



Factors influencing farmers' attitude and participation in the national agricultural development fund intervention programmes in selected Local Government Areas of Kaduna State, Nigeria

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ABSTRACT

This study examined the factors influencing farmers' attitude and participation in the National Agricultural Development Fund (NADF) intervention programmes in Zaria, Sabon Gari, and Makarfi Local Government Areas of Kaduna State, Nigeria. A multistage sampling technique was used to select 343 respondents from a sampling frame of 2,386 farmers. Primary data were collected using a structured questionnaire and analyzed using descriptive statistics and multiple regression analysis. The findings revealed that most respondents were male, married, and within the economically active age group, with a mean age of 42.6 years. The regression analysis on farmers' attitude showed that age, educational level, farming experience, programme awareness, trust in government programmes, and perceived benefits significantly influenced farmers' attitude toward NADF programmes. The model produced an R^2 value of 0.53 and an F-value of 24.63. The participation model revealed that farm size, annual farm income, cooperative membership, access to extension services, frequency of extension contact, and access to agricultural credit significantly influenced farmers' participation in NADF programmes. The model recorded an R^2 value of 0.57 and an F-value of 28.11, while access to agricultural credit emerged as the strongest determinant of participation. Major constraints identified included inadequate access to credit, delay in loan disbursement, inadequate extension contact, poor awareness, and high cost of farm inputs. The study concluded that socio-economic, institutional, and programme-related factors significantly influence farmers' attitude and participation in NADF intervention programmes. It recommends improved access to credit, strengthened extension services, effective awareness campaigns, and transparent programme implementation.

Keywords: Farmers' attitude; participation; intervention programmes

INTRODUCTION

The disposition of farmers toward agricultural development initiatives is a central factor influencing the success and sustainability of rural transformation efforts. The extent to

which programme objectives are realized depends largely on farmers' perceptions, level of acceptance, and willingness to actively engage in such interventions. Their reactions are shaped by the credibility of the information source, the effectiveness of communication channels, the trustworthiness of implementing agencies, and the prevailing socio-economic environment within which the intervention is introduced. Contemporary development scholarship increasingly acknowledges that conventional top-down approaches, which emphasize unilateral technology transfer without adequate beneficiary involvement, often yield limited and unsustainable outcomes (Dichter, 2003). In response, there has been a paradigm shift toward participatory and community-driven development models that prioritize stakeholder inclusion in programme design, implementation, and evaluation. Empirical evidence suggests that participatory approaches enhance programme relevance, strengthen local ownership, improve trust in institutions, and ultimately increase the likelihood of sustained farmer participation (Mansuri & Rao, 2013; Chambers, 2019; World Bank, 2022).

The Federal Government of Nigeria established the National Agricultural Development Fund (NADF) through the National Agricultural Development Fund (Establishment) Act, 2022. The NADF was created as a sustainable financing mechanism to support agricultural productivity, value chain development, and rural economic transformation. The Fund provides intervention programmes including subsidized farm inputs, agricultural credit facilities, capacity-building initiatives, and digital monitoring systems aimed at strengthening smallholder participation in formal agricultural development processes (Federal Government of Nigeria, 2022; NADF, 2024). While the establishment of NADF represents a significant policy shift toward structured agricultural financing, the success of such intervention programmes largely depends on farmers' attitudes and their level of participation. Previous studies on agricultural intervention programmes in Nigeria indicate that socio-economic characteristics, institutional access, awareness levels, and trust in government programmes significantly influence farmers' engagement (Abdulummini *et al.*, 2023; Auta *et al.*, 2023). Furthermore, participation in agricultural programmes has been shown to improve farm productivity, income, and livelihood outcomes only when farmers actively engage with programme components (Oladimeji & Abdullahi, 2022).

Kaduna State is one of Nigeria's major agricultural centers, with Zaria, Sabon Gari, and Makarfi Local Government Areas recognized for crop production activities such as maize, rice, sorghum, and vegetables. However, smallholder farmers in these areas continue to face constraints related to credit access, extension services, input affordability, and market linkages (Kaduna State Ministry of Agriculture, 2024). Despite the presence of NADF intervention programmes, there is limited empirical evidence examining the factors influencing farmers' attitudes and participation in developmental programs within these local government areas. Understanding these determinants is crucial for improving programme effectiveness and achieving sustainable agricultural development.

