NIGERIAN AGRICULTURAL JOURNAL
ISSN: 0300-368X
Volume 54 Number 2, December 2023 Pg. 273-280
Available online at: http://www.ajol.info/index.php/naj
https://www.naj.asn.org.ng

Effects of Rabbitry Technology Adoption on Income and Livelihoods of Rural Households in Bende Local Government Area, Abia State, Nigeria

Oti, E. and Ukonu, C. E.

National Root Crops Research Institute, Umudike.
Corresponding author's email: is erastusdavid4real@gmail.com

Abstract
The study investigated the effects of farmers' adoption of rabbitry technologies on the income and livelihood of rural households in Bende L.G.A. of Abia State, Nigeria. One hundred farmers were selected randomly using the simple random sampling technique. Data were collected by the use of a pre-tested questionnaire. The data generated were subjected to descriptive (frequency, percentages, and inferential (regression) statistical analysis. The result revealed that 32% of the farmers fell between the ages of 26 – 35 years old. While the majority (72%) of the farmers were males. Forty-seven percent (47%) of the farmers made a monthly income of ₦100 - ₦899 from the sale of rabbits and other rabbit products. Information for the adoption of rabbits was obtained from neighbours/friends and other sources of information. The adoption level of the technological package was with a grand mean adoption score of 2.26. The regression analysis showed that age (X_1 = 0.013, $P < 0.05$) and monthly income (X_7 = 0.001, $P < 0.05$) positively affected the adoption of the technologies. Rural households can significantly contribute to reducing poverty, enhancing their nutritional condition, and enhancing their standard of living by engaging in improved rabbitry production technologies. Improved rabbitry production had a significant contribution to the economic situation, way of life, and well-being of rural households. Females are to be encouraged in rabbit production as livelihood diversification. Also, banks, governments, and non-governmental organizations must offer farmers especially youths easily accessible and reasonable loan facilities as this will boost their revenue, promote adoption and reduce poverty levels among the masses/rural households. Training on forage production and storage is also recommended. Television viewing centres and Radio forums will also promote the adoption of improved rabbitry technologies.
Keywords: Livelihood Diversification, Poverty Reduction, Information Sources, Economic Impact and Loan Facilities

Introduction

As a country that has over 40.1% poverty rate (which is more than 85 million people), Nigeria is not protected from this threat (National Bureau of Statistics, 2019). In general, agriculture plays a remarkable role in Nigeria's economic development, especially in poverty reduction. Agriculture remains the backbone of the Nigerian economy. Farmers who rely on subsistence or small-scale farming as their primary means of survival make up a larger proportion of the world's impoverished people. As a consequence, the expansion of agriculture is promoted as an important and successful global strategy for reducing poverty (Janvry and Sadoulet, 2010; Hazell *et al*., 2010; Ogutu and Qaim, 2019; World Bank, World Data Bank, 2015). One of the main drivers of the rural and national economies, and special relevance to the poor, is livestock farming. Pica-Ciamarra *et al*., (2015) recognize that livestock farming diversifies production and lowers the risks of production losses due to crops destroyed by unfavourable climatic conditions, vices or diseases (Pica-Ciamarra *et al*., 2015). Policymakers and researchers continue to place a high priority on the need to lower the high rate of poverty and food insecurity, especially in rural Sub-Saharan Africa (Mukaila, *et al*., 2022). Eight hundred and eleven million people worldwide are food insecure (FAO, *et al*., 2021). Over 250 million people in Africa are undernourished, with about 239.1 million of them living in Sub-Saharan Africa. Food insecurity and/ or undernourishment have thus continued to rise within this region (FAO, *et al*., 2021). According to Omondi *et al*. (2017), livestock farming serves a variety of useful functions, such as providing employment for farmers and members of their families, serving as a kind of insurance, store for wealth, and promoting gender equality by creating opportunities for women (Omondi *et al*. (2017). Livestock production can also increase households' income and standard of living (Akinola, 2009). One of the few economic opportunities available to poor masses in developing nations is livestock

