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ARABLE CROP FARMING AND FARMER WELFARE IN IBARAPA EAST LGA, OYO STATE, NIGERIA

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Abstract: Enhancement of rural households' welfare is a concurrent policy objective in Nigeria. This study analyzed the determinants of welfare among arable crop farmers in the study area. The data for the study were collected from 120 randomly selected farming households and analyzed using descriptive statistics and censored Tobit regression model. Description of the welfare indicators revealed that the respondents were in the low to middle-income earning group. Most of the respondents used corrugated iron sheets, cement walls, and concrete floors. The respondents had little concern for the environment as evidenced by their poor waste disposal and drainage practices. Results from the regression analysis revealed that, of all the explanatory variables modeled to influence household expenditure per capita, farm size, household size, and years of schooling were the only significant predictors. Based on the outcome of this study, a key recommendation is that the government and other key stakeholders ought to emphasize the need for obtaining a high level of education since education impacted the farmers' welfare. This will affect their capacity to adopt new technology and their perception of growing their household size to hire family labor given its significant impact on their expenditure level and, as a result, their general welfare.
Keywords: Welfare indicators, Tobit regression, Farming households, Per capita expenditure.

Introduction

Welfare is an important economic element that interacts with households' performance and contribution to society. Several indices have been used to measure the level of households' welfare and these span from households' consumption and expenditure to their income. Self-reported household welfare level remains the most commonly used measurement index for household welfare and several studies that have investigated household welfare have adopted this measurement. However, Wossen et al., (2019) reported that this particular measurement index has its limitations and reported several limitations of self-reported measurement. One such limitation is a biased estimate of each household's level of consumption or expenditure. Although this limitation exists, this study adopted the self-reported measure of household welfare. An improvement would be the use of observatory data

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collection, which involves an observation of the participants over a period to understand their pattern of consumption. This method, though demanding, has been identified to be less biased and adopted in several studies (Rosenbaum et al., 2010; Dyaret al., 2019; Lin et al., 2020). To attain happiness, individuals have learned over time to interact with their environment and farmers especially, have enjoyed the benefits of this interaction. Propensity to survive increases as households begin to master environmental interactions and discover ways in which they fit right into the environment. Several factors contribute to the ability of households to meet their needs. Failure to meet these needs is suggestive of poor welfare and this has significant negative consequences on the livelihood of the individual.

The goal of every farming household is to ensure their general well-being is improved and this is usually achieved through a reduction in expenditures or consumption and an increase in their sources of income. All these are impacted by price level. A study conducted by Malik et al., (2015) revealed a significant relationship between pricing, household consumption and poverty status. A significant characteristic of rural communities is that they are faced with unfavorable economic situations that impact their standard of living (Girei et al., 2018) and so, they need to have certain mechanisms in place that provide support to people in their pursuit of improved welfare. These are usually in the form of certain services like cooperative societies, input subsidies, affordable consumer goods, and a flexible environment with vast amounts of opportunities that allow individuals to maintain multiple income streams. While peri-urban and rural areas are consumed with the responsibility of providing the basic requirement for daily living such as food, clothing, and shelter by maintaining an enabling environment where these necessities are available at affordable prices, urban societies are more inclined to maintain a perceived level of status quo attained not just by meeting basic needs but by going over and beyond, towards acquiring luxurious commodities. The focus of every society ought to be on rural areas, given that the percentage of the nation's assessed progress can be attributable to advances among the poor and rural residents (Victora et al., 2017).

Several studies have investigated welfare from an agricultural point of view, but these studies have looked at how certain agricultural elements such as crop diversification and adoption of improved varieties affect the welfare of farmers (Msoo and Goodness, 2014; Omonona et al., 2014; Olajide and Aderolu, 2017; Ehiakpor et al., 2019; Ikudayisi et al., 2019; Victoria and Goodness, 2014). While it seems very important to investigate welfare using specific agricultural improvements such as improved varieties of crops and livestock and technology (Issa et al., 2016), a holistic approach to welfare seems more representative. The utilization of improved crop varieties as well as any other form of agricultural technology can be influenced by the welfare status of the farmer. For instance, farmers with the financial wherewithal can easily cover the costs associated with adopting new practices compared to their counterparts with less favorable financial position. To understand each farmer's financial position or welfare status, certain indices need to be considered. This would help explain why even though some farmers may desire to adopt new and improved agricultural practices, this has not been the case. This study proves relevant as it explores farmers' welfare status through a unique lens by:

• describing the welfare indicators among the participating farming households;

• examining the determinants of welfare among the participating farming households.