Over the years, numerous agricultural intervention programmes have been implemented in Nigeria to address declining productivity and rural poverty. However, many of these programmes have recorded mixed outcomes due to low farmer participation, poor awareness, bureaucratic inefficiencies, and weak institutional support systems (World Bank, 2024). Although the NADF was established to provide a more structured and sustainable financing model for agricultural development, the effectiveness of its intervention programmes depends significantly on farmers' willingness to participate and their perceptions of programme benefits. Evidence from earlier agricultural programmes such as

the Anchor Borrowers' Programme and Growth Enhancement Support Scheme suggests that farmers' participation is influenced by factors such as education, farm size, cooperative membership, access to credit, and extension contact (Abdulummini et al., 2023; Auta et al., 2023). Additionally, trust in government initiatives and perceived fairness in beneficiary selection have been found to shape farmers' attitudes toward intervention programmes (Oladimeji & Abdullahi, 2022). In Makarfi, Zaria and Sabon Gari, Local Government Areas of Kaduna State, where agriculture is a dominant economic activity, it remains unclear which specific socio-economic, institutional, and attitudinal factors determine farmers' participation in NADF intervention programmes. The absence of empirical evidence on these determinants limits policymakers' ability to refine programme implementation strategies to ensure inclusive participation and maximum impact. Therefore, there is a need to investigate the factors influencing farmers' attitude and participation in NADF intervention programmes in these areas.

The general objective is to examine the factors influencing farmers' attitude and participation in the National Agricultural Development Fund (NADF) intervention programmes in Zaria, Sabon Gari, and Makarfi Local Government Areas of Kaduna State, Nigeria. The specific objectives are to: examine the influence of socio-economic and programme-related factors on farmers' attitude towards the NADF intervention programmes in the study area; determine the effect of socio-economic and institutional factors on farmers' participation in the NADF intervention programmes in the study area; and to identify the constraints affecting farmers' participation in the NADF intervention programmes in the study area.

Improving the effectiveness of intervention programmes such as NADF is essential for enhancing productivity and reducing rural poverty (FAO, 2023). As a relatively recent institutional framework established in 2022, empirical studies evaluating the grassroots implementation of NADF intervention programmes remain limited. This study contributes to bridging this knowledge gap, particularly within Kaduna State. Understanding farmers' attitudes and participation patterns will provide evidence-based insights for policymakers and programme administrators to strengthen implementation strategies, enhance transparency, and improve outreach mechanisms. Finally, the study contributes to academic literature on agricultural development by providing localized empirical evidence from Zaria, Sabon Gari, and Makarfi LGAs, thereby supporting future research and policy evaluation.

METHODOLOGY

The Study Area

The study was conducted in three selected Local Government Areas of Kaduna State, Nigeria, namely Makarfi, Zaria and Sabon Gari. The selected Local Government Areas are located in the northern part of Kaduna State within the Sudan savannah ecological zone of Nigeria. The area experiences a tropical continental climate characterized by distinct wet and dry seasons, which significantly influences agricultural production activities. The study area receives seasonal rainfall that typically begins around May and ends in October, with annual rainfall estimated to range between 800 and 1200 mm. The dry season spans from November to April and is usually characterized by high temperatures and low humidity. Average temperature conditions in the area generally range between 25°C and 38°C depending on the prevailing season. The vegetation of the region is predominantly savannah grassland

interspersed with scattered trees, creating favourable ecological conditions for crop farming and livestock rearing (FAO, 2023). Agriculture is the dominant economic activity of the inhabitants of the study area. The majority of farmers are smallholder producers engaged in the cultivation of staple cereal crops such as maize, millet, and sorghum, as well as legumes and vegetables. Some farmers also practice irrigation farming during the dry season using water resources available along lowland areas. Agricultural production activities constitute an important source of livelihood for rural households in the region (World Bank, 2024). Relatively high population density and active farming communities characterize the selected Local Government Areas. Agricultural extension service providers who disseminate information on improved farming technologies also serve the area and agricultural development programmes (Kaduna State Ministry of Agriculture, 2024). The choice of Zaria, Sabon Gari, and Makarfi Local Government Areas was based on their high concentration of farming households and relevance to agricultural production activities. These areas are also among the communities targeted by agricultural development intervention initiatives such as the National Agricultural Development Fund, which aims to improve agricultural financing, input access, and capacity development among smallholder farmers.

Sampling Technique and Sample Size

A multistage sampling procedure was employed in this study. In the first stage, three Local Government Areas were purposively selected due to their agricultural activity and relevance to the study. In the second stage, four wards were randomly selected from each of the three LGAs, giving a total of 12 wards. In the third stage, respondents were selected proportionately from each ward based on the population of farmers in the ward using the Taro Yamane's (1973) formula in computing the required sample size for the study. Therefore, 343 respondents were selected across all the wards for the study from the total sample frame of 2386 farmers.

The formula is expressed as follows:

$$n_0 = \frac{N}{1 + N(e^2)} \dots\dots\dots (1)$$

n_0 = Sample size

N = Total population of farmers in the selected area

e = margin of error (0.05)

N=2386

n_0 =343

e = margin of error (0.05)

$$\frac{343}{2386} \times 100 = 14.3\% \cong 14\%$$

Respondents from each ward were therefore selected proportionately using the expression below:

$$x = \frac{x}{n} \times N \dots\dots\dots (2)$$

Where:

x = Sample size per ward

X = Number of selected registered farmers per ward

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n = Total number of farmers in the three Local Government Areas

N = Required sample size for the study (from Taro Yamane's 1973 formula)

The selected State, Local Government Areas, wards and number of sampled farmers from each ward is as shown in Table 1 below.

