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Analysis of Women Participation in Agricultural Production in Egbedore Local Government Area of Osun State, Nigeria

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Abstract: This study analysed women participation in agricultural production in Egbedore Local Government Area of Osun State, Nigeria. It investigated the women's access to economic resources and examined the influence of selected socio-economic characteristics of women and access to economic resources on their participation in agricultural production. Multistage random sampling technique was used to select 50 respondents for this study. The research was carried out with the use of well structured interview schedule to obtain the necessary data. Both descriptive and inferential analytical tools were employed. Probit analysis was employed to investigate the determinants of women participation in agricultural production in the study area. The empirical results revealed that household size, marital status and local taboos had significant impact on the women participation in agricultural production; all at 5% probability level with a log likelihood of -96.160222, pseudo R^2 of 0.0875 and LR statistic of 18.44 which shows that the model has a good fit. Most of the respondents were illiterate with non-formal educational status which directly informed their participation in agricultural production. The study concludes that there is high rate of involvement of women in agricultural production in the study area; hence the role of some socio-economic variables as well as assets such as social capital, landed-property, cash as well as savings are central in determining the participation level or perception on agricultural production.

Keywords: Women participation, Agricultural production, Egbedore, Probit analysis

INTRODUCTION

Women constitute more or less half of any country's population. In most countries however, women contribute much less than men towards the value of recorded production both quantitatively in labour force participation and qualitatively in educational achievement and skilled manpower (Lawanson, 2008). She pointed out that, the under-utilization of female in Agriculture has obvious implications for economic welfare and growth. Several factors, both economic and non-economic are responsible for this. Traditionally, women are regarded as homemakers, who oversee and coordinate the affairs and activities at home. Previously in Africa, women remained at home while their husbands and sons went out to the farm to work. But at home, however, they were not idle as they engaged in manual processing of food crops and other farm produce in addition to their housekeeping duties. With the advent of western education, industrialization and paid employment, men as well as women are drifted into the modern sector of the economy. And

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today, there are visible changes in the perception of women, principally because they have greater opportunities for education than before. They now constitute themselves into various societies or organizations and they are aggressively fighting for the liberalization of the role of women as opposed to restricting them to the home and home-based activities. In Nigeria today, however, women are excluded from certain occupational categories due to formal barriers as well as informal barriers to entry; the formal barriers which continue to hinder the entry of women into such occupational categories include: (i) lack of educational or technical training, (ii) labour laws and trading customs. The informal barriers include: (i) customs and religious practices, (ii) difficulties in combining domestic and labour market activities, (iii) management and worker attitudes, (Lawanson, 2008). According to Anne and Mary (1998), the early studies legitimized the idea of women as productive partners in agriculture, discovering and documenting the various roles played by women as farmers, farm wives, and agricultural professionals and recounting the stories of successful women in these roles. Nigerian women are saddled with most of the tasks in agricultural production 'supposedly' meant for the man but the benefits gained by them are not commensurate to the man-hours they spend on the task. Despite the dominant and important role women play in agricultural production in the country, they are hardly given any attention in the area of training and/or visitation by extension agents with improved technologies. Banks hardly grant them loans and they are hardly reached with improved seeds, fertilizer and other inputs (Damisa, Samndi and Yohanna, 2007) citing (Saito and Spurring, 1992). These conditions have entrenched the women in a vicious cycle of poverty that places them at a less advantageous vantage of income and resource empowerment. Few Nigerian women are engaged in top management cadre of formal sector establishments simply because majority of them lack the educational qualifications necessary for such positions. There is a long history of women participation in productive labour in Nigeria. In traditional communities, women like their male counterparts, hold farmlands and assist their husbands in all farming activities. Besides working on the farms, women of Nigeria as elsewhere in West Africa, actively participate in non-agricultural activities such as craft and dyeing, weaving and spinning, food processing, retail trade and other home-based informal activities. Lawanson (2008) shed more light on the role of Nigerian women in agriculture. As in other parts of Africa, Nigerian women have worked side by side with men in agriculture with some marked division of labour between them. The men performed the tedious tasks of felling trees, gathering and burning of bush and making ridges while women were involved in planting of seeds particularly food crops, harvesting, transportation, processing and selling of farm products. In Nigeria, there are significant regional differences in women participation in agriculture. For instance, a study of women in the country revealed that on an overall basis, 40 per cent of the rural women surveyed regarded farming as their major occupation. On regional basis, 89, 10 and 6 per cent of those in the East,

West and South respectively regarded agriculture as their main occupation (Lawanson, 2008).

Damisa *et al.*, (2007) pointed out that various researches conducted on the contribution of women to agricultural development in the country suggest that women contribution to farm work is as high as between 60 and 90% of the total farm task performed. The contribution of the women ranges from such tasks as land clearing, land-tilling, planting, weeding, fertilizer/manure application to harvesting, food processing, threshing, winnowing, milling, transportation and marketing as well as the management of livestock. Charles and Willem (2008) opined that the importance of the role played by women in agricultural production is such that the widespread failure so far to reach women farmers through formal extension services has major repercussions for national output and food security as well as social justice. Sharon (2008) viewed that both women and men play critical roles in agriculture throughout the world, producing, processing and providing the food we eat. Women make up half the rural population and they constitute more than half of the agricultural labor force. Rural women in particular are responsible for half of the world's food production and produce between 60 and 80 percent of the food in most developing countries. Yet, despite their contribution to global food security, women farmers are frequently underestimated and overlooked in development strategies.

Fabiyi, Danladi, Akande, and Mahmood (2007) quoting Folasade (1991) on 'the role of women in food production' submitted that lack of separate land for women and inadequate contact with extension agents are serious constraints faced by women farmers. Women very rarely own land in Nigeria, despite their heavy involvement in agriculture. Because women generally do not own land or other assets it has traditionally been difficult for women to obtain Bank loans or other forms of credit through the banking system. Land tenure system is largely by inheritance. This lack of title to land prevents women from exercising or improving their expertise in crop production and animal husbandry because of security of tenure. Majority of them use low yielding and unimproved planting materials, primitive and labour intensive farm implements, traditional farming practices, which have adversely affected agricultural production. It has been reported that 80% of the work done on the farm in agricultural activities takes place in rural areas. It is now widely demonstrated that rural women, as well as men, throughout the world are engaged in a range of productive activities essential to household welfare, agricultural productivity and economic growth. Yet women's substantial contribution continues to be under-valued in conventional agricultural and economic analyses and policies, while men's contribution remains the central, often sole focus of attention (Fabiyi *et al.*, 2007).

Objectives of the Study

The main objective of this study is to analyze women participation in Agricultural production in Egbedore L.G.A. of Osun State.

The specific objectives are to:

1. identify the personal and socio-economic characteristics of the respondents.

2. determine the women's access to economic resources (including access to capital, land, natural resources, credit and savings programmes), technical and professional skills information.
3. examine the influence of selected socio-economic characteristics of women and access to economic resources on their participation in agricultural production.
4. identify the constraints militating against women participation in agricultural production.

Hypothesis of the study

Null hypothesis (H_o): There is no significant relationship between selected socio-economic characteristics of women, access to economic resources and the level of their participation in agricultural production.

LITERATURE REVIEW

Damisa and Yohanna (2007) stated that the role of women in agricultural production in Nigeria can never be underestimated. They perform crucial roles in the domestic and economic life of the society. Rural and national developments can hardly be achieved with the neglect of this important and substantial segment of the society. In recognition of the important role of women in nation building, the Nigerian Government more than ever before is keen upon rural poverty alleviation as a way of improving the economy. As such, focus is on planned and desirable change in the rural societies in the form of agricultural development. The success of this planned change is however hinged largely on the active participation of women in agricultural production. A lot of literatures have shown the various contributions of women to agricultural production in Nigeria. The role of women in agricultural production has however not widely been explored. Male dominance in decision making in the household and economy as well as agricultural production has continued even in areas where women are the key providers of labour because the influence of women has not been recognized. The women have more or less been relegated to play second fiddle in homes and the economy. Considering therefore the importance of active participation of rural women in agricultural production, it is necessary to correct for this anomaly.

According to the World Bank participation source book, in Nigeria, women play a dominant role in agricultural production. This was confirmed by the findings of a study financed by the United Nations Development Programme (UNDP) in which the study revealed that women make up 60-80 percent of the agricultural labor force in Nigeria, depending on the region, and produce two-thirds of the food crops. Yet, despite the facts, widespread assumptions that men-and not women-make the key farm management decisions have prevailed. As a result, agricultural extension services in Nigeria (as in other African countries) have traditionally been focused on men and their farm production needs, while neglecting the female half of the production force. Most extension messages targeted at women emphasized their domestic role with topics on child care and family nutrition.

It became clear that despite a decade of Bank assistance in building up Nigeria's agricultural extension service, women were receiving minimal assistance and information

from extension agents. The study caught the eye of the head of the Nigeria's Federal Agriculture Coordinating Unit (FACU) and the Bank division chief on agriculture in the West Africa department who were both committed to finding a solution. In 1988 their support led to the creation of Women in Agriculture (WIA) programs within the existing state agricultural development projects (ADPs) in an attempt to address the gender-related deficiencies within the existing extension program. The ADPs were created in the 1970s with funding assistance from the Bank and their main objective was to increase the production of both food and industrial crops by stimulating agricultural production at the small farmer level.

Probit Model

A lot of research has been carried out on the influence of socio-economic variables on farmers' adoption decision especially in agricultural participation. In most cases, the use of Probit, Tobit or Logit was applied (Damisa *et al.,* 2007). Farmers were assumed in these models to make adoption decisions based on an objective of utility maximization. If a farmer has options of U_i and U_{ii}; then the farmer would either prefer U_i to U_{ii} or would be indifferent. Given agriculture as an occupational technology, the socio-economic and demographic characteristics of the woman may influence her participation decision and this in turn is likely to influence the level of her participation in agricultural production; hence, a Probit model was used to capture the participation process. Probit modelling is used for explaining a dichotomous dependent variable with the empirical specification formulated in terms of latent response variable (Damisa *et al.,* 2007) quoting (Verbeke *et al.,* 2000). Defining *Yí* as the utility index of participation in agricultural production then *Yi* is a function of the socio-economic and demographic characteristics of the woman: *Yi* = 1 for woman to participation in agricultural production and *Yi* = 0 for non-participation in agricultural production. Where Y* is the latent or unobservable variable. According to Damisa *et al.,* (2007), the observable variable is a dummy representing the agricultural participation decision of the woman; that is, Y = 1 if Y*>0 and Y = 0 otherwise; since utilities are random, the i-th woman farmer will agree to participate in agricultural production if and only if $U_i \wedge U_{ii}$, for the i-th woman therefore, the probability of participating in agricultural production is given by the utility maximization function.

METHODOLOGY

The Study area

The Study area is Egbedore Local Government Area of Osun State; having its headquarters in an ancient town named Awo. It is located in a warm tropic region of the rain forest of the South Western Nigeria. And, it experiences an average monthly rainfall of 25mm between May and July and 2.5mm between December and January. Also, the study area covers an approximately 102 sq km which is bounded by Ede North L.G.A to the south, Ejigbo and Surulere L.G.As to the West, Irepodun L.G.A to the North and both Olorunda and Osogbo L.G.As to the East. In addition, the study area being located in plain and hilly terrains with beautiful climate and favourable vegetation is noted for agricultural activities.

Majority of the farmers engage in large scale production of food and cash crops such as Cocoa, Kolanut, Palm-products, Orange, Banana, Maize, Yam, Cassava, Cocoyam e.t.c. Although, peasant farming is predominant in the area, a sizeable percentage of farmers engage in other forms of agricultural practices like Poultry-keeping, animal husbandry, fishing and bee-keeping. Other occupations of the people include blacksmithing, hunting, dyeing, weaving among many others. The Local Government area comprises of the following historical and notable towns and villages: Ido-Osun, Ara, Iragberi, Ojo, Ikotun, Ilawe, Iwoye, Idoo, Ofatedo, Okinni, Aro, Ekuro, Olorunsogo, Ooye, Ilaasan, Igbokiti, Abudo and many others. People in the L.G.A are predominantly Yorubas of Oyo extraction. The historical profile shows that the indigenes of the area are direct descendants of Oduduwa or notable members of the ancestral ruling houses in the old Oyo kingdom. Yoruba is the common spoken dialect.

Sampling procedure and sample size

From the identified towns/ villages in the Local Government Area, 10 of them were randomly selected. In the second stage, five registered female farmers from each of the selected villages were randomly chosen and interviewed for the purpose of this study. Thus, a total of 50 women were used for this study.

Research Instrument

The instrument used for data collection is structured interview schedule. Information collected were on socio-economic characteristics of respondents, agricultural activities engaged in, as well as level of access to economic resources.

Data analysis

Descriptive Statistics: Such as percentages and frequency distribution tables were used to analyze data on selected personal and socio-economic characteristics of the women, their access to economic resources, technical and professional skill information (extension services).

Inferential Statistics: Probit model was used to analyze the relationship between selected socio-economic characteristics of the respondent women and their participation in agricultural production. Women participation in agricultural production was assigned a discrete choice variable (yes or no) where a selected woman was asked to individually indicate whether she participates in agricultural production or not.

Model specification

According to Oni, Oladele and Oyewole (2005), the probit model is expressed as:

$Y = B_o + B_iX_i + e_i$

Where Y is dichotomous dependent variable which can be explained as;

Y = 1, if women participate, Y = 0, if women did not participate,

B_o = the intercept

B_i = regression coefficients that explain the probability of participation by women farmers,

e_i = the error term.

Given agriculture as an occupational technology, the socio-economic and demographic characteristics of the women farmers may influence the level of their participation in agricultural production (Damisa *et al.*, 2007).

X_i = Vectors of parameters to be estimated, i.e independent variables (i =1, 2, 3…11) where:

X_1= Age (years), X_2= Level of education (Years of formal education) , X_3= Household Size (Actual number), X_4= Level of Disposable Income (Naira), X_5= Land tenure right (Dummy; Yes =1, No = 0) , X_6= Marital Status (Dummy; Married = 1, Otherwise = 0), X_7= Years of experience in farming (years), X_8= Distance of the women's farm from homestead (Km), X_9= Access to subsidized Inputs (Dummy; Yes =1, No = 0), X_{10}= Access to credit facilities (Dummy; Yes =1, No = 0), X_{11}= Taboo (Dummy; Yes =1, No = 0).

RESULTS AND DISCUSSION

As shown in Table 1, majority (52.0%) of the respondents fall between age range of 41-50 years which simply means that they are within the active and productive age while most of them have no formal educational attainment. It was revealed that 78.0% do not have land tenure rights which connotes that, majority of them operate on rented, leased or borrowed farmland. There is inadequate extension service delivery in the study area as most of the respondents (74.0%) reported lack of access to extension services. The overall perception on participation in agricultural production was positive as most of them see it as non-gender vocation. Agricultural production constraints faced by the respondents are lack of capital, lack of government support, poor weather condition and diseases; 30.0% claimed lack of capital while 46.0% claimed combination of the listed production constraints. Mindset and land tenure rights were identified as participation constraints by 48.0% and 28.0% of the respondents respectively.

Table 1: Socio-economic Characteristics of the respondents

Variables	Frequency	Percentage
Age		
31-40	17	34.0
41-50	26	52.0
51-60	4	8.0
Above 60	3	6.0
Educational level		
Non-formal	33	55.0
Primary	11	27.0
Secondary	6	16.0
Land tenure rights		
No	39	78.0
Yes	11	22.0
Access to extension services		
No	37	74.0
Yes	13	26.0
Participation perception		
Negative	11	22.0
Positive	39	78.0
Agricultural production constraints		
Lack of capital	15	30.0
Lack of government support	3	6.0
Poor weather condition and Diseases	9	18.0
Combination of above factors	23	46.0
Participation constraints		
Land tenure rights	14	28.0
Gender inequalities	5	10.0
Mindset	24	48.0
Combination of above factors	7	14.0
Total	50	100

Source: Field survey, 2009

Probit Estimates of selected explanatory variables

The probit model was used to examine the influence of selected socio-economic characteristics of women and access to economic

resources on their participation in agricultural production. The model does this by estimating the log likelihood of the explanatory variables that influence the dependent variable; the level of significance and true relationship of this influence is also appropriately estimated and indicated by the model.

The empirical estimation of the Probit analysis result as presented in Table 2 reveals a log likelihood of -96.160222, pseudo R^2 of 0.0875 and LR statistic of 18.44, all significant at 5 percent probability level; this shows that the model has a good fit. Considering p>|z| values for all the variables included in the model as shown in table 2, only X_3, X_6, and X_{11} are significant and they are all significant at 5 percent α-levels; having confidence interval of 95 percent each. The implication of these from the finding is that increase in the level of any of the explanatory variables with positive sign, X_{11} in this case will have a positive effect on the women participation in agricultural production, whereas those explanatory variables with negative sign, X_3 and X_6 will exert a negative relationship on women participation perception in agricultural production. However, taboo (X_{11}) being positive and significant at 5 percent indicates that, it is a strong factor considered for women participation in agricultural production; although its coefficient being positive is contrary to apriori expectation because it is expected to be contributing negatively to participation, the positive sign could be attributed to more emphasis being placed on both crop and animal production other than animal production only which mainly focuses on piggery. However, household size (X_3) and marital status (X_6) are negatively significant at 5 percent α-level respectively; this means that, they are both important factors towards participation in agricultural production but their negative coefficients is at variance with a-priori expectations and findings of (Damisa et al; 2007) because, household size should measure number of working members; generally, an increase in family size is likely to increase the probability of participation in agricultural production; all things being equal; this probably means that, younger members of the households are not participating actively in agricultural production because youths of modern days prefer white-collar jobs. In the same vein, most of the respondents are married and as such marital status has a direct relationship with household size. All other estimated variables, that is: X_1, X_2, X_4, X_5, X_7, X_8, X_9, and X_{10} were found to have no significant statistical effect on the dependent variable.

In conclusion, some of these findings are contrary to a prior expectations and findings of (Oni et al., 2005 and Damisa et al., 2007) but may be explained by insincerity on the part of the respondents; thinking that, government inadequacies could better be expressed by inaccurate responses. Poor record keeping and the use of memory estimates by the respondents also contribute to the little deviation from the apriori expectations experienced.

Table 2: Probit Estimates of selected explanatory variables on the dependent variable

Variables	Coefficient	Standard Error	Z statistics	P-value
Constant	1.797291	1.1019832	1.76	0.078
Age (X_1)	-0.017307	0.0216464	-0.80	0.422
Education (X_2)	0.2279989	0.1708957	1.33	0.182
Household size (X_3)	-0.5673548	0.277094	-2.05	0.041**
Income (X_4)	8.09e-08	2.12e-06	0.04	0.970
Tenure right (X_5)	-0.0730558	0.2783172	-0.26	0.793
Marital status (X_6)	-0.3293294	0.170241	-1.93	0.053**
Years of experience (X_7)	0.1143045	0.1664658	0.69	0.492
Distance travelled (X_8)	-0.0363675	0.194804	-0.19	0.852
Access to subsidized input (X_9)	0.0176362	0.2374294	0.07	0.941
Access to credit facilities (X_{10})	0.3985417	0.2938333	1.36	0.175
Taboo (X_{11})	1.797291	0.3126904	2.19	0.029**

Source: Field survey, 2009

Log likelihood = -96.160222, LR statistic = 18.44, Pseudo R^2 = 0.0875, Prob > chi^2 = 0.0719

** Significant at 5% probability level

CONCLUSION AND RECOMMENDATIONS

The women in the area of study see agriculture as the major means of livelihood and therefore put high expectation of returns on the occupation. Majority of the women farmers are between the ages of 47 and 50; this might have accounted for the negative coefficient of the age variable; also, most of the respondents have non-formal educational status and it is expected that, the higher the education level of the woman farmer, the more the likelihood of her to out- migrate to seek for better placed employment. Then, household size, marital status, and taboo have significant influence on women participation; this is so because marital status is directly related to household size and this thus dictates, to some extent, the availability of labour for agricultural activities. Then, taboo is also a significant variable; this forbids them from cultivating certain crops and rearing a particular animal; and as learnt, this has cultural and religious attachment. Years of experience on the other hand, has an insignificant influence on the level of women participation in agriculture; also is the subsidized input, this is quite expected since the women interviewed claimed they have never come in contact with any extension agent through whom they believe subsidized inputs will reach them. This goes to support the claim of women being side-lined in important agricultural policy related issues. The empirical estimation of the probit analysis shows a log likelihood of -96.160222, pseudo R^2 of 0.0875 and LR statistic of 18.44, all significant at 5 percent probability level; this shows that the model has a good fit. Considering p>|z| values for all the variables

included in the model, only X_3, X_6, and X_{11} are significant at 5 percent α-levels each. The implication of all these from the finding is that increase in the level of any of the explanatory variables with positive sign, X_{11} in this case will have a positive effect on the women participation in agricultural production, whereas those explanatory variables with negative sign, X_3 and X_6 will exert a negative relationship on women participation perception in agricultural production. Hence, the study concludes that, there is high rate of involvement of women in agricultural production in the study area; though the output does not justify this. This study shows the picture of how the women in Egbedore Local Government Area of Osun State engage in agricultural production; variables such as household size, marital status, and taboo were shown to have significant effect on women participation perception. Also, this study pointed out that, the role of some personal and socio-economic variables as well as assets such as social capital, landed-property, cash, as well as savings is central in determining the women participation in agricultural production; therefore, the Null hypothesis is hereby rejected.

