
FRI/SAFGRAD PROJECT ON

**PROMOTION OF APPROPRIATE HOUSEHOLD AND SMALL-SCALE SOYBEAN UTILIZATION TECHNOLOGIES FOR
SELECTED RURAL COMMUNITIES IN GHANA.**

**THIRD PROGRESS REPORT
(July 1999 - January 2000)**



**SOYBEAN PRODUCTION IN PROJECT VILLAGES: A PARTICIPATORY TRAINING AND
DEMONSTRATION ACTIVITY AT SAMSAM-ODUMASE AND MIMPEMIHOASEM.**

By

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**SOYBEAN PRODUCTION IN PROJECT VILLAGES: A PARTICIPATORY TRAINING
AND DEMONSTRATION ACTIVITY AT SAMSAM-ODUMASE AND
MIMPEMIHOASEM.**

W.A. Plahar, C.A. Nti, and F. Akpoh

ABSTRACT

Soybean production training and demonstration activities were undertaken for farmers in the project villages, *Samsam-Odumase* and *Mimpemihosem*. Two demonstration farms set up for the purpose were used alongside farmers' own experimental farms for the training. A total of 39 farmers benefited from the training and gained expertise in soybean production. The gender distribution of participants showed more male participation (64%) over their female counterparts (36%). The different stages of soybean cultivation covered in the training include planning and site selection, land preparation, planting and refilling, plant protection (especially weed control and protection from pests), harvesting, drying, threshing and storage. The training and demonstration activities facilitated the successful transfer of soybean production technology to the two project villages to help enhance the socio-economic and nutritional status of the people. It is recommended that micro-enterprise development in soybean processing should be promoted to further enhance household food and nutrition security in the area.

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1. INTRODUCTION

The general objective of the FRI/SAFGRAD multi-institutional and multidisciplinary project on soybean utilization is to develop and encourage the adoption of soybean utilization technologies appropriate for household and small-scale enterprises in order to stimulate soybean production, encourage small enterprise development, make available more utilization technologies, improve economic and social benefits to primary producers, processors and, rural communities in Ghana. The project was conceived to extend the experiences obtained in earlier projects by a multidisciplinary team of researchers on promoting the production and utilization of soybean in rural communities, to a wider cross-section of the Ghanaian population. Specifically, *Samsam-Odumase* and *Mimpemihoasem* in the Greater Accra Region of Ghana were the two farming villages selected for this project. The collaborative Institutions include the CSIR-Food Research Institute as the lead institution, the Home Science Dept. of the University of Ghana, and the Crops Services Department of the Ministry of Food and Agriculture.

The first set of activities undertaken during the first six months of project implementation (June - December 1998) and reported in the first progress report (Plahar *et al.* 1998), involved baseline studies at the two project villages to determine the general socio-economic status of the people, their food consumption patterns and food preparation techniques, the nutritional quality of available weaning foods and staple dishes as well as the general nutritional status of the vulnerable groups of the population. The study was also to document the status of soybean production, processing and utilization in the two villages. While information on the food consumption patterns and food preparation methods was intended to form the basis for product development and recipe formulation activities, the nutritional status studies would serve as baseline information for future impact assessment studies. The study has established the socio-economic characteristics of the two project villages, and determined the traditional food habits of the people (Plahar *et al.* 1998). Major food crops produced in the area were identified to include maize, cassava, yam, plantain and vegetables. The main cash crop is pineapple which is grown mainly for export. Traditional staple foods for

adult and pre-school children are based mainly on the cereals and starchy root and tuber crops while weaning foods are prepared with maize with no protein supplementation. Nutritional data obtained from the study indicated that pre-school children in the project area were "at risk" nutritionally and were malnourished. The need for a nutritional intervention was established in the study. The farmers at *Samsam-Odumase* and *Mimpemihossem* were found to be unaware of the economic and nutritional benefits of soybean production and utilization; and they had very little knowledge on household food uses of the soybean. The willingness was however, expressed to take up production and household utilization of soybean when exposed to the relevant training.

