

*Full Length Research Paper*

# Utilization of soyabean products by farm-families in Abia State, Nigeria

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Soyabean has been nicknamed “the poor man’s meat” because it contains 40.3% protein, 20% oil and 91.9% total digestible nutrient. This study assessed farmers’ awareness, knowledge of preparation and rate of utilization of selected soyabean products. Multistage sampling method was employed to select a sample of 137 farm-families who responded to a 45-item structured interview schedule used for data collection. Data were subjected to descriptive statistical analyses. Among others, it was found that between 73.7 and 93.4% of the farmers are aware of the various selected soyabean products. Friends and neighbours are farmers’ most important sources of information about soyabean, followed by television/radio while extension agents ranked third. Between 42.3 and 70.1% of the farmers know how to prepare soya flour, soya milk, soya moinmoin and soya vegetable soup but majority do not possess adequate knowledge for preparing soya meat, soya snacks and soya candies. About 32.9% of infants/children and 61.3% of pregnant women/lactating mothers were utilizing soyabean products at a very low rate of “once a week”. It was concluded that majority of the farmers are utilizing soyabean at a lower than adequate rate. It was recommended that more extension efforts be focused on creating awareness of the nutritional values of soyabean and dissemination of preparation technologies for products that most farmers do not know how to prepare. Pregnant women/lactating mothers and infants/children (who are more vulnerable to protein-deficiency diseases) should be persuaded to increase their frequency of utilizing soyabean products.

**Key words:** Soyabean products, farm-families, utilization, protein, nutritional deficiency diseases, Abia State, Nigeria.

## INTRODUCTION

The importance of agriculture to national development cannot be over-emphasized because agriculture is the major source of livelihood for man and animals. Nobody can do anything without food. Generally, all nutrients that are essential for normal growth and development of humans are derived from Agriculture. These include carbohydrates, protein, vitamins and minerals and oil. Carbohydrates refer to any of the various types of food such as cake, bread and potatoes which consist of oxygen, hydrogen and carbon and which provide the body with heat and power (energy). Protein, on the other hand, is any of many substances present in such foods (as meat, eggs, soyabeans, etc) that help to build the body and keep it healthy. Because of its significant roles

of body building and maintenance of health, protein has remained a very crucial element in the diet of man. Thus, the need for protein in the diet of man cannot be overemphasized. However, increasing high costs has continued to make protein from animal sources unaffordable to a vast majority of Nigerians, especially farmers. Igbedioh (1990) reported that morbidity and mortality arising from protein calories malnutrition in Nigeria was on the increase. Atinmo (1982) also asserts that malnutrition, especially protein-malnutrition in young children, continues to be the first and most outstanding health problem in Nigeria.

It should be noted that majority of Nigerians in rural areas, are resource-poor and hardly able to afford even their carbohydrates daily requirements talk less of protein. Protein from animal sources is unaffordable by most farm-families, hence the widespread of preventable protein-deficiency diseases in most rural communities in

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Nigeria. It was becoming increasingly necessary to supplement protein requirement of Nigerians (especially the farm-families) with relatively inexpensive plant protein as noted by Weingartner (1987), cited in Tiamiyu et al. (2001). Research evidence has shown that soyabean (*glycine max* (l) (merrill)) has higher and virtually unrivaled protein content than other crops and that it is a rich source of edible vegetable oil, vitamin and minerals. Soyabean, popularly called the "poor man's meat", contains 40.3% protein, 20% oil and as high as 91.9% total digestible nutrient (Fukushima, 2000; Fabiyi, 2007).

Health benefits of soyabean include prevention of heart diseases, cancer, high blood pressure, diabetes-related diseases and many others. Soyabean oil is rich in fatty acids and devoid of cholesterol. It is an excellent source of calcium, iron, and vitamins such as niacin, thiamin and riboflavin (Weingartner, 1992; World's Healthiest Foods, 2004).

