INCOME DIVERSIFICATION DYNAMICS AND ITS DETERMINANTS: EVIDENCE FROM SMALL-HOLDER RICE FARMERS IN JIGAWA STATE, NIGERIA

[1]Mamman, B. Y., [2]Suleiman A., [2]Mustapha A and [3]Sani, M. H

[1]Department of Agricultural Economic and Agribusiness Federal University Dutse, Jigawa State Nigeria

[2]Department of Agricultural Economic and Extension Bayero University Kano, Kano State Nigeria

[3]Department of Agricultural Economic and Extension Abubakar Tafawa Balewa University Bauchi, Bauchi State Nigeria

Corresponded Email. bymamman@gmail.com Phone: +2348037919656

ABSTRACT

This study was conducted to examine income diversification profile and its determinant among wet season smallholder rice Farmers in Jigawa State, Nigeria. Multi-stage sampling techniques consisting purposive and random sampling were used in selecting 292 wet season smallholder rice Farmers who were interviewed using structured questionnaires by trained enumerators. The analytical tools employed include descriptive statistic, Mean income share index, Simpson diversification index and censored Torbic regression models. The result shows that that 96.9% of the farmers were males with a mean age of 40 years. Mean household size was 12 persons. Wet season rice production was the major occupation for the farmers with most of them having average farm size of 2 hectares. Income from rainfed rice production which is mainly subsistence in nature and is the most basic farm income, providing about 56.4% of total farming household income and Income from livestock rearing contribute about 17.2% of the total income. The result of SID of the farming household shows that 51.6% had high income diversity and 48.4% had low income diversity scores. Variable that were found to be significant in influencing income diversification include income from rice production, access to credit, Vocational training and access to improve input index. It is therefore recommended that since the study observed that level of diversification increase as access to improve farming input and farm equipment increase, therefore there is need by the stakeholders to facilitate easy accessibility to improve seed, fertilizer, agro chemicals and other farm equipment such as tractors, mechanical traction. This can be accomplished with the support and cooperation of Government, NGOs and other development partners particularly in rural areas.

Keywords: *Income diversification, Simpson index, Smallholder and credit*

INTRODUCTION

Income diversification is a strategy whereby households allocate their productive assets among different income generating activities (Alobo Loison and Bignebat, 2017). Households may diversify their income generating activities by growing cash crops, rearing different kinds of livestock, working on other farms or engaging in natural resource related activities (Alawode &Adelere, 2021). They may also diversify into nonfarm activities by engaging in waged labor, self-employment or labor migration (Daud *et al*., 2018). Some households may even straddle between farm and nonfarm activities over time depending on the opportunities and constraints they face (Djurfeldt & Djurfeldt 2013). Income diversification may also be a deliberate strategy

to risk management and coping strategy meant to cushion the effects of economic hardship cuts across all workforces in the formal sector as well as in the informal sector. For instance studies by Nazinin, Hossain & Islam (2015) discovered that in less developed countries more than 60 percent of the total workforce are engaged in multiple occupations all aimed at cushioning the effects of shocks (economic and agro-climatic), poverty reduction, reduction in income inequality, consumption stability and overall improvement in the standard of living of the households. Diversification is becoming an increasingly important livelihood strategy among rural households in Developing Countries. Empirical studies from Sub-Saharan Africa show that diversification has positive impacts on household incomes, wealth, consumption and nutrition (Umar, Malami and Suleiman 2020)

