

Skills Required by Women in Agriculture in Soybean Production for Poverty Reduction

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Abstract

This study identified the skills required by women in soybean production for poverty reduction in Abia state. The study was carried out in Abia State, Nigeria. Three research questions and three hypotheses guided the study. Survey research design was adopted for the study. The population for the study was 638. This was made up of 565 women in Agriculture involved in soybean production and 73 extension agents in Abia State. The sample of the study was 234 from the population of the women in Agriculture involved in soybean and the entire population of the extension agents was used for the study. A 44-item questionnaire was used for data collection. The instrument was validated by three experts. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument. A reliability coefficient of 0.89 was obtained. Three hundred and seven copies of the questionnaire were administered to the respondents. All the administered copies of the questionnaire were retrieved and analyzed using mean, standard deviation and t -test. It was found that women in Agriculture required 18 skills in planning and pre-planting operations, 10 skills in planting and post-planting operations and 16 skills in harvest, processing and marketing operations of soybean production. It was recommended among others that the identified skills in soybean production should be developed into training modules by extension agents and administrators of skill acquisition centres for training of interested individuals especially the women in Agriculture in soybean production.

Keywords: poverty reduction, women, Agriculture, Soya bean, skills.

Introduction

The major objective of the Nigeria's food production policy is to achieve self sufficiency in food production as well as attaining poverty reduction. The development of agricultural sector is very important not only because the sector produces bulk of the nation's food and agricultural products but because majority of the nation's population lives and work in the sector. Some of the Nigeria's agricultural produce include rice, maize, yam and soybean etc. Glycine max commonly known as soybean in North America or soya bean belongs to the family *Fabaceae* formerly *Leguminosae* (Mayo, 2009). Soybean as an important source of vegetable and oil for human and animal consumption Couto, Silva, Valentão, Velázquez, Peix, Andrade (2011), is highly quoted on the world market Abbasi, Manzoor, Tahir (2010). It is an important food crop among the farming households in Nigeria. Its cultivation is highly favored and has been a permanent feature in the farming system in the area where majority of the farmers earn their living.

The common varieties grown in Nigeria, according to Ayoola (2001) are the 16XTGM, Samson and Malayan. It is an erect, hairy plant having between 0.6 to 1.5m (2 to 5ft) in height with large trifoliate leaves, small white or purple flowers and short pods with one to four seeds. On maturity of the crop which is attained at about 100 to 150 days after planting, depending on variety, location and weather, the leaves turn yellow and drop and the pods rapidly become brown and dry. Soybean is grown as a row crop, planted in May or June and harvested after three

month (Bernard, 2009). As a highly profitable crop, Dugje, Omoigui, Ekeleme, Bandyopadhyay, Lava-kumar and kemar (2009) noted that the production of soybean is further favored in Nigeria for the following reasons:

- i. soybeans are marketed for economic gains and the income derived from its sale is used to solve other pressing family problems;
- ii. it is good for food; Soy-milk, soy-cheese, dadawa;
- iii. it improves soil fertility and controls the parasitic weed, *Striga hermonthica*;
- iv. it is the source of an excellent vegetable oil;
- v. soybean cake is an excellent livestock feed, especially for poultry;
- vi. it is used in industries; and
- vii. the haulms provide good feed for sheep and goat.

To support the nutritional significance of soybean, Encarta (2009) described it as oil and protein-rich seed cultivated around the world for its nutritious value, soil improvement and provision of grazing for livestock. Soybean seeds account to 56% of global oilseed production (Wilson, 2008). The crop has a commercial value and concentration of protein about 40%, Calcium, Phosphorous, and fiber. It is also rich in oligo-elements such as magnesium, phospholipids, vitamins and minerals (Ali, 2010). Therefore, it is a very interesting crop for vegans. In addition to its nutritional values, soybean is also used as important nitrogen (N_2) fixing crop throughout the world for the restoration and maintenance of soil fertility in a sustainable way and consequently the improvement of crop yields Smaling, Roscoe, Lesschen, Bouwman, Comunello (2008). It is cholesterol free, has 20% edible vegetable oil and good balance of amino acids (Sanginga, Adesina, Manyong, Otite, Dasheill, 1999). International Institute of Tropical Agriculture (IITA, 2009) made the demand for its products in Nigeria to continue to increase, that is, in Nigeria this crop (soybean) is relatively new and expected to increase production due to its importance on supply of food, income and fodder. In order to address the wide demand and supply gap for the products, the Federal Government of Nigeria has continued to make several effort towards increasing its output. This includes educating the women in Agriculture on the need for soybean production for poverty reduction.

