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Livelihood Options and Forest Resources Conservation in Ikom Education Zone, Cross River State

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Abstract

The purpose of this study was to investigate livelihood options and forest resources conservation in Ikom Education Zone, Cross River State. To achieve the purpose of this study, 2 null hypotheses were formulated to guide the study. Conceptual and empirical literature were reviewed in accordance with the variables of the study. Predictive correlational research design was utilized for the study. The population of the study comprised all adult residents in forest communities in Ikom Education Zone. Three local government areas and twenty two communities used for the study were proportionately selected using simple random sampling technique while systematic random sampling technique was adopted to select the six hundred and fifty three (653) respondents used for the study. A twenty two item four point Likert scale questionnaire was the instrument utilized for data collection. To test the hypotheses formulated for the study, simple linear statistical tool was employed for data analysis. The hypotheses were tested at 0.05 level of significance. The findings obtained from analysis of data and testing of hypotheses in the study revealed that there was a significant relationship between grass cutter rearing, domestication of mushroom and forest resources conservation among members of forest communities in Ikom Education Zone, Cross River State. Based on these findings it was recommended among other things that non-Governmental organizations working on alternative livelihood activities should continue to empower more people with skills for snail farming in order to generate more income and conserve forest resources

INTRODUCTION

Forests play a critical role in sustaining environmental balance, supporting biodiversity, and providing livelihood resources for millions of people globally. In tropical regions such as Nigeria, forests also serve as carbon sinks, regulate local climate, and offer ecosystem services that support agriculture, water resources, and cultural heritage. However, rapid deforestation, driven by

agricultural expansion, logging, fuelwood harvesting, and infrastructural development, has placed these ecosystems under severe threat. Cross River State, located in the South-South geopolitical zone of Nigeria, harbours over 50% of Nigeria's remaining tropical rainforest (Forestry Commission, 2023), making it one of the country's most important biodiversity hotspots. The state's forests are home to rare and endangered species such as the Cross River gorilla, drill monkeys, and various endemic plant species.

Despite the ecological significance of the forests, the socio-economic realities of rural communities in Cross River State create challenges for sustainable conservation. Many local populations depend heavily on forest resources for their daily survival - engaging in activities such as farming, hunting, logging, and non-timber forest product collection. The high incidence of poverty, limited employment opportunities, and inadequate access to infrastructure and markets often push communities toward practices that degrade the forest. This situation creates a conflict between meeting immediate livelihood needs and protecting long-term environmental assets (Asu, 2022).

Cross River State is home to the Cross River National Park, Afi Mountain Wildlife Sanctuary, and numerous community forests, which harbour some of the richest biodiversity in West Africa, including endangered species such as the Cross River gorilla, chimpanzees, and forest elephants. These forests are also a source of food, medicine, fuelwood, and income for local communities. Ejim (2022) asserted that despite their importance, forest resources in Cross River State face significant threats from illegal logging, slash-and-burn agriculture, urban expansion, and infrastructural projects. The state has been at the center of conservation efforts in Nigeria, with initiatives including the creation of protected areas, community-based forest management programs, and collaborations with local and international Non-Governmental Organizations (NGOs). However, challenges such as weak enforcement of environmental laws, poverty, population pressure, and inadequate awareness continue to undermine conservation efforts.

In response to this dilemma, alternative livelihood options and community development initiatives have emerged as important strategies for forest conservation. Alternative livelihoods are income-generating activities designed to reduce direct dependence on forest exploitation – examples include ecotourism, mushroom farming, agroforestry, handicrafts, and small-scale processing industries. These initiatives, when integrated with community development programs, can improve household incomes, strengthen social cohesion, and build local capacity for sustainable resource management (Kilian, 2023). International organizations, government agencies, and NGOs have increasingly promoted such approaches in Cross River State, often combining them with awareness campaigns, participatory forest management, and policy reforms.

Domestication of mushroom propagation is another sustainable alternative livelihood activity that is adopted to provide rural dwellers with livelihood options. Obi (2022) asserted that mushroom is an important forest resource that is rich in vitamins and other nutrients. The harvesting of mushroom from the forest has been identified as a source of forest degradation. This informed the idea of domestication of this forest product in order to reduce people's dependence of the ones in the wild. This option of cultivating mushroom at home has encouraged the conservation of forest resources.

Statement of the problem

Cross River State is home to one of the last remaining tracts of tropical rainforest in the country, including parts of the Cross River National Park. These forests are globally significant for their rich biodiversity and vital ecological functions. However, over the past decades, they have been under increasing threat from unsustainable logging, agricultural expansion, fuelwood harvesting, and infrastructural development. Local communities, many of whom rely directly on forest resources for their livelihoods, are caught in a challenging dilemma: the need to meet immediate economic

and subsistence needs often conflicts with long-term conservation goals. Poverty, limited access to alternative income sources, and inadequate livelihood diversification are major drivers of forest exploitation in the state. In many rural areas, communities depend heavily on hunting, logging, and slash-and-burn farming for survival. While these practices provide short-term gains, they contribute to deforestation, habitat loss, and declining wildlife populations, thereby undermining the very resources that support these communities.

