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DETERMINANTS OF WOMEN PARTICIPATION IN LIVESTOCK PRODUCTION IN CENTRAL ZONE OF BAUCHI STATE, NIGERIA

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ABSTRACT
The study assessed the determinants of women participation in livestock production in central zone of Bauchi State. Multi-stage sampling procedure was used in selecting 190 respondents, data were collected using structured questionnaire and analysed using both descriptive and inferential statistics. Result reveals that 33.2% of the respondents were within age bracket of 17-30 years. Almost all (97.9%) of the respondents had 1-7 persons per household, and majority (61.6%) of them had primary education. The result further reveals that most (77.4%) of the respondents had a farming experience of 2-11years with herd size of 2-9 animals occupying (66.3%). The result also shows that most (79.5%) of the respondents keep their livestock under shade and almost all (98.4%) of the respondents have livestock farming as their major occupation. Furthermore, 98.4% of the respondents had no access to credits, with 73.2% of the respondents having access to extension services. All (100%) of the respondents indicated that family decision on animal matter decision is taken by men and 99.5% of them do not practice purdah. The results further depict that, egg and livestock selling and shade cleaning was done by women occupying 95.3% and 90.0% respectively. The results of regression analysis reveal that place of keeping livestock was negative and significant in influencing women participation in livestock production ($P<0.01$), household size, farming experience, cooperatives membership ware negative and significant ($P<0.05$). The result further indicates that the major constraints to participation in livestock production were inadequate media information, lack of confidence and social conflicts ranked 1st 2nd and 3rd, respectively. The study concluded that, women farmers play a significant role in livestock production. It was recommended that, proper extension services should be given to the women farmers and women should be encouraged to form cooperative groups to take advantage of credit windows available to cooperative societies.

Keywords: Determinants, Livestock, Multi-stage, Participation, Women.

INTRODUCTION
Agriculture remains the dominant sector in the rural areas of Nigeria and provides employment for two-third of Nigerians who are low in income. While the Northern part can guarantee the production of cereals, the middle Belt and the South have the potential to produce root tubers (Odoemelam *et al.*, 2014). In addition, it is recognized as a fundamental driver of economic growth and poverty reduction for many developing countries and a priority area for investment. Women comprise, on average, 43% of the agricultural labour force in developing countries, ranging from 20 percent in Latin America to 50% in Eastern Asia and Sub-Saharan Africa (FAO, 2011). Women make essential contributions to the agricultural and rural economies in all developing countries. Women roles vary considerably between and within

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regions and are changing rapidly in many parts of the world, where economic and social forces are transforming the agricultural sector. Rural women often manage complex households and pursue multiple livelihood strategies. Their activities typically include producing agricultural crops, tending animals, processing and preparing food, working for wages in agricultural or other rural enterprises, collecting fuel and water, engaging in trade and marketing, caring for family members and maintaining their homes. Accordingly, Anonymous (2012) reported that, about 70 million rural households were estimated to own livestock of one species or the other. Women's role within a livestock production system varies from region to region while distribution of ownership of livestock between men and women is strongly connected to social, cultural and economic factors. Participation is an obvious strategy for the success of any development activity. It is a powerful tool for mobilizing new and additional resources. According to Ataneh (2012), participation entails the ability of individuals to have an input in the decision-making process and to play a role in measures aimed at improving their quality of life.

Women constitute more or less half of any country's population. In most countries however, women contribute much less than men towards the value of recorded production both quantitatively in labour force participation and qualitatively in educational achievement and skilled manpower (Oladejo *et al.*, 2011). Women typically have complete responsibility for animals that are kept close to the homestead such as poultry, calves and other small livestock and for sick animals and they rarely have major holding and management responsibilities for large stock. Other roles played by women play in livestock sector includes; cleaning of animals, cleaning of shed, milking, watering of animals, making of dung cakes, and providing fodder to livestock in addition to house hold activities (Javed *et al.*, 2006). Raising of poultry, goat and sheep is totally under the control of rural women and they have to consult their male counterparts for decision making (Oladejo *et al.*, 2011). Despite the contribution of women in rearing small livestock, past studies have shown that, they are little empirical studies that assess the factors influencing women participation in livestock production. In addition, there are no adequate literatures that assess the role played by women in livestock production in Bauchi State. The above gap is what research intends to fill. The broad objective of this study was to assess the determinants of women participation in livestock production in central zone of Bauchi State, Nigeria. While the specific objectives were to:

i. Describe the socio-economic characteristics of women farmers in the study area;
ii. Identify the role played by women in livestock production;
iii. Determine the factors influencing women participation in livestock production; and
iv. Identify the constraints to women participation in livestock production in the study area.

