

University of Applied Sciences



**VAN HALL
LARENSTEIN**
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The Contribution of Soya bean Utilization Trainings to Women's Empowerment in the Sissala East District of Ghana.

**A Research Project submitted to VanHall Larenstein University of Applied Sciences In
Partial Fulfilment of the Requirements for a Degree of Master of Development,
specialization Rural Development and Gender**

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September, 2011



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Acknowledgements

I owe gratitude to many people for the realisation of this research work. First of all, I thank God for the gift of my life and all His many blessings.

I thank all the staff of VanHall Larenstein University for their support throughout my stay in the Netherlands. I thank especially my supervisor Mr. Marco Verschuur and my course coordinator Mrs AnneMarie Westendorp for their guidance and direction during my research work as well as my entire study.

I am grateful to the Netherlands government and Nuffic for sponsoring my study and the Ghanaian Ministry of Food and Agriculture for granting me a study leave to enable me pursue this course. To my Regional and District directors as well as my colleague staff members, I am grateful for all your support and encouragement. A big word of gratitude to the Director and staff of Ghana Health Service, Tumu for providing me relevant information.

Thank you to all respondents and key informants of this study for their time and answers. I also wish to thank all my family members especially my brothers Ivan and Justin for their patience, support and encouragement throughout this work .

I am indebted to all my friends, both at home and in the Netherlands, who made life worth living in this beautiful foreign land. I am particularly grateful to Mohammed Armani for his assistance with my data analysis.

Dedication

I dedicate this research to my sweet mother Mary Assumpta Batuang and my father Cyprian Yieri for giving me the greatest gift- my education.

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Conversions

€1=Gh¢2.18

1 bowl soya bean=3.5kg

List of Abbreviations

AEA	-	Agricultural Extension Agent
DA		District Assembly
DADU	-	District Agricultural Development Unit
DEO	-	District Extension Officer
DWO		District WIAD Officer
FAO	-	Food and Agriculture Organization
FGD	-	Focus Group Discussion
GDP	-	Gross Domestic Product
GHS	-	Ghana Health Service
MoFA	-	Ministry of Food and Agriculture
OA	-	Operational Area
RWO	-	Regional WIAD Officer
SARI	-	Savannah Agricultural Research Institute
SED	-	Sissala East District
SEDADU	-	Sissala East District Agricultural Development Unit
SUT	-	Soya bean Utilization Training
WIAD	-	Women in Agricultural Development

Abstract

In Ghana, women are still largely disadvantaged in various spheres of life. One of these is their access to agricultural production knowledge. 50.6% of the total population and 49.4% of all economically active women are employed in agriculture. The Women in Agriculture Development (WIAD) Directorate of the Ministry of Food and Agriculture (MoFA) is responsible for extension service provision to women. One of its major programmes is the promotion of soya bean use through soya bean utilization trainings. Soya bean utilization trainings are dominated by women because of their responsibility for household food preparation. The objective of this research was to evaluate soya bean utilization trainings in order to determine their contribution to women's empowerment in the Sissala East district by assessing women trainees experiences of these trainings.

The study made use of a survey and a case study. Respondents were women who were trained in soya bean utilization trainings in 2008 and 2009. Five(5) pre-determined key informants and One identified in the field were interviewed using a checklist in appendix 1. Three(3) focus group discussions were held with 3 different groups of women who attended the soya bean utilization trainings in three communities using a checklist in appendix 2. For the survey, forty-five (45) women, 15 in each community, were interviewed using a semi-structured questionnaire.

Results from this study indicate that the factors affecting soya bean use by those who were trained are the nutritional benefits of the soya bean, availability of soya bean, low cost of soya bean less cooking time with soya flour and shortage of staple grains such as maize. Cultivation of soya bean was less than its use among respondents because cultivation was affected by decision making ability and access to resources which was lower for women in the District. Soya bean Utilization trainings affected the use of soya bean among respondents as 98% of those who attended trainings were using the soya bean. However not all those using the soya bean apply the recommended heat treatment before use. Trainings also contributed to women's empowerment by increased access of women to extension officers and improved health of women and their families. Women's self worth and well-being were also improved with Soya bean Utilization trainings. Results showed that women had increased access to land in groups and also made cash from the sale of soya bean.

Finally, this study made recommendations on improving soya bean utilization trainings and other trainings for women to ensure that women benefit from them. The study recommends that certified soya bean seed should be made available at district and community levels, trainings should give equal attention to both utilization and cultivation of soya bean and more trainings and/or refresher trainings be conducted. It is also recommended that field staff should be given. gender trainings regularly and empowerment programmes for women should include steps to address the influence of socio-cultural influences on their outcomes. The study also recommends that more female staff should be employed and better linkages should be established between development organizations working in the area.

1.0. Chapter One : Introduction

1.1. Background Information

Agriculture is the largest sector of Ghana's economy contributing 39% of GDP, employing 50.6% of the population and 49.4% all economically active women (MoFA, 2010; Amu, 2006?). Women produce 70% of food crops, undertake 95% of agro-processing and 85% of food distribution in Ghana (Africa Development Fund, 2008). However, social constructions of femininity in Ghana limits women's access to land, credit, training, education and decision making processes (Anyidoho and Manuh, 2010). Women lack control over land and their access to trainings are limited by their multiple roles in the households and training times and venues. Women and girls are the most deprived when it comes to agricultural inputs and fair prices (Ibid). In addition, the labour force of the Ministry of Food and Agriculture (MoFA, 2007) is made up of only 15% women while agricultural policies largely favour the male dominated cash crop sector (Duncan, 2004). In rural Ghana, women farmers are among the poorest in society with statuses worsened by rural- urban and inter-regional disparities in development (Ibid).

In the Medium Term Agriculture sector Programme of the Ministry of Food and Agriculture for 2011-2015, taking equity concerns into programme implementation is stated as a challenge in the agricultural sector (MoFA, 2010). This includes issues of gender and geographical location. In recent years, focus is being shifted to bringing extension services closer to women and using them as contact points in extension service delivery (MoFA 1990 cited in Okorley et al, 2001).

The Women In Agricultural Development (WIAD) directorate is one of the technical directorates of the Ministry which is tasked with providing extension services to women and has a national directorate with Regional and District officers in all regions and districts who report to their regional and district directors respectively. The WIAD directorate is not autonomous but works with the mainstream extension agents who are mostly male and tend to concentrate more on crop production extension than on nutrition, processing and preservation or home management. According to Oxaal (1997), the work of women's organizations may not always promote women's empowerment. This is why it is important that the contribution of WIAD to the livelihood of its client group should be assessed.

The vision of WIAD is to improve lives and working conditions of rural households and women in terms of increased income, improved nutritional status and health and its mission to assist rural households and other women in the agricultural sector to improve their standard of living through improved agricultural practices.

The programme areas of WIAD are as follows:

1. Food based nutrition programs
2. Food production
3. Food processing, preservation, storage and utilization
4. Resource management on the farm and at home.
5. Food hygiene and safety

WIAD's nutrition programmes are an important contributor to improving the poor nutritional status of households especially in Northern Ghana where there is seasonal food insecurity with women and children facing a higher risk of malnutrition. Under this programme, women are trained to use soya bean by incorporating it into their local dishes. During these trainings, women are taught to apply heat treatment to soya bean to release protein inhibitors present in soya bean before consumption. They are also trained to process soya bean into flour which is added to local flours such as maize, sorghum, millet and cowpea used in local dishes. In addition, participants of such training are also taught to make soya milk for home consumption but this could also be a potential source of income for women since soya milk and other soya products are high in demand presently. After being trained on making soya flour and dough, the women, in groups prepare different local dishes with it. The different groups then share what they have done and learnt with the others in a plenary session. Such trainings were carried out in 2008 for Nanchalla and Banu while that of Nmanduonu was in 2009.

The soya bean has about 40% protein (world soy foundation, 2011) and so addresses the problem of protein energy malnutrition which is the commonest form of malnutrition in northern Ghana. According to MoFA (2010), in the savanna zone, households consume meat averagely two days per week with maize and millet being the commonest foods consumed. By adding soya flour to other flours, household food stocks are also augmented since most households ran out of food during the lean season leading to seasonal food insecurity (IFAD, 1998). Various studies on soya bean have produced important nutritional attributes. This leads to its use as a fortificant for other flours to decrease their carbohydrate content while increasing protein content in order to tackle protein energy malnutrition (Olatidoye and Sobowale, 2011). Though soya flour incorporation into other flours is seen as a way of improving the protein content of flours, there are also concerns regarding how much soya should be used. In a study on the utilization of soy flour in bread making by Sanful and Darko (2001), sensory analysis by consumers showed that bread supplemented with soy flour up to 30% is acceptable. Supporting this, Olaoye et al, (2006) also state that significant changes in sensory attributes of bread are seen at 15% supplementation of wheat flour with soya flour. The WIAD encourages women during its trainings to replace 20% of local flours with soya flour to improve protein content while enhancing acceptability.

The study will focus on the importance of extension trainings and particularly Soya bean Utilization Trainings for women in the Sissala East District (SED) of Ghana. Many factors affect women's access to extension information in the SED, high among them cultural influences that make it difficult for female farmers to approach male extension officers and socio- economic factors such as poverty which limits women's access to resources. Extension services in Ghana and hence the SED are still largely gender neutral and there is the need to identify the impact of methods used in delivering extension services to women. The WIAD directorate which is tasked with catering for the needs of women in the agricultural sector has a major role to play in this regard as it designs and implements programmes for women. After many years of working with women in agriculture, little improvement is seen in women's application of soya bean utilization trainings. There is also little information is also available on how the directorate is meeting the needs of its client group.

1.2. Significance of the Study

Despite the various studies that have been conducted on the nutritional benefit and utilization of soya bean as well as on its production in Ghana and other parts of West Africa (Plahar, Okezie and Gyato 2003; Annan, Plahar, Poll and Jakobsen, 2005; Olatidoye and Sobowale 2011; Olaoye, Onilude and Idowu 2006; Lawson, Mensah and Yeboah, 2009), few studies exist on the socio-economic benefits that can accrue to those involved in soya bean cultivation and use. This paper aims at contributing to the literature on this aspect of soya bean use.

The results of this study will inform policy decisions of the MoFA such as planning and design of trainings in order for them to meet the needs of women by the conclusions and recommendations arrived at. The study will also present lessons for the Technical Co-operation Programme between the FAO and MoFA on Enhancing soybean production and utilization in the savannah zones of Northern Ghana for revenue generation and improved family nutrition scheduled to be completed in December 2012.

1.3. Research Problem

To combat the problem of high malnutrition in the SED, Soya bean Utilization Trainings have been conducted with women and women's groups over the past four years. Soya bean utilization trainings are important in addressing the problem of malnutrition especially among women and children in SED. After being trained practically to use soya bean in preparing local dishes in groups, women were expected to use soya bean in cooking their daily meals to enhance household nutrition. However, monitoring activities of the Sissala East District Agricultural Development Unit (SEDADU), suggest that there is low adoption of these trainings in the district. After four continuous years of training on soya bean use in the Sissala East District, no data is available on how these trainings have benefited those trained since no evaluation has yet been conducted.

1.4. Research Objective

The objective of this research is to evaluate the soya bean utilization trainings which were designed to enhance household nutrition and cash incomes of women as well as to identify factors affecting Soya bean use and cultivation. The results of this study will help in making recommendations to the Sissala East District Agricultural Development Unit (SEDADU) on designing training programmes that will contribute to women's empowerment.

1.5. Main and Sub-Research Questions

1.What are the factors affecting soya bean use and cultivation in the Sissala East district?

- a) To what extent do Soya bean Utilization trainings affect soya bean use and cultivation by women in the Sissala East District?
- b) What social and cultural factors affect soya bean use and cultivation by women in the Sissala East district?

2.What is the effect of soya bean utilization trainings on women's empowerment in the Sissala East district?

- a) What is the contribution of Soya bean Utilization trainings to women's sense of self worth in the Sissala East District?
- b) What changes have Soya bean Utilization trainings brought to women's well-being in the Sissala East District?
- c) What changes have Soya bean Utilization trainings brought to women's access to and control over productive resources in the Sissala East District?

1.6. Research Methodology

1.6.1. Study Area

The study was conducted in three communities in the Sissala East District (SED) of Ghana. These are Nmanduonu, Nanchalla and Banu. The SED is positioned between longitude 1.30°w to 2.40°w and latitude 10.00° to 11.00° N. It is made up of Fifty-Seven (57) communities and 8,570 households. 85% of the people of the district live in rural settlements with no electrification. Among the major health service challenges in the district are high maternal and child mortality and high malnutrition among young children(MLGRD, 2011).

The district lies in the guinea savanna vegetative zone with an annual mean rainfall of about 1000mm (Blench, 2006). There are two major seasons in the area; a rainy season lasting from April to September and a dry season from October to March. Agriculture is rain fed and employs over 76% of the population of the district. (MLGRD, 2011). Maize and groundnuts are the major crops cultivated by the people.

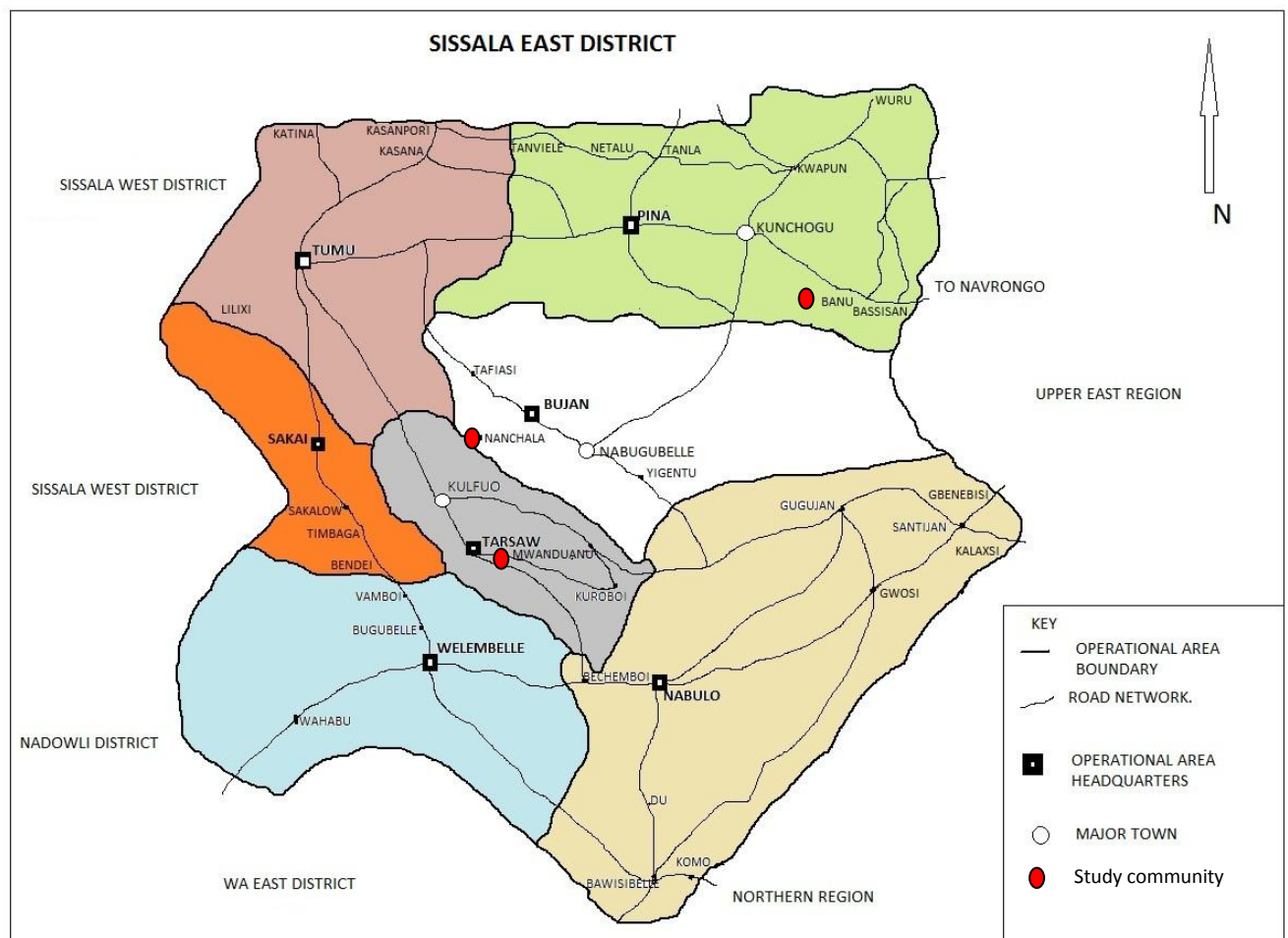
The SED is made up of 88% Sissalas, 5% Kassenas, 3% Dagaabas, 2% Moshies and the remaining 2% made up of other minority tribes. Polygamy is high due to the high population of Muslims (80%) and the practice of traditional religions. The male-female ratio is 96:100. (Ibid).

