Original Research Article

CONSTRAINTS TO AGRICULTURAL PRODUCTIVITY IN KAINJI LAKE NATIONAL PARK, NIGERIA

ABSTRACT

The aim of this research work, undertaken between January to December 2011, is to evaluate constraints to agricultural productivity in Kainji Lake National Park (KLNP). Simple randomized design was employed to select three communities/villages from each of the five districts of KLNP. A total of 600 copies of questionnaires were administered, with forty (40) copies of questionnaires being administered in each of the 3 villages. The harvested data were analysed using both descriptive and inferential statistics, while stepwise multiple regression was adopted to identify the contribution of agricultural constraints to the total food production in the study area. The highest duration of farming in all villages across all districts was 11-15 years, with 35.8% of respondents. The least farming duration was 20 years and above, with 4.6% of respondents. Most farmers (30.5% of respondents) in the villages in all the districts cultivated farmlands of less than 1 acre, while cultivation of farm sizes above 5 acres was the least, with 16.44% of respondents. Maize was the most commonly cultivated crop, while cassava, yam, cowpea, guinea-corn, groundnut were among other crops cultivated on the farmlands. Among the constraints to agricultural productivity, high cost of human labour had the highest regression coefficient (R^2) at 0.82, with high cost of transportation at 0.80, inadequate extension services 0.78, lack of funds and credit facilities 0.72, lack of modern farming equipment 0.6 while poor marketing had the least R^2 of 0.58. The high level of agricultural constraints in the Kainji Lake National Park had a commensurate negative effect on the survival of the surrounding communities. This calls for urgent intervention to avoid over-exploitation and further negative anthropogenic impacts on KLNP, in order to promote its conservation and sustainability.

KEYWORDS: Agriculture productivity, agricultural Constraint, Conflict, Degradation

1. INTRODUCTION

Agriculture occupies more than one-third of the World's land area and it is the leading cause of habitat destruction on a global basis, be it on traditional/ small scale commercial systems. Malthus theory (1826) says that the size and growth of the population depends on the food supply and agricultural methods, but Boserup's theory opposes this by saying that the agricultural methods depend on the size of the population. Malthus states that in times when food is not sufficient for everyone, the extra people will have to die. However, Boserup (1996) states that in times of pressure people will find ways to increase the production of food by increasing workforce, machinery and fertilizers among others.

Human demographic growth has caused increased demand for natural resources (Oramah, 2006). In Africa, most people depend directly on these resources for their livelihood (FAO, 2008b). In Nigeria like many other developing countries, majority of the population depends on agriculture for food, personal needs and income (FAO 2006). The relationship between agricultural practices and environment has been relatively stable and favorable, but it has in recent times been disturbed by anthropogenic forces, leading to serious environmental degradation. This varies from country to country and Nigeria is not an exception. Sekitoleko (1993) reported that any agricultural activity that upsets the natural ecosystem and the extent to which it is disturbed depends on the nature, intensity and duration of such activity. She further described the activities in categories, which are land/soil degradation, drainage, over harvesting and burning of wetlands, pollution of water bodies, land and air, overfishing and encroachment of protected area.

Conflict between agriculture and environmental quality is a challenge to mankind for survival. Conflicts arise when people who traditionally use natural resources around them are either controlled or forbidden on such resources (Norton-Griffths, 1996). Biodiversity conflict according to O' Leary and Bingham (2003) occur when there are fundamental and ongoing differences amongst parties concerning value and behaviour as they relate to the environment. In addition conflicts are situations where people deliberately, with or without knowledge of the consequences of their actions destroy biodiversity, particularly when they perceived a positive impact on their livelihood (Young et al., 2003; Young et al., 2005). For instance decision to establish a park where cultivation and grazing is prohibited requires removal of some people who used these lands. There may not be peace because the local people would feel that they are being deprived of something that rightfully belongs to them. Such affected individuals should have been given the opportunity in the planning process or been offered access to some alternative resources that would substitute their traditional lifestyle.

Yoram and Heinrich, 1988 reported that about one-third of vertebrates have suffered either extinction or a drastic reduction in population as a result of human activities, whether hunting, agricultural practices, urban industrial development or poisoning. Although hunting was the main cause of several species extinction, habitat destruction has also been responsible for the disappearance of large numbers of species. The major natural resources, which include land, water, associated soil, plants and animals are of great importance to man. Most of the food comes from plants grown on the land or from animals, which themselves live by eating plants. Therefore, man's survival depends on agriculture. Natural areas which shelter ethnic groups dependent on hunting, fishing, and food gathering preserve the heritage of human wisdom derived from a long association with nature, such as the use of wild plants and animals for medicinal purposes.

