Journal of Agricultural Economics, Extension & Social Sciences

JAE²S² Vol. 1(2), 146 – 153, Nov., 2018
Department of Agricultural Economics & Extension
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Available on line: http://www:unijos.edu.ng/jaeess
ISSN: 2636-6940

Evaluation of Forest Fauna Utilisation for the livelihood of Farming Populace in Kogi and Niger State, Nigeria

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ABSTRACT

The study evaluated Forest Fauna Utilisation for the livelihood of Farming Populace in Kogi and Niger States. To achieve the study objectives, 326 farmers were selected using multi-stage sampling methods. Data were collected from primary source using structured questionnaire complemented with interview schedule. Both descriptive such as percentages, frequency and mean were used for this study. Findings revealed that the mean age of farming populace was 40.2 years, while the mean farming experience was 18.9 years. Also, 15.6% of respondents had primary education while 54.0% had access to extension agents. Majority (88.0%) of the respondents used radio as their source of information. About, 82.0% of the respondents utilised forest mammals for their livelihood while 32.2% utilised reptiles. The major environmental hazards encountered by farmers in the study area were wind blow ($\bar{x}$=2.44) and bush burning ($\bar{x}$=2.42). It is recommended that adequate and timely information should be made available by government through extension agents on the need to prevent environmental hazards associated with forest resources utilisation, other alternative means of livelihood such as off-farm activities should be encouraged in the study area to reduce dependence on forest animals that could lead to extinction of fauna species and farmers should inculcate the habits of practicing sustainable forest practices that will conserve fauna species in the forest which will go a long way in augmenting their livelihood.

Keywords: Evaluation, Forest-Fauna, Utilisation, Livelihood, Farming, Populace

INTRODUCTION

The fauna products are in form of worms, insects, frogs, reptiles, molluscs, fish, mammals and birds. Wild animals used for food (bush meat) are found in all the eco-zones. Most of the animals are herbivours and are hunted more for food in the rural communities. In the forest ecosystems, the main wild animals hunted for food are rodents, birds, snails and reptiles. Men carry out the hunting of wildlife while the collection of snails, worms and insects is the activity majorly carried out by women and children to augment their livelihood (Shecklaton *et al.*, 2012).

The mangrove and fresh water swamp forest ecosystem are hunted for caterpillar, and insects beetle as delicacy. Other fauna resources of this ecological zone include: various kinds of fish and amphibians. A typical fish which lives in the muddy environment of the mangrove ecosystem is the mudskipper. Many species of fin fish are used as food, molluscs such as periwinkle are also cherished as food in addition to crustaceans like oysters, shrimps and crabs. The bees in this ecosystem help to produce honey and wax useful for domestic and industrial uses. Some birds are hunted for food, feathers and recreation. Reptiles are hunted for their skins, food and recreational purposes (Richards *et al.*, 2014). In the rain forest zone, mature grasshoppers and crickets are delicacies especially for children after roasting, as well as adult flying termites which are harvested and dried or fried for consumption. Generally, in this zone, different mammals as well as snails are found and are exploited for use. Religious and cultural beliefs forbid certain communities from eating some species which are cherished by others. Some of such animals that are not eaten by everybody in the forest zone include: snails, monkeys, and python 'and tortoise. Rodents, antelopes, duikers and monitor lizards appear to be universally eaten (Shackleton *et al.*, 2012). However, these fauna resources have benefited farming populace by supplying animal protein but can be somehow harmful to human health, this was because of outbreak and spread of certain diseases such as Ebola and Lassa fever are attributed to contact and consumption of forest fauna products such as monkeys and rats. Thus, it is imperative to

carry out a study on forest fauna utilisation of forest products in order to compare with recommended safety measures for consumption of forest edible products.

Aim and objectives of the study

The broad objectives of this study is evaluation of forest Fauna Utilisation for the Livelihood of Farming Populace in Kogi and Niger State, the specific objectives are to:

i. describe socio-economic characteristics of the respondents;
ii. identify the sources of information on forest resources utilisation;
iii. identify types of forest animals utilized for farmers livelihood; and
iv. examine environment hazards of forest resource utilisation by the rural farming populace.

