



FACTORS INFLUENCING MAIZE FARMERS PARTICIPATION UNDER CLIMATE CHANGE ADAPTATION AND AGRIBUSINESS SUPPORT PROGRAMME IN JIGAWA AND KATSINA STATES, NIGERIA

¹*Abdulumuni, L., ²Yusuf, O. and ²Damisa, M. A.

¹Department of Agricultural Extension and Rural Development,
Federal University Dutsin-Ma, Katsina State.

²Department of Agricultural Economic,
Ahmadu Bello University Zaria, Kaduna State Nigeria.

*Corresponding Author's Email: lawalkkn@gmail.com, GSM: +234-803-795-1426

ABSTRACT

The study assessed the factors influencing maize farmers' participation under Climate Change Adaptation and Agribusiness Support Programme (CASP) in Jigawa and Katsina States, Nigeria. A multistage sampling procedure was used to select 254 participating maize farmers. Descriptive statistics and Tobit regression were used to analyze the data. The results showed that the mean age of household heads was 42 years, average household size of 7 persons, and mean amount of credit received was ₦237118. The analysis of the revealed that over 90% were male and over 80% of the participating maize farmers were married. The results revealed that the factors that significantly influenced the maize farmers' participation in CASP programme were farm size, amount of credit and extension visit. The study concluded that farm size, access to credit and extension visit were the factors influencing maize farmers participation in CASP in the study area. Based on this, it is recommended that the community through Development Associations should pull their resources together to have private extension services delivery and the government should strengthened extension services delivery to the farmers by increased funding of extension agencies. Regular visits/contact of farmers by extension agents affords them the better chances of getting better information on the issues about maize production.

Keywords: Participation, Maize farmers, Climate change, Agribusiness support

INTRODUCTION

Environmental and Energy Studies Institute (2019) describe climate change as an increase in the concentration of atmospheric greenhouse gases, resultant in ample climatic disparity across the world. There has been an increasing interest in the impact of climate change on agricultural productivity and different ways of fighting the menace of climate modification on agricultural production, food security and poverty (Ogunleye *et al.*, 2021). The United Nations food, agriculture, and health agencies project that the statistic of hungry people in the world increased by 10 million in 2019 and enlarged by 60 million over the preceding 5 years (Food and Agriculture Organization (FAO) 2020; International Fund for Agricultural Development (IFAD) 2020. Developing economies like Nigeria, whose populace depends on agriculture, would have their agricultural production greatly impacted by climate change (Adeosun *et al.*, 2021; Woetzel *et al.*, 2020). These challenges highlight the urgent need for sustainable farming practices and adaptation strategies to mitigate the detrimental effects of climate change on agriculture especially in maize production. Maize is the largest cereal crop in terms of area and production volume and is the most consumed staple food in Nigeria (Onumah *et al.*, 2021). In Nigeria, maize is extensively utilized for human consumption, in animal feed, pharmaceutical industries, food manufacturers, breweries, flour mills and added



industries. Nearly 80% of the maize grain is used for human consumption and animal feed with the remaining 20% utilized for industrial processing of diverse products (Onumah *et al.*, 2021). Alene *et al.* (2009) and Wossen *et al.* (2017) explained that the maize crop is a source of cash income for farmers and contributes significantly to agro-industrial development particularly in the livestock feed industry. Maize accounts for 30 – 50% of low household expenditures in Africa. The maize provided over 30% of the caloric intake of people in Sub-Sahara Africa. On account of that, many African countries depend on maize as a staple food crop.