For the 2010 production season, 150 hectares of land in the SED was under soya bean production compared to 9,180 hectares for maize and 10,510 hectares for groundnuts (MoFA,2010). For the work of the MoFA, the district was previously earmarked to have Thirteen (13) Operational Areas (OAs) each manned by an AEA. However, due to limited number of AEAs the number of OAs has been reduced to 7 with 7 AEAs overseeing them.

(MoFA, 2011). Nmanduonu, Nanchalla and Banu are 58, 21 and 52km respectively from the district capital, Tumu, and in different OAs. The people of Nmanduonu and Nanchalla are mainly Sissalas while those of Banu are Kassenas.

Figure 1.1 is the map of the district showing the operational areas and study communities.

Figure1.1:Map of The Sissala East District



Source: Adapted from MoFA , 2011.

1.6.2. Sources of Data

A research framework was designed to direct the process of the study (figure 1.4). Three(3) strategies were used to obtain data: Desk study, Case study and Survey. This study employed the use of secondary data as well as empirical data from the field. Secondary data was obtained from desk study. Empirical Data for this study was obtained from women who were trained in soya bean use and key informants through FGDs and interviews.

Desk Study: This was used to obtain relevant data from existing literature to enhance formulation of the study before embarking on fieldwork. Sources used for this were official MoFA documents, reports, publications, articles, books, conference proceedings and the internet. The literature studied also informed the methodology of the study. The literature review covered the production and use of soya bean and the contribution of trainings to women's empowerment as well as methodology of mixed method research studies.

Case study: a case study was conducted involving 3 focus group discussions with 3 groups of women in 3 different communities. According to the Colorado State University (2011), a case study is a qualitative descriptive research that looks critically at an individual or a small group of participants in order to draw conclusions on that individual or small group in a particular context.

Five key informants were also identified based on their work with the MoFA and their relationship with the respondents. 3 Agricultural Extension Agents (AEAs) of the MoFA, the District Extension officer(DEO), the Regional WIAD officer(RWO) and a trader in soya flour were the key informants. At the start of field work, the key informants except for the trader were informed of the nature of the research and their roles. This was to prepare them and also agree on convenient times for interviews.

Appendix 4 shows the list of key informants who were interviewed in this study. 3 Agricultural Extension Agents (AEAs) were identified as key informants because of their role as change agents who bring new technologies and innovations to farmers. They also live with farmers in the communities and are conversant with what goes on socially, culturally and economically. The District Extension Officer (DEO) and Regional WIAD officer(RWO) were interviewed because of the fact that they have monitoring responsibility over the district WIAD Officer (DWO), AEAs and the women trained. Interviews were conducted with the help of the checklist in Appendix 1. A local trader in soya bean flour was also interviewed when she was identified.

Survey: A semi-structured questionnaire was used to obtain data from 45 women in 3 communities. The 3 communities were purposively selected based on the conduction of a SUT in the community. 15 respondents each were also purposively selected based on their participation in the trainings.

1.6.3. Research framework

Figure 1.2: Research Framework

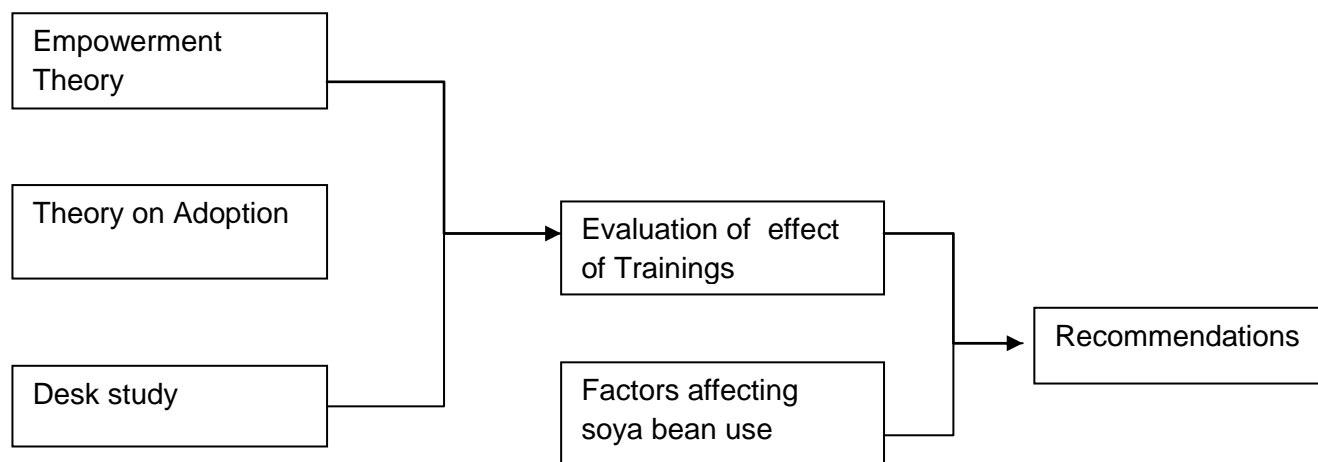


Figure 1.2: Research Framework for Assessing the contribution of Soya bean Utilization Trainings to Women's Empowerment.

1.6.4. Population and sampling size

The population of this study include all the participants of the trainings in soya been utilisation in SED. A total of 700 people/women have been trained by WIAD in the last three years. Empirical data was gathered from 45 women participants of soya bean utilization trainings, 3 AEAs in charge of the three communities where the research was conducted, 1 District Extension Officer and 1 Regional WIAD officer of the MoFA. The sample size was selected based on the minimum required respondents of 30 for a survey which was intended to provide in breadth knowledge and the time available for fieldwork. The research unit of the case study was 3 groups of women. This was chosen also on the basis of a range of 1-10 research units required by Baars (2011). It was also based on the time available for fieldwork and the fact that the period of field work is a busy time for farmers in the district. The five (5) key informants were purposively selected. These are further described in section 1.6.5 and appendix 4. A sixth key informant, a lady who processes soya bean into flour for sale was identified in the field and interviewed

1.6.5. Methods of Data Collection

Focus Group Discussions (FGDs): Three (3) FGDs were held with women who took part in SUTs in the three study communities. This was made up of 17 women in Nmanduonu, 23 in Nanchalla and 20 in Banu. This was done with the aid of the checklist in appendix 3 and an interpreter. Groups in Nanchalla and Banu were sub-divided into 2 groups each. Discussions were recorded and played back later to grasp all responses.

Key Informant Interviews: Three Agricultural Extension Agents (AEAs) in charge of the three communities, the District extension officer for the Sissala East District and the Regional WIAD officer were interviewed as key informants. The checklist in appendix 1 was used to

guide these interviews. A women processing soya bean into flour for sale was also identified later on and interviewed.

Individual Interviews: A total of 45 women were interviewed. This was made up of 16, 14 and 15 women from Nmanduonu, Nanchalla and Banu respectively. This was done with the help of a semi-structured questionnaire shown in appendix 3. A semi structured questionnaire was used so as to obtain written commentary in addition to quantitative data to enhance discussion of the results. The questionnaire was pre-tested on 2 women in Tumu town before the survey. However, after the first day of the survey the questionnaire was adjusted by adding options to some questions and re-arranging the sub-sections. Interviews were conducted with the help of an interpreter.

Personal Observation: this was used to identify physical conditions of women and their households, activities of women and the use of soya bean. Women who were met cooking were observed for the use of soya bean in cooking. Observation was also used to identify methods of processing soya bean and quantities of soya bean used

1.6.6. Methods of Data Analysis

Questionnaires were coded and entered on the same day of the interviews to prevent loss of relevant information. Quantitative data from the survey was coded and analyzed using Microsoft excel and Statistical Package for Social Sciences (SPSS). This was done using descriptive statistics to compare responses on age, marital status, household size, educational status, perception of trainings and factors of soya adoption. The results were presented in tables and figures. Qualitative data was analyzed using a systematic process of coding which identified similar responses.

2.0. Chapter Two : Contribution of Soya bean to Women's Empowerment

This chapter focuses on literature on the socio-economic background of rural women in Ghana who are mostly farmers, extension trainings, the WIAD directorate of the MoFA and its Soya bean Utilization Trainings, the benefits of the soya bean, concepts of women's empowerment and adoption of technologies and innovations.

2.1. Socio-Economic background of Respondents

Farming remains the main stay of over 70% of the people in Northern Ghana and accounts for 90% of household incomes (ACDEP, 2007). Majority of these are small holder farmers with average farm holdings of 1.2 ha (MoFA, 2010). 76% of the population of the Sissala East District depend on agriculture for their livelihood and women are among the poorest in the district (MLGRD, 2011). This agrees with the UNDP(2006) that women are on average poorer than men in developing countries and disadvantaged in income distribution, ownership and in consumption of goods and services. Women in Ghana are burdened with the responsibility of providing household services such as the care of children and family, family health, preparing food and fetching water and fuel wood for cooking among other domestic chores. They also play a major role in the productive activities such as petty trading, paid domestic and farm labour, farming, food processing and transportation (CIDA/MLGRD,2002). This goes to confirm the observation that women farmers in Africa work more hours than men (Weisfeld-Adams, 2008). Tibaijuka (2008) also observes in a study of smallholder farmers in Tanzania that women have less leisure time and greater labour input than men. The existing gender roles have an influence on the needs of male and female farmers.

In addition to the above, the situation of women in northern Ghana is further aggravated by the harsh weather conditions of the north. There is a 6-month period of rainfall which is followed by 6 dry months called the dry or lean season. This is unlike the southern Ghana which has a major and a minor rainy seasons. This leads to the challenge of seasonal food insecurity in these parts since the traditional grain and legume stocks are usually not enough to last the entire dry season. The traditional food patterns is also mainly made up of carbohydrates. This is where the soya bean comes in. According to Armah et al (2011), the promotion of cereal and legume production in the savannah zones of Ghana are integral for achieving food security since such crops are favoured by the climatic and edaphic factors of the area. Cereal and legume production hence provides farmers in this area with a comparative advantage. In order to sustain crop production in the drought and flood prone Northern Ghana, the Savannah Agricultural Research Institute (SARI) conducted trials on the potential of maize, sorghum, soya bean, cowpea and cassava for crop rotation and intercropping. Results showed that such rotation has the potential to improve household food security in the long term (Agyare et al, 2006). The Soya bean is less at risk of infestations compared to local beans and peas. All the above are reasons why the soya bean is the ideal crop for addressing the major problems of poor farmers of the SED.

2.2. Benefits of the Soya bean

Soya bean is known as the golden bean and rightly so because of its many attributes especially its nutritional benefits. Soya bean contains all three of the macro-nutrients needed for good nutrition: complete protein, carbohydrate and fat, as well as vitamins and minerals (calcium, folic acid and iron). Soya bean is the only plant food that contains complete proteins with all the essential amino acids in the amounts needed for human health. It provides 38% protein, 30% carbohydrates, 18% oil and 14% moisture. In addition to all these, the soya bean is relatively cheaper, abundant and has high versatility (World Soy Foundation, 2011). According to Ogoke et al, (2003) The high protein content of soya bean in comparison to other legumes is a major reason farmers adopt soya bean in the largely cereal cropping systems of the savannah zone in Nigeria. The dry matter protein yield of soya bean is double that of meat and most beans, and four times that of milk (Ibid). Following that the Sissala East district falls under the Savannah zone with similar conditions to that of Nigeria, it is expected that farmers in this area would reason in a similar fashion and see the need to adopt soya bean.

Protein-rich foods like the soybean, can provide a more complete and healthy solution to relieving hunger and malnutrition in sub Saharan Africa (Ogoke et al, 2003). Apart from being high in protein, soya bean has no cholesterol in comparison to traditional legume and animal food sources, is a cheap source of food, and at the same time has medicinal properties due to its genistein, photochemical and isoflavones content. Soya bean is extremely important in the fight against heart disease, cancer and diabetes (Xiao, 2008; World Soy Foundation, 2011). In a soya bean pilot programme in Kenya, Uganda and Tanzania, the improvement in farmers' blood pressure and diabetic conditions is encouraging farmers to adopt soya bean cultivation. In the same way that farmers in these areas experience a reduction in hospital attendance, households in the Sissala East District consuming soya bean are expected to experience improved health. Soya bean protein and calories are presently being used to prevent body wasting related to HIV infection. The importance of soybean in nutrition cannot be overemphasized in developing countries like Ghana where medications are scarce or lacking. Its economic potential in a wide range of industrial uses such as bio-diesel, disinfectants, pesticides/fungicides, antibiotics and cosmetics can be developed to benefit smallholder soya bean producers. (FAO, 2006?)

According to FAO (2006?), Soybean has the potential to contribute to soil improvement, human nutrition and health, livestock nutrition, household income and poverty reduction leading to improvements in livelihoods and ecosystem. Biological nitrogen fixation by rotation of soya bean with other crops is a less costly way of maintaining soil fertility. When intercropped, soya bean has also shown the potential to minimize threats from *Striga hermonthica* (a parasitic plant that attacks cereals) which is common in the Sissala East District. All these attributes make the soya bean an indispensable legume for developing countries and particularly Ghana.

Despite the numerous health benefits associated with soya bean, many also have concerns and challenges regarding its use. In the USA, challenges to the adoption of soya use include lack of skills in its preparation, unfamiliarity with soya bean, taste and texture, perception of soya as an inadequate substitute for animal products, availability, discomfort with use and high cost of especially soya milk. However for consumers of soya products, the same reasons that were barriers to consumption of soya were igniting factors for soya use; flavour,

ability to prepare soya foods, availability and cheaper costs of soya products as well as its health benefits (Schyver and Smith, 2005).

Soya bean is an important protein source for animal production especially in the developed world. According to Masuda and Goldsmith (2009), There is increasing world demand for soya beans which is important for the production of meat, milk and eggs. However it has also become an indispensable legume among humans in the fight against malnutrition in the developing world. Hence, in Africa, there was a gradual increased interest in soya beans in the 1960s. After 1973, the rise in world soya bean prices further increased interest in it. There are success stories of soya bean use in many countries including Nigeria and Zimbabwe. The establishment of the Upper west Agro enterprise in the Upper West Region of Ghana has also opened up the local market for soya bean farmers.

Looking at the history of soya bean production in Ghana, there is evidence that soya bean was first grown in Ghana in 1909 but interest in it could not be sustained because the main aim then was to promote it as a cash crop for export to England. Interest was revived in soya bean production briefly between 1960-1963 where it was used as feed for animals and for processing into cooking oil. The shift from soya bean as a cash crop and animal feed to a consumable crop has been slow. Though Ghana has the potential to produce 700, 000 metric tonnes of soya bean, it is currently producing under 50,000 metric tonnes per annum and out of the total production, just 15,000 metric tonnes is utilized (Dzogbefia et al, 2010). This is attributable to the lack of knowledge on the nutritional and economic benefits of the legume and inability to utilize it (FAO, 2004). This is what the SUTs of the WIAD seek to address. Farmers' production also fluctuates with market availability and prices. According to FAO (2004?), Ghana's domestic food supply and demand figures for 2006 and 2007 show major deficits for soya bean. And this is probably what contributes to low adoption of knowledge and skills in soya bean processing and utilization even when there is training in its use (Chianu et al, 2009).

Many networks are springing up to promote the production and use of soya bean across Africa. There is the Strategic Alliance also known as 'FORUM', of stakeholders involved in the soya bean production – consumption chain to deal with the lack of adoption of soya bean in East Africa. In Ghana, the Northern Rural Growth Programme (NRGP) set up the National Soya bean Alliance in 2008 to see to the implementation of a commodity business plan for soya bean production, processing, utilization and marketing in Ghana (MoFA, 2008).

