SUSTAINABLE LIVELIHOOD AND FOOD SECURITY STATUS AMONG RICE FARMERS IN ANAMBRA STATE, NIGERIA

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ABSTRACT
The Study examined sustainable livelihood and food security status among rice farmers in Anambra State, Nigeria. A multi-stage sampling procedure was employed to select the 120 sample size needed for the study. Data were analyzed using descriptive and inferentialanalytical tools such as Mean, Frequencies, Percentage, multinomial logit and food security index. The farmers' choices of livelihood revealed that 70% of the respondents chose crop production as their major source of livelihood. Estimate of multinomial logitshows that the Chi square was highly significant (p< 0.0000). The model has a strong explanatory power and the pseudo R^2 was 78.5%, the coefficient of marital status, Educational level of the household head, Farm size, household income, credit access size were the major determinants of households' choice of livelihood sources in the study area. The study area was regarded as food secure given the fact that majority of the rural households (65.83%) were able to meet the recommended calorie intake per capita per day. Only 15.83% of the households were food insecure and unable to meet the recommended daily per capita calorie requirements. The study therefore recommend that the extension personnel be trained and sufficiently motivated in order to disseminate relevant information to farmers on how to diversify their livelihood in order to cope with farming. AlsoGovernment should provide informal education opportunities through extension services on non-farm income earning opportunities.
Keywords: Sustainable livelihood, food security status, rice farmers

INTRODUCTION

The greatest challenge in agriculture is to grow food for its ever increasing population amidst the myriad of social, economic and cultural problems facing the nation (Fakoya*et al*., 2007). According to Titilola and Jeje (2008), analysis of the future demand for food and agricultural raw materials, as well as trends in their supplies have shown clearly that greater and rapid increases are needed over and above past trends if the goals of improved nutrition, economic development and poverty reduction are to be achieved. They claimed that achieving increased production will require the expansion and intensification of productive land for agriculture which will lead to increased production and improvement in the use of other farm inputs, thereby increasing output and reducing poverty. The existence of various agricultural programmes and policies intended to boost arable crop production are incentives for farmers to increase agricultural production and theseprogrammes policies however, have prompted many arable crop farmers to intensify the frequency of cropping, change combination of crops planted in attempts to maximize land use and reduce risks and uncertainties in production. (Udoh*et al*., 2011)

Sustainability of livelihoods becomesa function of how men and women utilize assetportfolios on both a short and long-term basis.Sustainable livelihoods are those that are able tocope with and recover from shocks and stresses suchas drought, civil war and policy failure throughadaptive and coping strategies (Jirli*et al*., 2008).Capability, equity and sustainability combine in theconcept of sustainable livelihood.The concept Sustainable. Conceptually 'livelihood' denotes the means, activities, entitlements and assets by which people make a living. Sustainable Rural Livelihood(SRL) is an attempt to go beyond the conventionaldefinitions and approaches to poverty eradication.These has been found to be too narrow they focusedonly on certain aspects or manifestations of poverty,such as low income, or did not consider other vitalaspects of poverty such as vulnerability and socialinclusion. It is now recognized that more attentionmust be given to the various factors and processeswhich either constrain or enhance poor people'sability to make a living in an economically,ecologically and socially sustainable manner. TheSRL concept offers a more coherent and integratedapproach to poverty alleviation. To achievesustainable rural livelihoods different livelihoodcapitals such as human capital, social capital, naturalcapital, physical capital and financial capital wouldplay a greater role to cope with shocks and stressesand maintain or enhance the individual's capabilitiesand assets both in present and in the future withoutdegrading the natural resource base.

Livelihood choices are those employmentoptions that the farm households can engage in so as toprovide for their needs. Households engage in farm, andnon-farm (non-agricultural) livelihood activities such ascrop production, animal rearing, petty trading in order togenerate additional income for survival and cope with thisharsh and difficult environment (Kalinda and Langyintuo, 2014). Livelihood activitiesof the households' are related to their endowment ofsocial, human, financial, physical and natural assets(Nkoya*et al*., 2004).