The findings of the study will provide guidance to the livestock technology development administrators and researchers for enhancing effective livestock development programme. Policy makers too would benefit from the research output since they require micro-level information to formulate and revise policies and strategies in the area of women farmers. The study was conducted in central agricultural zone of Bauchi State, this is due to limited resources.

MATERIALS AND METHODS

The Study Area

Bauchi State lies between 9.3^{o} and 12.3^{0} North of the equator and longitude 8.5^{o} and 11^{0} east of the Greenwich Meridian. It has a total land area of 49,259.01km^{2} which is about

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5.3% of the total land mass of Nigeria, out of which only 34,481 square kilometres is under cultivation (BSADP, 2003). It has a total projected population of 6,202,101 people based on 2006 population census (NPC, 2006). The area experiences both dry and rainy seasons with a maximum rainfall of about 700 mm per annum in the north to about 1300 mm per annum in the south. The State is characterized by two distinct vegetative zones which include Northern Guinea Savannah and Sudan Savannah. Agriculture dominates the economy, and millet, sorghum, corn (maize), sweet potato, rice, cassava, tomatoes, sesame and vegetables are produced.

Sampling Procedure

A multi-stage sampling procedure was used in selecting the respondents. In the first stage, central agricultural zone was purposively selected out of the three agricultural zones, which consists of 4 local governments namely; Darazo, Ganjuwa, Ningi and Warji as classified by Bauchi State Agricultural Development Programme (BSADP, 2018). In the second stage, three local government areas were randomly selected. In the third stage, out of the 3 selected local governments which are Ganjuwa, Ningi and Warji, three (3) villages were randomly selected. In the final stage, 5% of the registered women farmers were randomly selected from the sampling frame obtained from local governments making a total of 190 respondents as the sample

Method of Data Collection

Data were collected through the administration of structured questionnaire which was distributed to respondents randomly selected from the study area.

Method of Data Analysis

The data were analysed using both descriptive and inferential statistics. Descriptive statistics was used to achieve objective i, ii and iv while the inferential statistics was used to achieve objective iii.

Analytical Techniques

Descriptive statistics, e.g., frequency, percentage, ranking, mean was used to describe the position and nature of social and economic parameters, types of roles played by women farmers as well as the constraints to women participation in livestock production. Logit regression model was used to determine the factors influencing the likelihood of women participation in livestock production. Earlier studies (Idrisa *et al.,* 2010) used Logit model to identify factors affecting the likelihood of adoption of improved technologies. The explicit form of the Logit model is presented as follows:

$Y_i = b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4 +b_5X_5+b_6X_6 +b_7X_7+b_8X_8+b_9X_9+b_{10}X_{10}+b_{11}X_{11}+b_{12}X_{12+}$ u...(1)

where;

Y is the likelihood of participation labeled as PART.

Y_i (participation) = observed response for the respondent, which is in binary form: $Y_i = 0$ (non-participation) and $Y_i = 1$ (for participation).

$Y_i = 1$ (only woman who play more than one role)

$Y_i = 0$ (for any who play less than one role)

$X_{1, 2, 3,}$ …, n = number of explanatory variables included in the model.

For the Logit model, the equation for the relationship between characteristics of respondents and the likelihood of participation is specified as:

$PART = b_0+b_1AGE+ b_2SEX+ b_3MST+ b_4YEDU+ b_5HHS+ b_6INC+ b_7NOA+ b_8POH+ b_9POL+ b_{10}$ DMF+ $b_{11}EXTC+ b_{12}DMA+b_{13}YFE+b_{14}MOA+b_{14}PUR+U$ …(2)

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Where;
PART = Likelihood of participation which is a dummy variable (1 for participant and 0 for non-participant).
AGE = Age of respondents measured in years.
MST = Marital status of the respondent
YEDU = Years of Education (Measured in years spent in schooling)
HHS = Household size (measured in number of persons under the care of the respondents)
INC = Income of the respondents (measured in Naira)
NOA = Number of animals (Expressed in number of animals)
POH = Position in the household (1 = House head and 0 for Member)
POL = Place of keeping Livestock (Dummy variables Yes = 1 or No = 0)
DFA = Decision making on family matters (Dummy variables Yes = 1 or No = 0)
EXTC = Farmers contact with the extension agent
ATC = Access to credit (Dummy variables Yes = 1 or No = 0)
YFE = Years of farming experience (measured in number of years spent as maize farmer)
MOA = Membership of association (Dummy variables Yes = 1 or No = 0)
DMA = Decision making on animal matters (Dummy variables Yes = 1 or No = 0)
PUR = Purdah
U = error term.