Women in Agriculture, in the submission of Wikipedia in Asogwa, Mbu and Okafor (2011) are women who own farms and manage farming operations. These women, according to Wikipedia, engage in farming operations such as rearing of pigs, goats, poultry and growing of crops like tomato, cassava, yam, cocoyam, and bitter leaf among others. Uko (2010) explained Women in Agriculture are those female farmers that practice agricultural production of farm crops mainly for food. In the context of this study, Women in Agriculture are those female farmers that practice agricultural production of farm crops including soybean mainly for food and poverty reduction.

Historically, poverty has become inevitable in some parts of the world especially as non-industrialized economies produced very little while populations grew almost as fast, making wealth scarce. In the view of Olaitan, Ali, Nwachukwu and Onyemachi (2002), poverty is a state of not having money or means of meeting basic needs by an individual, thereby deserving sympathy or pity. Poverty is also defined by a sense of helplessness, dependence and lack of opportunities, self-confidence and self-respect on the part of the poor. Indeed, the poor themselves see powerlessness and voicelessness as key aspects of their poverty (Narayan et al., 2000). The World Bank report (2001) stated that poverty is an unacceptable human deprivation

in terms of economic opportunity, education, health and nutrition as well as lack of empowerment and security. Poverty reduction is described in Mama, Asogwa and Ukonze (2013) as the act of making the degree of poverty among individuals smaller than what it is at present by empowering them through entrepreneurial competencies. The World Bank's strategy for poverty reduction focuses on promoting the productive use of labor – the main asset of the poor – and providing basic social services to the poor. According to the report, investment in education contributes to the accumulation of human capital, which is essential for higher incomes and sustained economic growth. Education, especially basic (primary and lower-secondary), helps to reduce poverty by increasing the productivity of the poor, reducing fertility and improving health, and equipping people with the skills they need to participate fully in the economy and in society (World Bank,1990). In this context, poverty reduction is the process of increasing the capacities of the Women in Agriculture through skill acquisition in soyabean production for them to have money or means of meeting their basics needs. The Women in Agriculture could be equipped with skills in soybean production for higher their incomes and sustained economic growth hence reduces poverty among the women. The poverty reduction could be achieved if the Women in Agriculture acquire the required skills for production of soybean probably with the help of agricultural extension agents in the State.

Agricultural extension agents, in the opinion of Nagel (1997), are professionals who assist farmers through educational procedure, in improving farming method and techniques, increasing production efficiency and income, bettering their levels of living and lifting social and educational standards. The author further explained that extension agents provide assistance to farmers to help them identify and analyzed their production problems and become aware of the opportunity for improvement. Davis (2008) opined that extension agents are individuals set to support and facilitate people engaged in agricultural production to solve problems and obtain information, skills and technologies to improve their livelihoods and well-being. It was in the expectation of the researchers that the extension agents could train individuals such as women in Agriculture to establish and manage soybean production and marketing business for sustainable livelihood if there are identified skills but no such record exists.

Skill is defined by Okorie (2000) as a well established habit of doing something and it involves the acquisition of performance capability. Skills according to Agboeze (2010) are the professional ability to perform or carry out a task very well. In the context of this study, skill is the ability required by women in Agriculture to enable them perform task efficiently such as in the production of soybean. If the skill in soybean production is acquired by women in Agriculture, it will lead to massive production of soybean for poverty reduction.

