

<https://doi.org/10.33003/jaat.2025.1104.05>

## ANALYSIS OF ACCESS TO RESOURCES IN CATTLE PRODUCTION IN NORTH-EASTERN REGION OF NIGERIA

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### ABSTRACT

The study was conducted to explore the cattle farmers' access to resources in north-eastern region of Nigeria. A two-stage sampling procedure was used to select one hundred and twenty (120) cattle farmers from whom primary data were collected through the use of interview schedule. Data were collected on socio-economic characteristics and access to resources. Analysis of the data was done using both descriptive (mean, percentages) and inferential (Multiple Regression Analysis) statistical tools. The results revealed that the mean age was 45.02 years. Most (66.7%) cattle farmers were males and most (99.2%) were married. The majority (83.3%) had no formal education and no contact (83.3%) with extension agents. All (100%) cattle farmers belonged to cooperative society. The cattle farmers' access to natural resources (land and water), extension training and new production technologies was low. The results of Multiple Regression Analysis showed that formal education ( $\beta=0.38$ ) and sex ( $\beta=-0.24$ ) contributed significantly to cattle farmers' access to resources at 0.05 level of significance. The study concluded that cattle farmers' access to resources was low and may probably explain low productivity characterizing cattle production. It was therefore recommended that National Livestock Transformation Plan (NLTP) should be implemented with active collaboration of Federal Government and other stakeholders to make cattle farmers transit from extensive system to ranching to enhance access to land, water, extension and new technologies for improved productivity.

**Key words:** Cattle farmers, access, resources, extension, technologies.

### INTRODUCTION

Cattle production, which occurs mainly on extensive system in Nigeria, is the major income earner of the pastoralists who are largely the Fulani. Apart from the pastoralists whose primary livelihood is cattle production, the enterprise benefits millions of Nigerians who are value chain actors and consumers/users of cattle products such as beef, milk, cheese, hides and skin (Ilu *et al.*, 2016). Although cattle are mainly raised extensively and productivity remains low when compared with modern intensive system, pastoral system thrives when access to resources is high. Resources are means and goods, including those that are economic like household income; productive like land, equipment, agricultural inputs including labour and opportunity to leadership and decision-making, information, organisation and time (Mare and Girmay, 2016). Ajadi *et al.* (2015) asserted that resources can be both tangible such as capital, land, labour and raw materials, and intangible like knowledge, ideas and market. Paul and Meena (2016) defined access to resources as the right and opportunity to use resources. Yield gaps and production inefficiencies confronting smallholder farmers can be partially traced to unequal access and distribution of agricultural resources (Menzein-Dick *et al.*, 2019). Kinkingninhoun *et al.* (2020) asserted that constraints in access to resources limit productivity as evidenced by the lower yields realized by women. Ankrah *et al.* (2020) reported that access to resources for agricultural production ensures a

steady reduction in poverty and food insecurity. Agarwal (2015) cited in Kinkingninhoun *et al.* (2020) affirmed that if women are given similar opportunities and access to resources as men do, they will be equally productive as male farmers.

Considering the economic role of cattle production in Nigeria, gaining insights into the levels of access of cattle farmers to resources will be a step forward in addressing the area of resource needs, particularly, new production resources with a view to raising productivity and bridging supply-demand gaps in beef and milk production. The study provided answers to the following questions: 1) What are the socio-economic characteristics of the cattle farmers in the study area? 2) What are the levels of access of cattle farmers to resources?

The following hypothesis was tested in the study:

1) There is no significant relationship between socio-economic characteristics of the cattle farmers and access to resources.

### METHODOLOGY

The study was carried out in northeastern region of Nigeria. The region is one of the Nigeria's six geopolitical zones. It consists of six states, namely; Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe. The region shares border with Cameroon to the east, Niger and Chad to the north and Jigawa, Bauchi, Gombe and Taraba States in Nigeria to the west. It is the largest in size geographically covering nearly one-third of Nigeria's

total landmass (Wikipedia, 2023). The zone is primarily divided into semi-desert Sahelian savanna and the tropical West Sudanian savanna eco-regions (Wikipedia, 2023). The region is located around latitude 9.081999° and longitude 8.675277°. The climate is very warm with an annual average of 36°C, but has few truly tropical and muggy months. It is warm or hot yearlong (World data info, 2023). With 10 hours per day of sunshine, November is the sunniest month in most part of northeast region while sun shines the least in August (World data info, 2023). The month of August has the most rain days while January has the least rain days. Relative humidity averages 81% in August (World data info, 2023).