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Materials and Methods
Study Area and Sampling Procedure

The study was carried out in Ibarapa East Local Government Area (LGA) in Oyo State.

Ibarapa East Local Government is one of the thirty-three Local Government Areas in Oyo State, located in the Western part of Nigeria and has its headquarters at Eruwa town. A multi-stage sampling technique was used to select a cross-section of 120 arable crop farmers. To ensure the right farmers were selected and included in the study, a list of crop farmers across all towns in the LGA was collected from the Agricultural Development Program (ADP) office, from which a total of 120 arable crop farmers were selected.

Ibarapa East Local Government Area was purposively selected out of the thirty-three (33) Local Government Areas in Oyo State, due to the prevalence of arable crop farmers in the area. The first stage involved a purposive selection of the two towns (Eruwa and Lanlate) from the obtained list because of their high concentration of arable crop farmers. The second stage involved a random selection of four villages from the selected towns. Finally, fifteen arable crop farmers were randomly selected from each of the selected villages making a total sample size of 120 respondents. Each respondent was interviewed using a well-structured questionnaire. The interview was targeted towards obtaining information about the respondents' socio-economic farm characteristics such as age, gender, education, farm size, expenditure as well as welfare indicators such as roofing material, flooring material, housing unit and source of drinking water, as adopted by Akerele and Adewuyi (2011) in their study on welfare status of farmers in Ekiti State.

Analytical Techniques

Descriptive statistics were used to describe the socio-economic characteristics of the respondents and to analyze their responses to the welfare indicators. The Tobit Regression Model developed by Tobin (1958) to mitigate the problem of zero-inflated observations was used to analyze the determinants of welfare. The model reduces bias as it distinguishes the inability to spend on commodities because of a lack of finance from the existence of durable goods. The model specification is as follows:

$$y_i = Y_i^* = X_i\beta + e_i \qquad (1)$$

$$y_i = 0; \; if \qquad (2)$$

$$Y_i^* \leq 0 \; (i.\,e.\,, Z < 1) \qquad (3)$$

$$y_i = Y_i^*; \; if \qquad (4)$$

$$Y_i^* > 0 \; (i.\,e.\,, Z > 1) \qquad (5)$$

$$i = 1, 2, \dots, n \qquad (6)$$

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where Yi is the limited dependent variable. It represents respondents' welfare captured as per capita expenditure. This is censored around 2/3 mean per capita food expenditure of all arable crop farmers.

The empirical model is specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e \qquad (7)$$

X_1 = Educational (years); X_2 = Household Size (number of persons living in a household); X_3 = Age (years); X_4 = Gender; X_5 = Extent of Diversification (0 = single income source, 1 = multiple income sources); X_6 = Farming Experience (years); X_7 = Farm size (acres); e = Error term

Results and Discussion Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents are shown in Table 1. From the results, it was revealed that most of the farmers (59.2%) were male. This result agrees with the findings of Roche et al., (2016) and Knežević et al., (2017) who stated that agricultural production was male-dominated. The results also indicated that the respondents had a mean age of 45 years with 60 percent falling within the age bracket of 31 - 60 years. This indicates that these farmers are in their active production years as reported by Adesiyan et al., (2020). The majority (77.5%) of the respondents were married, indicating that they had more family responsibilities than their counterparts. This agrees with Otekhile and Verter (2017) who opined that marriage influences an individual's responsibility. This study reported an average household size of six persons. The majority (61.6%) of the respondents were educated beyond the primary education level. This showed that if given the opportunity, these respondents have a high tendency to easily adopt modern agricultural practices. The farmers in the study area operate on a small scale. This is evidenced by an average farm size of 2.73 hectares reported in this study. This small farm size could influence the type of agricultural production adopted in the study area and place a limit on the kinds of technology that can be adopted by these respondents.