In a study by Mensah- Wilmot et al (2001) on the acceptability of a cereal-legume weaning supplement made from maize, cowpea and soya bean, it was found out that Ghanaian mothers were happy with a weaning food made from local staples that could be made at village or household level. Education on health benefits of soya bean and food preparation methods that improve the flavour of soya bean foods are important in addressing the challenges in the adoption of soya bean use. For some people however, the knowledge of its health benefits alone is not enough to cause a change to soya use. (Schyver and Smith, 2005)

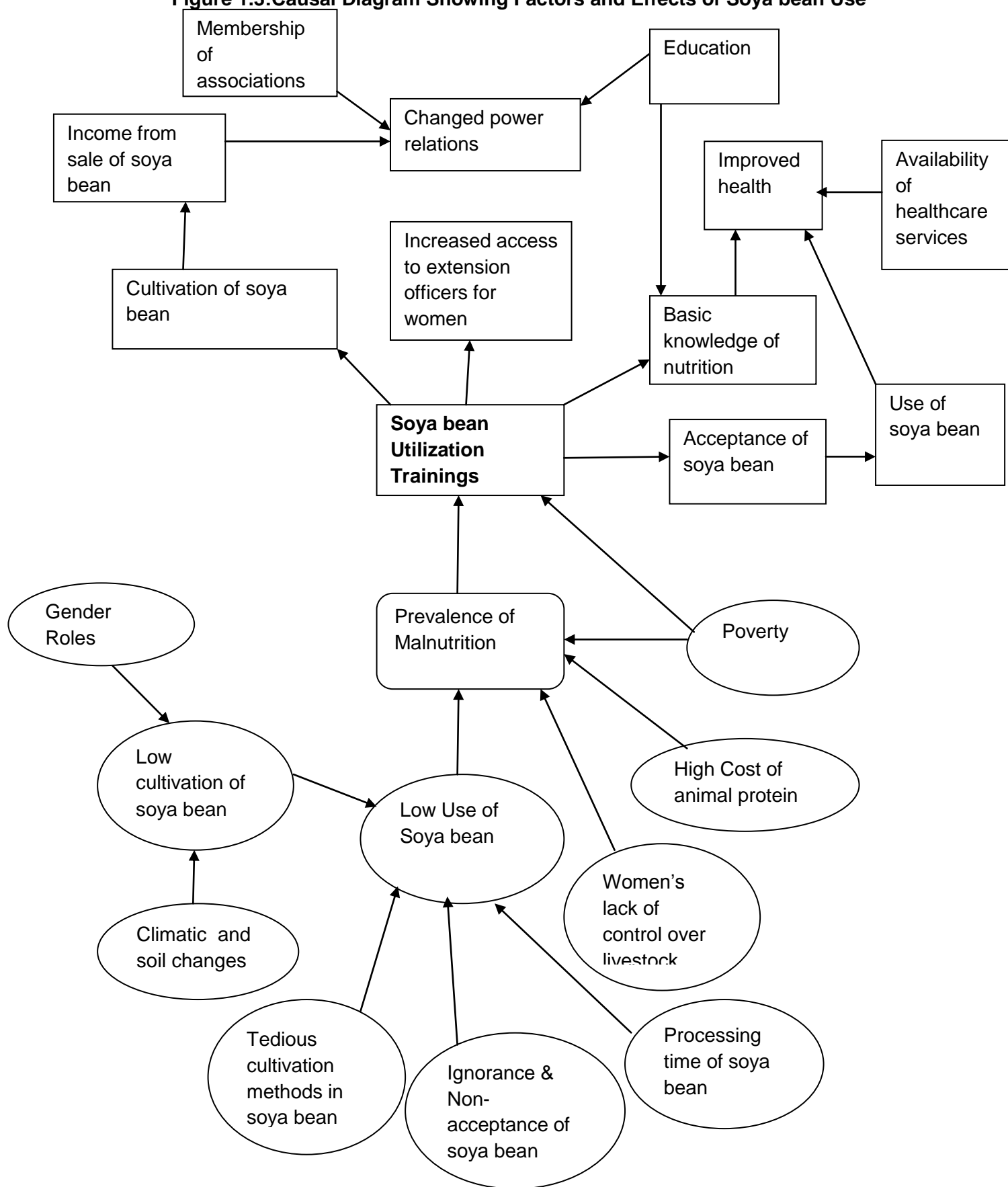
Perhaps, because of all these attributes of the Soya bean, it is one of the food crops identified in FASDEP II (the current policy document of the MoFA) to be promoted to address the problem of food insecurity in Ghana (MoFA, 2007).

Despite the numerous benefits of the soya bean, several factors hinder its use by rural women in Ghana. These include access to and control of land which affects women's cultivation of soya bean and inadequate money to purchase soya bean all year round. In addition, the availability of soya bean in the local market is affected by the low production of soya bean in the study district. Climatic and soil conditions equally affect the production of soya bean. Women also express challenges faced with having to spend time processing soya bean through heat treatment. These factors are indicated in Figure 2.1.

As can be seen from the discussion above, the benefits of soya bean can be categorized into the following:

- I. Nutritional
- II. Socio-economic and
- III. Industrial

Figure 1.3: Causal Diagram Showing Factors and Effects of Soya bean Use



2.3. Adoption of Innovations

Often, technologies and innovations are not spread at a rate and in a manner satisfactory to the innovators. This may be the reason why field officers of MoFA suggest that there is low adoption of knowledge from Soya Bean Utilization Trainings. The subject of adoption has been widely researched and various factors suggested for the lack of or low adoption. According to Rogers (2003), innovations possess five qualities which determine their rate of adoption. These are relative advantage, compatibility with existing practices, simplicity, trialability and observable results.

Even with the most rewarding and beneficial innovations, there are always some challenges to adoption. Many writers on the topic emphasise the fact that there is a lack of adoption among farmers due to a barrage of challenges and suggest new methods of extension delivery other than the traditional ones being employed (Daiel et al, 2001;Rodriguez et al, 2008). However such factors or barriers differ between geographical locations and between cases. Hence the need for demand driven services. In an assessment of adoption of agrochemicals by plantain farmers in Ghana, Egyir et al (2011) concluded that adoption of agrochemical use is associated with literacy, age, income from sales, access to hi-tech machinery, migrant status, and access to extension services and financial institutions. A farmer's gender and association with extension service providers however, did not make a difference.

Owusu et al, (2010) rightly states that education has a positive effect on adoption of new technologies by enabling farmers to critically assess the benefits and costs of adoption. If this is so, women's adoption of technologies in the SED will be low taking into consideration their lower literacy status compared to that of men. In addition, women's adoption of technology may be lower than that of their male counterparts because they tend to be more risk averse (Doss and Morris, 2001). Boohene, Sheridan and Kotey (2008) also confirmed this in a business study of Ghanaian businesses. This is why it is imperative to design innovations in ways that will appeal to women taking into consideration their peculiar situations and needs.

In another Ghanaian study, Results indicate that male and female farmers adoption of agricultural innovations differ according to their access to inputs such as land, extension services and labour. In the SED, which is a patriarchal society, land is owned and controlled by men. Women only have access to it through their husbands or other male family members. Women and men farmers also have different preferences for technology according to the reasons for which they farm. Thus men who farm for sale will have different technology needs from women who farm for household consumption (Doss and Morris, 2001). In the same way they will also have different motivations for adopting innovations. Household size and frequency of extension contacts are also important factors in adoption of innovations (Mohamed and Temu, 2008). Household size is expected to have an influence on the use of soya bean in the SED considering that soya bean use may have a cost attached to it.

Carr Jnr, (1999) defines adoption as the stage in which a technology is selected for use by an individual or a group and diffusion as the stage in which the technology spreads to general use and application. In essence, adoption involves a series of stages and quantitative analysis to measure.

Hence adoption is beyond the scope of this study. This study will however look at the acceptance of soya bean by those trained in its use. Results will give an indication of how much soya bean use and cultivation has been accepted by those trained. Discussion will be based on information from respondents and personal observation. Acceptance will be looked at on the following levels:

- i. The use of soya bean in cooking by women respondents
- ii. The cultivation of soya bean by respondents of the study
- iii. Source of soya bean for home use
- iv. Sale of soya bean for income
- v. Availability of soya bean at home

Utilization in this study is used to refer to the way of processing soya bean into forms such as flour or dough that can be used in homes and going ahead to use these in cooking by women.

2.4. Women's Empowerment

Women's empowerment is a highly multi-dimensional subject which is difficult to measure. Many and varied are the reasons for women's disempowerment or subordination. To understand this and work towards women's empowerment, an understanding of existing power relations is important. Women's empowerment does not mean that women take over control previously held by men, but rather that there is a change in the nature of power relations between men and women. Power may be understood as self confidence (power within), the capacity to come together with others towards a common purpose (power with), and the ability to effect change and make decisions, and not just power over others. It also deals with inequalities in different people's ability to make choices (Kabeer, 2002). In analyzing power, there is a difference between first class (strategic) and second class choices. These strategic choices such as rights to land and choice of what crops to grow lead to the structuring of less significant choices such as choice of what to eat.(Kabeer, 1999)

Empowerment as social change can be thought of in three dimensions: resources, agency and achievements (Ibid)According to IUSSP, 1997 cited in Houlihan and Green, empowerment is the changing of power relations including control over resources, changes in self-perception and confidence in one's self.

Empowerment means different things to different people in different locations. However, one important concept of empowerment is that of self agency which involves the ability of the disempowered (in this case, women) to take charge of decisions and actions having an influence on them. In other words, women themselves should either be involved in or take the lead in actions that are aimed at empowering them. As Kabeer (2002) defines it, empowerment is the ability of people to make planned decisions and choices in an environment where this was previously denied them. Disempowerment in the SED is shown in women's limited inclusion in extension programmes and activities, lack of control over factors of production especially land. Eyben et al (2008) state that empowerment is about people's ability to redefine their possibilities and choices and to act on these. In other words, empowerment enables people who never thought themselves capable of doing some things

develop the courage to take up those things. In addition, through empowerment people are able to work together with others to claim what they desire and what belongs to them. This leads us to the concept of social empowerment which involves changing society so that disempowered peoples' place within it are acknowledged and accepted on the conditions of the disempowered themselves. However, the attitude of men towards women are important to the ability of women to achieve change (Kabeer, 2010)

Longwe, (1998) states that women's empowerment is their capacity to make the best of their own lives. For Longwe, training and education for women's empowerment should deal with issues of conscientization, enlightenment and collective action. Among the factors that hinder women's empowerment include unequal sharing of responsibilities in the household, unequal access to resources and women's inability to access training and new technologies (UNDP, 2008). The soya bean utilization trainings come in to address the issues of access to training and new technology.

Empowerment involves a process of change. According to CARE, (2005?) empowerment of women can only be achieved and sustained when individuals, structures and relations change. Women need to become actors of change by making their own decisions based on awareness, skills, confidence, knowledge and experience gained. Extension trainings are important channels that enhance women's acquisition of such attributes. In addition, men and women have to form new relations with each other and with other social actors and structures. To change structures, men and women need to challenge existing conventions and laws. It is argued that, non-formal education or training is a way of increasing women's access to their rights. Training in itself may not be empowerment but provides a stepping stone to changing women's situations for the better, hence the need for an assessment of Soya Bean Utilization Trainings for their effect on changed situation of women.

According to Majoor and Manders (2009) cited in Ahenkan and Boon, (2011), Women's empowerment is a broad concept. However, women's empowerment need to be tackled in bits and parts though the overall goal should be a multi-faceted one. Many organizations work on empowerment from their own understanding and mandate (CARE, 2005?). It is in this direction that it is relevant to note the World Bank's assertion that agriculture is one of four areas if opened up for women in Ghana, will provide empowerment for them (Anyidoho and Manuh, 2010).

In agriculture, farm productivity, farm yields, income and decision making power of women increases when women are provided the same extension services as men and increase in farm yields is the most significant result (Ajah, 2010;Momsen, 2010). Yet women's adoption of extension services is low compared to their male colleagues (Doss, 2001). In comparison to agricultural technologies however, household technologies such as cost effective improved wood stoves, improved pestles and water pumps promote the welfare of women irrespective of the type of decision-making existing in households since they increase women's productivity in their assigned gender roles (Lawrence et al, 1999; Doss, 2001). Perhaps that is why most extension programmes targeted at women tend to focus on those technologies directly linked to their roles. The WIAD's programmes are no exception.

According to Kabeer (2010), interventions towards women's empowerment are realizing great results not just for women but also for whole societies. It is hoped that results of this

study will give an indication of how much change has been brought to not only women but the entire community of the Sissala East district

As a process, women's empowerment must result in a transformation of existing relations and situations. Kabeer (2002) states that empowerment is a type of social change that is less open to measurement but also agrees that for purposes of measuring empowerment, some universally accepted and essential needs such as good health and nutrition and adequate shelter can be explored. However, such criteria need to be context specific. Where a disadvantage does not exist in such needs, there is no need using them as criteria for measuring empowerment. Basing on the above discussion and the socio-economic situation of women in the Sissala East district, women's empowerment in this study will refer to an improvement in access of women to extension services culminating in changed relations between women farmers and extension workers as well as relations within the household. The indicators of women's empowerment for this research will be:

- i. Change in women's perception of their own capacities (self worth)
- ii. Change in women's well-being
- iii. Women's access to and control over resources (Extension services and land)
- iv. Change in relations within and outside the household

According to Kabeer, 1994, well-being refers to the basic human goals of survival, security and autonomy such health. Well being in this study will refer to women's health, reduced workload and cash income.

2.5. WIAD Programmes and Activities

Activities of the WIAD include soya bean utilization trainings, food safety workshops, gender trainings, food shows, promotion of healthy foods and home management trainings.

It has been realised that constraints to the promotion of soya bean include lack of processing facilities and lack of knowledge of the dietary value of soya bean. Efforts to combat the lack of knowledge on the dietary value of soya bean is what has brought about the soya bean Utilization trainings which are conducted by the WIAD. These trainings are expected not only to improve the nutrition of rural households but also to enhance the living standards of the rural poor through income from its cultivation.

Officers responsible for WIAD activities work together with other specialised officers on different aspects of agriculture (such as crop production, veterinary, extension etc) at regional and district levels. There is low budgetary allocations to the WIAD, whose programmes are relevant for improving the livelihoods of women, in contrast to other sectors of agriculture (Duncan, 2004). Funds allocated to the WIAD also have to be distributed to cover the other programme areas of the directorate.

Soya bean Utilization Trainings are important in the Sissala East District considering the poor nutritional status of a greater number of residents of the district. Women and children are particularly affected by poor nutrition. The prevalence of chronic malnutrition among children 6-59 months for 2009-2011 ranges between 21 to 29% (GHS, 2011) while 40% of children admitted to the paediatric ward of the District Hospital show various levels of Protein Energy Malnutrition (SRC, 2009).

According to Kalambokidis (2011), trainings do not only build individual capacities but also whole economies. It is therefore expected that Soya bean utilization Trainings will not only build the capacities of women in agricultural production but will also trickle down to the local economy especially as the soya bean has a large export market. Soya bean Utilization trainings are therefore relevant for both men and women since decision making power lies mainly with men.

Soya bean Utilization Trainings

Content: These trainings are conducted to train women farmers in the use of soya bean. Participants are trained as trained to further disseminate the knowledge to other members of the community. Trainings are conducted once in every community. The methodology used are lectures, hands on practical and group work. Lectures are given on the 3 major food groups: Energy-giving foods(Carbohydrates), Body-building foods (proteins) and protective foods (vitamins/minerals) and their sources. Local sources of these nutrients are exhibited for participants to see. The relevance of soya bean in nutrition is also discussed, together with statements about household measurements to be used in adding soya bean to local foodstuffs. Two different methods of processing soya bean to get rid of protein inhibitors is demonstrated or practiced with participants. These are a dry roasting method and a blanching method. Participants are then divided into groups to process soya bean into dough and paste. Each group then prepares a dish using soya bean after which groups recall their cooking methods to the entire group and give feedback to each other. Dishes prepared during hands-on practical are local dishes except for soya milk. It was deemed important to add soya milk to these trainings because of the high cost of milk the realisation that mothers may need to find cheaper sources of milk for their toddlers. At the end of trainings, women are encouraged to cultivate soya bean and to spread the knowledge about its benefits. Cognisant of the problems women have of accessing land, women are encouraged to grow soya bean in whatever little capacity they have: for example as border crops around their husbands farms and in their vegetable gardens where they have control. Women are however referred to AEAs for production knowledge in soya bean since this is not covered in soya bean utilization trainings.

Methodology: A combination of lectures, question and answer sessions, hands-on practical and group work is employed in soya bean utilization trainings. Women's previous knowledge is built upon as they, in groups, decide what methods to use in cooking and explain to their colleagues afterwards their choice of methods. However they are guided to do this to ensure that they chose healthy methods of cooking. For example methods that involve short cooking time of vegetables to prevent nutrient loss.

Afterwards reports of the training including number of participants and activities undertaken are written by district officers through the district director and copied to the Regional WIAD officers. The district director further forwards this information in a bigger district report to the Regional office from where it proceeds to the national office. Monitoring reports after training are also forwarded from AEAs through the district officers and up the same channel.