Although most farmers in the area of study do not grow soyabeans, it is produced in large quantity in the Middle-belt and Northern States of Nigeria and is readily available in most markets in the Southern and Western States due to virile activities of merchants. Soyabean products and their uses have been promoted in Nigeria (Odebode, 2005) and in the Eastern States of Nigeria through the extension unit of the agricultural development programme (Mathews-Njoku, 2005). The promotions of soyabean by the agricultural extension service (especially the women in agriculture- WIA) have led to the emergence of several varieties of soyabean products in both rural and urban markets in Nigeria.

Prominent among soyabean products that farm families can readily take advantage of in improving their protein intake are: soya flour, soya milk, soya-pap (ogi or akamu), soya vegetable soup, soya moinmoin, soya snacks, soya meat, soya candies and soya akara. Soya flour or granulated soya is made from dried and grounded soyabeans. To make soya milk, the beans are soaked in water, coats removed, ground and boiled gently, sieved to remove the chaff. Soya palp is produced from a mixture of maize and soyabean grounded to paste and prepared by adding boiling water. Soya vegetable soup is prepared by grinding the beans to fine paste after removing the coat. The paste is added to vegetable and other ingredients to make soup. Soya moinmoin is made from boiling soyabean paste mixed with other ingredients to taste. Soya snack is made from roasted well-drained beans plus oil, salt and sugar. Soya meat is made from boiling soya milk and magnesium sulphate until it coagulates, and solidified. Then, cook as scrambled eggs or add to stew to supplement meat. Soya candies are made from roasted beans added to sugar, water and lime melted in a frying pan. Soya akara is prepared by mixing beans and soyabeans paste (with ingredients) and deep fry with groundnut oil. It is expected that utilization of these soyabean products will adequately meet protein nutrient needs of the farm families including children,

pregnant women and lactating mothers who have been the most vulnerable to protein-deficiency-related diseases and deaths.

There is inadequate information on the extent of adoption of recommended uses of soyabean products in the area of study. The knowledge of farmers' awareness, sources of information, knowledge of preparation and frequency of utilization of these soyabean products would be valuable and pertinent in assessment of the impact of agricultural extension efforts aimed at promoting utilization of soyabean products by farm-families in the recent past. The research will equally provide a basis for re-invigorating efforts at increasing farmers' awareness and utilization of these "life-giving" soyabean products if their utilization is at low ebbs. Indeed, agricultural development in Nigeria would most likely than not depend on existence of healthy work force, especially the farm-families.

In view of the foregoing, answers were provided to the following research questions:

1. What percentage of farmers is aware of the selected soyabean products?
2. What are farmers' sources of information?
3. What is the percentage of farmers who have knowledge about preparation of selected soyabean products?
4. What is the frequency of utilization of soyabean products by sampled farmers?

## METHODOLOGY

The population of study includes all farm families in the three agricultural development programme (ADP) zones of Abia State (Aba, Umuahia and Ohafia) (Appendix, Table 1). Multistage sampling technique was employed to select sample, considering that Abia State have been delineated into zones, blocks, circles and sub-circles. Two zones (Umuahia and Ohafia) were purposively selected from the three ADP zones in the State. Using simple random sampling technique at each stage, 3 blocks were selected from each zone, 2 circles from each block, 2 sub-circles from each circle and six (6) farm-families from each sub-circle. Thus, samples of 72 farm-families each were selected from Umuahia and Ohafia zones respectively. Most farm families in the area of study are made up of 5 to 7 persons. These include father, mother, and 3 to 5 children. In each of the sampled farm families, the father, mother or a grown up child (above 18years of age) who was accessible was interviewed and his or her responses taken as data for that farm-family. The sample size is 144 but only 137 subjects who responded to the entire interview schedule were included in the study. A 45-item structured interview schedule was developed by the researcher, validated by test and measurement experts and pre-tested on similar, but not the same, sample. The reliability coefficient of 0.71 obtained was considered adequate as a justification for using the instrument. Relevant data were subjected to descriptive statistical analysis (mean, percentage and ranking).