farming (Pica-Ciamarra, *et al*., 2015; Steinfeld, *et al*., 2006). Small livestock or micro-livestock provide less financial risk than large livestock because they require less initial investment (Peacock and Hastings, 2011; Upton, 2004). Panin and Mahabile, (1997) observed that the financial value of livestock to smallholder farmers in rural Botswana households with small ruminants typically earned $11.27 per animal on average, or 34% of their initial investment and contributed an additional 15% to the household income (Panin and Mahabile, 1997). Studies have shown that one of the main methods used by low-income households to generate revenue is poultry production (Iannotti and Lesorogol, 2014). The selling of chicken and poultry products gives families the funds to meet other needs and is considered an empowerment strategy (Aboe, *et al,* 2006; Iannotti and Lesorogol, 2014). In many developing nations, rabbit farming is a vital source of income. Numerous research from African nations have discovered that rabbit farming strongly affects several rural household livelihood indicators, including nutrition, income and food (Akinsola, *et al*., 2021; Mutsami and Karl, 2020). The smallholder farming community can benefit immensely from micro-livestock farming because it has the advantage of producing small scale quickly growing animals for meat and other uses (Okoli, *et al*., 2002). Initially, rabbit farming was a hobby or a way to make a living but with time, there has been a transition in rabbit farming from a non-commercial to a commercial scale (Mailu, *et al*., 2013) Commercialization here refers to the transition from subsistence to commercial agriculture which is fully profit-oriented.

Factors that favour sustainable rabbit farming in poor masses or rural dwellers are Rabbits can first be grown on a diet free of grains. The ability to raise good rabbit meat (protein) on garden fodder is of great advantage in developing nations given the rising food prices and rising demand for grains. Also, Rabbits are known for their high fecundity, high feed conversion rates, quick growth rates, early maturity and short generation intervals. Under good management practices, rabbits can litter more than 40 kits a year, compared to a calf for a cow and up to two kids for a goat (Dairo, *et al*., 2012). Also, In contrast to many of the larger ruminants, rabbits are said to be odourless, noiseless, easy to house even in small spaces in the compound and capable of adapting to a variety of habitats (Anthony and Madu, 2015). There are several benefits embedded in livestock farming for the farmers and their households (Azzarri, *et al*., 2014; Randolph, *et al*., 2007; Swanepoel, *et al*., 2010;). In poor rural households in developing nations, there is substantial evidence that livestock farming improves nutrition, enhances economic stability, and lowers gender inequalities (Herrero, *et al*., 2009; Swanepoel, *et al*., 2010; World Bank, 2009; World Bank, 2012). Unlike in large animal farming like cattle (Ashley, *et al*., 1999), which typically requires substantial capital investment, labour, as well as access to suitable large pastures. These limitations prevent the poor from getting involved. Many of the studies (Adedeji, *et al*., 2015; Chah, *et al*., 2018; Daodu, *et al*., 2021), on small livestock farming in Nigeria, are majorly focused on the profitability, efficiency and marketing of rabbits. There is limited research examining how engagement in rabbit farming affected the households' livelihood and income. Hence, the a need for this study.

This study seeks to provide answers to the question of: what are the contributions of rabbit income to the households' livelihood and what is the adoption rate of rabbitry technologies? Specifically, this study describes the socioeconomic characteristics of respondents, evaluates the effects of rabbit income on the households' total income, examines the effects of rabbit production on household livelihood and identifies the constraints to rabbit production in the area. This study adds to the body of knowledge by supplying factual information on the effects of rabbit production on rural households and the major drivers of their production income. This evidence will serve as a guide for agricultural policy and planning in the design of small livestock intervention targeted at improving the rural sector. In the rural communities, the bulk of food crop, cash and livestock production takes place under traditional systems without the use of modern technology power. Usually, farm holdings are small and output is low due to the use of local farming techniques for production. These traditional and farm practices pose a formidable obstacle in the way of agricultural modernization (Onuekwusi and Okezie, 2006). There has been rising global awareness of the virtues of rabbit meat production in developing countries as an alternative means of alleviating the world food shortage. Development–oriented research often produces technologies that have a high potential for benefiting large segments of the population, particularly the resource–poor rural people. However, technologies can enhance socio–economic welfare by improving productivity or raising income levels and are of no value if they are not relevant to people's high-priority problems and needs and as a consequence, are neither adopted nor applied by those for whose advantages are intended (Vangara and Mcdocken, 1990).

According to Lukefahr (1992), efforts have continued to improve the production efficiency of commercial rabbit raising. Artificial insemination, scientifically formulated rabbit diets, specialized genetic lines of breeding stock, computer processing of herd records and specific pathogen-free stock, demonstrate the state–of–the–art level of intensive operations found mostly in rabbitries in developed countries.