In Abia State, it has been observed that there is increasing rate of poverty especially among Women in Agriculture. This is probably as a result of all of them concentrating on some specific crops like maize, cassava, yam, plantain, without diversification into crops such as soyabean is not common but has market. Most soyabean consumed in the state is imported from Northern part of the country like Sokoto, Kano, Kaduna, Jos which makes it costly for most consumers to afford. This opportunity could have been utilized by the Women in Agriculture if they have the required skills in the soyabean production. A visit to skill acquisition centres in the state by the researchers shows that there is no training package on soyabean production. This, the administrators attributed to lack of identified skills in soyabean production to enable them develop a training programme for interested individuals like the Women in Agriculture. It was in a move to fill this gap in literature that this study was born. Therefore, the purpose of study was

to identify the skills required by women in agriculture in soybean production for poverty reduction. Specifically, the study sought to identify the skills required by Women in Agriculture in:

1. planning and pre-planting operations of soybean;
2. planting and post- planting operation of soybean and
3. harvesting, processing and marketing operations of soybean.

Research Questions

The following research questions were developed in line with the specific purpose of the study.

1. What are the skills required by women in Agriculture for planning and pre-planting operations of soybeans for poverty reduction.
2. What are the skills required by women in Agriculture in planting and post-planting operation of soybeans for poverty reduction.
3. What are the skills required by women in Agriculture in harvesting, processing and marketing operations of soybeans for poverty reduction.

Hypotheses

1. There is no significant difference in the mean ratings of the responses of the women in Agriculture and extension agents on skills required by women in Agriculture for planning and pre-planting operations of soybean for poverty reduction.
2. There is no significant difference in the mean ratings of the women in Agriculture and extension agents on skills required by women in Agriculture in planting and post-planting operations of soybean for poverty reduction.
3. There is no significant difference in the mean ratings of the responses of the women in Agriculture and extension agents on skills required by women in Agriculture in harvesting, processing and marketing operations of soybean for poverty reduction.

Research methodology

The study adopted a survey research design. Nworgu (2006) said that a survey research design is one in which a group of people or items is studied by collecting data through interview or questionnaire and analyzing them. Therefore the questionnaire was used to collect data from the respondents.

The study was carried out in South east, Nigeria; specifically in Abia state. The population for the study was 638, made up of 565 women in Agriculture involved in soybean production and 73 extension agents obtained from the three agricultural zones in Abia state namely; Aba, Ohafia, Umuahia (Ministry of Agriculture). The sample of the study was 234 of women in Agriculture involved in soybean production and the entire population of extension agents which is 73 was used.

The instrument for data collection was 44-skill structured questionnaire titled: Soybean production skill questionnaire (SPSQ). The skill items had a 4-point response scale of Highly Required, Averagely Required, Moderately Required, Not Required with corresponding values of 4, 3, 2 and 1. The instrument was face validated by three university lecturers, Two from Department of Agricultural Education, Michael Okpara University of Agriculture, Umudike and one from the Department of Vocational Teacher Education, University of Nigeria, Nsukka. Their corrections and suggestions were utilized to improve the initial copies of the questionnaire to produce the final copies. Cronbach Alpha reliability method was adopted to determine the internal consistency of the questionnaire item. A Cronbach Alpha coefficient of 0.89 was

obtained. Three hundred and seven copies of the questionnaire were administered to the respondent which comprises of the sample size of women in agriculture involved in soybean production and the entire population of the extension agents. The entire Three hundred and seven copies administered were retrieved and analyzed. Mean and standard deviation were used to answer the research questions while t-test statistics was used to test the hypotheses at 0.05 level of significance and at 305 degree of freedom. The average mean of 2.50 was used for decision making. Any item with a mean rating of 2.50 or above was regarded as required, while any item with a mean score less than 2.50 were regarded as not required. Any item with a standard deviation between 0.00 and 1.96 indicated that the respondents were not far from the mean and the opinion of one another. The hypotheses of no significant difference was upheld for any item whose t-calculated value was less than the t-table value at 0.05 level of significance and at 305 degree of freedom.