Nigeria is a nation blessed with good climatic condition that favour Agricultural production which make Agriculture to be an important sector in the economy of Nigeria. The uniqueness of Agricultural sector in the Nigerian economy is buttressed by the crucial role it can play in addressing food security, Poverty reduction and challenge of unemployment and also about 70% of the labour force of the country is dependent directly or indirectly on Agriculture. However. Rainfed farming was the main source of livelihood for majority of the rural household in Nigeria, with the rising population decline land-man ratio and increasing mechanization in farm operation rainfed alone is not able to provide adequate income and employment to meet the needs of these farming household. According to Mamman *et al*., (2019) that in densely populated regions, there is now major concerned that land may have become too scarce to make any meaningful contribution to smallholder income. This land scarcity suggest that rainfed Agricultural activities may not remain the only, or even the main, source of income and therefore rural farmers may not climb out of poverty through growth in rainfed land productivity alone. Nnedi (2018) revealed that increased involvement of farmer in all year round agricultural activities will help reduce the problems of poverty, food security and unemployment in the country. Diversification of income sources can play a vital role to reduce poverty and increase the level of household well-being in the study area. Therefore, information on Diversifying economy capacities of small-scale farmers is important in order to check if the flow of income and investment from rain-fed to dry season, livestock production, and other income generating activities can be reliable vehicle of economic development. It is in view of this that the study is aimed examine the income diversification dynamics and its determinants among small-holder farming household. Specifically, the study described the socio-economic characteristics of small-holders farming households; Estimate the Mean income share of different income porfolios, extimate the degree of Income diversification, and determine the socio-economics factors that influence income diversification among the farming households.

MATERIALS AND METHOD

The Study Area

The study area for this research was Jigawa State. Based on the 2006 National Population figures, the state had a population of 4,361,002 of which 50.4% were males and 49.6% females. However, the current population estimate put the population of the State at 5,828,200 million people (NBS, 2016) with about 628,010 farm families (VLS, 2016). Eighty-five percent (85%) of this population resides in rural areas and 90% of the population is predominantly engaged subsistence agriculture. Agricultural production in the state is heavily reliant upon rainfall and the use of traditional (local)

implements. Out of the 2.24 million hectares of land area of the state, about 1.6 million hectares are estimated to be cultivated during the raining season while about 308,000 hectares of the land mass is potentially conducive for dry season farming but with barely 54,000 hectares of farm land being put under irrigation. The state is also blessed with large expanse of agricultural land, rivers and flood plains, suitable for crops, livestock and fish production. Based on these facts, over 80% of the state's total land mass is considered arable, which makes it one of the most agriculturally endowed states in Nigeria.

Sampling Procedure

Multi stage sampling procedure was used to draw a representative sample of Farming Household in this study area. The first stage involved the purposive selection of Zones 1, 3&4 based on the high concentration of rice farmers in the zone. The second stage also involved purposive selection of two Local Government Areas (LGA's) each, from each zone based on high concentration of rice farmers. Birnin kudu, Jahun, Auyo, Kiri Kassama, Kazaure and Roni LGAs were identified. Third Stage involved random selection of two (2) villages from each of the selected local government which gave a total of twelve (12) villages. The villages selected are Yalwan dame, Kafin Gana in Birnin Kudu LGA, Harbo Sabuwa, Harbo Sohuwa in Jahun LGAs, Arawa, Gatafawa in Auyo LGAs, Marawaje, Iwo in Kirikasamma LGAs, Gada, Wawan Rafi in Kazaure LGAs and Gumama, Gora in Roni LGAs. The study used scientific sample size calculator to generate the appropriate number of respondents for the study. The RAO-SOFT requires inclusion of sample frame and specifying the confidence level to generate acceptable statistical number of respondents. Using RAO-SOFT sample size calculator, proportionate random sampling was used to draw the estimated population of the farming household from each of the selected villages make up a total sample size of Two hundred and ninety two (292) respondents.

Analytical tools

Different analytical tools were employed for the study. Descriptive statistics in the form of frequencies, means, and percentage was used to describe the socio economic characteristic of the faming Household. Mean Income Share and Simpson diversification index was used to estimate level of Income diversification and Censored Tobit regression model was also used to determine the socio-economics factors that influence income diversification among the farming household.