Efforts at forest resources conservation, including government regulations and protected area policies, have often struggled to achieve desired outcomes due to insufficient integration of community development priorities. In some cases, strict conservation measures have restricted access to traditional forest resources without providing viable economic alternatives, leading to resistance from local people and even illegal resource extraction. Although several non-governmental organizations (NGOs) and development agencies have introduced alternative livelihood options - such as ecotourism, agroforestry, beekeeping, and non-timber forest product processing - the adoption and sustainability of these initiatives remain inconsistent. Factors such as inadequate training, poor market access, lack of financial support, and low community participation have limited their effectiveness. This necessitated the researcher to investigate alternative livelihood options and forest resources conservation in Ikom Education, Cross River State.

Purpose f the study

The purpose of this study was to investigate alternative livelihood options and forest resources conservation in Ikom Education, Zone Cross River State. In specific terms, the study seeks to;

1. Ascertain how grass cutter rearing relate to forest resources conservation
2. Identify the relationship between domestication of mushroom and forest resources conservation

Research questions

The research questions raised for the study included the following;

1. How does grass cutter rearing relate to forest resources conservation?
2. To what extent does domestication of mushroom relate to forest resources conservation?

Statement of hypotheses

The following hypotheses were formulated for the study;

1. There is no significant relationship between grass cutter rearing and forest resources conservation
2. Domestication of mushroom does not significantly relate to forest resources conservation

LITERATURE REVIEW

Grass cutter rearing and forest resources conservation

Grass cutter rearing is the controlled breeding and management of grass cutters (cane rats) in captivity for commercial purposes, primarily meat production. This micro-livestock farming provides a year-round, steady supply of a high-demand, protein-rich meat source that is popular in West Africa, offering a profitable alternative to wild hunting and a solution to dietary protein shortages. The concept involves housing grass cutters in secure pens, feeding them a diet of grasses, grains, and other food scraps, and managing their reproduction to ensure a consistent harvest of meat with high cultural value and nutritional benefits (Nsa, 2022). Grass cutter is adaptable to most tropical vegetations. They are found in mangroves, swamps, rainforests and savannas. Grass cutters love to dwell in farmlands, sugarcane plantations, oil palm plantations and in creeks. Grass cutter is classified as monogastric (one-stomach) herbivore.

The grass cutter, *Thryonomys swinderianus*, is one of the large rodents of Africa's grasslands being domesticated. Naturally, the distribution of the grass cutter is influenced by

occurrence of dense and thick cane-like grasses growing in damp places. The economic potential of the grass cutter is the reason many development agencies and non-governmental organizations interested in reducing poverty are promoting its production, particularly in countries in the West African sub-region where the meat of the animal is a delicacy. The meat of grass cutter enjoys a higher premium price per kilogram weight than chicken, beef, pork, mutton or chevon among many West Africans and elsewhere. Compared to other meats such as rabbit meat, grass cutter meat is very low in cholesterol and high in protein. It has a very high mineral (e.g. iron, calcium and phosphorous) content compared to beef, mutton, and chevon. The economic return on rearing is comparable to that of a cow, much higher than most livestock species, and only lower than that of the pig. The promotion of grass cutter rearing has empowered several individuals with alternative sources of income and subsequent reduction in the dependence on forest products in the wild for survival in forest communities (Jones, 2023).

Grass cutter farming in Nigeria is at the upward thrust and it is supplying profits for a variety of people. Grass cutter is adaptable to maximum tropical vegetations. They are found in mangroves, swamps, rainforests and savannas. Grass cutters like to reside in farmlands, sugarcane plantations, oil palm plantations and in creeks. Grass cutter is assessed as monogastric (one-stomach) herbivore. Grass cutter is likewise recognised as cane rat. In Yoruba language, they are referred to as Oya while they are referred to as Gafia (Gouza or Guahia) and Nchi in Hausa and Igbo languages respectively. Cane rats live in small groups led by a single male. They are nocturnal and make nests from grasses or burrow underground. Individuals of the species may live in excess of four years (Barry, 2023).

Dunkhana and Sunday (2017) examined the influence of grass cutter rearing on forest resources management in Emohua Local Government Area of Rivers State. The study adopted a descriptive survey research design. A total of 350 respondents (farmers) constituted the sample of study. 25 farmers each were randomly selected from fourteen out of thirty nine communities that make up Emohua Local Government Area. Data were collected using a structured questionnaire designed in the pattern of Likert 4-point rating scale. Data were analyzed using percentage and mean, while Chi square, Pearson Product Moment Correlation and Z test were also used to test the hypotheses. The results showed that majority of the farmers were highly aware of grass cutter rearing practices and as measures of sustainable forest management. Finding also shows that the null hypothesis generated for this study was rejected. It is therefore concluded that, there is a significant relationship between grass cutter rearing practices and forest resources management at $X^2 = 38.3$, P = 0.05 and Z cal 18.74, P= 0.05 respectively.

