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# ANALYSIS OF DETERMINANTS OF FARMERS' PARTICIPATION IN AGRICULTURAL COOPERATIVES IN BENUE STATE, NIGERIA

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## Abstract
*This study analyzed determinants of farmers' participation in agricultural cooperatives in Benue State, Nigeria. The research examined the socio-economic factors that influenced farmers' engagement in agricultural cooperatives; explored the influence of institutional support factors on farmers' involvement in agricultural cooperatives; examined how perceived benefits influence farmers' decisions to engage in agricultural cooperatives; and determined the overall satisfaction levels of farmers with their cooperative engagements as well as identified the constraints. Primary data were collected from 400 respondents through structured questionnaire. Descriptive statistics, multiple regression, correlation and Factor analysis were used to analyse data. Majority (72%) of the respondent were males, mostly (49.8%) within the age bracket of 31-40 years, with a mean age of 41.5 years. The result further showed that 64.2% are of respondents had formal education of 7-12 years, farming on average farm size of 3 hectares, with average annual income of ₦1,187,000. The result revealed that: age, gender, level of education, annual income, membership status, farm size, farming experience, years in cooperative, extension contact and off-farm income significantly correlate with the level of involvement in agricultural cooperatives. It was observed that subsidized input, training programs, institutional linkages, and provision for savings positively and significantly influenced farmers' involvement in agricultural cooperatives. The major perceived benefits included: access to inputs at subsidized rate, access to credit/loan facilities, redistribution of profits of cooperatives, collective bargaining for better market price, and supply of information on marketing opportunities. The perceived constraints were leadership issues, institutional challenges, and insufficient transportation. The study recommended that regular leadership development programs should be organized for cooperative leaders to enhance their leadership, management and communication skills; cooperatives should work toward improving their institutional linkages by forming partnerships with other stakeholders.*

**Keywords**: Analysis, cooperatives, determinants, participation

## 1.0 Introduction

Agricultural cooperatives play an important role in fostering agricultural development, enhancing productivity and improving the livelihoods of farmers in developing countries (Akintunde *et al.,* 2019). In Nigeria, particularly in Benue State, agriculture is the primary source of income for the majority of the rural population, that's why it is known as the "Food Basket of the Nation," Benue State's economy heavily relies on agriculture, with crops like yam, cassava, rice, and maize dominating the landscape (National Bureau of Statistics, 2020). However, despite the State's agricultural potentials, farmers often face numerous challenges, including limited access to input and output markets, inadequate infrastructure and financial constraints (Atewamba *et al.,* 2020).

Agricultural cooperatives, present a promising solution to numerous challenges faced by farmers, and there is a growing recognition among farmers in the State of the significant potential cooperative groups and associations have in addressing these issues. Additionally, many agricultural intervention agencies are advocating for collective action to ensure the success of their objectives. By combining resources, farmers can benefit from economies of scale, improved bargaining power, and access to essential services such as credit, inputs, and extension services (Olayide and Heidhues, 2018). Cooperatives also facilitate knowledge sharing and collective decision-making, which can lead to improved farming practices and increased productivity. In Benue State, the potential of agricultural cooperatives to transform the agricultural sector and uplift the rural economy is significant, yet farmers' participation in these cooperatives remains suboptimal (Ogwumike and Agom, 2018).

The growth of agricultural cooperatives in Benue State has shown a significant upward trend over the past decade. According to the Benue State Ministry of Agriculture, the number of registered Agricultural Cooperatives increased from approximately 350 in 2010 to over 1,200 by 2020, reflecting a growth rate of over 240% (Benue State Ministry of Agriculture, 2020). This surge is attributed to the increasing recognition of the benefits cooperatives offer, such as enhanced bargaining power, access to credit, and pooled resources for better productivity. Additionally, government and non-governmental organizations' initiatives have played a crucial role in promoting cooperative development, providing training and financial support to enhance their efficiency and sustainability (Olayide and Heidhues, 2018).