METHODOLOGY

Study Area

Kogi State

The State lies to the South of the Federal Capital Territory, Abuja, and shares boundaries with nine other states in the country. Nasarawa by the North East, Benue State to the East, Enugu State to the South East, Anambra State to the South, Edo State to the South West, Ondo State to the West, Ekiti State to the West, Kwara State to the North West, Niger State to the north. This gives way to common interstate trade. The State has two seasons, the wet and dry seasons. The wet season begins in March and ends in October and the dry season spans between November and early March. The annual rainfall is between 1016mm and 1524mm, while the mean daily temperature ranges between 24°c and 27°c. It is located within longitude 5° 22^1 and 7° 49^1 East & latitude 6° 31^1 and 8° 44^1 North.

Kogi State has a wide stretch of forest and arable land for farming, good grazing Land for livestock and large bodies of water for fishing and irrigation farming. The ecological condition made it possible for forest animals such antelope, Rodents, tortoise, monkey python and others to thrive well. Food and cash crops commonly grown in commercial quantities include yam, cassava, rice, maize, beniseed (sesame) guinea corn, cocoa, coffee, cashew, oil palm and vegetables. The State have a total human population of 3,278,487 and with a growth rate of 3.2%, the State will has an estimated population of 4,636,071 in 2017, while the land area is about 30,354.74 square kilometers (Kogi State Ministry of Information, 2016).

Niger State

Niger State is located in the Guinea Savannah ecological zone of Nigeria. In terms of land mass, it is the largest State in Nigeria. It covers a total land area of 74,224km^2 accounting for about eight percent of Nigeria's land area. About 85% of its land area is good for arable crops production (Niger State Geographical Information System, 2015). It is located within latitudes 8– 10^{o}N and longitudes 3 – 8^{o}E with a population of about 3,950,249 (NPC, 2006) and with a growth rate of 3.2%, the State has an estimated population of 5,586,000 in 2017 (Niger State Geographical Information System, 2015). The ecological condition of the State also made it habitable for forest animals such antelope, Rodents, tortoise, monkey and other forest animal to thrive well.

Niger State consists of twenty-five (25) Local Government Areas (LGAs) that are grouped into three agricultural zones: i, ii and iii with the zones having eight, nine and eight LGAs, respectively. Nupe, Gwari and Hausa are the major ethnic groups in the State. There are other minor ethnic groups such as Koro, Kakanda, Kadara, Ganagana, Dibo, Kambari, Kamuku, Pangu, Dukawa, Angwai. Igbo, Yoruba and other tribes also settle in the State. The soils are fertile, its hydrology permit the cultivation of most of Nigeria staple crops and still allows sufficient opportunities for grazing, fresh water fishing and forestry development. The State is blessed with abundant forest trees and mineral resources such as gold, clay, silica, kyanite, marble, copper, iron, feldspars, lead, columbite, kaolin and tantalite (Niger State Ministry of Information, 2012).

Sampling Procedure and Sample Size

Multi-stage sampling technique were used to sample respondents for this study. The first stage involved purposive selection of all the Agricultural zones in both States. The second stage involved the random selection of one (1) Local Government from each of the selected agricultural zone. The third was random selection of four

communities from the selected LGAs. While the fourth stage involved the use of proportional sampling of 10% of the farmers from the sampling frame of the selected communities.

Data Collection

Primary data was used for this study. Data was collected on socio-economic characteristics of rural farming populace, sources of information on fauna forest resources, types of forest fauna resources utilised and environmental hazards to forest resources utilisation. Data was collected by researchers and trained enumerators using structured questionnaire and interview schedule.

Method of Data Analysis

Objective i, ii and vii will be achieved using descriptive statistics such as frequency distribution, percentage and mean

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 showed the results of the socioeconomic characteristics of rural farming populace. The mean age of the respondents in Niger State was about 41 years, while the mean age in Kogi State was about 40 years. The pooled result of the mean age which was 40 years is not far from the mean ages of the respondents in the two States. The finding suggests that the respondents belong to the middle age class, who are physically fit to withstand the stress and rigorous activities involved in the exploitation and utilisation of forest fauna. Moreover, activities such as hurting for wild animals is mostly done by middle-age farmers for their livelihood. It is also believed that middle age farmers are mentally alert to embrace techniques that will boost their income and livelihood. This findings agreed with that of Olujide and Oladele (2014) who stressed that agro-forestry practitioners in Oyo State were in their active ages.

