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INCOME DIVERSIFICATION AND DRIVERS OF RURAL SMALLHOLDER FARMERS' INCOME IN ENUGU STATE NIGERIA

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Abstract

Rural smallholder farmers in developing countries were faced with the challenge of low income which disposed them to malnutrition and high poverty rate. This affects their productivity, livelihood and wellbeing. Understanding the drivers of income and its patterns is very important to curtail these challenges. Therefore, this study analysed the level of income diversification, shares of different income sources and drivers of smallholder farmers income in Enugu State Nigeria. Primary data collected from 180 rural smallholder farmers were analysed using descriptive statistics and multiple regression. The study revealed that the majority (65.6%) of the smallholder farmers did not diversify their income, thus agriculture is their major source of income. Farm income, off-farm income and non-farm income contributed 72.3%, 16.3% and 11.4%, respectively to rural smallholder farmers' income. The identified contributing factors to smallholder farmers' income were education, farm size, access to agricultural extension services, income derived from off-farm and non-farm activities, and access to credit facilities. The only inhibiting factor to smallholder farmers' income was the age of the farmers. This study recommends increase in diversification level of smallholder farmers' income and increase in cultivated farm size to boost their economic status. Provision of accessible credit facilities at a low or no interest rate, quality education and more extension contacts by the governments and related agencies to the smallholder farmers were also needed to increase smallholder farmers' income which will improve their wellbeing.

Key words**:** *drivers, farm income, nonfarm income, smallholder farmers, rural households*

INTRODUCTION

Nigeria is an agrarian country with abundant arable land supporting the growth of several crops. Agriculture is an important sector in Nigeria and other developing countries. Despite a reduction in its contribution to Nigeria Gross Domestic Product from 58.5% in the 1960s to 22% in 2019. Over seventy per cent of Nigeria population depends on agriculture and allied activities for their sustenance and livelihood [11, 13], thereby serving as a source of income for many Nigerians especially the rural dwellers. Over 80 per cent of the farmers in Nigeria are smallholder farmers who produced more than 85 per cent of the food locally produced in the country [8].

These rural dwellers, who engaged in agriculture, are the most hit in terms of malnutrition and high poverty rate in the world, especially in developing nations [3]. Level of income, food security and poverty are among the major drivers of the extent of economic growth and development and welfare of people in a country. Diversification of income among rural households can boost their income in a bit to achieve rural economic growth and development. Investing in agriculture, especially in nations where agriculture serves as means of livelihood to the majority, is generally agreed by practitioners and economist to be an effective measure of poverty, hunger and inequality reduction [16].

Farm income determines farmers access to basic needs and quality of life. Reduction in farm income and productivity severely affects rural prosperity and economic growth [2]. Thus, low farm income among smallholder farmers is among the policy debates in developing countries. This is because farm income determines most farmers' wellbeing and economic status. A low farm income

earner is likely to have a poor wellbeing while a high-income earner is likely to have a better wellbeing. Thus, an increase in farmers' income is fundamental to social and economic development and determine farmers' level of investment. This is because income of the inhabitants of a nation is among the criteria for measuring the level of socio-economic development in a region [6].

Agricultural income and its determinants are frequently discussed problem [6]. The income derived from agriculture determined the purchasing power of millions of rural dwellers [12], their living standards and wellbeing. For effective policy formulation for rural farmers to improve their wellbeing and welfare, identification of driving factors of income is very important. The low income in the rural areas who are mostly smallholder farmers remains a serious challenge in Nigeria as it disposed them to severe poverty and hunger. This further affects their productivity, livelihood, wellbeing and deny them some basic needs. Despite government programmes such as National Accelerated Food Production Programme, Operation Feed the Nation, Back to Land Programme, Better Life Program, Family Support Program, Family Economic Advancement Program, National Poverty Eradication Program, National Economic Empowerment and Development Strategy programme targeted at boosting Nigeria rural people's economic status, they remain vulnerable to poor wellbeing and poverty which lowered the level of development in the rural areas.