According to (IFAD, 2020) the CASP priority target group would be moderately poor and the productive core poor households, who represent over 90% of the population in the participating states. As most rural households that fall into these categories require support, geographical targeting of the North coupled with community participation and a strong emphasis on women and youth would ensure that targeting is enforced. Women and youth would be reflected in all programme activities; including in the management structure of the programme. The IFAD – funded CASP was designed, reliable with IFAD’s strategic goal (2016 – 2025) of put in rural people to enable them to overcome poverty and realize food security through remunerative, sustainable and resilient livelihoods. The initiative is in alignment with the National Agricultural Transformation Agenda (ATA) of the Federal Government of Nigeria, intended at increasing, on a sustainable basis, the income of smallholder farmers and rural entrepreneurs that are engaged in the production, processing, storage and marketing of the priority commodity value chains. In addition, the CASP was designed to significantly contribute to Agenda 2030 of the Sustainable Development Goals, the duration of the project is 6 years, extending from March, 2015 till September, 2021 (Zebra, 2021). The goal of CASP was to reduced poverty, increased food security and accelerated economic growth on a sustainable basis. The Programme Development Objective were increased incomes, enhanced food security and reduced vulnerability for smallholder farmers, particularly women and youth in the participating States. The Nigerian Government and NGO’s (local and international) have spent huge amount of money over the years in these programmes. However, food insecurity, poverty and low income persists among beneficiaries with clear evidence of marginalization of vulnerable groups who were the targeted beneficiaries. The World Bank Group (2019), reported that the large pockets of Nigeria’s population still live in poverty, without adequate access to basic services and benefit from inclusive development policies. It is stated that lack of job opportunities was at core of the high poverty levels of regional inequality, social and political unrest in the country. The study was carried out to assess the determinants of maize farmers’ participation under CASP in Jigawa and Katsina States and specifically to: describe the socio-economic characteristics of maize farmers of CASP programme and determine the factors influencing maize farmers’ level of participation in CASP programme.

METHODOLOGY

Study Area

The study was conducted in Katsina and Jigawa State, Nigeria. The Jigawa State has a latitude of 11.00 ° N to 13.00 ° N and longitudes 8.00 ° E to 10.15 ° E. The State has a total land area of approximately 22,410 square kilometers with a projected population of 7,218,741 people in 2022 and the population growth of the state is expected at 3.2 % (NPC, 2006). Out of the estimation about 2.9 million was measured to be productive adults and the majority (80%) of the population was found in the rural areas and is made up of typically Hausa, Fulani and Manga. According to Jigawa State Diary (2015), the topography has a high land area which is almost 750 meters above the sea level. Soil tends to be fertile ranging from sandy-loamy with many compartments of fadama and alluvial plains suitable for the cultivation of rice,



sugar-cane, millet, vegetables and sorghum etc. There are two seasons in the State namely; the rainy season starts from June through October and dry season begins from November and ends in May. The mean temperature ranges from 35 °C in October to about 50 °C in May, while mean annual rainfall varies from 700 mm to over 1000 mm and can reach up to 200 days in some lowland portions of the State (Jigawa State Diary, 2015). The months of November to March are mostly cold as a result of dry hamattan wind. The State is currently made up of twenty-seven Local Government areas out of which fourteen (14) Local Government Areas participated in the CASP programme. The participated LGAs include Auyo, Buji, Birniwa, Birnin Kudu, Dutse, Garki, Gwiwa, Kafin Hausa, Kiyawa, Miga, Ringim, Sule-Tankarkar and Taura.

Katsina State is located between longitude 6°52', 9°20' E and latitudes 11°8', 13°22' N, cover a land area of about twenty-four thousand, one hundred and ninety-four square kilometers (24,194 km²), with a population of five million, eight hundred thousand, six hundred and seventy-two (5,800,672) people consisting of 2,947,639 males and 2,853,033 females (NPC, 2006). The State has a projected population of 9,603,268 people in 2022 and the population growth of the state is expected at 3.2 %.

The two seasons in the State includes wet and dry seasons. The wet season starts from the months of June to September and the dry season from October to May. The dry season is generally led by the north-east trade winds which are dry and dusty, commonly called the "harmattan". The mean daily temperature ranges between 16 and 40°C while the annual rainfall ranges between 300 and 400 mm in the Sahel, 600 to 800 mm in the Sudan savannah and 900 to 1100 mm in the northern guinea savannah (Katsina State Agricultural and Rural Development Authority, KTARDA, 2014). There is an obtainable farmland area of about one million, six hundred and forty thousand hectares (1,640,000 ha) with an identified "Fadama" land area of thirty-six thousand, one hundred and thirty-nine thousand hectares (36,139 ha) out of which twenty-five thousand hectares (25,000 ha) are irrigatable "Fadama" areas. "Fadama" is the Hausa name for describing irrigatable lands that are underlined by shallow aquifer (Bello, 2006). The State is currently made up of thirty-four Local Government areas out of which seventeen (17) Local Government Areas participated in the CASP. The participated LGAs include Bakori, Batsari, Baure, Bindawa, Danja, Daura, Dutsi, Dutsin-Ma, Faskari, Jibia, Kafur, Kaita, Kurfi, Kusada, Mani, Musawa and Zango.