Extension services are set up usually to teach, improve and encourage the knowledge, skill and attitude of the rural people. Higher levels of production efficiency in the provision of goods and services are attempted to increase their per capita income, quality of life and general welfare. The overall objectives of the extension programmes in the Agricultural Development Programmes (ADPs) are to establish and organize an orderly and well-scheduled performance-oriented extension service capable of motivating the resource–poor farmers to adopt relevant and adaptable

technology. This is to achieve significant improvements in agricultural production practices, which 5n turn will enable increases in food production and income generation capacities of the farmers (Amalu, 1998).

The ADP extension service sub-programme strives to achieve this noble function through the implementation of Unified Agricultural Extension Service by incorporating in its programme:

a. formation of contact farmers into groups for purposes of training and dissemination of technical messages on crops, livestock, fisheries and agro-forestry species and horticultural materials;
b. dissemination of information on local sourcing of feeds to livestock farmers and fishermen and improved management practices on livestock breeds (poultry, sheep, goats, piggery, rabbitry, etc and fisheries;
c. demonstration of modern but low-cost hand and mechanical / tools for food Agro-processing, fish processing, and livestock processing;
d. provision of crops, animals and fishery health care services at various centres and
e. encouragement of resource-poor farmers to adopt integrated primary systems involving livestock, crops, rice and fish keeping among others (Amalu, 1998).

RESEARCH METHODOLOGY

Study Area

Bende Local Government Area is in Abia State Nigeria in the present Abia North Senatorial zone arrangement. It is bounded on the North by Ivo and Afikpo South Local Government Areas of Ebonyi State, South-west by Umuahia North L.G.A, South by Ikwuano L.G.A (both of Abia State) and at the extreme South-South by Akwa-Ibom State. Bende L.G.A. is located within longitude 7 30"-7 45" East and latitude 5 3"-5 45" North, with a mean annual temperature of 25.5 27.5 C, mean annual rainfall of 2000-2,250 mm/yr, mean daily relative humidity of 70%-80%. The evapotranspiration is between 1350-1450mm|yr. The elevation of Bende L.G.A. is within 200-400 feet (61-122m). Bende L.G.A. of Abia State is made up of 10 villages Alayi, Bende, Igbere, Item, Itumbauzo, Ozuitem, Ugwueke, Umuhu, Umuimenyi, and Uzuakoli. It has its headquarters at Bende. It has a total landmass of 679 square kilometres with a population of about 132,271 (1991 census). Goats, sheep, poultry, pigs and rabbits are the major livestock kept. Bende L.G.A. of Abia State falls within the tropical rainforest where the vegetation is mostly (evergreen) and made up of giant trees and shrubs. The soil is prevalently loamy. Crop production is the major occupation. Other agricultural activities are hunting, fruit gathering and lumbering. (Abia State Ministry of Land and Survey).

Sampling techniques

The sampling followed the ADP's block and cell pattern. Bende is within the Ohafia agricultural zone and has 3 main blocks: Uzuakoli, Bende and Umunna, each having 7 circles. Fifteen (15) rabbit farmers were randomly selected from each circle (cell) giving a sample size of 105 farmers. Out of the 105 farmers selected, only 100 farmers participated until to end of the survey.

Data collection

Data were collected with the aid of a structured questionnaire, which was designed to elicit information from the farmer on such areas as farmer characteristics, such as age, education, sex, and sources of information on rabbitry technologies, number of rabbits kept, why rabbits are kept, feeds, reasons for adoption of technologies or not adopted.

Analytical technique

Percentages and frequency distribution were used to analyse the socio-economic characteristics of rabbit farmers and the determination of their major sources of information on improved rabbitry farming. The determination of the level of adoption of improved rabbitry technologies was analyzed by the classical adoption model (AIETA) while the determination of factors that influence the adoption of rabbitry technology was achieved by the use of multiple regression analysis. Using the Likert-type scale of 1-6 the classical adoption model was used to determine the level of adoption score. 1 represents — unawareness, 2 — is aware, 3 — *is* interest, 4 = is evaluation 5 = is trial and 6 = is adoption. The scale multiplied the number of respondents at each stage and the values added to obtain the total adoption score for each technology. The mean adoption score was completed by dividing each adoption score by the number of respondents and the grand mean was obtained by adding the means and dividing by the number of technologies studied.

