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Factors affecting the adoption of improved breeds of livestock (small ruminants) in Ondo state of Nigeria

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ABSTRACT: This study investigated factors affecting adoption of improved breeds of livestock (small ruminants) in Ondo State of Nigeria. Specifically, it identified the socio-economic characteristics of livestock farmers, the information sources by which they became aware of improved livestock breeds, the various available livestock rehabilitation practices and the factors affecting the level of adoption of respondents with respect to improved breeds of livestock by farmers. A multi-stage random sampling technique was used to select one hundred and fifty (150) small ruminant farmers from five selected Local Government Areas (Akure North, Owo, Ose, Akoko South West and Okitipupa). The result of the findings revealed that, majority 38 percent of the respondents were between the ages of 41 and 50 years . Majority (50.0 percent) of the respondents had 1-5 people in their household, the result further revealed that majority of the respondents (96.0 percent) had one form of education or the other. The study also revealed that the majority of the respondents (79.3 percent) earned their monthly income within the range of less than N100,000 and 80.3 percent of the respondents spent less than N10,000 for feeding their livestock monthly . Logistic model, the results showed that increase in age (β = -0.266), household size (β = -0.207), level of education (β = 0.050), stock size (β = 0.240), monthly income of the farmers (β = 0.370), and also reduction in feeding expenses on animals (β = -0.457) had significant influence on the adoption of improved breeds of livestock as showed by wald statistics.

Keywords: Factors, adoption, improved breeds, small ruminants, feeding.

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INTRODUCTION

The livestock industry is an important sector of agriculture. It plays a vital role in providing meat, milk, fish and eggs for human consumption. These products are proteinous in nature and very important to the process of life. Protein is the principal constuent of the body and is needed in food for growth and body repair throughout life. According to Ademosun (1992), the Dutch chemist, Gerald Mulder stated in 1839 that "protein is unquestionably the most important of all known substances. Without it, no life appears possible on our planet". Protein is obtained from both plants and animals but animal protein according to Ademosun (1992) has a higher digestibility and better nutritive value.

Livestock account for one third of Nigeria's agricultural contribution to GDP, providing income, employment, food, farm energy, manure, fuel and transport. These are also one of the major sources of revenue for the government. Traditional livestock production in Nigeria is varied and complex. Livestock, especially ruminants, are the most efficient users of

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uncultivated land and can contribute substantially to crop production (ILRI, 2005).

It has also been stated that the average adult requires about 60 grams of total protein of which 27 grams or 45 percent should come from animals sources (Alake, 1993). The average daily animal protein intake in form of meat, milk, eggs and fish per adult in Nigeria is only 10 grams, which is only 27% of the total recommended minimum animal protein intake of 37 grams per day (Abegunde, 1987).

In addition to the supply of protein livestock serves as a source of farm power in the northern savanna zone and as a source of organic manure to boost crop production, as well as their efficient utilization of otherwise unusable plants to produce meat, milk and other product (ILRI, 2005).

Livestock is an important source of food for many people throughout the world, from the Mediterranean to the Carribbean, from South Africa to South Asia. They also provide useful skins, and in some countries, valuable hair (F.A.O., 1990). The majority of household in the savanna and the subhumid zones of Africa own some livestock, be it cattle, sheep and/or goats, in addition to poultry. These animals contribute substantially to the quality of the human diet as well as to the household economy (ILRI, 2005).

The challenges facing the livestock industry include increasing pressure on grazing land, ineffective livestock marketing system, lack of efficient and hygienic livestock processing facilities, slow cattle growth and low milk yield and trans-boundary animal diseases in addition to migratory pests. But the greatest challenge in achieving food security in Nigeria so far, has been inadequate funding as a paltry three percent of the budget was allocated to the sector up to 2007 while the provision was upped to only seven percent in the year 2008 because of the ominous food inadequacy signal staring the Federal Government in the face (Ruma, 2008).