Finding in the Table 1 showed that 83.0% and 78.6% of the respondents in Niger and Kogi States respectively were married. In the same manner, the pooled result revealed that 80.7% of the respondents in the study area were married which is a strong indication of some kinds of family responsibilities that will propel them to seek for alternative source of livelihood from forest fauna to augment their incomes.

The result in Table 1 further indicated that majority (73.4% and 58.2%) of the respondents were male in their respective States of Kogi and Niger. On the whole, 66.3% of the respondents in the study area were male. The males dominated females in the forest fauna exploitation and utilization in the study area might be due to fact that animals hurting mostly involved the use of guns and other weapons that cannot be handled by women.

Table 1 showed that the mean household size of respondents in Niger State was 11 persons, while that of Kogi State 7 members and the pooled result was 9 persons. Large household sizes points to the availability of family labour for forest fauna exploitation and utilization. Conversely, large household size could worsen the livelihood situation of farming populace particularly if they are composed of many dependents. Bola *et al.*, (2012) stressed that large household with no alternative income rely more on forest resources for their livelihood.

In Table 1, the average years of experience in forest resources exploitation and utilization in both States of Niger and Kogi were 20 and 18 years respectively, while the mean year of experience for the respondents was 19 years. The fact that majority of the populace of the study area started forest fauna exploitation and utilization long ago and early in their lives signifies that most farmers in the study area earn their livelihood through forest fauna exploitation and utilization.

Table 1 showed that the distribution by educational level in Niger State was 64.1% had non-formal while 19.6% primary education. The situation in Kogi State was similar with 34.1% had non-formal education while 26.6% had secondary education. While the pooled result revealed that 48.2% of respondents in the study area had non-formal education and 18.1% had secondary education. Also, on the average 6.1% of the respondents had primary and adult education respectively. The implication is that the level of awareness and benefits embedded in the utilisation of forest fauna can be easily tapped by high literacy level as seen in the study area. Moreover, the

distribution of farmers according to years spent in formal education showed that 26.6% spent between 7-12 years in formal education in Kogi State while 19.6% spent between 1-6 years in formal education in Niger State. The pooled was 18.1% of respondents spent 7-12 years in formal education.

Table 1 showed that most 50.3% and 42.2% of respondents had access to extension services in Kogi and Niger State, while the pooled result indicate that 54.0% of the respondents had no access to extension services. Extension contact enable farmers to access timely and speedy information, this could also expose them to benefits attached to utilisation of forest fauna for their livelihood.

Table 1: Distribution of farming populace according to socio-economic characteristic

Socio-economic characteristics	**Kogi State (n=173) Freq (%)**	**Niger State (n=153) Freq (%)**	**Pooled (n=326) Freq (%)**
Age (year)			
≤20	7 (4.0)	4 (2.6)	11 (3.4)
21-30	42 (24.3)	34 (22.2)	76 (23.3)
31-40	39 (22.5)	35 (22.9)	74 (22.7)
41-50	56 (22.4)	55 (35.9)	111 (34.0)
51-60	24 (13.9)	21(13.7)	45 (13.8)
>60	5 (2.9)	4 (2.6)	9 (2.8)
Mean	39.8	40.6	40.2
Sex			
Male	127 (73.4)	89 (58.2)	216 (66.3)
Female	46 (26.6)	64 (41.8)	110 (33.7)
Experience in resources utilisation (years)			
1-10	54 (31.2)	33 (21.6)	87 (26.7)
11-20	57 (32.9)	61 (39.9)	118 (36.2)
21-30	46 (26.6)	32 (20.9)	78(23.9)
31-40	11 (6.4)	20 (13.1)	31 (9.5)
>40	5 (2.9)	7 (4.6)	12 (3.7)
Mean	17.9	20.2	18.9
Educational level (year)			
Non-formal	59 (34.1)	98 (64.1)	157 (48.2)
Primary	21 (12.1)	30 (19.6)	51 (15.6)
Secondary	46 (26.6)	13 (8.5)	59 (18.1)
Tertiary	33 (19.1)	6 (3.9)	39 (12.0)
Adult	14 (8.1)	6 (3.9)	20 (6.1)
Years spent in formal education			
1-6	21 (12.1)	30 (19.6)	51 (15.6)
7-12	46 (26.6	13 (8.5)	59 (18.1)
>12	33 (19.1)	6 (3.9)	39 (12.1)
Mean	6.4	2.6	4.7
Access to extension			
Yes	73 (42.2)	77 (50.3)	150 (46.0)
No	100 (57.8)	76 (49.7)	176 (54.0)

