

The Postharvest Education Foundation

POSTHARVEST TRAINING ON APPROPRIATE TECHNOLOGIES FOR STORAGE AND PROCESSING OF SOYABEAN IN WA MUNICIPALITY IN THE UPPER WEST REGION OF GHANA

15th May, 2021

Board of Directors

2020-21

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Mission

To provide innovative programs that motivate and empower people to reduce food losses and waste.

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1.0. Background

Soybean is one of the important food and cash crops that is grown in all the districts of Upper West Region of Ghana. Soybean has several nutritional benefits, when consumed by human and livestock. The wet products such as soymilk has received attention in recent times following from the concerns of health related problems from animal products. The processing and appropriate storage technologies are important considerations for extension of shelf life of Soybean. Attempts have been made regarding the application of improved storage technologies to enhance quality of harvested Soybean. Industries produced dry products such as soyflour and fortified soyproducts to satisfy the nutritional needs of many people across the globe. The cost involved in the acquisition of equipment makes it difficult for local small scale industries to produce such products resulting in higher postharvest losses. Reducing postharvest losses in Soybean contributes to regional, national and international food supply due the high number of food products that include Soybean or its products in fortified foods. The target of the training has to do with shelf life extension of Soybean and soyproducts and further develop novel product as innovation taking into account the cost and benefits analysis. The selection of the training is based on innovative ways to harvest, package, store and processed soyproducts. The extension of shelf life of Soybean rely on appropriate technologies that help reduce the activities of microorganisms which caused food spoilage. The technologies the team applied was mainly conscious of the shelf life and food safety related issues. The importance of Soybean in providing food for majority of people in Africa and beyond cannot be underestimated, therefore any attempt to ensure its availability in safe condition can be justified. It is against this backdrop that this training program offered the possible postharvest innovative storage and processing technologies to reduce losses in food value and returns on investment.

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1.1. Postharvest Training Activities (Details are shown on Plates 1-21).

1.2. Objectives of the training were to:

- a. Train farmers on appropriate on-farm regime of postharvest practices during harvesting, packaging and handling from communities in the Wa municipality.
- b. Provide practical hands-on storage and processing training to locally grown Soybean farmers, wholesalers and retailers.
- c. Train beneficiaries (farmers and wholesalers) on the use of **PICS** and **Zerofly bags** for soybean handling and storage to prevent loss caused by pest infestation
- d. Train beneficiaries (farmers, wholesalers and retailers) on shelf life extension technologies using cost effective processing of **Soy infant** formular ,**Soyprotein shakes**, **Soynut** and **Soy-date formulations**

1.3. Postharvest Challenges of Soybean in Wa Municipality

- a. High level of losses due to shattering, pilfering and pest infestation
- b. Inadequate appropriate postharvest technologies for packaging and storage
- c. Increased cost of Soybean and their products due to high cost of production and postharvest management
- d. No practical training regarding the potential to produce *home-made* soy infant foods and protein shakes from locally grown Soybean.
- e. Postharvest pests and disease affect crops due to lack of postharvest technologies which results in loss of crop value, loss of nutrition and reduction in Return on Investment (RoI)

1.4. Selection of project venue

The Wa Municipality was carefully selected for execution of the project because there are more than 20 Soybean producing communities where high losses are encountered due to, no processing technology, biological activities, inappropriate storage conditions as well as low price per kilogram weight. The low resource based of the Soybean farmers in the target area coupled with the lack of appropriate technologies for storage and processing retards efforts to achieve zero hunger as spelt out in SDG goal No.2. Based on interaction with Soybean growers, the experienced and primary records from BIG AJAR FARMS the biggest Warehouse for grains in the Municipality where postharvest management is key, it was established that famers encounter loses at alarming rates which significantly affect their income and livelihood. In order to address the challenges confronting the cereal and grain sector this project works with small groups of farmers and organised retail groups which offered expansive training in storage and processing of Soybean and their products. The farmers and the players in handling were taken through the hands on practical procedures at their own communities.