In view of these, this study examined the degree of rural smallholder farmers income diversification, shares of different source of income to the farmers total annual income and identified the driving factors of income among rural smallholder farmers in Enugu State Nigeria in a bit to enhance their economic status, improve their wellbeing and reduced malnutrition which is highly pronounced among them. The identified contributing or inhibiting factors will be of importance to government and policymakers for proper intervention to boost the economic status of smallholder farmers and improve their livelihood, standard of living and wellbeing. This would also serve as a tool for rural development.

MATERIALS AND METHODS

This study was carried out in Enugu State, Nigeria. The state is one of the 36 states of the Federal Republic of Nigeria. It shares a national border with Abia and Imo State to the South, Ebonyi State to the East, Benue State to the Northeast, Kogi State to the Northwest and Anambra State to the West. The state has seventeen local government areas (LGAs) with Enugu as the capital. It is located between Latitudes $5^0$55'N and $7^0$08'N of the equator and longitudes $6^0$55' E and $7^0$08' E of the Greenwich meridian [4]. Enugu state has a population of 3,257,298 people and a landmass of 71,161 square kilometres. The larger proportion of the population lives in rural areas who are mostly farmers. The climatic condition in the state supports the growth of several crops and rearing of livestock. Multistage sampling technique was used to select smallholder farmers used in this study. Because most of the rural dwellers in the study area were engaged in agricultural and allied activities, a random selection was used. Six LGAs were randomly selected in the state in the first stage. The second stage also involved a random selection of three villages from each LGAs making a total of eighteen villages. The last stage involved a random selection of ten farmers in each village making a total of 180 farmers for the study.

Primary data were used in this study. The data were collected from the rural smallholder farmers through the use of a structured questionnaire and interview schedule. Data collected contained information on smallholder farmers demographic and institutional features, level of income diversification, contributions of each income source to total annual income and their total annual income. The data were collected between the month of August and September 2019. Data collected were analysed using descriptive statistics and multiple regression. Descriptive statistics such as mean, percentage and frequency were used to analyse the demographic and institutional

features of the smallholder farmers, level of income diversification and shares of different income sources to the smallholder farmers total income. Multiple regression is a predictive model used when the dependent variable is continuous. This was used to analyse the driving factors of income among smallholder farmers as it can perfectly account for continuous dependent variables. It is explicitly represented as:

$$Y = \beta_0 + \beta_1 Ag + \beta_2 Gen + \beta_3 ED + \beta_4 HS + \beta_5 FS + \beta_6 CM + \beta_7 EXT + \beta_8 EXP + \beta_9 NFinc + \beta_{10} AC + \varepsilon$$

where:
Y is the annual income measured in Naira,
β_0 is the constant,
Ag, Gen, ED, HS, FS, CM, EXT, EXP NFinc and AC are the explanatory variables,
β_{1-10} are the coefficient of regressors and
ε is the error term.

Table 1. Description of explanatory variables

Variable name		Description	Expected sign	Unit of measurement
Ag	Age	Age of household head	+/-	Years
Gen	Gender	Gender of the household head	+/-	Dummy (Male = 1, female = 0)
ED	Education	The educational level of the household head	+	Years
HS	Household size	Number of persons living in the same households contributing to or depending on the household income	+/-	Number of people
FS	Farm size	Hectares of farmland under cultivation	+	Hectare (10,000m^2)
CM	Cooperative membership	Membership of cooperative society by the farmers	+	Dummy (Member = 1, non-member = 0)
EXT	Access to extension	Access to agricultural extension services in the previous farming season	+	Number of contacts
EXP	Experience	Years of farming experience by the household heads	+	Years
Nfinc	Income from other sources	Income generated from nonfarm and off-farm activities by rural households	+	Naira
AC	Access to credit	Access to credit facilities from formal and informal sources	+	Dummy (Yes = 1, no = 0)

Source: Developed by authors.

