based on 10 areas of evaluative criteria, the results indicated that no design sufficiently met enough criteria (capacity, cost, sustainability, etc) to validate continued pursuit of this intervention. The project team therefore concluded to cancel metal drum production as well as related activities like tinsmith training and purchase of tinsmith kits rather focused on promotion of improved pit storage bags that showed greatest promise in reducing post harvest losses.

3.6. Support selected Farmers to engage in Seed Production

EPHSS project areas are characterized by its crop-livestock mixed farming system and farmers of the areas have long been producing long maturing maize and sorghum varities as their major food. But production and productivity of the crops have been largely affected by the existing moisture shortage problem and crop failure becomes a common phenomenon of the area. This situation is further aggravated with lack of seed of crop varities that can adapt to the existing local context. In view of this fact, Mercy Corps implemented an on farm seed multiplication activity to increase farmers' access to quality seeds of crop varities adaptable to the existing situation that fit the needs and priorities of the target farmers through strengthening farmers to farmers seed exchange mechanisms.

During the project period, 77 quintal seeds of improved early maturing crop varities such as 24 quintals of maize seed (Katumani and Melkas-1 varities) and 43 quintal sorghum seed (Abshir) and 10 quintals of wheat Varity (HAR 710) were purchased from Haramaya University, Mechara and Fedis Agricultural research centers and distributed to 1465 beneficiaries (10.5% women) who received a training on seed production activity on a revolving seed basis.

In order to manage the seeds properly and pass to the next beneficiaries in the coming season an MoU was signed with farmers, FFS and government representatives. A total of 433 ha of land were covered with the distributed seeds. Five quintals of newly released sorghum varities (3 quintals Gedo and 2 quintal Hormat) were distributed to 83 farmers (8% women) to test their adaptability in the project areas before their wider production. Despite the observed erratic rain fall, the planted seed performed well and most of the fields were harvested and ready for threshing.



3.7. Action Research

In partnership with Haramaya University, EPHSS project sponsored three graduate students and provided a grant for their M.Sc thesis research work. The students conducted their research on seed systems and post harvest management. The research work was carried out in close collaboration with their supervisors and delegated professionals. Following a series of procedures, the students defended their research and approval was made by the University's senate. Their report can be used as a reference material to train farmers and extension workers for better management and improvement of crop production as well as to link with marketing opportunities. Accordingly, the project team has made an effort and used all opportunities to link and introduce the research finding to wider users i.e. to government extension workers (see attached abstracts).

3.8. Establish Market Linkages for Sustainable Supply of Quality Seed

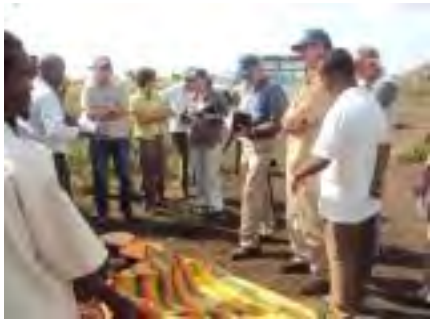
The project organized seed production and marketing linkage workshops to review seed production activities accomplished so far and linked seed producers to available seed markets so as to enhance seed transfer to other farmers of the project area. To this end, 52 participants drawn from the office of agriculture, seed producers, FFS, cooperatives offices, Afran Kalo Farmers Cooperative Union, Fedis Agricultural Research Center and Haramaya University (including project sponsored M.Sc students) attended the workshop. The workshop addressed the notable results obtained with the project team and the contribution of the activity to improve seed insecurity for the farmers was highly appreciated. The participants also highlighted the significance of the activity, the need to strengthen, sustain and scale up similar activities in other parts of the zone.

Moreover, it was strongly suggested to facilitate farmer to farmer seed exchange through information dissemination during community meetinsg and field day programs. In the workshop, a thorough discussion was also made to assure seed quality in order to link them with formal seed markets to sustain the production activities and ensuring market outlet. Accordingly strengthening of farmers groups and FFS as seed producer's cooperatives was suggested as a feasible strategy to contribute sustainability of the activity and to access reliable seed markets like through Afran Kalo Farmers' Cooperative Union than working with scattered individual farmers.