Understanding determinants of farmers' participation in agricultural cooperatives is crucial for developing effective strategies to promote cooperative membership and participation. Several socioeconomic factors may influence farmers' decisions to join and actively participate in cooperatives. Thus, it will be pertinent to know and understand these determinants to improve the operation and membership of the organizations (Akintunde *et al*., 2019). Despite the growing body of literature on agricultural cooperatives, there is a paucity of research specifically focused on Benue State. This gap underscores the need for a comprehensive analysis of the determinants of farmers' participation in agricultural cooperatives in this study area. Such analysis will not only contribute to academic understanding of cooperative behavior, but also provide valuable insights for policymakers, cooperative leaders, and development practitioners aiming to enhance cooperative development in Benue State (Olayide and Heidhues, 2018). The findings will inform the design of targeted interventions and policies to strengthen the growth and effectiveness of agricultural cooperatives, ultimately contributing to the sustainable development of the agricultural sector in Benue State and beyond (National Bureau of Statistics, 2020).

## 2.0 Objectives of the Study

The broad objective of this study was to analyze determinants of farmers' participation in agricultural cooperatives in Benue State, Nigeria. The specific objectives were to:

i. analyze the socioeconomic factors that influence farmers' engagement in agricultural cooperatives in Benue State;
ii. explore the influence of institutional support factors on farmers' involvement in agricultural cooperatives;
iii. examine how perceived benefits influence farmers' decisions to engage in agricultural cooperatives in Benue State; and
iv. determine the overall satisfaction levels of farmers with their cooperative engagements

## 3.0 Methodology

### 3.1 The Study Area

Benue State is located in the North Central region of Nigeria, between latitudes 6°25'N and 8°8'N and longitudes 7°47'E and 10°E' (Ade, 2014). It has a total land-area of about 33, 955 square kilometers with a population of 5,741,815 (National Population Commission, NPC, 2017). Benue State is a rich agricultural region and it grows crops such as; sweet potatoes, cassava, soya bean, guinea corn, flax, yams, sesame, rice, groundnuts and oil palm. The fish production systems predominant in the study area include: earthen pond, concrete pond, plastic, and tarpaulin fiber systems ( NPC, 2017).

The population of this study comprises all farmers who were registered members of agricultural cooperatives in Benue State, Nigeria. The population of the study consisted of 209 registered agricultural cooperatives and 8216 farmers who were members of these cooperatives (Ministry of Industry and Cooperatives, Benue State, 2022). The sampling technique for this study leveraged on the list of registered cooperatives maintained by the Benue State Ministry of Cooperatives. A total of 400 respondents were selected for the study.

Primary data were collected through structured questionnaire. Descriptive statistics (mean, percentage, frequency and standard deviation), multiple regression analysis, correlation analysis and Factor analysis were used to analyse collected data. The regression model is expressed as:

$\mathbf{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots + \beta_{14} X_{14} + \epsilon$ ........................ (1)

$X_1$ = subsidized inputs

$X_2$ = training programs

$X_3$ = provision of saving services

$X_4$ = credit/loan services

$X_5$ = extension services

$X_6$ = agricultural grants

$X_7$ = facilitation in marketing of products

$X_8$ = technical advice and support

$X_9$= access to processing and value added support

$X_{10}$= support in accessing farm labour

$X_{11}$= Institutional linkages

The correlation (r) is presented as:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \quad \text{.......................................................} (2)$$

Where:

r = Pearson correlation coefficient

Y = overall satisfaction level (typically measured using a scale 5-point Likert Effectiveness Scale rated as very satisfied (5), satisfied (4), Neutral (3), dissatisfied (2) and very dissatisfied (1)

n= number of farmers

x= score for independent variables

$\sum xy$ = sum of products of paired scores

$\sum x$, $\sum y$ = sum of x-values and y-values respectively

$\sum x^2$, $\sum y^2$ = sum of square

**Factor analysis**

Factor analysis is an econometric technique that can be used to derive a set of uncorrelated variables for further analysis when the use of highly inter correlated variables may yield misleading results in regression. The constraints were analyzed and reduced to a manageable number. Kaiser's (1958) rule of thumb was used to name the constraints. The rule states that constraints with correlation coefficient of 030 or more have high loading and as such are qualified to be used to name a factor preventing farmers from full participation in agricultural cooperatives in the study area, while, those with less than 0.30 were unclassified. The factor analysis model is given as:

