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# Analysis of Income Diversification Strategies Through Agricultural Activities Among Public Servants In Bida Town, Niger State, Nigeria

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***Abstract*— This research examines how public servants in Bida town, Nigeria, diversify their income through agricultural activities. It explores their socio-economic characteristics, the types of agricultural enterprises they engage in, the factors influencing their participation, and the challenges they encounter. Using a sample of 81 respondents identified through snowball sampling, the study employed descriptive statistics, chi-square tests, and factor analysis to analyze the data. The findings show that most respondents were middle-aged married men, with crop farming being their primary choice for diversification, followed by poultry and ruminant farming. Key factors driving diversification were demographic, economic, and environmental, while occupational factors had a lesser influence. Respondents highlighted market instability, insufficient resources, and a lack of farming experience as major challenges to their diversification efforts. The study illustrates that agricultural diversification is a practical strategy for improving income stability among public servants. However, overcoming barriers like fluctuating markets, limited access to resources, and skill gaps is essential. It recommends implementing policies that provide targeted support, establishing training programs to build capacity, and promoting gender-inclusive initiatives to enhance sustainable diversification.**

***Keywords*— *Agricultural Activities, Diversification, Factor Analysis, Public Servants, Bartlett's Test of Sphericity***

## I. INTRODUCTION

T The survival and development of any individual depends basically on the level of their well-being, where basic amenities such as food, clothes, education, health, etc. are affordable and available at a price within the income scope of an individual. Income sources of an individual or household decrease, it has an instant multiplier effect on the basic services. Sequential, a household experiencing such decreasing difficulties should diversify its income sources as distress-push strategy or demand-pull strategy to avoid risk and uncertainty situations during the economic slack or shock period [25]. Nigeria's economy remains heavily largely dependent on agriculture, which employs roughly two-thirds of the country's adult labor force and has consistently contributed 35 to 40 percent of the country's gross domestic product (GDP) to date. Crop production accounts for 51 percent of all non-oil earnings [10]. It is sufficient to mention that the majority of these actors and agricultural production activities are found in rural areas. While farming has historically only been done in rural areas, in Nigerian cities, farming is becoming a more significant source of income for a portion of the population due to the rise in homestead livestock and locally grown crops, such as vegetable plots, fish ponds, apiculture, livestock, and poultry production, that are appearing in the country's urban and peri-urban areas [19]. Urban households have therefore also been observed to diversify into agricultural pursuits in an attempt to mitigate the impact of the economic downturn, which was primarily brought on by the non-payment of public servants' salaries and emoluments as well as the widespread layoffs of laborers in numerous manufacturing and service industries. Additionally, there is compelling evidence that a sizable percentage of urban and peri-urban households are now diversifying into agricultural activities to support themselves through improved food consumption, supporting their children's education and family health care, or reducing income shocks and fluctuations that urban households experience, either temporarily or permanently [22, 21, 17]. Income diversification refers to an increase in the number of sources of income or the balance among the different sources. This a household that has two sources of income is more diversified compared to a household with only one source. Similarly, a household with two income sources, each contributing half of the total, is more diversified than a household with just a single source [13]. Diversification at the individual or household level also known as livelihood diversification, this means engaging in new economic activities. These activities can be related to agriculture or non- agriculture, self - employment or working for someone else, working from home or at different locations [1]. Government policies encourage public servants to diversify into agricultural activities only, by providing subsidized loans to public servants to start or expand agricultural ventures [23]. Provide training and

capacity-building programs to equip public servants with agricultural skills and knowledge [2]. Therefore, this study was conducted to ascertain the diversification strategies of public servants through agriculture practices.

## II. Material And Methods

### A. Study Area

This study was carried out at Bida local government area, Niger State, Nigeria. Bida is located in the north central region of Nigeria. Bida is a cosmopolitan urban area which is heavily into agricultural practice and commerce. Though the city has a few civil service workforces which are mostly within different government agencies and institutions domiciled in Bida local government area. However, they also seem to venture into agriculture maybe due to economic benefits and making sure food is readily available for the family.