Based on the findings of this first study, the second half of Project Year 1 was devoted to the development and quality evaluation of soy products and recipes as well as training on household utilization of soybeans, and a second Progress Report submitted (Plahar *et al.* 1999) covered this activity. A total of seventeen recipes with desirable nutritional and sensory characteristics were developed and promoted in the two project villages through training and demonstration activities using the participatory approach. The recipes adequately covered a range of traditional dishes for the three major meals of the people for an effective impact on their nutritional status. During the period, two major and six minor training and demonstration sessions were held for the extension of the products and recipes in the farming communities. The minor training sessions involved mainly small groups of mothers at a time, while the major sessions were held for the whole village. Of the 101 adult participants from the two villages that were trained in household utilization of soybeans, 71% were women and 29% were men. Forty-five children participated mainly to partake in the meals after the demonstration.

The period of the present report was devoted to training and demonstration activities for interested groups of farmers in the project villages on soybean production. This third Progress Report provides information on the various stages of training that the farmers were taken through in order to develop their skills in the successful cultivation of soybeans as part of their normal farming activity in the area.

2. PARTICIPATION

Farmers:

A total of thirty nine interested farmers from the two villages were taken through the stages of land preparation, planting, refilling, plant protection, harvesting and storage. The farmers showed a great deal of enthusiasm towards the training; so much so that ten of them have established own soybean farms alongside the training plots. The farmers were assisted with

Table 1. Soybean production training sessions and number of participants

Activity	Project site		Total
	Samsam-Odumase	Mimpemihossem	
Planning and Site Selection			
Sessions held	3	2	5
Participants	8	11	19
Land Preparation			
Sessions held	5	4	9
Participants	13	22	35
Planting & Refilling			
Sessions held	3	4	7
Participants	15	24	39
Plant protection			
Sessions held	6	7	13
Participants	14	23	37
Harvesting			
Sessions held	3	3	6
Participants	15	24	39
Drying and threshing			
Sessions held	5	6	11
Participants	14	23	37
Storage			
Sessions held	3	3	6
Participants	12	20	32

free certified seeds for the initial venture. Table 1 shows the number of training sessions held and the number of participants for the various activities. The list of participants is given in Appendix A. List of farmers who established soybean farms alongside the demonstration farms in the two villages is given in Appendix B.

The gender distribution of farmers who participated in the production training and demonstration programmes in the two project villages is illustrated in Fig 1a and 1b. At Samsam-Odumase, nine women (60%) and six men (40%) actively participated, while five (21%) women and nineteen men (79%) participated at Mimpemihossem, the second village. For both villages, the overall gender distribution showed more male participation (64%) over their female counterparts (36%).

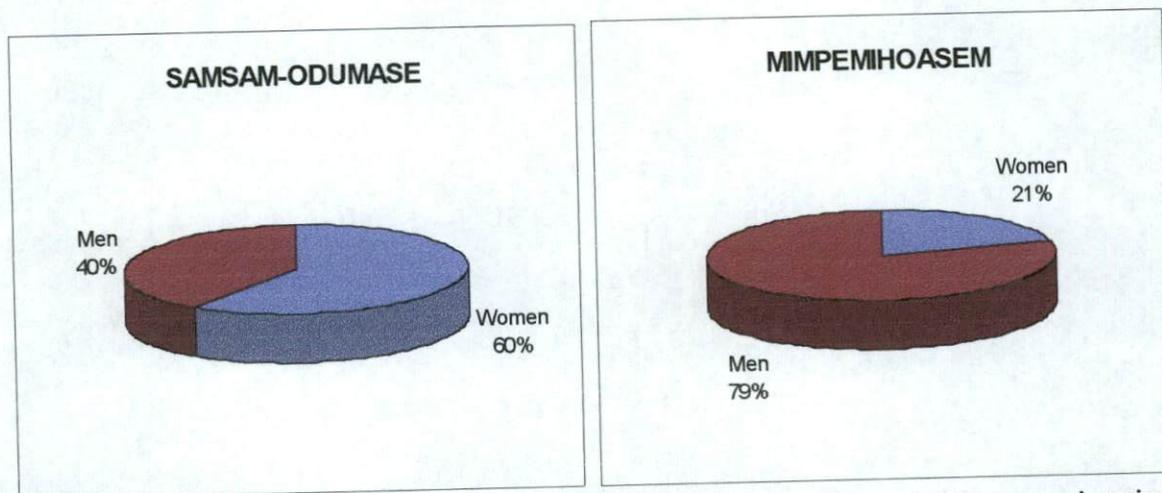


Fig 1a. Gender distribution of participants in soybean production training programme at the two project sites.

