

Factors Related to Continuity in Utilization of Soya Bean Products by Farm-Families in Abia State, Nigeria

S. O. Olatunji*, U. R. Etuk and O. M. Adesope**

*Department of Agricultural Economics and Extension, University of Port Harcourt, Choba,
Rivers State, Nigeria*

*E-mail: *sooolatunji@yahoo.com>, **<omadesope@yahoo.co.uk>*

KEYWORDS Nutrition. Health. Soya bean Products. Protein. Adoption. Agricultural Development Programme (ADP)

ABSTRACT The importance of Soya bean as a more affordable source of protein than animal sources and its health benefits cannot be over-emphasized. This study assessed the consistency in utilizing Soya bean products and factors related to discontinuity in utilization by farmers in Abia State, Nigeria. Data were generated with a 38-item interview schedule administered on a sample of 135 farmers. Data were analyzed using descriptive statistical method. Data analysis revealed that more than 70 percent of farmers have adopted a soya bean product in the past. Soya flour, soya milk, soya *moinmoin*, soya *akamu* and soya *akara* have the longest history of adoption while soya candies, soya meat, soya vegetable soup and soya snacks are relatively new to most farmers. Less than 60 percent of farmers remained consistent while others discontinued utilization. The major reasons offered for discontinuity include ignorance of health benefits of soya bean products and lack of time to prepare it. It was recommended that Extension Agents vigorously disseminate information about the health benefits and simple technologies for processing Soya bean at the farmers' home and at the village level.

INTRODUCTION

According to Williams and Williams (1991), the ability of developing countries to feed their ever-increasing population with adequate calories and proteins remains one of the major developmental challenges that need to be addressed. Since independence in Nigeria in 1960, various agricultural policies and development programmes have tried to address issues of increasing the available proteins and calories from crops and animal products. Most of these programmes have livestock, especially poultry production, as one of their major focal objectives. However, this (poultry) objective has neither been fully achieved nor sustainable because of some hazards, problems, risks, and uncertainties. The International Livestock Centre for Africa (1976) and Apantaku et al. (1998) explained that these problems include diseases and pests, natural hazards (fire outbreak, flood, excessive hot or cold weather, soldier-ants, etc.), lack of credit facilities, poor marketing, unprofessional husbandry, and lack of specialized qualified livestock extension agents. According to Oyesola and Olujide (2000) and Okoro (2000), the contribution of the livestock sector, which is an important component of the agricultural economy (providing animal protein to the populace), has animal protein from games, domestic animals and fish from natural water has failed to meet the nutritional needs of Nigerians, especially the farm-families.

Mathew-Njoku (2005) explained that in an effort to redress the protein shortages, the Agricultural Development Programme (ADP) has been promoting adoption of soya bean products among farm-families in the Eastern States of Nigeria. That was in recognition of the fact that soya bean provides an alternative source of relatively inexpensive plant protein. Alibaba.com Hong Kong Limited and licensors (2011) also reported that beginning in the early 1990s, the International Institute of Tropical Agriculture (IITA) promoted the use of protein-rich soybeans in everyday foods to curb malnutrition among the rural dwellers in Nigeria. Limson (2001) explained that soya bean can be used to produce a variety of traditional dishes, as well as processed foods such as soya milk and specially formulated foods to help malnourished infants and children. Nutritionally, they carry twice the protein of meat or poultry and contain all eight essential amino acids needed for childhood development. soya beans are also good for the environment. As revealed by Fabiyi (2007), soya bean has higher and virtually unrivaled protein content than other crops. It is a rich source of edible vegetable oil, vitamin and minerals. It was noted in The World's Healthiest Foods (2004), that soya bean also have many health benefits such as: prevention of heart diseases, cancer, high blood pressure, diabetics'- related diseases and many others. Soya bean oil is rich in fatty acids and devoid of cholesterol. It is an