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1.5. PEF Grant Approval

Application Form for the 2020 **PEF Cooperative Ventures** US\$1000 Grant was duly lunched on November 10, 2020. Following the submission of our application with details of the training program for soybean storage and processing, the board of directors gave approval on the 18th January 2021 for sponsorship. Subsequently, the transfer of the approved budget submitted to PEF in the application was made on the 22nd February, 2021. The approval offered the team comprising (academic and private sectors) the platform to collaborate to implement the proposed training program. Considering the vast knowledge of the team on postharvest technologies for food crops and soybean in particular, a working schedule was quickly drafted for implementation. A total of one hundred and sixty seven(167) persons were trained.

1.6.0. Modalities of training program

The maiden meeting was held after approvals of proposed program between PEF representative in Ghana (Mr. Adams Abdul-Rahaman) and Big Ajar Farms (Mr. Tawfic Abdul Rahman) at Big Aja Office in Wa to streamline the modalities of the training program. The meeting looks into the communities that would benefit from the training with a far reaching effect. It was established that, farmers and processors from Boli Kpongu, and Zingu which were all communities in Wa Municipality were to be considered. In addition, the five local varieties selected for the training include three dominant varieties from the Northern part of Ghana which include (*Afayak, Favour and Jangumo*) and two from the Southern part (*Anidaasi and Sunpomo*). The rational was to apply same processing techniques to these varieties and to establish a regime for possible common features and unique quality attributes that could be found during processing and storage. The team was unable to access the Anidaasi and Sunpomo due to their shortage at the time therefore focused on the three varieties from the Northern zone of Ghana. A pre-visit was scheduled to be embarked by the two leaders of the team to ascertain the readiness of the beneficiaries of the program.

1.6.1 Pre-visit to Boli Community

The team made a pre-visit to Boli community which is one of the communities with huge population of farmers into soybean production. It was done on Friday, 26th February 2021. The day was chosen because it is usually a resting day for most farmers. Although the message was given on a short notice, the attendance was appreciated. The meeting discussed the relationship and focus areas of the team (PEF and BigAjar Farms) which was explained to reduce postharvest loss in all crops. It was however made apparent to the beneficiaries that the training was to address postharvest losses of soybean during the period under consideration. Another important consideration during the pre-visit was to carry out the training at the community since many people were to benefit relative to conveying few to our training unit. The team clearly stated that the Postharvest Education Foundation had provided the needed funding which was to be completed by BigAjar farms. Following the interest generated after the team's explanations, the beneficiaries quickly suggested the urgent need to conduct the training on Tuesday, 2nd March, 2021.

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1.6.2. Training session at Boli Community

Following the agreement between the team and the beneficiaries on the pre-visit, the actual training in respect of the soybean storage and processing was done on the 2nd March, 2021. The beneficiaries which include farmers, traders and traditional processors were duly represented. The interest of the beneficiaries pushed our target out of balance to include several others who were not part of the initial arrangement. The impact of the training far exceeded our expectation and the intention of Postharvest Education Foundation to reach as many beneficiaries as possible was duly applied to rope in several beneficiaries. The theme for the training program was: **Upscaling Soybean Storage and Processing at Boli Community: Postharvest Education Foundation (PEF) Program 2021**. The main collaborator was BigAjar farms which provided additional items to compliment the efforts of PEF. The training started with a plenary session which reiterated the focus of the program to upscale their technologies on storage and processing. Due to the large number of persons that showed up coupled with the training been maiden, the team decided to put them into three groups(Group 1 with 18persons, Group 2 with 20 persons and group 3- 19 persons giving a total of 57 persons). Details of the beneficiaries can be found on appendices Table 1.

1.6.3. Soyprotein-Shake processing

The materials and steps used for protein-shake are described below.