$X_i = a_{i1}F_1 + a_{i2}F_2 + . \; . \; . + a_{im}F_m + e_i$......................................(3)

Where:

$X_i$ = observed variables

$a_i$s = factor loadings (or scores)

$F_1 - F_m$ = factors to be extracted

$e_i$ = part of variable $X_i$ that cannot be explained by the factors

**4.0 Results and Discussion**

**4.1 Socio-Economic Characteristics of Respondents**

Table 1 shows that majority (72%) of the respondents were males. The significant disparity may indicate a lack of female representation in decision-making processes within the cooperative. This could lead to decisions that do not fully consider the needs and perspectives of female members. This was however, contrary to the findings of Nafela (2016) who found that 55.8% of the respondents were females. It was found that 49.8% of the cooperative members were within the age bracket of 31-40 years, with a mean age of 41.5 years. This implies that the members were still agile enough to actively participate in cooperative activities. This finding supports the report of Kayode *et al*. (2024) who found that the mean age of farmers was 43 years. Marital status of cooperative respondents showed that, 72.8% of the respondents were married. The result further showed that 64.2% of cooperative respondents had formal education of 7-12 years. Literacy level of cooperative respondents plays a vital role in their active involvement in cooperative activities. The high level of education indicates the trainability of the respondents as well as their ability to replicate knowledge gained into productive use. Average household size was found to be 6 persons.

The average farm size was found to be 3 hectares, with average annual income of ₦1,187,000, and average farming experience of 10.8 years and 6.9 mean years as cooperative members, with poor extension contacts (35.3%). More than half (54.7%) of the cooperative respondents were into crop farming.

Table 1: Socio-Economic Characteristics of Respondents in the Study Area (n =400)

| Variables | Frequency | Percentage (%) | Mean |
|---|---|---|---|
| Age | | | 41.5years |
| =30 | 57 | 14.3 | |
| 31–40 | 199 | 49.8 | |
| 41-60 | 89 | 22.2 | |
| Above 60 | 55 | 13.7 | |
| Sex | | | |
| Male | 286 | 72 | |
| Female | 111 | 28 | |
| Marital status | | | |
| Unmarried | 291 | 72.8 | |
| Married | 109 | 27.2 | |
| Years spent in formal education | | | 10.17 years |
| =6 | 53 | 13.3 | |
| 7–12 | 257 | 64.2 | |
| Above 13 | 90 | 22.5 | |
| Annual Farm income (N'000) | | | 1,187,000 |
| =500 | 121 | 30.2 | |
| 501 –1,000 | 187 | 46.7 | |
| 1001 – 1,500 | 61 | 15.4 | |
| Above 2,000 | 31 | 7.7 | |
| Membership status | | | |
| Leader | 97 | 24.2 | |
| Member | 303 | 75.8 | |
| Household size | | | 6 persons |
| 1–4 | 148 | 37 | |
| 5–8 | 179 | 44.7 | |
| 9 and above | 73 | 18.3 | |
| Farm size(ha) | | | 3hectares |
| =2 | 259 | 64.7 | |
| 3–5 | 92 | 23 | |
| 5 and above | 49 | 12.3 | |
| Farming experience (Years) | | | 10.8 years |
| =9 | 198 | 49.5 | |
| 10–20 | 135 | 33.7 | |
| 21 and above | 67 | 16.8 | |
| Farming system | | | |
| Crop farming | 219 | 54.7 | |
| Livestock farming | 56 | 14 | |
| Crop and livestock farming | 125 | 31.3 | |
| Years in Cooperative | | | 6.9years |
| =5 | 121 | 30.3 | |
| 6-10 | 198 | 49.5 | |
| 11 and above | 81 | 20.2 | |
| Extension contact | | | |
| Had contact | 141 | 35.3 | |
| No contact | 259 | 64.7 | |
| Off-farm income (N'000) | | | 512,600 |
| =500 | 264 | 66 | |
| 501 –1,000 | 83 | 20.7 | |
| 1001 – 1,500 | 39 | 9.7 | |
| Above 2,000 | 14 | 3.5 | |
| Land tenure | | | |
| Owned | 127 | 31.7 | |
| Rented | 228 | 57 | |
| Sharecropped | 9 | 2.3 | |
| Communal | 36 | 9 | |