Odoemelam and Ajuka (2023) investigated the extents to which indigenous alternative livelihood practices can be used to sustain the environment in South East agro-ecological zone of Nigeria. Multi stage sampling procedure was used in the selection of the sample size. The South East agro-ecological zone is made up of Abia, Akwa Ibom and Ebonyi state. Two State, Abia and Ebonyi were purposively selected because they met the criteria for selection. From these two states one Local Government Area was randomly selected. (Ohafia Local Government Area and Afikpo South Local Government Area respectively), and two communities were selected from each local government area and from these communities, 2 villages and 35 farm families were selected, bringing the total to 180 respondents. Data were generated through the use of structured questionnaire and Focus Group Discussion (FGD) and subsequently analyzed with the use of simple descriptive statistics. Major findings revealed that the indigenous alternative livelihood practices engaged by the respondents to sustain their forest. About 15% of the respondents were engaged in grass cutter rearing.

Unimna (2022) conducted a study on grass cutter rearing and forest resources conservation in Obubra Local Government Area, Cross River State. The study sample comprised three hundred

and seventy eight (378) respondents drawn from the forest communities in the study area. The questionnaire served as the most dependable means of gathering data for the study. In testing the hypothesis on the relationship between grass cutter rearing and forest resources conservation, Pearson product moment correlation was used for data analysis. The result obtained from the study showed that there was a significant positive relationship (r=0.462) between grass cutter rearing and forest resources conservation in the study area.

Kingsley (2022) investigated animal farming practices and forest conservation in Itu Local Government Area, Akwa Ibom State. The study sample consisted of seven hundred and twelve (712) respondents drawn from thirteen forest communities in the study area. The study used a self-designed questionnaire by the researcher, which was duly validated and tested for reliability before being administered to the respondents. Pearson product moment correlation statistic was used to analyze data on the relationship between grass cutter rearing and forest resources conservation. The finding from the study showed that the calculated value (0.478) from the analysis of data is higher than the critical value (0.113) at 0.05 level of significance. The result stipulated that grass cutter rearing significantly relates with forest conservation in the area of this study.

Carlos (2019) conducted a study on alternative livelihood options and sustainable forest management in Mexico. The study assessed various alternative livelihood options and how they impact on both timber and non-timber forest resources in the study area. The study considered four hundred and twenty three (423) respondents as the sample whose responses were generalized to cover the study area. Most of the study respondents were directly involved in subsistence farming. Interviewing method was used for data collection. The results from the respondents showed that 70 percent of the farmers in the study area were practicing grass cutter rearing as their most preferred method. 18 percent were practicing snail farming and saw it as the most preferred livelihood option to them. Eight (8) percent of the respondents were practicing bee keeping among the study respondents while 4 percent were engaged in piggery in the study area. Again, 58 percent of the study respondents are of the view that grass cutter rearing promotes the conservation of forest resources in their locality.

Emmah (2022) conducted a study on grass cutter rearing and forest resources conservation in Obio/Akpor Local Government Area of Rivers State. The study adopted the stratified random sampling technique in selecting the five hundred and twenty four respondents used for the study. A questionnaire was the instrument used for data collection. It was validated and tested for reliability by relevant experts. To test the hypothesis that stated that grass cutter rearing does not significantly relate with forest resources conservation, Pearson product moment correlation statistical tool was employed for data analysis. The result obtained revealed that the calculated r-value of 0.384 was higher than the p.value of 0.00 at 0.05 level of significance with 522 degree of freedom. This revealed that the null hypothesis was rejected. So therefore, there was a significant relationship between grass cutter rearing and forest resources conservation in the study area.

Caius (2019) conducted a study on grass cutting farming and forest resources conservation in Ikom Local Government Area of Cross River State. The researcher adopted the stratified random sampling technique to select five forest communities while the systematic random sampling technique was also applied in selecting the three hundred and thirty eight respondents used for the study. The study used a researcher-developed questionnaire as the instrument for data collection. The questionnaire was duly validated and tested for reliability. To test the hypothesis which stated that grass cutter farming does not significantly relate with forest resources conservation, Pearson product moment correlation statistic was employed for analysis of data obtained. The result obtained indicated that the calculated r-value of 0.417 was higher than the p.value of 0.000 at 0.05 level of significance with 336 degree of freedom. This showed that the null hypothesis was rejected.

Therefore, it was found that grass cutter farming significantly relate with forest resources conservation in Ikom Local Government Area of Cross River State.

Akpan (2022) carried out an investigation on conservation practices and sustainable forest management in Odukpani Local Government Area of Cross River State. This survey research was conducted with six communities that were selected through simple random sampling technique. The study sample consisted of three hundred and eleven (311) respondents that were selected through quota sampling technique. The instrument used for data collection was a structured questionnaire that was developed by the researcher. The instrument was validated by relevant authorities and also tested for reliability. Pearson product moment correlation statistical tool was adopted for analysis of data and testing of hypothesis in the study. The result showed that the calculated value ($r = 0.279$) was higher than the critical value (0.119) at 0.05 level of significance with 309 degree of freedom. This revealed that the null hypothesis was rejected. As a result, there was a significant relationship between grass cutter reaing and sustainable forest management in Odukpani Local Government Area of Cross River State.