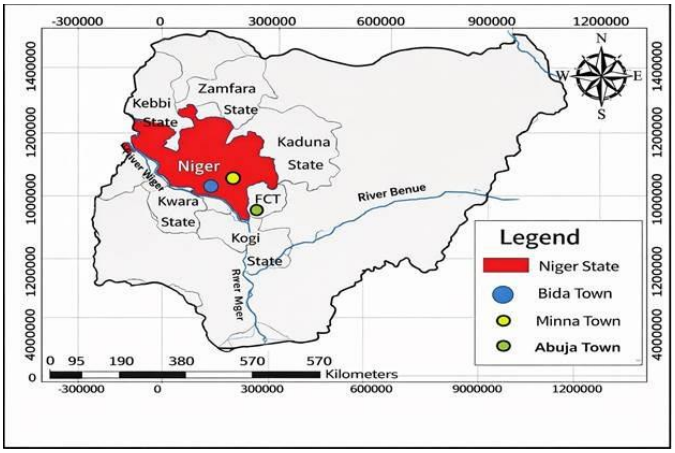


Fig. 1. Bida Local Government Map [8]

### B. Sampling Procedure and Sample Size

Public servants within Bida local governments were selected as a sampling unit for agricultural diversification. About 81 respondents were carefully chosen through snowball sampling. Different government agencies staff domiciled within Bida L.G.A were used for our sampling. The sampling unit were public servants who expanded into agricultural activities and 81 respondents were selected through snowball sampling techniques across the Bida urban area. The survey was distributed to different government institutions such as federal polytechnic, Bida, federal medical center, Bida, federal government girls' secondary school, girls' secondary school, federal road safety Corp, Nigeria police, Bida, Niger State, Nigeria, National agricultural seed council, etc. for identification of public servants that ventured into agricultural activities at different federal, state and local governments in Bida local government area.

### C. Method of Data collection

Primary data were obtained from the public servant that ventured into agriculture with the aid of a Well-structured survey which was complemented with an interview schedule. Data collected include the following: socio-economic characteristics of the respondents, the income levels of the respondents, factors responsible for public servants into agriculture activities as well as the constraints associated with income of farming activities. The information collected from the respondent includes, age, sex, number of years in farming, educational qualifications, household size, farm size, input availability and prices, returns alternatives business.

### D. Factor Analysis Model

This study applied factor analysis to explore the factors influencing public servants' diversification into agricultural activities. It encompasses the Kaiser-Meyer-Olkin (KMO) measure, Bartlett's Test of Sphericity, total variance explained, communalities, pattern matrix, structure matrix, and component correlations. Factor analysis categorized the factors influencing diversification into components, simplifying and organizing the data by identifying underlying patterns or relationships among the factors [12]. Instead of treating each factor as an independent variable, it groups related factors into components.

### E. Simpson Diversification Index

Simpson's Diversity Index (SDI) is a statistical measure that quantifies diversity within a dataset. Ensuing [3], SDI was employed to assess the extent of diversification among public servants into agriculture. A higher SDI value would indicate a more diversified engagement in agricultural activities, while a lower value would suggest limited diversification.

### F. Statistical Analysis

The data was analyzed using SPSS version 2023 statistical tools. Descriptive statistics was used to determine the mean and standard deviation while chi-square was employed for significance value. However, factor analysis (FA) was used to determine the factor responsible for agricultural diversification.

## III. Result And Discussion

### A. Socioeconomic Characteristics of the Respondents

Table 1 indicates that the majority (27.2%) are aged between 52-57 years, followed by (23.5%) aged 40-45, while the 34-39 age group comprises (17.3%) of respondents. The age group of 46-51 years includes (19.8%), and the least represented (12.3%.) are those aged 58-62.