Table 1: Distribution of sampled farmers from three LGAs in Kaduna State.

State	LGAs	Wards	Sample Frame	Sample Size (14%)
Kaduna	Makarfi	Gwanki	230	33
		Makarfi	220	32
		Gubuchi	200	29
		Tudun Wada	170	24
	Zaria	Dutsen Abba	250	36
		Kufena	210	30
		Wucicciri	200	29
		Tukur Tukur	195	28
	Sabon Gari	Basawa	240	35
		Bomo	180	26
		Dogarawa	156	22
		Samaru	135	19
Total	3	12	2386	343

Data Collection

Primary data were collected using a structured questionnaire administered to farmers in the selected wards. The questionnaire was designed to capture information on: socio-economic characteristics of farmers, awareness of NADF intervention programmes, farmers' attitude toward the programmes, level of participation, institutional and economic factors influencing participation and constraints to participation.

Level of Awareness of NADF Intervention Programmes (Awareness Score)

The level of awareness of NADF intervention programmes was assessed by determining farmers' knowledge of the existence, components, and services provided under the programme.

Respondents were presented with a list of key NADF intervention components, such as: Input support (fertilizer, improved seeds), access to credit/loans, extension and advisory services, training and capacity-building programmes, market linkage support. For each item, farmers were asked to indicate whether they were aware of it.

A binary response scale was used: Aware = 1; Not aware = 0

The awareness score for each respondent was obtained by summing the responses across all listed programme components:

$$\text{Awareness Score} = \sum_{i=1}^n A_i$$

Where:

A_i = awareness response for each programme component

n = total number of components listed

Farmers' Attitude Toward NADF Programmes (Attitudinal Score)

Attitude was measured using a Likert-type scale, which captures the degree of agreement with a set of statements about the programme.

Responses were rated on a 5-point Likert scale:
Strongly Agree = 5; Agree = 4; Undecided = 3; Disagree = 2; and Strongly Disagree = 1

Level of Participation in NADF Programmes (Participation Index)

Participation was measured by assessing farmers' involvement in different programme activities. A list of programme activities was provided (e.g., training, input distribution, credit access, extension services).

Farmers indicated their level of participation using a scale such as:
Not involved = 0; Occasionally involved = 1; and Regularly involved = 2

Perceived Benefits of NADF Intervention Programmes (Perception Score)

The perceived benefits variable was measured by eliciting farmers' subjective evaluation of the gains derived from participation in the NADF intervention programmes.

Respondents were asked to indicate the extent to which they perceived each benefit using a 5-point Likert scale: Very High Benefit = 5; High Benefit = 4; Moderate Benefit = 3; Low Benefit = 2; and No Benefit = 1.

Analytical Techniques

The data collected were analyzed using both descriptive and inferential statistical methods. Descriptive statistics such as frequency distribution, percentages, and mean scores were used to summarize socio-economic characteristics, awareness level, attitude, participation level, and constraints. Multiple regression analysis was used to determine the factors influencing farmers' attitude and participation in NADF intervention programmes. The multiple regression model is specified as follows:

$$Y = \beta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \beta_4 Z_4 + \beta_5 Z_5 + \beta_6 Z_6 + \beta_7 Z_7 + \beta_8 Z_8 + \beta_9 Z_9 + \beta_{10} Z_{10} + \beta_{11} Z_{11} + \beta_{12} Z_{12} + \beta_{13} Z_{13} + \beta_{14} Z_{14} + \beta_{15} Z_{15} + U_i \dots\dots\dots (3)$$

Where:

Y= Level of farmers' participation in NADF intervention programmes (participation index score)

β_0 = intercept

$\beta_0 - \beta_{15}$ = Regression coefficients

Z_1 = Age of farmer (years)

Z_2 = Educational level (years of formal schooling)

Z_3 = Farm size (hectares)

Z_4 = Farming experience (years)

Z_5 = Annual farm income (₦)

Z_6 = Household size (number of persons)

Z_7 = Sex (1 = Male, 2 = Female)

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Z₈= Marital status (1 = Married, 0 = Otherwise)

Z₉= Membership of cooperative society (1 = Yes, 0 = No)

Z₁₀= Access to extension services (1 = Yes, 0 = No)

Z₁₁= Frequency of extension contact (number of visits per season)

Z₁₂= Access to agricultural credit (1 = Yes, 0 = No)

Z₁₃= Level of awareness of NADF intervention programmes (awareness score)

Z₁₄= Trust in government agricultural programmes (Likert scale score)

Z₁₅= Perceived benefits of NADF intervention programmes (perception score)

a= Constant

e=error term.