Time: trainings are conducted between 4-5 hours a day. In communities where there are grinding mills, training takes one day because after heat processing of soya bean it can be milled in the community for practical to continue. However, in the absence of a grinding mill

in the community, the training takes two (2) days. In such cases, training day one ends with the processing and milling of soya bean into flour and practical hands-on cooking is done on training day 2. Trainings are carried out in the dry season because that is the season when women are less busy and can have time to stay and learn from these trainings. Another reason why the dry season is a good time for Soya bean Utilization trainings is the fact that trainings are done in open spaces because of the use of firewood in cooking. It is safer and healthier for both trainees and trainers that smoke from the firewood escapes freely, however if trainings should be conducted when there is the possibility of rain then cooking would have to be done in enclosed spaces which is not healthy. Though SUTs are normally carried out in the dry season, that of Banu (One of the study communities) was carried out in the early rainy season because a late release of funds led to its rescheduling.

Realising the importance of follow-up in adoption of new technologies, the MoFA has put in place a monitoring system for all of its activities. Funds are made available quarterly for monitoring by district officers and field agents. AEAs monitor the adoption of SUTs during their normal extension duties and report to the district office weekly and monthly. AEAs and women trainees are also monitored by the District and regional officers (DWO and RWO) every fortnight. District officers therefore visit each operational area twice in a month. Joint monitoring by all district officers is also organised periodically.

Conceptual Framework

The conceptual framework of this study was based on the role of soya bean utilization trainings in empowering rural women of the SED through increased access to extension services, changed relations and improved food security and nutrition.

This study focused on the evaluation of soya bean utilization trainings on three levels; the intervention, its outcome and effect on women and their households in the SED with emphasizes on the acceptability of trainings for women and factors affecting their adoption of soya bean use. It is based on the understanding that, there are factors that affect positively or negatively the result of soya bean utilization trainings.

This study also worked on the understanding that the gender roles existing in the study area have an influence on women's adoption of the knowledge acquired at SUTs. The Harvard analytical framework was used to explain gender roles in the study area and its influence on activities of WIAD and specifically on Soya bean utilization trainings.

3.0. Chapter Three : Results

This chapter presents the findings of field work in the Sissala East District over a 6-week period. The data is a result of Focus Group Discussions (FGD), interviews and personal observation carried out from 11th July to 19th August, 2011. From the FGDs, findings were on the women's understanding of SUTs, gender roles in soya bean cultivation as well as the sources and availability of soya bean for home use. Results from the survey include the background information of respondents, the importance of Soya bean Utilization Trainings (SUTs), factors affecting the adoption of soya use and the contribution of SUTs to changed status of women.

3.1. Key Informants

Appendix 4 shows the list of key informants who were interviewed in this study. 3 Agricultural Extension Agents (AEAs) were identified as key informants because of their role as change agents who bring new technologies and innovations to farmers. They also live with farmers in the communities and are conversant with what goes on socially, culturally and economically. The District Extension Officer (DEO) and Regional WIAD officer(RWO) were interviewed because of the fact that they have monitoring responsibility over the district WIAD Officer (DWO), AEAs and the women trained. Interviews were conducted with the help of the checklist in Appendix 1. A local trader in soya bean flour was also interviewed when she was identified.

Extension Service Provision: All 5 key informants with the ministry agreed that women did not participate in extension activities as often as men are in the study area. Reasons given for this were the inadequate staff numbers and women's workload and cultural and religious norms which prevented women from participating fully in meetings organized together with men. Women were normally selected for trainings by AEAs with the help of women's group leaders and contact farmers. Selection was also based on the interest and seriousness of the women. The DEO, said the WIAD was there to address the needs of women as women do not always benefit fully from mainstream extension programmes.

Soya bean Utilization Trainings: According to the Regional WIAD Officer(RWO), the objective of soya bean utilization trainings was to improve the nutrition of rural households through the use of soya bean and to promote the cultivation of soya bean as a major crop in order to improve the economic standards and ultimately the overall standard of living of rural farmers. She also said there was no specified budget for soya bean promotion but these trainings are conducted with funds for the promotion of local foods because of the importance of soya bean in attaining good nutrition among poor people. SUTs started in Ghana in the early 1980s before they reached the Upper west region in 1992 but had not been consistent due to the flow of funds. She said people were using it though some do not process it by the needed heat treatment. Trainings were organized in the communities to allow as many people as possible to attend. More women were encouraged to attend because of their responsibility for food preparation in the household. The men sometimes did not show interest in these trainings. When they attended, few took part in the hands-on practical. They were also carried out in the dry season when women were less busy and in the morning when they

could be found at home. However, delay in the release of funds sometimes lead to rescheduling of trainings.

Concept of training: Soya bean utilization trainings were carried out to train people on heat processing of soya bean and the use of soya bean in local dishes. Though men were involved in these trainings they were normally dominated by women because of women's responsibility for food preparation in the households. The methodology for conducting these trainings was a mix of interactive discussions, group work, hands on practical and follow up afterwards. The strategy of follow up was both individual and group follow up. This was determined by the existing monitoring strategy for the particular District Agricultural Development Unit (DADU). AEAs monitored the trainees weekly and reported to the DADU while district officers monitored AEAs and trainees every fortnight. The inadequate staff numbers however hindered smooth implementation of this as some AEAs had additional communities to oversee. Monitoring strategies were left to the discretion of officers who decided to monitor farmers in groups or individually.

Adoption: According to the DEO, soya bean had been cultivated in the SED for the past 12 years but production fluctuated with farmers' access to market. Farmers tend to reduce production when they produced and were unable to sell the produce. He added that the WIAD trainings came in along the line to improve the nutritional status of rural households. In his view, women's cultivation of soya bean did not only help improve household nutrition but also provided them with a source of income for needs such as the provision of household food ingredients. He also noted that women in the district were happy about the trainings and eager to adopt soya use but sometimes faced a problem with acquiring improved seed. The DEO added that there is currently great potential for soya bean production in the district because of the large market currently available. This was because of the establishment of the Upper west Agro Enterprise (a soya bean oil factory) in the region.

The 3 AEAs stated that women were appreciative of the trainings and were using soya bean. They particularly used it in the later part of the dry season and early rainy season when the main staple maize was running short in stock. According to the AEA in charge of Nanchalla, he had observed about 60% of women in his Operational area were using the soya bean since the training. He disclosed that there was a woman in Bujan who processed soya into flour for sale. This led to the identification of the sixth key informant, a trader, who however was not from any of the study communities but processed soya into flour for sale.

At Bujan, this trader processed soya into flour and sold them in bits of about 350grams each. According to her, she sold between 4 and 5 bowls (14-17.5kg) soya bean in a week. For her, sales were higher when there were funerals or other social gatherings in the community where a lot of people had to be fed.



Pic 1: Soya flour for Sale

3.2. Focus Groups

Three(3) focus group discussions were conducted in 3 communities with 17, 23 and 20 women. Their views on the relevance of soya bean utilization trainings, adoption of soya bean use and women's empowerment are described below.

Adoption: While some women had used soya bean since the training, others had stopped using after a while. Almost all respondents bought soya bean from the market because even for those who cultivated it, it was in small quantities and did not last them the whole year. At Banu, 2 women had cultivated an acre each of soya bean this year while 15 others had cultivated a 1acre group trial farm with the help of the AEA.

Table 3.1: Soya bean use and cultivation from Focus Group Discussions (N=60)

Form of Acceptance	Nmanduonu		Nanchalla		Banu	
Total No of women in discussion	17	28%	23	38%	20	33%
Still use soya bean	15	25%	23	38%	15	25%
Used and stopped	2	3%	-	-	5	8%
Cultivating Soya bean	5	8%	6	10%	17	28%
Buying Soya from the market	10	17%	11	18%	8	13%
Sells soya bean	1	2%	-	-	-	-
Learnt from others trained (Trickle down)	2	3%	2	3%	1	2%
Have soya bean at home	8	13%	15	25%	7	12%
Total Acreage of soya bean cultivated	5	8%	8	13%	3	5%

Source: Field Survey, 2011.

From table 3.1, the average acreage cultivated by each woman is 0.5acres. the least area cultivated was 0.5 acres and the largest was 2acres.

Factors of Adoption: for the women of Nmanduonu, the factors that encouraged them to use soya bean were the many health benefits of the soya bean which were discussed at the training and the availability of soya bean. Others were the cost of soya bean compared to other sources of protein and the ease of cooking when processed soya flour is at home. However, lack of access to ploughing equipment and improved seed affected their cultivation of soya bean which also affected the availability of soya for their use. Some of them bought it from the market but prices fluctuated with the seasons. Soya bean was as cheap as Gh¢1.50 per bowl between October and January but continually increased in price from February to as high as Gh¢3.00 just at the beginning of the next cultivation season in May. During harvesting in September, prices were reported to be as low as Gh¢1.00 per bowl.

In Nanchalla, the problems women faced in soya bean cultivation were high ploughing costs and weed infestation because of the marginal lands they had access to. For example, though they had a piece of land to cultivate as a group the previous year, it was a marginal land with problems of weed infestation. The women added that the processing time of soya bean was not a problem for them. One woman said: "There is always competition for time during this period, so you have to involve more men in the trainings so that they will help us to cultivate the soya bean" However, another suggested that since men farmed large plots of land, that is why they had no time to assist them on their own fields.

During the FGD at Banu, one woman remarked; "it is getting late and we have to go to the farm otherwise our husbands will beat us up when they return". This illustrated the

seriousness of women's lack of control over their own time. Another participant of the FGD, said "I cultivated soya bean last year and didn't harvest much because of poor rains and poor soil, so I have stopped"

Effect of Trainings: From the FGDs at Nmanduonu and Nanchalla, participants stated that, the training was important for them because they acquired knowledge for their own self development. They had learnt about the use of soya bean in improving their health. One woman remarked; "previously, we were always sick and anaemic, but now when we go to the clinic they tell us our blood levels are good and our children's weights are also better". A participant stated that her son is now eager to go to school every morning because she prepares soya milk for him to carry along to school. For the women of Banu, the most important factor was that the soya bean was good for their health. In all 3 discussions, the women also agreed that their health had improved because they did not fall sick as often as they did before they started using soya bean. They also reported that they felt physically stronger since they started using the soya bean. According to them, they benefited from the training because they learnt about a cheap protein source and how to prepare tasteful dishes for their families in a short time. Participants agreed that the soya bean is cheapest at Gh¢1.00 per bowl during harvest in September and most expensive during the early rains in May-June at Gh¢3.0 per bowl.



Pic 2:Focus Group Discussion

Participants agreed that the soya bean is cheapest at Gh¢1.00 per bowl during harvest in September and most expensive during the early rains in May-June at Gh¢3.0 per bowl.

Empowerment: the women in Nmanduonu and Banu stated that there was no change in the frequency of extension services they received as a result of the training. For those in Nanchalla extension visits were as frequent as they wanted it to be (twice weekly). The women in Nanchalla and Banu had been able to mobilize themselves as groups to produce soya bean. Though those in Banu had just planted their field, the women of Nanchalla had harvested produce the previous year which they shared among themselves. However, economically some women were improving their lives by the sale of soya bean. In the past 6 months, 1 woman from Nmanduonu had made up to sixty Ghana cedis (Gh¢60) from the sale of soya bean.

Gender Roles: From the 3 Focus group discussions and key informant interviews, the gender roles in soya bean cultivation were identified as in table 3.2. These roles were affected by the kind of farm; individual or group farm. On group farms, as in the case of Nanchalla, all farm activities were undertaken by women themselves. However, ploughing was done by hired tractor and paid for by the women. Sowing is done by both men and women when dibbling was used, otherwise women were responsible for sowing.

Table 3.2: Gender Roles in Soya bean Production

Community	Activity	Responsibility	
		Men	Women
Nmanduonu	Ploughing/land preparation	√	
	Dibbling	√	
	Sowing		√
	Weeding	√	√
	Uprooting	√	√
	Threshing	√	
	Winnowing		√
	Carting		√
Nanchalla	Ploughing/land preparation		√
	Dibbling		√
	Sowing		√
	Weeding		√
	Uprooting		√
	Threshing		√
	Winnowing		√
Banu	Carting		√
	Ploughing/land preparation	√	
	Dibbling	√	
	Sowing		√
	Weeding	√	
	Uprooting	√	√
	Threshing		√
	Winnowing		√
	Carting		√

Source: Field Survey, 2011.

3.3. Personal Observation

During the conduct of the study, it was observed that a lot of women were using soya bean in cooking their meals. However, some of them were still using the soya bean without applying the needed heat treatment to release protein inhibitors before use. Others used different measurements to combine soya and other flours. 7 women were observed coking using soya bean, 3 of them had not attended the training. The women who were cooking were also observed using a lot of fresh vegetables in cooking as is common during this season. Respondents and children found around looked physically healthy. In the search for respondents of the study, 3 women were discovered using the soya bean but had not attended the training. 2 were cooking and the 3rd was milling a corn-soya mixture.



Pic 3: Woman Cooking with Soya flour

3.4. Survey Results

3.4.1. Background Information:

This section presents the results of the survey in tables and figures. It gives the age, marital status, educational status and household sizes of the 45 respondents. The age distribution is shown in table 3.2. Majority of the respondents (33%) fell in the age group 26-35. The age group 18-25 had the least respondents (18%).

Table 3.3: Age Distribution of Respondents (N=45)

Age group	Number of respondents	Percentage
18-25	8	18
26-35	15	33
36-45	11	24
>45	11	24
Total	45	99

Source: Field Survey,2011.

Table 3.4 shows the marital status of respondents. 91% of respondents were married while no respondent was single.

Table 3.4: Marital Status of respondents(N=45)

Marital status	Number of respondents	Percentage
Married	41	91
Widowed	4	9
Total	45	100

Source: Field Survey,2011.

Table 3.5 shows that 58% of the respondents had their household sizes greater than 10 people.

Table 3.5:Household Size of Respondents(N=45)

Household size	Number of respondents	Percentage
2-5	4	8
6-10	15	33
>10	26	58
Total	45	100

Source: Field Survey,2011.

Table 3.6 shows the educational levels attained by respondents. 78% of those interviewed had no formal education and 2% had attended night school, an informal form of education.

Table 3.6:Educational Status of Respondents(N=45)

Educational status	Number of respondents	Percentage
No school	35	78
Primary school	7	16
Secondary school	2	4
Other	1	2
Total	45	100

Source: Field Survey,2011.

3.4.2. Effect of Soya bean Utilization Trainings

All respondents responded that SUTs were important for them. The reasons respondents gave for the Trainings being important included gaining knowledge on nutrition and the soya bean, the high nutritional benefits of the soya bean, improvement in health due to soya use and learning faster ways of preparing some meals. 58% of women thought trainings were important because they gained knowledge from them and 33% of them felt that their health and lives had improved because they attended these trainings.

40% of respondents liked the hands on practical part of the training most, 22% liked every part of it, 18% liked the discussion or lecture part while 11% liked the preparation of a new dish (soya milk). On the other hand, 7% liked the tasting of the dishes best and 2% felt that the training was well attended and that excited them most.

On suggestions for improving trainings, 13% of respondents called for refresher trainings while 18% wanted more dishes to be added in the practical. For 7% of respondents, the groups were too large and should be reduced in subsequent trainings. Another 7% of respondents wanted all participants to practice all dishes at the training.

Table 3.7: Importance of soya bean Utilization Trainings(N=45)

Response	No of Respondents	Percentage
Gained knowledge	26	58
Improved my health	15	33
Learnt to prepare fast meals	4	9
Total	45	100

Source: Field Survey, 2011.

Table 3.8 Shows the responses of respondents to the question of what was learnt at soya bean utilization training.

Table 3.8: Important Learning points of Soya bean Utilization Training(N=45)

Response	No of respondents	Percentage
To process and use soya bean	43	96
About nutrition	2	4
Total	45	100

Source: Field Survey,2011.

96% of respondents said they learnt how to either process or use the soya bean while 4% said they learnt about nutrition.

Table 3.9:Convenience of Training Time(N=45)

Response	Frequency	Percent
Convenient	39	87
Not convinient	6	13
Total	45	100

Source: Field Survey, 2011.

5 respondents from Banu said that the training time was not convenient because it was in the rainy season when they were very busy. 1 other from Nmanduonu said it was not convenient because it was too early in the day.

Table 3.10: Convenience of Training Duration(N=45)

Response	Frequency	Percent
Too short	3	7
Enough	38	84
Too long	4	9
Total	45	100

Source: Field Survey,2011.