RESULTS AND DISCUSSIONS

Demographic and institutional features of smallholder farmers

The demographic and institutional features of smallholder farmers were presented in Table 2. The larger proportion of the rural smallholder farmers were within the age of 41 to 50 years. They had an average age of forty-nine years. This implies that the smallholder farmers were advanced in age and still in their economic active age to carry out agricultural activities. Therefore, could maximize available scarce resources for increased production and outputs [14]. Considering the type and quality of farm labour available, age of the farmer is a vital factor due to the drudgery involved in peasant agriculture [9]. Therefore, younger farmers are likely to spend more hours on the farm than the elderly ones. Rural household heads were predominantly male while only 9.4% of the households were headed by females which was common among the widow. This implies that males dominated the rural households which might make them have a say in decision-making in the households. The majority (84.4%) of the smallholder farmers were married followed by the widow(er) and single. The majority (76.7%) had a household size between five and eight persons with an average household size of six persons. This suggests that they had a large household size who can assist them in farming. Family labour is the major source of labour used for farming activities among smallholder farmers, thus reduced the cost of production.

The level of education among the rural smallholder farmers was very low as the majority (49.4%) had only primary school

education. Only 5% could be said to be well educated among the rural smallholder farmers in the study area. This could affect their decision-making process as the level of education is highly correlated with decision making on agricultural production and the use of agricultural inputs [1]. The majority had above ten years of farming experience with an average of seventeen years of experience. The skills acquired in an enterprise depends on time spent on it; thus, the longer a farmer spent in an enterprise the better his or her understanding of the business [10]. The number of years spent in farming activities plays a significant role regarding the performance of the farmers and good knowledge of farming. Thus, smallholder farmers in the study area can be described as well experienced who have good knowledge of farming.

The majority of the smallholder farmers had below three hectares of farmland under cultivation with an average of 1.8 hectares. This implies that the farmers were operating on a small scale which the revenue derived from it might not be enough to meet their household needs. Access to agricultural extension services (36.7%) was low among the rural smallholder farmers. This could lower their productivity as agricultural extension agents disseminate useful information about the innovations and agricultural best practises.

Table 2. Demographic and institutional features of smallholder farmers

Variables	**Category**	**Frequency**	**Percentage**	**Mean**
Age	≤ 30	2	1.1	49
	31 – 40	34	18.9	
	41 – 50	68	37.8	
	51 – 60	54	30	
	> 60	22	12.2	
Gender	Male	163	90.6	
	Female	17	9.4	
Marital status	Single	12	6.7	
	Married	152	84.4	
	Widow(er)	16	8.9	
Household size	1 – 4	23	12.8	6
	5 – 8	138	76.7	
	≥ 8	19	10.6	
Education	No formal education	27	15	
	Primary	89	49.4	
	Secondary	55	30.6	
	Tertiary	9	5	
Experience	< 10	30	16.7	
	11 – 20	88	48.9	
	> 20	62	34.4	
Farm size	< 1	32	17.8	1.8
	1 – 3	136	75.6	
	≥ 4	12	6.7	
Access to extension services	Yes	66	36.7	
	No	114	63.3	
Cooperative membership	Yes	38	21.1	
	No	142	78.9	
Access to credit	Yes	43	23.9	
	No	137	76.1	

Source: Field survey, 2019.

Membership of cooperative association was low among them, only 21.1 per cent were members of cooperative society in the study area. This could deny the majority of the smallholder farmers some benefits such as access to information, financial assistance and enjoyment of economies of scale from the association. The majority (76.1%) of the

smallholder farmers did not have access to credit facilities.

This was basically due to lack of collateral required by commercial banks. It is worth noting that the few that could access credit got it from friends and family, money lenders and cooperative societies.

This could be one of the reasons for their low farm size under cultivation, that is operating on a small scale, as personal fund might not be enough for the farmers to operate on a large-scale farming.

Income distribution, diversification and shares of income sources among smallholder farmers.

Table 3 presents the income distribution of smallholder farmers, level of income diversification and shares of different income sources to the total annual income of the smallholder farmers. The larger proportion (28.3%) of the smallholder farmers had an annual income between ₦200,001 (USD 525.21) and ₦300,000 (USD 787.82) followed by those with ₦100,001 (USD 262.61) to ₦200,000 per annum. They had an average income of ₦239,778 (USD 629.75) and an average per capita income of ₦39,963 (USD 104.96) per annum. This suggests a very low level of income among the rural smallholder farmers and their households. This further implies that the smallholder farmers' household with an average of six-person were living on ₦656.93 (USD 1.73) daily. This shows that, on average, each member of the households was living on about ₦110 (USD 0.29) daily. This was far too low than the Nigeria poverty line of ₦376 (USD 0.99) per person per day which denotes level of wellbeing.

