Analysis of Livelihood, Income Diversification and Food Insecurity Status among Farming Households in Jigawa State, Nigeria

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ABSTRACT:
Diversification of income sources of households and widening of crops options by the farmers during cultivation have positive impact on the food security level of rural households. This study utilized data obtained from a survey of 200 farming households. The data were analyzed using descriptive statistics, food security index and logit regression analysis. The results revealed that 78.5% of the farmers were within the active age of 25-54 years with a mean age of 42.3 years, and farm size of less than 2ha (56%); 51% had acquired Islamic education, majority (82%)were married with the mean household size of 11 people. Aside farming, eleven livelihood activities were the major activities engaged in by the households. Furthermore, the result shows that engagement in livelihood activities reduces the risk of food insecurity The results also showed that the factors responsible for income diversification were land tenure system, unstable produce prices, seasonality of Agricultural activities and poor market outlay. Result on food security status of the respondents' shows that 52% of the respondents were food insecure. The result also shows that annual farm income household size, access to education and contact with extension agent were significant factors that determine food security status of the head of the household. Problems militating against household food security were identified as inadequate infrastructure, poor marketing channel, high price of farm inputs, low processing capacity, in adequate access to credit facilities and poor transportation network. We are therefore, recommended that government should create awareness program to empower farmers on the various diversification method.
Key ward: Food insecurity, Income diversification, Livelihood, Jigawa

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I.   INTRODUCTION

A key issue in food security is livelihood and income diversification potential of households. In fact, it may be noted that treating the issue of food security without consideration of the attendant security of the livelihood of the individual/household in question may be inadequate to making appropriate policy recommendations (Omobowale, 2012). Food security normally exists when all people at all times have access to safe nutritious food to maintain a healthy and active life (FAO, 1996).According to Omonona and Agoi (2007) , there are four major elements in accessing food security, namely: availability, accessibility, utilization, and sustainability. While availability connotes the physical presence of a large quantity of food, accessibility implies that there is the ability to acquire the required quantity; utilization/adequacy means sufficiency in both quantity and quality of food; and sustainability implies access at all times and not losing such access. Young *et al* (2001) asserts that food crisis and food related emergencies have led to malnutrition and mortality. Different agencies and developmental projects have defined and measured the food security/insecurity status of different countries, groups and social classes. There have been analysis of the food security status of whole regions and countries; however, there is now a shift to understanding the food security state of households, for whom policies can be enacted to give effective change to the national, regional and international profile of food security issues. Olayemi (1998) asserted that a major factor in food poverty and/or access is livelihood, which includes the various resources and activities that allow people to live.

A livelihood comprises the capability, assets (including both material and social resources) and activities required for a means of living. A livelihood is stressed when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future while not undermining

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the natural resource base (chambers, R and G Conway (1992). Livelihood systems and income diversification are the key components of poverty reduction and food security issues in different policy environments. According to Baro (2002), livelihood systems encompass means, relations, and processes of production, as well as household management strategies. The resources and values of specific physical and social environments determine the character of livelihood system components. Food security is not the only goal of rural populace; the need for a sustainable livelihood is more central since it reflects the ability to take hold of other issues that guarantee good life. Ayantoye *et al* (2011) stated that there is a nexus between poverty levels in rural Nigeria and the level of food security, as well as its transition. Rural Nigeria is characterized by an agrarian livelihood as well as certain other primary production activities. Studies have shown that agricultural-based livelihood in rural Nigeria has a higher level of poverty than other occupational groups. Rural agriculture is subjected to local variations in weather conditions, and thus expected variations in income levels and thus access to food (Omonona, 2009). Therefore, farming on its own is increasingly unable to provide sufficient means of survival in rural areas. However, there is need to increase livelihood income diversification in approaches to rural food poverty reduction. The attention given to food poverty of households is based on the fact that food poverty is the most important of all the different dimensions of poverty facing the poor (Awotide, 2007). Besides this, food is a basic essential for survival. The tendency for rural households to engage in multiple occupations is often remarked, but few attempts have been made to link this behaviour in a systematic way to rural food poverty reduction. Therefore, this study attempts to contribute to knowledge by empirically relating food poverty status to livelihood and income diversification in Jigawa State with particular reference to rural farming families. The broad objective of this study was to empirically relate food poverty to livelihood and income diversification among the farming households in Jigawa State. The specific objectives were to; describe socio-economic characteristic of the farming households, describe the food security status and livelihood activities engaged in by the farming household, to describe the effect of income diversification on rural livelihood and to identify factors militating against household food security.