Table 3.11: Convenience of Training Venue(N=45)

Response	No of respondents	Percent
Convenient	44	98
Not Convenient	1	2
Not Sure	0	0
Total	45	100

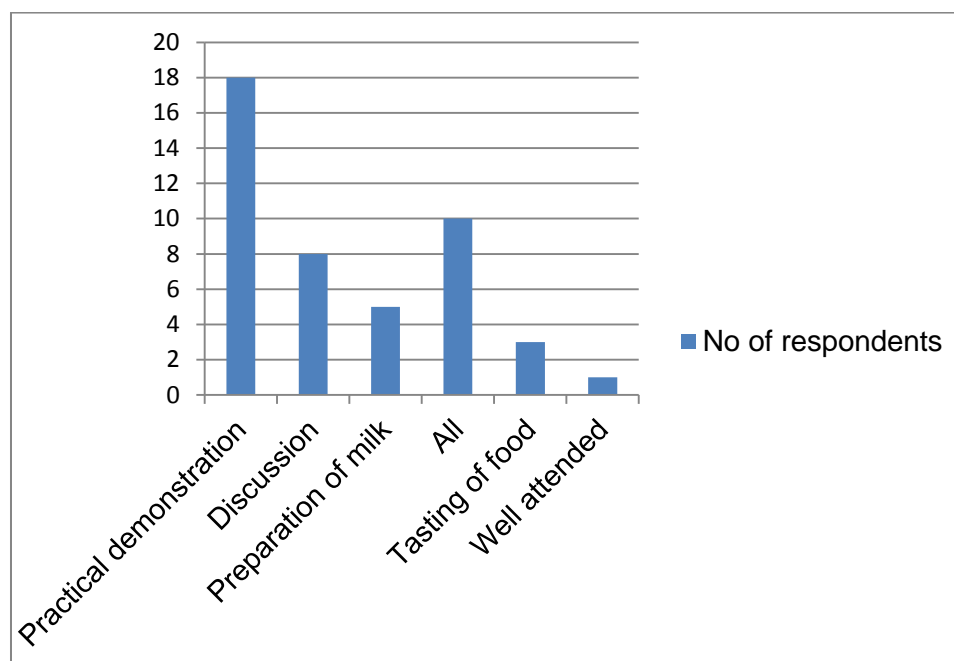
Source: Field Survey,2011.

Table 3.12: Suitability of Training Content(N=45)

Response	Number of respondents	Percentage
Understandable	43	96
Too technical	2	4
Too much	0	0
Total	45	100

Source: Field Survey,2011.

Figure 3.1: Respondents Perception of Best Part of Training (N=45)



Source: Field Survey,2011.

Table 3.13 shows that 98% respondents have used soya bean after training and 2% respondent have not.

Table 3.13: Use of Soya bean by Respondents(N=45)

Adoption	Frequency	Percent
No	1	2
Yes	44	98
Total	45	100

Source: Field Survey, 2011.

Table 3.14: Common dishes prepared with Soya bean (N=45)

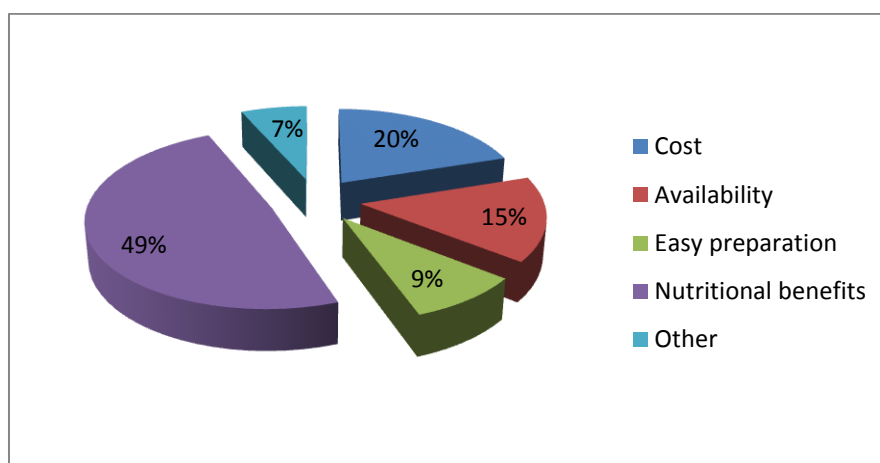
Dish	Practiced	Frequency	Percent
TZ	Yes	23	51
	No	22	49
Porridge	Yes	11	24
	No	34	76
Milk	Yes	7	16
	No	38	84
Other(kpoglo, apprapransa)	Yes	43	96
	No	2	4

Source: Field Survey, 2011.

3.4.3. Factors Affecting Soya use

The factors encouraging and discouraging soya use are shown in figures 3.2 and 3.3. Of the 25 respondents who answered other to the factors influencing their use of soya, 22 stated that the nutritional benefits of soya bean which they learnt at the training encouraged them to adopt the use of soya in cooking while 2 said they liked the food they tasted at the training and 1 wanted to practice what she had learnt.

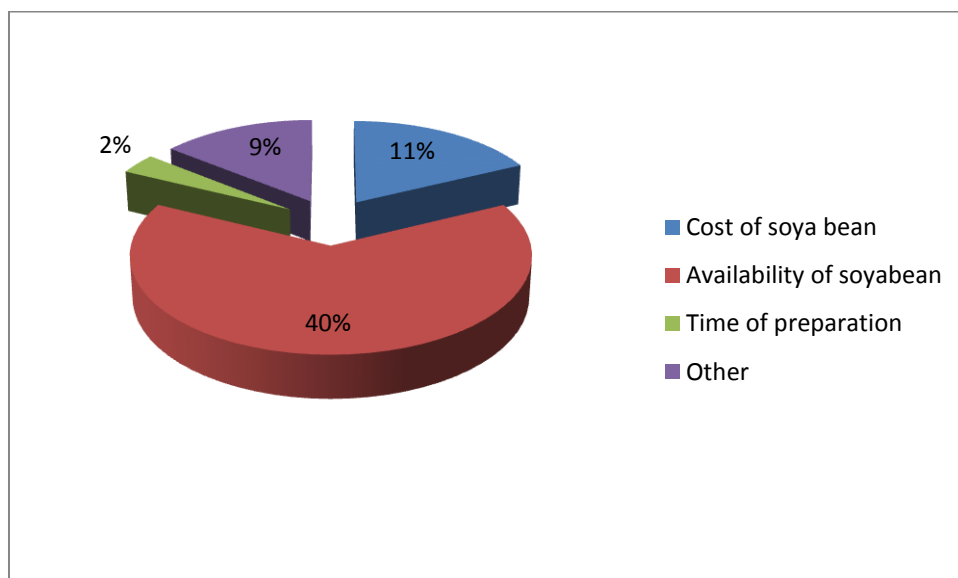
Figure 3.2: Positive Factors of Soya bean Use



Source: Field Survey, 2011.

In figure 3.3, 28 respondents who had either used soya bean for some time and stopped or did not start using soya bean immediately after training give reasons for this. Some of them also use soya bean occasionally.

Figure 3.3: Factors Discouraging Soya bean Use



Source: Field Survey, 2011.

Other factors cited for non adoption of soya use were poor rains, lack of knowledge of soya bean production and lack of time (overload of work) for its production.

Table 3.15: Background Characteristics and Frequency of Soya Use (N=45)

Characteristic	Range	Frequency of Soya bean Use				Total
		Daily	Weekly	Seasonally	Other	
Age	18-25	2	5	1	0	8
	26-35	2	8	2	3	15
	36-45	1	5	4	0	10
	>45	7	4	0	0	11
	Total	12	22	7	3	44
Marital status	Married	9	22	6	3	40
	Widowed	3	0	1	0	4
	Total	12	22	7	3	44
Educational Status	None	8	17	7	2	34
	Primary	3	4	0	0	7
	Secondary	1	1	0	0	2
	Other	0	0	0	1	1
	Total	12	22	7	3	44
Household Size	2-5	2	0	2	0	4
	6-10	1	10	1	1	13
	>10	9	12	4	2	27
	Total	12	22	7	3	44

Source: Field Survey, 2011.

A. Cultivation of Soya bean Among Respondents

56% of respondents had cultivated soya bean between 2008 and 2010. 25% (10) of respondents who had cultivated soya bean before sold some of it for money. For this production season, 51% of respondents have cultivated soya bean while 49% have not. This is depicted by figure 3.16.

Table 3.16: Cultivation of Soya bean by Respondents between 2008 and 2010(N=45)

Soya bean cultivation	Frequency	Percent
Yes	20	44
No	25	56
Total	45	100

Source: Field Survey,2011.

Table 3.17: Current Cultivation of Soya bean by Respondents(N=45)

Soya bean Cultivation	Frequency	Percent
Yes	23	51
No	22	49
Total	45	100

Source: Field Survey,2011.

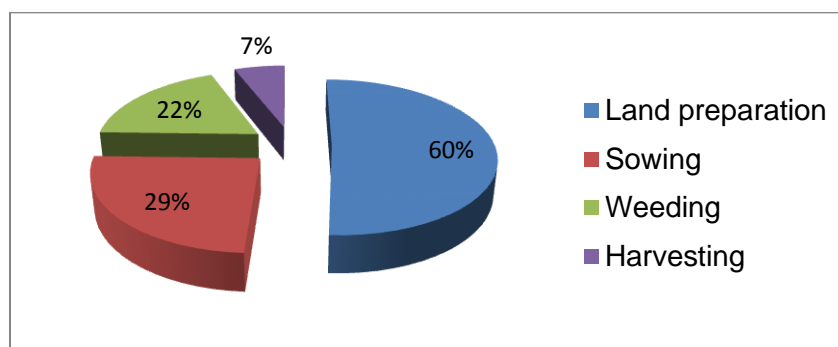
Table 3.18: Sale of soya bean by Respondents(N=45)

Sale of Soya bean	Frequency	Percent
Yes	10	22
No	30	67
Donot cultivate	5	11
Total	45	100

Source: Field Survey,2011.

From the survey, 60% of respondents who cultivated soya bean said that their husbands helped them with ploughing and land preparation, 29% had help with sowing, 22% with weeding and 7% with harvesting. However, some respondents had help with more than one activity.

Figure 3.4: Role Played by Men in Soya bean Cultivation by Women



Source: Field Survey,2011.

B. Current stock of soya bean in households

56% of households had no soya bean at home at the time of the survey while 40% had a bowl full or less as shown in table 3.16:

Table 3.19: Current Stock of Soya bean in Households(N=45)

Amount of Soya	Frequency	Percent
A bowl full	18	40
A basin full	2	4
None	25	56
Total	45	100

Source: Field Survey, 2011.

Most households' source of soya bean was from the market. It was usually bought in small quantities, hence out of 22 respondents who had soya bean at home, 18 had a bowlful (3.5kg) or less of soya bean.

C. Weekly consumption of Soya bean

As shown in table 3.17, 49% of households use soya bean weekly. Majority of households use a bowl (3.5kg) or less of soya bean weekly.

Table 3.20: Frequency of Soya bean Use(N=45)

Frequency of Use	Frequency	Percent
Daily	12	27
Weekly	22	49
seasonally	7	16
Other	3	7
Total	44	99

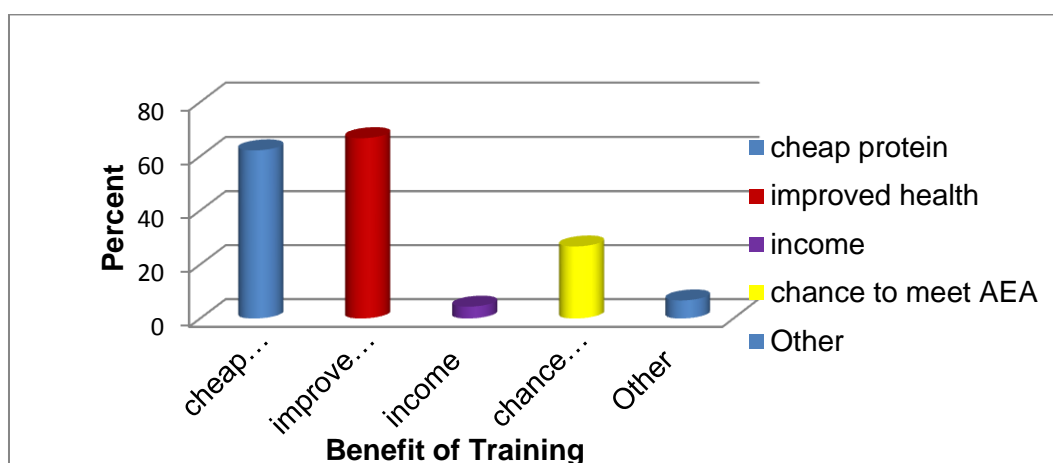
Source: Field Survey, 2011.

Total respondents from table 3.17 is 44 because 1 out of 45 does not use soya bean.

3.4.4. Women's Empowerment

Figure 3.5 shows the benefits that respondents derived from attending soya bean utilization trainings.

Figure 3.5: Benefits of Attending Soya bean Utilization Training



Source: Field Survey, 2011.

Of the 80% of respondents who said their health had improved from using the soya bean, 39% said they felt sick less often, 28% said they felt physically stronger, 16% said their children's weight had improved and 14% said they no longer experienced anaemia.

Table 3.21: Frequency Contact with Extension Agent (N=45)

Weekly contact with AEA	Week of SUTs		Normal Extension	
	Number of Respondents	Percentage	Number of Respondents	Percentage
None	-	-	10	22
Once	13	29	11	24
Twice	25	56	12	27
Thrice	2	4	3	7
Other	5	11	9	20
Total	45	100	45	100

Source: Field Survey, 2011.

Though only 3 respondents of the survey had attended other WIAD trainings, 8 from Nanchalla had attended an ActionAid Ghana training on preparation of a weaning food using soya bean.

Figure 3.6: Changed Relations with Extension Agents

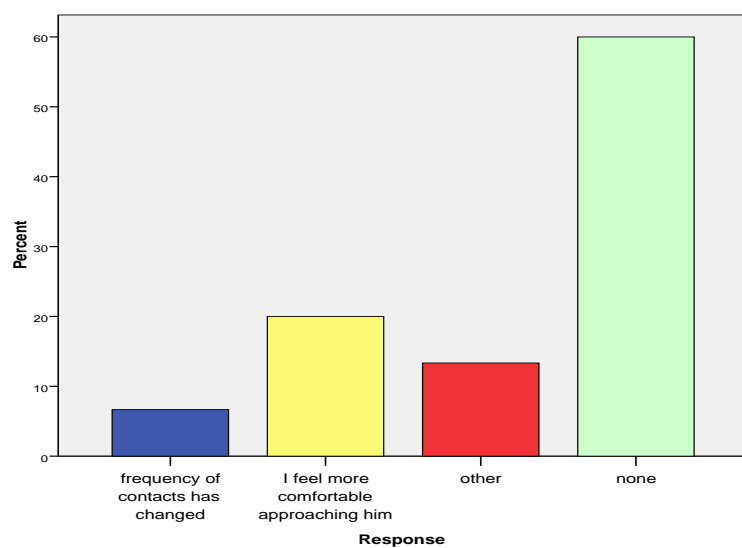


Table 3.22: Perception on Household changes due to Soya bean Utilization Trainings(N=45)

Response	No of respondents	Percent
Yes	43	96
No	2	2
Total	45	100

Source: Field Survey, 2011.

4.0. Chapter Four : Discussion

4.1. Background of respondents

Considering that respondents with no formal education had a high percentage and yet those who used soya bean was as high as 98%, it would appear that education had no influence on adoption the training knowledge in this study though literature suggests otherwise. Contrary to the researcher's expectation, the large household sizes had no negative effect on the use of soya use. This could however mean the availability of labour for processing of soya bean since even children could handle the task of roasting and milling soya bean into flour. It would seem that the participants of SUTs are in the economically active age group as majority of them fell in the age range of 26-35. Since no respondent was single, the influence of male decision making power in households will affect all respondents.

4.2. Research Question One: Factors influencing soya bean use

From the results of this study, it appears that acceptance of soya bean use was high among women who had been trained in its use as shown by Table 3:13 in the preceding chapter. The survey results showed that 98% of respondents were using the soya bean while 7 women (both respondents and non-respondents) were observed using the soya bean during the study. Among the factors influencing the use of soya bean were the health and nutritional benefits of soya bean that were taught at SUTs, cost of soya bean compared to animal protein, availability of soya bean, ease of cooking with soya flour and the acceptance of foods prepared with soya bean by households. All 45 respondents said their household members liked dishes prepared with soya bean and this encouraged them to use soya in cooking as often as possible. Soya bean is available on the market and so even women who do not cultivate soya bean are able to buy soya bean for home use. Contrary to suggestions that the processing of soya into flour and other forms was laborious and discouraged women from using the soya bean, it was found out that respondents of this study actually felt that they spent less time on cooking when they had already processed soya flour or paste at home. However, it was also realized that 62% of respondents of the survey had not used soya bean daily since the training. Some of them used it occasionally (during funerals, naming ceremonies and for hired farm labour) when they had to cook for large numbers of people, others did not start using it immediately after the training and yet a few others used it when it was cheap on the market. 2% of respondents stopped using the soya bean because they did not like the flavour of the soya bean. However, it is possible that they used soya bean above the recommended replacement amounts of 20%.