However, as multi-purposed as livestock is a nations' economy and food security, farmers are still found raising the indigenous breeds of animal types they are used to. Efforts of research have produced improved breeds of such animals with better quality of products, vitality and longevity. The question is: Are the farmer aware? If they are aware, why are they not raising the improved breed? It was in finding answers to these questions that this study was undertaken to determine the factors affecting the adoption of improved breeds of livestock in Ondo state. Specifically, the objective were to:

i. examine the socio-economic characteristics of livestock farmers in Ondo state.
ii. find out various livestock rehabilitation practices in the study area.
iii. determine the factors affecting the level of adoption of respondents with respect to improved breeds of livestock

METHODOLOGY

Study Area

The study was carried out in Ondo state, Nigeria. With respect to the climate of the state, it is tropical with two distinct seasons of rainy and dry seasons. The state is blessed with 12 diurnal sunshine hours and a moderate all year round temperature of around 25^{o}C. Annual rainfall varies from 2,000mm in the southern parts to 1,150mm in the northern extremes. Sequel to the favourite climate condition of the state, the people engage in livestock production such as Cattle, Sheep, Goat, Piggery, Poultry e.t.c.

Sampling Techniques and Sample Size

A multi-stage sampling techniques was employed. Five out of the eighteen Local Government Areas (LGAs) in Ondo State which are prominent in small ruminant production (sheep and goats) were purposely selected for this study. The Local Government Areas were

Akure north, Owo, Ose, Akoko south west and Okitipupa.

Random sampling technique was used to select three communities from each Local Government Area, this made a total of 15 communities that were used for the study. Each community was divided into five wards from which two were randomly selected. From each selected ward, five respondents were interviewed, given a total of 10 respondents per community and 150 for the study.

Data Source

Primary data was used for this study. The Primary data were collected by interviewing farmers with a well designed and pre-tested questionnaire to ensure its reliability.

Method of Analysis

Descriptive statistics and logistic regression model were used to analyse the data. The binary logistic regression model, which is denoted by:

$$\text{Logit}(p) = b_o + b_i x_i + b_2 X_2 + b_3 X_3 \ldots\ldots b_n X_n \ldots\ldots (1)$$

Where,

P = Probability of adoption of improved breeds

b_o = Constant terms

b_1 - b_n = Logistic regression co-efficient

$X_1 - X_n$ = Independent variables

The logit transformation is obtained as the log odds.

$$\text{Odds} = \frac{p}{1-p} = \frac{\text{probability of adoption}}{\text{probability of non-adoption}}$$

$$\text{Logit } p = \text{In}\left(\frac{P}{1-P}\right) \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where In = natural logarithm.

The following independent variables were fitted into the logit regression model in order to investigate their influences on the adoption of improved breeds of livestock.

X_1 = Age of farmers (in year)

X_2 = Household size (in number)

X_3 = Level of education (number of year spend in schools)

X_4 = Stock size (number of animals available)

X_5 = Monthly income (in Naira)

X_6 = Feeding expenses on animals (in Naira)

e = Error term.

RESULTS AND DISCUSSION

The descriptive statistics of the independent variables used in the model are presented in Tables 1, 2, and 3

Distribution of Respondents based on their Socio-economic and Personal Characteristics

Table 1 reveals that 30.7 percent and 38.0 percent represent the dynamic population in the study area in terms of age. Majority of the farmers are in their middle aged thus showing that most of them are still very active in livestock production and thus are more likely to adopt improved breeds of livestock faster than those above 60 years.

The findings showed that 70.0 percent of the respondents were female while 30.0 percent were male. The dominance of the females over the males may be attributed to the fact that more females have the time to take care of few numbers of small ruminants than their male counterparts in the study area. The implication is that males are more interested in crop production, and they should be encouraged to keep livestock. The table revealed that 60.0 percent of the respondents were married. The large percent that were married connote that marriage is highly cherished in rural areas. With this trend there will be provision of family labour for small ruminant production activities in the study area. Analysis from the table indicated that 50.0 percent had family sizes of 1-5 people. Respondents with 6-10 members constituted 38.0 percent while respondents with 10 and above members accounted for 12 percent. The family

Table 1: Distribution of Respondents by their Socio-economic and Personal Characteristics (N=150)