Domestication of mushroom and forest resources conservation

Mushroom farming is the commercial cultivation of edible mushrooms from spawn (a tissue culture of the fungus) on an organic substrate like compost, straw, or sawdust, followed by a specific sequence of environmental controls for incubation, colonization, and fruiting. This process involves preparing the substrate, inoculating it with spawn, allowing the fungal mycelium to colonize the material, and then providing the right conditions for the formation and harvesting of mushrooms. It offers a low-cost, high-profit agricultural opportunity, utilizing waste products and requiring minimal land, making it a viable business for various scales of operation. Mushroom farming also known as fungiculture is the cultivation of fungi such as mushrooms. Cultivating fungi can yield foods (which include mostly mushrooms), medicine, construction materials and other products (Jones, 2023).

Mushrooms are fast yielding, provide for nutritious food and can provide a source of income. Cultivation does not require any significant capital investment or access to land, as mushrooms can be grown on substrate prepared from any clean agricultural waste material. It can be carried out on a part-time basis, requires little maintenance and is a viable and attractive activity for rural, peri-urban and urban dwellers, in particular women and people with disabilities. Through the provision of income and improved nutrition, successful cultivation and trade in mushrooms can strengthen livelihood assets, which not only reduce vulnerability to shocks, but enhance an individual's or a community's capacity to act upon other economic opportunities. The domestication of mushroom has gained prominence in alternative income generation activities aimed at reducing the demand for non-timber forest products and promote their sustainability (Agbor, 2021).

There are hundreds of identified species of mushroom which, since time immemorial, have made a significant global contribution to human food and medicine. Some estimate that the total number of useful mushroom – defined as having edible and medicinal value – are over 2300 species. Although this contribution has historically been made through the collection of wild edible mushroom, there is a growing interest in cultivation to supplement, or replace, wild harvest. This is a result of the increased recognition of the nutritional value of many species, coupled with the realization of the income generating potential of mushroom through trade. In addition, where knowledge about wild mushroom is not passed on within families or throughout communities, people have become more reluctant to wild harvest and prefer to cultivate mushrooms instead. Cultivated mushrooms have now become popular all over the world (Agan, 2021).

Ezeji (2023) investigated alternative livelihood options and forest conservation in Urumba South Local Government Area of Anambra State. The study adopted the survey research design. The population of the study consisted of forestry personnel and timber dealers. The sample of the

study consisted of two hundred and twenty four respondents that were randomly selected from four forest communities. A questionnaire was the data collection instrument. In testing the hypothesis formulated for the study, Pearson product moment correlation statistic was employed for data analysis on the relationship between mushroom farming and forst resources conservation. The result of the analysis revealed that the calculated r-value of 0.321 was higher than the p.value of 0.000 at 0.05 level of significance with 222 degree of freedom. This indicated that the null hypothesis was rejected. By implication, there is a significant relationship between mushroom farming and forest conservation in the study area.

Smith (2019) in a study on alternative livelihood practices and biodiversity conservation in Vandykya Local Government Area of Benue State used a sample of two hundred and seventy eight (278) respondents. The stratified random sampling technique was adopted in selecting the four communities while systematic random sampling technique was adopted in selecting the respondents. A thirty item questionnaire developed by the researcher was the instrument used for data collection. The researcher presented the instrument for face and content validity before it was used for data collection. To test one of the hypotheses which stated that selective exploitation does not significantly relate with biodiversity conservation, Pearson product moment correlation statistical tool was considered most appropriate for data analysis on the relationship between mushroom domestication and biodiversity conservation. The result from the analysis revealed that the calculated r-value of 0.427 was higher than the p.value of 0.000 at 0.05 level of significance with 276 degree of freedom. This indicated that the null hypothesis was rejected. Therefore, there was a significant relationship between musroom domestication and biodiversity conservation in Vandykya Local Government Area of Benue State.

Watkins (2020) examined the diversity of mushrooms occurring in Eastern Africa and revealed the wild edible/medicinal species (WEMs) that have already been domesticated, their domestication status, the nutritional composition status of the edible species and availability of their germplasm (mother cultures). To achieve this, a detailed review of published research articles, books and reports from Eastern Africa was conducted. Data was collected from articles focusing on the diversity of WEMs, nutritional composition analysis and domestication methods and status. From the review, 306 WEMs are shown to have desirable characteristics for utilization as food /medicine, with Tanzania documenting the highest number (147) followed by Malawi (90). Among these, 82 species are edible ectomycorrhizal species with great potential to support the mushroom industry if sustainably harvested and managed. The rest are saprophytic fungi species. The findings further revealed that only 14 species among the saprobe group have been tissue cultured, tested for spawn production and cultivation. 51 species have been analyzed for nutritional composition. However, none of these have been commercially introduced to cultivation and the availability of their germplasm for research and propagation purpose is uncertain. The result from this study clearly shows research on the domestication of WEMS in Africa is still in its infancy stages.