Sources: Field survey, 2018
Figures in parenthesis are percentages

Sources of information of forest animal resources utilisation

Table 2 showed the distribution of respondents according to sources of information on forest animal resources utilisation. The results in Table 2, indicated that 87.6%, 36.6% and 35.9% of the respondents' utilised radio, friends and extension as their major sources of information on forest animal resources in Niger State respectively, while in Kogi State 88.4%, 49.7% and 27.7% of respondents indicated that radio, television and friends were their major sources of information respectively. The pooled result indicate that 88.0% of the respondents used radio as their source of information in the study area. This finding showed that radio and television were the main sources of information on forest resources utilisation in the study area. Timely and speedy information have the capacity to improve farmers' livelihood in the study area. This findings agree with Oyeyinka *et al.*(2014) who posited that radio and television are very important medium of communication in a rural communities because of the value attributed to it as it require little spending than the other mass media such as internet. Kirori (2015) also posited that radio, relatives/friends and neighbors were the major sources of information on forest resources utilisation. However, the level of television watching is much lower among rural households than urban.

Table 2: Distribution of farming populace according to sources of information on forest animals resources utilisation

Source of Information	Kogi State (n=173) Freq (%)	Niger State (n=153) Freq (%)	Pooled (n=326) Freq (%)
News	36 (20.0)	7 (4.6)	43 (13.2)
Radio	153 (88.4)	134 (87.6)	287 (88.0)
Television	86 (49.7)	28 (18.3)	114 (35.0)
Internet	26 (15.0)	2 (1.3)	28 (8.6)
Extension	41 (23.7)	55 (35.9)	96 (29.4)
Friends	48 (27.7)	56 (36.6)	104 (31.9)
NGO	19 (11.0)	17 (11.1)	36 (11.0)
GO	17 (9.8)	17 (11.1)	34 (10.0)

Sources: Field survey (2018)
Figures in parenthesis are percentages
*Multiple responses

Forest animal resources utilised for farming populace livelihood

Table 3 revealed that 87.6% of the respondents utilised Mammals such as Rat, Rabbits, Antelopes and Monkeys 45.8% utilised Reptile such as snake and Alligator 37.3% utilised Insect such cockroach, grasshopper and cricket 35.9% utilised Moluscs such as snails, cowries and olive shells 35.9% utilised Wild birds such as Eagles, bats and quails 28.1% Worms utilised such as earthworm, tapeworms, cock worms, round worms and flatworms, 14.4% utilised Frogs such as tree frogs, toads, pond frogs and glass frogs in Niger State. The study further revealed that 76.1% of Mammal such Rat, Rabbits and Antelope, 20.2% of Reptile such as Snake and Alligator, 17.3% of wild bird such as Eagle and bats, 15.6% of Worms such as earthworm, tapeworms and flatworms, 14.5% of Frogs such as toad and pond frogs, 9.8% of Insect such as cockroach, grasshopper and cricket, 9.2% of Moluscs such as snails, cowries and olive shells were also utilised by respondents in Kogi State. This findings revealed that mammals representing 81.6% on the average was the most utilised forest animal by farming populace for their livelihood in both States, which augmented income from other farming activities. This is in line findings was in line with Ibrahim *et al.* (2016) finding who stressed that mammals were the of most utilized forest animals by rural farmers in New Bussa area of Niger State, Nigeria.

Table 3: Distribution of respondents according to forest animal resources utilized for livelihood

Woody forest resources	Kogi State (n=173) Freq (%)	Niger State (n=153) Freq (%)	Pooled (n=326) Freq (%)
Forest animals			
Worm	27 (15.6)	43 (28.1)	70 (21.5)
Insect	17 (9.8)	57 (37.3)	74 (22.7)
Frog	25 (14.5)	22 (14.4)	47 (14.4)
Mammals	132 (76.1)	134 (87.6)	266 (81.6)
Reptile	35 (20.2)	70 (45.8)	105 (32.2)
Moluscs	16 (9.2)	55 (35.9)	71 (21.8)
Wild bird	30 (17.3)	55 (35.9	85 (26.1)