In the utilization training held earlier, Samsam-Odumase had 33 women, 21 men, and 24 children participating, while at Mimpemihossem, there were 39 women, 8 men and 23 children (Plahar *et al.* 1999). This distribution is illustrated in Figs 2a and 2b, and the full list is given in Appendix C. The traditional gender roles in terms of farming and food preparation have been clearly demonstrated by the differences in numbers of participants, especially at Mimpemihossem, where more men were interested in the production training than in utilization.

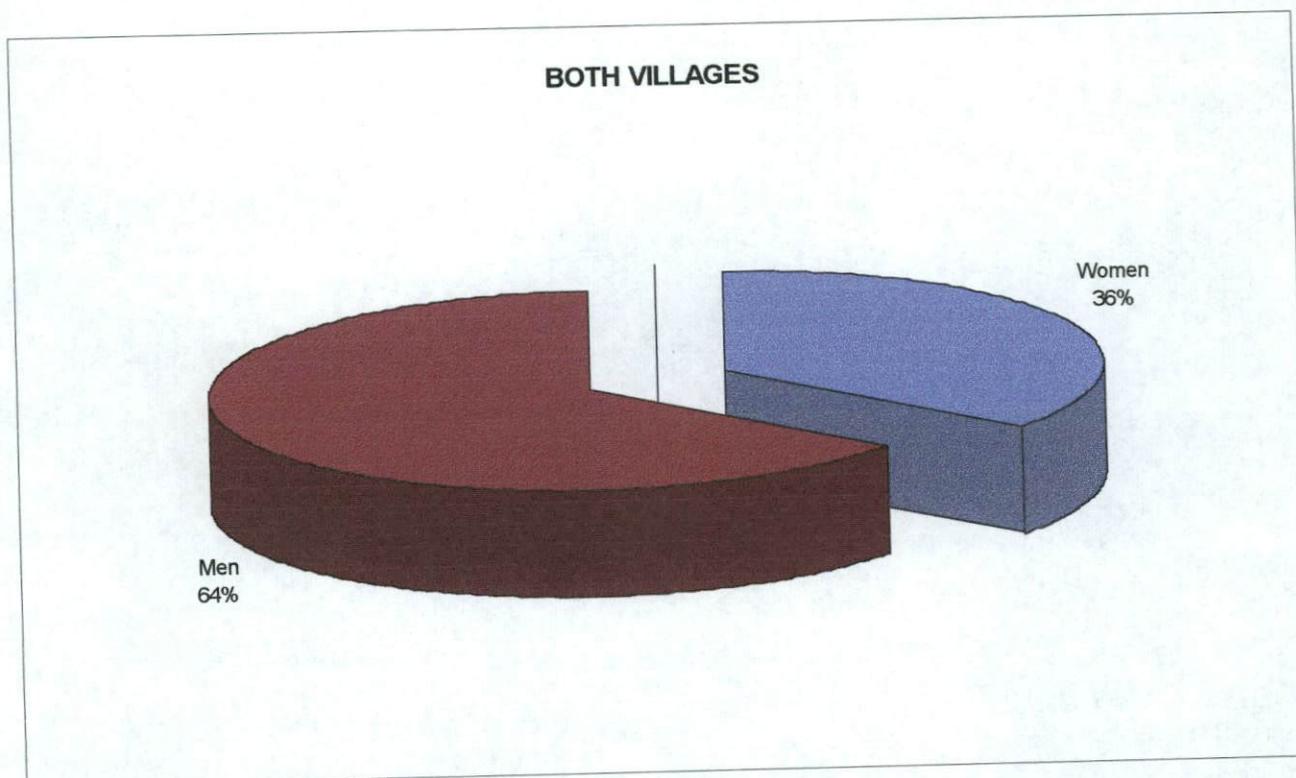


Fig 1b. Overall gender distribution of participants in soybean production training programme at the two project sites.

Resource Persons

The training activities were undertaken by the project members led by Ms. Faustina Akpoh of the Extension Services Department of the Ministry of Food and Agriculture. Other resource persons such as Mr. Daniel Nartey and Ms. Gifty Andoh, both of the Ministry of Food and Agriculture, were engaged to assist on temporary basis.