II.   METHODOLOGY
Study Area
The study was conducted in Jigawa state of Nigeria. It is situated in the north-western part of the country. The state has a total land area of approximately 22,410 km^2 or 2.2 million hectares of land and lies between latitude 10^0 57' North to 13^0 03' North and Longitude 8^0 08' East to 10^0 37' East (Jigawa State, 2004). It shares a common boundary with Katsina State to the North, Niger Republic and Yobe State. To the East and South by Bauchi State and to the West by Kano State (N.I.G, 2004). The State has a population of 4,348,649 people (NPC, 2006) while the estimated population in 2014 was 5,372,754 at 2.9% rate of population growth. Its topography is characterised by undulating land, with sand dunes of various size spanning several kilometres in parts of the state. The state is endowed with fertile arable land to which almost all tropical crops could adopt, thus constituting one of its highly prized natural resources..

Sampling procedure and sampling size
The study employed multi-stage random sampling techniques for the selection of the sample size; the first stage involved a random selection of four (4) Local Government Areas (LGAs). Second stage involves random selection of 8 villages from the initial four LGAs selected. Then 25 Household were randomly selected from each village to give a total of 200 respondents. Information was collected through the use of a well-structured questionnaire which was administered to the respondents through one on one interview. Give the list of LGAs and Villages selected in a table

Analytical Techniques
 The data was analysed using Descriptive statistics SUCH AS frequency, percentage and mean. likert scale (1= very severe, 2=severe, 3= less severe) was use to score the responses of Faming household, Food security index and logit regression model were also used in analyzing the data.

Food Security Index
The households were classified into food secure and food insecure households using food security index as earlier used by Omononaand Agoi (2007); this was used to establish the food security status of various households. The index is given by;

$$F_i = \frac{Per\ capital\ food\ expenditure\ for\ each\ household}{\frac{2}{3}\ Means\ per\ capital\ foodexpenditure of\ all\ \text{households}}$$

Where

F_i = food security index

When

$F_i \geq 1$ = Household is food secured

$F_i \leq 1$ = Household is food in secured

A food secured household is therefore those whose per capita monthly food expenditure fall above or is equal to or greater than two-third of the mean per capita food expenditure. On the other hand, a food insecure household is that whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure.

The logit regression model

Logit regression model is characterized by a binary dependant variable with mutually exclusive and exhaustive outcomes. The dependant variable Y is the food security status of the respondents, which is one (1) if food secured, and zero (0) otherwise. Following maddala (1990) and babcork et al., 1995. The model is specified as follows

.number all your equations

$$Y = \propto + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 + \beta 4 X4 + \beta 5 X5 + U)$$

Where:

Y = food security status of the head of the household, (1= Food secured otherwise = 0) X1 = Age of the head of the household in years

X2 =Access to education (formal =1, non formal = 0). This should have been based on years of education

X3= Household size (no. of people eating from the same pot)

X4 = contact with extension agent (contact = 1, no contact = 0).number of contacts in a year is better and easier

X5 = total Annual farm income in (₦)

U = error term

α = Constant

β1 = regression coefficient

III. Results and Discussion

Socio-economic characteristics of the respondents

Result from Table 1 presents the distribution of respondents by socio-economic characteristics. The results revealed that 78.5% of the respondents were within the age group of 25-54 with mean age of 49 years; which suggests that most of the respondents are fairly old and leaving their productive stage. It was further revealed that majority (82.0%) of the respondents were married. The result also revealed that 46% of the respondents have household sizes of 6-15persons. It was also shown that majority (54.5%) of the respondents have many number of dependants ranging between 11-15people. From the result 51% of the respondents have no formal education. The low level of literacy among the respondents is likely to hamper good livelihood opportunity in both formal and non-formal sectors of the economy; thus capable of endangering household food security. The result also indicated that majority (89.5%) of the respondents engaged in farming as their major occupation while only 10.5% engaged in non farming activities as their major occupation. Most of the respondents (48%) engaged in Agro- processing as their livelihood activities, while 33% engaged in petty trading. The findings also show only 23.5% consumed food thrice daily, 64.5% twice; this implies that majority of rural farmers can not to afford three meals per day. It was also revealed that most (54%) of the respondents spent between ₦15,000 and ₦25,000 monthly on food.