The study by William (2023) examined the economics of mushroom production in Oyo State. Survey research design was considered as the most appropriate for the study. A questionnaire was the instrument usedfor data collection. The instrument was duly validated by experts in relevant fields. Cronbach alpha method was adopted to establish the reliability of the research instrument. Data for the study were obtained from Ido, Surulere Local Government Area and Akinyele Local Government Area. A total of 202 respondents were selected for the study area. The data were analysed using descriptive statistics and costs-returns analysis. The result shows that majority (71.7%) of mushroom farmers are within 31 - 50 years of age. Majority (67%) of the farmers was male and married (79.2%). Furthermore, about all (95.0%) of the farmers had mushroom farms that were functional. This has contributed to poverty alleviation and subsequent reduction in forest resources degradation within the study area.

RESEARCH METHODOLOGY

The predictive correlational research design was considered most appropriate for the study. This design allows the researcher to assess the relationship between the independent and dependent variables in the study. Jones (2018) described predictive correlational design as a type of non-experimental research in which the researcher measures two variables and assesses the statistical relationship (i.e. the correlation) between them with little or no effort to control extraneous variables. This study investigates livelihood options and forest resources conservation in Ikom Education Zone, Cross River State. The purpose of this study can be achieved using the predictive correlational research design, because this design model provides the appropriate leverage to measure the independent variable and sub-variables against the dependent variables in order to establish their correlation without the interference of extraneous variables.

This study was carried out in Ikom Education Zone of Cross River State, Nigeria. According to available records, the coordinate of the area stretches between longitude $7^0 45^{'}$ and $9^0 15^{'}$E of the Greenwich Meridian and Latitude $5^0 30^{'}$ and $6^0 30^{'}$N of the Equator. The zone is occupying an area of 7632km^2. The area is located midway between Cross River South and the Northern Education Zones. It is bounded in the north by Ogoja, Obudu, and Obanliku Local Government areas of Northern Education Zone of Cross River State, and in the south by Biase and Akamkpa Local Government areas, in the east by Republic of Cameroon, and Ebonyi State in the West.

For administrative convenience, the area is divided into six local government areas, namely: Abi, Yakkur, Ikom, Etung, Boki, and Obubra. It has a projected population of one million five hundred and twenty five thousand two hundred twenty (1,525,220) (National Population Commission 2017 projection). The people of Ikom Education Zone like any other district are believed to have migrated from the Bantu race of Central Africa. The influence of the early missionaries is significantly felt in this area. Thus, Christianity is the predominant religion. Generally, the people cherish their culture and tradition. Like all patriarchal society, the area enjoys a rich cultural heritage, elaborately manifested in their traditional dances, marriages, customs, chieftaincy, age grades, and festivals. These festivals include Leboku New Yam Festival in Yakkur, Ekpache Nkome new yam festival in Ikom, Abu New yam festival in Obubra.

The population of the study consisted of all adult residents in forest communities in Ikom Education Zone, Cross River State. The projected population of the study comprised individuals that are drawn from various occupations including students, public servants, farmers, business and trading, These groups have a direct link with forest resources utilization The population of the study is five hundred and seventy two thousand, three hundred and fifteen (572, 315) persons (NPC, 2024). The population of the study is presented in Table 1.

The local government areas in the state were stratified into three Education Zones. The researcher wrote the names of the six (6) local government areas that make up Ikom Education Zone, Cross River State according to their strata on little pieces of paper, folded the papers into small ball-like shapes which were turned into a bowls, each representing an LGA in the Education Zone. The papers were mixed and the researcher blindly picked (50%) of the paper balls from the bowls according to their strata with replacement. (50% 50% from Ikom Education Zone which amounted to a total of three local government areas namely; Boki, Ikom and Obubra.

To select the communities used for the study, the researcher adopted proportionately, simple random sampling technique to select 30 percent of forest communities in each of the three local government areas selected for the study. In each local government area, the researcher wrote the names of all the forest communities on pieces of paper and folded them into ball-like shapes. The paper-balls were mixed and the researcher blindly picked thirty percent of forest communities from

each local government area. The total communities were twenty. To select the respondents used for the study, the systematic random sampling technique was adopted. In each community selected, the researcher numbered the houses in the community and every 200th house was selected for the study. This represented 0.5 percent of houses in each community. From the houses selected for the study, one respondent was selected as a sample. These persons formed the respondents used for the study. The sample for the study consisted of six hundred and fifty five (655) respondents that were randomly selected from twenty two (22) forest communities in Ikom Education Zone, Cross River State. The sample distribution for the study is presented in Table 2.

The instrument used for data collection was a questionnaire titled Livelihood Options and Forest Resources Conservation Questionnaire (LOFRSQ). The instrument was divided into two sections. Section A contained personal data of the respondents. Section B was developed using modified four point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD). It contained twenty items that measured the variables of the study. Items 1-5 measured grass cutter rearing, items 6-10measured domestication of mushroom while items 11-20 measured forest resources conservation.