Recommendations

1. There is need for mass enlightenment programme on the need for active participation in agricultural production irrespective of educational status.
2. Government should encourage efficient and sustainable use of the existing cultivable land, by further investing in agricultural research and extension, with a view to increase the agricultural output as well as the corresponding income for households especially for those investing in commercial agriculture. By so doing, extension visits will afford the farmers the opportunity to have access to subsidized inputs and this will boost their level of participation in agricultural production.
3. Because of the respondents' involvement in social organizations which primarily focuses on thrift and credit activities; there is need for adequate training on money management so that credit facilities obtained can be properly channelled to agricultural production and other useful purposes for which it is meant.

REFERENCES

Anne, B.W and Mary, V.G, 1998: 'Women in Agriculture'. Paper presented at the Second International Conference on Women in Agriculture organized by the U.S. Department of Agriculture, held in Washington DC, U.S.A.

Charles, A. and Willem Z. 2008: Participation in Agricultural Extension, The World Bank participation sourcebook, Appendix II, Working *Paper Summaries.*

Damisa, M.A, Samndi, J.R, and Yohanna, M. 2007: 'Women Participation in Agricultural Production: A probit analysis', *Journal of Applied sciences, Vol. 7* (3) pp. 412-414

Damisa, M.A, and Yohanna M. 2007: 'Role of rural women in farm management decision making process: Ordered probit analysis',*World Journal of Agricultural sciences; Vol. 3* (4), p. 543, *IDOSI publication.*

Fabiyi, E.F, Danladi, B.B., Akande K.E, and Mahmood Y, 2007: 'Role of Women in Agricultural Development and their constraints', *Pakistan journal of Nutrition; Vol. 6* (6) pp. 676-678

Lawanson, O.I. 2008: Female labour force participation in Nigeria:'Determinants and Trends', Oxford Business and Economic Conference Program, Oxford, United Kingdom. June 22-24, 2008.

Nigeria: "Women in Agriculture, World Bank participation sourcebook", The World Bank group.

Oni, O.A, Oladele, O.I, Oyewole, I.K. 2005: 'Analysis of factors influencing loan default among poultry farmers in Ogun state: probit analysis', *Journal of Central European Agriculture, Vol. 6 (*4) p. 620

Sharon, B.H. 2008: 'Rural Women and Food Security' FAO Participation in Panel Discussion on the occasion of the International Day of Rural Women held in New York; 15th October, 2008.

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A Survey of Agricultural Chemicals Available to Farmers in South Western Nigeria

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Abstract: Agrochemicals has remained the main-stay of agriculture all over the world due to benefits including; reduction of drudgery, timely and efficient weed control, effective pest control and enhancement of the shelf life of agricultural produce. Adequate availability of appropriate agrochemicals to famers is therefore a pre-requisite to enhanced crop production A survey of availability of pesticides to farmers in South Western States of Nigeria (Oyo, Ogun, Osun, Lagos, Ekiti and Ondo) was carried out to assess the availability, price and quality of the pesticides in respective states. The survey revealed that Ekiti and Ogun states have the highest volume of both herbicides, insecticides and fungicides, followed by Lagos Ondo, Oyo and Osun in that order. The use of fumigant is very low across the states with only Oyo and Ekiti States showing traces of its use. Fumigants were unavailable in all the shops sampled in other states. Fungicides were popular only among the tree crops growing states of Ondo and Ogun while Paraquat was the most common herbicide across the states. DDVP was the commonest insecticides while forcelet (carbendazim), a very effective fungicide, was the most available in the sampled states. It is evident from the survey that there is the need for more awareness to be created for farmers in the study areas to improve on the efficient use of chemicals for enhanced production.

INTRODUCTION

The growing demand for food arising from the daily increase in population the world over has called for a more drastic means of combating the identified problems of agricultural productivity. In Nigeria, as in other tropical countries, the problems of crop production among others include those of weeds (Akobundu, 1987) and pests.

Over the years, various agrochemicals have been used to combat these problems with a view to improving overall yield per plot. Agricultural chemicals are chemical agents used in enhancing food production. Among such chemicals are herbicides, fungicides, insecticides, nematicides and fumigants. Broadly, they are jointly referred to as pesticides. Pesticides therefore are all substance(s) used for controlling, preventing, destroying or repelling any pest (Liebman, 1993; Oudejans, 1994).

Many pesticides are available today for the control of unwanted organisms. The importance of these pesticides cannot be overemphasised in present day agriculture. This is due to the fact that more land needed to be put under cultivation to meet up the rising demand for food. Also, since the agro-allied products that are produced will have to be stored, there is the need for chemicals that will assist in the keeping quality of such produce. Furthermore, with the introduction of new varieties of crops, especially those with higher yield and better quality, it become more pertinent to step up protection against pest and pathogenic organisms as such

crops are usually more susceptible to pest and diseases, and will achieve the objective of high yield and quality (Moore, 1980).

Herbicides are the most widely used class of pesticides in the world, accounting for 44% of all sales in 1988 (Conko *et al*, 2002). In the United States, more than 90% of the total mass of pesticides applied each year is herbicide (Conko *et al*, 2002). In the last 100 years, the use of herbicides has led to increase in the food basket of the world geometrically by boosting agricultural productivity (Anonymous, 1992).

From the foregoing therefore, it is perfect to state that the development and hence productivity of agriculture is directly related to availability of pesticides. In the light of this, the objective of this work is to examine the extent to which various types of agricultural chemical are available to farmers in the South Western States of Nigeria. The specific objective is to examine the extent to which famers embrace the available chemicals

MATERIALS AND METHOD

Study Area

The study was carried out in the South Western region of Nigeria. The states in the region include Oyo, Osun, Ekiti, Ondo, Ogun, and Lagos States.

Population of the study

The population of the study comprise all the farmers in the South Western region of Nigeria. This constitutes the sampling frame within which the respondents were selected.

Sampling procedure

One to three towns with major farmers' centre were selected for the survey and three farmers' centres were selected from each state. In each of the three farmers' centres randomly selected in each of the major towns/cities, survey was carried out on the type of agricultural chemicals present in the shop. Ultimately, 26 centres were sampled. These agricultural chemicals were grouped under the following sub-headings: Herbicides, Insecticides, Fungicides and Fumigants. The manufacturing and expiration dates of each of the chemicals were noted and recorded. The data collected were described using descriptive statistics. These locations are as listed in Table 1.

Table 1: States and major towns/ cities where farmers' centres were located

State	Town(s)
Oyo	Ibadan, Oyo, Ogbomoso
Osun	Osogbo, Ede
Ekiti	Ado Ekiti
Ondo	Ondo
Ogun	Abeokuta
Lagos	Ikeja

RESULTS AND DISCUSSION

The agricultural chemicals available to farmers in the study area were presented in Table 2. It was revealed that Ogun and Ekiti states have the widest range of herbicides with an average of nine herbicides in their centres, followed by Lagos state. Ondo state has the lowest number of herbicide with an average of three herbicides.

For insecticides, Ekiti and Lagos states have the widest variety of insecticides available in their centres. Each of them has 8 various types of insecticide. They were closely followed by Ondo and Ogun states. Osun state has the lowest number of insecticide available in their centres. Furthermore, Table 2 shows that Ondo, Ogun

and Lagos state have the widest range of available fungicides. This could be as a result of predominant tree crop production activities in the states. It is well known in Nigeria that Ondo state top the list in Cocoa production (Morton and Staub, 2008; Ogunlade and Aikpokpodion, 2010) which involves heavy use of fungicides for the control of fungal diseases including black pod disease caused by the fungus *Phytophthora palmivora*. This may be responsible for the wide range of fungicide available in the state. The popularity of fungicides in Lagos in spite of the fact that Lagos is not known for tree crop production may be explained in terms of Lagos being the major commercial centre with many distributors and agro-allied chemical companies from where sellers all over Nigeria restock their warehouses.

Fumigants are not available to most of the farmers in the study area. This may be due to the fact that not many farmers store their farm produce. The bulk is sold immediately or shortly after harvesting *as* fumigants are mostly used for storage purposes. On the whole, Ekiti state has the widest range, 18 types of agro-chemicals available to the farmers, followed by Lagos, Ogun and Ondo states in that order. Osun state has the least number of agricultural chemicals. The poor availability of a wide range of agro-chemicals in Osun and Oyo states may be due to low production of tree crops such as cocoa, kolanut etc (Sanibel, 1999; Ogunlade and Aikpokpodion, 2010)

In all the farmers' centres sampled, 46.2% of them have less than 6 types of herbicides available for sale. The implication of this was that the farmers will not have enough choice in term of variety and type (Tilman, 2000).

Table 2: Mean frequency distribution of the number of Agricultural chemicals available in each of sampled states.

States	Herbicides	Insecticides	Fungicides	Fumigant	Availability
Osun	2.8	3.4	0.6	0	6.8
Oyo	4.7	4.3	0.56	0.22	9.78
Ekiti	9	8	1	0.23	18.33
Ondo	8	7.3	2	0	17.3
Ogun	9	7.3	1.67	0	17.97
Lagos	8	8	2	0	18

Table 3 shows that *Gramozone* containing *paraquat* was the commonest (57.0%) in all the shops sampled. This is followed by *altraforce* (46%) *paraeforce (paraquat*) 38.5. Force up *(glyphosate*) 27%. Force uron *(diuron*) 27% and fusillade *(fluazifop-butyl*) 27%.

Also, 38.5% of the centres have less than 6 insecticides available for sale. Table 4 shows that DD force containing DDVP is the mostly available of them in the shops sampled. This is follow by *act-force* and *thionex* 31%, *karate*, store force and *cyperforce* 23%, then *Lara force*, *nuvacron*, *monoforce*, *dimeforce* and *cyperdicot* which are available in only 19% of the sampled shops.

Table 3: Checklist of herbicides encountered during the survey and their frequency distribution within farmers' centre visited

Herbicide (Trade Name)	Classification (Pre/Post Emergence)	Availability		Non-Availability	
		Frequency	%	Frequency	%
Weed off	Post –E	5	19.2	21	80.8
Proper care		1	3.8	25	96.2
Cutlass	Post –E	1	3.8	25	96.2
Slasher	Post –E	1	3.8	25	96.2
Gramozone	Post –E	15	**57.7**	11	42.3
Ravage	Post –E	5	19.2	21	80.8
Paraquat	Post –E	3	11.5	23	88.5
Agro tone		1	3.8	25	96.2
Parae force	Post –E	10	**38.5**	16	61.5
Weed crush	Post –E	5	19.2	21	80.8
Dizmazine	Pre –E	3	11.5	23	88.5
Round up	Post –E	12	**46.2**	14	53.8
Up root	Post –E	1	3.8	25	96.2
Glycel		6	23.1	20	76.9
Fitscosate	Post –E	6	23.1	20	76.9
Vinash		3	11.5	23	88.5
Sansate	Post -E	2	7.7	24	92.3
Dizensate	Post –E	4	15.4	22	84.6
Transmite		2	7.7	24	92.3
Touch down	Post –E	2	7.7	24	92.3
Glycot		2	7.7	24	92.3
Clear weed	Post –E	1	3.8	25	96.2
Force up	Post –E	7	**26.9**	19	73.1
Betrazine	Pre –E	2	7.7	24	92.3
Altra force	Pre –E	12	**46.2**	14	53.8
Cotrazine	Pre –E	3	11.5	23	88.5
Primextra gold	Pre –E	7	**26.9**	19	73.1
Pendlin	Pre –E	5	19.2	20	80.8
Force top	Post –E	3	11.5	23	88.5
Delmi forte		2	7.7	24	92.3
Vestamine		2	7.7	24	92.3
Amino force		2	7.7	24	92.3
Herbex- Dsl		1	3.8	25	96.2
Force uron	Pre –E	7	**26.9**	19	73.1
Dietop		3	11.5	23	88.5
Fusilade	Pre –E	7	**26.9**	19	73.1
Butaforce		4	15.4	22	84.6

NB: Post –E = Post Emergence
Pre –E = Pre Emergence

Table 4: Checklist of Insecticides encountered during the survey and their frequency distribution within farmers' centre visited

Insecticides (Trade Name)	Availability		Non-Availability	
	Frequency	%	Frequency	%
Lara Force	5	**19.2**	21	80.8
Karate	6	**23.1**	20	76.9
Store Force	6	**23.1**	20	76.9
Act force	8	**30.8**	18	69.2
Dizpyafos	4	15.4	22	84.6
Pinex 48EC	2	7.7	24	92.3
Termex	1	3.8	25	96.2
Tremicot	2	7.7	24	92.7
Tricel	1	3.8	25	96.2
Gammalin 20	1	3.8	25	96.2
Nuvacron	5	**19.2**	21	80.8
Vestafos	1	3.8	25	96.2
Mono force	5	**19.2**	21	80.8
Cotchem	1	3.8	25	96.2
Diazol	2	7.7	24	92.3
Basudin	2	7.7	24	92.3
Thionex	8	**30.8**	18	69.2
Endocel	1	3.8	25	96.2
Endo force	7	**26.9**	19	73.1
Endo cot	2	7.7	24	92.3
Endo farm	1	3.8	25	96.2
Thiodan	1	3.8	25	96.2
Dime Force	5	**19.2**	21	80.8
Perferkthion	2	7.7	24	92.3
Cyperdicot	5	**19.2**	21	80.8
Dimethoate	1	3.8	25	96.2
Deltapad	2	7.7	24	92.3
Dash	4	15.4	22	84.6
DDVP	1	3.8	25	96.2
Pest off	1	3.8	25	96.2
Rhonchlorv	1	3.8	25	96.2
Cyperforce	6	**23.1**	20	76.9
Best cypermethrin	4	15.4	22	84.6
Best action	3	11.5	23	88.5
Unden 20	3	11.5	23	88.5
Smash	1	3.8	25	96.2
Dizvan	4	15.4	22	84.6
Delvap	4	15.4	22	84.6
Capsifox 20	1	3.8	25	96.2
Cyperfit	1	3.8	25	96.2
DD force	12	**46.2**	14	53.8

Furthermore, 46.2% of the centres did not have any fungicide for sale, while there were only 12 brands of fungicide available in the 14 centres that have the product (Table 5). *Forcelet, nordox 72, ridomin plus*, and *Z-force* are the most prominent of them all. In these centres where fungicides is not on sale, farmers are at the mercy of fungal diseases Also, 88.5% of the centres did not have fumigants with the remaining centres having only *phostoxin* and

aluphos in their stock (Table, 5). However, lack of adequate storage facilities by the resource poor farmers may be responsible for the low patronage for fumigants (Robert, 1985). This inadequate availability and use of the requisite chemical preservatives (e.g. fungicides) could be responsible for high storage losses often recorded in the tropics. When all\ the data were pooled together, it was obvious that 50% of the farmers' centres had more than 13 agro-chemicals in form of pesticides to sell to the farmers around them.

Table 5: Checklist of Fungicides and Fumigants encountered during the survey and their frequency distribution within farmers' centre visited

	Availability		**Non-Availability**	
	Frequency	**%**	**Frequency**	**%**
Fungicides (Trade Name)				
Team	1	3.8	25	96.2
Coacobre	1	3.8	25	96.2
Copper nordox	1	3.8	25	96.2
Funguran –OH	3	11.5	23	88.5
Chanp Dp	1	3.8	25	96.2
Nordox 72	4	**15.4**	22	84.6
Ridomin plus	4	**15.4**	22	84.6
Z-force	4	**15.4**	22	84.6
Forcelet	5	**19.2**	21	80.8
Seed plus	2	7.7	24	92.3
Dress force	1	3.8	25	96.2
Apron plus	1	3.8	25	96.2
Fumigants (Trade Name)				
Phostoxin	2	7.7	24	92.3
Aluphos	1	3.8	25	96.2

SUMMARY AND CONCLUSION

Having examined the availability of agricultural chemicals to farmers in southwestern state of Nigeria, the result showed that majority of the south western states need to boost their agriculture through better awareness to the farmers and see to the need for appropriate use of pesticides. These will automatically stimulate purchase and enhance productivity. It is also anticipated that with stimulated purchase, little or none of the pesticides will expire before sale to farmers. As a follow up, proper extension work is also required to educate the farmers on the appropriate choice, and effective use of the pesticides.

REFERENCES

Akobundu, I. O. (1987). Weed science in the tropics: principle and practices. John Wiley and sons N.Y. 522pp.

Anonymous (1992). Environmental protection Agency (EPA): Pesticides industry 1990-91 Office of pesticide programs fall. Washington D.C 75 pp.

Conko, G. and C. S Prakash (2002). "Bathing Hunger with Biotechnology" Economic perspectives vol. 7 No. 2

Liebman, M. and E. Dyck (1993). Weed management: A need to developed ecological approaches. Ecological application (3) 1:39- 41.

Moore, N. (1980). History of Agricultural Chemicals. Publication No 215 of Department of Corp Science, North Carolina State University

Ogunlade, M. L. and P. O.Aikpokpodion (2010). Physico-chemical Properties of Selected Cocoa soils in three cocoa growing Ecological Zones of Nigeria. Proc.44th Annual Conf., Agric. Soc. of Nig.: 1547pp.

Oudejans A. Y. (1994). The history of pesticides. Accessed at URL http://prr.hec.gov.pk/ Chapters/2953H-1.pdf on 25 October 2010

Robert, O. A. (1985). History of fumigants. National Research Council, National Academy Press. Washington DC. Vol.7:8. pp

Sanibel, J.D. (1999). Fungicides. Journal of Applied Ecology, Vol. 34, Issue 6.

Tilman, R.A (2000). Identification of Herbicides. *New Research*. National Academy Press, Washington DC.

Vince, M. and S. Theodor (2008). A short history of fungicides. APSnet Feature. Accessed at URL: http://www.apsnet.org/online/feature/fungi on 8 March 2008

Economic Analysis of Exotic Vegetable Production among Urban Fadama Women Farmers in Akinyele Local Government Area Oyo State, Nigeria

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Abstract: There is a steady increase in the number of people living in and around cities. The costs of supplying food from rural areas to urban areas are also rising. In urban areas, a few part-time growers devote time to the production of exotic vegetables at backyards as urban and marginal farms. This paper examines the economic importance of exotic vegetable production under Fadama system in Akinyele local government area of Oyo state. One hundred respondents were chosen using multistage sampling technique and information was collected from them with the aid of a well-structured questionnaire. Data were analysed using descriptive statistics such as frequencies and percentages as well as profitability analysis to determine the profitability level of the enterprise. Results obtained from various profitability ratios showed that exotic vegetable farming is a profitable venture that requires little capital and has become a source of livelihood to the farmers in the business. The significant variables that influenced vegetable production include farm size, quantity of fertilizer, insecticide, as well as labour. Profit can be maximised with the following in place; extension services, use of insecticides, availability of exotic vegetable seeds and provision of incentives to the exotic vegetable growers. The increase in their output level and profit will contribute significantly to food security in the country.