Materials: Soybean, Plantain, Dates, Carrot and Groundnut



Plate 1. Soybean pre-sorting



Plate 2. Plantain, Carrot, Dates, and Groundnut

[Photo credit: Adams, 2021]

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Processing Steps:

The participants started by Sorting out soybean to remove stones, and odd seeds to obtain clean seeds. This was immediately followed by washing and parboiling (10-15minuts).The parboiled seeds were Dehulled and air dried. Dry-frying and air dry the second time. The plantain fingers were cut into pieces and sun dried (1hr minimum). The seeds of the date fruits were removed by gentle pounding in a mortar and pistil .The next step was roasting and dehusking of the groundnut. The mixture were sent to the mill to obtain a fine Soyprotein-Shake powder. Additional information regarding the steps are shown in (Plates 1-21).

1.6.4. Soy-infant formular processing

The materials and steps used for Soy-infant formular are described below.

Materials: Soybean, Plantain, and Carrot

Processing Steps:

The participants started by Sorting out soybean to remove stones, and odd seeds to obtain clean seeds. This was immediately followed by washing and parboiling (10-15minuts).The parboiled seeds were Dehulled and air dried. Dry-frying and air dry the second time. The plantain fingers were cut into pieces and sun dried (1hr minimum). The next step was cutting the carrot into pieces and sun drying. The mixture was sent to the mill to obtain a fine infant formular.

1.6.5. Soynut processing

The materials and steps used for Soy-nut are described below.

Materials: Soybean

The participants Sorted out soybean to remove stones, and odd seeds. This was immediately followed by washing and parboiling (10-15minuts).The parboiled seeds were Dehulled and air dried. Dry-frying and air dry the second time. At this stage all broken seeds that were neatly done without multi-colours were carefully selected and packaged. The soynut were obtained whiles the processes for the other soy-items continued to produce the mixtures for the powder. It takes shorter processing time to obtain this product relative to the others.

1.6.6. Soy-date formulation

This was included to satisfy the need of consumers who prefer products that are sweet. The production of soy-date formulation started by Sorting out soybean to remove stones, and odd seeds. This was immediately followed by washing and parboiling (10-15minuts).The parboiled seeds were Dehulled and air dried. Dry-frying and air dry the second time. The next step was cutting and removal of date-seeds (0.5kg) into pieces by gentle pounding in a Mortar and Pistil. The mixture was sent to the mill to obtain a fine soy-date formulation. The quantity of the soybean was four times that of the date.

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Plate 3. Washing of soybean



Plate 4. Parboiling of soybean

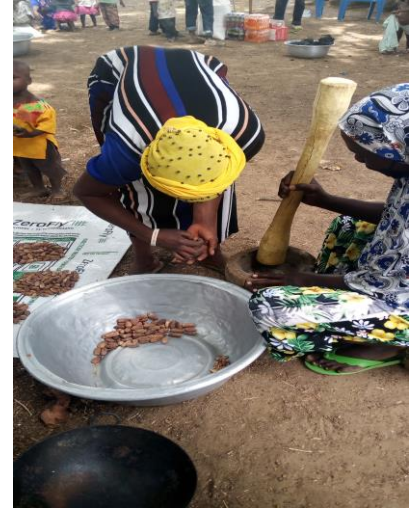


Plate 5. Removing date seeds



Plate 6. Cutting banana



Plate 7. Sieving soybean after parboiling



Plate 8. Air drying on traditional platform



Plate 9. Indoor platform drying

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Plate 10. Dry frying of soybean



Plate 10. Packaged Soy-Infant formula, Soy-Protein shake, Soy-date formulation and Soynut from 3 groups at Boli Community. Wa Municipality, Ghana. [Photo credit: Adams, 2021]