Results

The results for the study are presented in Tables 1 to 3.

Table 1: Mean ratings and t-test analysis of the responses on skills in planning and pre-planting operations for soybean production.

S/N	Planning Operations	X	S	t-cal	Remarks
1	Formulate specific objective for the enterprise	3.01	1.41	-0.03	Required, NS
2	Revise the objectives periodically	3.42	1.45	2.29	Required. S
3	Budget for the farm enterprise	3.05	1.20	0.48	Required, NS
4	Identify source of finance for the soybean production enterprise	3.24	1.05	0.67	Required, NS
5	Identify materials and equipment for the enterprise	2.84	1.08	1.97	Required, NS
6	Identify personnel for the enterprise	3.34	1.95	0.35	Required, NS
7	Draw schedule of activities for the enterprise	3.53	1.70	0.94	Required, NS
8	Select suitable land for the enterprise	3.70	1.75	0.86	Required, NS
9	Test for suitability of the land within the range of 4.4 to 8.5 soil pH	3.54	1.36	0.71	Required, NS
10	Prepare selected clearing tools for farm work	3.29	1.56	1.37	Required, NS
Pre-planting Operations					
11	Clear the weed very low for easy tillage	3.44	1.12	0.60	Required, NS
12	Pack dry weed from farm land	3.64	1.11	0.75	Required, NS
13	Stump stem and root on the farm before tillage	3.71	1.25	0.24	Required, NS
14	Till the soil with appropriate tools.	3.81	1.66	0.10	Required, NS
15	Fumigate the soil with fungicides before planting	3.90	1.51	0.13	Required, NS
16	Select seeds of high viability for easy germination	3.62	1.06	0.27	Required, NS
17	Carry out seed germination test on the selected seed before treatment	3.42	1.34	-0.50	Required, NS
18	Treat seeds with fungicides such as captan, apron plus or thiran at the rate of 1 sachet and 8kg of seeds before planting	3.58	1.20	0.51	Required, NS

X = Mean, **S**=Standard Deviation, **S** = Significant, **NS** = Not Significant, t-tab=1.96

Data in Table 1 revealed that all the eighteen skill items had their means ranged from 2.84 to 3.90 and were all above the cut-off point of 2.50. This indicated that all the eighteen items were the skills required by women in Agriculture involved in soybean production for the planning and pre-planting operations of soybean for poverty reduction in Abia state. The standard deviation ranged from 1.05 to 1.75 indicating that the respondents were not very far from the mean and from one another in their responses.

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The hypothesis tested in Table 1 revealed that seventeen out of the eighteen skill items had their calculated t- values ranged from -0.03 to 1.37 which were less than t-value of 1.96 at 0.05 level of significance and 305 degree of freedom. This indicated that there is no significant difference in the mean ratings of the responses of the two groups of respondents on the 18 skill items needed for skills required by women in Agriculture involved in soybean production for planning and pre-planting operations of soybean for poverty reduction. With this result, the null hypotheses of no significant difference were upheld for all the seventeen skill items.

The data also showed further that the 1 out of 18 had its calculated t-value as 2.29 which was greater than t-table value of 1.96 at $p \leq 0.05$ level of significance and at 305 degree of freedom (df). This showed that there was significant difference in the mean ratings of the responses of the two groups of respondents on the one item. Based on this result, the null hypothesis of no significant difference in the mean ratings of the respondents of the two groups of respondents on the one skill item in soybean planning and pre-planting operations was rejected.

Table 2: Mean ratings and t-test analysis of the responses on skills in planting and post-planting operations for soybean production.