According to Khodamoradi and Abedi (2011), women work together with men at all stages of agricultural production in addition to performing reproductive and social roles. The multiple roles women perform in the household affect their ability to cultivate soya bean and this further affects its availability for use. Some participants of the FGDs said that they did not cultivate the soya bean because they did not have enough time to attend to them. This is because they had to work on their husbands farms and also attend to household activities before they could find time to attend to their own fields. In accordance with Lawrence et al (1999) and Doss (2001) women's acceptance of soya bean use is high because it falls under

their socially assigned role of cooking for the family. However, soya bean use is affected by its cultivation which is lower among respondents because men have more decision making power regarding cultivation. While 56% of respondents had cultivated soya bean between 2008 and 2010, only 51% had cultivated soya bean at the time of the study. Challenges cited by those who did not cultivate were lack of access to ploughing equipment, improved seed and land. Lack of time was also mentioned as a problem. This shows the competition between various on and off farm activities for women's limited time. This suggests that women may have accepted the soya bean but are faced with problems of sustainable production. This will be further discussed under the section of women's empowerment. For traditional women's crops such as groundnuts, some men either plough land and assign portions to their wives for cultivation or provide money to hire tractors/bullocks for ploughing.

Groundnuts is a common source of income for women and protein for households in the study area. A number of women were observed cracking groundnuts or picking groundnut seed during the study. All respondents cultivated groundnuts as a source of income for their own and other household needs. This may be another factor affecting the use of the soya bean since women may feel that they have all their protein needs from its consumption. At the time, many men also lent support to their wives in groundnut cultivation because of the monetary value it had on the market. However, considering that the soya bean stores for longer and is less at risk of diseases and also has a higher protein content than groundnuts, it is reasonable to encourage women to cultivate soya bean. The soya bean also fixes nitrogen in the soil and is therefore good for improving poor soils which are usually the ones women have access to. Soya bean cultivation in the Sissala East district requires less use of pesticides on the field compared to cowpea and groundnuts which have numerous problems with pests and diseases due to long and continuous cultivation. In Ghana, no serious pests and diseases of soya bean have yet been identified. This agrees with CGIAR (2005), that soya bean has fewer pests and diseases in Africa because it has not been cultivated over a long period. Soya bean also stores for longer without chemical treatment. Considering that soya bean use increases when more people have to be cooked for, it is safe to suggest that some respondents also accept soya use in order to use it as a supplement or buffer for household food stocks.

The availability of soya bean however was the greatest factor preventing respondents from using the soya bean. This may be due to the fact that soya bean use was not compatible with the existing cultivation practices in the area since the major crops grown were maize, groundnuts and yam. Other factors discouraging use were cost of soya bean and processing time of soya bean. Poor rains, lack of soya bean production knowledge and work overload (lack of time) also accounted for some respondents inability to use soya bean because of unavailability.

It can be concluded from the analysis that the factors that affect the acceptance of soya bean among those trained in its use are the nutritional benefits of the soya bean, availability of soya bean, cost of soya bean, acceptance of soya foods and production problems.

Effect of Soya bean Utilization Trainings on soya bean use in the Sissala East district

Training on soya bean use is important not only for improving health and cash incomes (CGIAR, 2005) but also because of the need to promote non-indigenous crops so as to encourage diversification in a drastically changing climate. From this study it is safe to say

that soya bean use caught up with respondents of this study mainly because of SUTs. The trainings objective of getting more people to consume soya bean therefore seem to have been achieved since 98% of those who attended the trainings were using soya bean and others who did not attend trainings were also using it.

Both the Survey and Focus Group Discussion results show that the nutritional benefits of soya bean was the biggest factor affecting soya bean use. This agrees with Ogoke et al (2003) that the high protein content of the soya bean is a reason farmers adopt it. It must be noted here that the nutritional benefits of soya bean taught at trainings was not a response option during survey interviews as shown by Appendix 3, yet 49% of respondents gave it as a reason for using soya bean. Majority of respondents used soya in preparing traditional dishes which were practiced at the training. A few tried making soya milk which was entirely new to them. It is also important to note that soya bean cultivation was not covered extensively during SUTs.

As high as 88% of those who participated in the FGDs have been practicing the use of soya bean since training compared to 12% who used it for some time and stopped. 35% of participants also bought soya bean from the market at one point or the other. Whereas 22% of survey respondents had ever sold soya bean, only 2% of FGD participants had sold soya bean. 8% of participants of FGDs had either not attended trainings but were using soya bean or knew people who had not attended training but were using soya bean. 50% of participants also said they had soya bean at home compared to 12% of respondents who were observed using soya bean during the conduct of the survey. Both FGD and survey results show that the average area of soya bean cultivated per woman was 0.5acres.

Basing on the fact that Soya bean Utilization trainings emphasized more on soya bean use than on its cultivation, one would agree that governmental organizations such as the MoFA/WIAD provide services to clients based on their different gender roles (Amu, 2006?). This is a positive thing as shown by 98% of respondents who were using soya bean. However, for sustainability more needs to be done to promote the cultivation as well. Results of this study indicate that women's adoption of soya use was very much dependent on the sustainable cultivation of soya bean which was greatly influenced by men. Yet men were less represented in the trainings on soya bean utilization.

Compared to 5 respondents from Nanchalla who were observed cooking with soya, 2 were observed in Nmanduonu and none in Banu probably because a recent training on preparation of a weaning food for babies (weanimix) using soya bean and maize was carried out Nanchalla by ActionAid Ghana. The women of Nanchalla therefore had a reminder about the soya bean and its usefulness. This brings to light the importance of refresher trainings and follow ups for the adoption of innovations. Respondents from Nanchalla also had more soya bean at home because most of them were members of a group that cultivated soya bean the previous season and had shared the produce. Soya bean utilization training therefore has a positive effect on women's use of soya bean and refresher courses further promote the soya bean use. Soya use is high although some women use soya bean without the correct processing. A few respondents were either observed or heard saying that they used the soya bean without applying heat treatment. Survey and FGD Results show that averagely, each household had a bowlful (3.5kg) of soya bean at the time of the study.

Since respondents were satisfied with the content and methodology of soya bean utilization trainings, this had a positive influence on the acceptance of soya bean. According to 96% of respondents, the trainings were understandable because they were conducted using the local languages (Sissali and Kassem) while 2% thought that a native trainer would have been better. For 22% of respondents, they could not pick a best part of the training. They liked every part of the training because each built upon the other and ensured that learning was progressive and complete. Trainees retention was enhanced because they learnt by practicing (Race, 2010). This is evidenced by the large number of respondents who remembered what was taught because of what they did. From the Key Informant Interviews, Soya bean Utilization Trainings are made up of discussions, general nutrition education, basic household measurement tips, group work, hands on practical and feedback which all contribute to building capacities of participants. A mixture of methods is good for achieving a non-boring nor a complicated list of activities. All the aforementioned methods also have roles to play in the learning and acceptance process. 87% of survey respondents said the training time were convenient for them; 84% stated that the time allocated for the training was enough and 98% thought the venue for the training was conducive. Training time involved both the season and the time of day trainings were conducted. SUTs are relevant for all participants regardless of whether they were interested in soya bean use or not. The general nutrition knowledge was important for improving household nutrition with or without the use of soya bean. Group work and hands on practical allow women participants to learn from each other and also learn by doing.

SUTs have contributed to the use of soya bean by respondents of this study. Women had a positive impression on the conduct of SUTs though they called for refresher trainings and new strategies for making groups during practical.

4.2.1. Socio-cultural Factors affecting soya bean use in the Sissala East district

This study shows that two main factors influenced the acceptance of soya bean by women. These were:

- i. Access to and control over Land
- ii. Decision making power
- iii. Triple roles of women

Women had limited access to land and no control over it. Access to land was more difficult as individual women. However, access improved when women came together as a group. When women had access to land, they had no choice of the kind of land they were assigned. The women of Nanchalla were only able to access marginal land.

Women have no or limited decision making power in the Sissala East district. Decision making power on choice of crop to cultivate and on which plot of land are taken by male members of the household. When men do not see the need to cultivate soya bean, a woman's acceptance to use soya bean will be handicapped because of unavailability of soya bean which is not being cultivated by the household.

Whereas men have a double role of productive activities and social activities, women have three kinds of roles to play in the household; Reproductive-Productive-Social. Women's triple roles affected their ability to cultivate soya bean on their own as shown by respondents reply of lack of time to go into soya bean cultivation. 9% of respondents said they could not

produce soya bean because of lack of time and land. In relation to lack of time, is women's inability to make decisions concerning the use of their own time. Again, the statement of a FGD participant cited earlier comes to bear.

4.3. Research Question Two: Effects of training on women's empowerment in the Sissala East District

Among concepts associated with women's empowerment are participation, inclusion, access to and control over resources. For this study, women's empowerment was limited to access of women to skills, training and changed relations within and outside the household resulting in self improvement and improved life. Though empowerment is difficult to measure, responses of the respondents suggest that SUT has brought about some positive changes in their lives. These are discussed under the five indicators below:

- Change in women's perception of their own capacities (self worth)
- Change in women's well-being
- Women's access to and control over resources (Extension services and land)
- Change in relations within and outside the household

Women's empowerment as suggested by results of this study has been achieved in the Sissala East district through built group capacities, improved relations with AEAs and individual as well as improvement in family health.

4.3.1. Women's Self worth

One of the commonest concepts of empowering women is self agency and building self confidence. The SUT encouraged a group of women in Nanchalla to cultivate a group farm in the 2010 production season. In traditional cultivation practices of the district, men are responsible for land preparation, ploughing weeding and sometimes harvesting. They also dibble for women to sow. However, in this women's group farm, all activities were carried out by the women and control of the produce was also by women. The women of Nanchalla have learnt to increase their own capacities by going into the production of a non-traditional crop for improving their lives and that of their families. This may be as a realization of their strength in taking the health of their families into their own hands. However, this is being threatened by their lack of control over land. They failed to sustain this production because they could not find a replacement for the land they worked on in the previous year which was marsh land and had a problem with weed infestation. This shows the importance of men's support even when women realise the need for change in particular circumstances and try to achieve this. This is in agreement with Kabeer (2010), that the attitude of men towards women are important to the ability of women to achieve change.

From this study, 20% of respondents felt more comfortable approaching their AEAs after SUTs. This is a good thing as it improves their chances of being included in extension programmes. Through improved relations with the AEA, 1 woman has benefited from the Block farming scheme and 3 from the LDP credit in kind scheme. Both schemes are interventions of the MoFA to assist poor rural farmers.

In conclusion, soya bean utilization trainings have contributed to building women's self worth by providing them with skills and knowledge which they didn't have before. Such knowledge enhances their decision making ability as shown by the choice to go into soya bean

production. The experience also boosts their confidence to approach extension officers and learn from them which was previously difficult for them.

4.3.2. Women's Well-being

From the survey, 80% of respondents stated that their health had improved due to the use of soya bean. This they said was because their attendance to hospitals had reduced, their children's weights had improved and the number of anaemia cases in the household had also reduced. This agrees with the extensive literature that is available on the health benefits of the soya bean. Improved health of respondents in the study could also be attributed to the easy access to health care facilities. There is a health centre in Nmanduonu. Though, there are no health care facilities in Banu and Nanchalla, they are not far from reach. The people of Nanchalla accessed healthcare from Bujan which is just about 6km away while the people of Banu also accessed health care from a neighbouring community. From observation, most respondents and their household members looked healthy and well nourished. However, the rainy season with its advantage of increased access to vegetables could also be a contributory factor. Most women were observed cooking one vegetable soup or the other and some were preparing dishes incorporated with soya especially in Nanchalla.

In the past, soya bean was largely cultivated for sale because of little knowledge on its use in the Sissala East District. Hence, as with all other cash crops its production was dominated by men. From the study results, it seemed like there was not much economic benefit from the cultivation and use of soya because few women cultivated it for sale. This may however be as a result of the many challenges women had in taking production decisions. Though 22% of respondents sold soya bean for money, a lot more (80%) stated that since using the soya bean, they visited the hospital less often which was good for their economic well being considering that they spent less on hospital bills. According to participants of the FGDs, soya bean was also widely used to supplement other grains during the early rainy season when more people had to be fed in the form of hired or communal labour on farms. The amount of money that would have been used in buying more maize grain is saved. Maize was normally expensive in the lean season because it is the main staple and there is high demand for it.

While only 1 respondent from the focus group discussions sold soya bean for money, 22% of survey respondents who cultivated soya bean sold some soya bean for money. According to Damania (2009), women's income is largely spent on household needs such as food, clothing and children's fees. Cash that is made from sale of soya bean from women's farms are under the control of such women themselves. As such, of those women who make money from the sale of soya bean, 7 spent it on household food needs, 3 on children's fees, 2 on children's clothes and 2 others saved it to pay for the next year's ploughing cost.

Realising the importance of soya bean in improving their health and that of their families, some women bought the soya bean from the market for home use. They bought soya bean either because they did not cultivate it or because they run out of stock since they cultivated small quantities. At the time of the study, a bowl of soya bean was sold at Gh¢3 but could go as low as Gh¢1 during harvest. Comparing the estimated production cost of cultivating one acre of soya bean (Gh¢132.50 without fertilizer and Gh¢187.50 with fertilizer) to the total revenue from cultivating an acre (Gh¢960.00), One would say that soya bean production is a very profitable venture. (These estimates were made with the help of the District Extension officer)

Though not many respondents could attribute good relations with their husbands to SUTs, 9% of them said their husbands were now happier with their cooking and were eating better. 7% more said their children were eating better and growing well. They said that their children are healthier and stronger and so they could leave them at home while going about their productive activities without worrying about them. Based on the less significant figures for improved relationships due to the trainings, it is safe to agree with Tegbaru et al (2010) that change in gender relations is based on so much more and not just on transfer of new technologies.

Soya bean Utilization Trainings have contributed to women's welfare by improved health and cash incomes. Women's workload also reduced because they spent less time cooking with soya flour and could leave their healthy children for longer periods to carry out productive activities. However, a lot more factors can account for improved health and soya bean use is just a part of it.

4.3.3. Women's Access to and Control over Resources

In empowerment literature, control is often used to refer to both ownership and decision making power. In measuring agency, decision making power should involve decisions which women previously had no influence in. In the Sissala East district, even for women's own production of groundnuts, cowpea or vegetables, it is men who decide which plots of land should be assigned to women. There are instances where women have rejected or disagreed with the plots assigned to them though that mostly meant losing out on the little they were given all together. In this regard women have no ownership or decision making power over land.

In the household, decision making power on choice of crops to grow is also in the hands of men. Therefore for cultivation of any crop to be sustained within the household, it must be supported by men. For 71% of respondents the new knowledge of a cheap protein food was a good thing and this was reason enough to cultivate it. However, women felt constrained to pursue its production because of the little time they had outside of family farms and household chores to cultivate on their own. The statement of a FGD participant cited earlier in section 3.2 (page 22) clearly shows this. This is one of but probably not the only driving force behind the cultivation of soya bean farm in groups. However, when women cultivated soya bean through group action as will be described in the next section or individually, income that is made from sale of such produce is under the control of women.

Other respondents said the training gave them an opportunity to meet extension officers which was important for their major livelihood of farming. All 45 respondents had not attended any other training by the MoFA while only 3 had attended other trainings by the WIAD. This agrees with Okorley et al (2001) and Duncan (2004), that women have limited contact with extension workers and little access to extension training. Doss (2001) also rightly contend that access to agricultural extension is one of the important factors which affect production of women farmers. All three AEAs and the DEO stated that extension service delivery is not equal for men and women, with women receiving less services than men. According to an AEA, "it is difficult to visit women alone individually because of the cultural setting". So they resort to doing follow up with groups of women or visiting women on the farms when they are with their husbands. This shows the need for ingenuity on the part of extension agents in order for women not to be left out in extension visits of AEAs. In the

light of this, it is safe to agree with Gueye (2005) that the effective dissemination of extension services requires gender research and training at all levels of extension provision.

For the 20% of respondents who felt more comfortable approaching their AEAs after interacting with them during the SUT, They can now approach AEAs when they need agricultural information. This had hence improved their access to extension services. Due to this improved relationship, they had learnt to adopt row planting, correct planting, weeding and harvesting dates which increased their yields. Some also learnt how to correctly apply pesticides. Compared to 33% of respondents who had contact with AEAs more than once in a week during normal extension, 60% had contact with AEAs more than once during the week of SUT. 7% of respondents also said that they met with extension agents more often after training than before. This increased contact between AEAs and women could also mean AEAs are able to approach more women once a rapport had been established at the SUT. When improved relations with AEAs lead to increased production, women can make money from their various agricultural activities to buy soya bean from the market for home use.