Key words: Urban agriculture, Fadama, profitability analysis, Nigeria

INTRODUCTION

The world's population is rapidly becoming urbanised as the world's urban population increased from 30 percent in 1950 to 47 percent in 2002 (Kennedy, 2003). Thus the number of people living in and round cities is on the increase. About 50 percent of the world's population now lives in cities; 77 percent of Latin Americans live in cities, while in Asia and Africa the proportion is currently 39 per cent, climbing at a rate of 3 and 4 per cent per year respectively. The numbers of urban poor are rapidly increasing. Urbanisation in sub-Saharan Africa is growing at alarming trends such that as population grows at an annual rate of 2.8 percent, urban population grows at a rate of 6.8 percent. In Nigeria, population grew at an average of 2.83 percent between 1999 and 2004 while urban population grew at the rate of 4.7 percent within the same period. This rapid increase in urbanisation poses new and different challenges for food security. It is hard for most cities in developing countries to provide sufficient employment for their rapidly increasing population. Meanwhile, transmissible diseases such as HIV/AIDS have eroded the income-earning capacity and assets of millions of urban households. As a consequence, the

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urbanisation process goes hand in hand with increase in urban poverty, dubbed the 'urbanisation of poverty' (Haddad et al., 1999). According to UN-HABITAT, slum populations in urban areas of developing countries were estimated at 870 million in 2001 and are expected to increase by an average of 29 million per year up to 2020. The costs of supplying and distributing food from rural areas to urban areas or importing food for the cities are also rising. The distribution within cities is again uneven. As a consequence, urban food insecurity will continue to increase (Argenti, 2000). The problems associated with this trend demand creative and multi-dimensional approaches. The city authorities are therefore faced with challenges of creating sufficient employment, providing basic services such as drinking water, sanitation, health services among other socially sustainable strategies for the communities. Thus, cities are fast becoming the principal territories for intervention and planning of strategies that aim to eradicate hunger and poverty and improve livelihoods, requiring innovative ways to enhance the food security and nutrition of the urban poor and vulnerable households. Interventions into urban systems must therefore recognise and reflect the complex interaction of social, economic and environmental factors that drive the daily life of cities.

Urban agriculture is one such strategy that enhances food security, stimulates local economic development, and facilitates social inclusion and poverty alleviation (Hovorka and Keboneilwe, 2004). Urban agriculture is therefore a response to the market demands resulting from rapid urbanisation. It includes activities such as production of food and non-food plants, tree crops and animal husbandry within and at the fringes of cities. Urban agriculture, when conceived as an intervention, positively affects a wide variety of urban issues. In addition to its direct contribution to urban food security and nutrition, urban agriculture also touches on public health, economic development, social inclusion as well as urban environmental management.

Urban agriculture (often differentiated as intra-urban and peri-urban agriculture) can be defined as the production of food (for example, vegetables, fruits, meat, eggs, milk, fish) and non-food items (for example, fuel, herbs, ornamental plants, tree seedlings, flowers) within the urban area and its periphery. The activity may be purposely for home consumption and/or for the urban market, and related small-scale processing and marketing activities (including street vending of fresh or prepared food and other products). In many places, urban agriculture is also closely linked with recycling and use of urban organic wastes and wastewater. Urban agriculture takes place on private, leased, or rented land in peri-urban areas, in backyards, on roof tops, on vacant public lands (such as vacant industrial or residential lots, roadsides), or on semi-public land such as school grounds.

More than 70 percent of the working population of sub-Sahara Africa depends on agriculture and related business for their livelihoods. While farming has traditionally been restricted to the rural area, farming within Nigerian cities is increasingly becoming an important economic activity among a section of the urban dwellers given the increasing number

of small garden and vegetable plots springing up in different parts of the country. This is because it serves both as a quick source of food thereby improving nutritional status as well as an employment opportunity for many urban dwellers. Besides, the potential for significant increase in food production can be exploited through the water resources that are available on the flood plains. Farming in Fadama areas is therefore, a major livelihood asset for urban dwellers. Fadamas are flood plains and low-lying areas underlined by shallow aquifers. Put in another form, Fadamas could be described as 'wetlands' in 'dry lands' or lowland around a river that flood or becomes wet when the river is high. The lands often have large deposits of organic matter and soils richer than the surrounding top lands. While these lands are relatively small compared with the overall available area, the Fadama lands have the potential for extended seasonal use and provide the opportunity for production diversification (Roger and Ingawa, 2004).

Leafy vegetables are an important feature of Nigerian's diet that a traditional meal without it is assumed to be incomplete. In developing countries, the consumption of vegetables is generally lower than the FAO recommendation of 75kg per year in habitant (206g per day per capita). In urban areas, where the village pattern is being replaced by a more sophisticated way of life, many people in the community cannot produce their own vegetables and a few part – time growers devote their spare time to the production of their own supplies of exotic vegetables as a backyard, urban ad marginal farms.

METHODOLOGY

The study was conducted in Akinyele Local Government Area of Oyo State, Nigeria. The local government has a land area of 575 square kilometres and the climate supports the growth of both local and exotic vegetables such as cabbage, cucumber, lettuce. The study area is also characterised by bimodal type of rainfall; hence two growing seasons are recognised. Population of the study comprises of all persons cultivating vegetable in urban and peri-urban areas in the local government area. Snowball technique was used to select 100 respondents for the study.

This study made use of data from both primary and secondary sources. Data were collected from the respondents using well structured questionnaires, Focused Group Discussion (FGD) and key informant interview procedures were also conducted to collect qualitative data for the study.

The data collected were described using frequencies and percentages while cost and return analysis was used to calculate the profitability level of vegetable production by considering the total cost of production and the total revenue generated. Multiple regression analysis was also used to establish the relationship between the total output and the input factors.

Profit made is the differences between total revenue and total cost; $\pi = TR - TC$

Where

π=Profit

TR=Total Revenue in Naira/ha

TC=Total Cost in N/ha

TC=Total Fixed Cost (TFC) + Total Variable Cost (TVC)

TC=TFC+TVC

The various profitability ratios computed from the above analysis includes: benefit-cost ratio, rate of return, expenses structure ratio, gross margin ratio and gross revenue ratio.

Multiple regression analysis was used to determine the relationship between vegetable output and the inputs used. The implicit function is,

$Y=f(X1, X2,X3, X4,X5, X6,X7,X8,\mu)$

Where,

Y=Vegetable output value (Kg)

X1 = Farm Size (ha)

X2 =Cost of Planting materials (Seeds)

X3= Fertilizer (Kg)

X4 =Herbicide (Kg)

X5 =Insecticide (Kg)

X6= Cost of Hired labour (Man-days)

X7= Cost of Family labour (Man-days)

X8= Cost of Farm implements

μ= Error term

RESULTS AND DISCUSSION

Table 1 shows the cost and returns of exotic vegetable production. The total revenue generated from the sales of the produce for a typical farmer was N829,489.00 while the total fixed and variable inputs cost amounted to N163,998.85k to give a profit of N665,490.15. This shows that exotic vegetable farmers under Fadama system actually made profit.

Table 1: Average cost and return for exotic vegetable farmers/ha

Items	**Amount (Naira)**
Planting material	6977.04
Fertilizer	16472.00
Herbicide	7870.59
Insecticide	10192.65
Labour	102325.00
Total Variable Cost (TVC)	143837.28
Land rent	7630.00
Hoe	2066.17
Cutlass	1565.83
Basket	1593.50
Pumping machine	5339.34
Watering can	1966.74
Total Fixed Cost (TFC)	20161.57
Total Cost (TC = TVC + TFC)	163998.85
Cucumber	127726.92
Carrot	185345.28
Lettuce	135316.67
Cabbage	211160.87
Water Melon	169939.26
Total Revenue (TR)	829489.00
Net Farm Income (NFI = TR - TC)	665490.15

Table 2 shows the percentage of the total cost allocated to fixed and variable inputs. For a potential farmer that wants to invest in exotic vegetable production under the Fadama system, 56.31 percent of the total cost of production would be expended on hired labour, 4.25 percent on planting materials (seeds), 10.04 percent on fertilizer, 4.80 percent on herbicides and 6.22 percent on insecticides. For the fixed cost items, 4.65 percent would be expended on land, 1.26 percent on hoe, 0.95 percent on cutlass, 0.97 percent on baskets, 1.20 percent on watering can and the highest portion of the variable cost items of 9.35 would be expended on water pumping machines from the total cost to be incurred from the exotic vegetable production.

Table 2: Cost Structure for a typical exotic vegetable farmer under Fadama System.

Cost items	Amount (N)	% of TFC	% of TVC	% of TC
Fixed cost				
Land	3815	18.92		2.325
Hoe	1033.085	5.00		0.63
Cutlass	782.915	3.89		0.475
Basket	76.75	3.95		0.485
Pumping machine	2669.67	13.24		4.675
Watering can	983.37	4.875		0.6
Sub total	10080.785	50.00		9.19
Variable cost				
Planting material (seed)	3488.52		2.425	2.125
Fertiliser	8236		5.725	5.02
Herbicides	3935.295		2.735	2.4
Insecticides	5096.325		3.545	3.11
Labour	51162.5		35.565	28.155
Sub total	71918.64		50	40.81
Over all total	81999.425			50

Table 3 gives the summary of the regression analysis. The lead equation was the linear regression model in which the sign of the coefficients followed a priori expectations. The F-statistic of 29.02 was significant at 1% level of significance, meaning that all the explanatory variables put together explained the variability of Y.

The lead equation is given below:

$Y = 15167.6 + 199364.9*X_1 + 3.627X_2$

(6.77) (0.81)

$+ 348.947***X_3 + 177.224X_4$

(1.74) (0.76)

$+317.908***X_5 + 1071.55*X_6 +$

(7.25) (0.22)

$683.921X_7 + 6625.795X_8$

(1.86) (1.18)

From the regression above, four explanatory variables were significant at different levels. These include farm size (X1), fertilizer (X3), insecticides (X5) and labour (X6). The farm size (X1) was significant at 1% level and had a positive relationship with the dependent variable (exotic vegetable production). This means that if the farm size increases, the output of vegetable production will also increase. Also, the quantity of fertilizer (X3), the quantity of insecticide used (X5) and the labour employed (X6) were significant at 10, 10 and 1% levels respectively. All these variables were positively related to the exotic vegetable production. Therefore, any increase in these variables will equally translate directly into an increase in the output of vegetable produced.

Table 3: Summary of Multiple Regressions Analysis

Model	Linear Equation	Semi-Log Equation	Double-Log Equation
X0	4550.28	32105.34	4.46
X1	199364.9*	1.38100.4*	0.29279.2**
	(6.77)	(4.98)	(2.57)
X2	3.627	-12992.25	-0.081
	(0.81)	(-0.80)	(-1.21)
X3	348.947***	-28293.95	-0.011
	(1.74)	(-1.08)	(-0.10)
X4	177.224	11401.99	0.069
	(0.76)	(0.41)	(0.61)
X5	317.908***	18073.61	0.018
	(1.86)	(0.64)	(0.16)
X6	1071.55*	126596.5*	0.369*
	(7.25)	(4.69)	(3.32)
X7	683.921	-25389.6	0.961
	(0.22)	(-0.15)	(-1.42)
X8	6625.795	8249.29***	0.325***
	(1.18)	(1.77)	(1.69)
R^2	0.71	0.60	0.34
Adj.R^2	0.69	0.57	0.28
F- stat	29.02*	17.78*	6.01*

* Significant at 1% level of significance ** Significant at 5% level of significance
*** Significant at 10% level of significance

CONCLUSION

Exotic vegetable production is a profitable business and it has provided a means of livelihood to the operators of the business. Profit however can be maximised if government intervenes in the area of extension services, importation of improved exotic vegetable seeds and provision of adequate incentives to the exotic vegetable growers. This would increase their output level and also contribute significantly to food security in the nation as a whole and the urban areas in particular.

REFERENCES

Argenti, O. (2000): 'Food for the Cities: Food Supply and Distribution Policies to Reduce Urban Food Insecurity', FAO, Rome.

Haddad, L., Ruel, M., and Garrett, J. (1999) 'Are urban poverty and under nutrition growing? Some newly assembled evidence', World Development 27 (11).

Hovorka, A., and Keboneilwe, D. (2004) 'Launching a policy initiative in Botswana', Urban Agriculture Magazine 13, Trees and Cities – Growing Together: p.46.

Kennedy, G (2003):Food security in the context of urban sub-Saharan Africa. Food Africa Internet Forum.

Roger Blench and S.A. Ingawa (2004): A Practical Guide for National Fadama Development Project II on Conflict Analysis and Management.

Estimating Economic Growth and Inequality Elasticities of Poverty in Rural Nigeria

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Abstract: In order to achieve poverty reduction, both economic growth and equity have assumed a central place. It is against this background that this paper analyzes income growth and inequality elasticities of poverty in Nigeria over a period of time. The results are based on the analysis of secondary data obtained from National Consumer Survey of 1996 and 2003/2004 Nigeria Living Standard Survey. We use changes in mean per capita expenditure as a yardstick of economic growth and adopt simple but powerful ratio estimates of Economic Growth and Inequality elasticities of poverty. The growth elasticity of poverty indicates that 1 percent increase in income growth will lead to 0.624 percent reduction in poverty. The inequality elasticity of poverty shows that a decrease of inequality by 1 percent would have decreased poverty by just 0.34 percent. The result implies that what matters for poverty reduction is mainly accelerated economic growth, redistribution and reductions in inequality

Keywords: Economic growth**,** elasticity, inequality, poverty reduction, rural Nigeria.

INTRODUCTION

The establishment of the Millennium Development Goals has set poverty reduction as a fundamental objective of development. In recent years, there has been an upsurge of interest in the impact of development on poverty. Poverty has increasingly become a major global issue, with halving extreme poverty by 2015 constituting the first, and perhaps the most critical, goal of the Millennium Development Goals (MDGs).

Since the 1980s, the poverty rate has been trending significantly downward in all regions of the world except in sub-Saharan Africa (SSA). The ratio of poverty for all less developed countries (LDCs) fell from 27.9% to 21.1%, but the ratio for Africa actually increased from 44.6% to 46.4% (Ravallion and Chen, 2004). Against this background it is not surprising that several recent papers argue that most African countries will not achieve the target of reducing poverty by half by 2015 (Fosu, 2008; UNDP, 2003; Hanmer and Naschold, 2000) . In the last two decades in Nigeria, there has been little or no progress made in alleviating poverty despite the massive effort made and investment into many programmes established for that purpose. For instance, Canagarajah, *et al*., (1997), reported increased level of poverty over the period spanning the 1980s and 1990s in Nigeria and inequality was established with an increase in the Gini coefficient from 38.1 per cent in 1985 to 44.9 per cent in 1992. Results of the 1996/97 National Consumer Survey showed that about 56 percent of Nigerians live below the poverty line. In 1985 about 43 percent were below the figure at 34.1 percent at 1985 prices. In 1992, 46.4 million Nigerians were said to be living in absolute poverty, out of which 80.2% or 37.7 million are in the rural areas (Ogwumike, 1996). The marginalization of the rural areas through urban-biased development policies is

largely responsible for the high poverty incidence in the rural areas (Obi, 2007). These statistics indicate a worsening poverty situation in the country and a cause for concern (Okunmadewa, 1999).

The most frequently advocated manner to achieve such poverty reduction is through economic growth (Arsenio and Fuwa, 2003). Growth has therefore traditionally been considered the main engine for poverty reduction. As reported by the World Bank (World Development Indicator, 2002), real per-capita income in the developing world grew at an average rate of 2.3 percent per annum during the four decades between 1960 and 2000. This is a high growth rate by almost any standard. In order to achieve reduction in poverty, however, income growth has to be equitably distributed (Kalwij and Verschoor, 2007; World Bank, 2006). Thus, the current thinking on how best to achieve poverty reduction, both economic growth and equity have to assume a central place in development strategies. Further, equity is seen not only as of intrinsic importance but also of instrumental importance through its impact on the rate at which economic growth leads into poverty reduction. Essentially, economic growths are associated with policies of reduced poverty and income redistribution among the mass majority especially the rural dwellers.

What is more, evidences in the literature point to the increasing level of income inequality in developing countries including Nigeria, over the last two decades (e.g. Addison and Cornia, 2001; Kanbur and Lustig, 1999). Thus, to attain the objective of reducing poverty in Nigeria, the pre-occupation of the government has been the growth of the economy as a pre-requisite for improved welfare. To this effect the government therefore initiated several economic reform measures which include Economic Stabilization measures of 1982, Economic Emergency Measures in 1985 and Structural Adjustment Programme (SAP) in 1986. Components of SAP include market- determined exchange and interest rates, liberalized financial sector, trade liberalization, commercialization and privatization of a number of enterprises (Aigbokhan, 2008). Specialized agencies were also established to promote the objective of poverty reduction. These include Agricultural Development Programmes, Nigeria Agricultural, Cooperative and Rural Development Bank, National Agricultural Insurance Scheme, National Directorate of Employment, National Primary Health Care Agency, Peoples Bank, Urban Mass Transit, mass education through Universal Basic Education (UBE), Rural Electrification Schemes (RES) among others. The recent effort is based on the seven point agenda. Like earlier reform packages, the strategy considers economic growth as crucial to poverty reduction. The major issues of the seven point agenda include: power and energy, food security, wealth creation and transportation. Others are land reforms, security and mass education.

Additionally, attention to the importance of income distribution in poverty reduction seems to be growing .Whether growth reduces poverty, and whether in particular growth can be deemed to be “pro-poor”, depends, however, on the impact of growth on inequality and on how much this impact on inequality feeds into poverty (Araar and Duclos, 2007). This paper is thus set to analyse the growth and inequalities of poverty, that is, by how much does poverty decline in percentage terms with a

given percentage rise in economic growth and inequality in Nigeria. Technically, the *growth elasticity of poverty* is the rate of reduction in poverty resulting from a 1% increase in average income. If, for example, the growth elasticity of poverty is 2, then we would expect an increase in average income of 2% per year to yield a reduction of 4% per year in poverty. Previous research has shown that the value of the growth elasticity is lower in countries with higher inequality, as measured by the Gini coefficient (Ravallion, 2001, Hanmer and Naschold, 2000). This means that policies which reduce inequality will increase the amount of poverty reduction associated with economic growth. This is not to say such policies will necessarily lead to more poverty reduction, as they may also lower the rate of economic growth. This is the well-known trade-off between growth policies and redistribution (Anderson, 2005).

The rest of the paper is organized as follows: section two considers the theoretical framework and literature review while section three describes the methodology adopted in the study. Section four presents and discusses the results. Section five concludes and recommends policy options to alleviate poverty and reduce inequality.

LITERATURE REVIEW

De Janvry and Sadoulet (1995) concluded that during recessions inequality rises, while positive growth rates are distribution-neutral. Bruno et al., (1998), using data from forty-five countries each with at least four or more distributional surveys over at least two decades, found the effect of growth on inequality to be indeterminate.

Productivity - raising redistribution ensures that distribution does not reduce poverty at the expense of growth, and produces sustainable poverty reduction. Enhancing asset ownership for the poor is the clearest way to accomplish this. Investment in infrastructure, credit targeted to the poor, land redistribution and education can all be important mechanisms to make growth 'pro-poor'(Anderson, 2005). If redistribution is used to reduce poverty, be it transitory or structural, then key policy issues are redistribution from whom, to whom, and by what mechanism? The loss and gain of distributive programmes on income groups, and their reaction to these losses and gains will depend on the nature of the programme. Similarly, the administrative burden will vary by programme. It might be argued that re-distributive land reform, from large landowners to landless peasants involves a one-off administrative cost, which, once implemented, can be left to generate a more equal distribution and lower poverty levels. On the other hand, a redistribution of income, without asset redistribution, must be implemented by a continuous application of progressive taxation and equity-biased public expenditure. Land redistribution unaccompanied by rural development expenditure might generate a class of poverty-stricken smallholders. Most of the land redistribution programmes in Latin America, even those that radically changed ownership patterns (as in Peru), proved in practice to be poverty-generating rather than poverty-reducing (Thiesenhusen, 1989).

Like land redistribution, progressive taxation would appear to be an obvious vehicle for redistribution. However, studies of tax incidence and impact reach mixed conclusions. Some

indicate that progressive taxation is a limited tool for reducing inequalities in income distribution, usually as a result of evasion by the rich. A study of Latin America concluded that tax systems did not contribute significantly to the reduction of inequality (Alesina, 1998).

Studies of public education typically show that expenditure on primary and secondary education reduces inequality, and expenditure on tertiary education has a regressive impact. In this context, Alesina maintained that subsidising higher education at the expense of primary and secondary education reduces the re-distributive impact of public spending, because these subsidies will accrue to the middle or high-income groups.

Many papers recently focused on the statistical relationship between economic growth and poverty reduction across countries and time periods. Many of them - for instance Ravallion and Chen (1997), de Janvry and Sadoulet (1998), Dollar and Kraay (2000) - are based on linear regressions where the evolution of some poverty measure between two points of time is explained by the growth of income or GDP per capita and a host of other variables, the main issue being the importance of GDP and these other variables in determining poverty reduction. Other authors- for instance, Ravallion and Huppi (1991), Datt and Ravallion (1992), Kakwani (1993) fully take into account the poverty/mean-income/distribution identity in studying the evolution of poverty and its causes. In particular, they are all quite careful in distinguishing precisely the effects on poverty reduction of growth and distributional changes. At the same time, their analysis is generally restricted to a specific country or a limited number of countries or regions: Indonesia, regions of Brazil and India, Cote d'Ivoire, etc. The work of Bourguignon however proposes a methodology that is less demanding. It relies on functional approximations of the identity, and in particular on an approximation based on the assumption that the distribution of income or expenditure is Log-normal.