Rice is the most strategic food crop in West Africa because of its contribution to Sustainability livelihoods of the populations and its impact on the economy of households and countries (FAO, 2013). Rice is a staple crop throughout West Africa, especially in Nigeria, Cote d'Ivoire, the Gambia, Guinea, Guinea Bissau, Liberia, Burkina Faso, Senegal and Sierra Leone (Basorun, 2009). However, continued fluctuation in rice production in the country is an indication of limited capacity of the Nigeria rice economy to match the domestic demand which can be attributed to the inability of the rice farmers to obtain maximum output from the resources committed to the enterprise (Adi, 2007). The earliest cultivation of improved rice varieties (O. sativa) started in about 1890 with the introduction of upland varieties to the high forest zone in western Nigerian (Matanmi*et al*., 2011). Over the years, Nigeria has been producing rice below its potentials and this has given rise to increasing demand for the crop in the face of the Nation's rapidly growing population which has resulted in wide demand and supply gap. The importation of rice to bridge the demand and supply gap is worth N365billion (Ayanwale and Amusan, 2012).

A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base" (Chambers and Conway, 1992) Livelihoods are the ways in which people satisfy their needs, or gain a living (Chambers and Conway 1992). A 'livelihood' is a set of flows of income, from hired employment, self-employment, remittances or (usually in developing rural areas) from a seasonally and annually variable combination of all these. A livelihood should be sufficient to avoid poverty, and preferably, increase well-beingfor a typical worker plus dependants. Well-beingis the product of a range of factors, including adequate consumption of goods and services, health, status, achievement, and security.' Livelihood implies systems of how rural people make a living and whether their livelihoods are secure or vulnerable over time. Livelihood security means 'secure ownership of, or access to, resources and income-generating activities, including reserves and assets to offset risk, ease shocks and meet contingencies' (Chambersandconway 1992). Thus, it is livelihood security, rather than just food security, that is the focus of rural households because achievement of food security is just one of the objectives of livelihood security (Birkmanand Fernando,2008).

Despite all human and material resources devoted to Nigerian agriculture, the productive efficiency of farmers for most crops still fall below 60%. The inefficiency problem is attributed to factors such as use of low input technologies, lack of knowledge of high input technologies and poor farm management skills, poor extension services, unavailability and high cost of inputs (Anyanwu, 2010). Poor households are more in agricultural occupation and participation in agriculture is found to be more predominant in rural areas and peri-urban areas where majority are small-holder farmers. Moreover, efforts at improving agricultural production have always been concentrated on increasing production through the breeding of high yielding varieties with little emphasis on sustaining better livelihood options and efficiency of production output and the conservation of what is produced (Offor*et al*., 2010).

METHODOLOGY

Study Area

This study was conducted in Anambra state, Nigeria. Anambra State is a state in south-eastern Nigeria. Itsname is an anglicized version of the original 'OmaMbala', the native name of the Anambra River whichis a tributary of the famous River Niger. The capital and the Seat of Government is Awka. Onitsha andNnewi are the biggest commercial and industrial cities. The state's theme is "Light of The Nation". Anambra lies between geographical coordinates; longitude $6^0 20^1 N 7^0 00^1$ East of the Greenwich and latitude 6^0 33^0 N 7^0 00^1 E. It has an area of 4,884km^2 (1,870sq mi) and a population of 4,055,048 (NPC, 2006).

Sampling Procedure

Multi-staged sampling technique was used to determine the sample size of the study. In the first stage the three agricultural zones was selected in the states. The second stage involve a random selection of two Local Governments Area (LGAs) from each agricultural zones (Anambra East L.G.A, AnambraWest ;Orumba North L.G.A, Orumba South L.G.A,, Awka North and Idemili South L.G.A.) from the agricultural zone. In the third stage the simple random sampling technique will also use to select two communities each of the two selected local governments in the agricultural zone. Finally, from the selected community proportionate sampling was used to select rice farmers from each of the community selected given a total of 120 respondents.

Data Collection

The study use primary data sources. The primary data were obtained through aid of questionnaire and interview schedule. Information collected include data examining the socio-economic characteristics of the rice farmers in the study area, common sustainablelivelihood choices of the rice farmers in the study area, the factors that influenced the choices of sustainable livelihoods among the farm households in the study area and the coping strategies for sustaining livelihoods among the farm households in the study area;

Data Analysis

Both descriptive and inferential statistics were used to analyze data.

Food Security Status is given as;

F_i= Per capita monthly food expenditure for the ith household / 2/3 means per capita monthly food expenditure of all households

Where F_i = Food security index. When $F_i \geq 1$ it implies that the i^{th} household is food secure, but when $F_i < 1$, it implies that the i^{th} household is food insecure.