TABLE 1

Sample distribution by local government areas

S/N	LGA	No. of communities	Population	Sample (0.5%)
4.	Boki	10	20,601	243
5.	Ikom	8	17,327	207
6.	Obubra	4	13,275	205
	Total	22		655

Source: Field survey, 2026

Data that was used for the study was gathered directly from respondents through the use of questionnaire. The researcher visited all the forest communities selected for the study to administer copies of the questionnaire. To enable the researcher accomplish this task, a research assistant was trained to help the researcher in the administration of the instrument for data collection. In each of the communities visited, the researcher and the research assistant obtained permission from the community heads before administering the questionnaire to the respondents used for the study. Six hundred and fifty five copies of the questionnaire were administered and retrieved in four weeks. At the point of coding it was discovered that only six hundred and fifty three (653) copies of the questionnaire were properly responded to by the respondents.

Data obtained for the study was duly coded by assigning numerical codes to each item in the questionnaire. For the items designed with Likert scale, for positively worded items, Strongly Agree was assigned 4, Agree 3, Disagree 2, and Strongly Disagree 1. For negatively worded items, the reverse scoring was adopted.

RESULTS AND DISCUSSION

In this section, the researcher presents the means and standard deviations for the main variables in the study. The main independent variable is alternative livelihood options, which are categorized into; grasscutter rearing and domestication of mushroom. The dependent variable is forest resources conservation. A sample of six hundred and fifty three (653) respondents was used for the study.

Presentation of results

In this section, the researcher presents the result of analysis of data obtained in the study as well as the interpretation of the results. The hypotheses were tested at 0.05 level of significance.

Research question one

How does grass cutter rearing relate to forest resources conservation? Simple percentage statistic was employed for data analysis. The result obtained from the analysis as presented in Table 2 shows that 172 (26.3%) of the respondents strongly agreed. 187 (28.6%) of the respondents indicated agreed. 155 (23.8%) of the respondents disagreed while 139 (21.3%) indicated strongly disagree with regards to the relationship that existed between grass cutter and forest resources conservation in Ikom Education Zone, Cross River State. This showed that majority of the respondents agreed that grass cutter rearing significantly related to forest resources conservation in forest communities in the study area.

TABLE 2

Simple percentage analysis of the relationship between grass cutter rearing and forest resources conservation in Ikom Education Zone, Cross River State

Grass cutter rearing	Frequency	Percentage (%)
SA	172	26.3
A	187	28.6
D	155	23.8
SD	139	21.3
Total	653	100.0

Field work, 2026

Research question two

To what extent does domestication of mushroom relate to forest resources conservation? Simple percentage statistic was employed for data analysis. The result obtained from the analysis as presented in Table 3 shows that 181 (27.7%) of the respondents strongly agreed. 218 (33.4%) of the respondents indicated agreed. 135 (20.7%) of the respondents disagreed while 119 (18.2%) indicated strongly disagree with regards to the relationship that existed between domestication of mushroom and forest resources conservation in Ikom Education Zone, Cross River State. This showed that majority of the respondents agreed that domestication of mushroom significantly related to forest resources conservation in forest communities in the study area.

TABLE 3

Simple percentage analysis of the relationship between domestication of mushroom and forest resources conservation in Ikom Education Zone, Cross River State

Domestication of mushroom	Frequency	Percentage (%)
SA	181	27.7
A	218	33.4
D	135	20.7
SD	119	18.2
Total	653	100.0

Hypothesis one

There is no significant relationship between grass cutter rearing and forest resources conservation. The independent variable in this hypothesis is grass cutter rearing while the dependent variable is forest resources conservation. Simple linear regression statistical tool was used for data analysis. The result obtained from the analysis of data presented in Table 4 shows that the

independent or predictor variable (grass cutter rearing) has a significant relationship with the dependent or predicted variable (forest resources conservation) among residents of forest communities in Ikom Education Zone, Cross River State. This implied that grass cutter rearing accounted for 4.7% of forest resources conservation in forest communities in Cross River State. This shows a low positive relationship.

Secondly, the result of regression ANOVA presented in Table 16 revealed that there was a significant relationship between grass cutter rearing and forest resources conservation, $F(1, 651) = 32.407$; $p<.05$. The result of this analysis indicated that there is a low contribution of grass cutter rearing to forest resources conservation among residents. This showed that the null hypothesis was rejected. Therefore, grass cutter rearing positively relates to forest resources conservation in the study area. The regression coefficient shows that the independent or predictor variable grass cutter rearing ($\beta = .218$; $t = 5.693$; $p<.05$) has a low positive relationship with forest resources conservation among residents of forest communities in Ikom Education Zone, Cross River State.

The reason for this finding could be that the high rate of hunting of wildlife has resulted in the endangerment and extinction of several wildlife species. The concept of grass cutter rearing was to provide an alternative source of animal protein as well as provide a source of income or members of forest communities. The rearing of grass cutter at home helps to prevent the arate of hunting animals in the wild. Several persons can now generate income through grass cutter rearing as well as prevent over dependence on animals in the wild for protein. This has contributed significantly to forest resources conservation.