## RESULTS AND DISCUSSION

From Tables 1 to 5, results of data analysis are presented

**Table 1.** Percentage distribution of farmers on the basis of their awareness of selected soyabean products.

S/N	Products	Farmers not aware	Percentage	No of farmers who are aware	Percentage of farmers who are aware	Ranks of percentage awareness
1	Granulated soya	14	10.2	123	89.8	2
2	Soya milk	9	6.6	128	93.4	1
3	Soya candies	24	17.5	113	82.5	6
4	Soya ogi (akamu)	16	11.7	121	88.3	3
5	Soyavegetable soup	34	24.8	103	75.2	8
6	Soya meat	36	26.3	101	73.7	9
7	Soya snacks	32	23.4	105	76.6	9
8	Soya Akara	21	15.3	116	84.7	5
9	Soya moinmoin	18	13.1	119	86.9	4

**Table 2.** Percentage distribution of farmers on the basis of their sources of information about soyabean products.

S/N	Soyabean product	Not aware		EAs		Radio/TV		Print media		Friends/ neighbours	
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Granulated soya	14	10.2	12	8.8	34	24.8	8	5.8	69	50.4
2	Soya milk	09	6.6	07	5.1	29	21.2	10	5.8	82	59.9
3	Soya candies	24	17.5	30	21.9	39	28.5	6	4.4	38	27.7
4	Soya Ogi (akamu)	16	11.7	25	18.2	61	44.5	5	3.7	30	21.9
5	Soya veg.soup	34	24.8	28	20.4	13	2.5	2	1.5	60	43.8
6	Soya Meat	36	26.3	24	17.5	18	13.1	11	8.0	48	35.0
7	Soya snacks	32	23.4	17	12.4	29	21.2	13	9.5	46	33.6
8	Soya akara	21	15.3	14	10.2	33	24.1	5	3.7	64	46.7
9	Soya moinmoin	18	13.1	32	23.4	19	13.9	6	4.4	62	45.3
	Total	204		189		275		66		494	
	**Multiple ranks			3		2		4		1	

Sources of information (N=137).

**Table 3.** Percentage distribution of farmers on the basis of knowledge of preparation of soyabean products.

S/N	Product	Knowledge of soyabean product preparation		Rank
		No	%	
1	Soyabean flour	96	70.1	1
2	Soya milk	87	63.5	2
3	Soya candies	41	29.9	9
4	Soya ogi (akamu)	54	39.4	6
5	Soya vegetable soup	59	43.1	3
6	Soya meat	51	37.2	7
7	Soya snacks	49	35.8	8
8	Soya akara	56	40.9	5
9	Soya moinmoin	58	42.3	4

in the serial order of stated research questions.

#### Percentage distribution of farmers who are aware of selected soyabean products

The implication of the finding in Table 1 is that majority of

the selected Farm-families are aware of selected soyabean products. Only about a quarter are not aware of some of the products. This is commendable. It is a first step in the right direction because adoption of innovation usually begins with awareness. The adoption process involves: awareness, interest, evaluation, trial and

**Table 4.** Percentage distribution of farmers on the basis of frequency of utilization of soyabean products.

S/N	Soyabean products	Frequency of soyabean utilization per 3 week								Ranks
		0	%	1 to 2	%	3 to 4	%	5 to 6	%	
1	Soya flour	15	10.9	45	32.9	30	21.9	47	34.3	2
2	Soya milk	22	16.1	23	16.8	24	17.5	68	49.6	1
3	Soya candies	26	19.0	61	44.5	25	18.3	24	17.5	6
4	Soya ogi	27	27.0	49	35.9	17	12.4	24	24.5	3
5	Soya vegetable	34	24.8	53	38.7	28	20.4	22	16.10	8
6	Soya meat	36	26.3	58	42.3	20	14.6	23	16.8	9
7	Soya snacks	34	24.8	68	49.6	22	16.1	13	9.9	9
8	Soya akara	29	21.1	59	43.1	24	17.5	25	18.5	5
9	Soya moinmoin	35	25.6	49	35.8	27	19.7	26	19.0	4