1.7.0. Training session at Zingu Community

The arrangement of the training at the Zingu community was completed following an arrangement between the team and the community since the groups there were well organised informal farmers and processing groups. The training was carried out on the Wednesday, 10th March, 2021. The training session lasted for six hours due to the combination of factors including power outages which affected the grinding process. The interest of the participants and the seriousness attached to the sessions was evidenced in the final product obtained. The male participation was low because the female groups are themselves the farmers, processors and traders who produced and own their harvested produce. Although the team targeted only twenty participants, it was obvious that was not possible due to the renewed interest on soybean storage and processing by the beneficiaries. Therefore, a total of thirty seven participants were considered. At this point, the theme for the training was modified to capture the three communities which was reasonable thing to do since the modalities were similar. The theme became: **Upscaling Soybean Storage and Processing at Kpongu Boli, and Zingu Communities in the Wa Municipality.** The logo of the Postharvest Education Foundation (PEF) and that of BigAjar Farms were inserted on a banner designed purposely for the training session. The banner was attached while training was carried out which also drew attention of others who were not part initially to join at the later part of the training session. In addition, sticker-labels were designed with PEF and BigAjar symbols and were attached to the containers after processed products were filled. This offers the team an opportunity to train the beneficiaries on packaging and labelling. A huge plenary session was held and three persons from each of the three groups made a presentation of what they have been able to produce and packaged. The presentation was done in local language (Dagaare/Waale) and recordings were done by a local radio station called Sungmale (Help-to-Build) which was later aired at later date during their agricultural program session. The training on the processing and the storage were done following the processes of (16.3- 1.6.6).

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Plate 11. Preparing Carrot at Zingu



Plate 12. Winnowing of soybean after dehulling



Plate 13. Dried samples ready for grinding at Zingu community



Plate 14. samples held by participants



Plate 15. Packaged products by representatives

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Plate 16. Plenary session before commencement of Training at Zingu community

1.8.0. Training session at Kpongu Community

The arrangement of the training at Kpongu community was completed following the failure of the people of Busa community to respond to the request who kept the team waiting for two weeks. The team rather adopted a different pre-visit strategy for Kpongu which was to select a member as an intermediary. The focal person and the team had visited each other for four times at Wa and Kpongu and a sheet was sent out for interested persons to write their names. This arrangement took twelve days and resulted in producing more participants than the first two communities. The training was carried out on Sunday 4th April, 2021. The training session lasted for five hours less than the first two sessions perhaps because of the experiences of the previous trainings. The beneficiaries had formed their own groups that resulted in creating a new group to make it four groups rather than the usual three previously held at Boli and Zingu. These groups were female dominated and the huge number of participants resulted in training which was largely on processing. A total of seventy seven persons took part while others whose names were not captured partially participated. At this training session, a banner displayed with the theme: **Upscaling Soybean Storage and Processing at Kpongu, Boli, and Zingu Communities in the Wa Municipality was visible on the grounds.** Transcripts of beneficiaries were captured (2.0-2.3) and limited to only four persons since the groups number had increased.

1.8.1. Star product

The aspect of a star product was introduced only at Kpongu community. The star products which represent the best product was used to determine which group could produce the best in each of the four products. Interestingly, the representative of the chiefs and elders who had some experience in food nutrition was the sole judge and the beneficiaries agreed to his role at that stage.

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Plate 17. Indoor drying at Kpong



Plate 18. Plenary advice during straining session



Plate 19. Banner displayed during training at Kpong community.

1.9. Zerofly and PICS sacks

The storage of soybean using the non-chemical treatment technique such as Zerofly and PICS was explained to the participants before demonstration. The biology of growth stages of insect pest that attack food commodities were briefly explained. They were reminded about the harvesting dumping, drying and threshing techniques that could limit the activities of opportunistic insect pest which affect crop storage. For efficient demonstration each group were given sample of the Zerofly bags and they filled with their own seeds to be kept for as long as they would need it at storage.



Plate 20. CEO BigAjar explaining the principle of operation of the PICS and Zerofly storage Bags

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Plate 21. Practical demonstration of PICS and Zerofly Bags at Zingu Community.