Table 1: Socioeconomic Characteristics of the Respondents (n = 120)

Variable	Frequency	Percentage	Mean	Standard Deviation
Sex				
Male	71	59.2		
Female	49	40.8		
Marital status				
Married	93	77.5		
Single	16	13.3		
Widowed	7	5.8		
Divorced	4	3.3		
Household size (no of persons)				
1 – 3	24	20.0		
4 – 6	60	50.0	6	3.33
7 – 9	24	20.0		
>10	12	10.0		
Age				
≤30	24	20		
31 – 45	47	39.2	45.18	15.65

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46 – 60	25	20.8		
61 – 75	22	18.3		
>75	2	1.6		
Education				
No formal education	13	10.8		
Primary education	33	27.5		
Secondary education	49	40.8		
Tertiary education	25	20.8		
Farm size (hectares)				
≤3.0	82	68.3		
3.1 - 6.0	32	26.7	2.73	2.11
6.1 - 9.0	4	3.3		
> 9.0	2	1.7		
Farming experience (years)				
≤ 10	50	41.7		
11 -20	43	35.8	15.63	10.78
21 – 30	18	15		
> 30	9	7.5		
Own farm				
Yes	116	96.7		
No	4	3.3		

Distribution of Welfare Indicators among the Respondents

Table 2 contains information on the distribution of respondents based on selected welfare indicators. The use of housing conditions as welfare indicators was adopted from a study by Akerele and Adewuyi (2011) where they investigated poverty profiles and socioeconomic determinants of welfare among households in Ekiti State, Nigeria. The result revealed that the majority (76.7%) of the farming households used corrugated iron sheets as their roofing material. This agrees with the Nigeria Data Report (2006) which stated that most low and middle-income-earners use corrugated iron sheets. The majority (77.5%% and 87.5%%) of the houses surveyed had cemented walls and concrete floors respectively.

The most common housing type (56.7%) was a single room. Comparing this to the average number of persons per household reported, one conclusion that can be drawn is that the living condition of the households is a little below convenient. This agrees with the findings of Adeoye (2016) that residents in peri-urban areas of Nigeria had poor housing quality because the average number of persons ranged between 7 – 10 persons per room which exceeded the stipulated index of 2 persons per room set by the Nigerian Government for residents in the country. This result reveals that the residents in the study area would be faced with the problem of space inadequacy. Over half of the respondents (56.7%) depended on public tap as their major source of drinking water. This could reflect their inability to construct boreholes in their houses because of the cost of constructing a borehole. A majority (71.7%) of the respondents owned the houses they live in but had major problems with maintaining a good drainage system and proper treatment of their drinkable water.

The respondents have a high risk of health challenges as the result also showed that on average (55%), they consumed untreated water, which exposed them to certain health hazards. The distribution of the respondents

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based on the type of toilet facilities available showed that 40.8 percent had no toilets, 30 percent used water closets, 18.3 percent used pit latrines and 10.8 percent used VIP latrines. This also points to the poor living conditions of the respondents and the increased risk of illnesses. The results revealed that a knowledge gap exists on the relevance of environmental friendliness as the major means of waste disposal was within the compound (70.8%%) and only 50% of the respondents reported that they had good drainage systems.