Sources: Field survey (2018)
Figures in parenthesis are percentages
*Multiple responses

Environmental hazards encountered by farming populace in the utilisation of forest resources
The Table 4 showed that the farming populace in Niger and Kogi States admitted that wind blow was severe with mean value of ($\bar{x}$=2.46) and ($\bar{x}$=2.42). The pooled results indicated that wind blow was also severe with mean value ($\bar{x}$=2.44) implying that wind blow was the major environmental hazards encountered by rural farming populace in the utilisation of forest resources for their livelihood. This findings is in line with Inoni (2012) who reported that wind blow was the most environmental hazards face by chainsaw operators in Nigeria. This was followed by bush burning with similar trend in Niger and Kogi State with ($\bar{x}$=2.49) and ($\bar{x}$=2.36) respectively. The pooled mean value ($\bar{x}$=2.42) indicated that bush burning was also severe in the utilization of forest resources. Bush burning if not controlled may lead to extinction of wild animals. This is in consonance with Inoni (2012) who stated that bush burning had resulted to the extinction of some fauna and flora resources in Sub-Saharan Africa. However, flood is also severe in both States, Niger and Kogi with mean value of ($\bar{x}$=2.37) and ($\bar{x}$=2.02), the pooled result showed that ($\bar{x}$=2.18) mean value of the farming populace in the study area had a severe flood as environmental hazard in the utilization of forest resources. This implies that flood will reduce the utilization of forest resources in the area. This finding consonance with Umaru, (2009) who stated that effect of climate change will reduce the utilization of Agricultural Resources a case of Bayelsa State, Nigeria.

Furthermore, the following environmental hazards were not severe according to Table 4 result (see appendix), intensive radiation with mean value of ($\bar{x}$=1.94), drought with mean value of ($\bar{x}$=1.74), stricken of bees on bee extractors with mean value of ($\bar{x}$=1.66), snake bite with mean value of ($\bar{x}$=1.57), and wild animals attacks with mean value of ($\bar{x}$=1.30), this showed that these were not one of the major environmental hazards encountered by farming populace in forest resources utilisation in the study area

CONCLUSION

From the findings of the study, it was concluded that the mean age of the respondents was 40.2 years while the mean farming experience was 18.9 years. Also, 15.6% of respondents had primary education while 54.0% had access to extension agents Majority (88.0%) of the respondents used radio as their source of information. About 82% utilised forest mammals for their livelihood while 32.2% utilised reptiles. The results indicated that wind blow was also severe with mean value ($\bar{x}$=2.44) and bush burning was also severe with mean value of ($\bar{x}$=2.42).

RECOMMENDATIONS

i. Adequate and timely information should be made available by government through extension agents on the need to prevent environmental hazards associated with forest resources utilisation
ii. Other alternative means of livelihood such as off-farm activites should be encouraged in the study area to reduce dependence on forest animals that could lead to forest animal extinction

iii. Farmers should inculcate the habits of practicing sustainable forest practices that will conserve fauna species in the forest which will go a long way in augmenting their livelihood.

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APPENDIX

Table 4: Environmental hazards encountered in forest resources animal utilisation

Environmental hazards	Kogi State (n=173) Mean ($\bar{x}$)	R	D	Niger State (n=153) Mean ($\bar{x}$)	R	D	Pooled (n=326) Mean ($\bar{x}$)	R	D
Flood	2.02	3rd	S	2.37	3rd	S	2.18	3rd	S
Soil erosion	1.97	4th	NS	2.25	5th	S	2.12	4th	S
Drought	1.50	8th	NS	2.06	6th	S	1.76	6th	NS
Intensive radiation	1.59	6th	NS	2.33	4th	S	1.94	5th	NS
Snake bite	1.53	7th	NS	1.61	8th	NS	1.57	8th	NS
Stricken of bees on bees extractors	1.60	5th	NS	1.73	7th	NS	1.66	7th	NS
Windblow	2.42	1st	S	2.46	2nd	S	2.44	1st	S
Bush burning leads to animal extinction	2.36	2nd	S	2.49	1st	S	2.42	2nd	S
Wild animals attack	1.33	9th	NS	1.22	9th	NS	1.30	9th	NS

Sources: Field survey, 2018

Note: R=Ranks, D=Decision, S=Severe, NS=Not severe