RESULTS AND DISCUSSION

Socio-economic Characteristics

The result in Table 1 reveals that 47% and 32.2% of the respondents were within the age bracket of 31-45 years and 17-31 years while 10% and 9.5% of the respondents were within the age bracket of 45-60 years, respectively. This implies that majority of the respondents were within their active ages to participates in agricultural activities. This in line with the findings of Saba *et al.* (2020) in a research, role of women in livestock management in district Swabi. Who reported that 52.7% of women participating in livestock production fall in the 31-45 years age category of 31-45 years. The result further shows that almost all (97.9%) of the respondents had households' size of 1-7 persons. This implies that most of the respondents had fewer people per household in the study area which shows that family labour might not be efficient in the households. The result also shows that majority (61.6%) of the respondents had primary education, while 29.5% and 5.8% of the respondents had secondary and tertiary education; only 3.2% of the respondents had non-formal education. This implies that most of the respondents had attained a certain level of education in the study area which plays a significant role in farmers' decision on the use of new technologies.

In addition, the result from Table 1 further indicates that majority (77.4%) of the respondents had a farming experience of 2-11 years, while 21.1% of the respondents had a farming experience of 11-20 years. This implies that most of the respondents had relative years of farming experience in the study area which plays a vital role in the adoption and risk taking on new technologies and innovations. The result also reveals that majority (66.3%) of the respondents had a herd size of 2-9 animals in the study area, while 27.9% and 4.7% of the respondents had 9-16 animals and 16-23 animals respectively, only 1.1% of the respondents had a herd size of 23-30 animals in the study area. This implies that most of the respondents had small size of herd in the study area indicating that they were small scale livestock farmers.

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Table 1: Distribution of Respondents Based on Age, Household Size and Years of Education, Farming Experience, Family

Variables	Frequency	Percentage
Age		
17-31	63	33.2
31-45	90	47.4
45-59	19	10.0
Above 60	18	9.5
Household size		
1-7	186	97.9
7-14	3	1.6
14-21	1	.5
Years of education		
Primary education	117	61.6
Secondary education	56	29.5
Tertiary education	11	5.8
Non-formal	6	3.2
Total	**190**	**100.0**
Farming experience		
2-11	147	77.4
11-20	40	21.1
20-29	3	1.6
Herd size		
2-9	126	66.3
9-16	53	27.9
16-23	9	4.7
23-30	2	1.1

Source: Field survey, 2021

The results from Table 2 show that majority (79.5%) of the respondents keep their livestock under shade, while 20.5% of the respondents kept their livestock in an open area in the study area. This implies that animal housing in the study area were not modern this could be due to the facts that most of the respondents were small scale farmers and the study area seem to have a relatively high level of security. The result further reveals that almost all (98.4%) of the respondents were farmers, while 1.6% of the respondents were food processors in the study area. This implies that most of the respondents were livestock farmers only few augments it with other businesses. This results also, was in line with that of Saba *et al.* (2020), that, the major occupations of the sampled respondents include farming, private or public sector jobs, own business, and livestock farming. Furthermore, he reports that the majority women (68.2%) were involved in the agriculture sector as well as in the private/public sector jobs, 20.9% women were getting income only from the agriculture sector, 5.5% respondents were active in various livestock practices, 3.6% women were concerned in the livestock and farming activities, and the rest 1.8% women were doing non-farming activities.

The result also shows that most (92.6%) of the respondents were not members of any union or cooperatives in the study area, while 7.4% of the respondents were members of cooperatives or unions. This implies that most of the respondents in the study area had no access to cooperatives/unions in the study area. Yisehak (2008) have a similar report on

membership of association of the rural women in which he found out that, majority of the women in livestock production did not associate themselves with any form of cooperative participation and had no access to credit facility this may be due to the fact that women are rarely considered credit worthy because they have no collateral. The results further indicate that almost all (98.4%) of the respondents had no access to credits in the study area; only 1.6% of the respondents had access to credits. This implies that most of the respondents in the study area had no access to credit either from government or nongovernmental organizations or institutions. The result also shows that most (73.2%) of the respondents had access to extension services, while 26.8% of the respondents had no access to extension services in the study area. This implies that extension agents in the study area had delivered on their mandate of educating and transferring of new innovations and technologies from research institutes to livestock farmers so as to improve their living standard and income.