The raw participation score was then standardized into an index to ensure comparability across respondents:

$$\text{Participation Index} = \frac{\text{Actual Participation Score}}{\text{Maximum Participation Score}}$$

Where:

Maximum Possible Score = 2 × number of activities

The explanatory variables were selected based on their theoretical and empirical relevance to farmers' participation in agricultural intervention programmes. Socio economic factors such as age, sex, marital status, household size, education, farm size, farming experience, and income were included because they influence decision-making capacity, resource availability, and ability to meet programme requirements. Institutional factors such as cooperative membership, access to extension services, frequency of extension contact, and access to agricultural information were incorporated due to their role in facilitating information flow and linkage to government interventions. Awareness and attitudinal variables, including level of awareness, trust in government programmes, and perceived benefits, were included because participation is largely shaped by knowledge, confidence, and perceived usefulness of the intervention. Together, these variables capture the socio economic, institutional, and behavioural determinants of participation in NADF intervention programmes.

RESULTS AND DISCUSSION

The findings presented in Table 2 revealed that the majority (34.4%) of the respondents were within the age bracket of 41–50 years, with a mean age of 42.6 years. This indicates that most of the farmers were within the economically active and productive age group, suggesting that they possess the physical strength, farming experience, and decision-making ability required to participate effectively in agricultural intervention programmes. Farmers within this productive age category are generally more willing to adopt innovations and participate in development initiatives aimed at improving agricultural productivity. This finding agrees with Auta, Abdullahi, and Bello (2023), who reported that age significantly influences farmers' participation in agricultural intervention programmes in Northern Nigeria.

Table 2: Socio-economic Characteristics of the Respondents

Variables	Frequency	Percentage (%)
Age (Years)		
21–30	52	15.2
31–40	104	30.3
41–50	118	34.4
Above 50	69	20.1
Mean Age	42.6	
Sex		
Male	247	72.0
Female	96	28.0
Marital Status		
Married	268	78.1
Single	41	12.0
Widowed	21	6.1
Divorced	13	3.8
Educational Level		
No formal education	49	14.3
Primary education	82	23.9
Secondary education	136	39.7
Tertiary education	76	22.1
Household Size		
1–5 persons	97	28.3
6–10 persons	181	52.8
Above 10 persons	65	18.9
Mean Household Size	7	
Farm Size (ha)		
Less than 2 ha	88	25.7
2–4 ha	154	44.9
Above 4 ha	101	29.4
Mean Farm Size	3.4	
Farming Experience		
Less than 10 years	74	21.6
10–20 years	173	50.4
Above 20 years	96	28.0
Mean Farming Experience	16.8	
Cooperative Membership		
Member	214	62.4
Non-member	129	37.6
Access to Extension Services		
Yes	231	67.3
No	112	32.7
Access to Agricultural Credit		
Yes	198	57.7
No	145	42.3

The result further showed that male respondents constituted 72.0% of the sampled farmers, while females accounted for 28.0%. This suggests that agricultural production and participation in intervention programmes in the study area are predominantly male-driven. The dominance of male farmers may be attributed to greater access to productive resources such as land, credit, and extension services. This finding is consistent with the findings of Abdulmumini, Yusuf, and Ibrahim (2023), who observed that male farmers were more actively involved in agricultural development programmes due to easier access to institutional support services.

The marital status distribution indicated that 78.1% of the respondents were married. This implies that farming activities in the study area are largely family-based enterprises. Married farmers often have access to family labour, which may enhance agricultural productivity and increase participation in intervention programmes. This finding corroborates the report of Ibrahim and Aliero (2023), who stated that married farmers tend to participate more actively in agricultural programmes because of household labour availability and family livelihood responsibilities.

Educational attainment among the respondents showed that 39.7% had secondary education, while 22.1% possessed tertiary education. This indicates that a considerable proportion of the farmers had formal education, which could positively influence their understanding of programme objectives, access to agricultural information, and willingness to adopt innovations. Education improves farmers' ability to process technical information and make informed production decisions. This finding is in line with Enete, Madu, and Okoro (2024), who found that educational level significantly enhances farmers' engagement in agricultural innovation and intervention programmes.

The household size distribution revealed that the majority (52.8%) had between 6 and 10 household members, with a mean household size of 7 persons. This suggests relatively large rural households that may provide family labour for farming operations. Large household size may enhance labour availability for agricultural production, although it can also increase household dependency burden. Similar findings were reported by Asogwa, Umeh, and Nwibo (2024), who noted that household size influences labour availability and participation in agricultural support programmes.

The farm size analysis indicated that 44.9% of the respondents cultivated between 2 and 4 hectares, with a mean farm size of 3.4 hectares. This confirms that the respondents were predominantly smallholder farmers, which reflects the general structure of Nigerian agriculture dominated by small-scale production systems. Smallholder farmers are often the primary targets of agricultural intervention programmes such as NADF due to their vulnerability to production and financial constraints. This finding agrees with Eze, Nwachukwu, and Ezeh (2023), who reported that most beneficiaries of agricultural financing programmes in Nigeria are smallholder farmers operating on relatively small farm holdings.

