

Evaluation of Women's Contribution to Agricultural Development in Yobe State, Nigeria

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ABSTRACTS

The study evaluated women's contribution to agricultural development and the impact of Boko haram conflicts in Yobe State, Nigeria. Primary data collected with the aid of a well-structured questionnaire was used to elucidate responses from women farmers. About 351 women farmers were interviewed for the study. This comprised of one-hundred and sixty-two (160) non-beneficiaries and one hundred and ninety-one (191) programme beneficiaries respectively. Descriptive Statistics and Propensity Scoring Matching were utilized for data analysis. From the results, the average age for non-beneficiaries, beneficiaries, and pooled data was 49.50, 47.60, and 48.55, respectively. The average household size was 6 individuals per household. Also, Non-beneficiaries, beneficiaries, and pooled data had total yearly incomes of ₦261,716.00 (\$629.34), ₦285,595.90 (\$686.76), and ₦273,655.95 (\$658.05) respectively. FADAMA program was the major program women farmers benefited from in the study area. The result of Propensity score matching revealed that the value of average treatment effects for nearest neighbour, radius, kernel, and stratification were 0.273, 0.145, 0.163, and 0.183 respectively and were statistically significant at a 1% probability level. This suggests that the Boko haram conflict had a significant impact on the participation of women in agriculture. Based on the findings of the research, the study concluded that women contribute immensely to agricultural development and nutrition in the area. However, Boko haram crisis had an impact on women's involvement in agriculture. The study recommended more measures be put in place by the state government to encourage women's participation in agriculture as efforts are in course to curb the activities of Boko haram in the region.

Keywords: Women, agriculture, development, propensity Score Matching, Nigeria

INTRODUCTION

Agriculture development is vital and required for human nutrition development. Good nutrition is not only a determinant of an individual's physical and mental development, but it also has a significant impact on the country's health and Human Capital productivity. Malnutrition had a harmful influence at all stages of human development, therefore good

nutrition starts in the home and spreads across society. Malnutrition during pregnancy and the first two years of life can cause irreversible changes in a child's physical structure, cognitive ability, immune system, and mental capability [1]. As a result, the role of women nutritional development before, during, and after pregnancy, as well as throughout pregnancy and parenting, cannot be overstated. Because it is a critical component of their children's and the country's human capital development.

Women all over the globe have identified the benefits of an integrated agriculture system in terms of improving human nutrition and health over development. Thus, African women, who were historically considered as homemakers who oversaw and coordinated household activities, have expanded their activities to include manual agriculture to increase their children's nutritional output. In Nigeria, women have an important role in agriculture production, including food production, processing, transportation, and distribution, as well as threshing, milling, marketing, and animal management [2]. Women in Nigeria's North Eastern Region are tasked with agricultural production tasks that are normally performed by males, however, the advantages received from this effort are not proportional to the amount of time spent on these agricultural activities.

Policymakers' unfavourable policies regarding women's empowerment have discouraged and reduced women's participation in agriculture production. Policymakers' have neglected to recognize the unfavourable and deplorable circumstances in which women contribute to agricultural production in the country. This is due to the perspective of female policymakers, who believe that women play a second fiddle role in the economy [2]. The majority of policies established did not take into account women contributions to food production, which would improve nutritional development in North-Eastern Nigeria and the rest of the country. Policymakers must address this anomaly since a large portion of the rural population's women relies heavily on the consumption of their agricultural products. Inadequate data on women engagement in agriculture for improving human nutrition and health has not only undervalued their productive ability but has also resulted in a decline in nutrition production, leading to malnutrition and other associated diseases. To improve human nutrition and health in Nigeria's North-Eastern Region, an inquiry of the policies in place to empower women in agriculture extension is required. The information gathered will aid policymakers in formulating policies that will increase women's engagement in integrated agricultural systems, hence increasing nutritional production in North East communities and the country as a whole. The study's problem derives from the fact that there is a disconnect between government policies on women empowerment in agriculture extension and their implementation in Nigeria. Women have been hindered from participating in agriculture to increase nutritional production due to the government of Nigeria's lack of political will, persisting cultural beliefs, land tenure structure, and unrealized awareness programs on agriculture extension. The specific objectives of the study was to identify the various government policies that encourage women's participation in agricultural development; and determine the impact of Boko Haram crisis on women's participation in Agriculture for enhancing Nutrition outcome in Yobe State.