Source : Field survey (2024)

## 4.2 Relationship between Socio economic Characteristics and Farmers' participation in Agricultural Cooperative activities

Table 2 shows the relationship between socio-economic characteristics of the respondents and the level of participation in agricultural cooperatives. The significant variables used were: age, gender, level of education, annual income, membership status, farm size, farming experience, years in cooperative, extension contact and off-farm income. This was confirmed in the study carried out by Ajoke *et al.* (2024) and Maffioli *et al.* (2011) that farmers with better education, more skills, and more wealth were more likely to adopt certain kinds of innovations that were more dependent on knowledge. This positive and moderate correlations were also significant ($P<0.05$), thus the rejection of the null hypothesis and acceptance of the alternative.

Table 2: Correlation Analysis Showing the Relationship between the Socio economic Characteristics and Farmers ' participation in Agricultural Cooperative activities

| Variable | p-value | Correlation (r) value | Remark |
|---|---|---|---|
| Age | 0.25 | 0.03 | Significant |
| Gender | 0.10 | 0.045 | Significant |
| Marital Status | -0.05 | 0.62 | Not significant |
| Years in Education | 0.38 | 0.001 | Significant |
| Annual Farm Income | 0.42 | 0.000 | Significant |
| Membership Status | 0.29 | 0.02 | Significant |
| Household Size | -0.12 | 0.35 | Not significant |
| Farm Size | 0.33 | 0.005 | Significant |
| Farming Experience | 0.22 | 0.04 | Significant |
| Farming System | 0.15 | 0.15 | Not significant |
| Years in Cooperative | 0.30 | 0.02 | Significant |
| Extension Contact | 0.35 | 0.01 | Significant |
| Off-farm Income | -0.52 | 0.08 | Significant |
| Land Tenure | 0.20 | 0.07 | Significant |

Source : Field survey (2024).

## 4.3 Institutional Support Factors on Farmers' Involvement in Agricultural Cooperatives

The result of the multiple linear regression revealed that there was a strong relationship ($R^2 = 0.607$) between the independent variables and respondents' engagement in cooperative. The model predicted about 60% of the farmers' engagement was influenced by institutional variables, with an F-test statistical score of 26.67 and statistical significance of P< 0.01 (Table 3). This demonstrates that, the model fits well. It was found that subsidized inputs were significant at 5% and positively related to farmers' involvement in cooperatives. This indicates that, when farmers have access to subsidized agricultural inputs, such as seeds, fertilizers and pesticides, their likelihood of participating in cooperatives increases. The positive coefficient implies that the provision of these inputs serve as an incentive, making it more attractive to farmers to participate in cooperatives. Training programs positively influenced farmers' involvement in agricultural cooperatives and was significant at 10%. The positive coefficient implies that, improvements, in training initiatives leads to greater participation, highlighting the importance of capacity building in promoting cooperative membership. Institutional linkages were found to be significant (5%) and positively related to farmers' cooperative engagement. The implication is that, when farmers have strong connections with various institutions such as government agencies, NGOs, research organizations, and other cooperatives they are more likely to engage with cooperatives. These linkages can provide valuable resources, information, and support, enhancing the cooperative experience for farmer. The result further revealed a positive and significant provision for savings (5%) which indicates that the provision of saving services has a positive influence on farmers' involvement in agricultural cooperatives. This suggests that when cooperatives offer saving services, such as savings accounts or investment opportunities, farmers are more likely to engage and participate actively in these cooperatives.