The finding of this study is in agreement with that of Brown (2019) who revealed that as humans expanded into the cane rat's native habitats, the cane rats likewise expanded from their native reeds into the plantations, particularly the sugar cane plantations from which they derive their name. Their tendency to adopt plantations as habitat, where they feed on agricultural crops such as maize, wheat, sugar-cane and cassava, often earns them the label of agricultural pest. The rearing of grass cutter as an income generating activity has benefitted numerous individuals and families. This has also decreased the demand for grass cutter and other forms of bush meat from the wild, which is largely benefitting conservation efforts.

The finding of this study also supported that of Etefia (2019) who reported that grass cutters continue to be a delicacy in a number of countries. The vast majority of these animals are still gathered from the wild and several species have been hunted so extensively that they now face or are already extinct. And this offers small-scale farmers, investors, women entrepreneurs and all those with wealth-creation ambition, an economic incentive in raising grass cutters. The meat of the grass cutters has higher protein but lower fat content than domesticated farm animals and it is also appreciated for its tenderness and taste. Beyond the economic benefits associated with grasscutter rearing, the pressure on those in the wild due to excessive hunting by hunters is also reduced significantly. This is a positive step towards sustainable forest management.

TABLE 4

Simple linear regression analysis of the relationship between grass cutter rearing and forest resources conservation in Ikom Education Zone, Cross River State

Model	R	R^2	Adj.R^2	Std error of estimate	
1	.318	.147	.146	1.50217	
Model	SS	Df	MS	F	Sig
Regression	73.128	1	73.128	32.407	.000
Residual	1468.992	651	2.257		

Total		1542.119	652			
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. error	Beta		
	(Constant)	16.935	1.207		14.025	.000
1	Grasscutter	.505	.089	.318	5.693	.000

a. Dependent Variable: Forest resources conservation

Source: Researcher's Fieldwork, 2026

Hypothesis two

Domestication of mushroom does not significantly relate to forest resources conservation. The independent variable in this hypothesis is domestication of mushroom while the dependent variable is forest resources conservation. Simple linear regression statistical tool was utilized for analysis of data. The result of the analysis presented in Table 5 shows that the independent or predictor variable (domestication of mushroom) has a significant relationship with the dependent or predicted variable (forest resources conservation) among residents of forest communities in Ikom Education Zone, Cross River State. This implied that domestication of mushroom accounted for 18.2% of forest resources conservation in forest communities in Ikom Education Zone, Cross River State. This shows a low positive relationship.

Secondly, the result of regression ANOVA presented in Table 5 revealed that there was a significant relationship between domestication of mushroom and forest resources conservation, $F(1, 651) = 144.403$; $p<.05$. The result of this analysis indicated that there is a low contribution of domestication of mushroom to forest resources conservation among residents. This showed that the null hypothesis was rejected. Therefore, domestication of mushroom positively relates to forest resources conservation in the study area. The regression coefficient shows that the independent or predictor variable domestication of mushroom ($\beta = .426$; $t = 12.017$; $p<.05$) has a low positive relationship with forest resources conservation among residents of forest communities in Ikom Education Zone, Cross River State.

The reason for this finding could be that mushroom is a highly nutritious and largely consumed forest product. It sustainability in the wild has been greatly threatened over the years. The need to prevents it extinction necessitated the domestication of its propagation. This process has continued to serve dual purposes of alternative source of income generation and conservation of forest resources. As a result, the propagation of mushroom species at home has been very beneficial to members of forest communities as well as conservation efforts aimed at attaining sustainable forest resources management.

The finding of this study agrees with that of Agbor (2021) who reported that mushrooms are fast yielding, provide for nutritious food and can provide a source of income. Cultivation does not require any significant capital investment or access to land, as mushrooms can be grown on substrate prepared from any clean agricultural waste material. Through the provision of income and improved nutrition, successful cultivation and trade in mushrooms can strengthen livelihood assets, which not only reduce vulnerability to shocks, but enhance an individual's or a community's capacity to act upon other economic opportunities. The domestication of mushroom has gained prominence in alternative income generation activities aimed at reducing the demand for non-timber forest products and promote their sustainability.

The finding of this study also supported that of Jacob (2020) who revealed that mushroom cultivation can help reduce vulnerability to poverty and strengthen livelihoods through the generation of a fast yielding and nutritious source of food and a reliable source of income. Since it

does not require access to land, mushroom cultivation is a viable and attractive activity for both rural farmers and peri-urban dwellers. Small-scale growing does not include any significant capital investment: mushroom substrate can be prepared from any clean agricultural waste material, and mushrooms can be produced in temporary clean shelters. The ecological benefits of mushroom cultivation at home are also encouraging.