4. Project Activity Monitoring

A systematic and effective monitoring system has been in place throughout the project implementation periods. There were monitoring checklists against which progress was reviewed. Staff, farmers and partners were involved in the monitoring process. The results of monitoring were shared among all stakeholders and examined for further consideration. The woreda office of agriculture and rural development attempted including project activities in to their annual plan and to design monitoring systems at the grass root level to enhance their capacity by solving technical problems. In general, the necessity to have a well defined monitoring system was considered and also emphasized at the project start up. The system helped to ensure a continuous and institutionalized follow up throughout the life of the project and initially majority of planned activities were viewed to continue unchanged.

On top of this, Mercy Corps Senior officials from the country program and head quarter visited the project a number of times and provided technical and strategic advice. In addition, from the donors side OFDA and USAID high profile guests visited one of the project sites and met with project beneficiaries.


The project team also participated ina field day organized by Haramaya University and Fedis Agricultural Research Center. The forum creates an opportunity to share experiences and best practices to be used while implementing the project activity. It also assisted the team to strengthen and create linkage with other government staff participated on the field day.

5. Successes and Lessons Learned

Important lessons were learned during the implementation of EPHSS project activities. These include:

- The farmer-to-farmer extension through FFS at the grassroots level has proven an efficient, effective and sustainable way of doing development activities. The farmer facilitators, drawn from the FFS and trained do their promotion by going from house to house and disseminate improved technologies tested and verified with FFS members to the rest of community members. The project has also proven that, if they get a chance to be actively involved in development processes, farmers are not only the problem identifiers but also experts and creative to solve their own problems by themselves. Moreover the validity of indigenous knowledge has proven effective in controlling insect pests through FFS experimentation.
- From the past extension system it was learned that handing out goods and services to communities is not a sustainable way of helping them (the communities), unless the community members and stakeholders are actively involved in the development processes. Cognizant of this fact the project team has been implementing its intervention activities through adopting a participatory extension approach where the community members develop a sense of ownership and thereby ensure the sustainability of the project.
- Use of plastic bag for pit lining showed remarkable results in reducing both quantitative and qualitative post harvest storage losses in the project areas. However to scale up the activity, wider promotion of the result obtained with the technology and creating access to the plastic bag needs further effort both with government and non government organizations.
- Seed production in scattered individual farm households was difficult and made the field level support and supervision very difficult and also found to be inefficient in terms of resource use. Further such an approach was also looks less likely to sustain. Therefore farmers having common interest to produce seed and working together should have to be organized in a group so as to create sustainable access to seed at local level and help to produce quality seed. Moreover, such an approach would also help farmers to get access to government extension supports like credit service, basic seed source and market. This in turn will provide an opportunity for farmer groups to be involved in local level seed business activity.
- The genetic potential of basic seed (particularly that of openly pollinated varieties) will decrease after some years. Consequently, farmers have to renew their start up seed to maintain its quality as well as productivity. Therefore as local level seed producer groups play a vital role in addressing exiting seed demand, attention should be given to link farmers groups to the nearby basic seed sources like Fedis Agricultural Research Center and Haramaya University so as to sustain and strengthen the seed production activity started by the EPHSS project.
- In the target project areas; among other activities; FFSs are organized to conduct local level demonstrations and verification of improved crop varieties released from agricultural research centers before their wider dissemination. Verified and accepted seeds of crop varieties need to be multiplied and made accessible to farmers of the area. Hence linking seed producer group to FFS could play a crucial role in this regard so as to disseminate improved crop varities and production techniques to wider section of the community with in a shortest period of time.

6. Impacts of the Project

Practical field evidences clearly showed that as the result of the intervention, tangible results were obtained. Capacity building through the provision of various inputs and training has contributed in increasing beneficiary's awareness on several aspects of project intervention including improved agricultural practices.

FFSs were also found to be crucial and realized the role of women in development undertakings. Close to 20% of direct project beneficiaries were women who were actively involved in the decision making process. The women demonstrated the relevance of gender consideration in agricultural extension services (through their involvement in FFSs) and its implication for creation, adoption, and effective implementation of all project components. Thus, it has been possible to upgrade the capacity of target beneficiaries in terms technical and managerial skills. To this effect, beneficiaries become confident on joint undertakings and ownership of project outcomes which now enable to attain sustainable development.