In analyzing the factors influencing the adoption of improved rabbitry technologies the ordinary least square (OLS) regression model was used.

Regression Model

$Y = f(X_1, X_2, X_3 \text{ ------} X_7 + U)$

Where:

Y_1 = Adoption index (number of technologies adopted by respondent)

X_1 = Age of farmer (years)

X_2 = Household size (number)

X_3 = Level of Education (Years spent in school)

X_4 = Farming Experience (Years spent in fanning)

X_5 = Farm Size (Number of rabbitry kept)

X_6 = Membership of Co-operative Society (dummy variable, if member '1' if not '0')

X_7 = Level of Income (Income from sale of rabbit per month)

U = Error term.

The factors affecting the adoption of improved rabbitry technologies were determined by regressing the adoption index against the selected independent variables. To determine the equation of best fit, four functional forms of the model - linear, exponential, double-logarithm (Cobb Douglas) and semi-logarithm were fitted to the data by the method of ordinary least

squares. The double-log functional form was chosen based on the explanatory power of the model R^2, its conformity with the *a priori* expectation, magnitudes of expected coefficient, significances of the model and overall significance of the model (F - ratio).

Results and Discussion

Socio-economic characteristics of farmers

This is made up of two sections, the interpretation of the results and presentation and also the determination of the relationships between the variables measured in the study. It shows the farmer's distribution by socio-economic characteristics.

Distribution of respondents according to age

Table 1 revealed that 32% of the respondents were of the age range of 26-35 years, followed by the age range 15-25 years which had 22% while 46-55 had 15%, and 56-65 had 9%.

Distribution of Respondents According to Marital Status

Table 2 shows that majors (51%) of the respondents were single while 49% were married. This could be an indication of the deteriorating economy of the state; therefore, your farmers found it more difficult to settle/marry and get children who could help in agricultural activities (Asiabaka, 2002).

Distribution of respondents according to sex

Table 3 revealed that the majority (72%) of the respondents were male farmers while 28% were female farmers.

Distribution of Respondents According to Household Size

The findings revealed that household sizes 1-5 had 65% 6-10 had 31% 11-15 had 4%.

Distribution of Respondents according to Major Occupation

In Table l, civil servants had 28% of the total population interviewed. Other farming activities had (23%). Other major occupants of the area are Traders which had (15%) of the population, students (14%), Artisans (17%) and retired 3%.

Distribution of Respondents according to the means of introduction into rabbit farming

In Table 7, neighbour/friend had (35%) of the total respondents, which is an indication of a clustered or nucleated settlement pattern. According to Ebii, (2000) Extension service agents would find it relatively easy to get the villagers together to pass on information. Family members (7%) and ADP activity had 9% while mass media only 2%.

Distribution of Respondents according to Monthly Income from Sale of Rabbits

Table 8 showed that rabbit farmers who earned ₦100-₦899 were 47%, those who earned ₦900-₦1699 were 32%, those who earned ₦1700-₦2499 were 16%, others who earned ₦2500-₦3299 were 4% while 1% made up ₦3300 and above.

Distribution of Respondents According to Factors of Influence into Rabbitry Production

In Table 9 scarcity of meat had 20% self-employment had 17%, ADP's influences had 12%, economic power had 10%, educational background had 7% and others had 34%.

Distribution of Respondents according to membership of the Cooperative Society

Table 10 shows that the majority (60%) of the respondent farmers did not belong to any cooperative society while 40% belonged to some form of cooperative society.

This pointed out why few were aware of some innovations because they belonged to cooperative societies where innovations would have been taught.

Distribution of Respondents according to Problems Faced by Farmers

The distribution of respondents according to problems faced by farmers in Table 11 shows high cost of feeds had 43% in the 'YES' category and 10% in the 'NO' category. Inadequacy of breeding stock had 40% in the 'YES' category and 13% in the 'NO' category. High-cost feed had 41% in the 'YES' category and 12% in the 'NO' category. Lack of ADP assistance had 42% in the 'YES' category and 11% in the 'NO' category.