For factors that influenced the choices of sustainable livelihoods among the farm households in the study area, the multinomial logitwas used in this study because of the variousresponse categories. The livelihood choices were grouped into four categories, category 1, if the farm household chose crop production; category 2, if fishing was chosen; category 3, if livestock production was chosen and category 4 if the major livelihood choice was from agro-forest resources. The multinomial logit model was estimated as follows:

$$Pij = \frac{e^{Bj X_i}}{1+\sum_{k=0}^{j} e^{B_k X_i}} \quad ---1$$

P_{ij} = Probability of each household preferring a particular livelihood choice (crop production, fishing, livestock and agro-forest) reduces to:

$$Pij = \frac{e^{Bj X_i}}{1+\sum_{k=j}^{j} e^{B_k X_i}} \quad ---2$$

While the probability of being in the base outcome group is

$$Pi_0 = \frac{1}{1+\sum_{k=0}^{3} e^{B_k X_i}} \quad ---- \ 3$$

Where,
i =1,2…….n variables;
K= 0,1,2,3 groups;
Bj= a vector of parameters that relates Xi's (independent variables) to the probability of being in group j where there are j+1 groups.

The socio-economic characteristics of the farm household constituted the explanatory variables. By implication, after estimating the parameters, one can predict the probability that a sampled household with a specified set of socio-economic characteristics may chose rice production, processing, marketing and fishing in the rice swamp respectively as their choice of livelihood relative to non-agricultural occupations such as trading.

X_1 = Age of households head (in years)
X_2 = Marital status (married 1, otherwise 0)
X_3 = Household size (number of individual in the family.)
X_4 = Education of household head (years)
X_5 = Farm size (in hectares)
X_6 = Farming experience (in years)
X_7 = Household income (In Naira)
X_8 = Access to credit (Access = 1, 0 otherwise)
X9 = Membership of farmers organization (if any 1, otherwise 0)
X_{10} = Remittances (₦)

RESULTS AND DISCUSSION

Common Sustainable Livelihood Choices ofRice Farmers

Distribution of respondent according to choices of livelihood is shown in Table 1.

Table 1: Frequency and percentage distribution of the respondents according to choices of livelihoods

Livelihood Choices	Number of respondents	Percentage
Crop production	84	70.00
Fishing	19	15.83
Livestock production	48	40.00
Agro forestry	11	9.17
Non-agricultural occupation	22	18.33

* = Multiple responses were recorded, Source: Field survey, 2017.

The Table shows that 70% of the respondents chose crop production as their major source of livelihood, 40% chose livestock production, while 15.83, 9.17 and 18.33% of the respondents chose fishing, agro forestry and non- agricultural livelihood respectively. The implication is that the State will have reduced resilience to the effects of food insecurity due to lack of wide range of livelihood options. This is line with the work done by Fashogbon and Oni (2013) which showed that in Nigeria that farming is the predominant livelihood activity. In addition, in Ogun state, Nigeria, majority of farm households engage in fishing and fishing related activities as their occupations (Olawuyi and Rahji, 2012). However, it is evident that rural households in Nigeria engage in multiple livelihood activities such as trading, small scale business enterprises and processing of agricultural goods and arts and craft in order to supplement earnings from agriculture (Matthews-Njoku*et al.*, 2007; Adepoju and Obayelu, 2013).

Factors Influencing the Choices of Sustainable Livelihoods

Multinomial logitCoefficients of the factors influencing the choices of sustainable livelihoods among the farm households in Anambra State is presented in Table 2.

Table 2 Estimates of Factors influencing the choices of sustainable livelihoods

Variables	Fishing (2)	Livestock production (3)	Agro forestry (4)
Age	0.0027 (.0.2561)	0.0460 (0.0342)	-0.0245 (0.0633)
Marital status	-2.588** (1.2281)	-2.0373** (0.8848)	14.256*** (1176.587)
Household size	-0.302 (0.1522)	-2.2577** (0.1177)	-6.6769** (0.2636)
Education	0.4582 (0.0541)	2.1245** (0.0613)	0.0235 (0.0954)
Farm size	-1.2944 (0.3856)	-7.0808*** (0.2624)	-0.5983 (0.4424)
Farming Experience	0.1068 (0.0673)	-0.0016 (0.0471)	0.1026 (0.0771)
Household income	0.0001 (3.05e-08)	6.9154*** (2.13e-08)	6.9554*** (3.28e-08)
Credit access	2.7762*** (0.6938)	6.5479 (0.4375)	3.7176*** (0.8862)
Membership of org	1.2527 (0.9530)	-0.4816 (0.4911)	0.2367 (1.0154)
Remittance	-0.0015 (0.0023)	-0.1033 (0.0019)	0.0007 (0.0032)
Intercept	10.548***(9.8807)	-3.5441 (6.6004)	-11.2260***(1176.656)