2.0. Audio Transcription at Boli community

Prince Adams Mahama Pelpou: Media person please tell us your name and what you have done today here in Boli.

1st Participant, Amamata Hamidu, we learnt how to process soybean into different products. I will like to use this opportunity to express our appreciation to the organisations that came to our community to train us how to process the soybean.

Prince Adams Mahama Pelpou: Media person please tell us your name and how beneficial this training could be to you. Would you be able to process what you have been trained when the trainers finally leave.

2nd participant: Seidu latifatu: The training is beneficial to us , I could prepare it as food for my children and also sell it for an income to support my children to help in their education. Yes, I would be able to process it alone and can help to train others. I will like to use this opportunity to express our appreciation on behalf of our group to the organisers.

Prince Adams Mahama Pelpou: Media person, please tell us your name and the main challenge in your community

3rd participant: Fatuma, other name not mentioned: Our main challenge as women in our community is lack of access to jobs. Those who are strong enough are engaged in stone picking but I am not strong enough. I hope we will be able to produce what we were trained for income to support our children.

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2.1. Audio Transcription at Zingu community

Prince Adams Mahama Pelpou: Media person please tell us your name and what you have done today here in Zingu.

1st Participant Tenne Banoë: We processed soybean, we soaked soybean, we dry fried it, we cut carrot into pieces, we cut banana, date, and groundnut and combined all which were finally milled into different products. We have packaged them in containers and labeled. We will like to thank the organization that came and train us.

Prince Adams Mahama Pelpou: Media person please tell us your name, do you usually find such trainings in Zingu community and how will this training help you.

2nd participant, Rahinatu Alhassan: No, I have never been part of such training in Zingu community. It would be beneficial to me if I am to get small amount of money such that I can produce to sell at the market for money to take care of children. I pray God almighty will help them(trainers) to come back to help us in future.

Prince Adams Mahama Pelpou: Media person please tell us your name and how beneficial this training could be to you.

3rd participant: Salia Leticia- leader of the farmers group: We are very grateful for selecting our community for the training. This training is beneficial because we usually buy such products for our children when they are going to boarding schools and therefore we would like to appeal to any NGO who can be of help to come to our aid with such trainings. We urge you to extend our appreciation to PEF and BlgAjar for the opportunity with the hope they will come back to train us further.

2.2. Audio Transcription at Kpongu community

Prince Adams Mahama Pelpou: Media person please tell us your name and what you have learnt today from Mr. Adams Abdul-Rahaman in Kpongu Community. Do you usually find people coming to train you how to process such products

1st Participant, My name is Madam Seidu Marie and I worked at Dr. Hilla Limann Technical University. He taught us how to process soybean, we are women and very grateful for considering our plight. We followed the process successfully and I can process alone for my child if he is going to school or sell out. Yes, the only training I ever experienced was soap making and many women did not participant such as this training session.

2nd Participant, my name is Saaka Hamidu also known as Konbounaa (representative of Elders and assembly member), we will like to express our appreciation to PEF and Mr Adams for their initiatives. They have come to train our mothers, sister and wives this special training. We saw the items they have used including carrot, soybean, groundnut, banana and dates which are different from what our traditional processes have been applying. We saw their banner which states the upscaling of soybean processing and storage and we are appealing to Mr Adams and his team to extend other technologies to help us store our food communities properly.

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2.3. Audio Transcription of Mr Adams Abdul-Rahaman at Kpongu community

Prince Adams Mahama Pelpou: Media person please tell us your name, we have seen you today at Kpongu community training women, could you walk us through what you have done briefly.

Mr Adams Abdul-Rahaman, we have come to train them how to process soybean. Food products up to Twenty-one (21) different products can be gotten from soybean. Due to brevity of time it is not possible to train them on several products therefore we have decided on Four (4) products. We are hopeful all those who came today for the PEF training should be able to process all four products successfully. We have four groups for the training.

Prince Adams Mahama Pelpou: Media person why have chosen only Kpongu for the training.