Distribution of farmers according to the stages in the adoption process of improved technologies

The analysis in Table 12 shows that the grand mean adoption score is 2.26 where NA represents Not Aware, A=Aware, I=Interest, E= Evaluation, T= Trial, A= Adoption, D= Discontinued. Three out of the six technologies were well-evaluated by farmers. The mean adoption scores were, Feeding rabbits with feeds (2.82), Cleaning of Hutches morning and evening (2.68) and stocking of males to ten females (2.47) which were all above the grand mean adoption score of 2.26.

Regression Estimates of Improved Rabbitry Technologies

Table 13 is the result of multiple regression analysis of factors affecting adoption of improved rabbitry technologies, the R^2 (Coefficient of multiple determination) is 0.404, which means that 40.4% of the variations in adoption of the technologies are explained by the variables included in the model. Age and Monthly income were found to be significant determinants of the adoption of improved rabbitry technologies. Age and Monthly Income were significant at a 1% level. The level of education was significant at 5% level. The coefficient of Household size, Farming Experience, Farm Size and Cooperative Society membership were all found to be negatively related to the adoption of improved rabbitry technologies. The null hypothesis that there is no significant relationship between the adoption of improved rabbitry technologies and the socioeconomic characteristics of farmers was rejected because Age and Monthly Income were significant.

Conclusion

The improved rabbitry technologies were adopted in varying degrees. Age and Monthly income were positively related to adoption and were significant at a 1% level. The null hypothesis that there is no significant relationship between the adoption of improved rabbitry technologies and socioeconomic characteristics of farmers in Bende L.G.A of Abia State was rejected because Age and Monthly income level were significant

and the alternate hypothesis was accepted because of the significant relationship. High cost of feeds and other inputs were identified as the highest problems faced by the farmers and therefore affected adoption.

Recommendations

Based on the findings of this study, the following recommendations were made

1. Youth and other young people should be given loans to participate in rabbit production on a commercial scale to increase their income. This could be achieved by adopting improved rabbitry technology.
2. Federal and State governments should pay more attention to rabbit production by adequate facilitation of the ADPs for proper dissemination of information.
3. Television and Radio stations and other mass media should be charged with the transmission, publication and promotion of improved rabbitry technologies and rabbit meat.
4. Finally, the government should provide feed mills in each local government area to tackle the problem of feed and other inputs in rabbit production.

References

Aboe, P.A.T., Boa-Amponsem, K., Okantah, S.A., Dorward, P.T. and Bryant, M.J. (2006). Free-range village chickens on the Accra Plains, Ghana: their contribution to households, *Trop. Anim. Health Prod.* 38 (3): 223–234.

Adedeji, O.A., Osowe, C.O., Folayan, J.A. (2015). Socio-economic characteristic and profitability analysis of rabbit production in Ondo state, Nigeria. *European Journal of Physical Agricultural Science.* 3 (10): 19.

Akinola, L.A.F. (2009). Economics of rabbit production in Gokana local government area of Rivers State, Nigeria. *Journal of Environmental Ecology*. 27 (4A): 1685–1688.

Akinsola, G.O., Odum, E.E.B. and Oyedapo, O.O. (2021). Effects of Cuniculture Commercialization on household poverty status in south-western Nigeria. *Pesquisa Agropecu´aria Gaúcha*. 27 (1): 26–42.

Amalu, U.C. (1998). Agricultural Research and Extension Delivery Systems in Sub-Sahara Africa. University of Calabar Press. pp 18-30.

Anthony, V. and Madu, I. (2015). Survey of the current status and seasonal problems associated with rabbit production in the Kaduna metropolis. *Journal of Basic and Applied Research Biomedical.* 1 (1): 36–39.

Anyanwu, A.C. (1990). Unpublished Module of Communication in Extension. University of Nigeria Nsukka. pp 10-35.

Ashley, S., Holden, S. and Bazeley, P. (1999). Livestock in Poverty-Focused Development, Somerset, UK, Pp. 1–95.

Asiabaka, C.C. (2002). Agricultural Extension Handbook for Development Practitioners. Molsyfem United Services Rivers State. Pp.19.

Ayinde, I. A. and Aromolaran A.B. (1998). Economics of Rabbit Production in Abeokuta South, Nigeria. Nigerian *Journal of Animal Production*. 25(1):30.

Azzarri, C., Cross, E., Haile, B. and Zezza, A. (2014). Does livestock ownership affect animal source food consumption and child nutritional status? Evidence from rural Uganda, in Evidence from Rural Uganda, World Bank Policy Research Working Paper, 2014.