A two-stage sampling procedure was used to select the sample for the study. First, simple random sampling technique was used to select two States, namely, Bauchi and Yobe States. Second, snowball technique was used to finally locate and select 40 male and 20 female cattle farmers in each of Bauchi and Yobe States from the meeting locations of members of Miyetti Allah Cattle Breeders Association of Nigeria (MACBAN) resulting in a total of 120 cattle farmers. An interview schedule was used to elicit data from the respondents on socio-economic characteristics and access to resources.

**Measurement of variables**

**Socioeconomic characteristics:** Age, household size, years of experience, estimated annual income, herd sizes were measured at interval level while sex, marital status, formal education, contact with extension and membership of cooperative were measured at nominal level.

**Access to resources:** This was measured by asking the respondents to indicate the extent of access to various resources used in cattle production on a three-point rating scale of “Always=2”, “Occasionally=1” and “Never=0”. Access index was calculated by summing the scores on access to various resources for each respondent. The mean score of level of access was determined for each resource and the grand mean of access to resources was also calculated and used as cut-off point. The level of access to each resource was taken to be high if the mean was higher than the grand mean but the level was low if the mean was lower than the grand mean. Data were analysed with both descriptive and inferential statistics. Objectives one and two were analysed with percentages and mean while hypothesis one was analysed with MRA (Multiple Regression Analysis) using IBM SPSS Statistics version 26.

Multiple regression model is explicitly stated as follows:

$$Y = a + b_1x_1 + b_2x_2 + \dots + b_9x_9 + e$$

Y = Access to resources (Dependent variable)

x<sub>1</sub> = Age (in years)

x<sub>2</sub> = Cattle production experience (Years of experience)

x<sub>3</sub> = Herd size (number of cattle in the flock)

x<sub>4</sub> = Household size (number of members of the household)

x<sub>5</sub> = Education (Had formal education =1, No formal education =0)

x<sub>6</sub> = Contact with extension service (Had contact =1, No contact =0)

x<sub>7</sub> = Sex (Male =1, Female = 0)

x<sub>8</sub> = Annual income (in Naira)

x<sub>9</sub> = Marital status (Married = 1, Not married)

**RESULTS AND DISCUSSION**

Table 1 shows that 25.0% of the respondents were within the age bracket of 30 -39 years while 42.5% were within the age range of 40 -49 years. The mean age of cattle farmers was 45.02 years. This implies that most of the cattle farmers are young and able-bodied in their active and productive years, which is very important in the performance of different cattle production tasks. The finding is similar the finding of Zekarias (2018) who reported the mean age of the cattle farmers in Moyalle District of Oromyia Regional State was 42 years. Furthermore, most (66.7%) of the cattle farmers were males while 33.3% were females. Cattle production was dominated by male producers in the study area. This suggests that male farmers within the household are dominant holders of economic resources than their female counterparts. The finding is in consonance with the finding reported by Pousga *et al.* (2022) about more males’ involvement in livestock production system than females. The majority (99.2%) of the cattle farmers were married. This implies that cattle farmers in the study area had family responsibilities of catering for the needs of household members and this could motivate them to manage cattle production better and harness available opportunities in training and advisory services for improvement of productivity. This finding is similar to the finding of Ishaya *et al.* (2018) who reported that the majority (91.0%) of the cattle farmers in Bade Local Government Area were married. Furthermore, 83.3% of cattle farmers did not have formal education. Lack of formal education by most of the cattle farmers, who are mostly Fulanis in extensive cattle farming system, was due to poor attention given to the western education. The implication of this is that the knowledge and skills acquired through formal education, which are prerequisite to the adoption of improved technologies and innovations in cattle production for improved productivity are lacking among the cattle farmers in the study area. This finding is in agreement with the finding of Lawal-Adebowale *et al.* (2018) who reported that only 15.40% pastoralists in Yewa Division of Ogun State had secondary and primary education respectively. Also, the majority (85.8%) of cattle farmers had between 1 and 20 people within their households. The mean household size was 12.85.