Table 2: Respondents' Type of Livestock Housing, Primary Occupation and Access to Credit

Variables	Frequency	Percentage
Livestock housing		
Open area	39	20.5
Shade	151	79.5
Primary occupation		
Food processing	3	1.6
Farmer	187	98.4
Cooperative or union membership		
Yes	14	7.4
No	176	92.6
Total	**190**	**100.0**
Access to credit		
Yes	3	1.6
No	187	98.4
Access to extension services		
Yes	139	73.2
No	51	26.8
Frequency of extension services		
None	10	5.3
Weekly	18	9.5
Fortnightly	28	14.7
Monthly	73	38.4
Quarterly	61	32.1
Total	**190**	**100.0**

Source: Field survey, 2021

The result further reveals that 38.4% and 32.1% of the respondents had contact with extension on monthly and quarterly basis, respectively, while 14.7%, 9.5% and 5.3% of the respondents in the study area had contact with extension fortnightly, weekly and none, respectively. This implies that most of the respondents were updated on new technologies of livestock raising, feeding and drugs/vaccines in the study area for a better and improved farming.

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Social Factors Influencing Participation

The result in Table 3 indicates that almost half (47%) of the respondents were within the working ages of 12-24 years, while 33.2% and 19.5% of the respondents were within the working ages of above 36 years and below 36 years respectively. This implies that, working age in the study is in conflict with the one enshrined in the constitution of the Federal Republic of Nigeria which peg working age to start from 18 years. The result further shows that 100% of the respondents indicated that family decision is taken by the men in the study area, also the result reveals that almost all (99.5%) of the respondents do not practice purdah only 0.5% of the respondents practice purdah in livestock keeping in the study area. The result also reveals that 100% of the respondents agrees that animal matter decision is taken by men in the study area. This implies that there are social, cultural and religious factors hindering women from taking decision in the study area as indicated above women were not part of decision takers in the study area.

Table 3: Respondents' Social Factors Influencing Participation

Social Factors	Frequency	Percentages
Working ages		
12-24	90	47.4
24-36	37	19.5
Above 36	63	33.2
Total	**190**	**100.0**
Family decision making		
Male	190	
Total	**190**	
Purdah		
Yes	1	.5
No	189	99.5
Total	**190**	**100.0**
Decision on animal matters		
Male	190	100.0
Total	**190**	**100.0**

Source: Field survey, 2021

Role Played by Women in Livestock in Production

The result on Table 4 reveals that almost all (95.3%) of the respondents agrees that egg and livestock selling were done by women in the study area. The result also shows that majority (90.0%) of the respondents agrees that poultry raising was done by women, while 10.0% of the respondents shows that poultry raising was not done by women in the study area. The result further indicates that majority (88.4%) of the respondents agrees that shade cleaning was done by women. The results also show that majority (86.3%) of the respondents agrees that sheep and goats raising was the work of the women in the study area, This agrees with the findings Arshad *et al.* (2010) who reported that rural women play a key role in the livestock management and household activities, playing numerous roles in the agricultural sector like fisheries and livestock and make a significant contribution to food production particularly the livestock. The result also indicates that majority (87.9%) of the respondents agrees that milking and selling of milk/milk products were activities carried out by women in the study area respectively. The result further shows that majority (78.9%) of the respondents disagree that manure collection

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was carried out by women while 21.1% of the respondents agrees that manure collection was carried out by women in the study area. This result also agrees with Zakaria *et al.* (2007) who reported that, most livestock management practices were performed by wives in comparison with husbands and he also posited that there was a remarkable diversity between wives and husbands in executing the livestock management activities.

The result also reveals that most (80.0%) of the respondents disagree that sheep and goat selling is done by women while 20.0% of the respondents agrees that sheep and goats selling was carried by women in the study area. This implies that most of the activities were carried out by women in the study area especially activities involved in taking care of the animals and selling of animal bye products, while the selling of animals and manure collection were mostly carried out by men in the study area.