excellent source of calcium, iron and vitamins such as thiamin, riboflavin and niacin. Grass-roots extension delivery was carried out by the ADPs to disseminate appropriate technologies for soya bean product preparation and packaging. Various channels of communication such as radio, television, and print-media have also been employed to discriminate information on different types of soya bean products and the benefits of their utilization. These efforts have led to increased production of soya bean in Africa and Nigeria. For example, Adekayode (2011) indicated that in 2005 over 92 million hectares of soybean were planted worldwide. Brazil accounts for over 22 million hectares, and the United States for almost 29 million hectares. Africa accounts for just over 1 million hectares, Asia for 19 million hectares and Europe for almost 2 million hectares. Africa alone produced 1,238,443.00 metric tons of soybeans in 2005. Pedersen (2011) revealed that many products are being created every year due to research efforts funded by soybean farmers across America and other parts of the world. Industrial and food use products using soybean or soybean-derived products as one of the main ingredients include traditional soy foods such as *Miso*, *Natto*, soy milk, soy sauce, *Tempeh* and Tofu.

Ekpere (1993) had explained that adoption and spread of technology innovations in farming practices depend on the benefit they offer. Farmers who perceive the benefits of soya bean products will, more likely than not, continue to adopt a soya bean product once they are aware of it. Farmers who feel otherwise are likely to discontinue its adoption on grounds of the minutest constraint. The result of a previous study carried out by Olatunji et al. (2011) revealed that, although 74 percent of farmers in Abia State were aware of soya bean products, about 27 percent either did not adopt or discontinued adoption.

It is, therefore, pertinent to investigate the consistency with which farmers are adopting and possible constraints to adoption of soya bean products among the farm families. Thus, the study investigated farmers' history of adoption of selected soya bean products, percentage of farmers who have continued to adopt them and those who have discontinued. Answers were provided to the following research questions:

- i. What percentage of farmers has adopted selected soya bean products before?
- ii. Which soya bean product has the longest history of adoption among farm-families?
- iii. What percentage of farmers is still adopting selected products at the rate of, at least, once a week?
- iv. What percentage of farmers has discontinued utilization of soya bean products?
- v. What reasons are offered for discontinuity in adoption of soya bean product by farmers?

METHODOLOGY

All the farm families in Abia State comprised the population for the study. Abia State has been delineated into zones, blocks, circles and sub-circles by the Agricultural Development Programme (ADP). In view of this, multistage sampling technique was employed to select sample. Two ADP zones (Umuahia and Ohafia) were purposively selected from the three zones. Using sample random sampling technique at each state, 3 blocks were selected from each zone, 2 circle from each block, 2 sub-circles from each circle and 6 farm-families from each sub-circle. Thus, a total sample of 144 farm-families was selected from Umuahia (72) and Ohafia (72). However, data from only 135 subjects who responded completely and correctly to the interview schedule items were analyzed. A 38-items Interview Schedule was developed and used to collect information on farmers' history of adoption of selected soya bean products, rate of adoption per week, continuity or discontinuity in adoption and reasons for discontinuity of adoption. Data were collected in the last two months of the year 2009. Relevant data were analyzed using descriptive statistics such as means, percentages and ranking.

RESULTS AND DISCUSSION

The results of data analyses are presented in Tables 1, 2 and 3.

1. Farmers who have Adopted Soya Bean Products Before

The first and the second objectives are:

1. to find out the percentage of farmers who have adopted selected soya bean products before

Table 1: Percentage distribution of farmers on the basis of date of commencement of soya-bean utilization (N=135)