Sampling Technique

Multi-stage sampling procedure was used in selecting respondents for the study. The first stage involved purposive selection of three LGAs that participated in maize production from Jigawa and Katsina States respectively. The LGAs selected include Auyo, Miga, and Taura LGAs in Jigawa State while Bakori, Danja, and Musawa LGAs in Katsina State. However, the list of CASP benefitted communities and maize farmers were obtained from CASP Local Government Support Officer (LGSO). The second stage involved purposive selection of three (3) communities from the selected LGAs where the programme was implemented to give a total of eighteen (18) communities. The last stage involved the use of systematic random sampling technique to select 25% of the sampling frame, one thousand and twenty participants (1020). This gives a total of two hundred and fifty-four (254) participants to serve as a sample size of the study.

Data Collection

Primary data were collected through the use of structured questionnaire installed in Kobo-Toolbox collect with the help of competent enumerators under the supervision of the researcher. Information collected include socio-economic characteristics of participating maize farmers.



Data Analysis

Data for the study were analyzed using both descriptive and inferential statistics. Descriptive Statistics such as mean, frequency distribution, Coefficient of Variation (CV) and percentages were used to describe the socio-economic characteristics of maize farmers of CASP programme while Tobit regression model was used to determine factors influencing maize farmers level of participation in CASP.

The dependent variable (level of participation).

$$Y_i = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 \dots \dots \dots B_7X_7 + e \dots \dots \dots (1)$$

Where:

Y_i = level of Participation (participated in 1 – 3 CASP activities = Low, 1 – 6 CASP activities = Medium and 1 – 8 = High);

X_1 = Sex of respondent (1=male, 0=Female);

X_2 = Age of respondent (years);

X_3 = Marital status (1=single, 2= married, 3= divorced and 4= widow/widower);

X_4 = Household size (number of persons);

X_5 = level of education (years);

X_6 = Farm size (ha);

X_7 = Amount of credit (Naira);

B_0 = is the intercept; and e = is the exponential constant.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Participating Maize Farmers under CASP Programme

The results presented in Table 1 describes the socio-economic characteristics of participating maize farmers under CASP programme in the study area. The mean age of household head was 42 years and this implies that farmers are in their active age. The Coefficient of Variation (CV) was 24% which low level of difference in age among participating maize farmers. The finding is in line with finding of Abdulazeez *et al.*, (2018) which found the mean age of rice farmers under KARPP programme in Kogi State was 42 years and believed that age of farmers influenced level of participation in the programme.

Table 1: Socio-economic characteristics of participating maize farmers

Variables	Mean	Maximum	Minimum	SD	CV
Age (Years)	42	60	18	10	24
Household size (Number)	7	10	1	2.2	31
Level of education (Years)	6	15	1	2	33
Farm size (Hectare)	1.95	3	0.25	2	
Credit access (Naira)	237118	500000	100000	321985	
Extension visit (Frequency)	3	12	1	2	

Source: Field survey, 2024

The result also showed that majority 57% of participating maize farmers under CASP had an average household size of 5 persons with maximum and minimum of 10 persons and 1 person respectively. The calculated CV was 32% which indicates low level of variation in the household size among participating maize farmers. This result implies that more hand was available to carry out farm activities for the new technologies among participating maize farmers in the study.



The level of education of participating maize farmers presented in Table 1 had a mean of 6 years with maximum of 15 years and minimum of 1 years. The CV of level of education was 33% which revealed that there is low level of variation in the level of education among participating maize farmers have the capability of adopting modern farming technologies.

The farm size of the participating maize farmers in the study area had a mean of 1.95 with maximum and minimum of 7 and 0.25 hectares respectively. This implies that the farm size help in the participation of maize farmers in agricultural programme by given the land for trial and demonstration of new technologies. This is similar to the finding of Salau *et al.* (2013) which revealed that majority of participants in Fadama III had an average farm size of 1.70 ha.

Sex and Marital Status of Participating Maize Farmers

The result presented in Table 2 showed that majority of the participating maize farmers in CASP programme (92%) were male while 8% were female. This indicates that male maize farmers participated in the CASP programme than female maize farmers in the study area due to the cultural belief which restricted them from actively involved in farm activities. This finding collaborates with the results of Gambo *et al.* (2016) who revealed that the sex of participants and non-participants in the study area were 69% and 64% of male and 31% and 36% for female respectively. This means that majority of the farmers were male on account of cultural belief in the study area. Table 2 revealed that over 80% of the participating maize farmers were married. This implies that most of participating maize farmers were married and involved in maize production in the study area. The major importance of marital status on crop production is linked with the supply of agricultural family labour. This finding is similar to the finding of Adetomiwa *et al.* (2020) which revealed that majority over 80% of the participants and non-participants were married on account of the fact that marriage is cherish institution in the study area and this help in family labour for farming activities.