In general, the project proved feasible and equipped beneficiaries with information, knowledge and skills to be able to overcome challenges in their farming and implement solutions in more coordinated manner to achieve their desired results. More specifically, the impacts of the project are summarized as follows:

Economical: Even though the project implementation period is short, nearly two years, it has been possible to demonstrate remarkable reduction both in pre and post- harvest losses as a result of biotic and abiotic factors. The increase yield of the crop seeds is attributed not only to employing good pest management practices but also as a result of better agronomic and crop husbandry practices such as plant management, soil conservation practices and frequent filed assessment. From field observation and assessment IPM FFS practices provide better biomass and grain yield in comparison with the conventional farming system. There is also a tendency of reducing use of synthetic chemicals and thus, reduced monetary expenses to buy chemicals and farmers got an opportunity of using local pesticides made of plant extracts and cattle urine.

Social: Agricultural crop production is characterized by very complex problems where a large number of people's participation is required so as to respond to these multidirectional problems. Particularly, pest control and seed security requires collective responsibilities of all the community. One of the impacts of the intervention is that farmers are made to develop team spirit and group thinking. Today, the target group has carried out each activity jointly with the community and many of the FFS have even showed great desire to add more objectives like involving in trade and other businesses and thus improve their livelihood and some already legally registered for seed multiplication and selling. There are quite a number of social activities in the Field schools, which build on enormous social capital among the schoolmates. These include sharing the problems and joys of members' in terms of financial support, labors and moral support.

Attitudinal Change: Obviously, the project areas have remained food insecure for prolonged years due to crop loss caused by several intertwined factors. As a result, thousands of people remain dependent on external food aid. Thus, farmers stay passive in any development activities and more rely on external aids.

Practical evidence revealed that the greater achievements of EPHSS project is that farmers attitude change and reliance on their own knowledge to solve their multifaceted problems so as to escape

from poverty. Moreover, extension workers realize that indigenous knowledge is the corner stone to change rural poverty and now they are promoting farmer led extension approaches in their development activities other than conventional pest control system. There are also significant attitudinal changes among farmers and extension workers towards bottom-up planning and participatory learning and process. The involvement of women in the innovation process is significant. Good number of innovation was discovered by women and accepted by the field school.

7. Program Issues or Concern

The major problems were:

- Through out the project period rainfall frequency and distribution was erratic. As a result, stage of crop development is by far different from place to place due to varying in planting time. The rain pattern was critically affect program implementation in general and seed multiplication and FFS experimentation activities in particular.
- Frequent government staff turn over that creates gap in implementations of project activities and poor documentation and failure to provide a timely activity progress report as well.
- Absence of government staffs from their regular work due to frequent meeting and some other matters which adversely affected the timely implementation of project activities.
- Shortage of basic seed for the planned seed production activities

8. Annex

8.1. Summary of project participants (HHs) under major project intervention

S/N	Intervention Activities	Number of households by woreda									Grand total		
		Midega			Babile			Gursum					
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Participant only in FFS	3	1	4	10	0	10	0	0	0	13	1	14
2	Participant only in seed	398	31	429	276	43	319	375	48	423	1096	126	1,222
3	Participants only in comprehensive training	12	1	13	43	15	58	65	10	75	120	26	146
4	Participants only in pit storage rehabilitation	346	32	378	354	53	407	23	5	28	723	90	813
A.	**Sub Total (participants only in one activity)**	**759**	**65**	**824**	**683**	**111**	**794**	**463**	**63**	**626**	**1,952**	**243**	**2,195**
B.	**Total household participants in more than one activity**	**416**	**17**	**433**	**206**	**42**	**248**	**535**	**116**	**651**	**1,157**	**175**	**1,332**
C.	**Total householders directly participated (A+B)**	**1,175**	**82**	**1,257**	**889**	**153**	**1,042**	**998**	**179**	**770**	**3,109**	**418**	**3,527**
D	**Total households reached through FFS and field day (technology dissemination)**	**669**	**193**	**964**	**392**	**187**	**579**	**872**	**248**	**1,120**	**1,933**	**628**	**2,561**
E	**Grand Total (C+D)**	**1,844**	**275**	**2,221**	**1,281**	**340**	**1,621**	**1,870**	**427**	**1,890**	**5,042**	**1.046**	**6,088**
F	**Total Beneficiaries (E*6)**	**11,064**	**1,650**	**13,326**	**7,686**	**2.040**	**9,726**	**11,220**	**2,562**	**11,340**	**30,252**	**6,276**	**36,528**

