

## Challenges in Groundnut Production and Adoption of Groundnut Production Technology Information Packages among Women Farmers

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### Abstract

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Reviving groundnut production in Nigeria requires concerted efforts by the stakeholders. Women farmers are important groundnut producer in Taraba` state, they are involved in all aspect of the groundnut value chain. Several groundnut production technologies have been developed and communicated through the extension service to the farmers. Conversely there has been a decline in production and participation by women farmers. Therefore women farmers remain resource poor and largely illiterate. To up scale production and take advantage of the industrial potential of this crop an investigation was conducted to document the socio economic, demographic and institutional variables of women farmers, identify technology information packages communicated to the farmers and adoption of these technologies. A total of 200 farmers were interviewed, respondents were sourced using multi stage sampling procedure. Data collected were summarized and submitted for descriptive statistics, stepwise regression analysis as used to identify socio economic, demographic, institutional and institutional factors that influence the adoption of certified seeds, use of insecticides, storage and harvesting techniques among the women farmers. Showed that most of the respondents are married, full-time farmers and are fairly educated. The household size, marital status, source of information, primary occupation, age, land tenure status and recommended fertilizer dosage, significantly influenced adoption of certified seeds, use of insecticides, storage and timely harvest among groundnut women farmers. Groundnut producers indicated that lack of credit facilities, high cost of improved seed and technical know-how, lack of fertilizer, as factors that limits production. The study revealed the need to enhance access to improved varieties, biopesticides, harvesting and processing techniques, credits and farm input for groundnut producers.

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**Keywords:** Groundnut producers, Groundnut production techniques, Regression, Adoption, Women farmers

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## Introduction

Groundnut (*Arachis hypogea*) originated from South America, but is now widely cultivated throughout the tropical, sub-tropical and temperate countries, and in Africa, Asia, North and South America. Optimum mean daily temperature to good growth is 30°C and growth ceases at 15°C and cool temperature delay flowering. Between 500 - 600mm of water reasonably distributed through the growing season allows a good production. Groundnut does well on sandy – loam soil, with pH range of 5-7 and soil should be rich in calcium and phosphorus which are essential for pod formation. It has the bunch, erect and creeping type. The popular varieties in Nigeria are kano local, kano 50, Castle cary, Samnut 21, 22, and 23 (rosette resistant varieties). Groundnut can be a sole crop or intercropped. It performs better as sole crop. Limitations in groundnut production ranges from land availability, labour, fund, availability of appropriate fertilizer dosage, disease control, post harvest challenges, proper storage to marketing. Groundnut is put into use in several ways; it is processed for oil, paste and kuli kuli. Groundnut is a cash crop providing income and livelihoods to the farmers. It also contributes to nutrition of farm families through consumption of energy and protein rich groundnut kernel and provides nutritious fodder (haulms) to livestock. Groundnut based plummy nut, a ready use therapeutic food.

Women farmers in Taraba are resource poor and illiterate groundnut producers, they partake in all aspects of the groundnut value chain. They own farms through their husbands or inheritance for their groundnut production (Ranjha et al. 2009). They work to acquire basic necessities such as food, clothing and shelter, through groundnut production. The greatest challenge in sub Sahara Africa is inadequate food supply and job creation for her teeming population. This has manifested in continuous food crisis associated with short fall in supply, rising cost of living, poverty, malnutrition, diseases and social unrest. In the time past several technologies have been deployed by research to farmer and these have impacted positively on production and incomes. On the other hand, there are some locations in Taraba state that were not been captured during dissemination of groundnut technologies for increased return on production and to effectively utilize the potential of this crop. The participation of women in groundnut production had been acknowledged by several authors. Women are involved in planting, weeding, harvesting, processing, storage and marketing.

Therefore to up scale production to meet increasing interest in groundnut for industrial revolution, emphasis should be placed on documenting technologies that have been communicated to the women farmer through extension service. It is imperative to assess the effectiveness and adoption of groundnut production technologies information packages among women farmers) in Taraba state. In addition, it is imperative to understand the factors that could be improved to ensure increased production among women farmers in Taraba state. The objectives of this study are to determine the socio economic and demographic variables of women farmers in Taraba state. Secondly to determine the factors that determines adoption of groundnut production technologies among women farmers, and to determine the effectiveness of groundnut production technologies among women farmers in Taraba state.