Table 2: Distribution of maize farmers based on sex, and marital status

Variable	Frequency	Percentage
Sex		
Male	233	92
Female	21	8
Marital status		
Single	23	9
Married	222	87
Divorced	3	1
Widow	1	0
Widower	5	2
Total	254	100

Source: Field survey, 2024

Factors Influencing Maize Farmers Level of Participation

The Tobit regression model was used to determine the factors influencing maize farmers level of participation in CASP programme in the study area. The estimated coefficient, standard error and z-value were presented in Table 4. The log likelihood ratio statistics was – 67.839109. This log likelihood value represents the value that maximize the joint densities in the estimated model. The Prob>Chi² was 0.0000 and statistically significant at 1% level of significance. The probability of obtaining Ch² statistic showed that the regressor variables on specific alpha level and this signifies that at least one of the regression coefficients in the model



is not equal to zero. However, the level of participation in CASP programme among maize farmers was significantly influenced by farm size, credit access and extension visits.

The coefficient of farm size was negative and statistically significant ($P < 0.05$) level of probability. This inverse relationship between farm size and level of participation in CASP programme among maize farmers signifies that a unit increase in the farm size of maize farmers leads to a decrease in the level of participation in CASP programme in the study area and vice-versa. This occur on account of CASP programme was targeted towards poor people. The estimated coefficient of credit access was negative and significant in influencing maize farmers level of participation in CASP programme ($P < 0.01$). The coefficient confirmed the inverse relationship between credit access and level of participation in CASP programme. However, the objectives of CASP is to enhance food security, increase income and reduce poverty.

The estimated coefficient of extension visits was positive and significant in influencing maize farmers level of participation in CASP programme ($P < 0.01$). This implies that extension visits are a very important factor that influence maize farmers' participation in the CASP programme. The result implies that the maize farmers with higher extension visits by extension agent and has first-hand information about agricultural programme will increase their level of participation in CASP programme by 0.167 units. In agreement with this result, Adetomiwa *et al.* (2020) found extension contacts was positive and significant at 1% level of probability which shows that farmers has the likelihood to participating in Fadama III programme on account of contacts with extension agents in the past time and this help them to have first-hand information before the programme starts.

Table 4: Factors influencing maize farmers' level of participation in CASP programme

Participation	Coefficient	Standard Error	Z
Age	0.031	0.019	1.63
Sex	0.097	0.692	0.14
Marital status	0.744	0.666	1.12
Household size	- 0.06	0.023	- 0.24
Educational level	0.081	0.089	0.92
Farm size	- 0.311**	0.125	- 2.50**
Amount of credits	- 2560000***	85800000	- 2.99***
Extension visit	0.167***	0.062	2.71***
Constant	- 2.916	1.79	- 1.63
Diagnostic variables			
Number of observations	254		
LR χ^2	34.18		
Prob > χ^2	0.0000		
Log likelihood	-67.839109		
Pseudo R^2	0.2012		

at 5% and *** at 1%

Source: Field survey, 2024

CONCLUSION AND RECOMMENDATIONS

It can be concluded that most of the participating maize farmers under CASP were male and married in the study area. The factors that influenced maize farmers level of participation in CASP programme include farm size, access to credit and extension visit. Therefore, it is recommended that the community through Development Associations should pull their



resources together to have private extension services delivery and the government should strengthened extension services delivery to the farmers by increased funding of extension agencies. Regular visits/contact of farmers by extension agents affords them the better chances of getting better information on the issues about maize production