Women's Empowerment in Nanchalla:

Motivated by the many benefits that the soya bean had to offer them, a group of 16 women from Nanchalla came together in 2010 to provide support for each other in cultivating soya bean. Remarkable to say, they did cultivate soya bean in the 2010 production season and harvested produce which they shared among themselves. Another group of 15 women in Banu have cultivated a 1-acre soya bean farm with the help of their AEA. Since some respondents also stated that they had no knowledge in soya bean production, this could have influenced their decision to join in the group production. In Nanchalla, all farm activities on the soya bean farm including ploughing which was normally the responsibility of men were carried out by the women themselves. This is a highly recommendable action to especially encourage those women who felt that they could not cultivate the soya bean on their own either because their responsibility on household farms would not afford them the time to work on their own farms or because cultivation of soya bean was too tedious for them to engage in as women. It is also important to point out that, individually these women would have found it difficult to acquire land for their own production. With the increasing attention to women's empowerment issues in the Sissala East district however, many traditional leaders seemed willing to allocate especially land for women's group activities in the district. However as shown by the inability of these women to sustain this production, a number of underlying factors need to be looked at in these seemingly acts of support for women's empowerment. For the women of Nanchalla, the land they cultivated previously was infested with weeds and gave them extra tasks of having to weed more than the normal two times. In this instance, it is safe to say that the reasoning behind such shows of female support need to be looked at. Maybe, it is to give the women something to keep them quiet or to save face with those development agents who are encouraging their women to cultivate soya bean in order not to fall out of future beneficial relationships with them.

The inability to sustain this positive outcome could also be as a result of the women lacking their own self agency and motivation to continue especially if contact with the field officers had weakened. As Rowlands (1996) rightly says, it takes a few individuals with their own

sense of self worth and ability (individual empowerment) to make collective activities work. In addition, it also takes individuals who know how to deal with the details of group dynamics to sustain such good acts. It must be noted here that development workers try to distance themselves from issues of land and leadership since these are very sensitive issues in Ghana. However, the message of the good attributes of the soya bean seemed to have sank in as six(6) participants of the FGD in Nanchalla stated that they had cultivated soya bean individually.

The above discussion shows the complexities surrounding empowerment and the reason why empowerment requires a multifaceted approach. Soya bean Utilization Trainings may meet the women's practical need of increasing their access to extension service and providing them with income to support their families but to address women's needs strategically, something more than training is needed. In this sense, the building of linkages between community leaders who have control over land, the Ministry of Food and Agriculture (MoFA), the District Assembly (DA) and other stakeholders is necessary for building better situations for women. For example, a quota of land could be allocated to women to produce under the current Block Farming scheme. (This is a programme in which Government through the MoFA solicits for large plots of land in communities which are distributed to farmers together with input credit to be paid back with produce after harvest). Better still, land rights could be advocated for women in the long term. Technological innovations and trainings alone can therefore not solve the multidimensional problems of women.

It can be seen from this study that women's access to land has improved with group formation (collective action) but their lack of control over land still remains. Women have control over income from soya bean they cultivate by themselves or in groups.

More women have access to extension officers after attending Soya bean utilization trainings where rapport was built between women and AEAs. Increased access to AEAs grant women skills, knowledge and information needed to improve on their production. The case of the women in Nanchalla discussed above shows that empowerment is multi-faceted and requires a dynamic approach.

5.0. Chapter Five : Conclusions and Recommendations

5.1. Conclusions

This section presents the conclusions of this study based on the findings and discussions in previous sections.

Soya bean use among respondents of this study is high, but there are positive as well as negative factors affecting the use of soya bean. The reasons why respondents of this study used soya bean after training are:

1. Nutritional benefits of the soya bean– the benefits of soya bean which are taught and learnt at training accounts for 49% of the sample using soya bean. This is considered high.
2. Low cost of soya bean-respondents stated that the soya bean was cheaper in cost compared to animal sources of protein though its price also fluctuated with seasonality. It was cheapest at Gh¢1.00 and most expensive at Gh¢3.00.
3. Availability of soya bean-respondents also used soya bean because it was available from their own farms or from the local market. Women's multiple roles also affected their ability to produce soya bean and hence its availability for use.
4. Easy preparation of food with soya flour-findings indicate that women used less time in cooking when they had already processed soya bean at home and this encouraged them to continue using the soya bean.
5. Acceptance by households- the acceptance of dishes prepared with soya bean encourages women to continue to use soya bean in cooking. All respondents said their family members liked dishes prepared with soya bean.
6. As a supplement for household food stocks-soya bean was added to traditional grains such as maize, sorghum and cowpea to enable them last through the lean season.

Soya bean Utilization Trainings have a positive effect on soya bean use among respondents. This is because respondents referred to the training as having an influence on their choice to use soya bean:

1. 49% use soya bean because of what they learnt at the training. This means that respondents understood what the training had to offer them and also accepted it.
2. Respondents who were observed cooking dishes with soya bean were preparing dishes that were practiced at training in addition to some other local foods.
3. Cultivation was practiced less because trainings emphasized on use –compared to 56% of respondents who had ever cultivated soya bean and 51% who were currently cultivating soya bean, the 98% of respondents who were using soya bean is higher. This is because the Soya bean Utilization trainings emphasized more on utilization than cultivation but also because women faced a number of challenges in cultivating soya bean. Therefore, average area of soya bean cultivated per woman was just 0.5acres.
4. Adoption of Soya bean cultivation was influenced by decision making power and access to resources (land and ploughing cost) which was largely in the favour of men.
5. Although 96% of respondents were using the soya bean, not all users applied the recommended processing methods.

The following findings indicate that Soya bean Utilization Trainings have contributed to women's empowerment:

1. Collective action- Two groups of women in Nanchalla and Banu had been empowered through collective action because they cultivated farms of soya bean considering that it was more difficult to cultivate individually. In groups, they were able to make a production decision which would have been difficult individually and also improved their chance of accessing land for production.
2. Increased self worth-through the acquisition of skills and knowledge at trainings and from AEAs, women had increased their own self worth. Women who attended trainings built the confidence to approach AEAs after interacting with them during the trainings. In addition, women had control over income they made from the sale of soya bean which they cultivated.
3. Increased well-being - women's health and that of their families had improved with the use of soya bean and women spent less time cooking with soya flour. Women were also able to leave their much healthier children for long hours to engage in productive activities. All these contributed to their health and happiness.
4. Income- 25% of respondents who had ever cultivated soya bean sold some of it for money. For women who made money from the sale of soya bean, most of it was spent on purchasing household food ingredients and paying for children's fees or clothes. This also contributed to their well being.
5. Increased access to and improved relations with AEAs- Women's access to AEAs increased with Soya bean Utilization Trainings (SUT) as shown by 33% of respondents who had access to extension officers more that once a week normally, compared to 60% who had access to extension officers more than once during the week of SUT.
6. Access to land- women's access to land improved with group formation and group farms though they still had no control over the kind of land they had access to.
7. Women's empowerment needs a multi-faceted approach- this study indicates that women's empowerment involves a series of complicated needs and actions which can not be handled with a single approach.

5.2. Recommendations

The results of this study indicate that Soya bean Utilization trainings have increased the use of soya bean among those trained. A number of challenges however still affect the cultivation of soya bean. The recommendations in this section are based on the findings of this study and intended to improve upon SUTs and ultimately all trainings designed for women to ensure that they meet the needs of women fully. The recommendations are:

1. More trainings should be replicated in other communities to increase the number of people learning to use the soya bean and also to increase more women's access to extension officers.
2. It is also recommended that refresher trainings should be conducted to ensure that those trained get used to applying the right processing to soya bean and also to increase the use of soya bean as shown by the findings from Nanchalla.
3. Soya bean utilization trainings should give equal attention to both the cultivation and use of soya bean or separate trainings on soya bean cultivation should be added.

4. Better linkages should be established between development partners; the WIAD directorate, the MoFA, DA and local leaders in the promotion of soya bean use and also to address the strategic needs (long term) of women especially regarding land rights.
5. Trainings aimed at empowering women should look at the totality of empowerment by considering all other social and cultural factors such as access to resources and gender relations in order to plan for their influence on the training outcome.
6. To increase soya bean use, improved soya seed should be made available at district and community levels to promote the cultivation of soya bean and hence its use.
7. More female staff should be employed to help meet the needs of female farmers who are sometimes discriminated against in the provision of extension services by a dominant male work force.

5.3. Suggestions for further research

A more quantitative approach to the issues of health could be looked at in further studies. Though respondents of this study respond that their health has improved with the use of soya bean, this was not scientifically proven in this study. Further research could take on this aspect.

To determine how far the adoption of soya bean cultivation has gone, a research including both male and female farmers could also be conducted since men have the decision making power on what crops are cultivated in the household.

References

Aflakpui, G.K.S. 2007. Present outlook and transformation in the delivery of agricultural extension services: Implications for research-extension-farmer linkages. Outlook on Agriculture,(e-journal) Volume 36, Issue 1, Available through: Wageningen UR Database (Accessed 22/08/2011)

Agyare, W.A., Clottey, V.A., Mercer-Quarshie, H. And Kombiok, J.M., 2006. Maize yield response in a long-term rotation and intercropping systems in the Guinea Savannah zone of Northern Ghana. Journal of Agronomy, (e-journal). Volume 5, Issue 2, Pages 232-238, Abstract only. Available through: Academic Journals Database. (Accessed 07/07/2011)

Ahenkan, A. and Boon, E., 2011. Non-timber Forest Products Farming and Empowerment of Rural women in Ghana. Environment, Development and Sustainability(e-journal) Available through: Springer Database (Accessed 08/08/2011)

Ajah, J. 2010. Evaluation of Women Farmers' Perception of the Impact of Women-in-Agriculture Programme on Yield, Income and Decision-making Power in South-eastern Nigeria. Journal of Agricultural Extension,(e-journal) Vol. 14 (2), Available through: African Journals online database. (Accessed 02/05/2011)

Amu, N. J. 2006? The role of women in Ghana's economy. Online. Available at: <http://library.fes.de/pdf-files/bueros/ghana/02990.pdf> (Accessed 30/05/2011)

Annan, N.T., Plahar, W.A., Poll, L., and Jakobsen, M., 2005. Effect of soya bean fortification on Ghanaian fermented maize dough aroma. International Journal of Food Sciences and Nutrition(e-journal) 56 (5), pp. 315-326, Available through: NCBI Database (Accessed 29/05/2011)

Anyidoho, N. A. and Manuh, T., 2010. Discourses on Women's Empowerment in Ghana. Development, (e-journal) volume 53, issue 2, pp 267-273. Available through: Palgrave Macmillan Database (Accessed 22/05/2011)

Armah, F.A., Odoi, J.O, Yengoh, G.T, Obiri, S., Yawson, D.O. and Afrifa, E.K., 2011. Food security and climate change in drought-sensitive savanna zones of Ghana. Mitigation and adaptation strategies for global change (e-journal), volume 16, Issue 3, Pages 291-306, Available through: Wageningen UR Database (Accessed 12/06/2011)

Baars, R., 2011. Extracting information, MARE Research Design and Implementation. VanHallarenstein University, unpublished.

Boohene, R., Sheridan, A., and Kotey, B., 2008., Gender, personal values, strategies and small business performance; A Ghanaian case study. Equal Opportunities International (e-journal), 27(3), pp 252. Available through: Emerald Database (Accessed 01/07/2011)

CARE, 2005? . Women's Empowerment. Online. Available at: http://www.care.org/newsroom/publications/whitepapers/woman_and_empowerment.pdf (accessed 05/07/2011)

Carr jnr, V.H., 1999. Technology adoption and diffusion. Online. Available at: <http://www.au.af.mil/au/awc/awcgate/innovation/adoptiondiffusion> (accessed 03/06/2011)

CGIAR, 2005. Soybean (*Glycine max* L) (Online) Available at:

<http://www.cgiar.org/impact/research/soybean.html> (Accessed 22/09/2011)

Chianu, J. N., Ohiokpehai, O., Vanlauwe, B. Adesina A., De Groote H. and Sanginga N., 2009. Promoting a Versatile but yet Minor Crop: Soybean in the Farming Systems of Kenya. *Journal of Sustainable Development in Africa* (e-journal), Volume 10, No.4, Available through: Mendeley Database (Accessed 15/05/2011)

CIDA/MLGRD, 2002. District Capacity Building Project; Gender Analysis and strategy.

Online. Available at: <http://www.discap.org/Publications/Gender/AnalysisandStrategy.pdf> (accessed 29/05/2011)

CSU, 2011. Case study: Introduction and Definition. (online) Available at: <http://writing.colostate.edu/guides/research/casestudy/pop2a.cfm> (Accessed 20/09/2011)

Damania, 2009. The Shea Nut Tree (*Vitellaria paradoxa*) - Empowering women against poverty in developing economies. *Asian Agri-History* (e-journal), Volume 13, Issue 1, Pages 5-24, Available through: India Environment Portal database (Accessed 11/06/2011)

Doss, C. R., 2001. Designing Agricultural Technology for African Women Farmers: Lessons from 25 Years of Experience. In *World Development* (e-journal), Volume 29, Issue 12, Pages 2075-2092, Available through: Mendeley Database (Accessed 03/06/2011)

Doss, C.R. and Morris, M.L., 2001. How does gender affect the adoption of agricultural innovations?: The case of improved maize technology in Ghana. *Agricultural Economics* (e-journal), Volume 25, Issue 1, Pages 27-39, Available through: Mendeley Database (Accessed 08/05/2011)

Duncan, B. A. 2004. *Women in agriculture in Ghana*. 2nd ed. Accra; Friedrich Ebert Foundation.

Dzogbefia, V.P. Arthur, P.L., and Zakpaa, H.D., 2010. Value addition to locally produced soy beans in Ghana: production of soy sauce using starter culture fermentation. *Connecting Africa* (Online). Available at: http://www.connecting-africa.net/query_2.php?&ire=IR0000101&rid=B00008534 (Accessed 19/03/2011)

Egyir, I.S, Owusu-Benoah, E., Anno –Nyarko, F.O. and Banful, B., 2011. Assessing the factors of adoption of agrochemicals by plantain farmers in Ghana. *Journal of enterprising communities* (e-journal), Vol 5, Issue 1, pp 83-97, Available through: Emerald Database (Accessed 11/06/2011)

Eyben, R., Kabeer, N., and Cornwall, A. Conceptualising empowerment and the implications for pro poor growth. (Online) Available at:

<http://www.gsdrc.org/go/display&type=Document&id=3401> (Accessed 20/09/2011)

FAO, 2006? Soybean (*Glycine max*) promotion for improved nutrition and soil fertility in smallholder farms, East Africa. Online. Available at: ftp://ftp.fao.org/SD/SDA/SDAR/sard/Soyabean_promotion_Africa.pdf. (Accessed 02/05/2011)

GHS, 2011. *Nutrition Suiveillance Report-Sissala East District*.

Guèye , E.F. 2005. Gender aspects in family poultry management systems in developing countries. World's Poultry Science Journal (e-journal), volume 61, issue 1, pp 39-46, Available through: Cambridge journals Database (Accessed 27/05/2011)

Houlihan, B. and Green, M., 2001. Routledge Handbook of Sports Development. http://books.google.com/books?id=CwJoQ2qbUEC&pg=PA312&lpg=PA312&dq=definintion+of+em+powerment-battliwala&source=bl&ots=IrFfjTzkk&sig=WOrHhFnb1qk5PW3C6cDrdcvH2r4&hl=en&ei=r-V-Tvb1EoLoQZ66-N8P&sa=X&oi=book_result&ct=result&resnum=7&ved=0CEwQ6AEwBg#v=onepage&q&f=false (Accessed 23/09/2011)

Kabeer, N,. 2002. Resources, Agency, Achievements: Reflections on the Measurement of Women's Empowerment. Development and Change (e-journal) Volume 30, issue 3. Available through: Wiley Online library (Accessed 20/09/2011)

Kabeer, N,. 2010. Women's Empowerment, Development Interventions and the Management of Information Flows. IDS bulletin (e-journal), volume 41, issue 6, pg 105-113. Available through: Wiley online library (Assessed 20/09/2011)

Kalambokidis, L., 2011. Spreading the word about extensions public view. Journal of extension (Online), Available at: <http://www.joe.org/joe/2011april/a1.php> (Accessed 05/09/2011)

Khodamoradi, S. and Abedi, M. 2011. Assessing Employment of rural women and its effect on other empowerment. Life Science Journal, (Online). Available at: http://www.lifesciencesite.com/ljsj/life0802/28_4848life0802_222_226.pdf (Accessed 28/08/2011)

Lawrence, P.G. Sanders, J. H. and Ramaswamy, ,S.1999. The impact of agricultural and household technologies on women: A conceptual and quantitative analysis in Burkina Faso. Agricultural Economics (e-journal), Volume 20, Issue 3, Pages 203-214, Available through: ScienceDirect Database (Accessed 12/05/2011).