Table 1 Socio-economic Characteristics of the sampled farming households

Socio-economic Characteristics	Frequency	Socio-economic Characteristics	Frequency
Age		**Educational Status**	
25- 34	23(11.5)	Quranic	102 (51%)
35-44	36(18)	Primary	48 (24%)
45-54	98(49)	Secondary	32 (16%)
55-64	31(15.5%)	Tertiary	18 (9%)
Above 65	12(6%)	**Major Occupation**	
Mean		Farming	179 (89.5)
Marital Status		Non-Farming	21 (10.5%)
Married	164 (82%)	**Farm Size (ha)**	
Single	19 (9.5%)	Less than2	112 (56%)
Divorced	8 (4%)	2-4	64 (32%)

Widowed	9 (4.5%)	Above 4	24 (12%)
House hold size		**Land Tenure**	
1-5	43 (21.5%)	Purchased	19(9.5%)
6-10	49 (24.5%)	Inherited	146(73%)
11-15	87 (43.5%)	Leased/Borrowed	35 (17.5%)
Above 15	21 (10.5%)	**Household income/Month(₦)**	
Mean		10,000-20,000	114 (57%)
Dependants on Household Head		21,000-30,000	49 (24.5%)
1-5	38 (19%)	31,000-40,000	24 (12%)
6-10	43 (21.5%)	Above40,000	13 (6.5%)
11-15	109 (54.5%)	**Expenditure on food items/Month(₦)**	
Above 15	10 (5%)	10,000- 15,000	42 (21%)
Food Consumption/Day		15001- 25,000	108 (54%)
Once	8 (4%)	25001- 35,000	33 (16.5)
Twice	129 (64.5%)	35001- 45,000	11 (5.5%
Thrice	47 (23.5%)	Above 45,000	6 (3%)
Whenever hungry	16 (8%)		

Source: Author's computation

Factors Responsible for income Diversification

Result in Table 2 revealed that 31% of the respondents has the opinion that land sub-division at inheritance causing plots to become less viable for family food security as factor responsible for income diversification, 53% pointed out that seasonality of agricultural activities coupled with adverse environmental change or cyclical trends that increase the risks associated with natural resource-based livelihood activities, makes them to think of other livelihood activities, 70% said declines in agricultural markets relative to non-farm wage levels, making agriculture less viable as a source of livelihood, this is probably due to inelastic demand and supply of agricultural produce while 43.5% of the respondents pointed out that rises in input costs is their major cause of diversification.

Effect of income diversification on rural livelihood

Result in Table 2 also shows that diversification improve food security of the respondents (90.5%), all of the respondents were of the opinion that income diversification improve rural livelihood, some 66% of the respondents stressed that income diversification reduce shock and stress. This finding is in line with Reardon *et al*, (1992), who reported that diversification can certainly improve food security in the face of high risks of drought or other climatic disturbances.

Table 2 Livelihood activities, determinant of income diversification and the effects of income diversification on rural livelihood (Multiple response exist in b and c hence N>200)

a. Livelihood activities	Frequency	Percentage
Fishing	21	10.5
Petty trading	33	16.5
Tailoring	16	8.0
Carpentry	13	6.5
Shoe shinning/cobbling	8	4.0
Labour of other farms	27	13.5
Agro-micro processing	48	24.0
Artisanship/craftwork	3	1.5
Bike/motor bike repairing	4	2.0
Livestock rearing	9	4.5
Civil Service	13	6.5
Others	5	2.5
b. Factors Responsible for income diversification take to separate table		
Land Tenure system	62	31.0
Seasonality of agricultural Activities	106	53.0
Increase in the cost of input	87	43.5
Poor market during bumper harvest	142	71.0

c. Effect of income diversification on rural livelihood		
Food security	181	90.5
Increase in income	200	100
Risk reduction	113	56.5
Reduce shock and stress	132	66.0

Source: Author's computation

Food security index analysis results
This analysis evaluates the food security status of the households (Table 3). The analysis found out that more than half of the respondents (52%) are food insecure while 48% of the respondents are food secure. This finding is relatively similar to that of Arene and Anyaeji, 2010 we reported that 60% of household in Nsuka, Nigeria were food insecure.