Characteristics	Frequency	Percentage
Age		
21 – 30	9	6.0
31 – 40	46	30.7
41 – 50	57	38.0
51 – 60	29	19.3
Above 60	9	6.0
Sex		
Male	45	30.0
Female	105	70.0
Marital Status		
Single	42	28.0
Married	90	60.0
Divorced	12	8.0
Widow	6	4.0
Household Size		
1-5	75	50.0
6 – 10	57	38.0
Above 10	18	12.0
Level of Education		
Non-formal Education	5	4.0
Primary School	80	52.7
Secondary School	38	25.3
Tertiary school	27	18.0
Monthly Income		
Less than N100,000	119	79.3
100,001 – 200,000	15	10.0
200,001 – 300,000	10	6.7
300, 001 – 400,000	5	3.3
Above 400,000	1	0.7
Monthly Expenses		
Less than 10,000	110	80.3
10,001 – 20,000	17	12.4
20,001 – 30,000	5	3.6
30,001 – 40,000	2	1.5
40,001 – 50,000	2	1.5
Above 50,000	1	0.7

sizes of 1-5 individuals and 6-10 individuals respectively implied the reasonable amount of family labour that may be available for small ruminant production. From Table 1, the majority (96.0 percent) had one form of education or the other. Therefore they would be able to read and understand instructions require technical expertise in animal husbandry and other management practices relevant to improved breeds of small ruminants. It is relevant to note that farmers' monthly income plays significant roles in livestock production because, such income will determine the level of production and will also enhance the clienteles level of judgement in adopting new improved breeds of small ruminants. From the study, the respondents' monthly income was calculated from the monthly sales of animals with addition of the monthly earnings received from other economic sectors (salaries, wages, sales of other goods and so on). The table showed that majority (79.3 percent) of the respondents fell within the range of less than N100,000 as their monthly income, therefore they may not be able to adopt improved breeds of small ruminants because of high cost of management practices involved. It was also revealed that majority (80.3 percent) of the respondents usually spend less than N10,000 for feeding livestock, therefore they may not be able to embark on large animal husbandry in the study area.

Distribution of Respondents Based on the Knowledge of Some Rehabilitation Practices and Frequency of Practices.

From Table 2, respondents were requested to react to a set of rehabilitation practices. There were thirteen statements in all.

(a) Rehabilitation on designing and building farm structure: Sixty eight percent of the respondents said they never carried out such practice. This shows that majority of the respondents did not cherish designing and building farm structure. This could otherwise mean that the majority were practising free range system.

(b) Milking machine now replaced with human hands for the extraction of milk in commercial qualities: Those who never carried out this practice were 71.3 percent. This shows that majority of the respondents were not involved in the stated practice, this may be due to the attribute of technical-know how attached to the machine or the high cost of purchasing the machine.

(c) Use of improved breeds which are more productive : About 80.7 percent reacted to the statement that they never carried out the practice. This shows that majority of the respondents never used improved breeds. This implies that most of the farmers were satisfied with their local breeds, and or they may not have enough capital to purchase improved breeds.

(d) Artificial insemination: The statement showed that 42.7 percent said were they rarely involved in the practice. This shows that few of the respondents participated in artificial insemination due to the sophistication involved in the practice. Therefore, this implies that majority of the farmers released their animals to mate naturally in the study area.

(e) The destruction of vectors e.g. tsetse fly, tick etc: The statement showed that 49.3 percent of the respondents rarely got involved in the practice. This result shows that few of the respondents carried out the practice due to the high cost incurred on purchasing pesticides and insecticides; this implies that more farmers need additional capital for buying

Table 2: Distribution of Respondents Based on their Knowledge on some Rehabilitation Practices and Frequency of Practices