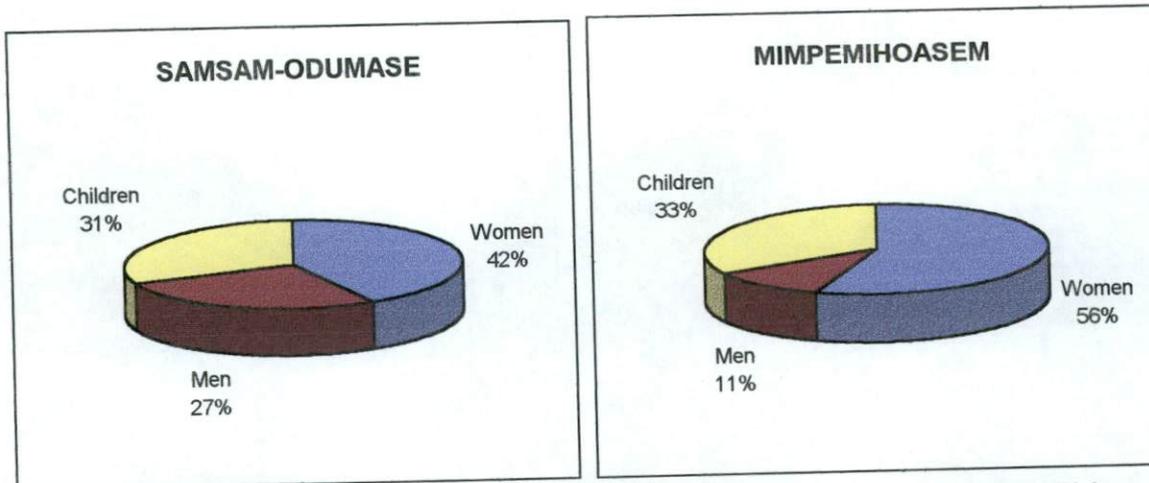


Fig 2a. Distribution of participants for utilization training in the two project villages (source: Plahar *et al.* 1999)