The mean of income share approach and Simpson diversification index

The mean income shares approach were used to estimate the income shares that will be obtained by smallholder farming household from different sources. The general mean of income share is estimate as

$$\mathbf{MS}_{\boldsymbol{i}} = \frac{E_i^n \frac{y}{\bar{y}}}{n} \quad \text{..... (1)}$$

Where

I = The income source (income from rice production, income from dry season production, income from livestock)

Y = Total Income

y = Income from particular activity

n = Number of household

The income diversification index is based on three different broad categories of income: income from Agricultural rain-fed production, income from dry season production, income from non-farm activities. The income diversification index captures both the number of income source and the relative importance.

The Simpson index diversification were used in this study to estimate the degree of income diversification among individual farmers.

Simpson Index is subtracted from 1 to give Simpson's Index of Diversity. The value of this index ranges between 0 and 1 where 0 signifies no diversity while 1 shows infinite diversity. SID measures the probability that any Naira taken, at random, from a household's income would have come from two different sources. Thus, a value of SID closer to 1 would indicate higher diversification while a value of 0 would signify deriving income from one source only i.e. specialization. The Simpson index of diversity is estimated as:

$$\mathbf{SDI} = \mathbf{1} - E_i^n \; Q_i^2 \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

$$\mathbf{Q} = \frac{K_i}{EK_i} \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Where

Q = the proportion of income generated from income source I in the total farmers income
SDI = Simpson diversification index
K_i = Income generated from income source i
The model for this study will be express as

$$\mathbf{SDI} = \mathbf{1} - E_i^n$$

Where
SID = Simpson diversification index
IFR = Income from rice production
IFD= Income from dry season production
IFL = Income from livestock production and its by product
IFOF = Income from off-farm activities
IFRP = Income from rice processing

Censored Tobit Regression Model

The Censored Tobit model is also known as a Tobit model commonly emanated in econometrics in cases where the variable of interest is only observable under certain conditions. Censored is a sample in which information on the regress and is available only for some observations. This model was used to identify the factor that determine famer's income diversification. Benard *et al*. (2014), Used this method and analyzed the income diversification. The Censored Tobit Model can be mathematically expressed as:

$$Y_i = Y_1^* = X_i \beta + _{eI} \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

$$Y_i = \quad Y_1^*{}_{,} \; \text{if} Y_1^* > 0 \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

$$Y_i = \quad 0_{,} \; \text{if} Y_1^* \leq 0 \; \ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Where:
Y_i = is a censored variable of Simpson diversification index.
I = 1, 2,..., N_i, where N_i is the total number farmers
X_i = vector of explanatory variables
B = vector of unknown parameters
$_{eI}$ = independently distributed error term.
$SID = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \ldots\ldots\ldots \beta_8X_8 + _{eI} \ldots\ldots(9)$

Where:
SID = Simpson diversification Index
β_0= Constant
$\beta_{1-}\beta_8$= vector of unknown parameters
e_i= independently distributed error term
X_1= Age of the Farmer (years)
X_2= Education level (years)
X_3= Farm Size (ha)
X_4= Income from rice production (Naira)
X_5 = Access to credit (1= access and 0 = No access)
X_6= Improve farming input index (Number)
X_7= Farm equipment index (Number)
X_8= Vocational training (attend =1, 0 otherwise)
β_0=Slope or intercept
β_1- β_1 = Coefficient of regressors
U = error term

Result and Discussion

Socio-economic characteristics of wet season small-holder rice Farmers

The distribution of the socio-economic characteristic in Table 1 revealed that 3.1% of the farmers were female against 96.9% males. The high proportion of males to females may be because of religious and custom/ culture which