Table 4: Distribution of Respondents According to the Roles Played in Livestock Production

Roles	***Frequency**	**Percentage**
Egg and livestock selling	180	95.3
Poultry raising	177	90.0
Shade cleaning	168	88.4
Raising of sheep and goat	164	86.3
Milking	165	87.9
Selling of milk and milk product	168	88.9
Collection of manure	40	21.1
Selling of sheep and goat	38	20

*Multiple Responses
Source: Field survey, 2021

Factors Influencing Women Participation in Livestock Production

The result in Table 5 shows the logistic regression of factors influencing women participation in livestock production in the study area. The result shows that place of keeping livestock was found to be negative and significant (P<0.01) in influencing women participation in livestock production. This implies that, women participation in livestock production decreases with increase in place of keeping livestock which signifies that most of the women keep the livestock in small number that doesn't require space. The results further reveal that, household was found to be positive and significant (P<0.05), which implies that as household size increases the participation of women in livestock production also increases. It disagreed with that of Oladejo *et al.* (2011) who posited that household size was negatively significant in influencing women participation in agricultural production. This in tandem with the findings of Andaleeb *et al.* (2017) who reported that, the size of the family is positive and significant influencing the contribution of rural women in livestock management activities. The results also show that, farming experience, membership of cooperatives was found to be negative and significant (P<0.05), respectively. This implies that as membership of cooperative societies and experience increases in women the tendency of participation in livestock production decreases.

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Table 5: Factors Influencing Women Participation in Livestock Production

Variables	Coefficient	Std. Err.	Z	P>|z|
Age	.0338043*	.0190115	1.78	0.075
Household size	.2925086**	.1341547	2.18	0.029
Years of education	.0402169	.0882983	0.46	0.649
Farming experience	-.3692973**	.1603792	-2.30	0.021
Herd size	.1398447NS	.1004192	1.39	0.164
Place of keeping livestock	-1.66163***	.52224	-3.18	0.001
Cooperative membership	-1.594261NS	.6613108	-2.41	0.016
Access to extension service	.2636629NS	.5857475	0.45	0.653
Frequency of extension	-.0843059NS	.1854957	-0.45	0.649
Family size	-.0249983NS	.0649927	-0.38	0.701
Prob Chi^2 0.554				
Pseudo R^2 = 0.5541				
Log likelihood = 101.1340				

Note: ***P<0.01, **P<0.05, *P<0.10 and NS Not Significant
Source: Field Survey, 2021

Constraints to Women Participation in Livestock Production

The result on Table 6 shows the constraints/challenges faced by the women livestock farmers in the study area. The major constraints were inadequate media information, lack of confidence and social conflicts which were ranked 1st and 2nd, while inadequate social interaction, social security, illiteracy and low payment of labour wages were ranked 3th, 4th, 5th and 6th, respectively.

Table 6: Respondents Based on Constraints to Participation in Livestock Production

Constraints	Frequency	Percentage	Rank
Inadequate media information	178	93.7	1st
Lack of self confidence	177	93.2	2nd
Social conflicts	177	93.2	2nd
Inadequate social interaction	176	92.6	3rd
Social security	175	92.1	4th
Illiteracy	174	91.6	5th
Low payment of work	173	91.1	6th
Inadequate access to credit	170	89.5	7th
Inadequate of women organization	168	88.4	8th
Transportation difficulty for women	168	88.4	9th
Inadequate job opportunities	166	87.4	10th
Inadequate of legal/economic and political literacy	104	54.7	11th
Informal matrilineal rules	28	14.7	13th
Women job in less valued disciplines	23	12.1	14th
Women work not recognized	16	8.4	15th

Source: Field Survey, 2021

The result (Table 6) further shows that inadequate access to credit, transportation and inadequate women organization were ranked 7th and 8th, respectively in the study area. Other challenges faced by the respondents includes inadequate job opportunities, lack of legal/economic and political literacy, violence against women, informal matrilineal rules, women job is less valued and women work not recognized were ranked 9th, 10th, 11th, 12th, 13th, and 14th, respectively in the study area.

CONCLUSION AND RECOMMENDATIONS

Emanating from the study findings it can be concluded that, women farmers play a significant role in livestock production. Household size, farming experience, place of keeping livestock and membership of cooperative society were the significant factors influencing women participation in livestock production in the study area. Based on the finding of the study, the following recommendations were made:

1. Adequate and efficient extension services should be given to the women farmers.
2. Financial institutions and other money lenders should be encouraged patronize women livestock farmers.
3. Women farmers should be given more training in livestock production.
4. Engagement of women extension workers will help in areas where there is religious restriction.
5. Appropriate policy should be formulated and if any should be enforced in order to reduce the rate of social barriers among women in the study area.

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