TABLE I. Age Distribution Of The Respondents

| Age Group | Frequency | Percent | Mean |
|---|---|---|---|
| 34–39 | 14 | 17.30% | 48.07 |
| 40–45 | 19 | 23.50% | Standard Dev |
| 46–51 | 16 | 19.80% | 7.7 |
| 52–57 | 22 | 27.20% | |
| 58–62 | 10 | 12.30% | |
| Total | 81 | 100% | |

### B. Sex of the respondents

Table 2 shows that out of the 81 respondents, 78 (96.3%) were male, while only 3 (3.7%) were female.

TABLE II. Sex Distribution Of The Respondents

| Sex | Frequency | Percent | Mean |
|---|---|---|---|
| Male | 78 | 96.3 | 0.96 |
| Female | 3 | 3.7 | Standard dev |
| Total | 81 | 100 | 0.19 |

### C. Marital status and Household size of the respondents

Table 3 revealed that all respondents (100%) were married. Household size distribution showed that the majority (48.1%) of respondents had household sizes between 7–10 members, followed by 45.7% with household sizes between 3–6 members. Only a small proportion had larger household sizes, with 1.2% having 11–14 members and 4.9% having 15–20 members.

TABLE III. MARITAL STATUS AND HOUSEHOLD SIZE DISTRIBUTION OF THE RESPONDENTS

| Variables | Frequency | Percent | |
|---|---|---|---|
| Marital status | | | |
| Married | 81 | 100 | |
| Household size | | | Mean |
| 03-Jun | 37 | 45.7 | 7.17 |
| 07-Oct | 39 | 48.1 | Standard Dev |
| Nov-14 | 1 | 1.2 | 3.12 |
| 15-20 | 4 | 4.9 | |
| Total | 81 | 100 | |

### D. Nature of Diversified Agricultural Enterprises Among the Respondents

Agriculture crop was the most diversified agricultural enterprise among public servants in the study area with 85.2% respondents as shown in table 4 while fish farming was the least diversified agricultural practice. However, about 71.6% public servants engaged in poultry and 55.6% were involved in animal rearing.

TABLE IV. NATURE OF DIVERSIFIED AGRICULTURAL ENTERPRISES AMONG THE RESPONDENT

| Agricultural Enterprise | Frequency | Percentage (%) |
|---|---|---|
| Crop Agriculture | 69 | 85.2 |
| Poultry Agriculture | 58 | 71.6 |
| Fish Farming | 11 | 13.6 |
| Ruminant Farming | 45 | 55.6 |
| **Engagement in Enterprises** | | |
| More than one enterprise | 70 | 86.4 |
| Only one enterprise | 11 | 13.6 |
| Total | 81 | 100 |

### E. Specific combinations of agricultural enterprises

The level of diversification of agriculture among public servants was presented in table 5. About 51.9% of the respondents had medium diversification while the very high diversification had the least respondents. Though high and low diversification had about 29.6% and 13.6% respondents respectively. However, no respondent had interest in no diversification.

TABLE V. DISTRIBUTION OF RESPONDENTS AS PER THE LEVEL OF DIVERSIFICATION.

| Level of diversification | SDI range | Frequency | Percent |
|---|---|---|---|
| No diversification | < 0.01 | 0 | 0 |
| Low diversification | 0.01-0.2 | 11 | 13.6 |
| Medium diversification | 0.26-0.5 | 42 | 51.9 |
| High diversification | 0.51-0.7 | 24 | 29.6 |
| Very high diversification | >0.76 | 4 | 4.9 |
| Total | | 81 | 100 |

The crosstabulation in Table 6 revealed that among the respondents, the health, education and defense had the most respondents at 0.5 on the diversification index while Agriculture had the most respondents at 0.75 diversification index. The chi-square test yielded a Pearson Chi-Square value of 15.037 with 9 degrees of freedom and a p-value of 0. 090.