play crucial roles in the social life of the people in the study area. The advantage of this male dominance in the study area is that the productivity level of income diversification is expected to be higher because of their tendency to be provide more labour and also involve themselves in different occupational status which inclined them to save and invest more. Mamman, et al., (2019) stated that men are more efficient in farming than women this is because they are more energetic and can handle more tedious work than their female counterparts The population of the wet season rice Farmers in the study area fall within their active age. This was testified by the statistical distribution of age especially the minimum, mean and standard deviation which was found to be 20, 39.6 and 13.2 respectively. This findings go in line with the findings of Haliru (2019). The age of the population is relevant to this study in that physical ability and productivity depend on age and this may have influence on diversification on economic activities. The educational attainments of the farming household as revealed in table1 Non Formal education (Qur'anic) accounted for 51.4% and 7.5% attained tertiary education. This means that the educational level of the farmers was very low since only 48.6% attain one form of formal education hence, an indication that the rate of adoption of agricultural technology, access to information, management of their income might be low. Mean household size was 12 persons. Classification of family size is relevant to this study because income and expenditure depends on the number and type of people in the family who are economically active. The result implies that majority of the households in the study area have reasonable number of individuals who share household resources. Orifah *et.al*, (2020) also reported similar findings with respect to household size of smallholder rice farmers. The analysis shows that the mean total household farm size was 2 ha. The minimum and maximum farm size was found to be 0.5 ha and 4 ha respectively. This finding implied that the study area was dominated by small-holder farmers inherited their farm lands. The results also revealed that majority (71.9%) belong to one form of association or another. The implication is that it may likely encourage diversification into different income generating activities among the farming household in the study area. It is assumed that being in a group or Association can enhance farmer's ability to save or diversified, collective purchase of inputs and output marketing, social interaction and learning of agricultural innovation among its member.

Table1: Socio-economic Characteristics of Smallholder Wets season Rice Farmers

Variables	Frequency	Percentage	Min	Max	Mean	
Gender						
Male	283	96.9				
Female	9	3.1				
Age (Yrs)						
20-29	71	24.3	20	70	39.6	
30-39	93	31.8				
40-49	48	16.4				
50-59	43	14.7				
60-70	37	12.7				
Educational Status						
Non Forman Education	150	51.4				
Primary Education	76	26.0				
Secondary Education	44	15.1				
Tertiary Education	22	7.5				
Household size (no.)						
02-09	71	24.3	2	40	12	4.8
10-17	191	65.4				
18-25	25	8.6				
26-33	4	1.4				
34-40	1	0.3				
Total Household Farm						
Size (ha)						
0.5-1.5	167	57.2	0.5	4	1.7	1.4
1.6 -2.0	75	25.7				
2.1-2.5	1	0.3				
2.6-3.0	36	12.3				
3.1-4.0	13	4.5				
Membership of Cooperative						
Member	210	71.9				
Non Member	82	28.1				
Total	292	100				

Source: Field Survey, 2020 n=292

Diversified Income portfolios of Smallholder wet season farmers in the study area

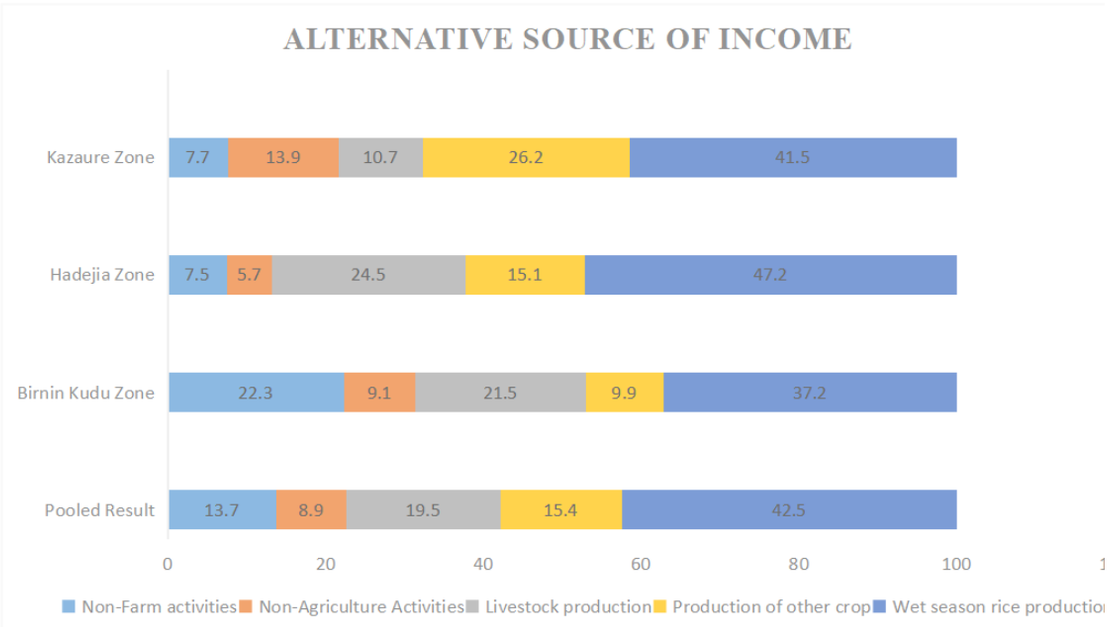
The study basically identified available income generating activities in different agricultural zones during the period of this study as presented in Figure 1. Major income generating activities identified include Wet season rice production, production of other crops such as sorghum, wheat and vegetable crops and livestock production which are classify under farm income generating activities, non-farm activities (processing, labour on farm) and off-farm activities(non-agricultural activities such as petty trading, civil services).