Note: Total project beneficiaries is calculated by multiplying the total household with the average family size (six family/household) of the project woredas

8.2. Seed Multiplication update, 2011

Woreda	Kebele	No. of Participant												Total Area Covered (ha)			
		Maize			Sorghum			Wheat			Grand Total			Maize	Sorghum	Wheat	Total
		M	F	Total	M	F	Total	M	F	Total	M	F	Total				
Babile	Ifadin	24	12	36	40	14	54	0	0	0	64	26	90	4	29	0	33
	Lakkole	14	2	16	11	5	16	0	0	0	25	7	32	4	8	0	12
	Erer Guddaa	14	2	16	15	3	18	0	0	0	29	5	34	4	8	0	12
	Gemechu	0	0	0	63	3	66	0	0	0	63	3	66	0	20.8	0	20.8
	Sheh Husen	15	1	16	45	1	46	0	0	0	60	2	62	4	16.6	0	20.6
Sub Total	**5**	**67**	**17**	**84**	**174**	**26**	**200**	**0**	**0**	**0**	**241**	**43**	**284**	**16**	**82.4**	**0**	**98.4**
Gursum	Bekeka	0	0	0	18	6	24	0	0	0	18	6	24		7	0	7
	Awudal	36	4	40	99	19	118	0	0	0	135	23	158	10.4	37	0	47.4
	O/Oromia	41	4	45	129	9	138	0	0	0	170	13	183	10.4	37	0	47.4
	Dayferes	0	0	0	0	0	0	22	0	22	22	0	22	0	0	3.5	3.5
	B/Negeya	0	0	0	0	0	0	18	2	20	18	2	20	0	0	3.5	3.5
Sub Total	**5**	**77**	**8**	**85**	**246**	**34**	**280**	**40**	**2**	**42**	**363**	**44**	**407**	**20.8**	**81**	**7**	**108.8**
Midega	Roba	22	3	25	61	6	67	0	0	0	83	9	92	6.25	8.25	0	14.5
	Bilisuma	12	2	14	32	2	34	0	0	0	44	4	48	3.5	16.5	0	20
	Biyoworaba	20	2	22	96	6	102	0	0	0	116	8	124	5.5	25.5	0	31
	Kufa	21	2	23	134	8	142	0	0	0	155	10	165	5.75	35.25	0	41
Sub Total	**4**	**75**	**9**	**84**	**323**	**22**	**345**	**0**	**0**	**0**	**398**	**31**	**429**	**21**	**85.5**	**0**	**106.5**
G.Total	**14**	**219**	**34**	**253**	**743**	**82**	**825**	**40**	**2**	**42**	**1002**	**118**	**1120**	**57.8**	**248.9**	**7**	**313.7**

8.3. Summary of seed multiplication, 2010

S/N	Activities Description	Woredas			Total
		Babile	Gursum	Midega	
1	**Number of Farmers Engaged in Seed Production**	**102**	**175**	**102**	**379**
	Maize	25	32	102	159
	Male	22	29	90	141
	Female	3	3	12	18
	Sorghum	77	143	0	220
	Male	73	128	0	201
	Female	4	15	0	19
2	**Amount of Seed distributed (qt)**	**6.5**	**6.5**	**7.5**	**20.5**
	Maize (Katumay)	2	2	7.5	11.5
	Sorghum (Abshir)	4.5	4.5	0	9
3	**Area Planted (ha)**	**45.5**	**45.75**	**28.5**	119.75
	Maize	8	8.25	28.5	44.75
	Sorghum	37.5	37.5	0	75
4	**Crop damaged due to rain shortage, late planting, floods & lack of proper agronomic practice (ha)**	**6.5**	**31.5**	**9**	**47**
	Maize	4	0	9	13
	Sorghum	2.5	31.5		34
5	**Farmers with no Production**	**25**	**128**	**36**	**189**
	Male	22	114	33	**169**
	Female	3	14	3	**20**
6	**Total Yield Harvested (qt)**	**84**	**125**	**215**	**424**
	Maize	15.25	112	215	342.25
	Sorghum	68.75	13	0	81.75

8.4. Underground Pit storage plastic bag distributed or number of beneficiaries, 2010

Woreda	Kebele	Bags distributed/HH
Babile	Ifadin	241
	Lakkole	87
	Gemechu	105
	Sheh Husen	202
	Sub total	635
Gursum	Awudal	277
	Bakkaka	94
	Oda Oromia	265
	Sub total	636
Midega	Roba	245
	Bilisuma	155
	Biyo Waraba	124
	Kufa	105
	Sub total	629
Grand total		**1,900**