METHODOLOGY

Study Area

Yobe State is located in the North-Eastern part of Nigeria, at latitude $11^{\circ}42'50''$ North and longitude $11^{\circ}4'52''$ E. It is mostly a farming state. On August 27th, 1991, the State was created. The State was carved out from the present-day Borno State. The State is bordered on the West by Bauchi, on the South by Gombe, and on the East by Borno. The State is organized physically into three parts: Eastern, Southern, and Northern. It has seventeen Local Government areas (LGAs). The Eastern part of the State is divided into four Local Government Areas including the State capital, four LGAs from the Southern part of the State, and nine LGAs from the Northern part. The study was carried out in the State's northern part, which has more LGAs and so provides a greater representation of the State. This region is located on Longitude $12^{\circ}87'N$ and along which the Yobe river runs. Because the location is located inside the dry savannah belt, it is hot and dry for most of the year. The people's primary occupations include farming, fishing, and trade. The majority of the populace are uneducated or semi-literate, speaking Kanuri, Fulani, Ngzim, Bole, and Kare-Kare language.

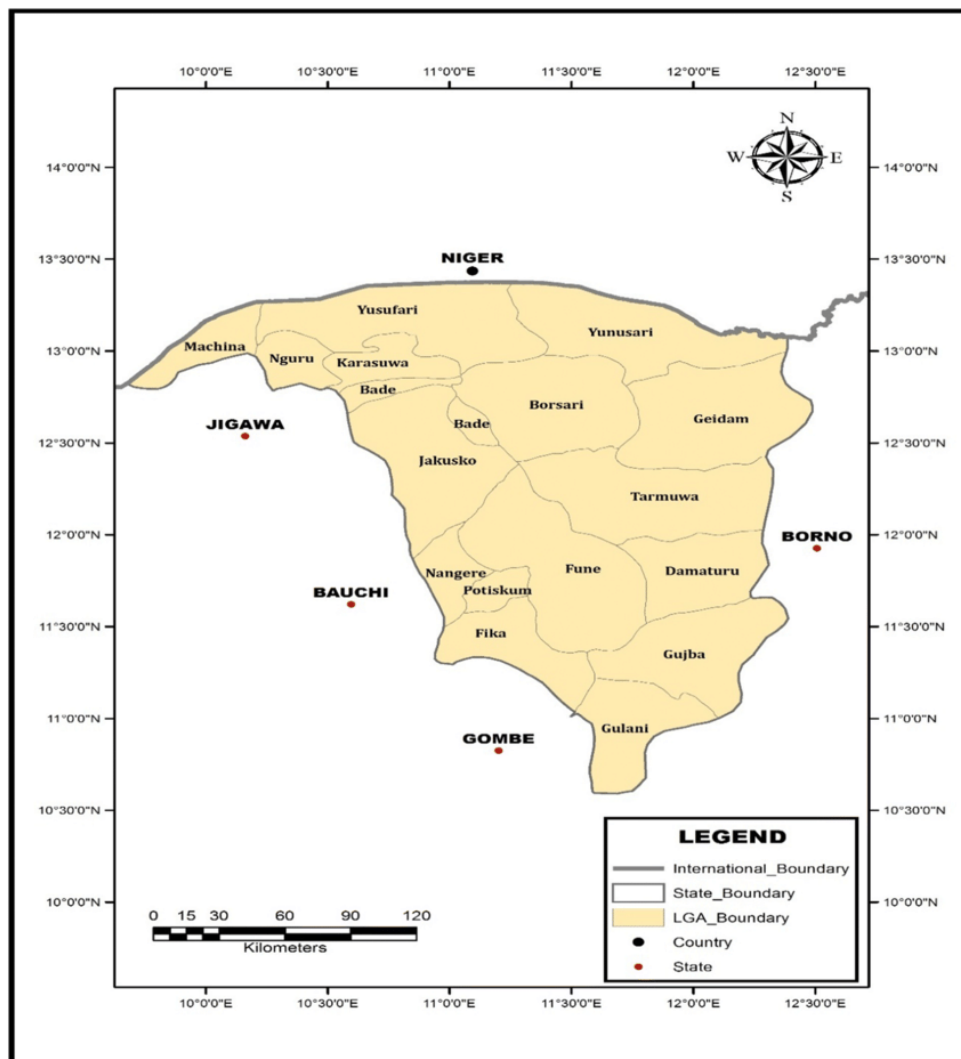


Figure 1: Map of Yobe State showing the Local Government Areas of the State

Source: www.researchgate.net

Method of Data Collection

The study made use of primary source of data collected using a well structure questionnaire. The information was collected on socio-economic characteristics of women farmers, government policies interventions known to the farmers and their various production variables. These data were collected in both conflict affected areas and conflict free areas.