REFERENCES

- Abdulazeez, R. O., Musa, M. W., Saddiq, N. M., Abdulrahman, S. & Oladimeji, Y. U. (2018). Food Security Situations among Smallholder Farmers under Kogi Accelerated Rice Production Programme: A USDA Approach. *Journal of Agricultural Economics, Extension & Social Sciences*, **1**(1): 125 – 132.
- Adeosun, O. T. Asare-Nuamah, P., & Mabe, F. N. (2021). Vulnerability analysis of Nigeria's agricultural output growth and climate change. *Management of Environmental Quality*, **32**(6): 1352 – 1356.
- Adetomiwa, K., Mayowa, O. O., Adebayo, A. I., & Victor, O. O. (2020). Impact Assessment of Fadama III group participation on food security status of rural households in Southwest, Nigeria. *Journal of Agriculture and Sustainable*, **13**(21): 1 – 29.
- Alene, A.D., Menkir, A., Ajala, S.O., Badu-Apraku, B., Olanrewaju, A.S., Manyong, V.M., & Ndiaye, A. (2009). The economic and poverty impacts of maize research in West and Central Africa. *Agricultural Economics*, **40**: 535 – 550.
- Awotodunbo, A. A. (2019). *Impact of Agricultural Transformation Agenda on productivity and livelihood of cocoa farmers in Ondo and Ekiti States, Nigeria*. Ph.D. Thesis submitted to the Department of Agricultural Extension and Rural Development, Ahmadu Bello University, Zaria pp199.
- Environmental & Energy Studies Institute (EESI) (2019). How Climate Change Affects the United State. Retrieved July 18, 2019 from www.player.fm.
- FAO, IFAD, UNICEF, WFP and WHO (2020). Transforming Food Systems for Affordable Healthy Diets. FAO, Rome. <https://doi.org/10.4060/ca9692en> Retrieved on 10th December, 2022.
- Gambo, D., Muhammad, S. N., Abel, G. & Muhammad, L. (2017). Impact of IFAD-Community Based Agriculture and Rural Development Programme on participants and non-participants farm production efficiency in Katsina State, Nigeria. *Net Journal Agricultural Science*, **5**(1): 1-7.
- International Fund for Agricultural Development (IFAD) (2020). IFAD at Glance available at <https://www.ifad.org/en/web/knowledge/-/publication/ifad-at-a-glance>. Retrieved on 06 January, 2022.
- International Institute of Tropical Agriculture (2023). Maize (*Zea mays*). Available at www.iita.org/cropsnew/maize/#1620923190212-7c9ed661-81d8 retrieved on 15 July, 2023.
- Jigawa Diary (2015): Jigawa State Comprehensive Development Framework. http://www.google.com/search?q=1.%09JIGAWA+DIARY+2015&ie=utf8&oe=utf8&rfs=org.mozilla:US:official&client=firefox-a&gfe_rd=cr&ei=RjSeVuLWAcOVLGbi_AK
- Katsina State Agricultural and Rural Development Authority (KTARDA) (2014). Katsina State Agricultural and Rural Development Project. Manual.
- National Population Commission (2006). Population figure of the Federal Republic of Nigeria, Abuja. Retrieved from <http://www.npc.gov.ng>



- Nonvide, G. M. A. (2020). Impact of Irrigation on Food Security and Nutrition Outcomes Among Rice Farmers in Benin. The African Economic Research Consortium (AERC) Working Paper BMGF-003, Nairobi, Kenya.
- Ogunleye, A. Kehinde, A., Mishra, A., & Ogundeji, A. (2021). Impacts of farmers' participation in social capital networks on climate change adaptation strategies adoption in Nigeria. *Heliyon* 7 (2021) e08624. <https://doi.org/10.1016/j.heliyon.2021.e08624> Accessed on 17 November, 2022.
- Oluwadare, A. J. (2019). *Impact of National Programme for Food Security on farmers' income in South West, Nigeria*. Unpublished Ph. D. Thesis in the Department of Agricultural Extension and Communication Technology, Federal University of Technology, Akure, Ondo State, Nigeria.
- Onumah, G., Dhamankar, M., Ponsioen, T., & Bello, M. (2021). Maize value chain analysis in Nigeria. **In:** Report for the European Union, INTPA/F3. Value Chain Analysis for Development Project. VCA4D CTR 2016/375-804), 155p+ annexes.
- Woetzel, J. Pinner, D. Samandari, H., Engel, H., Krishnan, M., Mccullough, R., Melzer, T. & Boettiger, S. (2020). How will African farmers adjust to changing patterns of precipitation? Climate risk and response case study. *Agriculture in Africa*.
- World Bank Group (2019). <https://www.worldbank.org/en/country/nigeria/overview>
- Wossen, T., Abdoulaye, T., Alene, A., Feleke, S., Menkir, A., & Manyong, V. (2017). Measuring the impacts of adaptation strategies to drought stress: the case of drought tolerant maize varieties. *Journal of Environmental Management*, **203**:106 – 113.
- Zebra Company Limited (2021). IFAD-CASP Impact Study Uncompleted Draft Report.