Table 3: Multiple Regression Result of Influence of Institutional Support Factors on Farmers' Involvement in Agricultural Cooperatives

| Variables | Coefficients | Standard Error | t-value | Marginal effect |
|---|---|---|---|---|
| Subsidized inputs | .3673 | .1450 | 0.011** | -.3801 |
| Training programs | .1379 | .0803 | 0.086* | .5489 |
| Credit/loan facilities | .01004 | .0456 | 0.826 | -.0040 |
| Extension services | .4600 | .2353 | 0.251 | .1831 |
| Agricultural grants | .0031 | .0072 | 0.685 | .0013 |
| Provision of Saving Services | .5582 | .2607 | 0.023** | -.2196 |
| Facilitation in marketing of Produce | -.1954 | .3383 | 0.546 | -.0776 |
| Technical Advice and Support for Members | .3498 | .2194 | 0.111 | .1393 |
| Access to Processing Facilities and Value-added Support | .1126 | .1927 | 0.459 | .0449 |
| Support in accessing Farm Labour | 6.89 | 9.70 | 0.477 | 2.37 |
| Institutional linkages | .3673 | .1450 | 0.011** | -.14626 |
| Constant | 10.2554 | 5.1925 | 0.048 | |
| $R^2$ | 0.607 | | | |
| Adjusted $R^2$ | 0.543 | | | |
| F-statistics | 26.67 *** | | | |

Source : Field survey (2024)

Note: *Significant at *P< 0.1* and ** significant at *P<0.05*, respectively.

## 4.4 Perceived Benefits Influencing on Farmers' Decision to Engage in Agricultural Cooperatives

The benefits perceived by members from their cooperatives engagement in the study area were presented in Table 4. Access to input at subsidized rate was ranked 1st among perceived benefits, with 92.25% of the respondents. Access to Credit/loan facilities scored 91%, thus ranked 2nd. It can be inferred from the result that access to credit/loans as a source of finance can increase farmers production level. Additionally, acquisition of farming inputs at subsidized rate can lower production cost, which simultaneously increases profit. Profits of cooperative redistributed to members were rated 3rd and highlighted by 90.5%. This redistribution could also serve as incentive for members to be more committed and increase their savings to the cooperatives, as they were directly rewarded for their collective success. Collective bargaining for better market price and supply of information on marketing opportunities had 88%. By pooling their products together, farmers could reduce transaction costs and eliminate middlemen who typically reduce profit margins.

Furthermore, amongst the perceived benefits were access to supply of information on marketing opportunities (85.7%), provision of storage facilities (80.75%), access to processing facilities and value-added support (80.75%), provision of saving services (65.25%), access to extension services and training programs (60.5%), and support in accessing farm labour (50.75%). The cooperative also helped farmers to get information on consumers preference (80.80%), members enjoyed economies of scale (76.27%), helped to reduce assembly cost (71.47%), provision of transport facility at low cost (70.93%), access to input at subsidized rate (64.53%), aid in effective calculation of operating costs (57.07%), improved education level (54.40%), provision of storage facilities (41.33%), and access to fertile land (19.20%).

Table 4: Perceived Benefits Influencing Farmers' Decision to particpate in Agricultural Cooperatives

| Variables | *Frequency | Percentage | Rank |
|---|---|---|---|
| Access to input at subsidized rate | 369 | 92.25 | 1st |
| Access to Credit/loan facilities | 364 | 91 | 2nd |
| The profits of cooperative are redistributed to members based on patronage | 362 | 90.5 | 3rd |
| Collective bargaining for better market price | 352 | 88 | 4th |
| Access to supply information on marketing opportunities | 343 | 85.75 | 5th |
| Provision of storage facility | 323 | 80.75 | 5th |
| Access to Processing Facilities and Value-added Support | 323 | 80.75 | 7th |
| Provision of Saving Services | 261 | 65.25 | 8th |
| Access to extension Services and training programs | 242 | 60.5 | 9th |
| Support in accessing Farm Labour | 203 | 50.75 | 10th |
| Economies of scale enjoyed | 186 | 46.5 | 11th |
| Networking opportunities | 125 | 31.25 | 12th |
| Control market entrance/competition | 65 | 16.25 | 13th |

Source: Field survey data (2024).

* Multiple responses.

## 4.5 Farmers' Perceived Constraints to full Participation in Agricultural Cooperatives

The farmers' perceived constraints to farmers' full participation in agricultural cooperatives were analyzed using Factor analysis (Table 5). In determining the minimum point, a variable with loading to be accepted as having an effect, the Kaiser's rule of thumb of 0.4 was employed.