TABLE VI. CROSSTABS AND CHI-SQUARE TESTS PUBLIC SERVANT SECTOR DIVERSIFIED INTO AGRICULTURE

| Sector | Diversification Index | | | | Total |
|---|---|---|---|---|---|
| | 0.25 | 0.5 | 0.75 | 1 | |
| Health sector | 1 | 9 | 7 | 1 | 18 |
| Education sector | 6 | 23 | 10 | 0 | 39 |
| Defense sector | 4 | 8 | 2 | 2 | 16 |
| Agricultural sector | 0 | 2 | 5 | 1 | 8 |
| Total | 11 | 42 | 24 | 4 | 81 |
| Chi-Square Tests | Value | df | | Asymp. Sig. (2-sided) | |
| Pearson Chi-Square | 15.037 | 9 | | 0.09 | |
| Likelihood Ratio | 17.093 | 9 | | 0.047 | |
| Linear-by-Linear Assoc. | 0.528 | 1 | | 0.468 | |
| N of Valid Cases | 81 | | | | |

### F. Factors Influencing Public Servants Diversification into Agricultural Activities

Table 7 revealed that demographic factors like increasing family food demand had a high agreement rate among respondents, with 62.5% agreeing and 37.5% strongly agreeing. Similarly, 41.3% agreed and 58.8% strongly agreed that household income from agriculture was a significant factor. However, perceptions of household size and composition were mixed, with 15.0% strongly disagreeing, 8.8% disagreeing,

15.0% undecided, 50.0% agreeing, and 11.3% strongly agreeing. Regarding occupational factors, 41.3% agreed, and 28.7% strongly agreed that their work schedules accommodated agricultural activities, while 62.5% strongly disagreed, and 37.5% disagreed that their primary job income supported agriculture. Opinions on occupational differences were divided, with 38.8% disagreeing, 27.5% undecided, and 33.8% agreeing. Under economic factors, 91.3% strongly agreed, and 8.8% agreed that profit from agriculture was a significant motivator. Similarly, 53.8% agreed, and 46.3% strongly agreed that prevailing economic conditions encouraged agricultural activities. For environmental factors, 78.8% disagreed, and 10.0% were undecided on whether their location enabled agriculture, with only 11.3% agreeing. Respondents largely disagreed (47.5%) or strongly disagreed (13.8%) that environmental sustainability influenced decisions. A significant majority (58.8%) strongly disagreed that resources in their locality were available for agriculture, while 11.3% agreed.

TABLE VII. PERCEPTION OF RESPONDENTS ON FACTORS INFLUENCING DIVERSIFICATION INTO AGRICULTURE

| Factors | Response | Frequency | Percentage |
|---|---|---|---|
| Demographic Factors | | | |
| Increasing family food demand | Agree | 50 | 62.5 |
| | Strongly agree | 30 | 37.5 |
| Household income from agriculture | Agree | 33 | 41.3 |
| | Strongly agree | 47 | 58.8 |
| Household size and composition | Strongly disagree | 12 | 15 |
| | Disagree | 7 | 8.8 |
| | Undecided | 12 | 15 |
| | Agree | 40 | 50 |
| | Strongly agree | 9 | 11.3 |
| Ocupational Factors | | | |
| Work schedule accommodates agriculture | Strongly disagree | 7 | 8.8 |
| | Disagree | 12 | 15 |
| | Undecided | 5 | 6.3 |
| | Agree | 33 | 41.3 |
| | Strongly agree | 23 | 28.7 |
| Primary job income supports agriculture | Strongly disagree | 50 | 62.5 |
| | Disagree | 30 | 37.5 |
| Occupational differences in agricultural engagement | Disagree | 31 | 38.8 |
| | Undecided | 22 | 27.5 |
| | Agree | 27 | 33.8 |
| Economic Factors | | | |
| Profit from agriculture | Agree | 7 | 8.8 |
| | Strongly agree | 73 | 91.3 |
| Economic conditions encourage agriculture | Agree | 43 | 53.8 |
| | Strongly agree | 37 | 46.3 |
| Enivironmental Factors | | | |
| Location enables agriculture | Disagree | 63 | 78.8 |
| | Undecided | 8 | 10 |
| | Agree | 9 | 11.3 |
| Environmental sustainability influences decisions | Strongly disagree | 11 | 13.8 |
| | Disagree | 38 | 47.5 |
| | Undecided | 15 | 18.8 |
| | Agree | 16 | 20 |
| Availability of resources in locality | Strongly disagree | 47 | 58.8 |
| | Disagree | 19 | 23.8 |
| | Undecided | 5 | 6.3 |
| | Agree | 9 | 11.3 |