Sampling Technique and Sampling Size

Multistage random sampling technique was employed in the study. Firstly, four (4) Local Government Areas (LGA's) namely Nguru, Karasuwa, Gulani and Geidam were selected using random sampling technique. In the second stage, four (4) wards were randomly selected from each of the Local Government Area with the aid of raffle draw ballot box method of random sampling. In the third stage, two (2) villages were randomly selected from each of the sixteen (16) wards making a total of thirty-two (32) villages. The fourth and final stage involved proportionate determination of the sample size from equation (1) using the sampling frame as stated in Table 1. Hence, the respondents were drawn from a total of thirty-two villages. The estimated sample size is given thus;

$$n = \frac{N}{1 + N(e^2)} = 351 \dots \dots \dots (1)$$

Where,

- n = Sample Size (Units)
- N= Sample Frame/Population size (Units)
- e = Level of Precision (5%)

Table 1: Sampling Matrix and Sample Size of Women in Agriculture in the Study Areas

S/N	Local Government Areas	Wards	Villages	Number of Farmers	Proportion	Sample Size
1	Nguru	Bulabulin	Bulangua	81	0.028	9.865
			Bulanguaram	99	0.034	12.057
		Hausari	Jigamari	95	0.033	11.570
			Kakori	91	0.032	11.083
		Dogana	Dogon-Kuka	83	0.029	10.109
			Dumasai	88	0.031	10.718
		Kanuri	Karanbari	95	0.033	11.570
			Kisogana	92	0.032	11.205
		Bukarti	Fajiganari	91	0.032	11.083
			Garin Gawo	98	0.034	11.935
2	Karasuwa	Jaji Maji	Waro	95	0.033	11.570
			Yajiri	83	0.029	10.109
		Wachakal	Kafetuwa	81	0.028	9.865
			Dalari	97	0.034	11.814
		Garin Jarma	Zango	86	0.030	10.474
			Tabawa	97	0.034	11.814
		Bara	Borno-Kiji	85	0.029	10.352
			Bularaba	88	0.031	10.718
		Bumsa	Burasari	92	0.032	11.205
			Chandam	91	0.032	11.083
3	Gulani	Gabai	Gagure	90	0.031	10.961
			Gagari	91	0.032	11.083
		Garin Tuwo	Kukuwa	82	0.028	9.987
			Kushimaga	98	0.034	11.935
		Abachari	Ashekri	93	0.032	11.327
			Badi	84	0.029	10.230
		Gumsa	Gosora	95	0.033	11.570
			Gallaba	91	0.032	11.083
		Kawuri	Karamti	88	0.031	10.718
			Keleri	92	0.032	11.205
4	Geidam	Maannam	Magario	88	0.031	10.718
			Maidari	82	0.028	9.987
		Total	4	16	32	2,882
			1	351		

Method of Data Analysis

Descriptive Statistics: Descriptive statistics such as averages and graphs were used to analyse the socioeconomic characteristics and government supported agricultural programmes implemented in the study area.

Propensity Scoring Matching

Propensity score matching was employed to determine the impact Boko Haram crisis on women's participation in agricultural development for enhancing nutrition in Yobe State; Usually, the propensity score matching is used in programme evaluation to access whether the programme has an impact on the participants [3]. The most common evaluation parameter of interest is the Average Treatment Effect on the treated (ATT) which is defined as: -

$$ATT = E \left(\frac{Y_1 - Y_0}{P = 1} \right) - \left(\frac{Y_1}{P = 1} \right) \dots \dots \dots (2)$$

The propensity score is the probability of the participation for farm households, if given a set $X = X_i$ of characteristics.

$$P(X) = P_r \left(\frac{P = 1}{X = X_i} \right) \text{ (Pufahl and Weiss, 2009) } \dots \dots \dots (3)$$

The propensity scores were derived from the regression model in which these characteristics were compared. The impacts of treatment on the treated (causal effect of project participants) were estimated by computing the differences across both groups:

$$ATT = \frac{1}{N_1} [Y_1 - Y_0] \dots \dots \dots (4)$$

Where,

ATT = Average Impact of Treatment on the Treated,

N_1 = Number of Matches (From Regression Model),

Y_1 = Productivity Index by Participants, and

Y_0 = Productivity Index by Non-Participants.