In Birnin-kudu zone, the result showed that 37.2% and 22.3% of the income that accrued to the farming households were obtained from wet season rice production and non-farm activities (post-harvest operation engagement), respectively. This result affirms the assertion that majority of household in the state earned their income from agricultural sector (baseline Survey, 2006). It then implies that, agriculture is a potent tool that can meet the food and financial needs of the people to ensure a sustainable livelihood. Other source of income included livestock rearing and production of other crops which accounted for 21.5% and 9.9%, respectively, while salaried income and other business earning (9.1%) accounted for non-agricultural activities.

The result of diversify income portfolios of Hadejia zone revealed that, the major farm income generating activities in the zone were rice production (47.2%) and livestock production (24.5%). Beside rice production and livestock rearing, production of other crops (vegetable, wheat and sorghum) were reported as prominent (15.1%) source of income among households. This domination of farming household in farm activities may be attributed to the environmental condition which favour farm production in Hadejia zone. This is not surprising considering the present of Hadejia-Nguru wetland in the axis which encourage a multiplicity of economic activities.

The result of Kazaure zone showed that 41.5% and 26.2% earned their income in rice production and production of other crop, respectively. This result agreed that most of the incomes accruable to the sample households were from farm source. Other sources of income included non-agricultural activities.

The pulled result further revealed that farming household had high options, especially in the agricultural activity. The result shows that 42.5% obtained their income from rice production. Beside rice production, livestock rearing (19.5%) and production of other crop (15.4%) were reported as the most prominent source of income among farming households. This implies that livestock production would provide income from sale of animals, provide farm yard manure to fertilize rice farms and reduce cost of fertilizer and increase yield which will also lead to increase in income that would be invested in to other income generating activities. Production of other crops and non-farm activities provide additional income to augment returns from rice farms and also serves as insurance against agricultural risk and enable farming household to adopt new technologies and to increase productivity that would induces reduction in poverty. This is in line with the findings of Adem *et al*. (2018) who assert that economic diversification is a source of income growth and potential for poverty reduction.