Table 2: Distribution of Respondents Based on Welfare Indicators (n = 120)

Indicator	Percentage
Roofing material	
Asbestos	22.5 (27)
Wood	0.8 (1)
Corrugated iron	76.7 (92)
Wall material	
Cement	77.5 (93)
Stone	1.7 (2)
Mud	20.8 (25)
Flooring material	
Concrete/stone	87.5 (105)
Wood	0.8 (1)
Mud	7.5 (9)
Others	4.2 (5)
Housing unit	
Single room	56.7 (68)
Flat	30.8 (37)
Whole building	8.3 (10)
Duplex	4.2 (5)
Source of drinking water	
Indoor plumbing	3.3 (4)
Water vendor	0.8 (1)
Neighboring household	1.7 (2)
Public tap	56.7 (68)
Well with pump	10.8 (13)
Well without pump	22.5 (27)
River/lake/spring	2.5 (3)
Rainwater	1.6 (2)
Water treatment	
Yes	45 (54)
No	55 (66)
Toilet facility	
Water closet	30 (36)
Pit latrine	18.3 (22)
VIP latrine	10.8 (13)

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No toilet	40.8 (49)

Table 2(cont'd): Distribution of Respondents Based on Welfare Indicators (n = 120)

Indicator	Percentage
Refuse collection method	
Government agency	8.3 (10)
Compound disposal	70.8 (85)
Private agency	1.7 (2)
Heaping	19.2 (23)
Good Drainage	
Yes	34.2(41)
No	65.8(79)
Windows/door net	
Yes	54.2(65)
No	45.8(55)
Own Dwelling	
Yes	71.7 (86)
No	28.3 (34)

Distribution of Income and Expenditure among the Respondents

Table 3 shows the distribution of the respondents based on their income and expenditure levels. The result revealed that the mean income was ₦1,094,032 (± ₦1,609,538) with a majority of the respondents (63.4%) having an income level of not more than ₦1,000,000. This result supports the findings from the welfare indicators, where it was reported that most of the respondents are low-middle income earners based on the report by Nigeria Data Report (2006). This also supports the findings of Robertson et al., (2011) who stated that middle-income earners in Nigeria constitute a majority of the population with a monthly income of ₦75,000 – ₦100,000 (approximately ₦1,000,000 per annum). Furthermore, the report on the expenditure showed a mean expenditure level of ₦127,632 with most of the respondents (59.2%) spending a maximum of ₦100,000.

Table 3: Income and Expenditure Distribution among the Respondents

Variable (n = 120)	Percentage ('000)	Mean Standard Deviation ('000)	
Income (₦'000)			
Below 1000	63.4 (76)		
1000.001 – 5000	35.8 (43)		
Above 5000	0.8 (1)		
Total	100	1094.032	1609.538
Expenditure (₦ '000)			
Below 100	59.2 (71)		
100.001 - 250	25.8 (31)		
250.001 - 400	9.2 (11)		

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400.001 - 550	2.5 (3)		
Above 550	3.3 (4)		
Total	100	127.6324	137.1462

Determinants of Welfare among the Respondents

Table 4 shows the result of the estimated welfare model. The output reveals a final log likelihood value of -1394.544 which on its own cannot be relied upon but can be used to compare nested models. The result shows a likelihood ratio chi-square (LR chi^2) of 29.71 (df=7) with a p-value of 0.000, indicating that the model has a significantly better fit than a model with no predictors. Farm size ($\beta \pm SE$ = 9710.37 $\pm$ 3021.6, P<0.01), household size ($\beta \pm SE$ = -5988.21 $\pm$ 2818.15, P<0.05)., and years of schooling ($\beta \pm SE$ = 3529.57$\pm$ 1412.44, P<0.05) were the only significant predictors of welfare. For a one unit increase in farm size, the predicted per capita expenditure increases by ₦9710.37. This implies that a larger area of land means an increased level of production and an efficient production system, given a large area of land, increases income earned and per capita expenditure. This agrees with the findings of Noack and Larsen (2019) that agricultural production and amount available for spending increase with farm size. Furthermore, an increase in number of years of schooling by one year increases the predicted per capita expenditure by ₦3529.57 implying that respondents who prioritize education are more likely to have a higher disposable income and therefore increased consumption level than those who did not place much value on education. This result agrees with Akerele and Adewuyi (2011), Akaakohol and Aye (2014) and Kinuthia and Mabaya (2017). In addition, an increase in the number of household members by one unit decreases the predicted per capita expenditure by ₦5988.21. This result agrees with the findings of Biyase and Zwane (2018) which was corroborated by Afera (2015), Awotide et al., (2016), Ehiakporet al., (2019) and Lakhan et al., (2020), that an increase in the number of households members significantly increase the probability of being poor.