### **Materials and Methodology**

The study area covered women farmers registered with the extension service in five (5) local government areas (Ardo – kola, Jalingo, Lau, Yorro and Zing) in Taraba state, Nigeria. A multi - stage sampling procedure was used in this study. The study areas are purposively selected due to high activities of groundnut production by women farmers. In the second stage, two wards were chosen from each L.G.A, and in the third stage, from the selected wards, one village from the selected wards was picked to provide information on the groundnut production, processing and marketing. For each village 20 women farmers were randomly selected. Both structured questionnaires and interview sessions were employed to seek for information on groundnut production technologies. Some of the variables measured are Age, level of education, marital status, type of cropping system, farm size, experience (in years) of cowpea farming, access to credit and extension services. Data collected are summarised and submitted to descriptive statistics (frequency distribution tables and percentages). The extent to which socioeconomic variables, institutional and production characteristics limit adoption of groundnut production technology was rated among the respondents. The responses were categorized in accordance to a four point Likert-type scale (High, Moderate, Low and No impact). The categories were assigned scores of 4, 3, 2 and 1, respectively. The mean score for each technology information/factors was determined.

Technology information with a mean score of equal and above the cut-off mean of 2.5 was declared as information source perceived as important, and any mean score lower than 2.5 was classified as information that is not important.

A= number of responses per category

N= sampling size

Z= Likert score for each category

$[A \times Z / N]$ ..... (1)

The relationship between women farmers' socio economic, demographic and institutional variable on the adoption of certified seeds, use of insecticides, storage techniques and timely harvest was computed using the stepwise regression technique.

## Results and Discussion

The socio- economic characteristics of the respondents considered in the study are Age, marital status, Family size, Educational level, Primary occupation, Farm size, Years of experience in farming groundnut, land tenure status, source of information, source of improved groundnut production technologies, visit of extension staff and adoption of improved groundnut production technologies. Table 1 showed that 38% of the respondents are between the age brackets of 40-49 years, followed by those between 30-39 years (34%) and 20% of the respondents had their ages between 20-29 years, while (8%) recorded 50 years and above. Large proportions of the farmers are young and are supposed to be physically able and mentally more open to learn new technologies than older farmers. Our findings mirrored Ogunbameru et al. (2006) who identified age as a factor affecting women participation in agriculture. To a large extent our respondents are married (57%) with fairly large (6-10) household size. This ensures readily available household labour with reduced labour cost required for groundnut production (Ndanitsa and Umar, 2007).

Education is a measure for judging the quality of human resources and development stage of a society. More than half of the respondents (53%) attained one form of formal education or the other, hence the likelihood of their adopting the improved groundnut production technologies more than the uneducated respondents. The findings agreed with reports of Imoh and Essian (2005). They noted that farmers' level of education influenced adoption of technologies positively.

As shown in Table 1, 53% of the respondents are full – time farmers, 22% are civil servants while 20% are traders. Also 5% of the respondents are into other professions like pot making, cloth weaving etc. 85% of respondents have farm size of not more than two (2) ha, 11% have farm size of 2.1 – 4.0ha, while 2% have farm size of 4.1 – 6.0 ha. The remaining 2% of the respondents have farm size of more than 6.0 ha. The implied that women farmers are predominantly small scale groundnut producers with average farm size of 1.3 ha. Rabinowicz (2002) reported that small – scale farmers do not have adequate capital to expand their production level to take advantage of profitable packages of technologies to boost productivity. The study implied that the women groundnut producers could have increased their capacity if technology information packages and capital in short term is made available to them. 68% of the respondents had groundnut growing experience in excess of 10 years. Experience in farming was important because as the farmer cultivates year in and out, he is aware of his mistakes and accomplishments. He interacts with his counterparts on the achievements and challenges and in turn he learns corrective measures in groundnut production. This trend portrayed good signal for adoption of groundnut improved technologies in the study area as experienced farmers tend to understand the importance of technologies in farming (Idrisa et al. 2006). Also 72% of the respondents owned land, though most of the lands operated by married respondents are owned by their husbands. If not for their husbands, there is a possibility that access may be restricted due to unforeseen circumstances and family issues. Further, 28% of the respondents rented farmland for groundnut production.

Further, 45% of the women farmers got help from other farmers. A reasonable size of the respondents (39%) got information on groundnut production technology from extension workers. And 16% of the farmers benefitted from agricultural programmes aired on radio and television programmes. A study by Fabiyi et al. (2006) revealed that a serious constraint to agricultural development in Nigeria and West Africa is limited access to agricultural technology information by farmers. A large number of women farmers got information from other farmers, 39% got information from the agricultural extension service of Taraba Agricultural Development Programme, 4% of the respondents received information from the Ministry of Agriculture, while 8% were informed through the NGOs. A great deal of responsibilities lies with the extension workers to bring about change in the productivity and living standard of women farmers.