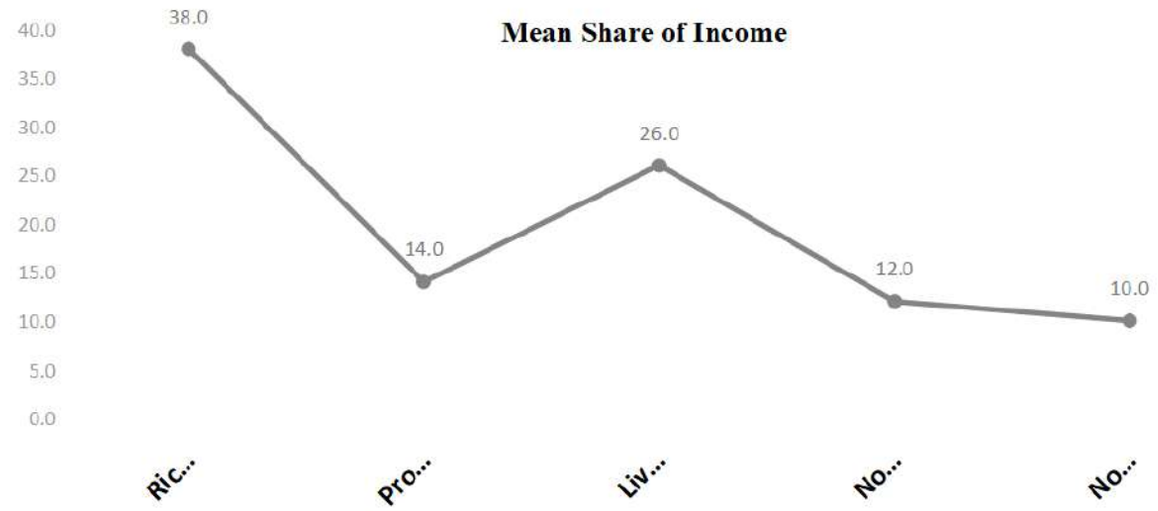
Source: Field survey, 2020

Figure 1: Diversified Income Portfolios of Smallholder Wet Season Farmers

Composition of Smallholder Wet Season Farmers Mean Income Share from Different Portfolio in the Study Area.

The mean share of different income generating activities as depicted in Figure 2, revealed how different income generating activities contributed to overall household income. Income from rainfed rice production which is mainly subsistence in nature and is the most basic farm income, providing about 38% mean income share of total farming household income. This result implies that wet season rice production provide basic food source and surplus exchanged for cash to improve living condition and also will continue to be as leading income generating activity among the rice farmers because of the high share generating from rice production. Income from livestock rearing contribute about 26% mean income share of the total income. Many reasons were in support of the proportion of diversified in to livestock rearing by the farming household, ranging from vast grazing area, use of some animals as beast of burden, favourable climatic conditions, and insurance against crop failure to quick return on investment. In addition to this, income from production of other crops accounted for 14% mean share of income to the total income.

Generally when we look at the income share composition in the study area as presented in Figure 2, Wet season rice production income takes the highest share followed by income from livestock rearing ether selling livestock products or livestock themselves. The implication of this findings is that diversification in the study area conforms to investment patterns of peasant farmers which is purchase of livestock and supporting production of other crop which would increase their diversification capacity. The result also in line with the findings of Long Hau and Tan Nghiem (2020) who studied determinants of income diversification among rural households in the Mekong River Delta.



Source: Field survey, 2020

Figure 2: Percentage of Mean Income Share of Diversified Income Portfolios of Smallholder Wet Season Farmers.

Degree of Income Diversification among Smallholder Wet Season Rice Farmers

In order to estimate the degree of diversification of smallholder wet season rice Farmers as shown in Table 2, Simpson diversification index (SDI) which runs from 0 – 1 as adopted by Batool *et al.* (2017). A cut off valued < 0.5 and ≥ 0.5 are categorised as low and high diversity scores, respectively, as used by Umar *et al.* (2020) were adopted for the study. The result in Table 2 provide level of diversification details in different regional zones of the study area. The finding revealed that in Birnin-kudu Zone 60.3% had high income diversity score whereas 39.7% had low income diversity scores with a 0.58 mean degree of diversification. In Hadejia, zone 52.8% had high income diversity and 47.2% had low income diversity scores with mean degree diversification of 0.55. The result were also similar in Kazaure zone were 52.3% had high income diversity and 47.7% had low income diversity scores with a mean degree of diversification of 0.56.