Longwe, S. H., 1998. Education for Women's Empowerment or Schooling for Women's Subordination? Gender and Development (e-journal), Vol. 6, No. 2, Page 22 of 19-26. Available through: JSTOR Database (Accessed 18/06/2011)

Masuda, T. and Goldsmith, P. D., 2009. World Soybean Production: Area Harvested, Yield, and Long-Term Projections. International Food and Agribusiness Management Review, (Online) Available at: http://ageconsearch.umn.edu/bitstream/92573/2/20091023_Formatted.pdf (Accessed 06/09/2011)

Mensah-Wilmot, Y., Philips, R.D. and Sefa- Dedeh ,S. 2001. Acceptability of extrusion cooked cereal/legume weaning food supplements to Ghanaian mothers. International Journal of Food Sciences and Nutrition(e-journal), Volume 52, Issue 1, Pages 83-90. Available through: NCBI Database (Accessed 23/08/2011)

MLGRD, 2011. Sissala East district profile. (Online). Available at: http://www.ghanadistricts.com/districts/?r=9&_113&sa=4299 (accessed 01/06/2011)

MoFA, 2007. Food and Agriculture Sector Development Policy. (Online). Available at: <http://ashanti.gh.com/smofa/docs/FASDEP%20II> (Accessed 07/05/2010)

MoFA, 2010., Medium Term Agricultural Sector Investment Plan, 2011-2015. (Online). Available at: <http://www.mofa.gov.gh/METASIP%2016022011.pdf> (accessed 29/05/2011)

Mohamed, K.S. and Temu, A. E., 2008. Access to credit and its effect on the adoption of agricultural technologies: The case of Zanzibar. *Savings and Development (e-journal)*, volume 32, issue; supplementary. Available through: Mendeley database (Accessed 20/09/2011)

Momsen, J. 2010. *Gender and Development*. Routledge. Oxon, UK.

Ogoke, I. J., Carsky, R. J., Togun, A.O. and Dashiell, K. E., 2003. Maturity Class and P Effects on Soya Bean Grain Yield in the Moist Savanna of West Africa. *Journal of Agronomy and Crop Science (e-journal)*, Volume 189, Issue 6, pages 422–427. Available through: Wiley online library (Accessed 05/06/2011)

Okorley, E.L., Zinnah, M. M., Mensah, A. O. and Owens, M., 2001. Women in Agro-processing in Ghana: A case Study of the State of Women in Small-scale Fish Processing in the Central Region of Ghana. In *Proceedings of the AIAEE (Association for International Agricultural and Extension Education), 17th Annual Conference: 'Emerging trends in agricultural and extension education'*. Baton Rouge, Louisiana, USA, April 4-7,

Olaoye, O.A., Onilude, A.A. and Idowu, O.A. 2006. Quality characteristics of bread produced from composite flours of wheat, plantain and soybeans. *African journal of biotechnology (e-journal)*, volume 5, Issue 11, Pages 1102-1106. Available through: African Journals Online Database (Accessed 01/06/2011)

Owusu, V., Leuth, D and Abdulai A., 2010. Adoption of Safer Irrigation Technologies and Cropping Patterns: Evidence from Southern Ghana. *Ecological Economics (e-journal)* 70 (7), pp. 1415-1423, Available through: ScienceDirect Database (Accessed 25/08/2011)

Race, P. *Making learning happen: A guide for post- compulsory education*. 2nd ed. Sage, London, UK.

Renzaho, A.M.N. and Mellor, D., 2010. Food security measurement in cultural pluralism: Missing the point or conceptual misunderstanding? *Nutrition (e-journal)*, Volume 26, Issue 1, Pages 1-9, Available through: NCBI Database (Accessed 12/06/2011)

Rodriguez, J. M., Molnar, J.J., Fazio, R.A., Sydnor, E. and Lowe, M.J., 2008., Barriers to adoption of sustainable agriculture practices: Change agent perspectives. *Renewable Agriculture and Food systems*, Vol 24, issue 1, pp 60-71, Available at: Cambridge journals Database (Accessed 03/08/2011).

Rogers, E.M., 2003. *Diffusion of Innovations*. 5th Edition. New York: Free press.

Rowlands, J., 1995. Empowerment Examined. In: D. Eade, ed 1996. *Development and Social Diversity*. Oxford: Oxfam, pg. 86-92.

Sanful, R.E., and Darko, S. 2010. Utilization of soybean flour in the production of bread. *Pakistan Journal of Nutrition*, (Online). Available at: <http://www.pjbs.org/pjnonline/fin1772.pdf> (Accessed 05/05/2011)

Schyver, T. and Smith, C., 2005. Reported attitudes and beliefs toward soy food consumption of soy consumers versus non consumers in natural foods or mainstream grocery stores. Journal of Nutrition Education and Behaviour (e-journal) ,Volume 37, Issue 6, Pages 292-299. Available through: NCBI Database. (Accessed 09/05/2011)

Sissala Research Committee, 2009. List of Research Topics. Online. Available at: http://src.imcculand.dk/index.php?option=com_content&view=article&id=20:list&catid=3:list-of-research-topics&Itemid=5 (Accessed 28/08/2011)

Tegbaru, A., Fitzsimons, J., Gurung, B. and Odame, H.H., 2010. Change in gender relations: Managerial and transformative approaches of gender mainstreaming in agriculture. Journal of Food, Agriculture and Environment (e-journal), Volume 8, Issue 3-4 PART 2, Pages 1024-1032, Available through: Refdoc database (Accessed 11/06/2011)

UNDP, 2006. Taking Gender Equality Seriously. Online. Available at: <http://www.undp.org/women/docs/TakingGenderEqualitySeriously.pdf> (Accessed 01/09/2011)

UNDP, 2008. Innovative approaches to promoting women's economic empowerment. (Online) Available at: <http://www.undp.org/women/publications.shtml> (Accessed 02/06/2011)

Weisfeld-Adams, E., 2008. The Hunger Project Factsheet-Women Farmers and Food Security. Online. Available at: <http://www.thp.org/system/files/Factsheet+on+Women+Farmers+and+Food+Security.pdf> (Accessed 06/09/2011)

WHO, 2011. Trade, foreign policy, diplomacy and health; Food security. Online. Available at: <http://www.who.int/trade/glossary/story028/en/> (assessed 13/06/2011)

World soy foundation, 2011. Nutrition Analysis. (Online). Available at: <http://www.worldsoyfoundation.com/whysoy/nutrition.html> (Accessed 06/06/2011)

Xiao, C. W., 2008. Health Effects of Soy Protein and Isoflavones in Humans. Journal of Nutrition (e-journal) Volume 138, Issue 6, Pages 1244S-1249S, Available through: NCBI Database (Accessed 12/05/2011)

Appendices

Appendix 1: Checklist for key Informant Interviews

THE CONTRIBUTION OF SOYA BEAN UTILIZATION TRAININGS TO WOMEN'S EMPOWERMENT IN THE SISSALA EAST DISTRICT OF GHANA.

A. Regional WIAD Officer (RWO)

1. What are the objectives of soya bean utilization trainings?
2. For how long has soya bean utilization trainings been carried out in the Upper West region/ Sissala East district?
3. What method is used in soya bean utilization trainings?
4. Where are soya bean utilization trainings carried out?
5. In what season are soya bean utilization trainings conducted?
6. During what time of the day are soya bean utilization trainings conducted?

B. District Extension Officer (DEO)

1. How often do you meet with women in the provision of extension services?
2. What is the response of households in the district to soya bean dishes?
3. During what season are programmes for women carried out?
4. During what time of day are programmes for women carried out?
5. Is there follow up or monitoring after trainings? How often?
6. What is the strategy used in follow up or monitoring?
7. What are the existing gender roles in the cultivation of soya bean in the district?

C. Agricultural Extension Agents (AEAs)

1. How often do you meet with women in the provision of extension services?
2. How are women selected to benefit from training?
3. What is the response of households in the communities to soya bean dishes?
4. What strategies do you use in following up on trainings?
5. What are the existing gender roles in soya bean cultivation in your operational area?

Appendix 2: Checklist for FGD with beneficiaries of Soya bean Utilization Trainings

A. Relevance of Training

1. Do you think soya bean utilization trainings are important for you?
2. What did you benefit from attending soya bean utilization trainings?
3. What do you think of the way soya bean utilization trainings are carried out?
4. What do you like about the way soya bean utilization trainings are carried out?
5. What do you not like about the way soya bean utilization trainings are carried out?
6. What would you like to be changed about the way soya bean utilization trainings are conducted?
7. Which part of the soya bean utilization training would you like to remain the way it is?

B. Factors of adoption

8. Why do you use soya bean after training?
9. What encouraged you to start using soya bean after training?
10. Why are you not using soya bean after the training?
11. What challenges/problems do you face in adopting soya bean use?
12. Where do you get soya bean for home use?
13. If by cultivating it, what challenges do you face in cultivating soya bean?
14. Do your husbands support you in cultivating soya bean?
15. Who is responsible for the following activities during soya bean production?

Land clearing	Men <input type="checkbox"/>	Women <input type="checkbox"/>
Sowing	Men <input type="checkbox"/>	Women <input type="checkbox"/>
Weeding	Men <input type="checkbox"/>	Women <input type="checkbox"/>
Harvesting	Men <input type="checkbox"/>	Women <input type="checkbox"/>
Threshing	Men <input type="checkbox"/>	Women <input type="checkbox"/>
Winnowing	Men <input type="checkbox"/>	Women <input type="checkbox"/>
Transportation	Men <input type="checkbox"/>	Women <input type="checkbox"/>
16. If bought from the market, is it always available when you need it?
17. If not, during which time is it available and which time is it not available?

C. Empowerment

18. What positive changes has soya bean utilization trainings brought to you and your households?
19. Is there any change in the frequency of extension visits you receive since attending soya bean training?
20. What has soya bean use contributed to the health of your household?
21. What has soya bean contributed to your income in the past 6 months?

Appendix 3: Survey Questionnaire for women trained in soya bean use.

THE CONTRIBUTION OF SOYA BEAN UTILIZATION TRAININGS TO WOMEN'S EMPOWERMENT IN THE SISSALA EAST DISTRICT OF GHANA.

A. Background information of Respondents

1. Name of respondent:
2. Age: 18-25 ☐ 26-35 ☐ 36-45 ☐ > 45 ☐
3. Marital Status: Married ☐ Single ☐ Widowed ☐ Divorced ☐
4. Community's Name:
5. Household size: 2-5 ☐ 6-10 ☐ >10 ☐
6. Educational Status: Never been to school ☐ Primary School ☐
Secondary School ☐ Other ☐

B. Relevance of Soya bean Utilization Training for Respondents

1. Do you think soya bean utilization trainings are important for you? Yes ☐ No ☐
1.a Why?
2. Did you learn anything from the soya bean utilization training you attended? Yes ☐
No ☐
2.a If yes, what did you learn?
.....
2.b If no, why do you think you did not learn anything? Training was difficult to understand ☐ Training took a long time ☐ Time the training was carried out ☐
Persons carrying out the training ☐ Personal reasons ☐.....
3. What can you say about the timing of the training? It was;
Convenient ☐ Not convenient ☐ Not sure ☐
4. Was the duration of the training:
Too short? ☐ Enough? ☐ Too long? ☐
5. Was the venue of the training:
Convenient? ☐ Not convenient? ☐ Not sure? ☐
6. What do you think about the content of the training?
Understandable ☐ Too technical ☐ Too much ☐
7. What did you like most about the soya bean utilization training you attended?
.....
.....
8. What did you like least about the soya bean utilization training you attended?
.....
.....
9. What do you think of the way the soya bean utilization training was conducted?.....

C. Adoption of Soya bean Utilization Training Knowledge

1. Why did you attend Soya bean Utilization Training?
.....
2. Have you been using soya bean in your dishes at home since the training?
Yes ☐ No ☐
 - 2.a. If yes, how often do you use it? Daily ☐ Weekly ☐ Seasonally ☐
Other
 - 2.b. What dishes do you use soya bean for? TZ ☐ Porridge ☐ Gravy/Soup ☐
Milk ☐ Other ☐
 - 2.c. What encouraged you to use soya bean in your home? Cost ☐ Availability ☐
Easy to use ☐ Other ☐.....
 - 2.d. If no, what prevents you from using it ? Cost ☐ Availability ☐ Time ☐ Other
☐.....
3. What was the response of your husband and children to soya bean dishes when you started preparing them? Liked it ☐ Disliked it ☐ Didn't notice ☐ Other ☐.....
 - 3.a Did their response encourage you to use soya bean? Yes ☐ No ☐
 - 3.b Did their response discourage you from using soya bean? Yes ☐ No ☐
4. How much soya bean do you have at home currently? A bowl full ☐ A basin full ☐
A half bag ☐ > A bag ☐ None ☐
5. How much soya bean do you consume as a household in one week? A bowl full ☐
A basin full ☐ Other ☐ None ☐
6. Have you cultivated soya bean this year? Yes ☐ No ☐
 - 6.a If yes, how many acres did you cultivate? ≤1 ☐ 2-5 ☐ 6-10 ☐ ≥10 ☐
 - 6.b If no, have you cultivated soya bean between 2008 and 2010? Yes ☐ No ☐
 - 6.c Why did you not cultivate soya bean this year?.....
 - 6.d Do you sell soya bean for money? Yes ☐ No ☐
 - 6.e If yes, What do you use the money for? Household food ingredients ☐
Children's fees ☐ Children's clothes ☐ On myself ☐ Other ☐.....
7. In which of the following farm activities does your husband help when you cultivate soya bean? Land preparation and Ploughing ☐ Sowing ☐ Weeding ☐ Harvesting ☐
8. What other crops do you cultivate on your own? Maize ☐ Cowpea ☐
Groundnuts ☐ Other ☐

D. Empowerment of Women

1. Which of the following will you consider as benefits you got from attending the soya bean utilization training? Cheap protein ☐ Improved health ☐
Income ☐ Chance to meet AEA ☐ Other ☐.....
2. How many times do you meet with your AEA in a week? Once ☐ Twice ☐
Thrice ☐ Other ☐
3. How many times did you meet with extension officers during the period of soya bean training? Once ☐ Twice ☐ Thrice ☐ Other ☐.....
4. What changes have you seen in your relationship with your AEA as a result of attending the training? Frequency of contact has changed ☐ I feel more comfortable approaching him ☐ Other ☐

5. How has your relationship with your AEA affected your farming activities?
.....
6. What changes have occurred in the frequency of trainings you attend since attending Soya bean Utilization Training?
7. Have you seen any changes in your relationship with your husband as a result of attending the training? Yes ☐ No ☐
8. If yes, what are these changes?
.....
9. Is there any changes in your household as a result of attending soya bean utilization trainings? Yes ☐ No ☐
10. If yes, what has changed? Health of my household ☐ Income level ☐
Relationship with my husband ☐ Relationship with my children ☐
11. How do you know your health has improved?
.....
12. Has the soya bean utilization training affected your life in any way? Yes ☐ No ☐
13. If yes, How much do you think attending soya bean utilization training has affected your life? None ☐ Very little ☐ Little ☐ Much ☐ Very Much ☐
14. How has the training affected your life?.....
15. Which other WIAD trainings have you also attended? Grain and vegetable preservation Training ☐ Moringa Utilization Training ☐ Credit management Training ☐ Food Safety Training ☐ None ☐
16. How many other trainings have you attended that were organized by MoFA? One ☐ Two ☐ Three ☐ >Three ☐ None ☐
17. How much have these other trainings affected your life? None ☐ Very little ☐ Little ☐ Much ☐ Very Much ☐

Appendix 4: List of Key Informants

Name	Sex	Role/Responsibility
Elizabeth Kutina	Female	RWO- Regional WIAD Activities
Lawrence Kutir	Male	DEO-District Extension Activities
Herbert Braimah	Male	AEA-Nanchalla
Cosmos Abi	Male	AEA-Nmanduonu
Francis Moro	Male	AEA-Banu
Habibata Braimah	Female	Trader

Appendix 5: Pictures from Soya bean Utilization Trainings



Picture A: Soya bean dishes after Practical



Picture B: Women preparing Soya milk



Picture C: Woman preparing soya TZ



Picture D: Soya Vegetable sauce



Picture E: Woman preparing soya soup



Picture F: Soya flour & Paste



Picture G: Trainee



Picture H: Trainees

Appendix 6: Pictures From Field Work



Picture 1: Soya flour for sale



Picture 2: Interview with a survey respondent



Picture 3: Food prepared with maize and soya flour



Picture 4: Woman cooking with Soya bean



Picture 5: Focus Group Discussion



Picture 6: Key informant interview



Picture 7: Germinating soya bean