The high population of communities in the five districts of the Kainji lake National Park (Table 1) has placed more demand on agricultural land use. Hence, this research targeted at enumerating the types and levels of constraints to agricultural productivity in the Kainji Lake National Park.

Table 1: Population of selected villages in five districts of Kainji Lake National Park, Nigeria

District	Villages	Population
Wawa	Gada Olli	10,050
	Sabon Kadi	5,000
	Leshibe	2,500
Babanna	Kubli	6,000
	Kwasure	4,000
	Garuji	693
Zugurma	Patiko	4,000
	Muliya	3,500
	Faje	4,200
Kemeji	Tenebu	3,000
	Nanu shugaba	6,000
	Bezira	2,800
Dekala	Gulbi	2,000
	Benya	3,580
	Bezhi	2,500
TOTAL		**59,823**

Source: Global Environmental Facility (GEF) World Bank Assisted Project (2009).

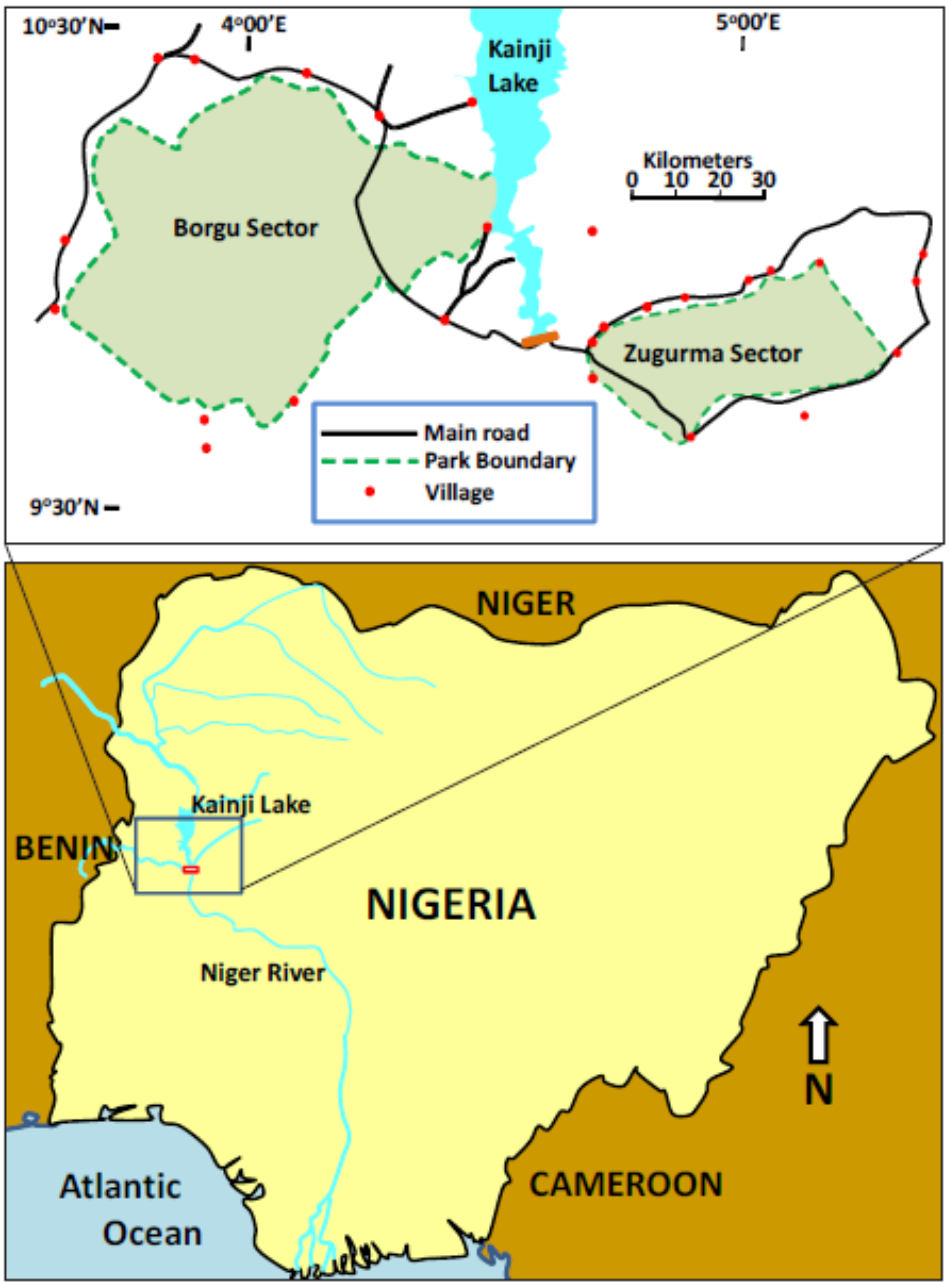

Plate 1: Map showing Kainji Lake National Park, Nigeria. (Source: Amusa *et al.*, 2010)