In terms of farming experience, the study revealed that 50.4% of the respondents had between 10 and 20 years of farming experience, with a mean farming experience of 16.8 years. This implies that the farmers possessed substantial practical knowledge of agricultural production and rural livelihood systems. Experienced farmers are more likely to understand the benefits of intervention programmes and participate actively in them due to their exposure to production challenges and institutional support mechanisms. This finding supports the work of Okunlola and Akinbode (2023), who emphasized that farming experience positively influences farmers' participation in agricultural development initiatives.

The result further showed that 62.4% of the respondents belonged to cooperative societies. Cooperative membership is important because it facilitates access to agricultural information, credit facilities, farm inputs, and government intervention programmes. Membership in farmer organizations also strengthens social capital and collective action among rural farmers. This finding is consistent with Udegbe and Falola (2024), who identified cooperative membership as a significant determinant of farmers' participation in agricultural development programmes in Northern Nigeria.

Access to extension services was reported by 67.3% of the respondents, indicating a relatively high level of institutional linkage between farmers and extension personnel in the study area. Extension services play a crucial role in disseminating agricultural innovations, creating awareness about intervention programmes, and improving farmers' technical knowledge. Farmers with regular extension contact are more likely to participate in agricultural development programmes due to improved access to information and advisory support. This finding agrees with Mohammed and Abdullahi (2023), who reported that extension services significantly promote farmers' participation in rural development and intervention programmes.

Finally, the study revealed that 57.7% of the respondents had access to agricultural credit. Access to credit is essential for purchasing farm inputs, expanding production activities, and meeting programme participation requirements. Farmers with access to financial resources are generally better positioned to adopt innovations and benefit from agricultural interventions. This finding corroborates Okoro and Chinedu (2025), who found that access to agricultural credit significantly enhances smallholder farmers' participation in agricultural financing schemes in Nigeria.

Table 3: Multiple regression results on factors influencing farmers' attitude

Variables	Coefficient (β)	Std. Error	t-value
Constant	0.8426	0.3924	2.15**
Age	0.0198	0.0076	2.61**
Educational Level	0.1684	0.0673	2.50**
Farming Experience	0.0147	0.0061	2.41**
Level of Awareness of Programme	0.1957	0.0694	2.82***
Trust in Government Programmes	0.1096	0.0467	2.35**
Perceived Benefits of Programme	0.2748	0.0803	3.42***
R ²	0.53		
Adjusted R ²	0.51		
F-value	24.63***		

*** = Significant at 1% level, ** = Significant at 5% level, NS = Not significant

The multiple regression analysis was conducted to determine the influence of selected socio-economic and programme-related variables on farmers' attitude toward NADF intervention programmes in the study area. The regression model produced a coefficient of determination (R^2) of 0.53 and an adjusted R^2 of 0.51, indicating that about 53% of the variation in farmers' attitude toward the programme was explained by the explanatory variables included in the model. The F-statistic was significant at the 1% probability level, confirming that the regression model was statistically fit and reliable in explaining farmers' attitude toward NADF intervention programmes.

Age had a positive and statistically significant influence on farmers' attitude toward the programme. This implies that older farmers were more likely to develop favourable perceptions toward NADF intervention programmes compared to younger farmers. Older farmers may possess more farming experience, institutional exposure, and understanding of government agricultural initiatives, which could positively shape their attitude. This finding is consistent with the study by Auta et al. (2023), who reported that age significantly influences farmers' participation and disposition toward agricultural extension programmes in Northwestern Nigeria.

Educational level also had a positive and significant effect on farmers' attitude. This indicates that educated farmers were more likely to understand the objectives, procedures, and benefits of NADF intervention programmes, thereby developing more favourable attitudes toward participation. Education improves farmers' access to information, analytical ability, and openness to innovation. This finding agrees with Abdulkarim et al. (2023), who found that farmers with higher educational attainment exhibited more positive attitudes toward agricultural innovation practices in Northwestern Nigeria.

Farming experience positively and significantly influenced farmers' attitude toward the programme. This suggests that experienced farmers are more capable of appreciating the relevance of intervention programmes due to their exposure to production challenges and institutional support mechanisms over time. Experienced farmers are often more confident in evaluating programme benefits and risks, which enhances favourable perception toward intervention initiatives. This finding aligns with Onyemekihiya, Onyemekonwu, and Ehiwario (2024), who reported that farming experience positively influenced farmers' attitude toward agricultural extension systems in Delta State, Nigeria.

The level of awareness of the programme had a positive and highly significant influence on farmers' attitude. This implies that farmers who possessed adequate knowledge and information about NADF programmes were more likely to exhibit favourable attitudes toward participation. Awareness increases farmers' understanding of programme objectives, opportunities, and expected benefits, thereby improving acceptance and confidence in the intervention. This finding corroborates Adetola, Akintayo, and Olomjobi (2024), who reported that effective communication strategies significantly improved farmers' awareness and perception of agricultural technologies in Southwestern Nigeria. Furthermore, Adeyeye, Salawu, and Adesina (2024) observed that agricultural information dissemination through local communication channels positively influenced farmers' behavioural change toward agricultural practices in Nigeria.