A positive (Negative) value of ATT will usually suggest that participants in a programme have higher (lower) outcome variable than non-participants.

RESULTS AND DISCUSSION

Socioeconomic Characteristics

Table 2 illustrates the socioeconomic characteristics of women farmers in the research region. According to the results, the average age for non-beneficiaries, beneficiaries, and pooled data was 49.50, 47.60, and 48.55, respectively. This result is consistent with that of [4], who discovered in their study that the majority of the farmers were under 50 years old. As a result of the findings, the majority of farmers are in their active working years. People at this age are more likely to be lively and open to new ideas, resulting in increased productivity.

Household size is a crucial consideration, especially when it comes to farm labour utilization. A farmer with a large household size may be able to employed them as farm labour. This will have an impact on the size of land farmed and increase returns. The majority of women farmers had households with more than five people. For non-beneficiaries, beneficiaries, and pooled data, the average household size was 6 individuals per household.

Farming experience is used to assess management abilities; the more experience a farmer possesses, the better the farmer will be able to make an informed farm decision. Non-beneficiaries, beneficiaries, and pooled data had an average farm experience of around 13 years, as presented on Table 2. This means that women farmers were able to make well-

informed decisions that improved their yield. For non-beneficiaries, beneficiaries, and pooled data, the average livestock held by women farmers was 6, 7, and 6 correspondingly. For non-beneficiaries, beneficiaries, and pooled data, the average crop farm size was 1.6, 1.9, and 1.8, respectively. This suggests that the women farmers were small-scale farmers with small plots of land. Non-beneficiaries, beneficiaries, and pooled data had total yearly incomes of ₦261,716.00 (\$629.34), ₦285,595.90 (\$686.76), and ₦273,655.95 (\$658.05), respectively. This suggests that the women farmers are low-income workers who live on an average of ₦22,804.66 (\$54.84) per month, which is less than the minimum wage. The results also imply that program beneficiaries fared better than non-beneficiaries.

Table 2: Socioeconomic Characteristics of Women Farmers in the Study Area

	Non-Beneficiaries'	Beneficiaries'	Pooled
Variable	Mean	Mean	Mean
Age (Years)	39.50	37.60	38.55
Household Size (Number)	6.17	5.54	5.855
Farm Experience (Years)	12.19	12.88	12.569
Number of Livestock (Number)	5.56	6.77	6.22
Income from Livestock (Naira)	38,290.16 (\$92.07)	79,543.27 (\$191.27)	57,115.52 (\$137.34)
Farm Size (Hectare)	1.62	1.92	1.78
Income From Crop (Naira)	261,716.00 (\$629.34)	285,595.90 (\$686.76)	273,655.95 (\$658.05)
Total Respondents	160	191	351

Source: Field Survey(2021)

*Note: \$1=₦415.86 at the period of data analysis

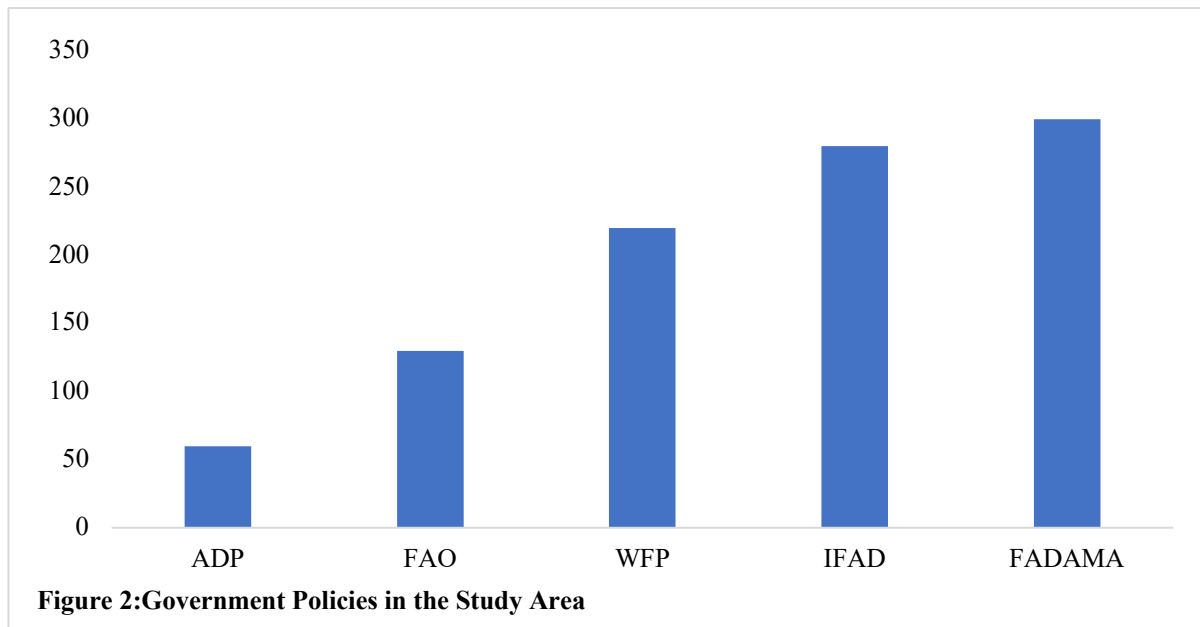
Agricultural Interventions that encourage women's participation in agricultural extension for enhancing Nutrition output in Yobe State