**Table 5.** Frequency of utilization of soyabean by infants/children and pregnant women/lactating mothers.

Respondent	Frequency of utilizing soyabean product per week (N=137)							
	0	%	1 to 2	%	3 to 4	%	5 and above	%
Infant/children	48	35.1	45	32.9	22	16.1	20	14.6
Pregnant women/ lactating mothers	23	16.8	84	61.3	11	8.0	19	13.9

adoption/use (Orebiyi et al., 2005). No one is expected to adopt a technology of which he is not aware. This high rate of awareness may be due to effective extension activities, enlightenment, education or effective use of communication channels. The result corroborates the findings of a study in which Mathews-Njoku (2005) found that 66.6% rank of her study sample from Owerri North Local Government Area of Imo State Nigeria were aware of and consumes soyabean flour regularly. Higher percentage of awareness is noted in this study than Mathews-Njokus'. The policy implication of this is that extension activities in the study area may be adjusted effective. In the order of magnitude, most farmers are aware of soya milk (ranked first), followed by soya flour (ranked second) soya moinmoin (ranked third) and soya akara (fourth rank). Soyabean products that farmers are least aware of include: soya snacks (7th rank), soya vegetable soup (8th rank) and soya meat (9th rank). This finding suggests that more awareness needs to be created for soya candies, soya snacks, soya vegetable soup and soya meat (Table 1).

#### Farmers' major sources of information about soyabean products

The percentage distribution of farmers on the basis of their sources of information about soyabean is as shown in Table 2. Friends and neighbours were the most frequently used information source about soyabean product, followed by radio/TV. Extension agents ranked third (3rd) while print media was the least used source of information on soya bean products. Ogunlade (2004)

recorded a higher percentage (85%) of his study using extension agents as the major source of information on soya bean in Kwara State, Nigeria than noted in the current study (for example, 23.4% for Soya moinmoin). Most of this study sample used friends and neighbours as the main source of information. For example, 59.9% used friends and neighbours soya milk. The implication could be that extension activities in the area of study are not so effective. The findings that print media ranked last is expected since majority of the respondents are illiterates who cannot read printed extension information.

#### Percentages of the sampled farmers with adequate knowledge about preparation of selected soyabean products

Relevant data were analyzed using descriptive statistics and the finding are as presented in Table 3.

The products which most of the farmers cannot prepare are soya meat, soya snacks and soya candies. Thus, soya flour, soya milk, soya vegetable soup and soya moinmoin are the products which most farmers have adequate knowledge of preparation. Extension efforts that focus on dissemination of technologies for preparation of soya meat, soya snacks and soya candies require more attention among farmers in Umuahia and Ohafia ADP zones of Abia State.

#### Frequency of utilization of soyabean products by the sampled farmers

As shown in Table 4, between 10.9 and 26.3% of

sampled farm-families do not adopt selected soya bean products at all. This comprised the group of farmers who are not aware of the products and those who were aware but did not adopt. Considering the fact that most of the farmers in the area of study are resource-poor and cannot afford to source required level of protein for healthy living from animal sources only, the finding that up to 26.3% of respondent do not utilize soyabean product becomes a subject of concern. The implication is that a third of the farmers are likely to be susceptible to protein-deficiency related diseases. This situation will further aggravate the rate of protein calories malnutrition-related morbidity and mortality in Nigeria which Igbedioh (1990) already noted was on the increase.

The frequencies of respondents who utilize soyabean vary with different products. With the exception of soya milk, most of the respondents utilize soyabean products at a rate of 'once-per-week'. Soya milk is the product that farmers are utilizing more frequently than other products. In ranking of products farmers utilize more frequently, the products would appear in this order: (1) soya milk (2) soya flour (3) soya ogi (4) soya moinmoin (5) soya akara (6) soya candies (7) soya meat (8) soya vegetable soup (9) soya snacks.