Mr Adams Abdul-Rahaman: NO, we targeted six (6) community but due to the increased interest of farmers we have limited the number of communities. So kpongu has become the third community including Boli (about fifty-seven persons) and Zingu (about thirty three persons) which were previously visited in respect of the same training.

Prince Adams Mahama Pelpou: Media person where do you get your funding from?

Mr Adams Abdul-Rahaman, we get funding from Postharvest Education Foundation(PEF) led by Dr. Lisa Kitinoja which is US-Based Non-Governmental Organisation that support farmers, academics and handlers of food commodities to reduce postharvest losses globally. Their effort was complemented by BigAjar farms in Wa, Ghana. I have been an active member of PEF since the year 2012 and this training offered us an opportunity to transfer technology directly to our local farmers. PEF has largely engaged in storage technologies but the Corona-virus pandemic came and affected food security globally. I have decided to expand the training to include agro processing which makes food readily available during times of lock-down. One of the objectives of PEF is to empower the local people to use available technologies to reduce food losses and the approach we adopted provided just-in-time information to the women groups that participated in the training program.

3.0. Challenges

The team encountered few challenges during the training program at the various communities which include but not limited to the following.

- a. Farmer based groups or women groups that were previously formed in the communities were not willing to be part of new groups purposely for this training. This delays the commencement of the training in some communities.
- b. The well organised groups in the communities are usually women and this resulted in unbalance distribution regarding the gender participation
- c. Potential beneficiaries were skeptical about the relevance of the training based on their previous experiences of poor implementation of government project in their communities.

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- d. All communities visited requested for credit facility to start up on their own when PEF-AJAR finally offered the training.
- e. Communities are far apart, therefore each community needed a pre-visit and main visit separately. This increased the cost of training which introduced repeated activity with its cost.
- f. Several others could not be given the opportunity based on our limited budget, it was possible to organize the same training in one community for many beneficiaries but only few lucky persons were considered.
- g. The use of Temperature-probe and moisture meters were explained but not demonstrated due the lengthy activities involved in processing coupled with PICS storage.

4.0. Direct benefits of PEF- training to participants and communities

- i. Hands-on skill on soy processing was acquired by all participants without any payment of fees or purchase of training material.
- ii. Monies that beneficiaries used to purchase similar products can be used to support their families in different ways since they can now produce their own soy products at less cost.
- iii. From the audio transcriptions, it became apparent that no such training had previously been organized and placed future PEF programs at higher rating relative to others
- iv. All products processed in the communities were consumed by the members as trial without any complains which implied a nutritional benefit to communities where training were offered.
- v. Few beneficiaries in Kpongu community confirmed that they were able to produce samples on their own after the main training during post-visit. This reassures PEF that the sustainability of the processing can be upheld.

NB: All the four groups in Kpongu community on their own later invited the team on separate days to confirm that their products were up to standard. In fact the sustainability of the training program can be ensure by this community. They organized few resources on their own and reproduce all the four products therefore engaged the PEF team further after we are done with the training.

5.0. Conclusion

The benefits of Postharvest Education Foundation (PEF) co-operative ventures to farmers, women and farmer organizations in respect of reducing losses was evident. It was established that the training offered by the team was the first of its kind in all the communities that benefited which makes the impact of the PEF co-operative ventures more relevant in the Covid-19-Era. The interest of the participants, the readiness of BigAjar farms coupled with the intensified effort of the lead facilitator resulted in the effective execution of the program. It can be stated safely that the training contributed significantly to the objective of PEF in reducing postharvest losses whiles ensuring food security in developing economies.