Further analyses revealed that the few rural households (10.6%) that had up to ₦376 per person per day were those with small household size (below four persons) who also earned above ₦350,000 (USD 919.24) per annum. This suggests that small household size reduce the financial burden on the farmers and could enhance household wellbeing and access to basic needs of life. This is because small household size increases the household per capita income and boost the economic status of the rural households. Whereas large household size lowers the per capita income in the household.

The level of income diversification among the smallholder farmers was low as only 24.4 per cent had other sources of income (off-farm and nonfarm). This could contribute to their low level of income as income derived from only farm may not be enough to meet up with their basic needs as they operate on a small scale which is usually characterised with low level of productivity.

Table 3. Income distribution, diversification and shares of income sources among smallholder farmers

Variables	Categories	Percentage	Mean
Annual income	≤ 100,000	17.8	239,778
	100,001 – 200,000	25	
	200,001 – 300,000	28.3	
	300,001 – 400,000	22.2	
	> 400,000	6.7	
Income diversification	Yes	34.4	
	No	65.6	
Income sources share	Farm income	72.3	
	Non-farm income	11.4	
	Off-farm	16.3	

Source: Field survey, 2019.

Farm income from crop and livestock production had the highest share (72.3%) of the rural farmers' income, thus was the major source of income among the rural smallholder farmers.

The share of off-farm income derived from marketing of agricultural produce and processing of crops such as palm fruits into palm oil was 16.3 per cent. Nonfarm income

had a share of 11.4 per cent of the total annual income.

Non-farm income in this context is the income smallholder farmers derived from other sources (remittance and artisan) apart from crop or livestock production and other agricultural related activities in a farming season, usually one year. These results imply that diversification of income contributed to rural smallholder farmers' income.

Drivers of smallholder farmers' income

Table 4 presents the results of multiple regression estimates used to identify the factors influencing the smallholder farmers' income. The identified contributing factors to smallholder farmers' income were education, farm size, access to agricultural extension services, income derived from off-farm and non-farm activities, and access to credit facilities. The only inhibiting factor to smallholder farmers' income was the age of the farmers. The coefficient of determination (R-Squared) of 0.6281 shows that 62.81 per cent of the variation in smallholder farmers' income was explained by the independent variables included in the model. The model also had a good fit as indicated by the F-stat (27.52) which was, however, significant at 1%.

The coefficient of the age of smallholder farmers was negative and significant in relation to smallholder farmers income ($p < 0.01$). This implies that one-year increase in age will reduce the smallholder farmers' income by ₦928.44 per annum. This is because the energy possessed by farmers reduces as their age increases which may lower their agricultural productivity due to the nature of their production (use of crude implement). This agrees with the finding of [5] who reported that the rural farmers income declined as their age increases.

The coefficient of the level of education was positive and significant in relation to smallholder farmers income ($p < 0.1$). This implies that one-year increase in education level will increase farmers income by ₦759.48. This is because education paves ways for access to relevant information and adoption of innovation. Also, level of education increases the ability to make intelligent decisions in an enterprise [1]. A similar result was reported by [7, 15] who reported that the level of education increased the income of cowpea and shallot farmers, respectively.

The coefficient of farm size was positive and significant in relation to smallholder farmers income ($p < 0.05$). This implies that one hectare increase in cultivated land will increase smallholder farmers' annual income by ₦24,682.94. This is because more land under cultivation increases farmers output, *ceteris paribus.* This will, in turn, increase smallholder farmers revenue from agriculture. This is in tandem with the findings of [12, 5] who reported that farm size increased the income of farmers.