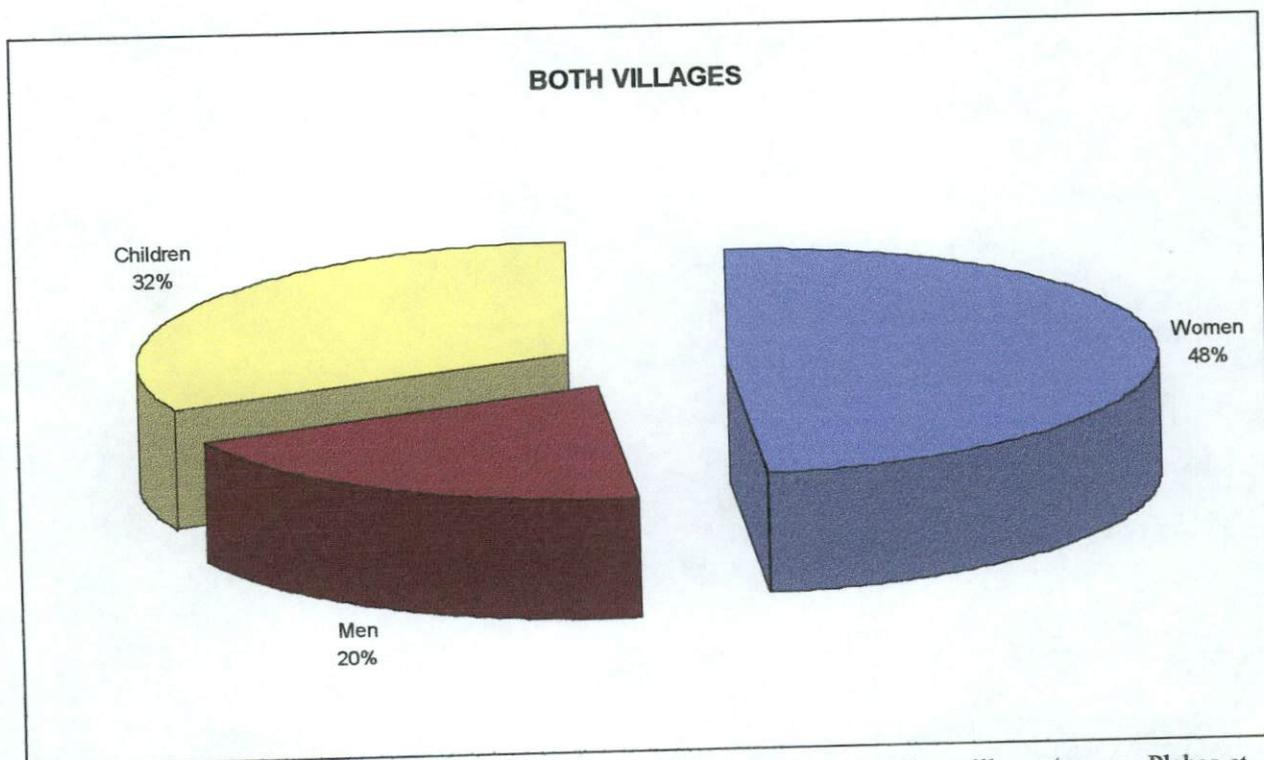


Fig 2b. Overall distribution of participants for utilization training in the two project villages (source: Plahar *et al.* 1999)

3. SOYBEAN PRODUCTION TRAINING & DEMONSTRATION ACTIVITIES

The sections that follow provide information on the stages involved in the production of soybean as well as the training and demonstration provided to the farmers. In addition to the two demonstration farms used in the training, ten farmers prepared their own soybean farms . They were assisted simultaneously as the training proceeded. Results of previous studies in soybean production and utilization in West Africa formed the basis for the training (Plahar *et al.*, 1998; IITA, 1990; Singh *et al.*, 1987).

Planning and Site Selection

For the purposes of the training and demonstration activity in soybean production in the two project villages, two plots of land were acquired for a demonstration farm. Each plot, located in each village, was not larger than one acre. It was explained to the farmers that it is always advisable to start with a small area and gradually build up skill in the cultivation of the crop. This will enable the farmer to identify and find ways to overcome any problems with the plot of land. A successful venture with a small plot could be followed up with planting a larger area.

Together with the elders and farmers in each village, the land was selected based on the desirable characteristics required for soybean cultivation. It was explained to the farmers that land required for soybean cultivation should be flat or have just a small slope. Also, the land should have deep soils and good drainage with no problems of water-logging. The land selected at Samsam-Odumase was fairly flat while that at Mimpemihossem had a slight slope.

Preparation of the demonstration farm was planned to be participatory. Although all inputs were to be provided by the project, the farming activities, from land preparation to harvesting, were to be undertaken by the farmers to be trained, under the supervision of the agricultural extension officer and the other resource persons. The farmers were also free to start their own small farms alongside

the demonstration farms. The normal traditional gender roles in farming, as practiced in the villages were to apply. For example, if land clearing is the normal occupation of men, it was decided that this should be applied in the preparation of the demonstration farms.

Land Preparation

The farmers were instructed to apply the same land preparation practices as they normally do for maize, which is known to feature prominently in their farming systems. Land preparation involved slashing, stump removal, gathering and burning (Figs 3a and 3b). Generally, the slashing and stump removal were done by the male farmers, while the women and children assisted with the gathering and burning. These roles were however not exclusive to each gender.

To ensure that there were no weeds growing at the time of planting, the plots were ploughed with hoe just before planting. This also facilitated loosening of the soil for good germination.

Planting and Refilling

Instructions given to farmers on soybean planting include seed selection, time to plant, spacing and depth of planting and the need for refilling. Farmers were asked to always obtain certified seeds from the relevant agencies for planting, and never to use own harvested seeds. The extension staff responsible for the area would assist, as is the case with other crops grown in the area. For the purposes of the training and demonstration, certified *Salintuya* variety seeds were purchased from the Ministry of Food and Agriculture for use. Planting was done in rows 60 to 70 centimeters wide and 5 centimeters between plants in a row. The depth was 1 to 2 centimeters. Ropes were used to ensure straight line rows while the spacing was estimated with marks made on their cutlasses and sticks. A tape was initially used to get the actual spacing. The seed rate used for the demonstration farms was 30 kilograms per hectare. Drilling, instead of the planting technique used would have given a seed rate of about 50 Kg/ha.