TABLE 5

Simple linear regression analysis of the relationship between domestication of mushroom and forest resources conservation in Ikom Education Zone, Cross River State

Model	R	R^2	Adj.R^2	Std error of estimate	
1	.426	.182	.180	1.39240	
Model	SS	Df	MS	F	Sig
Regression	279.967	1	279.967	144.403	.000
Residual	1262.152	651	1.939		
Total	1542.119	652			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	16.201	.635		25.524	.000
	Mushroom	.559	.046	.426	12.017	.000

a. Dependent Variable: Forest resources conservation

Source: Researcher's Fieldwork, 2026

CONCLUSION AND RECOMMENDATIONS

Conclusion

The essence of the research was to investigate and present findings on livelihood options and forest resources conservation in Ikom Education Zone, Cross River State. The findings obtained from analysis of data and testing of hypotheses in the study revealed that there was a significant relationship between grass cutter rearing, domestication of mushroom and forest resources conservation among members of forest communities in Ikom Education Zone, Cross River State. It can be concluded that alternative livelihood alternatives significantly relate positively with forest resources conservation in Ikom Education Zone, Cross River State.

Implication of the findings

As more members of forest communities are trained to engage in grass cutter rearing, the conservation of forest resources will be promoted and sustained. The continuous involvement of members of forest communities in domestication of mushroom will contribute positively to the conservation of forest resources within the study area. The practice of agroforestry as a means of generating additional income by members of forest communities will always contribute to forest resources conservation. When all the alternative livelihood options covered in this study are combined in poverty reduction activities, it will significantly promote forest resources conservation.

Recommendations

Based on the findings obtained from analysis of data and testing of hypotheses in the study, it was recommended that;

1. Government and non-governmental organizations should continue to collaborate in providing the necessary inputs that would empower more persons with skills for grass cutter rearing as a poverty alleviation strategy that would promote forest resources conservation

2. More members of the host communities should be adequately empowered with the skills for improved mushroom propagation in order to earn an alternative source of income and contribute to forest conservation

REFERNCES

Agan, R. N. (2021). Bees and their role in forest livelihood. *International Journal of Food Science,* 14(3), 112-119

Agbor, W. A. (2021). Enhancing sustainable recourse management in Cross River State. Annual Report of the Cross River State Forestry Commission.

Akpan, E. L. (2022). Conservation practices and sustainable forest management in Odukpani Local Government Area of Cross River State. *Journal of Forest Conservation*, 19(4), 43-52

Asu, G. O. (2022). Changing forest values and ecosystem management. *Society and Natural Resources,* 8(4), 311-320

Barry, E. M. (2023). The concept of value in resource allocation. *Land Economics,* 6(3), 231-246.

Caius, J. D. (2019). Grass cutting farming and forest resources conservation in Ikom Local Government Area of Cross River State. *Journal of Sustainable Forestry*, 9(4), 13-22

Carlos, R.W. (2019). Alternative livelihood options and sustainable forest management in Mexico. *International Journal of Biodiversity Conservation*, 18(1), 38-46

Dunkhana, B. O., & Sunday, W. O. (2017). Grass cutter rearing and forest resources management in Emohua Local Government Area of Rivers State. *Journal of Livestock Farming,* 13(2), 56-64

Ejim, C. E. (2022).). A review on replacing fish meal in aqua feeds using plant and animal protein sources. *International Journal of Chemical Studies*, 7(3),47-58

Emmah, G. O. (2022). Grass cutter rearing and forest resources conservation in Obio/Akpor Local Government Area of Rivers State. *Journal of Animal Science*, 22(3), 87-96

Ezeji, F. K. (2023). Alternative livelihood options and forest conservation in Urumba South Local Government Area of Anambra State. *Journal of Forest Policy*, 24(3), 116-125

Forestry Commission. (2023). *The value of biodiversity: Where ecology and economy blend*. Calabar: Forestry Commission

Jones, M. O. (2023). Beyond deforestation: Restoring forests and ecosystem services on degraded lands. *Science,* 320, 1458–1460

Jones, V. B. (2018). *Contemporary issues in behavioural research in education and social sciences.* Uyo: University of Uyo Press

Kilian, P. E. (2023). Impacts of hunting on mammals in African tropical moist forests: A review and synthesis. *Mammal Review,* 39, 231–264.

Kingsley, A. O. (2022). Animal farming practices and forest conservation in Itu Local Government Area, Akwa Ibom State. *Journal of Animal Husbandry*, 16(4), 104-113

Nsa, C. E. (2022). Practices and forest conservation in Cross River North. *Journal of Agricultural Science,* 3(4), 38-46

Odoemelam, R. E., & Ajuka, B. A. (2023). Indigenous alternative livelihood practices and environmental sustainability in South East agro-ecological zone of Nigeria. *Journal of Community Forest Management*, 14(3), 77-86

Smith, L. E. (2019). Alternative livelihood practices and biodiversity conservation in Vandykya Local Government Area of Benue State. *Journal of Forest Policy*, 21(3), 98-107

Unimna, J. A. (2022). Grass cutter rearing and forest resources conservation in Obubra Local Government Area, Cross River State. *Journal of Wildlife Management*, 23(4), 32-46

Watkins, A. I. (2020). *The diversity of mushrooms occurring in Eastern Africa*. Nairobi: Makini Press

William, K. O. (2023). *The essence of modern agricultural extension services in contemporary farming operations*. Enugu: Assam Printers Ltd.