In discussing the zonal regional difference in terms of degree of diversification it is important to note that that the specific context of each zone matters because it influence the type of diversification pursued by different farming households. Moreover, farming household income level may reflect the type of diversification pursued. In Table 2 result shows that Birninkudu zone Mean degree of diversification 0.58 is slightly higher than that of Hadejia Zone and Kazaure Zone. This support our earliest theory adopted that diversification could be mainly associated with pull or push factors. The high degree of diversification recorded by farming household in the Birnin-Kudu zone could be attributed to the access to better major Market (Sara market, Kachaco market, Gujungu market and Shuwarin market) and Good road connection and accessibility to major towns.

The pooled estimated result shows that 51.6% had high income diversity and 48.4% had low

income diversity scores with minimum, maximum and mean degree of diversification of -0.99, 1.74 and 0.58. This agrees with the findings of Sekumade and Osundere (2014) who conducted a study on determinant and effects of livelihood diversification on farm households in Nigeria where it was reported that majority of the respondents had high income diversity. The high income diversity score among smallholder wet season rice Farmers may be connected to available income diversification option. However, the mean degree of diversification 0.58 is higher than that observed by Umar *et al*. (2020) of 0.33 in their study of dynamic of income diversification strategy among smallholder farmers in Jigawa State Nigeria.

Table 2: Degree of Income Diversification of Smallholder Wet season Rice Farmers

ɛs	Degree of Income Diversification	Frequency	Percentage
BirninKudu Zone	High Diversity (=0.5)	73	60.3
	Low Diversity (<0.5)	48	39.7
	Sub Total	121	100
	Mean	0.58	
	S.E	0.49	
	Minimum	0	
	Maximum	1.8	
Hadejia Zone	High Diversity (=0.5)	56	52.8
	Low Diversity (<0.5)	50	47.2
	Sub Total	106	100
	Mean	0.55	
	S.E	0.53	
	Minimum	-0.99	
	Maximum	1.66	
Kazaure Zone	High Diversity (=0.5)	34	52.3
	Low Diversity (<0.5)	31	47.7
	Sub Total	65	100
	Mean	0.56	
	S.E	0.07	
	Minimum	0	
	Maximum	1.44	
Pooled Zone	High Diversity (=0.5)	150	51.4
	Low Diversity (<0.5)	142	48.6
	Total	292	100
	Mean	0.58	
	S.E	0.31	
	Minimum	-0.99	
	Maximum	1.74	

Source : Field survey, 2020

Socio Economic Factors Influencing Income Diversification of Smallholder wet season rice Farmers

In order to determine the influence of socio economic factors on income diversification of the smallholder wet season rice Farmers in the study area. Censored Tobic Regression models was developed with Simpson Diversification Index as dependent variable The output of the censored tobic regression model as depicted in table indicated that the Psedo R^2 was 0.33 which signified that 33% of total variation observed in the dependent variable(Simpson Diversification Index) was explained by the explanatory variables (age, educational level, farm size, access to credit, participation in vocational training, Access to farm input index and access to farm equipment index) included in the model. The fitness of the model was further confirmed by the chi-square (x^2) value of 145.5 with a degree of freedom (df) 8 which was significant at 1% level. Variable that were found to be significant in influencing income diversification include income from rice production, access to credit, Vocational training and access to improve input index.

Income from rice productionh of the farming household exerted a positive influence on the Simpson diversification index of the farming household and was statistically significant at 1% ($p<0.01$). The result implies that increase in farming household farmers will bring about increase in the level of diversification capacity. This concurs with studies by Oluwatayo (2009), Maniriho and Nilson (2018), and Darmadusa and Hewaritharana (2017). Showing that income positively influences diversification

At 10% level.