Trust in government programmes was also found to positively and significantly influence farmers' attitude toward NADF intervention programmes. This suggests that farmers who perceived government agricultural initiatives as transparent, reliable, and beneficial were more likely to develop positive attitudes toward participation. Institutional trust reduces uncertainty and enhances farmers' confidence in programme implementation. This finding is supported by studies on agricultural innovation adoption which emphasized that trust and confidence in institutions significantly shape farmers' behavioural responses toward agricultural interventions.

Perceived benefits of the programme emerged as one of the strongest determinants of farmers' attitude toward NADF programmes. Farmers who believed that the programme could improve productivity, income, and livelihood conditions were more likely to develop favourable attitudes toward participation. Perceived usefulness and expected gains often motivate farmers to support and engage in agricultural interventions. This finding agrees with

Efobi (2024), who found that exposure to information on agricultural benefits positively changed farmers' attitudes and behavioural intentions toward improved agricultural practices in rural Nigeria.

The findings indicate that farmers' attitude toward NADF intervention programmes is largely shaped by socio-economic characteristics, programme awareness, institutional trust, and perceived programme benefits. The result implies that improving awareness creation, strengthening institutional credibility, and ensuring that farmers derive tangible benefits from intervention programmes would significantly enhance positive attitudes toward agricultural development initiatives in the study area.

Table 4: Multiple regression results on factors influencing farmers' participation in intervention programme

Variables	Coefficient (β)	Std. Error	t-value
Constant	1.0634	0.4385	2.43**
Farm Size	0.1216	0.0398	3.05***
Annual Farm Income	0.0007	0.0003	2.58**
Cooperative Membership	0.1843	0.0589	3.13***
Access to Extension Services	0.0798	0.0304	2.63***
Frequency of Extension Contact	0.0712	0.0276	2.58**
Access to Agricultural Credit	0.2947	0.0576	5.12***
R ²	0.57		
Adjusted R ²	0.55		
F-value	28.11***		

*** = Significant at 1% level, ** = Significant at 5% level, NS = Not significant

The regression analysis presented in Table 4 examined the socio-economic and institutional factors influencing farmers' participation in NADF intervention programmes in the study area. The model produced a coefficient of determination (R^2) of 0.57 and an adjusted R^2 of 0.55, indicating that approximately 57% of the variation in farmers' participation in NADF programmes was explained by the explanatory variables included in the model. The F-statistic was significant at the 1% probability level, implying that the model was statistically significant and suitable for explaining farmers' participation behaviour in the intervention programmes.

Farm size had a positive and statistically significant influence on farmers' participation in NADF programmes. This implies that farmers with larger farm holdings were more likely to participate actively in the intervention programmes than those with smaller farm sizes. Farmers operating larger farms often possess greater production capacity, resource endowment, and stronger incentives to access agricultural support services. This finding agrees with Eze, Nwachukwu, and Ezech (2023), who reported that farm size significantly influences farmers' access to agricultural financing and participation in agricultural support programmes in Nigeria.

Annual farm income also exerted a positive and significant effect on farmers' participation in NADF programmes. This suggests that farmers with higher income levels were more capable of meeting programme requirements and financing complementary production activities associated with participation. Higher income enhances farmers' financial stability and ability to bear transaction costs involved in programme participation. This finding corroborates Asogwa, Umeh, and Nwibo (2024), who found that farm income

significantly influences farmers' participation in agricultural intervention and support programmes in Nigeria.

Cooperative membership positively and significantly influenced participation in NADF programmes. This implies that farmers who belonged to cooperative societies were more likely to participate in intervention programmes than non-members. Cooperative societies facilitate access to information, credit, farm inputs, training opportunities, and institutional support, thereby improving farmers' linkage to government programmes. The finding is consistent with Udegbe and Falola (2024), who reported that cooperative membership significantly enhances farmers' participation in agricultural development programmes in Northern Nigeria.

Access to extension services had a positive and significant influence on farmers' participation in the NADF programmes. This indicates that farmers who had contact with extension agents were more likely to participate actively in intervention activities due to improved awareness, technical guidance, and information dissemination. Extension agents serve as important channels through which farmers receive information regarding programme opportunities and implementation procedures. This finding agrees with Mohammed and Abdullahi (2023), who emphasized that access to extension services significantly promotes farmers' participation in rural agricultural development programmes in Nigeria.

Similarly, frequency of extension contact positively and significantly influenced participation. Farmers who had more frequent interactions with extension personnel were more likely to participate in NADF intervention programmes. Regular extension contact improves farmers' confidence in agricultural innovations, strengthens information flow, and increases awareness of programme benefits. This finding supports Usman, Salisu, and Garba (2024), who observed that frequent extension contact significantly enhances farmers' involvement in agricultural transformation programmes in Nigeria.