There are at least three approaches available to estimate the elasticity of poverty with respect to growth. One method is to use information on poverty, inequality and per capita income and run the regressions on the log variables to extract the desired elasticities. The coefficients of the regression provide the required elasticities. This method is frequently used in cross-country studies (e.g. Ali and Thorbecke, 2000, Fosu, 2002), where data on poverty and inequality are not available for more than one period in a given country. The second approach is to use the ratios of changes in poverty to changes in growth over a given period as a measure of the elasticity of poverty with respect to growth when such data is available (Ravallion, 2000). The third approach is based on decomposition of a poverty measure into growth and inequality components (see e.g. Kakwani, 1990; Datt and Ravallion, 1992; Bourguignon, 2002; and Kraay, 2004). This approach basically decomposes the change in the measure of poverty into the components of economic growth and change in income inequality. The data requirement for this approach is minimal (one period information on distribution of income is sufficient). The discussions about the possibility of achieving the MDG1 in Africa is based mainly on the last method since the data available on poverty and inequality for most African countries is limited to one period. The method of

decomposing changes in poverty into the components of growth and income distribution change provides a measure of point elasticity, while the other methods provide an arch measure of elasticity or an average measure of elasticity. Results from analysis by Bigsten and Shimeles (2005) shows that high-inequality and relatively high-income countries (e.g. Namibia, South-Africa, Senegal, Gabon, Zimbabwe) had higher elasticity of the iso-poverty curve, indicating that redistribution policies may be effective tools in dealing with poverty in those countries. For instance, if we take South-Africa, at the poverty line close to 750$ per person a year, a one percent decline in the measure of income inequality needs about 9% decline in per capita income to remain on the same poverty level. That means that the joint effect of a reduction in per capita income lower than 9% and a one percent decline in the Gini would be a reduction in poverty. This means that it takes a large reduction in per capita income following a one percent reduction in the Gini for poverty not to decline, and any increase in income inequality must be compensated by a large per capita income increase if the existing level of poverty is to be maintained.

The second point to note is that, for low-income countries, such as Burundi, Burkina Faso, Niger, Ethiopia, Tanzania and Zambia, the room for poverty reduction via redistribution is very limited. A one percent reduction in income inequality would only need a small change in per capita income to stay on the same level of poverty. Likewise, the effect of rising income inequality on poverty would be offset by a low rate of growth in per capita income. An increase in inequality may not be a significant poverty threat if there is a high rate of growth in these countries (McKay 2004, Fosu, 2009).

Fosu (2009) explored the extent to which inequality influences the impact of growth on poverty reduction, based on a global sample of 1977-2004 unbalanced panel data for SSA and non-SSA countries. Several models are estimated, with growths of the headcount, gap and squared gap poverty ratios as respective dependent variables, and growths of the Gini and Purchase Power Parity (PPP) -adjusted incomes as explanatory variables. For both SSA and non-SSA samples and for all three poverty measures – headcount, gap and squared gap – the paper finds the impact of GDP growth on poverty reduction as a decreasing function of initial inequality. The study additionally observes that higher rates of increases in inequality tend to exacerbate poverty, with the magnitude of this effect rising with initial income. The income-growth elasticity, moreover, tends to increase with mean income relative to the poverty line. It has been estimated that for any appreciable reduction in poverty to be achieved in sub-Saharan Africa, an annual growth rate of 6.5% is required (World Bank, 1996). For Nigeria, whose growth has been described as less pro-poor, it is estimated that, given a population growth rate of 2.9%, the country's growth elasticity with respect to poverty is –1.45 (World Bank, 1996; HDR, 1996), which implies that a 1% increase in income reduces poverty by 1.45% .This study will provide a more recent information on how poverty has been responding to growth over the last two decades.

METHODOLOGY

Sampling procedure and sampling size

The study made use of data collected from the National Consumer Survey of 1996 and 2003/2004 Nigeria Living Standard Survey. The national consumer survey of the Federal Office of Statistics (Now National Bureau of Statistics) is a nationally representative survey covering about 10,000 households. A two- stage sampling design was used for the survey. Also, the stratification criteria were based on the state of residence and the locality (urban/rural). The survey contains detailed information on the income, expenditure and consumption of household members.

The National Living Standard Survey NLSS is based on the National Integrated Survey of Household (NISH) framework. The NISH is an ongoing programme of household surveys enquiring into various aspects of households. The population census enumeration areas (EAs) constituted the primary sampling units while the housing units were the secondary sampling units. In each state, a sample of 120 EAs were selected for the survey, while 60 EAs were selected for Abuja. At the second stage, a selection of 5 housing units from each of the selected EAs was made. Thus, a total of 600 households were randomly interviewed in each of the states and the FCT, summing up to 22,200 households (FOS, 2003). However, 14,515 rural households whose responses were consistent were used for analysis in this study.

The questionnaires were designed to obtain information from various members of the household, including husbands, wives and adult children. These data were used for determining poverty status, for estimating poverty status regression and for analysing inequality in the rural sector.

Estimation methods

Growth elasticity of poverty

In order to answer the question of the extent to which economic growth reduces poverty that is, how much does a given rate of economic growth (by economic growth we mean increase in average income) reduce poverty, the paper considers what is technically described as growth elasticity of poverty. In other words, the decline of poverty in percentage terms with a given percentage rises in economic growth.

Given the two time period of our data, we adopt simple but powerful ratio estimates of growth and inequality elasticities of poverty. We use the notation η_g for growth elasticity of poverty, Δp as the change in poverty between the two periods t_1 and t_2. p is poverty level in the base year, Δg is income growth between the two periods and g is growth in the base year. Thus, the growth elasticity of poverty is written as:

$$\eta_g = \frac{\Delta p / p}{\Delta g / g} \quad \text{.....(1)}$$

It is good to note that the expression in the numerator is the relative change in poverty and the expression in the denominator is the relative change in growth.

Inequality Elasticity of Poverty

Similarly, inequality elasticity of poverty can be stated as:

$\eta_i =$ ... ... (2)

Where η_i is the inequality elasticity of poverty, Δp is the change in poverty between the two periods t_1 and t_2. p is poverty level in the base

year, while Δ gini and gini are change in inequality between the two periods and gini is the inequality in the base year.

RESULTS AND DISCUSSIONS

Growth Elasticity of Poverty

As defined earlier, growth elasticity of poverty is the rate of reduction in poverty resulting from a 1% increase in average income. If, for example, the growth elasticity of poverty is 2, then we would expect an increase in average income of 2% per year to yield a reduction of 4% per year in poverty. In this study, the growth elasticity of poverty is found to be -0.624 It means a 1 percent increase in growth will lead to 0.624 reduction in poverty or a 1 percent increase in growth from 1996 to 2004 would have led to 0.624 decrease in poverty. The growth elasticity of poverty in Nigeria is considered low generally. Aigbokhan (2008) found estimated growth elasticity of poverty to be -0.64 compared with calculated value of -0.79 which are consistent with Ram's (2006) contention that a value of the order -1 is more realistic for developing countries context. This may have been aided by high initial inequality as gini for 1996 is 0.49 while for 2004 it is 0.4882. Previous research has also shown that the value of the growth elasticity is lower in countries with higher inequality, as measured by the Gini coefficient (Ravallion, 2001; Hanmer and Naschold, 2000). This means that policies which reduce inequality will increase the amount of poverty reduction associated with economic growth.

Inequality Elasticity of poverty

The inequality elasticity of poverty was calculated to be -0.34. This means that if we decrease inequality by 1 percent, poverty is going to reduce by 0.34 percent.

Lastly, the results indicate that though there is growth, poverty is declining at a lesser rate than the growth rate. i.e growth is at higher rate than the rate at which poverty is decreasing. The reason for rapid economic growth in the country in 2004 may be as a result of the re- invigoration of the reform programmes by the democratic government in 1999. The privatization programme, commenced a decade earlier was continued in the major sectors of the economy. Deregulation of the downstream sub sector was introduced, designed to allow for variable petroleum product prices across the country instead of a regime of uniform prices that existed until 2000. As stated by Iradian, (2005), higher growth in per capita income is associated with higher rates of poverty reduction. Poverty would increase if the adverse impact of an increase in inequality more than offsets the reduction in poverty associated with growth. For the same growth in per capita income, poverty will be reduced more in countries with low initial inequality than in countries with high initial inequality. Other things being equal, growth leads to less poverty reduction in unequal societies than in egalitarian ones.

Lastly, the most pressing issue for research is whether governments can reduce inequality without adversely affecting the rate of economic growth. Nevertheless, there is the need for researchers to document precisely *how much* additional poverty reduction, or additional pro-poor growth, could be brought about from a reduction in inequality, assuming that the latter *could* be achieved without a large adverse effect on the growth rate.

CONCLUSION

The growth elasticity of poverty is very low. Inequality elasticity of poverty is also low. It means the kind of poverty reduction taking place in Nigeria is not enough to reduce poverty and inequality significantly. Although growth is taking place, poverty is declining at a lesser rate than the rate at which growth is taking place.

The fact that overall rural income distribution did not improve despite government interventions perhaps indicates that the growth process in Nigeria is actually unequalizing. The unequalizing effect is not strong enough to completely offset the poverty-reducing effect of rising per capita income. The picture painted by the results of this research suggests that the success of the ongoing poverty reduction efforts will have to be not just the rise in per capita income, but also how to ameliorate income inequality. While increasing poverty is an indication that something is fundamentally wrong with the development efforts, increasing inequality signals either the unevenness of growth, the unevenness of the distribution, the weak pathways in the spread of the benefits of growth, or the lack of anti-poverty reducing policy instruments.

Recommendations

Reducing poverty will only become feasible when the livelihoods of the rural poor are improved directly. This can be achieved through anti-poverty policies, and targeting schemes (with the poorest smallholders who produce for subsistence and have limited engagement with markets as the main focus) which are expected to impact both on poverty and on inequality.

The conditions for pro-poor growth are those closely tied to reducing the disparities in access to human and physical capital, and sometimes also to differences in returns to assets, that create income inequality and probably also inhibit overall growth prospects.

A low growth elasticity of poverty as recorded in this study suggests that what matters for poverty reduction is mainly accelerated economic growth, income redistribution and reduction in inequality. The poverty elasticity can be influenced by the mix of government (and of course other) expenditure, and other institutional incentives. Studies carried out by Besely and Burgess, (2000); White and Anderson, (2000) indicate that even modest reductions in inequality can have a large poverty reducing impact.

REFERENCES

Addison, A., and Cornia, G. A., 2001. Income Distribution Policies for Faster Poverty Reduction, UNU-WIDER Discussion Paper No 2001/93 (September).

Aigbokhan B.E., 2008. Growth, Inequality and Poverty in Nigeria. Economic Commission for Africa. ACGS/MPAMS Discussion Paper No. 3. February.

Ali, A.G.A. and E. Thorbecke .,2000. "The State and Path of Poverty in Sub-Saharan Africa: Some Preliminary Results", *Journal of African Economies* 9, Supplement 1:pp 9-40.

Alesina, A., 1998. "The Political Economy of Macroeconomic Stabilizations and Income Inequality: Myths and Reality" in *Income Distribution and High-Quality Growth*, V. Tanzi and K. Chu (eds.), (Cambridge, Mass: MIT Press) pp. 299-326

Anderson, E., 2005. Estimating the potential contribution of redistribution to poverty reduction and pro-poor growth. Poverty and Public Policy Group, Overseas Development Institute, London.

Araar,Abdelkarim and Duclos Jean Yves., 2007. Poverty and Inequality Components: A micro framework. Working Paper 07-35.

Arsenio M.B., and Fuwa N., 2003. "Growth, inequality and politics revisited: a developing-country case." Economics Letters 79(53–58).

Besley, T., Burgess, R., 2003. "Halving global poverty". Journal of Economic Perspectives 17, pp 3–22.

Bourguignon, F., 2002. "The Growth Elasticity of Poverty Reduction: explaining heterogeneity across countries and time periods", forthcoming in T. Eichler and S. Turnovsky, *Growth and Inequality*, MIT Press.

Bigsten, A. and Shimeles A.,2005. Can Africa Reduce Poverty by Half by 2015? The Case for a Pro-Poor Growth Strategy Department of Economics University of Göteborg June 14, 2005.

Bruno, M., Ravallion M., and L. Squire.,1998. "Equity and Growth in Developing Countries: Old and New Perspectives on the Policy Issues." In V. Tanzi and K. Y. Chu, eds., *Income Distribution and High Quality Growth.* Cambridge, Mass.: MIT Press

Canagarajah, S., Ngwafon J and Thomas S., 1997. "The Evolution of Poverty and Welfare in Nigeria, 1985 – 92". Policy Research Working Paper No 1715 (January).

Datt, G and Ravallion M.,1992. "Growth and Redistribution Components of Changes in Poverty Measures: Decomposition with Applications to Brazil and India in the 1980s", *Journal of Development Economics*, 38: pp 275-95

De Janvry, A., and Saoulet, E.,1995 "Poverty, Equity and Social Welfare in Latin America: Determinants of Change Over Growth Spells", *Issues in Development Discussion Paper*,Development and Technical Cooperation Department, Geneva: International Labour Office.

De Janvry, A., and Sadoulet, E.,1998. Agricultural Growth and Poverty Reduction: Additional Evidence. Oxford University Press. alain@berkeley.edu.

Dollar D., and Kraay A., 2001."Growth is good for the poor" Policy Research Working Paper No. 2587, World Bank, Washington D.C.

.Federal Office of Statistics (FOS) (Now National Bureau of Statistics-NBS), 2003. Nigeria Living Standard Survey: Interviewers Instruction Manuel FOS, Abuja, Nigeria.

Fosu, A.,2002. "Inequality and the Growth-Poverty Nexus: Evidence from Sub-Saharan Africa", Paper presented at the CSAE Conference on 'Understanding Poverty and Growth in SSA' University of Oxford. Oxford

Fosu, A. K., 2008. 'Inequality and the Growth-Poverty Nexus: Specification Empirics Using African Data'. *Applied Economics Letters*, 15 (7): pp 653–56

Fosu, A.K., 2009. Inequality and the Impact of Growth on Poverty:Comparative Evidence

for Sub-Saharan Africa**.** BWPI Working Paper 98

Hanmer, L. and Naschold, F., 2000. Attaining the International Development Targets: will growth be enough? *Development Policy Review*, 18, pp.11-36.

Iradian, G., 2005 Inequality, Poverty and Growth: Cross Country Evidence. IMF Working Paper.

Kakwani, Nanak C. 1990. *Poverty and economic growth : with application to Cote d'Ivoire / Nanak Kakwani* World Bank, Washington, D.C.

Kakwani, N., 1993 Poverty and Economic Growth with Application to Cote D'ivoire. Review of Income and Wealth. Series 39, No. 2, June.

Kalwij, A. Verschoor, A., 2007. Not by Growth Alone: The Role of the Distribution of Income in Regional Diversity in Poverty Reduction. European Economic Review 51, pp 805-829.

Kanbur, R. and N. Lustig, 1999. Why is Inequality Back on the Agenda? Paper Prepared for the Annual Bank Conference on Development Economics, World Bank Washington DC., April 28-30.

Kraay, A.,2004. "When is Growth Pro-Poor? Cross Country Evidence", IMF Working Paper. WP/04/07, Washington DC.

McKay A., 2004. Economic Growth for Poverty Reduction in Africa: Recent History and Current Issues: Background Paper prepared specifically for the IV Mediterranean Seminar on International Development, "Africa's Tragedy", *Universitat de les Illes Balears*, Palma de Mallorca.

Obi, B.O., 2007.Fiscal Policy and Poverty Alleviation: Some Policy Options for Nigeria. *Department of Economics, University of Abuja, Nigeria.* AERC Research Paper 164. African Economic Research Consortium, Nairobi .February 2007

Ogwumike, F.O. 1996. *Structural Adjustment and Poverty in Sub-Saharan Africa*. A report prepared for the Network on African Perspective on Structural Adjustment. CODESRIA, Dakar

Okunmadewa, F.,1999."Overview of the Measurement of Poverty and Inequality" Centre for Econometric and Allied Research, University of Ibadan, Ibadan Nigeria.

Ram, R., 2006. Growth Elasticity of Poverty: Alternative Estimates and a Note of Caution, KYKLOS 59, 4 (Nov) pp 601-610

Ravallion, M., 2000. "Growth and Poverty: Making Sense of the Current Debate." The World Bank, Washington D.C. Mimeo

Ravallion, M., 2001. "Economic Growth, Income Inequality and Poverty: Looking Beyond Averages", *World Development* 29: pp 1803-15.

Ravallion, M., and Chen, S., 1997. What Can New Survey Data Tell Us About Recent Changes in Distribution and Poverty? World Bank Economic Review ; 11(2) pp 357-382.

Ravallion, M., and Chen, S., 2004. How Have the World's Poorest Fared Since the Early 1980s? Development Research Group. World Bank.

Ravallion M and M Huppi.,1991. "Measuring Change in Poverty. A methodological case study of Indonesis during an adjustment period". *World Bank Economic Review* 5(1).

Shorrocks, A.F., 1999. "Decomposition procedures for Distributional Analysis: A unified Framework Based on the Shapley value." University of Essex.

Thiesenhusen, W. H., 1989. *Searching for Agrarian Reform in Latin America* (Winchester, MA:Unwin Hyman).

UNDP 2003, MDGs: A Compact Among Nations to End Poverty. *Human Development Report 2003*, New York

White, H and E. Anderson E., (2000), "Growth Vs Redistribution: Does the Pattern of Growth Matter?", Institute of Development Studies, University of Sussex, mimeo.

World Bank .,1996. "Poverty in the Midst of Plenty: The challenge of growth with inclusion in Nigeria" A World Bank Poverty Assessment, May 31, World Bank, Washington, D.C.

World Bank, 2000, *World Development Report* (New York and Washington: Oxford University Press and World Bank).

World Bank, 2002, "World Development Indicators ." Washington D.C.

World Bank, 2006, *World Development Indicators Report* (Washington: World Bank).

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Abstract: This study examines the economics of plank production in Gbonyin Local Government Area of Ekiti State. Fifty saw millers were selected randomly for the study and the revenues generated were mainly from the cost of milling while fuel (generator) cost and labour cost (34.1 and 38.9% respectively) form the highest percentage of total variable cost of the business. The business is seen as being profitable because the gross margin was close to half of the total revenue. From the normalized profit function, result shows that; mill fueling (generator cost), waste disposal cost, transformer and marital status has contributed significantly to the variations of dependent variable [profit (π)]. These factors were shown to have a great influence and impact on the business in the area. High energy [labour} and large sum of amount spent on fuel characterize these industries due to the cumbersome work and irregular power supply in this area. From the study, it is recommended that government attention and policies should be directed to the area in area of electricity supply. Electricity supply to the area will increase and improve production to a greater height and make the products available to the general populace at affordable prices.

Keywords: Plank production, Saw millers, Economic analysis, Ekiti State

INTRODUCTION

Forests have arguably played a bigger role in the development of human societies than any other resource, the prime direct or marketable product of most forest today is wood for use as timber, fuel-wood, pulp and paper, providing some 3.4 billion cubic meters of timber equivalent a year globally (FAO, 2004). After a 60 percent increase between 1960 and 1990, global wood consumption fluctuates but rose no further during the 1990s largely due to the more efficient use of timber and paper recycling (FAO, 2004).

Wood is the most versatile raw material the world has ever known. Throughout history, people relied on wood for needs varying from farming tools to building materials, from fuel to weapons of hunting and warfare. Wood remains virtually the most predominant material used for construction and energy generation until the last half of the 19th century {Douglas, 1995}. People used timber in the construction of houses, barns, fences, bridges, furniture items and musical instruments. In contemporary times, wood is still widely used for constructional purposes. It is also a valuable industrial raw material for the production of pulp, paperboard, rayon, cellophane, photographic films, tannin, methanol, ethanol, wood adhesives and chemical derivatives. The ubiquitous nature of wood has made it a valuable material in every stage of human development,

thus man depends on wood right from the cradle to the grave.