Data in Table 5 specifically focus on utilization of soyabean products by infant/children and pregnant/lactating mothers. The table reveals that 35.1 and 16.8% of infants/children and pregnant women/lactating mothers, respectively, do not utilize soyabean products. While it is commendable that only 16.8% of pregnant women/lactating mothers do not use soyabean products, it is worrisome that as high as 35% of infants and children do not use them. This finding give credence to the assertion of Atinmo (1982) that malnutrition, (especially protein-energy malnutrition in young children continues to be first and most outstanding health problems in Nigeria. Should this trend continue, there may be astronomic increase in the rates of morbidity and mortality arising from protein calories malnutrition in Nigeria which Igbedioh had reported was on the increase in 1990.

Table 5 also reveals low rates of soyabean product intake among infant/children and pregnant women/lactating mothers. As high as 61.3 and 32.9% of women/lactating mothers and infants/children respectively take soyabean products at a rate just once a week. Only 14.6% of infant/children and 13.9% of women/lactating mothers take soyabean 5 or more times a week.

Although studies are needed to determine the quantity of soyabean product that is adequate for every individual, yet, the finding of this study represents gross insufficiency in the rate of utilization. The implication of eating balanced diet as stressed by WHF (2004) and Fabiyi (2007) would mean that each day's food should be rich in protein. Thus, it seems that with utilization of soyabean products in at least once-a-day would

represent the minimum dosage for all farmers, but more especially for infants, children, pregnant women and lactating mothers. Most farmers are very far below that minimum. The findings are as indicated in Tables 4 and 5.

## Conclusion

The study revealed high rate of awareness of respondents on the selected soyabean products. Awareness was as high as 93.4% for soya milk while the product that farmers are least aware of is soya meat (73.7%). The highest percentage of sampled farmers who are not aware of some soyabean product is 26.3%. This percentage is considered high enough to generate anxiety because of its health implications. The soyabean products that respondents are least aware of are soya candies, soya snacks, soya vegetable soup and soya meat. Most of the sampled farmers got most information about soyabean products from friends and neighbours, followed by radio/TV, while extension agents ranked third (3rd) The finding suggests that extension activities in the area of study may not be as effective as expected, even as farmers are using other information sources more than the extension agents. Most farmers are aware of processes for preparing soya flour, soya milk, soya vegetable soup and soya moinmoin but do not possess adequate knowledge for preparing soya meat, soya snacks and soya candies.

It was also found that the rate at which most respondents utilize soyabean product is about once-a-week. Only a few utilize soyabean products at five or more times per week. Less than 15% infants, children, pregnant women and lactating mothers utilize soyabean products at the rate of five or more times a week. Majority of the respondents utilize soyabean products at the rate of once per week. The rate is considered grossly inadequate to meet the protein calories requirement of farmers, infants, children, pregnant women and lactating mothers to check increases in morbidity and mortality which literature have established are on the increase in Nigeria (Kennedy and Alderman, 1987; WHF, 2004 and Fabiyi, 2007).

## RECOMMENDATIONS

Based on the findings, it was recommended that the current status of awareness be sustained and improved upon. Efforts should be made to reach the 26.3% of farmers who are not aware of some soyabean products. More attention should be focused on soya candies, soya snacks, soya meat and soya vegetable soup which farmers are not so much aware of. Lack of awareness on soyabean processing technologies may have resulted in observed low adoption among the respondents.

Therefore, promotion activities are very necessary to create adequate awareness of existing soyabean foods. Processing knowledge will, more likely than not, increase the rate of utilization of soya meat, soya candies, soya snacks and soya vegetable soup which most farmers do not know how to prepare. These products that farmers tend to use only sparingly (soya snacks, soya vegetable soup, soya meat and soya candies) should be popularized through increased extension activities. The women in agriculture (WIA) could be involved in a special outreach to women in the villages with a view to informing and teaching women on the nutritional benefits, how to prepare and use soyabean products.

There should be widespread campaigns emphasizing the nutritional values of soyabean utilization especially among vulnerable groups such as children, infants, pregnant women and lactating mothers. The current average rate of adoption (once-per-week) should be greatly improved upon.

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APPENDIX



Table 1. Map of Abia State, Nigeria indicating the study area.