S/N	planting operations	\bar{X}	S	t-cal	Remarks
1	Sow 3 to 4 seeds per hole	3.64	0.65	2.25	Required, S
2	Maintain a spacing of 50-74 between rows and 5-10cm within rows	3.68	0.54	2.53	Required, S
3	Sow seeds at 2-5cm sowing depth	3.64	0.62	0.52	Required, NS
4	Replace ungerminated seeds after 10 days of planting	3.49	0.56	0.43	Required, NS
Post-planting Operations					
5	Weed twice in the first 6-8 weeks after planting	3.70	0.47	-0.13	Required, NS
6	Irrigate or drain the soil to maintain recommended soil moisture level	3.73	0.43	0.79	Required, NS
7	Apply phosphorous fertilizer where necessary at the rate of 25-30kg per hectare	3.80	0.45	0.36	Required, NS
8	Apply herbicides for effective weed Control	3.37	0.50	2.54	Required, NS
9	Apply foliar herbicides to control disease infections.	3.50	0.42	0.88	Required, NS
10	Spray soybean plants with insecticides to reduce insect vector during pre-flowering stage	3.59	0.49	2.85	Required, NS

\bar{X} = Mean, S=Standard Deviation, S = Significant, NS = Not Significant, t-tab=1.96

Data in Table 2 revealed that the ten skill items had their means ranged from 3.49 to 3.80 and were all above the cut-off point of 2.50. This indicated that all ten skill items were required by women in Agriculture involved in soybean production for planting and post-planting operations of soybean for poverty reduction in Abia state. The standard deviation ranged from 0.42 to 0.65 indicating that the respondents were not very far from the mean and from one another in their responses.

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The hypothesis tested in Table 2 showed that 6 out of ten skill items had their calculated t-values ranged from -0.13 to 0.88 which were less than t- table value of 1.96 at 0.05 level of significance and 305 degree of freedom. This indicated that there is no significant difference in the mean ratings of the responses of the two groups of respondents on the 6 skill items required by women in Agriculture for planting and post- planting operations in soybean production. With this result, the null hypothesis of no significant difference was upheld for the 6 skill items.

The data also revealed further that the remaining four items (1, 2, 8 and 10) had their calculated t-values as 2.12, 2.25, 2.54 and 2.85 respectively which were greater than t- table value of 1.96 at $p \leq 0.05$ level of significance and at 305 degree of freedom (df). This showed that there was significant difference in the mean ratings of the responses of the two groups of respondents on the four items. Based on this result, the null hypothesis of no significant difference in the mean ratings of the responses of the two groups of respondents on these four skill items in soybean planting and post- planting operations was rejected.

Table 3: Mean Ratings and t-test Analysis of the responses on skills in harvesting, processing and marketing operations for soybean production.

S/N	Harvest Operations	\bar{X}	S	t-cal	Remarks
1	Get the hand clipper or knife and tarpaulin ready	3.59	0.63	0.26	Required, NS
2	Sharpen the knife if blunt	3.70	0.55	0.63	Required, NS
3	Get the reel or soybean head down low enough to avoid missing any pod.	3.56	0.49	-1.27	Required, NS
4	Cut the pods off the plant	3.03	0.48	-0.63	Required, NS
5	Drop the pods in the tarpaulin for weeks to dry.	3.60	0.52	0.22	Required, NS
Processing Operations					
6	Thresh dried soybean pods manually or mechanically	3.76	0.39	1.09	Required, NS
7	Winnow soybean manually or mechanically to remove seeds from the debris	3.63	0.80	0.06	Required, NS
8	Open-air dry winnowed soybean seeds before storage	3.78	0.79	1.27	Required, NS
9	Store soybean seeds at moisture contents of 10% until ready for sale	3.64	0.40	1.45	Required, NS
Marketing Operations					
10	Advertise soybean to attract customers	3.75	0.46	1.45	Required, NS
11	Grade and measure soybean seeds in bags or container	3.62	0.56	0.77	Required, NS
12	Open a sales book record for the product	3.45	0.44	1.63	Required, NS
13	Fix appropriate prices for the different grades and measures of the product.	3.67	0.64	0.78	Required, NS
14	Distribute and transport the products to the buyers	3.47	0.62	0.56	Required, NS
15	Balance farm account at the end of farming season.	3.76	0.40	1.33	Required, NS
16	Expand market for soybean through advertisement	3.77	0.645	0.563	Required, NS

\bar{X} = Mean, S=Standard Deviation, S = Significant, NS = Not Significant, t-tab=1.96

Data in Table 3 revealed that all the sixteen skill items had their means ranged from 3.03 to 3.78 which were all above the cut-off point of 2.50. The above finding indicated that all the sixteen skill items were required by women in Agriculture involved in soybean production for harvesting, processing and marketing operations in soybean for poverty reduction in Abia state. The standard deviation ranged from 0.39 to 0.79 indicating that the respondents were not very far from the mean and from one another in their responses.