Leadership constraints were: lack of trust among members (0.42), poor leadership and management (0.82), inadequate financial resources (0.60) and poor member financial commitment (0.55).The high factor loading signifies that poor leadership and management practices were critical concern. This may encompass ineffective communication, lack of strategic vision, or inadequate managerial skills. Also, limited resources can restrict growth, hinder investments in infrastructure, and impede provision of services to members. Members' financial commitment is a significant concern. This may stem from a lack of perceived benefits, dissatisfaction with management, or insufficient member engagement.

Institutional constraints were; inadequate government interventions (0.65), poor institutional linkages (0.67) and poor market infrastructure (0.72). Inadequate support from government agencies is a prominent issue for the cooperative. This may include a lack of financial assistance, insufficient policy frameworks, or minimal regulatory support. Additionally, weak connections with other institutions (e.g., agricultural extension services, financial institutions, and research bodies) were significantly impacting the cooperatives' performance. Poor linkages can hinder access to information, resources, and best practices. Insufficient transportation, lack of storage facilities, and poor access to markets, limit members' ability to sell their produce effectively.

Poor access to extension services (0.80) and inadequate training for members (0.46) were extension services essential for providing farmers with the necessary information, technology transfer, and support for improved agricultural practices. Limited contact with these service providers entails limited knowledge transfer. Competition from private enterprises (0.71) and increase in duties for issuing agricultural certificates (0.56) were market competition challenges. Private entities may offer better pricing, superior products, or more efficient services, which can attract members away from the cooperative. Also, increase in duties by regulatory authorities may create additional administrative burdens for members, potentially leading to disengagement.

Table 5: Factor Analysis of Farmer 's Perceived Constraints to full Participation in Agricultural Cooperatives

| Variables | Factor 1* | Factor 2** | Factor 3*** | Factor 4**** |
|---|---|---|---|---|
| Lack of Trust among members | 0.42* | -0.20 | 0.29 | 0.22 |
| Poor Leadership and Management | 0.82* | 0.14 | 0.21 | 0.27 |
| Inadequate Financial Resources | 0.60* | 0.20 | 0.03 | 0.26 |
| Poor Member financial Commitment | 0.55* | 0.09 | -0.24 | 0.00 |
| Inadequate Government Interventions | 0.09 | 0.65** | 0.15 | -0.16 |
| Poor Institutional Linkages | 0.16 | 0.67** | 0.09 | 0.18 |
| Poor Market Infrastructure | 0.01 | 0.72** | 0.14 | -0.10 |
| Poor Access to Extension Services | 0.27 | 0.18 | 0.80*** | 0.13 |
| Inadequate Training for Members | 0.26 | 0.11 | 0.46*** | 0.05 |
| Competition from Private Enterprises | 0.21 | 0.23 | 0.05 | 0.71**** |
| Increase in Duties for Issuing Agricultural Certificates | 0.35 | 0.27 | 0.21 | 0.56**** |

Source: Field Survey (2024).
Method: Orthogonal varimax (Kaiser Normalization
*= Factor 1: Leadership issues factors, ** = Factor 2: Institutional challenge issues,
***=Factor 3: Access to resources and training and ***=Factor 4: Market competition
Rule: Value = 0.4 is considered overloaded and it is a constraint

## 5.0 Conclusion and Recommendations
### 5.1 Conclusion

Addressing the challenges presented by the respondents would require a holistic approach that will include good leadership capacity**,** strengthening government and institutional support**,** and investing in education and infrastructure. By implementing these strategies, cooperatives can become more resilient, competitives and better equipped to meet the needs of their members.

### 5.2 Recommendations

The study therefore made the following recommendations:

i. Regular leadership development programs should be organized for cooperative leaders to enhance their leadership, management and communication skills;
ii. Cooperatives should work towards improving their institutional linkages by forming partnerships with agricultural research institutions, financial bodies, and NGOs to get access to better resources, advice, and
iii. Funding opportunities; cooperative leaders should ensure that the cooperative financial management is transparent to encourage more trust and higher member commitment to financial contributions.

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