The wood based industries have contributed to the economy of Nigeria and it was pointed out by Adeyoju {1975, 2001} that in 1963 wood based industries employed 17.5% of the labour force in the country, and 17.4% of the indigenous skilled and unskilled labour.

The sawmills account for 93.32% of the total number of wood based industries in Nigeria in 1997 {Fuwape, 2001}. These mills are concentrated in the Southwestern part of the country with Ekiti, Ondo, Ogun and Lagos states having the largest numbers.

As evidence, demand of plank is rising in almost every part of the country without a balanced supply. The problem of availability of sawn wood have been discovered to be problem that can be attributed to the sawn wood production from the point of felling to the last stage of selling. It is known that there is increase in demand for wood products and there is increase in the prices of these products,

For the wood based industry to meet the demand and to ensure the stability of the forest ecosystems, Oyegade {2000} suggested some strategies which could be adopted by the wood based sector and these are;

i. Production and market development for plantation species
ii. Limiting the area of natural forest to be converted to artificial forest
iii. Improvement in wood efficiency
iv. Improvement in logging operation
v. Improvement in wood protection.

Munro {1974} observed that forest loss is occurring essentially because forest and trees are being used up faster than they are being generated i.e. supply and demand for forest products are not balanced. He now suggested one way of restoring balance or achieving the balance of proper forest in the economy, is to make all those who use the forest to pay the full economic costs for their activities.

Awolola {1997} said this can only be done by guiding against illegal felling of trees which can be done by increasing the number of protection squads and providing them with the required operating equipment and funds.

The third national development plan also worked on ensuring balance between demand and supply of agricultural products, it stated that “there is considerable wastage of agricultural raw materials due to inadequate storage and processing facilities”. Akachukwu {1997} gave the total saw milling waste range from 23.5 – 66.0 per cent with his research in determining the total saw milling waste. Fuwape {2001} initially attributed saw mill wastage to inefficient operation of saw milling machines. Akachukwu {1997} now suggested that in order to minimize saw mill wastage small inefficient machines that dominate Nigeria saw mills industry should be replaced with larger efficient machines that can saw small diameter logs from plantations. Also sawmills should be integrated with other wood based industries that can utilize saw milling wastes.

Popoola (2001) connects imbalance demand – supply detriment of forest products to inadequate financial resources. He described wood business as highly capital intensive and for proper marketing and distribution system, this is very important to this end he felt the forest supply

should encourage tree farmers to farm forestry cooperative and organize them accordingly.

It is therefore essential to thoroughly analyse the owners of timber products so that supply could be increased, thereby increasing the production of sawn wood. It should be noted that the number of consumers/buyers is increasing daily affecting the structure of the market. Also since the various prices being charged are the result of the total variable cost incurred in the production of sawn wood, therefore it is necessary to analyze the production performance and efficiency involved. The study will help to discover the problems faced by loggers or fellers involved in the business.

METHODOLOGY

The study was conducted in Gbonyin Local Government Area (LGA) of Ekiti State, Nigeria. Gbonyin LGA was chosen for the study because it is well known in the state for a variety of forest products ranging from planks, oil palm products just to mention a few. Ekiti State is one of the six states constituting the southwest region of the country. It is located in the tropics and has 16 local government areas.

Analytical Techniques

A number of analytical tools were employed in the study and these include; descriptive statistics, gross margin analysis and normalised profit function.

Descriptive Statistics-Descriptive statistics such as tables, percentages and frequency distribution were employed in the analysis of respondents' socioeconomic characteristics.

Gross Margin Analysis

The gross margin was analyzed using the following expression;

GM =TR-TVC

Where : GM =Gross margin

TR = Total revenue

TVC =Total variable

Normalised Profit Function

A profit {or cost} function relates maximized profits {or minimized cost} to the price of products input as also to other exogenous variables such as fixed input or agro climatic and social variables.

Profit = f {input & quantities used}.

Because of scale difference, we normalize input quantities with input price

$\pi = \frac{f\{\text{input quantities per business}\}}{\text{Price}}$

Profit (π) f $\{X_1, X_2 \ldots\ldots\ldots X_{15} + ei\}$

Where, X_1 = cost of mill machinery maintenance (Naira)

X_2 = mill fueling/ generator cost (Naira)

X_3 = Utility bills (Naira)

X_4 = waste disposal

X_5 = Blade replacement

X_6 = labour Cost

X_7 = Other costs

X_8 = Rent on machinery

X_9 = Transformer

X_{10} = Age

X_{11} = Marital status

X_{12} = Tribe

X_{13} = Educational level

X_{14} = Experience in years

X_{15} = Family size

ei = error term

RESULTS AND DISCUSSION

The result of the survey shows that 10% of the saw millers are within the ages 21-30years, 31-40 years (28%), 41-50 years (52%) and above

50 years (10%). The analysis of the data shows that a greater percentage of middle age men (i.e. 41 – 50 years,) were involved in saw mill business in the area. This could be attributed to the nature of the business which requires a lot of energy, ability to stay longer at work and initiative. From Table 1, it is also shown that 100% of the respondents were males, reflecting the observation that, in Nigerian economy most capital intensive and arduous jobs tend to be male-dominated. The findings reflect the dominance of the male in the business.

Furthermore, it is seen that 90% of the respondents are married while only 10% are single. The greater involvement of married people in this business is driven by the desire to increase family income.

According to the table, 62% of the respondents are Yoruba, 34% are Ibo and 4% are Hausa. The high percentage of Yoruba and Ibo shows their interest in Sawmills business and small-scale industries than the Hausa people. Yoruba having the high percentage might be because of their access to land and logs/ wood in their locality.

The table also shows that, 16% of the respondents had Primary education, 35% Secondary education while 46% had tertiary education. This therefore shows that a greater percentage of the respondents are literate. This is due to the fact that a lot of measurements and calculations with management skills are involved in the business. The standard way of measurement is carried out using the Hopper's measurer. This is a book which gives the standard measurement of planks that can be found in certain cubic meter of timber. It is seen that, 12% of Saw millers have 0 – 10 years of experience, 68% have 11 – 20 years of experience while 20% have above 21 years of experience. It shows therefore that due to high cost involved in setting up the business, few entrants are involved at the initial stage (0 – 10 years).

Table 1: Socio-Economic Characteristics of Respondents

Socioeconomic characteristics	Frequency	Percentage
Age (years)		
<20	0	0
21 – 30	5	10
31 - 40	14	28
41 – 50	26	52
>50	5	10
Sex		
Male	50	100
Female	0	0
Marital Status		
Married	40	90
Single	10	10
Tribe		
Yoruba	31	62
Ibo	17	34
Hausa	2	4
Education		
Primary	8	16
Secondary	19	38
Tertiary	23	46
Business Experience (years)		
0-10	6	12
20-Nov	34	68
Above 21	10	20

Moreover, those that are in the business, because of the profitability of the business and their age, stay in the business. But as years goes on many leave the business to their children because a lot of energy is required. On profitability, the gross margin analysis was carried out. From the result shown on table 2, the only major source of revenue for the saw millers is the revenue from milling per cubic of timber (#568,980),while the mean total variable cost is #287,928 from this it can deduced that the gross margin is #281,052.00 therefore the

total variable cost takes over half of the total revenue. The result shows that saw mill business is profitable and saw millers are in business though certain amount will still be set aside as depreciation value for fixed equipment and machinery.

Moreover, labour cost (#112,080) formed about 38.9% of the total variable cost. This shows that more hands {labour} are needed because of the high demand for energy involved in the business. Also, Mill fueling/generator cost is #98,040 which is about 34.1% of the total variable cost. This can be attributed to the erratic power supply to the area therefore leading to a reduced amount paid on utility bills [NEPA, Water etc]

Table 2: Gross Margin Analysis in Plant Marketing

Revenue	**Mean Value (#)**
Revenue from milling	568,980
Total revenue	568,980.00
Variable cost	
Mill maintenance	27,080
Mill fueling/generator	98,040
Utility bills	3,948
Waste disposal	7,640
Blade replacement	26,720
Labour	112,080
Other Costs	12,420
Total variable cost	287,928.00
Gross Margin = Total Revenue – Total Variable Cost	
#568,980.00 - 287,928.00	
Gross Margin = #281,052.00	

From the normalised profit function, result shows that; mill fuelling / generator cost, waste disposal cost, transformer and marital status has contributed significantly to the variations of dependent variable [profit (π)]. These factors were shown to have a great influence and impact on the business in the area. The value of the R2 indicate that about 78.5% of the variation in the dependent variable is explained by the explanatory variables.

From Table 3, it was shown that mill maintenance, utility bill, blade replacement, labour, rent on machinery, age, tribe, education, experience and family size do not affect the dependent variable in saw mill business.

However, Mill fueling/generator cost was significant at 1%, an indication that because of erratic power supply in this area, high cost is incurred on fuel and generator. This has been an important factor in any production industry if they will continue to stay in business. Also, waste disposal is significant at 5%; this mean that as the production increase the waste produced will also increase.

Furthermore, transformer is significant at 5%, this shows that high voltage required in production in saw mills industry, it is quite necessary to have personal transformer. This invariably permits a continuous and efficient production. Also, marital status is significant at 10% this mean that most saw millers are married and have responsibilities {wife, children and other family members} attached to them and will because of this continue in their business to meet up with the family needs.

Table 3: Normalized profit function analysis

Variable	Coefficient	Standard Error
Constant	-20106.618	68617.15
Norm Mill	45.559127	48.45
Norm fuel	-51.61583	13.777***
Norm utility	-7.788075	24.664
Norm waste	433.26151	192.450**
Norm blade	75.48729	50.829
Norm labour	-7.8121	9.897
Norm other cost	-70.8034	57.797
Rent on machinery	-123.250	89.910
Transformer	42479.80	17376.5**
Age	-154.136	94.781
Marital status	3273.53	1692.46*
Tribe	566.768	669.22
Education	-27.586	90.512
Experience	86.904	84.655
Family size	-83.243	250.616
R^2	0.7832	
R^2	0.57519	

Source: Computed from Survey Data, 2007

CONCLUSION

There is no doubt that saw mills industries in Nigeria is an important, but underdeveloped avenue for increasing the nation's revenue while potentially providing employment and enhancing income generation for hundreds and thousands of people. This sector is expected to continue to grow as there are many potentials of industrialization in saw milling / wood base panel industry. However, mill fuelling / generator cost, waste disposal cost, transformer and marital status have contributed significantly to the variations in the profit(π). These factors were shown to have a great influence and impart on the business in the area.

Recommendations

From the study, the government attention and policies should be directed to the area of electricity supply. Many of the sawmills spend part of their profits on buying diesel and generator. Electricity supply to the area will increase and improve production to a greater height and make the products available to the general populace at affordable prices.

The wastes from the forest industries are a valuable raw material capable of stimulating development of rural modern industries in the area. E.g. particle board, pulp and paper and plywood mills or industrialists should be encouraged to site their industries in this area.

Adequate maintenance of machines and equipment, availability and supply of spare parts to replace the worn-out parts is very necessary to reduce fatigue and the high energy required. Also improvement in educational status through capacity building of the residents and this will ensure proper accountability

REFERENCES

Adeyoju, S. K. (1975): Forestry and the Nigerian Economy. University Press, Ibadan, Nigeria. 308pp.

Adeyoju, S. K. (2001): "Forestry for National Development; A critique of the Nigerian situation". Proceedings of the 27th Annual conference of the forestry association of Nigeria, Abuja, Nigeria. 54-68p.

Akachukwu, A. E (1997): "Strategies for sustained environmental conservation through Resource development". In: Proceedings of the 1997 Annual Conference of the Forestry Association of Nigeria, September 22nd–26th, Ibadan, Nigeria, 258–270.

F.A.O. (2004): Assessing Forestry Project Impact: Issues and Strategies, F.A.O. Rome 4-6p.

Fuwape J.A. (2001): "The Impact of Forest Industry and Wood Utilization on the Environment". A Journal of Tropical Forest Resource. 17{2}.

Munro, D. D. (1974}: "Logging and Forest Recovery: A Modeling Approach to the Question of Forest gap Dynamics". Journal of Conservation {ROAN} 1(1) 16-21p.

Popoola, L. and O. I. Ajewole (2001): "Public perceptions of urban forests in Ibadan, Nigeria Implications for environmental Conservation". *Arboricultural Journal*, 2001, vol.25, Pp. 1-22.

Oyegade, A. (2000): The supply of forest products in Nigeria. First Step sector analysis. Annex 5 Oversees Development Administration. U.K.

Food Insecurity Dynamics and its Correlates among Rural Households in South-Western Nigeria

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Abstract: This study examines the dynamics of food insecurity (FI) transitions among rural households in Southwestern Nigeria. The data were collected over two-time period from 292 rural households from September to December 2006 during food crops harvesting season (HS) and from March to May 2007 during food crops planting season (PS). Data were analysed using Marcov Probability Chain (MPC) and probit regression. Results indicate movements into and out of FI during the two seasons. However, more rural households (71.8%) moved into FI during PS. In the long-run, 86.1% of households would transit to FI during PS. Household size, educational status of head, age, asset ownership, remittances, occupational status of head, access to credit and access to extension services are factors that significantly determine these movements.

Keywords: Transition, determinants, correlate, food security, food insecurity and Southwestern Nigeria

INTRODUCTION

It is an indubitable fact that adequate quantity and quality of food is a basic need that affects our ability to survive, thrive and learn (Morduch, 1995).Given the numerous negative outcomes associated with poverty and hunger, food insecurity is a serious threat to the well-being of our society. Thus, achievement of food security is a significant victory over poverty in any given country. It is in recognition of these facts, that the Universal Declaration on the Eradication of Hunger and Malnutrition (1974), declares that "every man, woman and child has an inalienable right to be free from hunger and malnutrition. Nigeria's appalling food insecurity situation has degenerated to a level that it is listed among the 42 countries tagged "low-income food deficit countries" (Okunmadewa, 2003).

Food insecurity disproportionately affects rural people particularly rural women, minorities and children (London et al, 2005). Studies (World Bank, 2001; Ribar and Hamrick, 2003 and London et al, 2005) have revealed that rural people face a high risk of food insecurity due to poverty, income inadequacies, limited access to resources, underemployment, and unemployment, and many barriers to self-sufficiency, which create family frailty and crisis.

A nexus between food insecurity and poverty has been established. According to Sen (1981) poverty is a major determinant of chronic household food insecurity. The poor do not have adequate means or "entitlement" to secure their access to food even when food is available in local or regional markets. Poverty in Nigeria is increasing in hyper-geometrical rate since 1980 (Okuneye, 2002). Statistics from the National

Bureau of Statistics (NBS, 2007) indicates that poverty incidence in Nigeria rose from 28.1 percent in 1980 to 54.4 percent in 2004.With the estimated population figure of 140 million, this translates to 74 million Nigerians living below poverty line. While 63 percent of this figure lives in the rural areas, 43 percent of this number resides in the south west, Nigeria (NBS, 2007). Similarly, Okunmadewa, (2001) reveals that one major characteristics of the farming populace of Nigeria is food insecurity, specifically in 2004, NBS in its study on the relative poverty by occupation of household heads indicates that 67 percent of households whose heads engage in agriculture are poor and by implication lack the means to secure access to sufficient food at all time.

Furthermore, this problem of food insecurity especially during the hungry period among farming households in Nigeria is long standing (Obamiro et al, 2005). This is because rural households in Nigeria face a high level of income variability(access to food variability) due to factors beyond their control such as poor storage and infrastructural facilities couple with their poverty, that make them particularly vulnerable to shocks such as seasonal changes in food production(Riber and Harmrick, 2003 and Obamiro et al, 2005).Hence rural households have access to food produce in the area; their food insecurity status especially farming households depend on the season of the year .At the beginning of the rain this insecurity is higher than the late rains.

Importantly, an understanding of the dynamics of food insecurity is critical to the formulation of appropriate policy towards addressing the problem of food insecurity in Nigeria. The main objective of this study therefore, is to analyse rural households' food insecurity dynamics and its correlates among rural households in the South Western Nigeria.

LITERATURE REVIEW

Despite apparent empirical strength, the operationalization of the food security concept still presents many challenges. The concept of food insecurity has evolved, developed, multiplied and diversified since the World Food Conference of 1974. The main focus has shifted from global and national to household and individual food insecurity and from food availability to food accessibility and the security of access (Maxwell and Smith, 1996). Hence, this study which is focused on the food insecurity status, transitions and its correlates among rural households in south west, Nigeria is aimed at achieving this goal.

It has equally been observed that the issue of not knowing the exact figure of households who are food insecure in Nigeria poses a serious problem in evolving an all embracing solution to the problem. This is due largely to definitional, measurement problems and inadequate data Olayemi (1996). Also, FAO (1986) observed that many anti-poverty and food security policies and projects in Nigeria had failed largely because these policies and projects were conceptualized and formulated using reports of the more robust and influential organisations such as the World Bank, United Nation Development Programme (UNDP), United Nation International Children Emergency Fund (UNICEF) among others, which are based on studies in which aggregated data were used. These aggregate data often conceals the very extreme poor or the ultra-poor, those classified as destitute

or most disadvantaged or critically poor. This submission is equally true for the food insecurity status analysis of the households thereby neglecting the local peculiarities. It is therefore, advised that such food insecurity studies be done in clusters and be grouped targeted. Furthermore, national aggregates may not necessarily reflect local peculiarities in structure, extent, pattern and profile of food insecurity (FAO 1986). This study is therefore targeted at the rural households in the south west, Nigeria.

Also, previous studies on food insecurity in Nigeria (Olayemi 1996, Agboola et al., 2005, Okuneye, 2002; and Adejobi, 2004) are centered on the status and correlates of food insecurity rather than the correlates of food insecurity transitions. These studies did not take into congnisance that food insecurity is a stochastic phenomenon and that the food secure today may not be tomorrow or vice versa. These studies according to Bauclh (1998) are like treating the symptoms not the cause of food insecurity. What is therefore, desirable for policy intervention is to know those factors that will affect the likelihood of entering or exiting food insecurity rather than measuring the correlates of food insecurity status alone if the aim is to eliminate food insecurity. Finding this will assist in the formulation of policies that will improve exit rate from food insecurity and decrease entry rates into food insecurity. However, there is a limited data in the literature on food insecurity transitions and changes over time, particularly among Nigeria households. This is because of the non availability of panel data to capture the trend over time. Hence the study of chronic food insecurity and its determinants have not been possible in Nigeria.

Measurement of food insecurity

Maxwell and Frankenberger (1992) list 25 broad indicators and a host of other indicators related to the different aspects of food security. Following FAO (2003), five general types of methods/indicators are identified. These are undernourishment measure, food intake measures, anthropometric measures, food accessibility measure and Household Food Security Scale (HFSS) module. Among the methods of measuring households' food insecurity highlighted above, Food-Energy intake approach as used by Greer and Thorbecke (1986) was adopted for the study because of its effectiveness, simplicity and ease of computation.

METHODOLOGY

This study was carried out in the Southwestern Nigeria, with Ondo and Ekiti states randomly selected from the six states that make up the zone. Data were collected from 292 rural households over a two-time period: during the harvesting season of 2006 (September to December) and during the planting season of 2007 (between March and May) when farmers prepare their land for planting and planting of food crops. The primary data were collected through the aid of a well-structured questionnaire with rural households as target population.

Method of Data Analysis

Estimating Food Insecurity Line

Various methods have been used in calculating the food insecurity line (Ravallion and Bidani, 1994; Aigbokhan, 2000; Okurat *et al*, 2002). The Cost of Basic Needs (CBN) approach, the Food-Energy Intake (FEI) method and the Cost-of Calorie (COC) function. However, the Food-

Energy Intake used by Greer and Thorbecke (1986) was adopted for this study to estimate the food insecurity line due to its simplicity and ease of computations in the following specific steps.

(a) The Value of Food (F_{*j}) consumed by each household, which is equal to the sum of the value of purchased food (V_{*j}) and the value of own production consumed (C_{*j}) was determined as

$F^*_j = V^*_j + C^*_j$ (1)

The value of purchased food consumed V^*_j by each household was established by multiplying the quantities of different food types purchased (D_i) by the prices per unit (P_i)

$V^*_j = \sum D_{ij} P_{i\ j}$ (2)

Where

V^*_j = Value of purchased food consumed by the *j*th household

D_{ij} = The quantity of *i*th food item purchased by *j*th household.

$P_{i\ j}$ = The local price paid by the *j*th household for the *i*th food item

The value of own output or donated food consumed by the household K^*_j is the product of own production (including donations) (M_i) and the local prices (P_i). The quantity M_i is the imputed value of consumption.