2.0 MATERIALS AND METHODS

Data were obtained from both primary and secondary sources. The primary sources of data were of two types. First, questionnaires were prepared and used to collect information on agricultural practices and productivity from the residents around KLNP. Secondly, the field observation method was employed. The study area (KLNP) has a total population of about 59,823 (Table 1) (Global Environmental Facility 2009).

2.1. The administration of questionnaires: A total of six hundred copies of questionnaires were administered in all the five districts, with forty questionnaires being administered in each of the three villages in each district. The five districts were examined, totalling fifteen villages in all. The questionnaires provided information on determining the demographic characteristics and duration of cultivation of farmlands in each district (Table 2; Hammond and Mccullagh,1978).

2.2. Field observation: The sizes of randomly selected farmlands in three villages from each of the five districts were measured (Below 1 hectare, 1-2 hectares, 2.1-5 hectares and above 5 hectares) (Table 3). The types of crops cultivated was also observed (Plate 1 and 2).

Simple Randomized Sampling technique was employed in selecting the villages from each district. Three communities were sampled from each district. Data obtained were analyzed using both descriptive and inferential statistics.

A stepwise multiple regression was adopted to identify the contribution of agricultural constraints to total food production in the study area (Olawepo. 2010). For this study, our dependent variable Y is the total acre cultivated and total food production in tonnes, while the independent variables 1-6 are the constraints. Thus, the equation could be written as:

$Y = a + b_1X_1 + b_2X_2$-------$b_n X_n + e$

Where Y = acre

a = Intercept

b_1, b_n = parameter estimates

e = standard error

X_1 = Lack of modern farming equipments

X_2 = poor marketing

X_3 = High cost of human labour

X_4 = Inadequate extension services

X_5 = Lack of funds / credit facilities

3.0 RESULTS

3.1.1 Duration of cultivation of farmland

The duration of cultivation of the farmlands was determined from the questionnaires administered. Table 2 shows that 20.1% of the respondents spend less than five years on their farmland while 33% have been cultivating their farmlands for 5-10 years and 35.8% for 11-15 years respectively. Similarly, 6.4% of the respondents have been cultivating their farmlands for 16-20 years while 4.6% have been cultivating for over 20 years respectively.

Table 2: Duration of Cultivation on Farmland

Districts	Villages	Below 5 yrs	5 – 10 years	11 – 15 years	16 – 20	Above 20
Wawa	Gada Oli	8	6	12	3	1
	Sabon kadi	4	16	8	5	0
	Leshibe	2	14	6	2	3
Babanna	Kubli	6	12	8	2	1
	Kwasure	8	14	10	0	3
	Garuji	0	10	16	1	1
Zugurma	Patiko	2	16	12	0	1
	Muliya	4	8	16	3	2
	Faje	8	8	10	1	2
Kemije	Tenebu	10	6	12	3	0
	Nanu Shugaba	8	6	2	1	0
	Bezira	0	8	12	1	0
Deakala	Gulbi	6	12	8	4	2
	Benya	14	6	16	0	1
	Bezhi	8	2	10	2	3
Total		88 (20.1%)	144 (33.%)	156 (35.8%)	28 (6.4%)	20 (4.6%)

3.1.2. Size of farmlands in the communities

The size of farmlands revealed that in the five districts and across all the communities the highest level of cultivation (30.5%) was on farmlands less than 1 acre in size. Farm sizes between 1-2 acre had 26.7%, 2.1-5 acres farmlands had 26.3%, while farmlands with 5 acres and above had the least at 16.44% (Table 3).