Note: Figure in bracket is female headed beneficiaries

8.6. Farmers selected for establishing Farmers Field Schools (FFSs)

No	Woreda	Kebele	Number of participants		
			Male	Female	Total
1	Gursum	Biyyo Nagaya	22	2	24
		Dyferes	19	5	24
		Oda Oromia	19	5	24
		Awudal	18	6	24
		Bakkaka	24	-	24
2	Babile	Ifadin	21	3	24
		Gemechu	24	-	24
		Erer Guda	19	5	24
		Shek Husen	22	2	24
		Lakkole	22	2	24
3	Midhega	Biyyo Warabo	18	6	24
		Bilisuma	18	6	24
		Roba	18	6	24
		Qufa	18	6	24
	Total	**14**	**282**	**54**	**336**

8.8. Action Research Abstracts and official letter

Title 1. Post Harvest Handling and Marketing of Groundnut in Babile Woreda, East Hararghe zone

By Solomon Bekele

This study was initiated to analyze the post-harvest handling and marketing of groundnut in Babile Woreda. The specific objectives of the study were: to examine the existing post-harvest handling activities of groundnut among smallholder farmers, to identify factors determining quantity of groundnut supplied to the market, and to analyze the constraints and opportunities in post-harvest handling and marketing of groundnut. The data were generated from groundnut farmer individual interview using pre-tested semi-structured interview schedule. Both primary and secondary data were taken for this study. The total household survey amounted to 130 (86 RPF and 44 RRF) smallholders groundnut producers from Babile Woreda. A three-stage sampling technique was applied to select respondents. Descriptive and inferential statistics were employed to analyze the collected data.

The multiple linear regression model was used to identify the factors influencing quantity of groundnut supplied to the market. According to the result of the study, the comparison using t-test and Chi-square test revealed that there is a significant difference between the groups regarding their farming experience, and yield obtained, use of extension service and market information, credit access and membership in cooperative. There is a difference in harvesting at the right time, drying of groundnut, means of transportation of groundnut from field to home, separating the pods from the vines, drying at home, storage, shelling. The result obtained from multiple linear regression model indicate that among thirteen explanatory variables, education, being a member of cooperative, family size, total produce of groundnut, number of oxen the respondent holds, land allocated for groundnut, market and price information, and income from non farm activities were found to be significant. Diseases at the field and in storage, absence of alternative storage structures, labor shortage, weak performance of primary cooperative, and theft were identified as post-harvest handling problems of groundnut in the study

woreda. Low amount of groundnut supplied, low price, provision of credit, extension services, cooperative services, and market and price information problems, infrastructural problems, and low demand for the processed groundnut were problems of groundnut marketing.

The presence of institutions, the already existing farmers to farmers seed exchange and trade, the cooperative working on groundnut marketing, the presence of agro-processing factory in Babile town, and the increasing price of groundnut in the year 2010/2011 were the opportunities to improve the groundnut sub-sector in the Woreda. As a concluding remark, developing and/or promoting distribution of improved groundnut varieties, introduction of groundnut machineries like Sheller, decorticator, and stripper, developing and distributing alternative and cheaper storage structures, strengthening the local primary cooperatives, strengthening farmers to farmers seed exchange and trade, providing short term training on groundnut for DAs, and increasing farmers marketing and price information on groundnut are crucial points required to improve the groundnut sub-sector in Babile Woreda.

Title 2. Role of Farmers' Seed Supply System for Improving Food Security: The Case of Sorghum in Gursum District, Eastern Hararghe Zone

By Solomon Geremew

Seed is very fundamental input in crop production. Indeed, it can hardly be possible to be food secured without improving the seed system. The objectives of this study were to assess strengths and weaknesses of farmers' seed supply system and to analyze the importance of this system for improving food security in the case of sorghum in Gursum district. To achieve these objectives, study area was purposively selected. A total 140 households were selected using multistage sampling procedure and probability proportional to sample size (PPS) from three PAs. Two household typologies were identified for sample frame as sorghum seed producer and non producers. In order to collect essential quantitative data for study from the sampled households, semi structured interview schedule was developed. The interview schedule was pre-tested before final use and necessary adjustment were made to make it fit with the real conditions prevailing in the study areas. Furthermore, focus group discussion, own observation and key informant interview were made to generate qualitative data.