Fig 3a. Land preparation: Slashing and removal of stumps



Fig 3b. Land preparation: Gathering and burning

As part of the planting instructions, farmers were warned to make sure that soybeans are always planted alone and not overshadowed by other crops. In terms of planting time, both the major and minor raining seasons were considered favourable. However, to ensure adequate drying of harvested grains, farmers were advised to plant mainly in the minor season, beginning with land preparation in July and planting in August. The two demonstration farms were planted on the 5th and 19th of August respectively. The time interval between the two was to give the resource persons adequate time between activities in each village to plan for the other. For better yields, rotation with other crops was advised. Figure 4 illustrates a session of the planting demonstration.

Plant Protection

Instructions and demonstrations on plant protection covered weed control, birds, rodent and domesticated pests, as well as insect infestation.

Weed control: The need for early first weeding soon after emergence was stressed to farmers. They were made to appreciate the fact that it is only after the development of full canopy cover around the 8th week after seedling emergence that the soybeans can compete with weeds until maturity. It was therefore important to keep the farms weed free up to this time to avoid reduction in yield. Farmers in both villages were also educated on the various methods of weed control. These include the available options involving the use of cultural methods, biological weed control and chemical methods. However, considering the farm sizes in the area, the cultural practices and the resource base of the farmers, hand weeding was recommended and used as effective weed control method. Chemical weedicide, 'Round Up' was used on a portion of the demonstration farm at Mimpemihossem to destroy the stubborn spear grass, before planting. Thus, it could be said that a combination of chemical and cultural methods were used in the control of weeds. First weeding was done 2 weeks after planting, second weeding was done 5 weeks after planting, and the third and final weeding was done 8 weeks after planting. The three weeding demonstrations are illustrated in Figs 5, 6 and 7.



Fig 4. Soybean planting demonstration



Fig 5. First undergrowth weeding and refilling after two weeks of planting



Fig 6. Second undergrowth weeding of demonstration farms after 5 weeks of planting



Fig 7. Third undergrowth weeding after eight weeks of planting



Fig 7b. Woman farmer admiring project demonstration farm at sunrise (Top) and children playing in their father's backyard soybean garden (Bottom)

Protection from pests: With regards to birds, farmers were advised to undertake bird scaring, especially in the early hours of the mornings and late afternoons, during the first 2 weeks after planting. The most problematic of all pests in the area was found to be goats and sheep which found the foliage of the new crop very palatable, and perhaps, nutritious. All fodder and other foliage in the area were ignored in preference for the new crop. In both project villages, farmers had a tough time trying to keep the goats and sheep away from both the demonstration farms and farmers' own farms, especially those close to the villages. For the demonstration farms, it became necessary to apply an insecticide spray (Karate) once, not necessary for insect infestation, but to ward off the goats and sheep. With regards to rats and rabbits, these were not found to be a problem in the area. Farmers were however advised to keep dense vegetation back from the growing area as a means of discouraging rodent attack. Rats and rabbits are known to eat the leaves and tops of the plants as soon as the first leaves begin to appear.

Harvesting

Timing of harvesting was stressed to farmers. It was very necessary to avoid delaying harvesting as over dried pods will shatter and the seeds will be scattered. Harvesting was done about three months after planting, at a time when the pods turned brown (Fig 9), and the pods rattled when shaken. The whole plant was uprooted and the harvested lot loosely stacked and covered with polyethylene sheets for later threshing. Figure 10 shows a female farmer harvesting soybeans from one of the demonstration farms.

Drying And Threshing

The harvested plants were spread on polyethylene sheets to dry further in the sun for a few days. In the evenings or when the weather was damp, the plants were loosely packed in a heap and covered with the polyethylene sheets. Threshing was done by beating sack-full of the harvested plants with sticks to break the pods and release the beans. The stalks were removed and the grains separated from the dry chaff by winnowing (Fig 13) and picking to obtain clean grains (Fig 14).



Fig 8. SAFGRAD International Coordinator, Dr. Taye Bezuneh, inspecting demonstration farm during a monitoring visit



Fig 9. Extension officer displaying matured (top) and dried (bottom) soybean pods on demonstration farm to farmers.