No	Statements	Always		Occasionally		Really		Never	
		Freq	(%)	Freq	(%)	Freq	%	Freq	(%)
A	Designing and building farm structure	11	7.3	7	4.7	30	20.0	102	68.0
B	Milking machine now replaced with human hands for the extraction of milk in commercial quantities.	10	6.7	12	8.0	21	14.0	107	71.3
C	Use of improved breeds which are more productive	6	4.0	7	4.7	16	10.7	121	80.7
D	Artificial insemination	11	7.3	26	17.3	64	42.7	49	32.7
E	The destruction of vectors e.g. tsetse fly, tick etc	21	14.0	44	29.3	74	49.3	11	7.3
F	Administration of drugs	22	14.7	64	42.7	54	36.0	10	6.7
G	Maintaining healthy environment e.g. disinfecting premises regularly	19	12.7	43	28.7	59	39.3	29	19.3
H	De-worming of livestock	60	40.0	35	23.3	16	10.7	39	26.0
I	Dipping and spraying stock with appropriate insecticides	42	28.0	57	38.0	28	18.7	23	15.4
J	knowledge of Good nutrition	39	26.0	60	40.0	34	22.7	17	11.3
K	knowledge of Dehorning	2	1.3	21	14.0	49	32.7	78	52.0
L	knowledge of Castration	8	5.3	27	18.0	68	45.3	47	31.3
M	knowledge of Weaning	46	30.7	46	30.7	39	26.0	19	12.7

chemicals in order to carry out this practice in the study area.

(f) Administration of drugs: The statement showed that 42.7 percent of the respondents occasionally carried out the practice. This result shows that a considerable number of respondents occasionally administered drugs to their small ruminants. This implies that farmers would have less risks to diseases attack, neonatal mortality, increased cost of production and so forth in the study area.

(g) Maintaining a heathy environment by disinfecting premises regularly: The result showed that 39.3 percent of the respondents rarely got involved in the practice. This shows that few of the respondents carried out this practice due to the high cost incurred on purchasing chemicals.

(h) De-worming of livestock: The result showed that 40.0 percent of the respondents were always involved in the practice, meaning that some of the respondents always carried out this practice. This implies that farmers value this practice of de-worming their animals in the study area.

(i) Dipping and spraying stock with appropriate insecticides: The statement showed that 38.0 percent of the respondents occasionally carried out such practice. This implies that farmers would have less pest attacks on their animals in the study area.

(j) Good nutrition: Forty percent of the respondents occasionally carried out this practice. This implies that good nutrition is given to the animals at the right time will give them good health and timely maturity.

(k) Dehorning: Fifty two percent of the respondents said that they never got involved in such practice. The result shows that majority of the respondents never carried out the practice, this may be ascribed to religion, tradition or taboo attached to this practice in the study area.

(l) Castration: From the statement, 45.3 percent of the respondents claimed that they rarely carried out castration. This shows that few respondents carried out the practice as may be a result of religion, tradition or taboo in the study area.

(m) Weaning: The statement revealed that 30.7 percent of the respondents claimed that they always wean their animals. The result shows that majority of the respondents always carried out this practice. This implies that farmers value the practice of weaning their animals at the right time in the study area.

Factors Affecting Respondents' Level of Adoption

From Table 3, 50.7 percent of the respondents said they would occasionally adopt improved breeds if weather and feed available favoured the rearing of improved breeds. The final decision of the first factor indicated "Affected". This implies a reasonable number of the farmers considered weather and livestock feed availability as an important factor that would make them to adopt improved breeds if it is favoured.

Diseases Control: About 42.7 percent said they would never adopt improved breeds based on diseases control . The final decision on the second factor indicated "Did not affect". This implies that majority of the respondents would not adopt improved breeds if they could not control the diseases affecting them.

Table 3: Distribution of Respondents Based on Factors Affecting their Level of Adoption

No	Factors	Always		Occasionally		Really		Never		Total Score	Mean Score	Decision
		Freq	(%)	Freq	(%)	Freq	%	Freq	(%)			
A	Weather and Feed availability	48	32.0	76	507	24	16.0	2	1.3	470	3.13	Affected
B	Diseases control	11	7.3	43	28.7	32	21.3	64	42.7	301	2.00	Did not affect
C	Animal traction	39	26.0	34	22.7	8	5.3	69	46.0	343	2.29	Did not affect
D	Market system	77	51.3	66	44.0	2	1.3	5	3.3	515	3.43	Affected
E	Cultural preference including religion	51	34.0	46	30.7	28	18.7	25	16.7	423	2.82	Affected
F	Conflict with crop farming	15	10.0	54	36.0	44	29.3	37	24.7	347	2.31	Did not affect
G	Sophistication of raising improved breeds	4	2.7	31	20.7	35	23.3	80	53.3	259	1.73	Did not affect
H	Transportation	18	12.0	93	62.0	34	22.7	5	3.3	426	2.84	Affected
I	Land space	15	10.0	77	51.3	57	38.0	1	0.7	407	2.71	Affected
J	Housing problem	14	9.3	75	50.0	59	39.3	2	1.3	401	2.6	Affected