Chah, J.M., Attamah, C.O., Nnodim, M.E. (2018). Disease management practices among rabbit farmers in Enugu State Nigeria. *Journal of Agricultural Extension*. 22 (3): 130–138.

Dairo, F.A.S., Abi, H.M. and Oluwatusin, F.M. (2012). Social Acceptability of Rabbit Meat and Strategies for Improving its Consumption in Ekiti State, Southwestern Nigeria. *Livestock research for rural Development Journal.* 24: 6.

Daodu, O.B., Shaibu, J.O., Richards, A.B., Folaranmi, E.B., Adegoke, S., Ajadi, A. and Oluwayelu, D.O. (2021). Detection and molecular characterization of a first isolate of rabbit haemorrhagic disease virus in Nigeria, *Tropical Animal Health Production Journal*. 53 (1): 1–10.

Ebii, C.O. (2000). A Guide in Rural Sociology for Students of Agricultural Sciences in Developing Economy. Snap Press Ltd, Enugu. P65.

FAO, IFAD, UNICEF, WFP and WHO. (2021). The state of food security and nutrition in the world, in: Transforming Food Systems for Food Security, Improved Nutrition and Affordable Healthy Diets for All, FAO, Rome.

Hazell, P., Poulton, C., Wiggins, S. and Dorward, A. (2010). The future of small farms: trajectories and policy priorities, *World Dev.* 38 (10) 1349–1361.

Herrero, M.P., Gerber T. P., and Reid, R.S. (2009). Livestock, livelihoods and the environment: understanding the trade-offs. *Curricula Opinion Environmental Sustainability Journa*l. 1: 111–120.

Iannotti, L. and Lesorogol, C. (2014). Animal milk sustains micronutrient nutrition and child anthropometry among pastoralists in Samburu, Kenya, *Am. J. Phys. Anthropol*. 155 (1): 66–76.

Janvry, A.D.E and Sadoulet, E. (2010). Agricultural growth and poverty reduction: additional evidence. *World Bank Res. Obs.* 25 (1): 1–20.

Lukefahr, S.D. (1992). The Rabbit Project Manual. A Trainer's Manual for Meat Rabbit Project Development. A Heifer Project International. USA.pp2.

Lukefahr, S.D. and Cheeke, P.R. (1990). Livestock Research for Rural Development, Rabbit Planning Strategies for Developing Countries, Practical Consideration. *African Journal of Livestock Extension.* 2(2).

Mailu, S., Wanyoike, M. and Serem, J. (2013). Rabbit Breed Characteristics, Farmer Objectives and Preferences in Kenya: A Correspondence Analysis, Munich Personal R. Archive paper. 48476.

Matthew, D.A. Matthew, O.A. Muhammad, A.B., Kudirat, F.A. and Adeola, A.O. (2023). Effects of

rabbit production on income and livelihood of rural households in Nigeria. *Heliyon Journal*. 9: 18568. 1-10.

McCrosky, R. (2002). Basic Rabbitry Management for Home or Commercial Meat Production. Publication 1020A, Canadian Centre for Rabbit Production Development, Survey, BC Canada. (Online Guide).

Mukaila, R., Falola, A., Akanbi, S.U., Egwue, L., Obetta, A. and Onah, T.L. (2022). Effects of vegetable production on income and livelihood of rural households in Nigeria, Mustafa Kemal Üniversitesi Tarım Bilimleri Dergisi 27 (2) 213–223.

Mutsami, C. and Karl, S. (2020). Commercial rabbit farming and poverty in urban and peri-urban Kenya. *Journal of Front Veterinary Science*. 7: 353.

National Bureau of Statistics, (2019). Poverty and Inequality in Nigeria [Executive Summary], National Bureau of Statistics.

National Research Council (1991). Micro Livestock: Little-known Small Animals with a Promising Economic Future. National Academy Press, Washington, DC.

Nwachukwu, I, (2003). Agricultural Communication. Principles and Practice. Snap. Press Lte, Enugu. Pp.21.

Nwachukwu, I. and Onuekwusi G.C. Agricultural Extension and Rural Sociology. Snap. Press Ltd. Enugu. 101-158.

