*Asian Journal of Agricultural Extension, Economics & Sociology*

*38(2): 67-72, 2020; Article no.AJAEES.55094*
*ISSN: 2320-7027*

# Determinants of Agroforestry Practitioners Income in Semi-Arid Region of Nigeria

**B. D. Zira[1*] and M. A. Gupa[1]**

*[1]Department of Forestry and Wildlife, University of Maiduguri, Nigeria.*

***Authors' contributions***

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

***Article Information***

DOI: 10.9734/AJAEES/2020/v38i230311
Editor(s):
(1) Fotios Chatzitheodoridis, University of Western Macedonia, Greece.
Reviewers:
(1) Ehlinaz Torun Kayabaşi, Kocaeli University, Turkey.
(2) Ismail Ukav, Adıyaman University, Turkey.
(3) Hussin Jose Hejase, Al Maaref University, Lebanon.
Complete Peer review History: http://www.sdiarticle4.com/review-history/55094

***Original Research Article***

***Received 27 December 2019***
***Accepted 02 March 2020***
***Published 21 March 2020***

## ABSTRACT

This study examined the determinants of farm income among Agroforestry Practitioners in Semi-arid region of Nigeria. Using a multistage sampling technique, 300 Practitioners were randomly selected from six purposive selected semi-arid region of Nigeria. The data were analyzed using descriptive statistics and multiple regression analysis. The study revealed an income of between ₦301,000 and ₦400,000 among the Agroforestry Practitioners in the study area. Result on the linear regression analysis revealed that the coefficients of Agroforestry farm output (p<0. 01), farm size (p<0. 01, household size (p<0. 05,) and education (p<0. 05,) were found to positively and statistically influence Agroforestry farm income in the study area. It is recommended that multifaceted interventions through infrastructural development that supports access to education and land, skill acquisition and empowerment program should be implemented in the study area.

*Keywords: Determinants; income; Agroforestry; semi-arid; Nigeria.*

## 1. INTRODUCTION

The concept of poverty has received the attention of stakeholders in many disciplines. This has dominated social and economic research for a world over, because attempts are being made in all quarters both in developed and developing economies by local and international

**Corresponding author: E-mail: zirabamidel@unimaid.edu.ng.com;*

organizations and development partners to at least reduce poverty to as low level as possible. The devastating effect of poverty can never be treated with levity due to its effects on many aspects of human life from physical to moral and psychological. It has posed economic and social threat to many nations especially in the third world of which Nigeria is counted. Many studies have also confirmed that the rate of poverty in the rural areas is higher than in urban areas. Statistics from the National Bureau of Statistics [1] indicates that poverty incidence in Nigeria rose from 39.6% in 2015 to 60.2% in 2017 and to 64.8% in 2019 involving 111,491,429 Nigerians. 67% of this figure lives in the rural areas and are predominantly Agroforestry Practitioners [1]. Despite the growth in the Nigerian economy, the proportion of Nigerians living below US1 Dollar is increasing every year [2].

Poverty among rural dwellers in Nigeria is an indication of low yield and income [3,4]. Hence, raising Agroforestry Practitioners income is crucial in reducing poverty and ensuring food security in rural areas; this is because farming is the most important income source for the poor rural households, accounting for over two thirds of overall income. The income level of rural communities may be explained by certain crucial factors, and determination of these factors may be the key to the design of effective rural development policy in Nigeria. A closer look at the determinants of Agroforestry practitioner income would provide an in-depth understanding into the factors that are critical to Agroforestry income among resource poor Practitioners in rural areas [5].

The study identified factors influencing Agroforestry income in Semi-arid region of Nigeria. It is envisaged that the results of the study will contribute meaningfully to the design of effective poverty reduction that would boost the incomes of the poor households.

## 2. METHODOLOGY

The study was carried out in Sokoto State which is located between latitude 13° 03' N and longitude 5° 14' E with a land area of 28,232.37 Square kilometers. It is bordered in the north by Niger Republic. Zamfara State to the east and Kebbi State to the south and west [6]. In terms of vegetation, the State falls within the Sudan savannah zone. Rainfall starts late May and ends late September or early October with an annual mean rainfalls ranging between 500 mm 700 m [6]. According to [1], Sokoto state has a population of 3,696,999 people. The inhabitants of Sokoto State practice one form of agroforestry or the other [6].