S. No.	Soya-bean products	Never adopted		Less than 2 years ago		2-3 years ago		4 or more years		All Adopters		Ranks
		No.	%	No.	%	No.	%	No.	%	No.	%	
1	Soya flour	22	16.3	32	23.7	44	33.6	37	27.4	113	83.7	1
2	Soya milk	20	14.8	42	31.1	40	29.6	22	16.3	125	92.7	2
3	Soya candies	12	8.9	53	39.3	48	35.6	25	16.3	123	91.1	6
4	Soya <i>akamu</i>	19	14.1	55	40.7	36	26.7	25	18.5	126	93.3	4
5	Soya vegetable soup	24	17.8	39	28.9	54	40.0	18	13.3	111	82.2	8
6	Soya meat	35	25.9	36	26.7	43	51.31	21	15.6	100	74.1	7
7	Soya snacks	32	23.7	42	31.1	51	37.8	10	7.4	103	76.3	9
8	Soya <i>akara</i>	39	28.9	39	28.9	33	24.4	24	17.8	96	71.1	5
9	Soya <i>moinmoin</i>	28	20.7	24	17.8	55	40.7	28	22.7	107	79.3	3

- to identify the soya bean product that has the longest history of adoption among farm-families

Relevant data were subjected to descriptive statistical analysis and the results are as shown in Table 1.

It is revealed in that the percentage of farmers who have never adopted soya bean product ranged from the lowest 8.9 percent for soya candies to the highest 28.9 percent for soya-*akara*. The percentage that has commenced utilization of soya bean products ranged from the lowest 71.1 percent (soya *akara*) to the highest 85.2 percent (for soya-milk). It implies that the percentage of farmers who have adopted soya bean products at one time or the other was in most cases higher than 70 percent. This is very commendable. It suggests that the extension activities that the ADPs embarked upon to create awareness of its benefits and disseminate technologies for processing Soya bean in Eastern States of Nigeria (as noted by Mathews-Njoku 2005) were largely effective. Fabiyi (2007) have also noted that, although, high percentage (60.73 percent) of farmers adopted soya cheese, very low percentage (20 percent) adopted soya milk, soya '*kunu*', and soya vegetable soup in Dass Local Government Area of Bauchi State, Nigeria. The high adoption rate recorded in this present research may be explained, in part, by effective extension services and usage of the right channels of communication among the farm-families. Brader (2001) cited in Limson (2001) reported that Osamu Nakayama was the first to get the idea to use "tofu" (soy milk and local plant extract) as a substitute for "*Wara*"- a traditional but expensive kind of cheese. He noted that the demand for tofu and other processed soy foods is growing at an annual rate of 20 percent, fueling a major cottage industry in

rural Nigeria. Although, great strides have been made, there is still the need to make efforts to reach about 30 percent of the farmers who have never adopted soya bean products in the area of study. The non-adoption by these farmers could probably be due to lack of awareness, inadequate information or ineffective extension services.

2. Soya Bean Product with the Longest History of Adoption among Farm Families

Data presented in Table 1 reveal that between 17.8 percent and 42.9 percent of the respondents began adoption of the various soya bean products just two or less than two years ago. The percentage of farmers who started adopting soya bean products from four years and above are very low (ranging from 7.4 percent for soya snacks to 27.4 percent for soya flour. Considering the magnitude of the percentage of farmers who adopted, soya bean products that have the longest history of adoption by farmers would appear in this serial order: (1) soya flour (2) soya milk (3) soya *moinmoin* (4) soya *akamu* and (5) soya *akara*. The percentages of farmers who began adoption of soya candies, soya meat, soya vegetable soup and soya snacks from four year ago are lower. This is indicative of their lack of popularity among farmers. Extension activities require focus on these products that are yet to gain popularity among farmers. Although, the percentage of farmers that are adopting these products are not as high as expected, they represent an improvement, compared to what Fabiyi (2007) found in her study of farmers in Dass Local Government Area of Bauchi State, Nigeria. She reported low percentage (about 20 percent) adoption of soya milk and soya vegetable soup, while adoption percentage was zero for soya yoghurt, soya *akamu*, soya

moinmoin, and soya cake. The International Institute of Tropical Agriculture (IITA) (2010) reported that Nigeria now has more than 65 soya beans processing plants, ranging in size from small village-level mills to plants established by food processing giants Nestle and Cadbury. The big processors, he notes, use soy bean to boost the protein content of baked goods, breakfast cereals, weaning foods, and dairy products. Currently, about 140 soy-based food products have been developed for use in Nigeria.