Access to agricultural credit emerged as the strongest determinant of farmers' participation in NADF programmes. The positive and highly significant coefficient implies that farmers with access to credit facilities were more likely to participate actively in intervention programmes than those without access to financial support. Agricultural credit enables farmers to purchase farm inputs, expand production activities, adopt improved technologies, and meet programme participation requirements. This finding is in agreement with Okoro and Chinedu (2025), who found that access to agricultural credit significantly increases smallholder farmers' participation in agricultural financing schemes in Nigeria. Similarly, Balana and Oyeyemi (2020) reported that access to credit plays a critical role in improving farmers' adoption of agricultural innovations and participation in intervention programmes.

Finally, the findings indicate that farmers' participation in NADF intervention programmes is largely influenced by economic capacity, institutional support systems, and access to productive resources. The results suggest that improving farmers' access to credit facilities, strengthening extension service delivery, encouraging cooperative membership, and enhancing farmers' income-generating opportunities would significantly increase participation in agricultural intervention programmes within the study area.

The findings presented in Table 5 revealed that farmers encountered several serious constraints limiting their effective participation in the National Agricultural Development Fund (NADF) intervention programmes, as reflected by the grand mean score of 3.83. The

result indicates that economic, institutional, and administrative challenges continue to hinder farmers' involvement in agricultural intervention programmes in the study area.

Table 5: Constraints to Farmers' Participation in NADF Intervention Programmes

Constraints	Mean Score	Std. Dev.	Rank
Inadequate access to agricultural credit	4.41	0.72	1
Delay in loan disbursement	4.28	0.81	2
Inadequate extension contact	4.16	0.76	3
Lack of awareness of programme opportunities	4.02	0.88	4
High cost of farm inputs	3.94	0.83	5
Bureaucratic procedures in programme registration	3.87	0.91	6
Poor access to market information	3.76	0.95	7
Inadequate trust in government programmes	3.69	1.02	8
Poor transportation infrastructure	3.61	0.97	9
Low educational level of farmers	3.48	1.04	10
Political interference in beneficiary selection	3.44	1.08	11
Distance to programme service centres	3.31	0.93	12
Grand Mean	3.83	0.91	

Decision Rule: Mean score ≥ 3.00 = Serious Constraint; Mean score < 3.00 = Not a Serious Constraint

Inadequate access to agricultural credit emerged as the most severe constraint with a mean score of 4.41. This implies that many farmers lacked sufficient financial resources required to participate fully in programme activities and invest in productive agricultural operations. Limited access to credit reduces farmers' ability to purchase farm inputs, adopt improved technologies, and comply with programme requirements. This finding agrees with Balana and Oyeyemi (2020), who reported that credit constraints constitute one of the major barriers to agricultural technology adoption among smallholder farmers in Nigeria. Similarly, recent evidence showed that both supply-side and demand-side credit limitations significantly constrain smallholder agricultural participation and productivity in Nigeria (World Development Sustainability, 2022).

Delay in loan disbursement ranked second with a mean score of 4.28, indicating that untimely release of funds negatively affects farming activities and discourages participation in intervention programmes. Delays in accessing financial support often disrupt planting schedules and reduce farmers' confidence in government programmes. This finding supports Olaolu and Akinagbe (2014), who identified institutional and financial delays as major factors constraining the effectiveness of agricultural intervention programmes in Nigeria.

Inadequate extension contact was identified as another serious constraint with a mean score of 4.16. This suggests that many farmers had limited interaction with extension personnel, thereby restricting their access to information, technical guidance, and programme awareness. Extension agents play an important role in sensitizing farmers, disseminating innovations, and facilitating participation in intervention programmes. The finding corroborates Auta et al. (2023), who reported that inadequate extension agents and weak farmer-extension contact significantly reduce farmers' participation in agricultural programmes in Northwestern Nigeria.

Lack of awareness of programme opportunities also constituted a major challenge, with a mean score of 4.02. This indicates that inadequate sensitization and information

dissemination limited farmers' understanding of programme objectives, benefits, and participation procedures. Farmers who are poorly informed about intervention programmes are less likely to participate actively. This finding aligns with earlier studies which emphasized that awareness creation significantly influences farmers' participation in agricultural interventions (Auta et al., 2023).

High cost of farm inputs, with a mean score of 3.94, was another important constraint affecting participation. Rising prices of fertilizer, seeds, agrochemicals, and other production inputs increase the financial burden on smallholder farmers and reduce their ability to benefit from intervention programmes. This finding is consistent with Olaolu and Akinngbe (2014), who found that high cost of farm inputs remains a critical challenge affecting the implementation of agricultural intervention programmes in Nigeria.