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6.0. Future Prospects

- i. The future PEF programs should consider provision of small revolving fund to support communities to ensure project sustainability (such as Kpongou). It would enable the farmer organizations or women groups to continue the processing and storage technologies even when PEF ends its support.
- ii. Part of reducing food losses include access to market, PEF should consider making provision for trainers to conduct market feasibility and possible linkages between potential buyers or wholesale with PEF trainees.
- iii. To encourage the beneficiaries to always avail themselves, PEF should institute an Award scheme for outstanding groups including certificates of participation to deserving participants
- iv. It was observed that participants usually attempt to shift focus to agronomic practices and facilitators must ensure they keep to the objectives of PEF
- v. A collaboration between privately own organization was helpful and should be maintained as it sped up the pre-visit arrangement. It however increases budgetary allocations.
- vi. The addition of media persons to the training program makes the awareness of PEF in local content more expansive, future programs should consider using television and online portals to provide positive publicity to PEF activities.

Acknowledgement

I (Abdul-Rahaman Adams) hereby write to express my profound gratitude to Board of Directors of Postharvest Education Foundation cooperative ventures for providing financial support for the training program. I also wish to acknowledge the expert opinion and mentorship of Dr Lisa Kitinoja during the execution of the program. The contribution of CEO of BigAjar farms Mr. Tawfic Abdul-ahaman, Prince Adams Mahama Pelpou who works for Sungmale FM 90.5MHZ, Mr. Adams a Technician at BigAjar farms. The efforts of Yakubu Nuri at Boli, Madam Leticia Salia at Zingu and Mr. Saaka Hamidu also known as Konbounaa at Kpongou community are highly appreciated.

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List of participants at Boli community = TOTAL = 57

SN	Name	Gender	Group	
1	Yahaha Mariam (LEADER)	F	1	
2	Kadiri Amata	F		
3	Osuman Ajara	F		
4	Douku mumunata	F		
5	Iddrisu faati	F		
6	Yakubu Yahayama	F		
7	Kukuri Tenama	F		
8	Seidu Sata	F		
9	Yakubu Nuri (SECRETARY FOR TRAINING)	M		
10	Imoru Hamidu	M		
11	Kaarinaa seidu	M		
12	Yakubu Seidu	M		
13	Yahaya Rukaya	F		
14	Ibrahim Hajara	F		
15	Abu Aradiatu	F		
16	Nuhu Faati	F		
17	Dawda fatuma	F		
18	Awala Fatuma			
19	Abudi Salamata (LEADER)	F	2	
20	Koubunaa Sayama	F		
21	Yakubu Mumunata	F		
22	Abudi Samata	F		
23	Douku Asana	F		
24	Ibrahim Mariama	F		
25	Nuri Rashida	F		
26	Seidu Maria	F		
27	Kassim Saata	F		
28	Latifu Samata	F		
29	Yakubu Habibata	F		
30	Alhassan Faati	F		
31	Ibrahim Adiya	F		
32	Ibrahim Zenebu	F		
33	Issah Memunata	F		
34	Iddrisu Arijara	F		
35	Osuman Mariama	F		
36	Seidu Ibrahim	M		
37	Kuonuba Kassim	M		
38	Kaarinaa Fuzy	M		
39	Seidu latifatu (LEADER)	F		
40	Imoro Mumunata	F		
41	Yakubu Mariama	F		

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42	Fuzy Mutia	F	3
43	Abudi Zienabu	F	
44	Seidu Saweba	F	
45	Rmiyawu Jamila	F	
46	Adams Rakia	F	
47	Ali Afisa	F	
48-	Ibrahim Fadila	F	
49	Olinaa Alimata	F	
50	Dabou Kutia	F	
51	Seidu Mariama	F	
52	Ibrahim Sarafatu	F	
53	Fuzy Alima	F	
54	Hamidu Amamata	F	
55	Dabou Seidu	M	
56	Osuman Latif	M	
57	Yakubu Kadiri	M	