3. Farmers Who Have Remained Consistent in Utilization of Soya Bean Products

It was found that between 30.4 percent and 60 percent of farmers has continued adoption of adopt soya bean products at the rate of, at least, once a week. The percentage adoption is fairly high. The results of this study indicate an improvement over that of an earlier study conducted in Nigeria by Dionco-Adetayo et al. (2002) which revealed that the level of utilization of soybean was very low despite efforts of the government agencies to educate the consumers. Chi-square results further reveal that there was a significant relationship between age, education, and occupation; and soybean utilization in terms of awareness. Consequently, cost, adequate training, and health issues were identified as factors encouraging the use of soybean for household consumption. The result of this present study corroborates the report by Alibaba.com Hong Kong Limited and Licensors (2011) that direct human consumption of soybeans is significant in Nigeria, especially among rural low-income groups that cannot afford other alternative protein sources such as meat, fish and eggs. The IITA estimates the cost of protein, when purchased as soybeans, to be only about 10 - 20 percent of the cost of protein from meat, eggs, fish or milk. Soybeans are now widely consumed and are readily used in the production of soymilk, soy cake, soy yogurt and the fortification of local carbohydrate-based Nigerian food staples. *Dawadawa*, a local food seasoning is also produced from soybeans. Government sources estimate that about 25 percent of Nigeria's domestic production is consumed directly in rural areas as human food. It should be noted however that Mathews-Njoku (2005) in a study reported that 66.6 percent of her sample consumed soya bean flour because it was

the commonest product in the open markets and supermarkets in Owerri, Imo State, Nigeria. The 66.6 percent adopters she reported are higher than the 60 percent noted in this current study. What this may imply is that points all adopters of soya bean products have not been consistent over time.

Other soya bean products were either not adopted or their adoption rate is very low. Most of the sample for this study are adopting, not only soya bean flour, but also soya milk, soya *moinmoin*, soya *akara*, soya vegetable soup, soya snacks, and soya candies. This fairly high rate of adoption may probably be indicative of effective promotion of soya bean products by the Extension Service in the area of study. This is commendable, even though greater efforts are needed to achieve higher adoption rate for products whose rates of adoption are still low. These include, soya snacks, soya meat, soya *akara* and soya *moinmoin* (Table 2).

4. Farmers Who Discontinued Utilization of Soya Bean

Data analysis revealed that as high as 45.9 percent 40.7 percent and 39.3 percent of farmers discontinued adoption of soya snacks, soya vegetable soup and soya candies respectively. These products are among the ones that have recent history of adoption by farmers as shown in Table 1. They are also the products that lower percentage of farmers are aware of, have knowledge of how to prepare them and lower frequency of adoption in a similar study by Olatunji et al. (2011). It is probable that it is the combined effects of low awareness and low knowledge of preparation that made high percentage of farmers discontinued their utilization. The percentages of farmers who discontinued utilization of the other soya bean products are lower. For example, only 23.7 percent, 31.1 percent and 34.1 percent discontinued utilization of soya flour, soya *akara* and soya milk respectively. Nonetheless, these percentages are not altogether negligible.

5. Reasons for Discontinuity of Utilization of Soya Bean Products

The respondents presented different reasons for discontinuing adoption of selected soya bean products. These reasons are summarized and

Table 2: Percentage distribution of farmers on the basis soya-bean product adoption status (N=139)

S. No.	Soya-bean products	Never adopted		Adopted but discontinued		Continued adoption	
		No	%	No	%	No	%
1	Soya flour	22	16.3	32	23.7	81	33.6
2	Soya milk	19	14.1	46	31.1	70	29.6
3	Soya candies	24	17.8	59	39.3	64	35.6
4	Soya <i>akamu</i>	35	14.1	48	40.7	68	26.7
5	Soya vegetable soup	24	17.8	62	28.9	60	40.0
6	Soya meat	35	25.9	42	26.7	52	51.31
7	Soya snacks	32	23.7	62	31.1	41	30.4
8	Soya <i>akara</i>	39	28.9	42	31.1	54	40.0
9	Soya <i>moinmoin</i>	28	20.7	49	36.3	58	43.0