Key for decision

≤1.50	=	Never
1.51 – 2.50	=	Rarely
2.51 – 3.50	=	Occasionally
≥3.51	=	Always
Further dichotomized to		
<2.50	=	Did not affect
>2.51	=	Affected

Animal Traction: Also, 46.0 percent of the respondents said they would never adopt improved breeds based on animal of traction. The final decision on the third factor indicated "Did not affect". This implies that majority of the respondents would not adopt improved breeds of small ruminants if they could not put them to work on their farms.

Market System: Fifty one percent said they would always adopt improved breeds based on market system . The final decision on the fourth factor indicated "Affect". This implies majority of the respondents would adopt improved breeds of livestock if market prices are favoured in the study area.

Cultural Preferences Including Religion: About 34.0 percent of the respondents said they would always, and 30.7 percent said they would occasionally adopt improved breeds respectively . The final decision on the fifth factor indicated "Affected". This implies that the majority of the respondents considered cultural preferences including religion as one of the important factors that would make them to adopt improved breeds if it is favoured in the study area.

Conflict with Crop Farming: Thirty six percent of the respondents said they would occasionally adopt improved breeds and 29.3 percent said they would rarely adopt respectively.

The final decision on the sixth factor indicated "Did not affect". This implies that some respondents would not adopt improved breeds if rearing of them would not enable the farmers to have time for crops farming in the study area.

Sophistication of Rearing Improved Breeds: Fifty three percent of the respondents said they would never adopt improved breeds . The final decision on the seventh factor indicated "Did not affect". This implies that majority of the respondents would not adopt improved breeds if they could not handle the management practices of rearing them.

Transportation: Six two percent said they would occasionally adopt improved breeds of livestock. The final decision on the eighth factor indicated "Affected". This implies that a considerable number of respondents would adopt improved breeds of small ruminants if transportation favoured them as a factor of conveying improved breeds to their farms in the study area.

Land Space: About 51.3 percent of the respondents also said that they would occasionally adopt improved breeds of livestock. The final decision on the ninth factor indicated "Affected". This implies that a considerable number of respondents would adopt improved breeds if there are enough land spaces to accommodate them in their farms.

Housing Problem: Finally, 50.0 percent of the respondents said they would occassionally adopt improved breeds. The final decision on the tenth factor indicated "Affected. This implies that a reasonable number of respondents would adopt improved breeds if there are no problems associated with livestock house in the study area.

Result of Logit Analysis

Table 4 showed the result of the hypothesis tested using the Binary Logistic Regression Model.

Binary stepwise logistic regression analysis was employed to investigate the socio-economic factors that determine the adoption of improved breeds of livestock. The dependent variable Y is the adoption, which is binary variable. Those that adopted improved breeds are coded 1, while those who did not adopt improved breeds are coded O.

All the (6) postulated regressors were found to have significant effects on the adoption of improved breeds of livestock. Table 2 showed also the model chi-square, which is 112.6 and was significant at 0.05 level. The general predictive power of the model was high as revealed by the pseudo-efficient (R^2) of

Table 4: Empirical Result of the Binary Logistic Regression Model

Variable	Logit Co-efficien	Standard error	Wald statistic	Significant Level
Constant	0.608	0.803	0.572	0.447
Age (X_1)	-0.226	0.240	8.852 **	0.035
Household size (X_2)	-0.207	0.321	8.662 **	0.035
Level of education (X_3)	0.050	0.280	9.778 **	0.009
Stock size (X_4)	0.240	0.229	6.102**	0.004
Monthly income (X_5)	0.370	0.000	9.744**	0.000
Feeding expenses on animals (X_6)	-0.457	0.000	7.640**	0.002