Bureaucratic procedures in programme registration, poor access to market information, and inadequate trust in government programmes were also perceived as serious constraints. Excessive administrative requirements discourage farmers from enrolling in intervention programmes, while poor market information limits their ability to make informed production and marketing decisions. Inadequate trust in government programmes may result from previous experiences of poor implementation, political interference, or unequal distribution of programme benefits. Similar observations were reported by Abdulmumini, Yusuf, and Ibrahim (2023), who noted that weak institutional credibility and administrative bottlenecks negatively affect farmers' participation in agricultural programmes.

Poor transportation infrastructure and long distances to programme service centres also constrained participation. Poor rural roads increase transportation costs and limit farmers' access to extension services, farm inputs, and programme offices. This finding supports studies on agricultural participation in Nigeria which identified poor rural infrastructure as a major impediment to effective programme implementation (Olaolu & Akinngbe, 2014).

Political interference in beneficiary selection was another challenge reported by farmers. This suggests that some farmers perceived bias and lack of transparency in the allocation of programme benefits. Such practices can reduce confidence in intervention programmes and discourage participation among genuine beneficiaries. Previous studies on agricultural interventions in Nigeria similarly identified favoritism and weak institutional transparency as constraints to programme effectiveness.

Finally, the findings imply that farmers' participation in NADF intervention programmes is constrained by inadequate financial support, weak extension delivery systems, poor awareness, institutional inefficiencies, and infrastructural deficiencies. Addressing these constraints through improved credit access, timely loan disbursement, strengthened extension services, effective awareness campaigns, and transparent programme administration would significantly enhance farmers' participation and improve the effectiveness of agricultural intervention programmes in the study area.

CONCLUSION

This study examined the factors influencing farmers' attitude and participation in the National Agricultural Development Fund (NADF) intervention programmes in Zaria, Sabon Gari, and Makarfi Local Government Areas of Kaduna State, Nigeria. The findings revealed that farmers' attitude toward NADF programmes is significantly influenced by socio-

economic and programme-related factors such as age, educational level, farming experience, awareness of the programme, trust in government programmes, and perceived benefits of the intervention. These variables positively shaped farmers' perception and acceptance of the programme, indicating that knowledge, institutional credibility, and expected benefits are critical in determining favourable attitudes toward agricultural intervention initiatives.

The study further established that farmers' participation in NADF intervention programmes is largely influenced by economic and institutional factors. Farm size, annual farm income, cooperative membership, access to extension services, frequency of extension contact, and access to agricultural credit significantly enhanced participation among farmers in the study area. Among these variables, access to agricultural credit emerged as the strongest determinant of participation, underscoring the importance of financial inclusion in agricultural development programmes.

Despite the positive influence of these factors, the study also identified several serious constraints limiting effective participation in NADF programmes. Major challenges included inadequate access to agricultural credit, delay in loan disbursement, inadequate extension contact, poor awareness of programme opportunities, high cost of farm inputs, and bureaucratic procedures in programme registration. Other constraints such as poor market information, weak trust in government programmes, poor transportation infrastructure, and political interference in beneficiary selection also hindered farmers' active involvement in the programmes.

Finally, the study concludes that farmers' attitude and participation in NADF intervention programmes are determined by a combination of socio-economic capacity, institutional support, programme awareness, and perceived programme benefits. Therefore, improving access to financial resources, strengthening extension delivery systems, ensuring transparency in programme implementation, and enhancing farmers' awareness are essential for increasing participation and improving the effectiveness of NADF intervention programmes in the study area.

The findings of this study highlight the following recommendations proposed to improve farmers' attitude and participation in NADF intervention programmes in the study area:

Access to agricultural credit should be improved through simplified loan application procedures, reduced collateral requirements, and timely disbursement of funds. This will enable farmers to obtain the financial resources needed to participate effectively in agricultural intervention programmes and expand their farming activities.

Agricultural extension services should be strengthened by increasing the number of extension personnel and improving the frequency of extension contact with farmers. Regular extension visits will enhance awareness creation, technical support, and dissemination of information relating to NADF programmes.

Government and programme implementing agencies should intensify awareness campaigns on NADF intervention programmes using radio programmes, community meetings, farmer associations, and local extension networks. Improved awareness will increase farmers' understanding of programme objectives, benefits, and participation procedures.

Cooperative societies should be promoted and supported among rural farmers since cooperative membership was found to significantly enhance participation. Strengthening farmer cooperatives will improve farmers' access to information, credit facilities, farm inputs, and institutional support services.

Programme implementation procedures should be made more transparent and less bureaucratic to reduce delays and build farmers' trust in government intervention programmes. Fair and transparent beneficiary selection processes should also be ensured to minimize political interference and encourage wider participation.

Government should subsidize critical farm inputs such as fertilizer, improved seeds, and agrochemicals to reduce production costs and encourage greater farmer participation in agricultural development programmes.

Rural infrastructure, particularly road networks and market information systems, should be improved to facilitate farmers' access to programme service centres, markets, and extension services.

Further studies should be conducted in other agricultural zones of Nigeria to compare determinants of farmers' participation in intervention programmes and provide broader policy recommendations for agricultural development planning.

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