In contrast to the primary role of extension in this study area, 40% of the respondents were visited by extension staff at one time or the other, 60% did not have extension contact. Adekanye and Opaluwa (2009) had reported that extension services have often been ineffective in food and agriculture. They concluded that the problem is more compounded in the case of women, because of the unified agricultural extension system (UAES) in which men were always the first or the only target and recipient of the planned change in agriculture.

**Table 1: Socio-Economic Characteristics of Respondents in the Study Area (N=200)**

<b>Variables</b>	<b>Frequency</b>	<b>Percentages (%)</b>
<b>Age (Years)</b>		
20-29	40	20
30-39	68	34
40-49	76	38
50 above	16	8
<b>Marital status</b>		
Married	113	57
Widow	19	10
Single	68	34
<b>Household size</b>		
3-6	90	45
7-11	75	38
12-15	35	18
<b>Educational level</b>		
Primary	63	32
Secondary	39	20
Tertiary	4	2
Informal	94	47
<b>Primary occupation</b>		
Farming	106	53
Civil servant	44	22
Trader	40	20
Others	10	5
<b>Land tenure</b>		
Owner	144	72
Rented/lease	56	28
<b>Source of information</b>		
Radio	13	7
Television	19	10
Extension worker	78	39
Neighbours/friends	90	45
<b>Source of technologies</b>		
Other farmers	100	50
ADP	78	39
Ministry of Agriculture	7	4
NGOs	15	8
<b>Extension Visit</b>		
Visited	120	60
Not visited	80	40
<b>Experience in groundnut farming</b>		
<4 year		
5 - 9years	120	32
10 – 15 years	70	60
15 years>	10	8

**Table 2: Determinants of Adoption of Certified Seed among Women Groundnut Farmers in Taraba State**

Step	Variable Entered	Partial R - Square	Model R - Square	C(P)	F value	Pr > F
1	Improved varieties	0.5562	0.5562	83.3605	284.11	<.0001
2	Deep Tillage	0.0680	0.6241	42.5809	35.62	<.0001
3	Marital Status	0.0199	0.6441	32.0394	10.97	0.0011
4	Primary occupation	0.0099	0.6539	27.8361	5.55	0.0194
5	Age	0.0104	0.6643	23.3046	6.00	0.0152
6	House hold size	0.0158	0.6801	15.3613	9.53	0.0023
7	Source of inform.	0.0128	0.6929	9.3213	7.99	0.0052
8	Recommended fertilizer dose	0.0073	0.7002	6.7045	4.67	0.0319

The result of the stepwise regression analysis of socio economic, demographic and institutional variables (explanatory) on adoption of certified seeds (dependent) (Table 2) showed that eight variables namely; improved varieties, deep tillage, marital status, primary occupation, age, household size, source of information and recommended fertilizer dosage significantly influenced adoption of certified seeds among groundnut women farmers. Among all the variables, improved varieties and deep tillage are highly significant ( $P < 0.001$ ), they are most important compared to other variables. This is sequel to important role of deep tillage practice in the cultivation of groundnut. This practice tends to promote better rooting environment and increased podding.

The relationship between the use of insecticides in groundnut production and socio economic, demographic and institutional variables of the respondents using step wise regression technique showed that adoption of insecticidal was largely influenced by improved varieties and marital status (Table 3). In the study area groundnut producers were provided with high yielding, medium and late maturing varieties, on the other hand these varieties are susceptible to insect pests and diseases. Therefore to improve seed yield insecticidal spray must be carried out. Consistent use of insecticides has negative effects on the groundnut consumers, the producers and on the environment. High adoption for use of insecticides is consistent with greater awareness that spraying of insecticides is a requirement for high yield. Monu (1983) had noted that the control of pest and diseases was important for high yield otherwise yield loss between 40 – 80% was possible. This could be the same with groundnut production in the study area. Sabo et al (2013a and 2013b) had noted high preference for use of insecticides compared to botanicals in the control cowpea insect pests.

**Table: 3 Stepwise Regressions of Socio Economic and Institutional Variables on the Adoption of Use of Insecticides among Women Farmers**

Step	Variable Entered	Partial R - Square	Model R - Square	C(P)	F Value	Pr > F
1	Improved varieties	0.2218	0.2218	51.1035	56.44	<.0001
2	Marital Status	0.0962	0.3180	22.5563	27.79	<.0001

Groundnut is processed in to several forms which can contribute positively to household income, economic empowerment of rural people and industrial transformation. A major challenge of groundnut production in sub Sahara Africa is the access to functional storage and processing services. In the study area there are inadequate processing facilities and rural women are left with the crude methods of processing harvested groundnut. This investigation showed that adoption of groundnut storage technique was significantly related to deep tillage practice, marital status (women), availability of high yielding and stable varieties, household size and educational level. They recorded highly significant estimates. This implied that farmers are aware of adverse effect of poor storage of crops and the economic loss associated with yield loss.