The sampling frame was established by obtaining a list of all Agroforestry practitioners in Local Governments Areas and the respective Agroforestry practitioner's villages from the Ministry of Agriculture and SADP, Sokoto. Thereafter, the names of all Agroforestry practitioners in the respective villages were obtained from the village heads and leaders of cooperative associations. This provided the bases for sampling. A 3-stage multi-stage random sampling technique was used to draw the sample. The first stage involved a purposive selection of six leading Local Government Areas noted for Agroforestry farming in the state; these include Wurno. Goronyo, Rabah, Kware, Kebbe and Silame local government areas. The second stage involved a random selection of two villages involved in Agroforestry practices in each of the selected Local Government Areas. The third stage was a random selection of 25 Agroforestry practitioners from each of the sampled communities. A total of 300 Agroforestry Practitioners were sampled and interviewed. Data were collected using questionnaire administered by trained enumerators. According to [7], "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data." Therefore, this study analyzed data collected with descriptive statistics such as frequencies and percentages supported with diagrams for clarity. Another tool used was multiple regression analysis specified under the linear regression model.

The model is specified as:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + Ui$$

Where: a =Constant term
$\beta_1$- …, $\beta_6$ = Coefficients of the explanatory variables to be estimated
Y = Agroforestry income (₦)
$X_1$ = Agroforestry output (kg)
$X_2$ = Farm size (ha)
$X_3$ = Household size (adult equivalent)
$X_4$ = Level of education (years)
$X_5$= Gender (dummy, I for male, for female)
$X_6$ = Number of income earners
Ui = Error term

## 3. RESULTS AND DISCUSSION

### 3.1 Socio-Economic Characteristics

The result of the study on socio-economic characteristics is presented in Table 1. The result shows that Agroforestry practitioner in the study area was dominated by middle aged (41-50 years) and aging males (51-60 years) with a family size of between 1 and 5 members. These are the economically active age brackets and people in this age brackets are usually self-motivated and innovative [8]. The result shows that 60% of the Practitioners had non- formal education and only 40% had formal education. This finding is in line with that of [9] who reported that 62% of practitioners in the rural areas had no formal education. New innovations should hence be introduced to the practitioners through Hausa language to facilitate easy understanding and adoption. Responses on farming experience shows that 42% of the Practitioners in the study area had been practicing Agroforestry for a period of 6 - 15 years. This implied that Agroforestry Practitioners in the study area have been in the profession for quite some period of time and are not novices in Agroforestry farming.

The mean farm size for Agroforestry in the area was 1.74 ha which implied that practitioners in the area generally had small farms devoted to Agroforestry production. In separate studies, [10] reported a mean farm sizes of 1.89 ha and 1.90 ha, respectively. This finding substantiated the fact that Agroforestry production in Nigeria is characterized by small scale production. This could pose an unlimited hindrance to commercialization in Agroforestry production and by extension food security. The Agroforestry Practitioners had a mean adult equivalent household labour availability of 5.6.

### 3.2 Level Farm Income

The level of farm income in Agroforestry production in the study area is presented in Table 2. Results revealed that 29.67% of the practitioners had farm income of between ₦301,000 to ₦400,000. The finding concurs to the findings of Zira (2016) who reported that 39%

**Table 1 Socio-economic characteristics of Agroforestry practitioners in semi-arid region of Nigeria**

| Variable | Frequency | Percentage |
|---|---|---|
| **Age (Years)** | | |
| 20—30 | 28 | 09.33 |
| 31-40 | 86 | 28.67 |
| 41 - 50 | 96 | 32.00 |
| 51-60 | 50 | 16.67 |
| 61 Above | 40 | 13.33 |
| **Education** | | |
| Non-formal | 180 | 60.00 |
| Formal | 120 | 40.00 |
| **Farming experience** | | |
| 6—15 | 127 | 42.33 |
| 16—25 | 73 | 24.33 |
| 26—35 | 47 | 15.67 |
| 36 Above | 53 | 17.67 |
| **Farm size (ha,)** | | |
| 0.1 2.0 | 210 | 70.00 |
| 2.1 —4.0 | 72 | 24.00 |
| 4.0 Above | 18 | 6.00 |
| Mean Farm Size | 1.74 | |
| **Household size** | | |
| 1—5.9 | 169 | 56.33 |
| 6— 10.9 | 103 | 34.33 |
| 11—15.9 | 21 | 07.00 |
| 6 and Above | 7 | 02.33 |
| **Mean (AE)** | 5.6 | |

*Source: Survey Data, 2019*

of a sample of beneficiaries of Agroforestry programme in Southern Kaduna, Kaduna State Nigeria earned over ₦350,000 per season. The mean income per Agroforestry practitioner in the study area was ₦ 379,850/season. This results revealed that Agroforestry practitioners in the study area live below the poverty line. These results demonstrate that majority of households in rural area maintain an insufficient farm income. This could consequently lead to a food insecurity scenario. Pervasive poverty among rural population in Nigeria is that an indication of low Agroforestry productivity and low income. According to [11], farm families with limited access to productive resources such as capital and inputs required for attaining physical efficiency in the food will face low productivity, food insufficiency and lack of income to purchase the needed calorie.