Table 3 and figure 2 shows government programmes and interventions in the study area. From the results FADAMA program was the major program women farmers benefited from. About 29% and 27% of the women benefited from FADAMA and IFAD program respectively. The interventions provide wide range of benefits for the participants. Some of the benefits include training and capacity building on modern and climate resilience agricultural practices, provision of inputs, provision of soft capital and grants, information sharing and linkages with subject matter specialists, among others.

Table 3: Identified Agricultural Interventions in the Study Area

Government Programmes/Interventions	Frequency	Percentage
ADP	60	6
FAO	130	13
WFP	220	21
IFAD	280	27
FADAMA	300	29
Multiple Responses	1040	100

Source: Field Survey (2021)



Source: Field Survey (2021)

***Note: The full meaning of the acronyms used are**

ADP – Agricultural Development Project

FADAMA- Fadama Development Programme.

FAO – Food and Agriculture Organization

IFAD- International Fund for Agricultural Development

WFP- Women Food Programme

Propensity Score Matching of the impact of Boko Haram crisis on women's participation in Agriculture for enhancing Nutrition outcome in Yobe State

Table 4 shows the propensity score matching of the impact of the Boko Haram crisis on women's participation in Agriculture for enhancing Nutrition outcomes. The coefficient of average treatment effect on women's participation in Agriculture for the nearest neighbour, radius, kernel, and stratification was positive. Nearest neighbour, radius, kernel, and stratified matching algorithms were significant at 1%, probability levels respectively. This means that considering the matching method selected, the Boko Haram crisis had an impact on the women's participation in agricultural development in the area for the beneficiaries. This finding is in line with the result of related studies on child development in North Eastern, Nigeria [5]. The value of average treatment effects for nearest neighbour, radius, kernel, and stratification was 0.273, 0.145, 0.163, and 0.183 respectively. This suggests that the Boko haram conflict had a significant impact on the participation of women in agriculture based on similar finding by [6]. Also, [6] postulated that conflict is found to reduce aggregate output of farm households, but not productivity and negatively impacts on hired labour of which women farmers participate in.

Table 4: Average Treatment Effect of Before and After Bootstrap on the Impact of Boko Haram Crisis on Women's Participation in Agriculture for Enhancing Nutrition Outcome

Matching Algorithm	ATT	Standard Error Before Bootstrap	Standard Error After Bootstrap	Bias	t-Value
Nearest Neighbour	0.273	0.077	0.0745	-0.0406	3.659***
Radius	0.145	0.054	0.0481	0.0033	3.016***
Kernel	0.163	-	0.0544	0.0176	2.997***
Stratification	0.183	0.058	0.0673	0.04284	2.725***

Source: Field Survey (2021)

CONCLUSION AND RECOMMENDATIONS

The study evaluated women's contribution to agricultural development in Yobe State, Nigeria. It also examines the impact of Boko haram conflicts on the activities of women farmers in the area. Based on the findings, the study concluded that government agricultural development interventions are significant and impactful. Boko harm crises had a negative impact on women involvement in agriculture which may lead to poor nutritional access for women, children and entire household. The study recommended that policies targeted at improving agricultural production in the region be more inclusive to capture the interest of more women. Also more measures should be put in place by the state government, international donor agencies and private sector to encourage women participation in agriculture as efforts are on course to cub the activities of Boko haram in the region.

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