Ogutu, S.O. and Qaim, M. (2019). Commercialization of the small farm sector and multidimensional poverty, World Bank, World Data Bank. *World Dev.* 114: 281–293.

Okoli, I.C., Okoli, C.G. and Ebere, C.S. (2002). Indigenous livestock production paradigms revisited: a survey of plants of ethnoveterinary importance in southeastern Nigeria. *Journal of Tropical Ecology.* 43 (2): 257–263.

Omondi, I., Rao, E.J., Karimov, A.A. and Baltenweck, I. (2017). Processor linkages and farm household productivity: evidence from dairy hubs in East Africa. *Agribusiness Journal.* 33 (4) 586–599.

Onuekusi, G. C. (2001). Adoption of Improved Technologies by Farmers in Akwa-Ibom State, Nigeria; Implications for Extension. Proceedings of 36th Annual Conference, Agricultural Society of Nigeria F.U.T. Owerri. Oct.20-24. Pp368-371.

Onuekwusi, G.C. and Okezie C.A. (2006). Adoption of Improved Rabbitry Technology among Youth in Umuahia South L.G.A. of Abia State, Nigeria. *Nigeria Journal of Extension Service.* 2(1):65-69. Medwell.

Panin, A. and Mahabile, M. (1997). Profitability and household income contribution of small ruminants to small-scale farmers in Botswana. *Small Ruminant Research Journal*. 25 (1): 9–15.

Peacock, C. and Hastings, T. (2011). Meru dairy goat and animal healthcare project. *International Journal of Agricultural Sustainability*. 9 (1): 203–211.

Pica-Ciamarra, U., Tasciotti, L., Otte, J. and Zezza, A. (2015). Livestock in the household economy: cross-country evidence from microeconomic data. *Developmental Policy R*. 33 (1) 61–81.

Randolph, T.F., Schelling, E., Grace, D., Nicholson, C.F., Leroy, J.L., Cole, D.C. and Ruel, M. (2007). Invited review: role of livestock in human nutrition and health for poverty reduction in developing countries. *Journal of Animal Science*. 85 (11): 2788–2800.

Steinfeld, H., Wassenaar, T. and Jutzi, S. (2006). Livestock production systems in developing countries: status, drivers, trends. *Journal of R Scientific Technique*. 25 (2): 505–516.

Swanepoel, F. Stroebel, A. and Moyo, S. (2010). The role of livestock in developing communities: enhancing multifunctionality, in World Conference on Animal Production, Technical Centre for Agricultural and Rural Cooperation [CTA], Bloemfontein, South Africa, First Edit.

Upton, M. (2004). The role of livestock in economic development and poverty reduction. Pro-Poor Livestock Policy Initiative [PPLPI], in FAO Working Paper10, Food and Agriculture Organization of the United Nations, Rome, Italy.

Vengara, N.T. and McDocken, K.G. (1990). "Extension and Agro-forestry Technology Delivery of Farmers". In McDocken K.G. and Vengara, N.T. (eds), Agro-forestry Classification and Management, Bangkok, Thailand. 20-22.

Weeratunge, N., B´en´e, C., Siriwardane, R., Charles, A., Johnson, D. and Allison, E.H. and Badjeck, M.C. (2014). Small-scale fisheries through the wellbeing lens. *Fishery journal*. 15 (2): 255–279.

World Bank, (2009). Minding the stock: bringing public policy to bear on livestock sector development, Report No. 44010-GlB, Washington, DC.

World Bank, (2012). Gender equality in development, Washington, DC, World Bank. World Development Report 2012.

Table 1: Distribution of Respondents According to age, (N=100)

Age (Years)	Frequency	Percentage (%)
Less than 15	03	3.0
15-25	22	22.0
26-35	32	32.0
36-45	13	13.0
46-55	15	15.0
56-65	09	9.0
66 and above	06	6.0
Total	100	100.0

Source: Field Survey, 2007

Table 2: Distribution of respondents according to marital status (N=100).

Marital Status	Frequency	Percentage (%)
Single	51	51.0
Married	49	49.0
Total	100	100.0

Table 3: Distribution of Respondents According to sex (N=100)

Gender	Frequency	Percentage (%)
Male	72	72.0
Female	28	28.0
Total	100	100.0

Table 4: Distribution of Respondents according to Household size (N=100).