presented in Table 3. Ignorance of its benefits ranked first (1st) among the reasons farmers presented for discontinuity in utilization of Soya bean products. The World's Healthiest Foods (2004) have highlighted the benefits of Soya bean to include prevention of heart diseases, cancer, high blood pressure, diabetes-related diseases and many others. Soya bean is a source of quality but cheaper protein which is especially affordable to most farm-families. In order to change this negative perception among farmers, the Extension Service needs to re-package and vigorously disseminate information, educate and re-educate farmers on several health benefits of soya bean utilization.

Table 3: Reasons that farmer offered for discontinuing adoption of selected soya bean products

S. No.	Reasons for discontinuing adoption of selected soya bean products	Frequency	Rank
1	Lack of time to prepare the product	53	2
2	To prevent excessive use (dosage)	31	8
3	Change of taste	26	11
4	Inconsistency of suppliers	51	3
5	Loss of interest	29	10
6	Scarcity of the product in the market	30	9
7	To avoid the risk of poisoning resulting from improper preparation	34	5
8	Soyabean cannot be eaten directly like beans	36	5
9	It has odor that is not so attractive	45	4
10	Soya products are not prestigious for example soya milk is lower in standard than cow milk.	32	7
11	I don't see the benefits of continuing to use it.	58	1

Other reasons that significantly affect continuity of soya bean adoption include lack of time to prepare the product, inconsistency of suppliers and the odour of soya bean. Dionco-Adetayo et al. (2002) had reported a study in Nigeria where they found that lack of awareness and

inadequate training were revealed to have been the factors responsible for low utilization of soya bean products. Shurtleff and Aoyagi (2010) indicated that in Ondo State, Nigeria, nearly 100,000 Nigerians, three-fifths of them women, have been trained in soybean production and in the preparation of soy products by local NGOs, hospitals, and church groups working in cooperation with IITA and various government agencies. That is commendable but it requires improvement so as to reach the larger percentage of farm families that are yet to be trained. What these point to, is the necessity of invigorating the promotion of adequate and simple technologies for soya bean processing at the farmers' homes and at the village level.

CONCLUSION

Factors influencing continuity/discontinuity in adoption of Soya bean products among farmers in Abia State were investigated. Results of data analysis reveal that more than 70 percent of the farmers have consumed soya bean product at one time or the other. Soya flour, soya milk, soya *moinmoin*, soya *akamu* and soya *akara* have the longest history of adoption by farmers. Soya candies, soya meat, soya vegetable soup and soya snacks are relatively new. The percentage of farmers who have remained consistent in adoption of soya bean products is fairly high - ranging from 30.4 percent for soya snacks to 60.0 percent for soya flour. The percentage of farmers who discontinued utilization of soya bean products is equally fairly high. The highest percentage discontinuity of 45.9 percent was recorded for soya snacks, but only 23.7 percent for soya flour. Among reasons offered for discontinuing utilization, ignorance of the health benefits of using soya bean, lack of time to prepare then, inconsistency of suppliers and unat-

tractive odour ranked first (1st) to (4th) respectively.

RECOMMENDATIONS

Based on the findings, the following recommendations were put forward for implementation.

1. Although great strides have been made, as evidenced by high percentage of farmers adopting soya bean products, a lot of effort is needed to promote and achieve substantial levels of adoption of soya candies, soya meat, soya vegetable soup and soya snacks. These are the products with relatively short history of and low rate of adoption.
2. Intervention programmes should be put in place by the Extension Service to re-awaken farmers' interests in soya bean utilization. This can be done by massive campaign aimed at educating and re-educating farmers on the health benefits of soya bean products. This will remove the ignorance of its value that ranked first among the reasons for discontinuity in adoption of soya bean products.
3. Extension efforts should also incorporate dissemination of information on simple technologies for soya bean processing at farmers' homes and at the village level.
4. Further research should also focus on easier way of processing soya bean.
5. Periodic monitoring and assessment of adoption statuses of farm-families should be done by Field Extension Agents while feedback is provided for Research Scientists.