### 3.3 Determinants of Farm Income

Multiple Regression Analyses specified under linear model was used to estimate the relationship between farm income and six explanatory variables. The explanatory variables included in the linear model were Agroforestry practitioners output. Farm size, household size, education, gender of household head and income earners. The results are presented in Table 3. The coefficient of determination $R^2$ was found to be 73%. This implies that the model as fitted explains 73% of the variability in farm income. The F-ratio (101.23) which was significant (p<0.0l) indicates that there was a significant relationship between the predictor variables included in the model and farm income at the 99% confidence level.

The t-test revealed that Agroforestry practitioners output, Farm size, household size and education statistically and positively influence farm income of the Agroforestry practitioners in the study area. The other explanatory variables included in the model were not statistically different from zero. As for Agroforestry output, as expected, had a positive and significant (p<0.0l) effect on farm income. The result indicates that a kg increase in Agroforestry output produced by the Practitioners will lead to a corresponding ₦ 66.4 increase in the total farm income. This implies that when households have high Agroforestry yields, their farm income increases. This finding conforms to a *priori expectation* and economic theory [12,13]. [14] provides more evidences from India and indicate that average real income of small scale Practitioners rose by 85% as a result of increased Agroforestry productivity and 131% increases in average incomes of the landless through farm and off-farm jobs. This finding suggests that since Nigeria has the ecological condition to expand Agroforestry production and improved technology, National Forest policies should be geared towards meeting demand and increasing rural farm income through increase in domestic production. Concisely, intensification of production on area already in use (increases in average yield) should be the driving force in production growth.

Farm size has a positive coefficient (50208.5) and was significant (p<0.0l). The result implies that hectare increases in land holding will *ceteris paribus*, increase Agroforestry Practitioners income by ₦50,208.50. The size of farm holding is an important factor in Agroforestry. It determines the rate at which other resources can be employed in the farm for optimum productivity. Size of the farm also influences the welfare and income status of the Practitioners. Operators of large sized farms enjoy higher income, better standard of living, greater output, greater labour efficiency, lower costs and may be food secure. Small sized farms on the other hand, deter the use of mechanization and improved inputs, and the owners are characterized by low income [15]. The finding suggests that Practitioners could increase their land holding in order to boost their output and improve their income status.

**Table 2. Distribution of Agroforestry practitioner according to level of farm income**

| Variable (₦) | Frequency | Percentage |
|---|---|---|
| 1000 -100,000 | 29 | 09.67 |
| 101,000 200,000 | 31 | 10.33 |
| 201,000—300,000 | 53 | 17.67 |
| 301,000—400000 - | 89 | 29.67 |
| 401,000—500,000 | 78 | 26.00 |
| Above 500,000 | 20 | 6.67 |
| Total | 300 | 100 |

*Source: Survey data, 2019. Mean income — N379,850/ practitioner*

**Table 3. Result of the linear regression analysis on the determinants of farm income**

| Variable Reg. | Coefficient Stand. | Error | t-Ratio |
|---|---|---|---|
| Constant | 23.7876 | 32.417 | 0.734 |
| Output($X_l$) | 66.4*** | 4.8958 | 13.563 |
| Farm Size ($X_2$) | 50208.5*** | 18866.6 | 2.661 |
| Household size($X_3$) | 124666.6** | 4158.8 | 2.998 |
| Education ($X_4$) | 6522.5** | 3645.9 | 1.789 |
| Gender ($X_5$) | 29997.9 | 32328.9 | 0.920 |
| Income Earners ($X_6$) | -20506.3 | 16455.8 | - 1.246 |
| R-Squared | 73.00 | | |
| F Value | 101.23*** | | |

**** Significant at 1 percent, ** Significant at 5 percent*

The variable for Household size was positive (12466.6) and significant ($p<0.05$). The result indicates that a unit increase in household size (adult equivalent) of the Agroforestry practitioners in the study area, increases farm income of the households by ₦ 12,466.60. Household size is an important variable which determines the availability of labour to the household [8]. In food security and income studies, increase in household size increases income and the chances of being food secure provided the bulk of the household members are productive. However, if the bulk of the household members are unproductive, income and food security status deteriorates [16]. The implication of this finding is that Agroforestry practitioners should encourage their adult household members to engage in farm and off-farm economic activities in order to boost their respective household income.