Household	Frequency	Percentage (%)
1-5	65	65.0
6-10	31	31.0s
11-15	04	4.0
Total	100	100.0

Table 5: Distribution of Respondents According to Educational Level (N=100)

Variables	Frequency	Percentage (%)
No. Formal Education	09	9.0
Primary	10	18.0
Secondary	40	40.0
Tertiary	33	33.0
Total	100	100.0

Table 6: Distribution of Respondents according to Major Occupation. (N=100)

Major Occupation	Frequency	Percentage (%)
Students	14	14.0
Traders	15	15.0
Farmers	23	23.0
Artisans	17	17.0
Civil Servant	28	28.0
Retired	03	3.0
Total	100	100.0

Table 7: Distribution of Respondents According to the means of introduction into Rabbit Farming (N=100).

Variables	Frequency	Percentage (%)
Neighbour/Friends	35	35.0
Family Members	07	7.0
ADP	09	9.0
Mass Media	02	2.0
Other Sources	47	47.0
Total	100	100.0

Table 8: Distribution of Respondents according to Monthly Income from Sale of Rabbits (N=100).

Monthly Income (₦)	Frequency	Percentage (%)
100-899	47	47.0
900-2499	32	32.0
1700-2499	16	16.0
2500-3299	04	4.0
3300 and above	01	01.0
Total	100	100.0

Table 9 Distribution of Respondents according to Factors of Influence into Rabbitry Production (N=100).

Factors That Influenced Rabbit Production	Frequency	Percentage (%)
Educational Background	07	7.0
Economic Power	10	10.0
ADP	12	12.0
Self-employment	17	17.0
Scarcity of meat	20	20.0
Others	34	34.0
Total	100	100.0

Table 10: Distribution of Respondents According to Membership of Cooperative Society. (N=100).

Membership of Cooperative Society	Frequency	Percentage (%)
Yes	40	40.0
No	60	60.0
Total	100	100.0

Table 11: Distribution of Respondents According to Problems Faced by Farmers (N=100)

Problems	Frequency	%	Frequency	%
High cost of feed	43	43.00	10	10.00
High cost of inputs	41	41.00	12	12.00
Disease	17	17.00	36	36.00
High Mortality	19	19.00	34	34.00
Inadequate breeding stock	40	40.00	13	13.00
Inadequate market outlet	18	18.00	35	35.00
Predator attack	24	24.00	29	29.00
Lack of ADP assistance	42	42.00	11	11.00

Table 12 Distribution of farmers according to the stages in the ad option process of improved rabbitry technologies

S/N		Na	A	I	E	T	A	D	Total Adoption	Mean Adoption
1	Selection of breed type	41	29	29	1	0	0	0	190	190
2	The housing of Rabbits in Approved Dimension	45	14	35	5	1	0	0	203	2.03
3	Feeding rabbits with feed	10	30	27	30	2	0	0	281	2.81
4	Stock with 1 male: 10 females	26	20	31	22	0	0	1	247	2.47
5	Cleaning hutches	8	27	31	27	1	0	6	268	2.68
6	Keep written records	51	6	29	3	1	0	10	167	1.67

Table 13: Determination of the Adoption of Improved Rabbitry Technologies

Variables	Linear	Exponential	Double-log	Semi-log
(Intercept)	0.681 (-0.640)	0.953 (0.757)	5.872 (1.197)	20.139 (-0.271)
Age	0.013* (-0.748)	0.015 (0.757)	51.169 (-1.830)	3.372 (0.601)
Household size	0.072 (0.798)	0.089 (-0.479)	0.331 (1.921)	0.682 (1.529)
Educational level	0.038** (1.832)	0.050 (0.470)	1.284 (-0.280)	4.461 (0.495)
Farming experience	0.110 (4.734)	0.195 (0.970)	0.390 (1.904)	1.382 (1.151)
Farm size	0.060 (4.734)	0.056 (0.283)	0.040 (0.788)	1.424 (-0851)
Cooperative members	0.060 (-0.324)	0.306 (1.046)	-	-
Monthly income	0.001* (-0.793)	0.000 (-0.436)	0.378 (0.138)	1.135 (-0.749)
R_2	0.404	0.234	0.661	0.505
Adjusted R	0.358	0.010	0.370	0.236
F-Ratio	8.798	1.045	2.275	1.874

* Significant at %
** Significant at 5%
Figures in parenthesis are t-ratios