**Table 1: Distribution of socio-economic characteristics of cattle farmers**

<b>Variable</b>	<b>Percentage (n=120)</b>	<b>Mean</b>	<b>Standard deviation</b>
<b>Age (years)</b>			
30 – 39	25.0		
40 – 49	42.5		
50 – 59	22.5		
60 and above	10.5	45.02	8.96
<b>Sex</b>			
Male	66.7		
Female	33.3		
<b>Marital status</b>			
Married	99.2		
Not married	00.8		
<b>Formal education status</b>			
No formal education	83.3		
Had formal education	16.7		
<b>Household size</b>			
1-20	85.8	12.85	7.14
21 and above	14.2		
<b>Years of experience in cattle production</b>			
1-10	15.0		
11-20	33.3		
21- 30	27.5		
31- 40	16.7	24.12	11.96
Above 40	07.5		
<b>Estimated annual income in Naira (₦)</b>			
1- 500,000	71.7		
500,001- 1,000,000	17.7		
1,000,001- 1,500,000	02.5	527, 667	621,040
1,500,001 -2,000,000	04.1		
Above 2,000,000	04.2		
<b>Herd size</b>			
1-50	95.8	20.80	19.29
51-100	04.2		
<b>Contact with extension agents</b>			
No contact	83.3		
Had contact	16.7		
<b>Membership of cooperative</b>			
Non-member	00.0		
Member	100.0		

\*Multiple responses

Source: Field survey, 2021

Early marriage and the practice of polygamy are possibly responsible for large household sizes. This implies that cattle farmers in the study area had large number of household members that could assist them in carrying out various production activities. This finding does not agree with the findings of Nalle *et al.* (2017) who reported that the majority (81.0%) of cattle farmers in grazing system had household size of 1-2 persons. Also, 33.3% of the cattle farmers had between 11-20 years of experience while 27.5% had between 21-30 years of experience. The mean year of

experience was 24.12. This implies that cattle farmers in the study area had accumulated long years of experience in cattle production that could enable them to properly harness productive inputs for maximum output. This finding is in line with finding of Ishaya *et al.* (2018) who stated that the more the farmers' experience, the more their abilities to manage the factors which affect the cattle business. Most (71.7%) of cattle farmers had estimated annual income between ₦1- ₦500,000 while 17.5% had estimated annual income between ₦500,001- ₦ 1,000,000. The mean

estimated annual income was ₦ 527,667. The implication is that cattle production has not been yielding the maximum size of income that would be expected for meeting cattle farmers' household needs. This may be connected to the prevalent low technological inputs and poor utilization of livestock research findings (Adisa, 2015). The majority (95.8%) of cattle farmers had between 1 and 50 cattle in their flocks. The mean herd size was 20.80. This finding is in contrast with the findings of Nalle *et al.* (2017) who reported that more than half (53.0%) of the cattle farmers in tethering system had herd size of 1-2 cattle. Most (83.3%) of cattle farmers did not have contact with livestock extension. This suggests that there were low livestock extension activities in the study area; hence cattle farmers will not be exposed to improved technologies to enhance the productivity of the cattle. This finding agrees with Pousga (2022) who affirmed there were fewer extension activities on livestock production compared with crop production in sub-Saharan African (SSA). However, the finding is in contrast with the finding of Asadu *et al.* (2021) who reported that 70.0% of the urban livestock farmers in Southeastern Nigeria had extension contact. All (100%) the respondents were members of cooperative society. Membership of cooperative society confers on cattle farmers the advantage of saving and obtaining loans for their production activities. This finding is in contrast to the finding of Ishaya *et al.* (2018) who reported that the majority (73.0%) of cattle farmers in Bade Local Government Area were not members of associations.

**Cattle farmers' access to resources**

Table 2 reveals that about half (50.8%) of the cattle farmers always had access to land while 45.8% never had access to land. Those who never had access to land may be herding their cattle on other people's land, which always leads to farmer-herder conflict. Access to land was low as indicated

by the mean (1.05). The finding agrees with Majekodunmi *et al.* (2017) who affirmed that cattle farmers' had less secured land tenure based on occupancy and gifts. Access to capital and labour was unfettered as all (100%) cattle farmers always had access to these two resources. Hence, access to capital and labour was high as indicated by the respective mean (2.00). Membership of cooperative can help cattle farmers pool their savings and obtain loans in turns. Furthermore, all (100%) cattle farmers never had access to extension training. The mean value of access to extension training was 0.00. The implication is that livestock extension is inadequate in meeting the needs of cattle farmers for knowledge, skills and new technologies. The finding aligns with Pousga *et al.* (2022) of few extension activities in livestock production. Also, there was high access (1.98) to breeding animal, which were probably selected from the herd or sourced from other cattle farmers as the majority (99.2%) always had access to breeding cattle. Access to feeding equipment was high (1.60) and access to milking equipment was also high (1.40). However, access to potable water was low (1.00) as 41.7% never had access to potable water. The average water consumption per live cattle is lower in Nigeria than the world average (FAO, 2019). Land and water are associated resources and farmers often blocked access to water as reported by Saleh *et al.* (2019). Also, 99.2% of cattle farmers never had access to new cattle technologies and 95.8% never had access to cow milking machine. Therefore, access to new cattle technologies and cow milking machine was low as the mean values were 0.01 and 0.04 respectively. Poor livestock extension support ultimately leads to poor technology intake by cattle farmers (Adisa 2015; Pousga *et al.*, 2022) According to the mean value of 12.72 which was used as cut-off point, more than half (51.7%) of the cattle farmers had low access to resources.