$K^*_j = \sum M_{ij} P_{ij}$ (3)

(b) The adult equivalent H_j for each household was proxy by the household size.

(c) Total value of food consumed per adult equivalent (F_j) was derived by dividing the total value of food by household adult equivalent:

$F^*_j = \underline{F}_j$ (4)

H_j

Where

$\underline{F}_j$ = Total value of food consumed by jth household

H_j = Adult equivalent for jth household

F^*_j = Total value of food consumed per adult equivalent units.

(d) The different types and quantities of foods consumed by the different households were converted to calories (Cj) using the calorie equivalents presented in appendix 1&2.

It is important to note that in order to remove the effect of changes in prices that might have taken place between the two periods of data collection, food consumed per adult equivalent by each household was standardized by deflating it using the rural price index to obtain the food consumed per adult equivalent for each household. This was used for subsequent analysis.

(e) A regression model was fitted to estimate parameters to be used in determining food insecurity threshold (line).

$\ln F^*_j = a + bCj$ (5)

Where

F^*_j = Total food expenditure per adult equivalent by household j

Cj = Total calorie consumption per adult equivalent by household j

a and b are parameters to be estimated

(f) The food insecurity line, Z, which is the estimated cost of acquiring the calorie recommended daily allowance (RDA) was estimated as

$Z = e^{(a + bR)}$ (6)

Where

Z = Food Insecurity threshold (line)

R = Recommended daily allowance of calories per adult equivalent of 2900 (World Bank 2001)

Food Insecurity Transitions among Rural Households,

To investigate food insecurity transitions, the technics used by Baulch et al (1998) to measure the dynamics of poverty transitions in rural Pakistan was modified and adopted along with the works of Nord et al (1998), Ribar and Hamrick (2003) and London and Scott (2005). The items in the transition matrix as shown in simple first-order Markov model in Table 1 are converted into probability values of entering and exiting food insecurity by dividing each item by the corresponding row total to give the transition probability matrix below:

$$\begin{matrix} X_{11} \\ X_{21} \end{matrix} \begin{pmatrix} X_{12} \\ X_{22} \end{pmatrix}$$

Also, the vector of initial probability P (o) was obtained by dividing each column total by the grand total.

Thereafter, we tried to see the proportion of households that will be in each category in the subsequent periods by using

$$P(k) = P(o)\, Pk \qquad (7)$$

Where k is the time period in seasons.

The long term equilibrium (when the proportion of households entering food insecurity equals the proportion exiting it) was obtained by using

$$eP = e \qquad (8)$$

$$(e_1, e_2) \begin{pmatrix} X_{11} & X_{12} \\ X_{21} & X_{22} \end{pmatrix} = (e_1, e_2) \qquad (9)$$

The solution to the above matrix produced e_1, e_2, which are the proportion of households that will be food secure, and food insecure at equilibrium in the long run.

Where e_1 = probability of households that will be food secure at equilibrium

e_2 = probability of households that will be food insecure at equilibrium

Table 1: First-Order Markov Model of Food Insecurity Transitions

	Period 2– Planting Season		
Period 1- Harvesting Season	**Food secure**	**food insecure**	**Total**
Food secure	n11	n12	n1
Food insecure	n21	n22	n2
Total	n1	n2	

Source: Field surveys 2006 and 2007

Correlates of Food Insecurity Transitions

To examine the determinants of food insecurity transitions, a probit model was used to determine the factors influencing entering or exiting food insecurity. The model was adopted for its suitability in capturing the various degree of food insecurity among the food insecure households.

$$Y_{IJ} = B_O + B_I X_I + E_I \ldots\ldots\ldots\ldots\ldots\ldots (10)$$

Where: Yij = the dependent variable for the various food insecurity transitions

i=1….. 292

j=1…….4 categories of food insecurity transitions

Yij = f(X_1, X_8…….X_{15})

The four categories of food insecurity transitions are as stated below:

Y_{11} =1 if remaining food secure 0 if otherwise

Y_{12} =1 if moving into food insecure 0 if otherwise

Y_{13} =1 if exiting food insecure 0 if otherwise

Y_{14} = if always staying food insecure 0 if otherwise

b_o = constant term

X_i = the independent variables

The independent variables, which are the socio – economic and demographic variables, are captured as:

X_1 = Household size

X_2 = Primary education dummy (D =1 if Household head has primary education, 0 if otherwise 0)

X_3 = Secondary education dummy (D =1 if Household head has secondary education, 0 if otherwise 0

X_4 = Tertiary education dummy (D =1 if Household head has tertiary education,

0 if otherwise 0

X_5 = Age of household head (year)

X_6 = Marital status of the household head (D=1if married, 0 if otherwise)

X_7 = Gender of the household head (D=1 if male, 0 if otherwise)

X_8 = Years of farming experience

X_9 = Dependency ratio

X_{10}= Farm size

X_{11}=Access to extension services (1 if yes, 0 if otherwise)

X_{12} = Access to credit facilities (1 if yes, 0 if otherwise)

X_{13}= Occupations status of the head (D=1 if household head is into farming as primary occupation, 0 if otherwise)

X_{14}= Access to Remittance (D=1 if household has access to remittance, 0 if otherwise)

X_{15}= Assets Ownership D=1 if household own assets, 0 if otherwise)

Table 2: A priori expectation of the independent variables with respect to the food insecurity status

Variable	Households entering food insecurity	Households never food insecure	Households always food insecure	Households exiting food insecurity
Households size (X_1)	+	-	+	-
Primary education (X_2)	-	+	-	+
Secondary Education (X_3)	-	+	-	+
Tertiary Education (X_4)	-	+	-	+
Age ((X_5)	+	-	+	-
Marital status (X_6)	+	-	+	-
Gender (X_7)	+	-	+	-
Farming Experience (X_8)	-	+	-	+
Dependency Ratio (X_9)	+	-	+	-
Farm size (X_{10})	-	+	-	+
Access to Extension (X_{11})	-	+	-	+
Access to credit (X_{12})	-	+	-	+
Occupational Status (X_{13})	+	-	+	-
Access to Remittance (X_{14})	-	+	-	+
Asset ownership (X_{15})	-	+	-	+

RESULTS AND DISCUSSION

Food Insecurity Transitions

Table 3 shows the result of the transition matrix and their probabilities. The result is in line with the works of Baulch et al (2003), Ribar and Hamrick (2003) that households move in and out of poverty and food insecurity. It reveals that 28.8 percent of those who were food secure during harvesting season in 2006 remained food secure during the planting season of 2007, while 71.8 percent of those who were food secure during the harvesting season in 2006 transitioned to food insecurity during the planting season of 2007. Similarly, 13.1 percent of those who were food insecure during the harvesting season in 2006 transitioned to food security during the planting season in 2007, while 86.8 percent of those who were food insecure during the harvesting season of 2006 remained food insecure during the planting season in 2007. Further analysis of the probability transition matrix reveals that at the short run, the probability that a rural household in the study area will be food secure is 22.2 percent, while the probability that rural household will be food insecure in the short run in the Southwest Nigeria is 77.7 percent.

At equilibrium, that is, in the long run, the probability that the household will be food secure

is 13.89 percent, while the probability that rural household will transit to food insecurity in the South West Nigeria is 86.1. This result shows that many households will be sliding into food insecurity during the planting season in the study area in the nearest future. This may be attributed to the poor storage facilities of food crops, food scarcity and high level of poverty. This result is in consonance with Truman and Daphne (1990) that today's food secure may not be tomorrow food secure as a result of food insecurity risk arising from shortages prior to harvest.

Table 3. Food Insecurity Transition Matrix

	2007	
2006	Food Secure	Food Insecure
Food Secure	49	121
	(0.2882)	(0.7118)
Food Insecure	16	106
	(0.1311)	(0.8689)
Total	**65**	**227**

Source: Computed From Field Surveys 2006 and 2007. (Figures in parenthesis are probability Transition matrix)

Factors Influencing Food Insecurity Transitions in the South Western, Nigeria

This section presents the results of the determinants of food insecurity transition among rural households in South-west, Nigeria. In general, the model as revealed by the Chi square values in Table 4 has a good fit to the data.

Determinants of Households Moving Into Food Insecurity

In column 4 of Table four, the probability of moving into FI decreases by -0.0084 ($p<0.01$),-0.0205 ($p<0.05$) and -0.0330 ($p<0.01$) due to assets ownership, attainment of secondary education and access to credit respectively. It increases by 0.1238 ($p<0.01$) with a unit increase in household size. This agrees with Riber and Harmrick (2003) that the larger the household size the higher the probability of moving into food insecurity. This could be as a result of the fact that increased household size is synonymous with higher dependants that hardly contribute to the income of household. Also, column 1 of Table four reveals that the probability of exiting FI increases accordingly by 0.1276, 0.5969 and 0.8682 with access to extension, access to remittances and asset ownership at ($p<0.01$. A unit increases in household size and being engaged in farming decreases exiting FI by -0.0073 and -0.127 respectively at ($p<0.05$). (This is agreement with Ribar and Hamrick (2003). Also, the probability to remain food secure as shown in column 2 of Table four reveals that the probability to be never food insecure increases with attainment of tertiary education (0.0683), access to credit (0.0143) and asset ownership (0.3150) at ($p<0.01$), and decreases by -0.0130 ($p<0.05$), and -0.0473 (($p<0.01$) with a unit increase in dependency ratio, and being engaged in farming respectively. Finally, column 3 of Table four reveals that a unit increase in household size, age, farming experience and dependency ratio lead to an increase in the probability to always stay FI by 0.0321, 0.0048, 0.2915 and 0.0866 accordingly at ($p<0.01$) However, this decreases by -0.3465 with attainment of primary education at $p<0.05$

Table 4: Maximum Likelihood Estimate of Probit Regression of Households in Transition into Food Insecurity

Variable	Households exiting food insecurity	Households never food insecure	Households always food insecure	Households entering food insecurity
Constant	-0.0084 (0.0859)	0.0342 (0.0557)	-0.6726 (0.4946)	-0.0654 (0.2455)
Household size (X_1)	-0.0073**	-0.0269* (0.0162)	0.0321***(0.0054)	0.1238***(0.0426)
Primary education (X_2)	(0.0034)	0.0460 (0.0422)	-0.3465**(0.1586)	0.2635*(0.1580)
Secondary Education	0.0175 (0.0143)	0.0146 (0.0157)	-0.3035 (0.3147)	-0.0205**(0.0109)
(X_3)	0.0760 (0.0646)	0.0683***(0.0257)	-0.0554 (0.1341)	-0.1481*(0.0874)
Tertiary Education (X_4)	-0.0606 (0.0.607)	0.0017 (0.0021)	0.0048**(0.0025)	0.0150* (0.0078)
Age (X_5)	-0.0169 (0.268)	-0.0074 (0.0160)	0.0985* (0.0547)	-0.0607 (0.0821)
Marital status (X_6)	-0.0085 (0.0155)	-0.0018 (0.0095)	0.1204 (0.1276)	0.734 (0.0591)
Gender (X_7)	0.0109 (0.253)	0.0020 (0.0088)	0.2915**(0.1336)	0.0081 (0.0164)
Farming Experience (X_8)	0.0055*(0.0033)	-0.0130**(0.0054)	0.0866** (0.0341)	0.0019 (0.0250)
Dependency Ratio (X_9)	-0.0073 (0.0312)	0.0004 (0.0006)	0.0005 (0.0022)	-0.0010 (0.0015)
Farm size (X_{10})	0.2067* (0.1257)	0.0227 (0.0180)	-0.0833* (0.0479)	-0.1745 (0.2247)
Access to Extension	0.1276***	0.0143** (0.0061)	0.1597 (0.1385)	-0.0330***
(X_{11})	(0.0444)	-	-0.1381 (0.2276)	(0.0111)
Access to credit (X_{12})	0.0616 *(0.0325)	0.0473***(0.0157)	0.0026 (0.0180)	0.0529* (0.0303)
Occupational Status	-0.1279**	0.0159 (0.0123)	0.0163 (0.0122)	0.1347 (0.7460)
(X_{13})	(0.0593)	0.3150*** (0.224)		-0.0084***
Access to Remittance	0.5969		59284.689	(0.0031
(X_{14})	***(0.0109)	59648.692	453	
Asset ownership (X_{15})	0.8682***	453	0.00	59648.692
	(0.0112)	0.00		453
Chi square				0.00
DF	53034.884			
Prob	453			
	0.00			

Source: Computer Print out of Probit Regression

The coefficients and marginal effects***-denotes significance at 1%, ** at 5% and * at 10%

CONCLUSION AND POLICY IMPLICATION

There is high level of food insecurity transitions in the study area particularly from food secure in the late rain (harvesting period) of 2006 to food insecure in the early rain (planting period) of 2007. Safety net in form of provision of subsidized food during the planting period is

therefore advocated. The identified chronically food insecure households (always food insecure) should also be specially targeted by the government for safety net such as provision of subsidized food crops, distribution of food crops as relief materials and special nutrition programme involving the provision of free meal for the malnourished households.

This study suggests that efforts should be made to sensitize and encourage households to have children they can really cater for. As the study revealed that household with large size and high dependency ratio are worst hit by foods insecurity transitions. The very few that had fairly small household sizes are always food secure.

The study has found out that majority of households who slide into food insecurity are headed by low educated persons who engage in farming as primary occupation, this calls for an improving access to education particularly, the identified food insecure households. In addition, special training to enable them acquire skills fully at government expense is being advocated. This will guarantee them more income to meet food needs during the planting period.

REFERENCES

Adejobi, O. (2004). "Rural livelihood, Poverty and Household food demand structure in Kebbi state, Nigeria. Unpublished PhD Thesis in the Department of Agricultural Economics, University of Ibadan, Ibadan

Agoola,P. O, Ikpi, A.E and Kormawa, P.M. (2005). Factors Influencing Food Insecurity Among Rural Households In Africa: Results of Analysis From Nigeria. http://www.freewebtown.com

Aigbokhan, B.E. (2000). "Poverty,Growth and inequality in Nigeria a case study"African Economic Research consortium Research Paper102 October 2000

Baulch, B. and N. McCulloch. 1998. Being Poor and Becoming Poor: Poverty Status and Poverty Transitions in Rural Pakistan. Preliminary material and Interim research results circulated to stimulate discussion and critical comment. Institute of Development Studies, University of Sussex

Bickel, G., M. Nord, C.Price, W. Hamilton and J. Cook, 2000. *Guide to Measuring Household Security*, revised. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service

Chung, K L, Haddad J. Ramakrishna and F. Riely 1997. "Alternative Approaches to locating the Food insecure Qualitative and Quantitative Evidence from south India". Discussion paper No-22, Food Consumption and Nutrition Division IFPRI. Washington. DC.

Clampet-Lundquist, S., K., Edin, S., Scott, and V. Hunter. (2004). "Making a Way Out of No Way: How Mothers Meet Basic Needs while Moving from Welfare to Work". In Ann C. Crouter and Alan Booth (eds), *Work-Family Challenges for Low-income Parents and Their Children.* Mahwah, New Jersey: Lawrence Erlbaum Associates.

Coates, J. P Webb and R. Houser, (2003). "Measuring Food Insecurity: Going Beyond Indicator of income and Anthropometry", Food and Nutrition Technical Assistance Project. Academy for Educational Development, Washington D.C.

FAO. (1986). The Dynamics of Rural Poverty, FAO Rome

FAO (2003), The special programme for Food security. Responding tonew challenges, FAO Rome.

Gittelsohn, J. S. Mokheriji and G. Pelto, (1998)" Operationalising Household food security Rural Nepal" WIDER mimeo.

Foster, J., J.Greer and E. Thorbecke. (1984). A class of Decomposable Poverty Measure", Econometrical Vol.52 pp 761-766

Frongillo, E. (1999). "Validation of Measures of Food Insecurity and Hunger. *Journal of Nutrition, 129*, 506S- 509S

Greer, J. and E. Thorbecke. 1986. "A methodology of measuring food poverty, applied to Kenya". *Journal of Development Economics*, Vol. 24 Pp 59-74.

Jimoh, A. K. (2004). 'Perception and Determinants of Vulnerability to Poverty among Farming Households in Kajola Local Government Area of Oyo state, Nigeria' Unpublished M.Sc. Thesis in the Department of Agricultural Economics, University of Ibadan, Ibadan.

Kennedy, E. (2003) "Qualitative Measure Of food insecurity and Hunger". In proceedings of the FAO International Scientific Symposium. Rome 26-28 June 2002 PP. 165-184

Maxwell, S. (1990) "Food security in Developing Countries Issues and Options for the 1990s" In IDS bulletin, Vol: 21, No3, PP 2-13.

Maxwell, S. and M. Smith. (1996). Household food security: A Conceptual review in S. Maxwell and T.R. Frankenberger, eds, Household Food Security: Concepts, Indicators, Measurements. A Technical Review. Jointly sponsored by UNICEF and IFAD.

Maxwell S. and T. Frankenberger, (1992). Household food security: Concepts, indicators, measurements. A. Technical review. New York. NY: UNICEF and Rome: I FAD.

Morduch, J. (1995). "Income smoothing and consumption smoothing" Journals of Economic Perspectives, vol. 9 Pages 103-114.

National Bureau of Statistics (NBS). (2007). Poverty Profile for Nigeria 2004. NBS Abuja National Population Commission (NPC). *2006 National Provisional Population Figures.*

Nord, M., K., Jemison and G. Bickel. 1999. *Prevalence of Food Insecurity and Hunger, by State, 1996-1998.* Washington, DC: USDA, Food Assistance & Nutrition Research Report No.2.

Nord, M. K, Satpathy, N. Raj, P Webb and Houser (2002)" Comparing Household survey based measures of food

insecurity across countries: Case studies in India, Uganda and Bangladesh". Discussion paper No 7, Friedman School of nutrition science and policy. Tufts University

Obamiro, E.O (2005): Pillars of Food Insecurity in Rural Areas of Nigeria. http// www. Cigar.Org.

Okunmadewa, F. (2003). "Risk and Vulnerability in Agriculture: concept and Context" Staff seminar paper in the Department of Agricultural Economics, University of Ibadan, December 5th

Okurat, F.N., J.O. Odwee and A. Adesina. (2002). " Determinants of Regional poverty in Uganda": African Economic Research Consortiums AERC RP 122

Okuneye P. A. (2002). "Rising Cost of Food Prices And Food Insecurity in Nigeria And Its Implication for Poverty Reduction" CBN Economic And Financial Review

Olayemi J.K. (1996). "Food Security In Nigeria" The Report of a Research Study Sponsored by Development Policy Centre, Ibadan, Nigeria. September

Ravallion, M. and B. Bidani. (1994)." How robust is a poverty profile?" World Bank Economic Review, Vol. 8 No.1 January Pp75-102

Ribar, D., and K. Hamrick. (2003). *Dynamics of Poverty and Food Insufficiency:* Food Assistance and Nutrition Research Report No. 36 Washington, DC: USDA.

Sen, A.K. (1981). Poverty and Famine: An Essay on Entitlements and Deprivation, Oxford: Clarendon Press

Svedberg P. (2001) Poverty and Food Insecurity: Theory measurement and policy Oxford: Oxford University Press

World Bank (2001): Poverty and Hunger: Issues and Options for Food Security in Developing Countries .Washington, DC, USA: World Bank

World Bank (2002). Poverty Reduction Handbook. The World Bank, Washington D.C

World Bank (2004). World Development Report.

World Bank. 1996. Nigeria Poverty in the midst of plenty. The challenges of Growth with Inclusion. A World Bank Poverty Assessment. Population and Human Resources Division, West Africa Department, African Region. Report No. 1473

APPENDIX 1

Nutrition (Calorie based) Equivalent Scales

Years of Age	Male	Female
0-5	0.4875	0.4875
6-15	0.896	0.7800
16-64	1.060	0.8267
ABOVE 65	0.840	0.7400

Calculated from Omonona, 2001

APPENDIX 2

Nutrients Composition of Commonly Eaten Foods in Nigeria- Raw, Processed and Prepared

Food item	Kcal/kg
Gari	3840
Cowpea	5920
Rice	1230
Soybean	4050
Melons(shelled)	5670
Groundnut	5950
Bread	2330
Sugar	3750
Orange	440
Mango	590
Powdered milk	4900
Agric egg	1400
Fish	2230
Meat	2370
Maize	4120
Okra	4550
Pepper	3930
Tomatoes	880
Plantain	770
Yam	3810
Cocoyam	3830
Cassava flour	3870
Leafy vegetable Oil	4210
	8750

Source: Omonona, 2001

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Perception of Agricultural Information Needs by Small-Scale Maize Farmers in Isin Local Government Area of Kwara State

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Abstract: This study assessed the perception of agricultural information needs by small scale maize farmers in Isin Local Government Area of Kwara State. Stratified random sampling technique was used to select 110 small scale farmers duly registered with the Agricultural department of the local government. Frequency counts, percentages and Pearson correlation were used to analyze the data. Findings from the data revealed that majority (80%) received agricultural information from their neighbours. Also (36.6%) needed high information on time of planting and agronomic practices of maize. Respondents also needed information on pest and disease control, processing and storage and marketing of maize. The result of the Pearson correlation showed that lack of necessary farm inputs (r=-0.709), time of planting factor (r=0.666) had negative but significant relationship with agricultural information needs. However pest and disease control (r =0.760) and weed control (r=0.252) had positive and significant relationship with agricultural information needs of the respondents. This implies that the lesser the constraints affecting the respondents the lesser the agricultural information needs by the small –scale farmers.