Statistics: chi^2 (36) = 185.67, prop > chi^2 = 0.0000; Pseudo - R^2 = 0.785; number of observation= 120. The figures in parenthesis are standard errors. Source: **Field survey, 2017**

The Chi square result was highly significant (p< 0.0000), suggesting that the model has a strong explanatory power. The pseudo R^2 was 78.5%, thus confirming households' choice decision making process could be attributed to fitted covariates. In terms of consistency with a priori expectations on the relationship between the dependent and the explanatory variables, the model appeared to have performed well.

The coefficient of marital status was negatively and significantly (p<0.05) related to the probability of the household choosing fishing and livestock production as their major sources of livelihood in comparison with crop production. However, marital status was positively related to the probability that the household head will choose agro forestry production. Implying that married household heads could have bigger household size which could mean more family labour for crop production and agro forest activities. Married farmers are usually involved in farm business because of the need to supplement family means of livelihood (Anyiro and Emerole, 2013).

The coefficient of household size was negative and significantly (p<0.05) related to the probability that the household chooses livestock production or agro forestry as their major sources of livelihood in comparison with crop production. This means that households with bigger sizes are more likely to choose crop production as their major source of livelihood. This could be because larger household sizes mean more available family labour for crop production activities (Okon and Enete, 2009). This finding is also consistent that of Hassan and Nhemachena (2008), who observed that household with larger sizes were more likely to choose crop production as their choice of livelihood than livestock, agro forestry and fishery.

Educational level of the household head was positive and significantly related to the likelihood of the household head choosing livestock production in comparison with crop production. This implies that educated household heads are more likely to practice livestock production in comparison with crop production. Education is expected to impact positively on farmer's decision making, since educated households are expected to be more informed and knowledgeable on the best livelihood choices to choose. This finding is in line with that of Birkmann and Fernando (2008), who noted that education and skills up grading are powerful adaptive strategies for individual families and communities. In addition, Adi (2007) identified education as one of the determinants of livelihood choice in Eastern Nigeria.

Farm size had a negative and significant (p<0.01) relationship with the probability that the household chooses fishing or livestock production as their major source of livelihood as compared to crop production. The implication of this finding is that households with large land size are more likely to choose crop production as their major source of livelihood, because farmers need more land for crop production.

Household income was positive and statistically significantly (p<0.01) in all choices of livelihood. This is to be expected because income is the major determinants of livelihood options. There is every tendency of the household choosing a livelihood source that will generate more income in other not to be crushed by the depressed economic situation. The more income got from a livelihood source, the greater the probability of a household choosing it as their major livelihood option. This finding is in line with Kinsella *et al.* (2000), who observed that financial resources such as cash, credit and other economic assets are essential for pursuit of livelihood strategies.

Credit access was statistically significant in all the livelihood choices and positive as compared to crop production. This is in agreement with *apriori* expectation, The result is not in agreement with by Barret*et al.*, (2001), who reported that households with access to credit facilities would more likely diversify agriculture. Nwaru (2004) reported that, farmers became more efficient where more credit where available for production, the result also confirms similar findings by Kebede (2001) a farmer who has access to credit will be able to obtain the

necessary production input timely, and therefore, able to improve his/her of output level and food secured.

Food security status of the Respondent.
Distribution of the respondents based on Food security status is presented in Table 3

Table 3: Distribution of the respondents based on Food security status

Status	Frequency	Percentage
Food secured	79	65.83
Food insecure	19	15.83
Total	**120**	**100.0**

Source: Field survey, 2017.

A food secure household is, therefore, that whose per capita monthly food expenditure is at least two-third of the mean per capita monthly food expenditure. On the other hand, a food insecure household is that whose per capita monthly food expenditure is less than two-third of the mean monthly per capita food expenditure. The study area could be regarded as food secure given the fact that majority of the rural households (65.83%) were able to meet the recommended calorie intake per capita per day. Only 15.83% of the households were food insecure and unable to meet the recommended daily per capita calorie requirements.