**Table 2: Cattle farmers' access to resources (n = 120)**

Access to resources	Always	Occasionally	Never	Mean ( $\bar{x}$ )
Land	50.8	3.2	45.8	1.05*
Capital	100.0	0.0	0.0	2.00
Labour	100.0	0.0	0.0	2.00
Extension trainings	0.0	0.0	100.0	0.00*
Breeding cattle	99.2	0.0	0.8	1.98
Cow milk	78.3	6.7	15.0	1.63
Cattle feeding equipment	73.4	13.3	13.3	1.60
Cow milk equipment	65.0	10.0	25.0	1.40
Potable water	40.8	17.5	41.7	1.00*
New production technologies	0.8	0.0	99.2	0.01*
Cow milking machine	0.0	4.2	95.8	0.04*
<b>Grand mean ( <math>\bar{x}</math> )</b>				<b>1.15</b>
<b>Distribution of access</b>	Percentage	Mean	Min.	Max.
Low access (7 – 12)	51.7%	12.72	07	16
High access (13 -16)	48.3%			

Source: Field survey, 2021

Mean  $\geq$  1.15 indicates high access; mean  $<$  1.15 indicates low access\*

**Hypothesis testing**

The results of multiple regression analysis presented in Table 3 reveal that education and sex were the significant determinants of access to resources (Dependent variable). The highest predictor of access to resources was education ( $\beta=0.38$ ), followed by sex ( $\beta= -0.24$ ). Education made positive direct contributions to access to resources as farmers with formal education had higher access to resources than those who had no formal education. Sex made negative direct contribution to access to resources as male cattle farmers had lower access to resources than female cattle farmers. This is probably because male cattle farmers usually have large herd size than female cattle farmers, which demands access and use of more resources. This finding is in contrast with the findings of Rani and Paul (2016) who asserted that though women participated in farm activities, they had less access to and control over farm resources when compared to men. Other variables were not significant contributors to access to resources. The significance of the model as shown in the table is as follows:  $F(10, 110) = 5.304, p<0.05$ . The model explains 30.3% of the variance ( $R^2 = 0.303$ ).

**Table 3: Multiple regression analysis of the determinants of access to resources (n=120)**

Variables	Unstandardised coefficients		Standardised coefficients	t-value	p-value
	Beta	Std error			
Constant	15.088	2.240		6.736	0.000
Age	0.006	0.031	0.025	0.200	0.842
Sex	-1.105	0.438	-0.235	-2.521	0.013*
Income	5.576E-7	0.000	0.156	1.677	0.096
Years of experience	-0.005	0.024	-0.027	-0.211	0.833
Herd size	-0.008	0.012	-0.071	-0.697	0.487
Household size	0.044	0.026	0.143	1.722	0.088
Education	2.233	0.520	0.376	4.293	0.000*
Contact with extension	0.834	0.505	0.140	1.654	1.654
Marital status	-3.057	1.965	-0.127	-1.556	0.123

\*Significant variables  $p < 0.05$

Model significant  $F(9, 110) = 5.304, p<0.05$ .

R Square = 0.303

Adjusted R Square = 0.246

Source: Field survey, 2021

**CONCLUSION AND RECOMMENDATIONS**

The study found that cattle farmers’ access to land, water, extension trainings and new technologies was low. Generally, more than half of the cattle farmers had low access to resources. This can explain why cattle productivity in Nigeria is low and there are incessant natural resource use conflicts. Education and sex had significant contributions to access to resources. Cattle farmers who had formal education were able to gain more access to resources than those who did not have formal education whereas male cattle farmers’ access to resources was lower than female cattle farmers’ access to resources. Based on the findings of the study, Federal Government should lead and coordinate other stakeholders to implement existing National Livestock Transformation Plan (NLTP) that promote cattle production transition from extensive system to ranching or use of grazing reserves where land, grass, water, extension trainings and technology transfer can be more readily made available to boost cattle production in the

long run to be able to meet the anticipated growing needs of the population for livestock products.

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