The hypothesis tested in Table 3 revealed further that all the sixteen skill items had their calculated t-values ranged from -0.63 to 1.63 which were less than t-table value of 1.96 at 0.05 level of significance and 305 degree of freedom. This indicated that there is no significant difference in the mean ratings of the responses of the two groups of respondents on the sixteen skill items required by women in Agriculture involved in soybean production for harvesting, processing and marketing operations in soybean production. With this result, the null hypothesis of no significant difference was upheld for all the sixteen skill items.

Discussion of Results

The result in Table 1 shows that eighteen items are the skills required by women in Agriculture involved in soybean production in planning and pre-planting operations of soybean. The result is in accordance with Osinem (2008) who found that the planning and pre-planting operations in all crop production including soybean should include; formulating specific objectives for the enterprise, revising the objectives periodically for planning and clearing the weed very low for easy tillage, packing dry weed from farm land etc for pre-planting operations.

The result in Table 2 shows that ten items are the skills required by women in Agriculture involved in soybean production in planting and post-planting of soybean. The result is in keeping with Bernard (2009) who identified the skills required in planting and post-planting of soybean production to include; Sowing 3 to 4 seeds per hole, irrigating or draining the soil to maintain recommended soil moisture level for post-planting operations.

The result in Table 3 shows that sixteen items are the skills required by women in Agriculture involved in soybean production in harvesting, processing and marketing of soybean. The result is in line with Pocock (2010) who listed some skills to be carried out in harvesting and processing operation as; Getting the hand clipper or knife and tarpaulin ready, Sharpening of the knife if blunt etc. The author also identified the skills required in processing operations to include; threshing dry soybean pods manually or mechanically, winnowing soybean manually or mechanically to remove the seeds from the debris. Also Amusa, Akali and Oketoobo (2010) identified some skills to be carried out in marketing operations as; advertising soybean to attract customers, Grading and measuring soybean seeds in bags for marketing operations and so on.

Conclusion

In Abia State, Women in Agriculture do not engage in soybean production because they lack the skills required for this profitable enterprise. This creates a gap between the quantity demanded and the quantity supplied in the market necessitating the marketers to import soybean from other state of the federation. This shows the need for the Women in Agriculture in the state to diversify into the soybean production. But the lack of identified skills in the production gave rise to this study to enable stakeholders like agricultural extension agents to develop training programme in the crop for the Women in Agriculture. Hence, the above skills were identified for soybean production in Abia state.

Recommendations

Based on the findings of this study, the following recommendations were made.

1. The identified skills in soybean production should be developed into training modules by extension agents and administrators of skill acquisition centres for training of interested individuals especially the women in Agriculture.
2. Women should be empowered by government through provision of production factors to embark on soybean production as a source of living.

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3. Women should be sensitized on the economic importance of soybean production in order to create more awareness of the crop.
4. The identified skills should be used by women in Agriculture to build the production level of soybean in Abia state.
5. A specific percentage of income tax generated annually by Government should be utilized for sponsoring of women involved in soya bean production in the state.
6. Government should provide adequate facilities to agricultural workshop/technical vocational education institutions workshops using current strategies identified to ensure acquisition of relevant soya bean skills, cooperation, knowledge and experience that are relevant to the growth of the country economy as it relates to the production of soya bean.
7. Institutionalization of a viable Monitoring and Evaluation (M&E) framework to checkmate the activities of both the women, personnel and resources used for soya bean skill acquisition.

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