The data were analyzed using descriptive statistics, inferential statistics and econometric model. Inferential statistics such as t, f and chi-square tests of significance were used to compare sorghum seed producer and non-producer groups with respect to the explanatory variables. To analyze the strengths and weaknesses of farmer seed system SWOT was employed. The results of this study could show that the seed system has flexibility to adapt extreme shocks, range of mechanisms in seed access, responsible for on farm conservation, maintenance and selection of farmers varieties, Seed availability within a village and regulating through social obligation are some of strengths of Farmers' seed supply system . Difficult to test quality at the time of seed exchange, low yield and poor market structure were some of the weaknesses of Farmers' seed supply system. Based on minimum expenditure requirement and core food security model (CFSM), the survey result shows that 1975.74 Birr per adult equivalent per year income required for the cutoff point for food secured households. Accordingly, 56.43%, 16.43%, 18.57%, and 8.57% of sample

farm households were food secure, food insecure without hunger, food insecure with moderate hunger and food insecure with sever hunger respectively. Out of total food secured (79) and insecure (61) sample households, 84.81% and 67.21% were sorghum seed producers and non seed producers respectively. The ordered logit model results show that among 15 explanatory variables included in the model, 6 variables were found to be significant. These significant variables included family size, seed management, annual income, credit access, seed security and social net work. The evidence of ordered logit model reveals that all significant variables are important to address the issue of food security problem. The study findings suggest that in selecting priority intervention areas, the food security strategy should be considered statistically significant variables and a seed security action plan could be develop to anticipation of disaster i.e. synergy between informal and formal seed system through localized farmers center economy.

Title 3. Analysis of Informal Seed Supply System: The Case of Midega Tola District, East Hararghe Zone

By Meseret Getahun

Seed is a vital input to improve agricultural production and productivity. Farmers obtain seed from both formal and informal sources. The informal seed sector in Ethiopia is the major seed supplier of seed for many crops grown in the country. Access to the formal seed sector is limited for the farmers, and hence the role of informal seed supply system is significant. The study is intended to assess the strengths, weaknesses, opportunities and prevailing challenges and institutional frameworks of the informal seed supply system of sorghum and maize crops in Midhega Tola district of east Harerghe zone, Ethiopia. Purposive sampling method was employed to select four sample KAs and probability proportional to size random sampling was used to select 200 sorghum and maize grower sample respondents. The data collected from sample respondents was using structured interview schedule were processed using descriptive statistics with the help of SPSS software. In addition, the qualitative data were also collected using FGDs, key informant interviews and field observations. The qualitative data were analyzed using narrative analysis, SWOT analysis and actor linkage analysis.

The research revealed that the main seed sources for the farmers in the study area were own saved seed, neighbors, local markets, NGOs and the woreda agricultural and rural development office. Farmers in the study area obtain seed mainly by means of exchange with other seed/grain, gift and cash. The respondents and discussants indicated that timely availability, easily accessibility, local adaptability, knowledge and skill sharing along with the seed were the important strengths of the informal seed supply system of the study area. However, the major weaknesses, as reported by the respondents were low quality of seed, lack of purity and lack of specificity of variety. The major challenges faced by the farmers to improve the system were frequent drought, lack of adequate knowledge and skill in seed related activities and lack of appropriate storage. The study also identified the opportunities to strengthen the informal seed system and thereby improve the seed supply system in the area. The presence of traditional seed experts, farmers' cooperatives,

facilitating GOs and NGOs, proximity to research centre and Haramaya University were among the opportunities available.

The informal seed supply system in relation to achieving seed security was assessed and it was found that it has a strong contribution. The main actors involved in the informal seed supply system of the study area were farmers, NGO and GOs; and the linkage between these actors found to be very weak. Therefore to strengthen the informal seed supply system, the existing opportunities should be used as a tool and the linkage between actors should be strengthened.

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Subject: Thesis copies

Please find enclosed thesis copies of Solomon Geremew, Solomon Bekele and Meseret Getahun which were sponsored by your organization for the thesis research. Harmaya University appreciates the support given by and collaboration of MercyCorps.

Looking forward to seeing MercyCorps in future collaboration.

With regards

Firew Mekbib (PhD)