Key words: Information needs maize, small-scale farmers.

INTRODUCTION

In modern day agriculture, information plays a pivotal role in our present day society due to the advancements in information and communication technologies. Meyer (2000), stated that the information behaviour of traditional people was unwittingly applied to encourage a group of traditional farmers to produce food for their own consumption, the incoming information was better understood and accepted by the group because the message were communicated in a way which they could indentify.

Stanley (1990) posited that information is one of the basic human needs after air, water, food and shelter. This has resulted in information becoming very crucial for everyday living of people all over the world and enable people to relate with one another. Adedoyin (1990) noted that a steady flow of accurate, understandable and factual information brings about scientific innovations with which the farmers' problems can be solved. In addition, for any true agricultural progress, farmer must know, understand and act on this information. Therefore, how far people progress in whatever they are doing depends largely upon the availability and access to accurate and reliable information.

Agricultural information comes from research institute of agriculture, University of Agriculture, government legislation, services

institutions, agro-based industries and agriculture in conventional University, (Aina, 1995).

It is necessary that the generated information from these different sources reaches the intended users and ultimately meets their needs for such; various agricultural information users are different from one another based on their needs and requirements. Olawoye (1996) noted that the message (agricultural information) passed by the media could enhance agricultural productivity of farmers when they have access to it. Agricultural information is targeted to improve the knowledge, skills and ability of the farmers to produce more than enough. Information on agriculture was sold and exchanged in books and journals but some other sources like audio visual aids and pictures are now used by farmers.

Maize is known to be third widely grown cereal after wheat and rice for food and livestock fodder. Green maize boiled on the cob, or roasted has become a common sight along roadsides in villages and towns along highways in Nigeria. Moreover, new use has been found for the increased production. Maize is being substituted for sorghum and millet in some local dishes and industries are using it for brewing and for oil extraction. The information are basically on pests and diseases control, storage system, improved variety, weed control etc which attention must be given so as to discourage economy down turn through crop failure (CTA Annual Crop Report, 1996).

Adenddof (1991) reported that as a result of the training programme involved in information transfer, a substantial number of people in rural communities could take part in growing food, not only to alleviate chronic hunger, but also to raise maize growing practices to a substantial level.

However, the production of maize is getting reduced due to inadequate information to the farmers on new improved technology recommendation, protection against diseases, new planting techniques, harvesting, improved variety, spacing etc.

The study therefore identified the various sources of agricultural information available to the small-scale maize famers thereby suggesting solutions to those constraints. The socio-economic characteristics of the respondents were also examined. In this view, a hypothesis which stated that there is no significant relationship between constraints encountered in maize production and information needs of small scale maize farmers was analysed and tested.

METHODOLOGY

The study was carried out in Isin local government area of Kwara state in Nigeria. The local government was bounded in the north and east by Ifelodun and Irepodun local government areas respectively. Majority of the people in the area are subsistence farmers who grow arable crops such as maize, guinea corn and cash crop such as cocoa, cashew etc. They are also rearing livestock like local goats, sheep and poultry.

The population of the study comprises of men and women small –scale maize farmers in the area. There are eleven wards in the study area. Systematic random sampling was used to select ten respondents from each ward in the study area. This was done by selecting names of

the maize farmers that fell on the even number i.e 2, 4, 6.....from the list of small-scale maize farmers collected. Therefore, 110 respondents constituted the sample size.

Structured interview schedule was used to collect information from the small-scale maize farmers in the study area. Descriptive statistics used were frequency counts and percentages. The inferential statistics used to test the hypothesis was Pearson correlation analysis.

RESULTS AND DISCUSSIONS

Socio-Economic characteristics of the respondents

Data presented on Table 1 reveals that 25.5% and 52.7% of the sampled respondents were between age range of 20-30 years and 40-59years respectively. This indicated that majority of the respondents were in their active years, agile and capable of coping with the rigorous activities of farming. About 21.8% were in the age range of 60 years and above. This implies that some aged farmers still engaged themselves in farming activities from where they derived means of livelihood. The table further shows that majority of the respondents (67.3%) were male while 32.7% constituted the female. This shows that men are increasingly involved in farming in the study area since they were more active and can cope with tedious activities in farming.

The table further shows that (60.9%) of the respondents had formal education, 16.4% had no formal education, 11.8% had adult education while 10.9% had Quranic education. The implication of the result is that more than average were literate which assist them in seeking for agricultural information when the need arise. In addition, 48.2% of the respondents had about 1-10years farming experience, 40.9% and 10.9% had 11-20years and 21 years and above farming experience respectively. This implies that majority of the respondents had been in farming for a long time which assist them in gathering information needs on agriculture to improve their productivity.

Also the table revealed that 54.5% of the respondents were using family labour, 73% and 10.9% utilised their personal efforts and hired labour respectively, while 27.3% used all combination of self, hired and family labour. This implies that all the respondents in the study areas had one or more access to labour which they make use of towards increasing their maize production.

Table 1: Frequency and percentage distribution of respondents according to their socio economic characteristics

Socioeconomic characteristics	Frequency	Percentage
Age interval (years)		
20-39	28	25.5
40-59	58	52.7
60 and above	24	21.8
Gender		
Male	74	67.3
Female	36	32.7
Formal Education		
No formal education	67	60.9
Adult education	18	16.4
Quranic education only	13	11.8
Farming experience		
1-10	12	10.9
11-20	53	48.2
21 and above	45	40.9
Labour source		
Family labour	12	10.9
Personal / self efforts	60	54.5
Hired labour	08	7.3
All the combinations	12	10.9
	30	27.3

Source: Field work, 2008.

Table 2 shows that 80.0% of the respondents received information from neighbours, 28.8% received information through television and radio, 64.5% from friends, 16.4% from research institute and lastly 7.3% received agricultural information from extension agents. This implies that majority of the respondents gather their information through informal means of which such information could be distorted which definitely affects their maize production.

Table 2: Distribution of respondents according to source of information

Source*	Frequency	Percentage
Neighbours	88	80.0
Friends	71	64.5
Television and radio	31	28.2
Research institute	18	16.4
Extension agent	8	7.3

*** Multiple responses**

Source: Field work, 2008

Table 3 shows that 78.2% were facing constraints related to pest and diseases control, 88.2% on weed control, 57.3% on time of planting factor and 56.4% on farm inputs. This implies that respondents were lacking agricultural information mostly on pest and diseases control and weed control since they have little access to formal and reliable source of information. All these could adversely affect their maize production.

Table 3: Distribution of respondents according to constraints facing them

Constraints*	Frequency	Percentage
Pest and disease control	86	78.2
Weed control	97	88.2
Time of planting factor	41	57.3
Lack of farm inputs	62	56.4

* **Multiple responses**

Source: Field work, 2008

Table 4 revealed that 18.2%, 24.5% and 2.7% needed high, moderate, low and no information respectively as regards to pre-planting activities. Also 63.6%, 2.7%, 27.3% and 6.4% required high, moderate, low and no information respectively on time of planting. Similarly, 37.3%, 24.5%, 30.0% and 8.2% needed high, moderate, low and no information respectively on pest and disease control. In addition, 21.8%, 29.1% and 30.0% and 19.1% respectively on processing and storage of maize. Lastly, 56.4%, 11.8%, 6.4% and 25.5% needed high, moderate, low and no information respectively on marketing of maize respectively. This implies that various information as stated above must be made available and accessible to the respondents to improve their maize production.

Table 4: Distribution of respondents according to information needs

Information needs	High	Moderate	Low	Not at all
Pre-planting activities	20* 18.2	27* 24.5	60* 54.5	03* 2.7
Time of planting and agronomic practices	70* 63.6	03* 2.7	30* 27.3	07* 6.4
Pest and disease control	41* 37.3	27* 24.5	33* 30.0	09* 8.2
Processing and storage	24* 21.8	32* 29.1	33* 30.0	21* 19.1
Marketing	62* 56.4	13* 11.8	0.7* 6.4	28* 25.5

*** Percentages**

Source: Field work, 2008

Hypothesis Testing

Data presented on Table 5 shows that relationship between the constraints facing respondents in maize production and agricultural information needs of the respondents. It was revealed that time of planting factor (r=-0.666) had negative but significant relationship with agricultural information needs. However, lack of necessary farm inputs (r=0.709), pest and diseases (r=0.760) and weed control (r=0.252) had positive and significant relationship with agricultural information needs of the respondents. This means that the lesser the constraints facing the respondents on lacking of necessary inputs, and time of planting factor, the lower their needs for agricultural information and vice versa. However, as the constraints on pests and diseases and weed control is increasing, the higher their needs for agricultural information. This implies that constraints facing respondents on maize production had great influence on their needs for agricultural information, for example, constraint on time of planting factor can be linked to agro-metrological forecast.

Table 5: Summary of the correlation analysis of the relationship between constraints facing respondents in maize production and agricultural information needs

Variables	r-values	Decision
Lack of necessary inputs	0.709	Significant
Pest and disease control	0.760	Significant
Time of planting factor	-0.0666	Significant
Weed control	-0.252	Significant

Level of significance = 0.05

Source: Field work, 2008

CONCLUSION AND RECOMMENDATION

Majority of the small scale farmers were in the age range of 40-59years, larger percentage of the respondents had formal education. Respondents received agricultural information from neighbours and friends, but few received information through television and radio, extension agents and research institutes. Also they need information on weed control, pest and disease control, marketing, storage etc. Positive and negative significant relationship existed between the constraints facing respondents and their information needs.

Based on the findings, the following recommendations were made:

1. Since most of the respondents received agricultural information from neighbours and friends, but few received information through television and radio, respondents should be encouraged to seek more agricultural information on mass media channels and it should be made accessible to them.
2. Extension delivery packages to small-scale maize farmers should lay emphasis on agricultural information relating to weed control, pest and disease control, storage methods and improved seeds since they were most needed information by respondents.

REFERENCES

Adendorf, J. (1991). LAC farmer support training manual, Lebowa, South Africa.

Adedoyin, S. F. (1990): "Linkages in the Development and Delivery of Agricultural information by Nigerian Research Institutes", Unpublished Ph. D. Thesis. Department of Communication and Language Arts, University of Ibadan, Ibadan. Pp 69-71.

Aina, L.O. (1995). "Information and Agriculture in Africa", (in) Aina L.O. and Kaniki A.M.and J.B. Ojiambo (eds), Ibadan, Pp. 11.

CTA Annual Report, (1996): The Technical Center for Agricultural and Rural Cooperation annual report, Wageningen, The Netherlands.

Meyer, H.W.J. (2000): "The transfer of agricultural information to rural communities" Unpublished doctoral dissertation, University of Pretoria, Pretoria, South Africa

Olawoye, J. E. (1996): "Agricultural Production in Nigeria" (in) Babatoye, T. And Okiki A.(eds), Utilising Research Findings to Increase food Production. Proceedings of the one-day seminar organised by the Oyo state chapter of the Media Forum for Agriculture 1996, IITA, Ibadan

Stanley, K. N. (1990). A critique of information systems and services in Kenya. Bonn Education Science and Documentation Centre, Bonn, Pp. 3-98.

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The Potentials of Shea Nut Tree to the Nigerian Economy

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Abstract: The Shea nut tree is an economic crop indigenous to the Guinea and Sudan savanna zones of Nigeria. It is grown between latitudes 7^0N -12^0N. Its role in food production, foreign exchange earnings, raw materials for industries, income and employment generation to millions of Nigerians most especially women and young people makes it a crucial asset for National Economic Development. It is obvious that apart from the nutritional and medicinal properties of Shea nut tree, the evidences on its economic and environmental importance to the economy of the nation are enormous. With adequate exploitation, the crop has the potentials to make significant contribution to the country's Gross Domestic Product (GDP). Nigeria is the leading producer of Shea nuts: 355,000MT was produced in 1999, 58% of the African production and 414,000MT in 2005. Mali and Burkina Faso are other leading producers as at 2005, with 85,000MT and 70,000MT respectively. African processed Shea butter exports have increased from 1200MT in 1998 to 3200MT in year 2000. The market prospect is very bright particularly at the international scene. Therefore the greatest potential in this respect lies in the commercial development of Shea products with ready market value, which will give the nation a major economic boost of unimaginable proportions from the industry. Despite the numerous potentials of Shea nut tree, it is mostly grown naturally in the wild with little attention to planting in an organized plantation. Dearth of information on its potentials and the long period taken to reach maturity led to the development of cold feet to sustainable management of the Shea nut industry. This paper is therefore designed to unveil the potentials of Shea nut tree and its role in the development of the economy of the nation. In order for the development of Shea products trade to result in tangible improvement in sustainable management of the Shea resources in the country, partnership between rural producers, national policy – makers, the private sector and international industry is inevitable.

Key words: Shea nut, potentials, market, dearth of information, sustainable, tangible.

INTRODUCTION

Shea tree is indigenous to the Guinea and Sudan savanna zone from Senegal to Sudan, and to western Ethiopia and Uganda, in a belt 500–700 km wide. It is found in the interior, separated from the Gulf of Guinea by forest; only in Ghana and Nigeria does it occur within 50km from the coast (Nikiema & Umali, 2007). Shea tree grows naturally throughout Guinea Savannah region. It is perennial and deciduous. Mature tree height vary considerably with some trees attaining heights of over 14m and girth of over 1.75m (Yidana, 1994). The tree has profuse branches with a round or hemisphere crown. The bark of the stem is conspicuously thick, waxy, corky and deeply fissured that make it fire resistant. Many vernacular names are used for *Vittelatia*, which is a reflection of its extensive range of occurring nearly 5,000km

from (West) to (East) across the African continent. The nomenclature history and synonymy of the Shea tree follow a very tortuous evolution since the oldest recorded specimen collected by a European explorer. It eventually arrived at the name *Vittellaria* with sub species *paradoxa* and *nilotica*.

The abundance of the Shea tree in Nigeria exists in and thrives almost exclusively in the North .They mostly grow naturally in the wild, the long period taken to reach maturity has discourage its planting in an organized plantation. The Shea or Karite, formally Butyrospermum produces its first fruits (which resembles large plums) when it is about 20 years old and reaches its full production when the tree is at about 45 years old and continue to produce nuts for up to two hundred (200) years, after reaching maturity. Shea tree is important as an economic crop because of the heavy demand for its butter, both locally and internationally mainly as cocoa butter substitute for the production of chocolate, following increasing international interest in Shea butter as a cocoa butter equivalent in confectioneries and pharmaceutical and cosmetic industries. Shea nut products are used domestically and exported. The main importer is Europe. Nigeria is the largest producer of Shea nut in West Africa, producing about 58% Shea nut in 2008.

The long- term prospect of Shea products measure in any Nation includes research and development, the improvement of Shea productivity and product quality, the transfer of technology diversification and processing improvement of the sectoral infrastructure. The Shea tree also comprises a unique resource for rebuilding the lives and livelihoods of rural farmers, this resource were already in use by mostly women and children to generate substantial income to support their domestic needs which in the medium- term, alleviates poverty amongst the rural women and in the long-term provides continuous employment opportunities for both rural women and young people, and not only that, the economic environmental and other benefits of Shea tree to the nation is undoubtedly clear in providing revenues for increased income from both export and local consumption. This will also open new frontiers for the country in the world export market for Shea products as a substitute to palms of economic value. Local farmers on the other hand, who have become serious about production and protection of Shea resources, will generate income to sustain their families and improve the quality of their lives.

Shea tree as one of NIFOR's mandate crop

In recent years the Shea tree has gained importance as an economic crop because of the heavy demand for its butter, both locally and internationally, and the need to find substitutes for cocoa butter. Shea butter is a useful cocoa butter substitute because it has a similar melting point (32–45°C) and high amounts of di-stearin (30%) and some stearo-palmitine (6.5%) which makes it blend with cocoa butter without altering flow properties.

The high proportion of unsaponifiable matter, consisting of 60–70% triterpene alcohols, gives Shea butter creams good penetrative properties that are particularly useful in cosmetics (Nikiema,& Umali, 2007). Therefore in recognition of the need to find substitutes for the rather expensive cocoa products, and to maximize economic exploitation of the vast Shea resource in Nigeria, the federal government of Nigeria included Shea tree as one of the mandate crop of

economic importance to the Nigerian Institute for Oil palm Research (NIFOR). This led to the establishment of NIFOR Shea nut tree research sub- station. The sole responsibility of this sub-station is to research into the economy, ecology and biology of the Shea tree and with the aim of improving its yield. The research sub-station, apart from providing job opportunities for researchers and others, it will also provide avenues for increased production of Shea nut yields if extended to the end users. And consequently, Shea nut output, for both export and local consumption, will increase tremendously in the next few years. Shea tree mostly occurs in 19 countries across the African continent, namely Benin, Ghana, Chad, Burkina Faso, Cameroon, Central African Republic, Ethiopia, Guinea Bissau, Cote D'Ivoire, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda, Zaire, and Guinea (FAO, 1988).

METHODOLOGY

This work comprises of review of literature on Shea nut tree. Sources of information were mainly from Nigerian Institute for Oil Palm Research (NIFOR) annual reports, NIFOR In-house Research review 2008, Articles and Journals, Conference papers, FAO statistics from the internet, International workshop on processing and marketing of Shea products in Africa Dakar, Senegal 4-6 march 2002; Project executing agency and co financier; Food and Agriculture Organization of the United Nation; Rome, Italy. (Forest products services of the forest products and economic division, Basic food stuffs service of the commodities and trade divisions and FAO intergovernmental on oilseeds, oils fats).

The need for Shea tree production in Nigeria

The Nigerian Agricultural industries have the potentials to contribute significantly to the economic and industrial development of the nation, especially with the wide range of industrial application of most of the nation's agro-produce like Shea nut. Nigeria is fairly blessed with Shea trees which could be harnessed for industrial development through which the quality of life of the people will be improved. The Shea tree occupies a pre-eminent position in the Nigerian economy in providing employment to a large number of people on the Shea tree belt if special consideration is given to its organized planting. Quite sizeable portion of unemployed population will find ready jobs if the opportunities provided by the numerous applications of Shea nuts were fully tapped. The planting, harvesting and processing of Shea nut in to fat and oil or (butter) and the kernels into Shea Nut Cake (SNC) will not only provide business opportunities to millions of Nigerians mostly in the Shea tree belt, it will also offers a wide range of investment opportunities that are economically attractive to the people at home and abroad. The role of Shea tree in food production, foreign exchange earnings, raw materials for industries, income and employment generation to millions of Nigerians including women and young people makes it a very crucial asset for National Economic Development.

The Shea butter processing in Nigeria is mostly done traditionally by women in the rural area; the procedure is quite tedious and time consuming, from collection of the Shea fruits to the production of the final product. A variety of methods are used traditionally to remove the husks. These include trampling, pounding using a mortar

and pestle, and cracking between two stones. In removing the oil from the kernels, it is estimated that the production of 1kg of Shea butter takes one person 20-30 hours and that 8.5-10.0kg of wood fuel is needed to produce it (Niess, 1988). This means that energy input is quite high. No estimates exist of the overall balance between cost of input energy and the economic profit from the sale of Shea butter. The traditional oil extraction technique of Shea butter is time consuming, physically exhausting and requires large quantities of fuel wood and water; resources that are often scarce in the regions where the butter is produced. In general, it is also inefficient in terms of the amount of fat extracted. These however could be improved in the modern way, and without doubt, the Shea nut output, for both export and local consumption, will increase tremendously.

Therefore, it will be appropriate that the national economic searchlight for national development focus on developing Shea nut tree especially in the aspect of processing and marketing of its kernels so that the current over dependence on crude oil as the main source of the country's revenue could tilt a bit in favor of agricultural produce as it were before the discovery of crude oil.