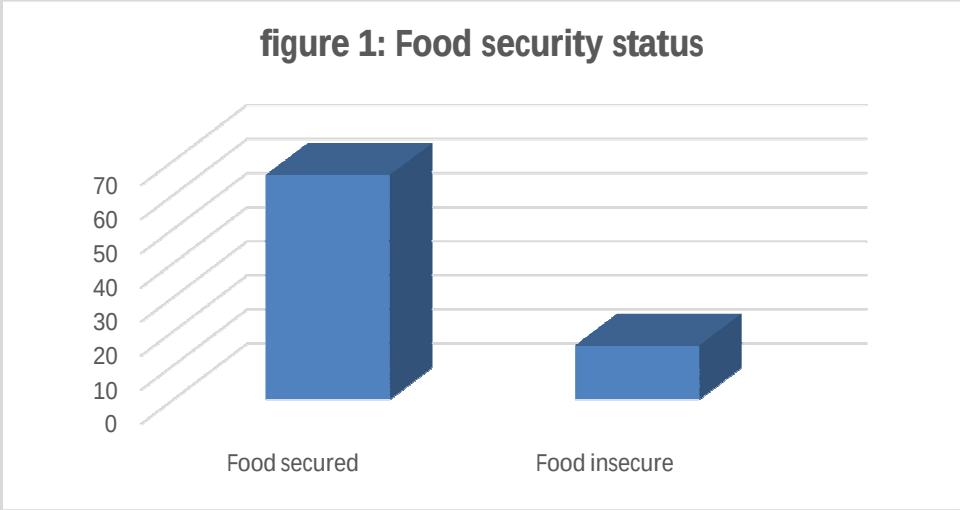

Figure one shows that majority of the respondent in the area are food secured, this shows that the sustainable livelihood choice adapted by the farmers in the area has significant influence on food security status among rice farmers in Anambra State, Nigeria.

Constraints Affecting Food Security Status
Table 4 shows the distribution of the respondents according to problems encountered in rice production which limit their livelihood choice.

Table 4 Factors affecting food security status among rice farmers

Constraints*	**Frequency**	**Percentages**
Limited access to farm credit	26	21.67
Limited/inadequate extension workers	29	24.17
Limited access to land	18	15.00
Limitedaccess to mechanized equipment	34	28.33
Limitedaccess to agro-chemicals	28	23.33
Inadequate reliable public transportation	28	23.33
Culture and norms	11	9.17
Inadequate/lack of storage facilities	12	10.00

Source: Field Survey Data, 2017*Multiple responses recorded

The results showed that 15.0% of them complained of lack of access to land, lack of access to farm credit (21.67%), lack of access to mechanized equipment (28.33%) and lack of access to agro-chemicals (23.33%) such as fertilizers herbicides and pesticides. With respect to the respondents' access to infrastructural facilities, a fair proportion (23.33%) of the farmers complained of inadequate reliable public transportation while 10.0% had problems of inadequate storage facilities. Meanwhile, inadequate

extension workers constituted a problem to most (24.17) of the rural farmers. Culture and norms accounted for 9.17% of total population. The result implies that although rice farmers contribute significantly to agricultural production in Nigeria, they are least likely to benefit from agricultural extension services, agricultural credit schemes and technologies that would improve their productivity. This has been as a result of barriers exerted by cultural, social, biological and religious factors (Nwaru, 2004). In fact, there is a strong case for arguing that without credit and complementing public infrastructure (roads, bridges, electricity, schools), It is difficult to see how smallholders women farmers could generate incomes that can sustain an adequate livelihood (Anyiro and Oriaku 2011).

CONCLUSION AND RECOMMENDATIONS

The study examined sustainable livelihood and food security status among rice farmers in Anambra State, Nigeria. It may be concluded from the above results that The coefficient of marital status, Educational level of the household head, Farm size, household income, credit access size were the major determinants of households' choice of livelihood sources in the study area.

Based on the findings of the study, the following recommendations were made in an attempt to improve sustainable livelihood and food security status among rice farmers in Anambra State, Nigeria.

i. The significant variables influencing sustainable livelihood choice should be taken into consideration in policy issues.
ii. the extension personnel should be trained and motivated in order to disseminate relevant information to farmers on how to diversify their livelihood in order to cope with farming
iii. Since the coefficient of credit was significant, government should give to farming households' consumption and production credits at minimum interest rate. This will reduce the constraint of lack of access to credit faced by households in the study area, thereby improving their livelihood choice.
iv. Since the involvement in off-farm and non - farm job was identified as the largest (40.83%) portion for all food security categories as coping mechanisms, farmers be provided with informal education through extension services on non- farm income earning opportunities.

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