Fig 10. Female farmer harvesting soybeans from demonstration farm



Fig 11. Drying of un-threshed soybeans on large polyethylene sheets (top) and farmers' own platform as an innovation to overcome domesticated pest problem (bottom).



Fig 12. Farmers drying soybean at Mimpemihossem

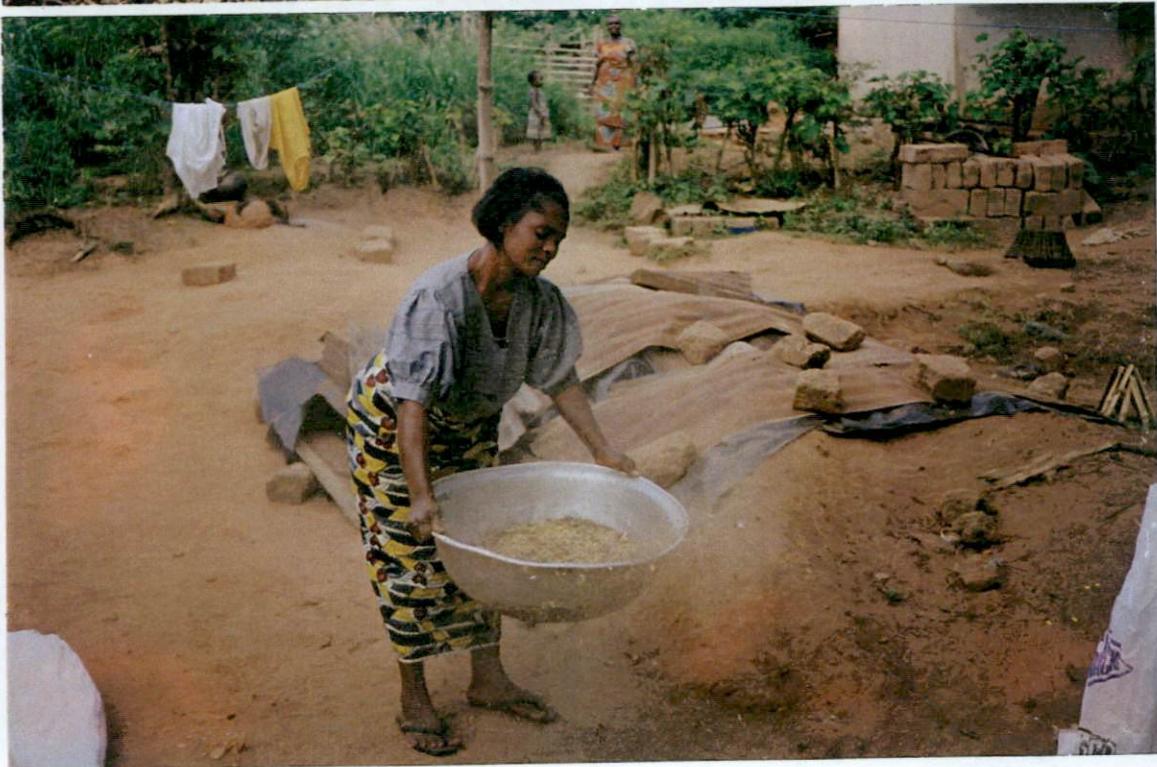


Fig 13. Threshing and winnowing



Fig 14. Picking to obtain clean grains

Storage

Bag storage of grains was recommended to farmers. For good storability, the farmers were advised to store the grains in a dry condition, at about 10% moisture. A quick test for dryness was given as the situation where it is not possible to dent the bean with the teeth. Dried grains from the demonstration farms were stored in woven sacks. Farmers were also taught that seeds for planting should not be exposed to moist environment and should be stored in plastics bags to maintain the moisture content at the 10% level.

4. CONCLUSION AND RECOMMENDATIONS

The training and demonstration activity facilitated the successful transfer of soybean production technology to the two project villages. The new crop when fully adopted, will help enhance the socio-economic and nutritional status of the people, and help promote food security in the villages.

It is recommended that with the assured local source of soybean in the villages, micro-enterprise development in soybean processing should be promoted. A project extension with funding is required to achieve this

ACKNOWLEDGEMENT

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APPENDIX A.