REFERENCES

- Adekayode FO 2011. Soya Bean-Recipes (Utilization of Soya bean products in Ondo State, Nigeria). From <http://www.docstoc.com/docs/69874711/Soyabean-Recipes-_Utilization-of-Soybean-Products-in-Ondo-State> (Retrieved July 20, 2011).
- Alibaba.com Hong Kong Limited and Licensors 2011. USDA Attache: Nigeria's Soybean Output Growing. From <http://www.alibaba.com/trade/servlet/page/static/copyright_policy> (Retrieved July 20, 2011).
- Apantaku SO, Omotoayo AM, Oyesola OB 1998. Poultry farmers willingness to participate in Nigerian Agricultural Insurance Scheme in Ogun State, Nigeria. In: OO Oduguwa, AO Fanimu, AO Osinowo (Eds.): *Proceedings: Silver Anniversary of Nigerian Society for Animal Production (NSAP)/WASAP Inaugural Conference*. March 21-26, pp. 510-511.
- Dionco-Adetayo EA, Olaniyan OF, Ogunba BO 2002. Factors Influencing Soybean Utilization in the Household Consumer Market. *Technovation* Volume 22, Issue 2, Pages 129-133. From <<http://www.Sciencedirect.com/science?>> (Retrieved on August 30, 2011).
- Fabiye EF 2007. An assessment of improved soya bean processing adoption in Dass Local Government Area of Bauchi State, Nigeria. *Global Journal of Agricultural Sciences*, 6(1): 73-76.
- International Institute of Tropical Agriculture (IITA) 2010. Research Gives Birth to Nigerian Soybean Industry. From <<http://www.iita.org>> (Retrieved July 20, 2011).
- International Livestock Centre for Africa 1976. *Livestock Production of West Africa: A Regional Review of ILCA Systems Study*. Addis Ababa: ILCA.
- Mathews-Njoku E 2005. Adoption of soya bean products in Owerri North Local Government Area of Imo State, Nigeria. *Agrosearch*, 7(1): 17-22.
- Okoro FU 2000. Adoption of rabbitry technologies among farmers in Okigwe Agricultural Zone of Imo State. In: SN Ukachukwu, JA Ibeabuchi, SN Ibe, AG Ezekwe, SF Abasiakon (Eds.): *Proceedings of 25th Annual NSAP Conference*, held at Umudike, March 19 -23, 2000, pp. 414 - 417.
- Olatunji SO, Agumagu AC, Adesope OM 2011. Utilization of soya bean products among farm families in Abia State, Nigeria. *Journal of Agricultural Extension and Rural Development* (JAERD-10-002). *Accepted for publication*, (In press).
- Oyesola OB, Olujide MG 2000. Participation of Livestock Farmers in Nigeria Agricultural Insurance Scheme. A case study of Iseyin Local Government Area of Oyo State. In: *Proceeding of the 5th Annual Conference of the Animal Science Association of Nigeria*, held at Port Harcourt, September 19-22, 2000, pp. 213-214.
- Pedersen P 2011. Iowa State University Extension. From <<http://extension.agron.iastate.edu/soybean/contact.html>> (Retrieved on August 29, 2011).
- Shurtleff W, Aoyagi A 2010 History of Soybeans and Soyfoods in Africa (1857-2009): Extensively ...Research & Impact: Areas of Research. From <<http://www.cgiar.org/impact/index>> (Retrieved July 20, 2011).
- WHF (World's Healthiest Foods) 2004. Soya Bean Internal: From <file:11f:\New Folder\the World's Healthiest Foods. Htm> pp 1-16 (Retrieved on April 14, 2006).
- Williams CE, Williams SKT 1991. Extension Services in Livestock Production sector in Nigeria. *Nigerian Journal of Rural Extension and Development*, 1(1): 1-13.