Access to credit of farming household exerted a negative influence on the income diversification but statistically significant at 10% ($p<0.1$). The sign is defies to our prior expectation and this could be due to few of the farming household had access to credit (21.2%). This implies that access to credit decrease likelihood of diversification instead of increase in level livelihood diversification. The significant and positivity relationship between access to credit and the likelihood of diversification implies fungibility of credit that is credit is used for the purpose it is borrowed for. The credit the farming household was specifically meant for their wet season rice production hence it led to intensification of the rice farming rather than diversification. This ties in with the findings of various authors Romeo et.al (2020), Batool, *et al*, (2017), and Asfaw *et al*., (2015) who both reported credit access to have a negative influence on decision to diversify income.

Access to farm equipment (Farm equipment index) was found to be significant at 5% level and positively influence income diversification. This implies that farming household who access farm equipment (such as Animal drought, mechanical traction, tractor, sprayer, water pump) were able to diversified their income sources. The result correlated with the finding of Alobo Loison and Bignebat (2017) in their work on Patterns and determinant of household income diversification in rural Senegal and Kenya.

Access to farm input (Access to farm input index) such as Fertilizer, Improve seed/seedling Agro chemicals exhibited a positive and significant relationship with diversification index at 10% significant level. This finding implies that smallholder wet season rice Farmers that had high number of access to improve farm inputs had high level of diversification than those who could not have access. Empirical study has shown that the used of improved farming inputs like high yielding

varieties of seeds and planting materials, fertilizers pesticide tends to increase their level of output per hectare. Hence, increase output leads to increase income and consequently increase the level of diversification. The result does not agree with the findings of Javed *et al*., (2015) who reported that access to improve input has negative influence on rural household income diversification Participation in vocational training especially for rural farming household will increase their participation in small and medium enterprises, enabling the farming household to mitigate risks associated with complete reliance on farm sectors. Participation in vocational training indicates positive relationship but not significant. This may be as a result of few member participate in vocational training as early reported.

Table 6: Censored Tobit Regression Results of Factors Influencing Income diversification in the Study Area

Variables	Coefficient	Std. Err.	t-value	P>|t|
Constant	-0.1083022	0.1445347	- 0.75	0.454
Age (years)	0.0008759	0.0018589	0.47	0.638
Educational level (years)	-0.0064598	0.0250525	-0.26	0.797
Farm Size (ha)	0.0343259	0.0271067	1.27	0.206
Income From Rice Production(?)	1.62e-06	1.22e-07	13.26***	0.000
Access to Credit	-0.0455506	0.0270858	-1.68*	0.094
Access to farming Equipment Index	0.1272679	0.0519846	2.45**	0.015
Access to improve farming input Index	0.0619889	0.0341734	1.81*	0.071
Vocational training	0.0006198	0.0329674	0.02	0.985
Model Statistic				
Log likelihood	-147.6731			
LR chi-square (8)	145.56			
Prob >chi-square	0.0000			
Pseudo R^2	0.3301			
Left Censored Observation	0			
Un Censored Observation	288			
Right Censored Observation	0			

Source : Field Survey, 2020

CONCLUSION AND RECOMMENDATIONS

Based on the findings, the study revealed that most of the Smallholder wet season rice Farmers are diversified in income generation. Even though rainfed farming constitutes their major occupation, more income was also generated from livestock production, dry season farming and non-agricultural related activities. Income from rice production, access to credit, Vocational training and access to improve input index were the key push and pull drivers of diversifications. Finally the study also observed that diversifying income portfolio among smallholder farming household is an effective strategy to improve household income. Based on the findings of this study, the following policy measures aimed in improving the living standard among the smallholder farming household in the study area were suggested for recommendations. This study shows that level of diversification increase as access to improve farming input and farm equipment increase,

therefore there is need by the stakeholders to facilitate easy accessibility to improve seed, fertilizer, agro chemicals and other farm equipment such as tractors, mechanical traction. This can be accomplished with the support and cooperation of Government, NGOs and other development partners particularly in rural areas. The study also shows that most of farming household diversify on dry season farming and livestock production. Therefore, there is need for capacity building on proper livestock management and irrigation farming in order to help the farming household in their investment effort this also can be achieved through extension education delivery.

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