The coefficient of education is shown to be positive and significant ($p<0.01$). This connotes that for every additional year spent in educational attainment, farm income improves by ₦ 6,522.50. The educational attainment of Practitioners does not only increase their productivity, but also increases their ability to understand and evaluate the information on new techniques and processes being disseminated through extension services. Level of education has also been used to determine the rate at which people in a social system will respond towards an improved technology [17]. [18] also highlighted the importance of education in facilitating the transfer and promotion of technologies meant to improve Agroforestry production. The implication of this finding signifies that educating the practitioners is a sure way of improving their income statuses.

The estimated parameters for number of income earners in households and gender of households' heads were not significantly related to farm income. The non-significance of the coefficients of these variables suggests that they were not the driving forces behind farm income among the resource poor Practitioners in the study area.

## 4. CONCLUSION AND RECOMMENDATIONS

The finding of the study had substantiated the significance of Agroforestry output, farm size, level of education and household size as determinants of farm income among resource poor Practitioners in the study area. The study hence recommends that Agroforestry practitioners should boost their output by adopting yield boosting technologies, diversify their income, raise their level of education and utilize their household members for labour and off farm income activities. In view of these alternatives, it is further recommended that multifaceted interventions through infrastructural development that supports access to education and land, skill acquisition and empowerment program should be fully implemented.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. National Bureau of Statistics (NBS); 2019. Poverty Profile for Nigeria 2010. NBS Abuja NPC (2008). National population census results. Federal Government of Nigeria Official Gazette. 2010;24(94):6-7.
2. Gbenga S. Nigerian poverty level. Gurara Journal of Agriculture. 2018;22(3):54-51.
3. Tunde CL. Researched agricultural productivity growth and poverty reduction in Africa, Asia and Latin America. IBH

Publishing Company, New Delhi. 2014;219.
4. Afraid A. An overview of the Nigerian Agroforestry economy. Nigeria Institute of Social Economic Research (N ISER); 2012.
Available:phttp://www.unep.ch/etb/evens/2019/1NovemberAgri/nigeria.pds
5. Obed MO. Agricultural production and practitioners income in Jama'a District. Unpublished B.Sc. Project, Department of Geography. Kaduna State University; 2017.
6. Sokoto State Government (SOSG). Diary. Sokoto State Government Printing Press, Sokoto, Nigeria; 2009.
7. Hejase AJ, Hejase HJ. Research methods: A practical approach for business students (2nd Edition). Philadelphia, PA, USA: Masadir Inc. 2013;272.
8. Yunana MB. Not farms alone: A study of rural livelihood in the middle belt of Nigeria. Journal of Applied Science. 2017;31(2):23-29.
9. Zira BD. Socio-economic benefits of agroforestry in Southern Kaduna, Kaduna State. Journal of Forest Science and Environment. 2016;11(2):64-71.
10. Abbas IS. Production function analysis of Agroforestry practitioners in Imo State. Nigeria. Proceedings of the 23rd Annual Conference of the Farm Management Association of Nigeria. Sokoto. 2009;11-15.
11. Arifalo EI. Economic analysis of agroforestry practice in Adamawa State, Nigeria. Journal of Agriculture and Environment. 2016;21(2):61-68.
12. Kefas HY. Causes of food insecurity in Koredegaga peasant association, Oromiya zone, Ethiopia. Agrekon. 2015;44(4):523-560,684.
13. Babatunde RO, Flex GY, Samson S. Socio-economic characteristics and food security status of farming households in Kwara State, North Central Nigeria. Pakistan Journal of Nutrition. 2017;6(1):49-58.
14. Ashley C, Maxwell S. Rethinking rural development. Development Policy Review. 2000;19(4):395-425.
15. Bello. Impact of inflation on farm families in Sokoto. Proceedings of the 23" Annual Conference of the Farm Management Association of Nigeria, Sokoto. 2009;98-103.
16. Mohammed ST, Settima BG, Abubakar, Oche BE. Analysis of household food security in some communities around Maiduguri area of Borno state. Proceedings of the 23 Annual Conference of the Farm Management Association of Nigeria, Sokoto. 2009;312-315.
17. John V. Introduction to culture and human development. London Publishers. 2000;512.
18. Lawal BO, Ayooia OT. Practitioners knowledge and use of pacesetters organic fertilizer for Arabic crops in Oyo state, Nigeria. Nigerian Journal of Agriculture and Rural Development. 2008;2:55-68.



*Peer-review history:*
*The peer review history for this paper can be accessed here:*
*http://www.sdiarticle4.com/review-history/55094*