The coefficient of access to agricultural extension services was positive and significant in relation to smallholder farmers income ($p < 0.05$). This suggests that an increase in agricultural extension contacts will increase smallholder farmers income by ₦13,706.61. This is because extension agents disseminate useful information on best farming practises and introduce innovation to the farmers. Access to useful information and adoption of innovation will boost farmers productivity which will, in turn, enhance their income derived from agricultural activities. This result conforms with the findings of [7] that access to extension services increased the income of farmers.

The coefficient of nonfarm and off-farm income was positive and significant in relation to smallholder farmers income ($p < 0.01$). This implies that income derived from off-farm and nonfarm activities increased the smallholder farmer income by ₦3,431 per annum. This result is in coherent with the findings of [17] that nonfarm income increased the farmers' income. Considering the fact that the farmers were operating on a small-scale, diversification of income will increase the smallholder farmers income level. This is likely to improve the standard of living and wellbeing of rural households.

Access to credit facilities was positive and significant in relation to smallholder farmers income ($p < 0.01$). This implies that one per cent increase in credit access will increase

farmers' income by ₦17,737.39. This is because the personal fund is not always enough in a farming enterprise, especially to operate on a large-scale farming, thus access to credit provides farmers with required capital for a better investment. A better investment will, in turn, yield a higher output, return to investment and income, *ceteris paribus*. This is in coherent with the findings of [15, 17] who reported that access to credit facilities increased the income of farmers.

Table 4. Drivers of smallholder farmers income

Independent variables	Coefficient	Standard error	t-value	P-value
Age	-928.4365***	261.8251	-3.55	0.001
Gender	12063.03	9515.068	1.27	0.207
Education	759.483*	440.3218	1.72	0.086
Household size	944.6857	3773.358	0.25	0.803
Farm size	24682.94**	4112.492	6.00	0.000
Cooperative membership	-11038.17	7368.679	-1.50	0.136
Access to extension	13706.61**	5325.271	2.57	0.011
Experience	56.2204	2790.916	0.02	0.984
Nonfarm/off farm income	3431.267***	316.7396	10.83	0.000
Access to credit	17737.39***	4488.05	3.95	0.000
Constant	-57050.51**	26263.64	-2.17	0.031
F-stat	27.52			
Prob > F	0.0000			
R-squared	0.6281			
Adjusted R-squared	0.6052			

*** significant at 1%, ** significant at 5% and * significant at 10%
Source: Field survey, 2019.

CONCLUSIONS

This study revealed that smallholder farmers were low-income earners who have not fully diversify their income, thus sourced their income majorly from agricultural and allied activities. The low income seriously disposed them to high poverty rate which could lower their purchasing power and wellbeing. Farm income had the highest share of rural smallholder farmers' income followed by off-farm income and nonfarm income. Income diversification contributed to rural smallholder farmers' income. Level of education, farm size, access to agricultural extension services, income derived from off-farm and non-farm activities, and access to credit facilities were the contributing factors to smallholder farmers' income. While age was the inhibiting factor to smallholder farmers' income. To boost their economic status, smallholder farmers need to diversify their income and increase their cultivated farm size. Policymakers, governments and other relevant agencies need to provide accessible credit facilities at an affordable interest rate, quality education and designate more agricultural extension agents to the rural areas to increase smallholder farmers' income. These would not only boost their economic status but also improve their productivity, purchasing power, food security status and their wellbeing. Increase in rural households' income would also enhance rural development in the long run. This is because level of income among people in an area determined the development level of such region.

REFERENCES

[1]Akanbi, O.S., Oloruntola, D.S., Olatunji, S.O., Mukaila, R., 2020, Economic analysis of poultry egg production in Kwara state, Nigeria. Journal of Economics and Allied Research, 4(3), 57–71.
[2]Bihari, B., Singh, M., Bishnoi, R., Mishra, P.K., 2019, Issues, challenges and strategies for doubling the farmers ' income in India – A review. Indian Journal of Agricultural Sciences, 89(8), 1219–1224.
[3]De La O Campos, A.P., Villani, C., Davis, B. Takagi, M., 2018, Ending extreme poverty in rural areas – Sustaining livelihoods to leave no one behind. Rome, FAO. 84 pp. Licence: CC BY-NC-SA 3.0 IGO.