Model chi-square = 112.646
R^2 = 0.813

** Significant at 0.05

CONCLUSION

Having considered the various scenarios with respect to factors affecting the adoption of improved breeds of small ruminant, the summary of the result in this case favourably support the acceptability and adoption of improved breeds of livestock. Based on the factor affecting respondents level of adoption from the finding, many respondents showed that they would occasionally adopt improved breeds of livestock as judged by some stated factors. The stepwise logistic regression method selected age, household size, level of education, stock size, monthly income and feeding expenses on animals as the significant variables that determine the probability of adopting improved breeds of livestock based on the wald statistics. This study has contributed in no small measure to present drives toward rehabilitating livestock production by way of providing relevant information about the factors that will determine farmers' level of adoption of improved breeds. Therefore substantial efforts must be made to motivate farmers through extension agents to embrace improved breeds with good husbandry and effective management practices in order to improve on the old methods of raising livestock for increased production.

REFERENCES

ABEGUNDE, T. O. (1987). "Second Livestock Development Project Western Zone". An Address Delivered at the Seminar on Second Livestock Development Project, April 22nd – 24th, 1987, Kwara Hotel, Ilorin.

ADEMOSUN, A. A. (1992). "Livestock Production in Nigeria" "Perspective and Prospects. A Lecture Delivered at the Ondo State Farmer's Congress Workshop, Akure, August 27th, 1992.

ALAKE, J. O. (1993). "Proposals for Dry Season Fattening Scheme for Small Ruminants in Ondo State". Paper Presented at the Ondo State Council of Agricultural Meeting, April 1-2, 1993.

FOOD AND AGRICULTURAL ORGANIZATION - FAO (1990). "Dairy Goat Production". Published by FAO, United Nations. Pp 64.

RUMA, Z.A. (2008). "Opening up Nigeria's Agriculture to meet domestic, world market demand". Report presented on resources in response to food crisis, and price hike currently bedeviling the Nigeria nation and the world. Nigeria Tribune, Thur. 1st May, 2008. Pp3.

LIVESTOCK RESEARCH IN NIGERIA (LRN) (2008). Livestock Research in Nigeria, Keynote Address by Prof. Saka Nura at: Director National Animal Production Research Institute Ahmadu Bello University, Zaria. From http://www.odi.org/into50er/webpub/falldocs/x546307.htcon.

OTESILE ,E .B (1998). The impact of disease on productivity of Sheep and Goat. Paper presented at workshop of Nigeria Vet. Med. Association. Ondo State Branch At Akure. April, 1998.

WOOD, G.A.R and LASS, R.A. (1989). Ruminant: Longman Scientific Technical. U.S.A

ILRI (2005). Modern Breeds of Livestock Survey. Report by International Livestock Research Institute to IITA , Ibadan, Nigeria, **ILRI (2005).** Modern breeds of livestock survey. Report by International Livestock Research Institute to IITA, Ibadan Nigeria.

INTERNATIONAL LIVESTOCK CENTRE FOR AFRICAN (ILCA). (1980). Livestock Research ILCA (1980): Annual Report International Livestock Centre for African. Addis-Ababa, Ethiopia Pp. 2-4. Called from http://www.worldbank.org/html/cigar/25years/live.html(2009).

ILCA (1982). Trypanotolerant Livestock in West and Centre Africa. (2 Vols.) ILCA MONOGRAPH 2. ILCA Addis-Ababa.

FARINDE, A.J. (2006). "Agricultural Extension Methodology". Workshop Paper on Capacity Building for Agricultural Extension Officers. Published by Osun State Government Pp. 84.

LAGATES, J.E. and EVERETT, J.W. (1990). Breeding and Improvement of Farm Animals. Published by MC GRAW-HILL, COMPANY, New York. Pp. 8-9

OJO, M.O, BALOGUN, E.D. and EVBOUOMOSUN, G.O. (1993). "Sustaining Agricultural Production in a Deregulated Economy". *Journal of Economic Financial Review*, CBN **31**:2

MCDOWELL, R.E. and BOVE, L. (1977). The goat as a producer of meat. (Cornel Int'l Agric. Mimeo) Cornell University Press, Ithaca, New York.