**Table 4: Stepwise Regression of Socio Economic Institutional Variables on the Adoption of Storage Techniques among Women Farmers in Taraba State**

Step	Variable Entered	Partial R – Square	Model R – Square	C(P)	F Value	Pr >F
1	Deep Tillage	0.2413	0.2413	35.6837	62.98	<.0001
2	Marital Status	0.0394	0.2807	25.6434	10.80	0.0012
3	Improved varieties	0.0200	0.3008	21.5288	5.61	0.0188
4	House hold size	0.0294	0.3302	14.5413	8.57	0.0038
5	Educational level	0.0324	0.3625	6.6607	9.85	0.0020

The results of the step wise regression of timely harvest (dependent variable) on socio economic, demographic and institutional variables (explanatory) (Table 5) indicated that deep tillage, marital status, house hold size, extension visit, fertilizer application and land tenure are variables that influenced adoption of timely harvest among the women farmers. This result emphasized the importance of timely harvest of pods as an indicator of high economic return. The high adoption of timely harvest by the respondents was an indication that they were aware of the loss associated with delayed harvest.

**Table 5: Stepwise Regression of Socio Economic and Institutional Variables on the Adoption of Timely Harvest among Women Farmers in Taraba State**

Step	Variable Entered	Partial R-Square	Model R-Square	C(P)	F Value	Pr >F
1	Deep Tillage	0.1701	0.1701	38.8086	40.59	<.0001
2	Marital status	0.0604	0.2305	23.7140	15.47	0.0001
3	House hold size	0.0184	0.2490	20.5026	4.81	0.0295
4	Extension visit	0.0218	0.2708	16.3272	5.84	0.166
5	Fertilizer dose	0.0330	0.3038	8.9907	9.19	0.0028
6	Land Tenure	0.0149	0.3186	6.7871	4.21	0.0416

The groundnut producers in the study area provided information on the factors that limit groundnut production. As shown in Table 6, factors that limit groundnut production in the study area are lack of credit facilities was ranked first, next was high cost of improved seed and technical know-how. The women farmers identified lack of fertilizer and inadequate government aid as challenges to groundnut production. Further groundnut producers identified age as a determinant and was ranked fifth (5<sup>th</sup>), while gender issue was ranked sixth. Pest and diseases ranked seventh. These problems were severe among women farmers interviewed. It is pertinent to note that the cumulative effect of these problems may adversely impair the adoption of improved groundnut production technologies.

### Conclusion and Recommendation

The study found that most of the women groundnut farmer are young and are in to full time ground nut production; they are likely to adopt improved groundnut production technologies than the elderly ones. Most of the women famers had been left out by the agricultural development services of the ministry. A few respondents had extension contacts during the production period and in most cases the respondents stated that they did not see any extension worker at all. Among the women farmers adoption of certified seeds was largely influenced by the economic returns believed to accrue after production. This made great impact on socio-economic characteristics on the respondents. Also high adoption of insecticidal use in the study area by the respondents may be due to the devastating effect of pests on groundnut in the area. Also, adoption of timely harvest was recorded high by the respondents.

This indicated that they were aware of the loss that will be incurred as a result of untimely harvest. Knowing its importance, storage recommendations were accorded high level of adoption by large proportion of the respondents. Adoption of technology has proved to be a means of achieving sustainable increase in farm output and in turn higher income which could lead to better living standard of farmers generally. The study revealed that the adoption of improved groundnut production technologies by women farmers who benefitted from extension was very encouraging but could have been better if more women farmers were reached. However, adoption of technologies can only be seen and felt if backed by inputs supply and Government encouragement. Based on the findings of the study; the government should facilitate and link the women farmers in the study area to financial institutions to help them access credit facilities to enable them adopt improved groundnut production technologies for higher productivity.

The government should also help link women farmers with input providers (inputs such as fertilizer, improved seeds, pesticides) for easy sourcing of these inputs in good time and at affordable prices in order to arrest adoption discontinuations. It should be noted that mere information about improved groundnut production technologies by extension workers will not result in the adoption of such technologies unless farmers have easy access to inputs which is a major factor in the adoption of technologies for increased crop productivity generally. Improved production technologies to farmers should take into cognizance the prevailing farming system of the respondents. Technology dissemination to farmers should be based on potential economic benefits and should be simple and suited to the educational/ technological level of the respondents. Participation of young women in agricultural development schemes should be encouraged by Government and other stakeholders because of their high level potentials of innovation as compared to their older contemporaries.

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