[4]Egwue, O.L., Agbugba, I.K., Mukaila, R., 2020, Assessment of rural households food insecurity during covid-19 pandemic in South-east Nigeria. International Journal of Research -GRANTHAALAYAH, 8(12), 182–194. https://doi.org/https://doi.org/10.29121/granthaalayah.v8.i12.2020.2713, Accessed on 12.01.2021.

[5]Fadipe, A.E.A., Adenuga, A.H., Lawal, A., 2014, Analysis of income determinants among rural households in Kwara State, Nigeria. Trakia Journal of Sciences, 12(4), 400–404. https://doi.org/10.15547/tjs.2014.04.010, Accessed on 12.11.2020.

[6]Kryszak, L., Matuszczak, A., 2019, Determinants of Farm income in the European Union in New and Old Member States. A Regional Study. Annals of the Polish Association of Agricultural and Agribusiness Economists, 11(3), 200–211. https://doi.org/10.5604/01.3001.0013.3042, Accessed on 11.11.2020

[7]Kwaghe, P.V, Ibrahim, A., Mojirode, E.A., 2009, Socio-economic determinants of income among cowpea farmers in Bama Local Government Area of Borno State, Nigeria. Global Journal of Agricultural Sciences, 8(2), 163–167.

[8]Mgbenka, R.N., Mbah, E.N., 2016, A review of smallholder farming in Nigeria: need for transformation. International Journal of Agricultural Extension and Rural Development Studies, 3(2), 43–54.

[9]Mukaila, R., Falola, A., Omotesho, O.A., 2020, Food security status: its drivers and coping strategies among vegetable farming households. Cercetări Agronomice in Moldova (Agronomic Researches in Moldova), 53(4), 414–425. https://doi.org/10.46909/cerce-2020-035, Accessed on 12.02.2021

[10]Mukaila, R., Obetta, A.E., Awoyelu, F.E., Jachinma, C., 2021, Marketing analysis of vegetables: the case of carrot and cucumber marketing in Enugu State, Nigeria. Turkish Journal of Agriculture - Food Science and Technology, 9(2), 346–351. https://doi.org/https://doi.org/10.24925/turjaf.v9i2.346-351.4000, Accessed on 10.03.2021.

[11]Nwachukwu, I.N., Anyanwu, N., 2015, Analysis of wealth status and its determinants among Cassava processing households in Imo State, Nigeria, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15(1):321-324, http://managementjournal.usamv.ro/pdf/vol.XV_1/Art48.pdf, Accessed on 11.04.2021.

[12]Nzabakenga, A., Feng, L.X., Yaqin, H., 2013, Agricultural income determinants among smallholder farmers : Case of Northern Part of Burundi. Asian Journal of Agriculture and Development, 3(11), 780–787.

[13]Obetta, A.E., Achike, A.I., Mukaila, R., Bala Taru., 2020, Economic analysis of marketing margin of banana and plantain in Enugu state, Nigeria. African Journal of Agriculture and Food Science, 3(4), 52–62.

[14]Osuji, E., Anyanwu, U., Okwara, M., Tim-Ashama, A., 2018, Implications of agricultural practices on land productivity of farming households in Imo State, Nigeria, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 18(1):299-303, http://managementjournal.usamv.ro/pdf/vol.18_1/Art39.pdf, Accessed on 11.04.2021.

[15]Purnamadewi, Y.L., Firdaus, M., 2018, Analysis of income determinants among households in the upland shallot production center in Malang district, Indonesia. 2nd International Conference on Food and Agricultural Economics, (April), 68–78. Turkey: Alanya Alaaddin Keykubat University, Turkey.

[16]Ryś-jurek, R., 2019, Determinants of family farm income depending on farm size. Annals of the Polish Association of Agricultural and Agribusiness Economists, 11(3), 401–411. https://doi.org/10.5604/01.3001.0013.4097, Accessed on 12.02.2021.

[17]Urgessa, T., 2015, The determinants of agricultural productivity and rural household income in Ethiopia. Ethiopian Journal of Economics, *14*(2), 63–92.