The Table 8 shows the KMO measure of 0.555 and Bartlett's Test of Sphericity ($\chi^2 = 12.529$, $p = 0.051$). This demonstrates that the sample data can be used for factor analysis while Bartlett's test shows significance suggesting the data sample can be categorized into components.

TABLE VIII. KAISER-MEYER-OLKIN (KMO) MEASURE AND BARTLETT'S TEST OF SPHERICITY

| KMO and Bartlett's Test | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.555 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 12.529 |
| | Df | 6 |
| | Sig. | 0.051 |

*G. Total Variance Explained*

Table 9 indicates that only two components have an eigenvalue that's equal to or greater than one and they explained a cumulative variance of 62.53%, with Component 1 (Demographic, Economic, Environmental factors) accounting for 36.04% and Component 2 (Occupational factors). Components 3 and 4 are residuals for 26.49%.

TABLE IX. TOTAL VARIANCE EXPLAINED

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 1.442 | 36.042 | 36.042 | 1.442 | 36.042 | 36.042 |
| 2 | 1.059 | 26.486 | 62.528 | 1.059 | 26.486 | 62.528 |
| 3 | 0.815 | 20.371 | 82.9 | | | |
| 4 | 0.684 | 17.1 | 100 | | | |

*H. Factor Communalities*

The 10 revealed Communalities for demographic Factors (0.589), Occupational Factors (0.798), Economic Factors (0.580) and Environmental Factors (0.534).

TABLE X. COMMUNALITIES FACTOR

| Factors | Initial | Extraction |
|---|---|---|
| Demographic factor | 1 | 0.589 |
| Occupational factor | 1 | 0.798 |
| Economic factor | 1 | 0.58 |
| Environmental factor | 1 | 0.534 |

*I. Pattern matrix and structure*

The table 11 reveals that the pattern matrix of Component 1 had more influence from demographic (0.767), economic (0.698), and environmental factors (0.600), while Component 2 primarily captures occupational factors (0.891). This is also corroborated by the structure matrix which demonstrates strong association between occupational factors and component 2 while component 1 associates more with demography, economic and environmental factors.

TABLE XI. PATTERN AND STRUCTURE MATRIX

| Factors | Component (1) | Component (2) |
|---|---|---|
| Pattern matrix | | |
| Demographic factors | 0.767 | - |
| Economic factors | 0.698 | -0.311 |
| Environmental factors | 0.6 | 0.413 |
| Occupational factors | 0.891 | |
| Structure Matrix | | |
| Demographic factors | 0.767 | -0.305 |
| Economic factors | 0.695 | 0.418 |
| Environmental factors | 0.603 | 0.89 |
| Occupational factors | | |
| Component Correlation | 2 | 0.008 |

*J. Constraints to Public Servant's Income Diversification in Agriculture Activities*

Table 12 shows that the majority of public servants' face constraints in their efforts to diversify into agricultural activities. About 65.4% respondents identified limited resources as a challenge. However, lack of experience had 54.3% while market fluctuation had 87.7%. Additionally, 50.6% of respondents indicated that climate change affected their agricultural activities. The least cited constraint was the lack of training, with 21% of public servants reporting it as an obstacle to their involvement in agricultural ventures.