Table 3: Food security index analysis results

Food security status	Frequency	Percentage
Food insecure	104	52
Food secure	96	48

Source: Author's computation

Determinants of Food Security among Household Heads
      The result presented in Table 4 shows that four out of the five variables tested were significant in determining food security status of the head of the house hold. The size of the household was significant at 10% ($P < 0.10$) and was negatively related to food security status. This implies that increase in the size of the household would increase the probability of the household being poor; this is in agreement with S. Umar *et al.,* (2015) that an increase in the size of households result in inability of the resource available to household to satisfy their need. This study is consistent with a priori expectation that increase in number of dependents could predispose the household to poverty situation.
      The annual farm income is also significant at 1% which suggests that additional naira earned by Head of household would decrease the probability of being poor.
      However, significant positive relationship exists between access to formal education, and food security status ($Prob < 5\%$). this is consistent with the a priori expectation and some authors finding such as Nwaru (2004), Sengul and Tuncer, (2005), that as the level of education enhance the ability to derive, decode and evaluate useful information as well as improve the quality of labour as viewed by Onyenweaku (1991).Contact with extension agents was also found to be significant at 5% which implies that, extension agents are important in disseminating information to the head of household on how to improve their productivity with cumulative effect of increase in income.
Age of the respondents was not significant determinant to food security status of the respondents. This finding is similar with that of Omonana, 2010 who reported that age is not important variable in determining food security status.

Table 4: **Regression Estimate of for determinant of food security**

Variable	Beta	S.E.	Z-Value
Extension contact	.766	.306	2.50**
Age	0.17	0.16	1.06[NS]
Household Size	-.914	.418	2.19[*]
Education	.942	.408	2.31**
Income	0.674	.216	3.12***
Constant	.894	2.325	.384

-2log likelihood = 67 ,Nagekerke (R^{2}) = 0.45
* Significant at 10%, ** significant at 5%, *** significant at 1%, and NS = not significant

Factors militating against farming household food security
      The Three most important constraints faced by the respondents in ensuring household food security in the study area are presented in Table 5. Poor access to credit facilities, low processing capacity were very severe constraints to food security in the study area. Poor access to credit facilities is also an important factor determining acquisition and involvement in large scale activities which has significant influence on income generating activities. Also, household purchasing power would be eroded in case of high cost of food items thereby reducing access to food; this was in line with Dada & Adedoyin (2006) who stressed that without stable

and gainful employment, households lack the capability to access adequate food always. Lack of processing capacity affects the availability of food items which may lead to food insecurity.

Table 5: Distribution of respondents according to factors militating against household food security

Constraints	Frequency (very severe)	Frequency (Severe)	Frequency (Less severe)	Total
Lack o of inputs	-	138(69)	62(31)	200(100)
Low processing capacity	17(8.5)	129(64.5)	54(27)	200(100)
Poor marketing channel	9(4.5)	162(81)	29(14.5)	200(100)
Poor access to credit facilities	32(16)	123(61.5)	45(22.5)	200(100)
High cost of food item	-	59(29.5)	141(70.5)	200(100)
Cost of storage equipment	-	44(22)	156(78)	200(100)
Inadequate infrastructure	-	167(83.5)	33(16.5)	200(100)
Poor transportation network	12(6.0)	111(55.5)	77(38.5)	200(100)

Source: Field survey, 2014

IV.   Recommendations and Conclusions

From the finding of this research it is recommended that Policies aimed at increasing the income generation ability of the household should be strongly considered. The favoured livelihood activities should be thoroughly examined to enable policy makers know the right point of intervention.

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