List of participants at ZINGU community =TOTAL =33

SN	Name	Gender	Group
1	Salia liticia (LEADER)	F	Liticia's Group
2	Abubakar Azini	F	
3	Musah Habiba	F	
4	Yidaana Laadi	F	
5	Abu Banuule	F	
6	Abu Ajara	F	
7	Iddi Mariam	F	
8	Basit Memuna	F	
9	Abubakari Ajara	F	
10	Suglo Genifa	F	
11	Abu Hawa	F	
12	Dongbamaana Yidaana	M	
13	Naannumah Adisata(LEADER)	F	Naannumah Group
14	Yahaya Adisa	F	
15	Zulfata Tamim	F	
16	Tahiru Fatima	F	
17	Iddrisu Jalia	F	
18	Tenne Banoé	F	
19	Hawawu iddrisu	F	
20	Alhassan Rahinatu	F	
21	Hudi Damata	F	
22	Assay Pounaa	F	

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23	Yahaya Gmenimaale	M	Sakina Group
24	Abu Sakina(LEADER)	F	
25	Saabanaa Magret	F	
26	Zineyela Memuna	F	
27	Moses Daanuba	F	
28	Mohammed Zainab	F	
29	Issah Memuna	F	
30	Issah Mary	F	
31	Salam Diana	F	
32	Adinan Mercy	F	
33	Ibrahim Nafisata	F	

List of participants at KPONGU community =TOTAL = 77

SN	Name	Gender	Group
1	Suleman Barikisu	F	A
2	Aziz Fadila	F	
3	Amadu Elham	F	
4	Hamza Najat	F	
5	Naeem Memuna	F	
6	Ali Hawa	F	
7	Musah Wasila	F	
8	Alhassan Zuwera	F	
9	Adams Mariam	F	
10	Adams Salima	F	
11	Daud Salamatu	F	
12	Aminu Hafisa	F	
13	Abubakar Salamatu	F	
14	Adams Hawa	F	
15	Alhssan Shefatu	F	
16	Adamu Mariam	F	
17	Ajara Abudu	F	
18	Tahiru Eransung	F	
19	Hudi Ramatu	F	
20	Imori Rashida	F	
21	Salifu Atikata	F	B
22	Maham Mansara	F	
23	Abdulai Kuburaa	F	
24	Abu Safia	F	

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25	Zakaria Shamira	F	
26	Saiba Maire	F	
27	Mahama Asana	F	
28	Dary Christiana	F	
29	Seidu Asata	F	
30	Alhassan Juliaha	F	
31	Seidu Hawa	F	
32	Yahana Hadijaf	F	
33	Abbas Elham	F	
34	Shaibu Alijatu	F	
35	Imori Salima	F	
36	Hamidu Rukaiya	F	
37	Mahmood Tenia	F	
38	Amadu Awusara	F	
39	Saaka Madina	F	
40	Seidu Marie(Leader)	F	C
41	Mumuni Nafisa	F	
42	Yakubu Fusiena	F	
43	Hafiz Fati	F	
44	Alhssan Rashida	F	
45	Abubakar Akua	F	
46	Issahaku Aminatu	F	
47	Wahidu Hawulatu	F	
48	Iddrisu Alima	F	
49	Insah Hadiatu	F	
50	Adams Najat	F	
51	Osuman Latifa	F	
52	Mahamama Gbolo	F	
53	Mohammed Naimat	F	
54	Abbas Munira	F	
55	Inusah Awusara	F	
56	Ibrahim Awusata	F	
57	Tamaah Mary	F	
58	Iddrisu Maire		D
58	Mohammed Fammara		
60	Awudu Fatimata		
61	Issahaku Hawawu		
62	Abubakar Asata		
63	Abu Hkimat		
64	Haris Ayisha		
65	Yahaya Ayisha		
66	Fusieni Aminatu		

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67	Damani Diera		
68	Jakelia Habiba		
69	Razak Libaba		
70	Saaka Amina		
71	Mgeni Saaka		
72	Jakelia Asara		
73	Seidu Damata		
74	Imori Kutum		
75	Adama Ubeida		
76	Sherifu Fadila		
77	Zubeiru Vida		