Table 4: Determinants of Farming Household Welfare

Coefficients	Estimate	Std. error	t value	Pr (> t)
intercept	-8140.75	34655.01	-0.235	0.8143
farm size	9710.37***	3021.6	3.214	0.0013
marital status	-1386.63	8235.21	-0.168	0.8663
Age	-152.64	485.3	-0.315	0.7531
Sex	-6429.09	12303.35	-0.523	0.6013
household size	-5988.21**	2818.15	-2.125	0.0336
years in school	3529.57**	1412.44	2.499	0.0125

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farming experience	-853.25	756.11	-1.128	0.2591
no of observations	120			
LR chi^2(7)	29.71			
Prob > chi^2	0.000***			
Pseudo R^2	0.0105			
log-likelihood	-1394.544			

***1% level of significance; **5% level of significance

Conclusion and Recommendation

In conclusion, the farmers in the study area are low-middle income earners because of the limited available space for farming as indicated by the average farm size reported in the study. This has negatively impacted their general living conditions as shown by the welfare indicators adopted in this study. Given the impact of education on welfare, both government and private institutions should organize educational programmes and make them easily accessible to these farmers. This would improve their adoption of new and improved technology as well as change their perception of increasing household size for use as family labor, considering its significant impact on per capita expenditure.

References

Adesiyan, O. F., Adesiyan, A. T., & Abisoye, L. (2020). Determinants of farmers' willingness to export yam in Ibarapa East and Ibarapa Central Local Government Areas of Oyo State, Nigeria. Ghana Journal of Agricultural Science, 55(1), 54-64. https://dx.doi.org/10.4314/gjas.v55i1.6

Afera, N. (2015). Determinants of poverty in rural Tigray: Ethiopia evidence from rural households of GulomekedaWereda. Journal of Poverty, Investment and Development, 10, 95-102. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=b3b80beb87108722cc9f803b2266a97ab3d5804d

Akaakohol, M. A., & Aye, G. C. (2014). Diversification and farm household welfare in Makurdi, Benue State, Nigeria. Development Studies Research: An Open Access Journal, 1(1), 168-175. https://doi.org/10.1080/21665095.2014.919232

Akerele, D., & Adewuyi, S. A. (2011). Analysis of poverty profiles and socioeconomic determinants of welfare among urban households of Ekiti State, Nigeria. Current Research Journal of Social Sciences, 3(1), 1-7. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=33de988d9445aa446e64e15a0dcfc5a9c3efea01

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Awotide, B. A., Karimov, A. A., & Diagne, A. (2016). Agricultural technology adoption, commercialization and smallholder rice farmers' welfare in rural Nigeria. Agricultural and Food Economics, 4(1), 1-24. https://doi.org/10.1186/s40100-016-0047-8

Biyase, M., & Zwane, T. (2018). An empirical analysis of the determinants of poverty and household welfare in South Africa. The Journal of Developing Areas, 52(1), 115-130. https://www.jstor.org/stable/26416998

Dyar, A., Lachmann, H., Stenfors, T., & Kiessling, A. (2019). The learning environment on a student ward: An observational study. Perspectives on Medical Education, 8(5), 276-283. https://doi.org/10.1007/s40037-019-00538-3

Ehiakpor, D. S., Danso-Abbeam, G., Dagunga, G., & Ayambila, S. N. (2019). Impact of Zai technology on farmers' welfare: Evidence from northern Ghana. Technology in Society, 59, 101189. https://doi.org/10.1016/j.techsoc.2019.101189[...truncated for brevity...]

Wossen, T., Alene, A., Abdoulaye, T., Feleke, S., & Manyong, V. (2019). Agricultural technology adoption and household welfare: Measurement and evidence. Food Policy, 87, 101742. https://doi.org/10.1016/j.foodpol.2019.101742