LIST OF PARTICIPANTS IN SOYBEAN PRODUCTION TRAINING

SAMSAM ODUMASE		MIMPEMIHOASEM	
Women	Men	Women	Men
Mary Dzadgele Abbey Okonfo Adwoa Ayorkor Aryee Cecilia Klu Abigail Sowa Doris Ayorkor Adaduwa Darko Vida Sowa Dinah Tetteh	Emmanuel Abbey Yaw Ahanyo Thomas Adjei Christopher Dzang Ben Darko John Apiedu	Grace Osae Comfort Donkor Rebecca Osae Awawo Osae Akua Afful	Akotia Osae Kwaku Osae Joseph Akotua Talata Issaka Philip Apeadu Fudu Ntse Mukula Ntse Kofi Perbi Akotua Sea Kwaku Kyei Seth Amu Joseph Adjei John Okae Isaac Adjei Kwaku Adjetey Theo Amu Evans Adjei Jonas Adjetey Paul Annang

APPENDIX B.

LIST OF FARMERS WHO MADE SOYBEAN FARMS

SAMSAM ODUMASE		MIMPEMIHOASEM	
Women	Men	Women	Men
Mary Dzadgele Abbey Okonfo Adwoa Ayorkor Aryee	Emmanuel Abbey	Grace Osae Comfort Donkor Rebecca Osae Awawo Osae	Akotia Osae Kwaku Osae

APPENDIX C.

LIST OF PARTICIPANTS IN SOYBEAN UTILIZATION TRAINING

SAMSAM ODUMASE		MIMPEMIHOASEM	
Men	Women	Men	Women
1. Thomas Adjei	1. Cecilia Klu	1. Kweku Kyei	1. Victoria Appiah
2. Peter Fafanyo	2. Amankwa Oppong	2. Talata Issaka	2. Mary Okata
3. Richard Zormeloo	3. Florence Opare	3. Kofi Perbi	3. Patience Lamley
4. Christopher Dzang	4. Abigail Sowa	4. Akotua Sea	4. Elizabeth Quaye
5. Klu Okang	5. Adole Aryee	5. Mukula Ntse	5. Comfort Annang
6. Tawiah Apiedu	6. Agnes Akotua	6. Fudu Ntse	6. Akua Donkor
7. Ben Darko	7. Doris Ayorkor	7. Philip Apeadu	7. Akua Afful
8. David Odonkor	8. Kaa Kwashie	8. Joseph Akotua	8. Veronica Quaye
9. Gabriel Awutey	9. Atswei Opare		9. Priscilla Agyei
10. Joseph Bram	10. Morkor Korley		10. Victoria Zaka
11. Yohanes Anim	11. Adaduwa Darko		11. Sannyie Mary
12. Yao Ahanyoh	12. Kaa Martey		12. Mary Ohenewa
13. John Apiedu	13. Akoile Apiedu		13. Akua Dantaah
14. Samuel Addo	14. Gladys Okata		14. Hanna Sackey
15. Enoch Anang	15. Janet Kudjo		15. Elizabeth Akotua
16. Jonas Adjetej	16. Vivian Darko		16. Stella Dede
17. Edward Mensah	17. Joyce Okyere		17. Ama Asantewaa
18. Paul Anakpo	18. Dina Tetteh		18. Joyce Bredu
19. Edu Kweku	19. Mary Adjorkor		19. Leticia Klu
20. Atsu Dogbe	20. Vida Sowa		20. Beatrice Fianko
21. Daniel Sowah	21. Faustina Akpenam		21. Mavis Martey
	22. Christian Tetteh		22. Comfort Amposah
	23. Emilia Amartey		23. Theresa Ohene
	24. Martha Odikro		24. Mary Amonbea
	25. Rose Duodu		25. Patience Dalah
	26. Margaret Sowa		26. Gava Josephine
	27. Evelyn Mensah		27. Fransica Anoma
	28. Grace Apiedu		28. Rebecca Oye Osae
	29. Amoa Adjoa		29. Joyce Bram
	30. Victoria Klu		30. Comfort Addey
	31. Mary Adjoa		31. Mabel Osae
	32. Rebecca Osae		32. Christina Kai
	33. Susanna Laryea		33. Comfort Tetteh
			34. Mary Anyetei
			35. Grace Martey
			36. Rebecca Larteley
			37. Ama Saka

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