TABLE XII. CONSTRAINTS TO PUBLIC SERVANT'S INCOME DIVERSIFICATION IN AGRICULTURE ACTIVITIES

| Constraint | Frequency | Percent |
|---|---|---|
| Limited Resources | 53 | 65.4% |
| Lack of Experience | 44 | 54.3% |
| Market Fluctuation | 71 | 87.7% |
| Climate Change | 41 | 50.6% |
| Lack of Training | 17 | 21.0% |
| Total | 81 | 100% |

## IV. DISCUSSION

The age distribution indicates a relatively balanced representation across the different age groups. This suggests that middle-aged individuals are the most prevalent in this study area, which may reflect socio-economic factors such as

employment stability and family responsibilities often associated with this age range. Conversely, there is a potential decline in participation among older adults in the study area. Pickering, [24] reported lower participation rates among older populations due to health issues or lack of interest. However, the gender of the participants reveals an unequal representation indicating male domination in the study area. Akpan et al. [4] revealed that socio-cultural factors continue to hinder women's involvement and advancement in public service roles leading to a significant decline in the number of female public workers and according to [16] out of the top positions in public sector institutions, only 226 were held by women compared to 1,356 by men. The marital status distribution of public servants indicates a homogenous marital status among the public servants interviewed in the study area which could stem from the fact that married public servants may be more inclined to engage in agricultural activities as a means to supplement household income or provide for their families. Ayantoye et al. and Tata et al. [26, 5] highlighted that married respondents are more likely to diversify their livelihoods due to increased family responsibilities. The majority of households among public servants in the Bida metropolis are within the 3 to 10 members category, representing about 93.8% of the respondents. This demonstrates that smaller households are more likely to diversify into agriculture due to funds availability as there is less consumption of resources in the family. Coster et al. [9] and Idris-Adeniyi et al. [12] revealed that smaller household sizes often correlate with increased economic opportunities and investments in agriculture due to reduced immediate consumption needs. Additionally, crop farming was the most diversified agricultural practice in Bida which can be attributed to market demand and soil fertility within the area. According to Barbieri and Mshenga [6], crop production is predominant in farming. Moreover, more agricultural practices are being engaged by public servants [14]. The diversification category shows that medium diversification had more respondents indicating a barrier to higher diversification. This may be because of lack of access to land or capital for farming [15]. Further, restrictive policies and lack of government support can impede the public servants from agricultural practices [7]. The level of public servant diversification in agriculture is significantly associated with public servant sectors. There are several determinants influencing public servants' engagement in agricultural activities, including economic factors and sector-specific characteristics [20]. Public servants' diversification into agriculture are greatly influenced by demographic and economic factors considering increasing family food demand and profits from agricultural activities. Moreover, the influence of occupational factors was observed to have a mixed role in terms of Job being the primary income and agriculture providing support while environmental factors had little influence on public servant's diversification decisions. However, different constraints have been identified to public servant agricultural diversification. Market fluctuations and limited experience were the most influencing constraints while lack of training was the least. According to Coster et al. [9], the volatile nature of agricultural markets, influenced by both local and global factors can impede agricultural business. However, inexperienced farmers often struggle with effective decision-making, which is crucial for diversifying income streams, making training and mentorship programs essential to equip public servants with the necessary skills for successful agricultural practices and Odoh et al. [18] highlighted climate change as a significant threat to agricultural productivity.

## IV. Conclution

This study highlights the critical role that public servants play in diversifying agricultural activities as a means of supplementing their income. The socio-economic characteristics indicate a workforce that is primarily middle-aged and male, suggesting potential socio-cultural barriers for women in this sector. The findings underscore the importance of crop production due to its established market demand and lower entry barriers compared to other agricultural enterprises. Moreover, the study emphasizes that while many public servants are engaged in diversified agricultural activities, they face significant challenges, particularly market volatility and resource limitations. These constraints hinder their ability to fully capitalize on the benefits of diversification, which is essential for enhancing income stability and overall economic resilience.

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