Production and international trade

Vitellaria paradoxa is one of the most important sources of vegetable oil in rural areas of the savanna zone of West Africa. The bulk of the Shea nuts produced are for home consumption and local trading. Nigeria is the leading producer of Shea nut: 355,000MT produced in 1999, 58% of the African production, but 10,000MT lower than in 1996 and 414,000MT in 2005 (FAO, 2005). Mali and Burkina Faso are other leading producers; at the end of 2005 they produced 85,000MT and 70,000MT respectively, followed by Ghana (65,000MT), Côte d'Ivoire (36,000MT), Benin (15,000MT) and Togo (8,000MT). Up-to-date statistics on Shea nut production are not available for most countries. Reports on Burkina Faso show a remarkable increase in production to 222,000MT in 2005. Similar trends probably take place in other West African countries. In 1998, Africa exported 56,000MT Shea nut, valued at US$ 10.5 million, of which 60% came from Ghana. Benin's exports decreased from 15,266MT in 1994 to 5,600MT in 1998, Togo had only a slight decrease from 6,562MT in 1994 to 5,100MT in 1998, whereas exports from Burkina Faso increased from 5000MT in 1994 to 7,632MT in 1997 and then to 26,600MT in 2003. African total export for five years (1993-1997) amounted to over 48,000MT, valued at over US$ 10,000. No export data have been reported for Nigeria since 1995. Processed Shea butter exports in 1998 for the whole of Africa amounted to 1200MT, worth US$ 571,000. African exports of Shea butter have increased to 3200MT in year 2000. (Nikiema, & Umali, 2007). Major Shea nut importers in recent years were Belgium, Denmark, Japan, the Netherlands, Sweden and the United Kingdom (FAO).

The nutritional importance of Shea

The fruit of the Shea tree ripens during the annual hunger season when food supplies are at their lowest ebb and agricultural labour requirements are at their peak. When the Shea fruits ripen, they fall under their own weight to the floor and are gathered by hand mostly by Nigerian women and children. The fruit, which is green in colour, has a fleshy edible pulp, it is rich in vitamins and minerals and not lacking in protein

too. It contains 0.7-1.3g of protein and 41.2g of carbohydrate and is very sweet. The fruit pulp is a particularly rich source of ascorbic acid: 196.1mg/100g compared with 50mg/100g in oranges. The iron and calcium content compares favorably with raspberries: 1.93mg/100g as against 0.92mg/100g for iron, and 36.4mg/100g as against 26mg/100g for calcium. (FAO, 1988), reports that vitamin B is also present. The sugar content varies from 3-6%, equally distributed between glucose, fructose and sucrose. Shea butter has several industrial applications, but the majority of kernels (approximately 95%) provides an important raw material for Cocoa Butter Replacers (CBRs), and is used for manufacturing chocolate and other confectionery. Shea butter could be used as a pan-releasing agent in bread baking. The fruit pulp, being a valuable food source, is also taken for its slightly laxative properties. Although not wide spread minor uses include cosmetics and pharmaceuticals. The fruit is also an important source of food for many organisms, including birds and bats.

Inside the fruit is a seed rich in the mixture of edible oils and fats known as Shea butter. The mature kernel contains 61% fat which when extracted is edible- a crucial nutritional resource for millions of Nigerian rural households and can serve as medicinal as well as industrial purposes. The oil extracted from the kernel (45-60%) is important in the U.K as cocoa butter substitute in chocolate manufacture. Greater quality assurance of the Shea butter throughout the supply chain is a pre-requisite if the Shea tree is to reach its full nutritional resource for rural and urban households across the nation and for future generations.

Medicinal properties of Shea tree

Shea butter is one of the main edible oil for the rural people of northern Nigeria being the most important source of fatty acids and glycerol in their diet. It is an unguent for the skin. Alander and Aderson (2002) and Alander (2004) identified other specific compounds such as triterpene alcohols, known to reduce inflammation; cinnamic acid esters, which have limited capacity to absorb ultraviolet (UV) radiation; and lupeol, which prevent the effect of skin aging by inhibiting enzymes that degrade skin proteins. Shea butter also protects the skin by stimulating production of structural proteins by specialized skin cells. It also has anti-microbial properties, which gives it a place in herbal medicine. It is also used in the pharmaceutical and cosmetic industries as an important raw material and/or a precursor for the manufacture of soaps, candles, and cosmetics. Shea butter is used as a sedative or anodyne for the treatment of sprains, dislocations and the relief of minor aches and pains. Other important uses include its use as an anti-microbial agent for promotion of rapid healing of wounds, and as a lubricant for donkey carts. In Roger Caillie's own words as reported in (Hall et al., 1996), "the indigenous people trade with it, they eat it and rub their bodies with it; they also burn it to make light; they assure me that it is a very beneficial remedy against aches and pains and sores and wounds for which it is applied as an unguent". Today the Shea tree produces the second most important oil crop in Africa after oil palm (Poulsen, 1981), but as it grows in areas unsuitable for palm, it takes on primary importance in West Africa, and in regions where annual precipitation is less than 1000mm of rainfall. However, it loses popularity in urban areas

within these regions due to the pungent odor it emits, should it become rancid (Ayeh, 1981).

As a cosmetic, it is used as a moisturizer, for dressing hair (Ezema & Ogujiofor, 1992) and for protection against the weather and sun. It is used as a rub to relieve rheumatic and joint pains and is applied to activate healing in wounds and in cases of dislocation, swelling and bruising. It is widely used to treat skin problems such as dryness, sunburn, burns, ulcers and dermatitis (Bonkoungou, 2001) and to massage pregnant women and small children. Having a high melting point of between (32-45°C) and being close to body temperature are attributes that make it particularly suitable as a base for ointments and medicines (Bonkoungou, 2001). It is also used to treat horses internally and externally for girth galls and other sores. The healing properties of Shea butter are believed to be partly attributable to the presence of allantoin, a substance known to stimulate the growth of healthy tissue in ulcerous wounds (Wallace-Bruce, 1995).

A leaf decoction is also used as an eye bath (Abbiw, 1990; Louppe, 1994). The leaves are a source of saponin, which lathers in water and can be used for washing (Abbiw, 1990). Mixed with tobacco, the roots are used as a poison by the Jukun of northern Nigeria. Infusions of the bark have shown to have selective anti-microbial properties, as being effective against Sarcina lutha and Staphylococcus mureas but not mycobacterium phlei as well as for diarrhea or dysentery (Soladoye et al., 2000).

Refuse water from production of Shea butter is used as a termite repellent. In Burkina Faso, Shea butter is used to protect against insect (Callosobruchus maculatus) damage to cowpeas (Vigna sp.). Research has shown that after treatment with Shea butter a reduction occurs in the life span and fertility of the insects and hence the infestation rate. Shea butter, however, is not as effective as cottonseed or groundnut oil (Owusu-Manu, 1991).

Other uses of Shea tree;

The Shea tree also has a great, untapped capacity for producing copious amounts of sap that can constitute an important source of raw material for the gum and rubber industry. Research into the properties and potential industrial uses of Shea butter began in the first few decades of the last century. Previously, it was used in edible fats and margarine, e.g. Oleine, and was only beginning to attract the soap and perfume industry when interest ceased because of the 2nd World War. Revival of the Shea industry after the war suffered serious setbacks from an insufficient pricing mechanism, logistical problems of transport (low availability and unpredictable) unable to cope with the supply of the nuts, thus making the ventures economically non-viable. During the mid 1960s Shea trade re-emerged when Japanese traders joined their European counterparts, which saw a considerable expansion of the industry, particularly in the cosmetics and confectionery industry barely a decade thereafter.

The residual meal, as in the case with Shea butter, is also used as a waterproofing agent to repair and mend cracks in the exterior walls of mud huts, windows, doors and traditional beehives. The sticky black residue, which remains after the clarification of the butter, is used for filling cracks in hut walls and as a substitute for kerosene when lighting firewood (Wallance-Bruce, 1995). The husks reportedly make a good mulch and fertilizer

(FAO, 1988), and are also used as fuel on three stone fires. Latex is heated and mixed with palm oil to make glue (Hall et al., 1996). It is chewed as a gum and made into balls for children to play with (Louppe, 1994). Shea tree seed husks have a capacity to remove considerable amounts of heavy metal ions from aqueous solutions, for example, from wastewater. These were found to be more effective than the melon seed husks for absorption of Pb (II) ions (Eromosele & Otitolaye, 1994). The brown solid that is left after extracting the oil and the hard protective shell, are used as a water-proofing material on the walls of mud-buildings to protect them from the eroding forces of the wind and rain. Poor quality butter is not only applied to earthen walls but also to doors, windows, and even beehives as a waterproofing agent. In a traditional setting, Shea butter of poor quality is used as an illuminant (or fuel, in lamps or as candles).

Shea butter and its markets

The Shea fruits picking is basically an occupation for rural women and children, it serves as the main source of livelihood for the rural women and children who are engaged in its gathering. As a natural resource controlled by mostly women, the Shea Butter Tree *Vitellaria paradoxa* supports the nutritional and economic health of rural families and sustains indigenous plant and animal biodiversity. This wild and slow-growing savannah tree provides food (nutritious fruit as well as food oil), and revenues from the sale of its annual bounty help rural households to feed themselves, to invest in livestock and other income-generating forms of wealth, to meet cash requirements including shelter, clothing, health care, taxes, school fees, school uniforms and school books. Hazards in Shea fruits gathering include scorpions and snakes, especially beyond cultivated areas (Schrechenberg, 1996).

The Shea business was previously, a largely opportunistic trade, with little or no organization at community level. Men do not participate in Shea nut gathering in most parts of Nigeria and regard this as the preserve of women and children. It is called an "opportunistic business" because no one has ownership rights over the trees and gathering is equally open to all. The owners of farms and old abandoned farms maintain the right to harvest their trees. Women and children sometimes pick Shea fruits from their husbands' plots; They are taken to the market in various measuring containers ranging from Sacks, Plastic rubber, empty Tins etc for fair price ,fruits are sold directly to consumers while some times are processed into Nuts or Butter for sale.

Butter has become a valued ingredient in the finest natural cosmetics (Fin trace Corporation, 1999) and even small amount in a formulation can earn a prominent display on the label. The cosmetic and pharmaceutical industries alone consume an estimated figure of 2,000 to 8,000MT of Shea butter each year, and this figure is expected to rise with growing demand in the world's markets, the market prospects of Shea butter is high both locally and internationally.

Nigeria is endowed with Shea trees it is therefore important to reinforce sound management to sustain the species and maximize its productivity, it's important also to maximize returns to the primary producers (the farmers) who make the management decisions on which the future of the tree and the ecological integrity of the landscape depend. Shea butter does have a higher value than Shea nut, but the value depends very

much on the market on which it is sold. In both local and international markets, one of the most straightforward means of adding value to any commodity is processing of raw material into higher value end products, higher-quality butter will fetch a higher market price, and it is also preferred for home consumption and will keep longer in storage than poor-quality product. There may also be scope for improving products quality through identification of Shea tree population with specific chemical attributes conferring enhanced value, given the degree of chemical and genetic variation between populations (Lovett and Haq 2000); Fontaine et al,2004) and the extremely specialized high value products and market applications derived from the species particular compounds (Alander; 2004) to this end; Shea tree database has to be developed giving economical and chemical profiles, including analysis of Shea fruit, Shea nuts and Shea butter for increased productivity and for the development of the industry.

The processing and marketing of Shea nut and butter help rural women immensely to engage themselves in fair trade, this allows women in the agricultural sector to rise above poverty and make a decent living. It allows them to provide for their families and educate their children without getting into debt. Fair trade gives the hardworking women options. It allows her to know that her hard work has value. This goes beyond paying a fair rate for the nuts and the time the women spent extracting oil from the nuts. It also includes capacity building which includes training and creating opportunities for the women to sell their products in the international market.

In Nigeria, processing of Shea kernels in to Butter is mostly done traditionally by women with their crude processing materials which affect the quantity and the quality of butter produced, thereby affecting its market credibility, as consumers will only be willing to pay more for higher quality products. Research has also established that typically unpleasant odour due to poor quality of Butter of West African Shea (not characteristics of the eastern subspecies *nilotica*) results from one or more of the step in post harvest processing, and that modifying these steps could reduce or prevent it (Lovett,2004). In recent years, product certification according to quality criteria has been considered one avenue by which the value of Shea products may be raised for the benefit of primary producers (Walter et al 2003; Lovett 2004). To this end, reinforcing the economic value of the Shea-butter tree through expanded markets, the Shea Project will receive an enthusiastic response from participating farmers, who have become serious about protection of Shea woodland - and serious as well about production of the finest quality Shea-butter at a premium price. In addition, assisting farmers in the area of processing and marketing of Shea nut and butter will not only attract more income to the farmers but will also increase the nation's revenue from its sale in the international market.

CONCLUSION

It is obvious from the evidences on the economic and environmental importance of Shea tree deduced so far, that when this tree is given a special consideration, the economy of the north and certainly the entire country will receive a major boost of unimaginable proportions from domestic consumption and in the international market. This

will also provide practical, market-based incentives for the sustainable management and conservation of the Shea resources. Perhaps the greatest potential in this respect lies in the commercial development of Shea products from naturally occurring species with ready market value. The industry not only provides food, raw materials, income, it also provides employment for the growth of the nation. While the Economic, environmental and other benefits of Shea tree is undoubtedly clear, there is need to protect the tree against destruction. Nigeria being the largest producer of Shea in West Africa; prospects for sustainable economic profit for the citizens and the country as a whole on Shea products will remain uncertain if strategies are not developed through research to bring about technological progressiveness to boost the productivity of farmers. The establishment of Shea tree plantations will not only add to the total economic GDP of the country but will invariably check the speeding rate of desertification in the country and it will also make a positive impact on the income of the citizens as well as the diet of the people thereby, contributing to the standard of living of not only the farmers but the entire population. It is a big challenge, and Nigeria as a nation can live up to it. It is worth investing in that area, as the country is not short of scientists who are eager and willing to deploy their expertise in that regard. In order for the development of Shea products trade to result in tangible improvement in sustainable management of the Shea resources in the country, partnership between rural producers, national policy – makers, the private sector and international industry is inevitable and some portion of the benefits must be channelled in to better management of the Shea industry.

Recommendations

Shea is among the economic tree crops grown in Central and Northern Nigeria, the industry has the potentials to provide food, raw material, income and employment to millions of Nigerians. Government could make these possible if more energy is harnessed into domesticating the very slow growth of the Shea tree species through the development of modern propagation techniques, which reduces periods of juvenility. Credit facilities when given to the farmers also, will boost their productivity to meet up with the domestic consumption and for export. Mechanized processing centre is needed for the application of new processing techniques not only to ease the drudgery involve in traditional method of processing but to also boost production and ensure higher quality butter that will attract better price from both local and international markets. The government can also ease the difficulties involved in the evacuation of Shea nuts from the wild through the provision of accessible roads and means of transportation. Provision of standard markets and facilities, stable market price, product certification and quality control of Shea product will not only provide employments and alleviate poverty amongst farmers in the provision of substantial income to support their basic needs; the Shea industry will also boost the economy of nation. The awareness of the need for the conservation of natural plant populations must be created to encourage the local communities to conserve the Shea trees for future exploitation of its resources.

REFERENCES

Abbiw, D. (1990). The useful plants of Ghana. Intermediate Technology Publications/ Royal Botanic Gardens, London / Kew. 337pp.

Alander, J. and Anderson A. C. (2002). The Shea butter family - the complete emollient range for skin care formulations. Cosmetics and Toiletries Manufacture worldwide, 2002; 28-32 Available at: www.ctmw.com/KARLSHAMNS.pdf

Alander, J. (2004). Shea butter a multifunctional ingredient for food and cosmetics. Lipid Technology, 16(9): 202-205.

Ayeh, F. Y. O. (1998). Effect of dye on rancid Shea butter. Cocoa Research Institute, Ghana, Annual Report 1988/89: 124

Bonkoungou, E. G. (2001). Monographie du karité, Butyrospermum paradoxum (Gaertn. f.) Hepper, espèce agroforestière à usages multiples. Institute de la Researche en Biologie et Ecologie Tropicale, Centre National de la Researche Scientifique et Technologique, Ougadougou. 69pp.

Eromosele, I. C. and Otitolaye, O. O. (1994). "Binding of iron, zinc and lead ions from aqueous solution by shea butter (Butyrospermum pakii) seed husks". Bulletin of Environmental contamination and Toxicology, 52: 530-537.

Ezema, D. O. and Ogujiofor, K. O. (1992). "The evolution of Butyrospermum paradoxum as a suppository base". International Journal of pharmacognosy, 30: 275-280.

FAO (1988). Appendix 5, Forest Genetic Resource Priorities. 10. Africa. Report of Sixth Session of the FAO Panel of Experts on Forest Gene Resources, held in Rome, Italy, December 8-11, 1985, pp 86-89. FAO, Rome. 79pp.

Fintrace Corporation (1999). Market and Technical Survey. Shea nuts, prepared for United States Agency of International Development (US AID) Rural and Agricultural incomes with a sustainable Environment (RAISE)

Fontain, C., Lovett, P.N., Sanou, H., Maley, J. and Bouvet, J. M. (2004). Genetic diversity of Shea tree (*vitellaris paradoxa* C.F. Gaertn) detected by RAPD and Chloroplast microsatellite makers. Heredity, 93(6): 639-648.

Hall, J. B.; Aebischer, D. P.; Tomlinson, H. F; Osei-
Amaning, E. & Hindle, J. R. (1996). Vitellaria paradoxa: A monograph. School of Agricultural and Forest Sciences, publication no. 8. University of Wales, Bangor. 105pp.

Karate gold products - http://karitegold.com/non-product-pages/shea-butter-production.htm

Lovett, P.N. (2004). The impact of certification on the sustainable use of Shea butter (Vitellaria paradoxa) in Ghana

Lovett, P.N. and Haq, N. (2000). Diversity of Shea nut tree (Vitellaria paradoxer Gaertn C.F.) in Ghana. Genetic Resources and crop Evolution, 47(3): 293-304.

Niess, T. (1988). Technologie approprieé pour les femmes des villages. Développement de la presse à karité au Mali. Deutches Zentrumfür Entwicklungstechnologien, Deutsche Gesellschaft für Technische

Zusammenarbeit vieweg & Sohn, Braunschweig. 42pp.

Nikiema, A. & Umali, B.E., (2007). Vitellaria paradoxa C.F.Gaertn. In: van der Vossen, H.A.M. & Mkamilo, G.S. (Editors). PROTA 14: Vegetable oils/Oléagineux. [CD-Rom]. PROTA, Wageningen, Netherlands.

Nigerian Institute for Oil palm Research (NFOR) In house Research Review (2008). pp 205-222)

Owusu-Manu, E. (1991). Shea Entomology, Insect Survey. CRIG, Annual Reports 1988/89: Accessible at URL http://d.scribd.com/docs/28t3tey9htb8qvezh965.pdf

Poulsen, G. (1981). Important forest products in Africa other than wood - a preliminary study (Project Report RAF/78/025). FAO, Rome.

Salunkhe, D.K.; Chavan, J.K.; Adsule, R.N. & Kadam, S.S (1992). World oilseeds. Chemistry, technology and utilization. Van Nostrand Reinhold, New York. 554pp.

Schrechenberg, K. (1996). Forests, fields and markets: a study of indigenous tree products in the woody savannahs of the Bassila region, Benin, PhD thesis, University of London. 326pp.

Soladoye, M.O.; Orhiere, S.S. & Ibimode, B.M. (2000). "Ethnobotanical study of two indigenous multipurpose plants in the\Guinea savanna of Kwara state - Vitellaria paradoxa and Parkia Biglobosa". Biennial Conference of the Ecological Society of Nigeria, 14th August 1989, Forestry Research Institute, Ibadan. 13pp.

Wallace-Bruce, Y. (1995). Shea butter extraction in Ghana, pp. 157-161. In: Do It Herself. Women and technical innovation. (Ed. by H.

Appleton), pp. 157-161.Intermediate Technology Publications, London. 310pp.

Walters, S., Cole, D., Kalte, W., Lovett, P. and Paz Soldan, M. (2003). Impact of certification on the sustainable use of NWFP: Lessons learnt from three case studies, presented at the international conference on rural. Accessible at URL ftp://ftp.fao.org/docrep/fao/010/y5952e/y5952e.pdf

Yidana, J. A. (1994). Pollination in Shea trees. Cocoa

Research Institute, Ghana, Annual Report 1992/93.

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