Table 3: Size of farmland in the study area (Acre)

Districts	Villages	Size in Acres			
		Less than 1	1-2	2.1-5	Above 5
Wawa	Gada Oli	2	3	5	1
	Sabon kadi	3	4	3	2
	Leshibe	6	2	4	1
Babanna	Kubli	4	5	3	3
	Kwasure	3	2	4	2
	Garuji	7	6	4	3
Zugurma	Patiko	4	4	1	2
	Muliya	5	5	5	3
	Faje	3	3	4	4
Kemije	Tenebu	6	5	3	3
	Nanu Shugaba	5	4	4	2
	Bezira	4	3	6	3
Deakala	Gulbi	2	2	4	1
	Benya	5	6	3	3
	Bezhi	6	3	3	2
Total		**65**	**57**	**56**	**35**
Total (%)		**30.50**	**26.76**	**26.30**	**16.44**

3.1.3. Crops Cultivated in the study area

The bulk of the people in the study area are farmers. The commonly cultivated food crops in the study area include yam, cassava, groundnut, guinea corn, maize, millet (Plates 1 and 2; Table 4). Others are vegetables, fruits and soya beans.

Table 4: Types of crops grown in the study area

Districts	Villages	Crop specialization
Wawa	Gada Oli Sabon kadi Leshibe	Sorghum, Groundnut, Rice, Maize and Cowpea
Babanna	Kubli Kwasure Garuji	Yam, Maize, Guinea-corn, Cassava, Groundnut and Vegetables

Zugurma	Patiko Muliya Faje	Yam. Guinea-corn, Cowpea, Maize, Groundnut and Cassava
Kemeji	Tenebu Nanu-Shugaba Bezira	Cotton, Rice, Maize, Guinea-corn, Groundnut and Cassava
Dakala	Gulbi Benya Bezhi	Guinea-corn, Millet, Maize, Yam, Cowpea and Cassava

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152 **3.1.4. Stepwise multiple regression results of the agricultural constraints**

153 In order to measure the contribution of each of the constraints to the variation in the total agricultural
154 productivity in the study area, the multiple regression model (Table 5) shows that a strong positive
155 relationship exists among the variables tested. From the regression table, it is observed that high cost
156 of human labour (X_3) has the highest multiple regression coefficient (R^2) is the most felt constraint to
157 increased food production, followed by high cost of transportation (X_6), inadequate extension services
158 (X_4), lack of funds/ credit facilities (X_5), lack of modern equipments (X_1) and poor marketing (X_2) with
159 the coefficient of determination (R^2) of 0.82, 0.8, 0.78, 0.72, 0.64 and 0.58 respectively (Table 5).

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161 **Table 5: Stepwise multiple regression results for the agricultural constraints**

Agricultural Constraints	Parameter estimates	Standard Error	R	R^2	% Change	% Cummulative
Modern farming equipment	0.03	0.01	0.87	0.64	-	64
Poor Marketing	-3.21	0.41	0.65	0.58	-6	58
High cost of human labour	-2.92	1.02	0.90	0.82	24	82
Inadequate extension services	1.54	2.21	0.86	0.78	-4	78
Lack of funds/ credit facilities	3.09	1.29	0.77	0.72	-6	72
High cost of transport	2.11	1.63	0.89	0.80	8	80

to urban centres

Source: Field Data

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Plate 2: Mixed Cropping Cultivation

Plate 3: Millet Cultivation

DISCUSSION

Agricultural constraints in Kainji Lake National Park has a profound impact on the survival of the communities located in the five districts of the park. This study focused on four objectives which were to determine the duration of farming, the types of crops cultivated, the size of the farmlands and the types and rates of constraints affecting agricultural productivity in communities found in the five of districts of Kainji Lake National Park.

The duration of farming practised by the largest percentage of the sampled communities was least which existed between one to five years. This could be as a result of cultivating mainly annual (maize, yam, rice, groundnut, millet, guinea-corn), biannual and biennial crops and the types of farming practised. The highest duration of farming was observed to be twenty years and above and was practiced by the least percentage of the population.

The size of farmlands cultivated revealed that the highest percentage of the population cultivated lands less than one acre, while the least percentage of the population cultivated lands above five acres. This can be attributed to the lack of funds/credit facilities, modern farming equipments and high cost of human labour in the sampled communities.

The most felt constraints to agricultural productivity in KLNP is high cost of human labour. This is because most farmers do not have access to modern farming equipment and still rely on human labour to carry out farming activities such as weeding, tillage, planting and harvesting. High cost of transport to urban centres also has a profound impact on agricultural productivity, probably because of bad roads not encouraging commuters. This will result in the high cost of transporting agricultural products from the rural areas to the urban areas. Extension services in the communities targeted at improvement of agricultural productivity is inadequate, as evident in the use of unimproved seedlings, agricultural practices that are not eco-friendly and lack of pest management. Poor marketing is the least of the constraints observed in the communities and could be as a result of lack of relevant marketing skills (Ejidike and Ajayi, 2012).

4.0 CONCLUSION

There are major constraints to agricultural productivity within the Kainji Lake National Park (KLNP), with high cost of human labour having the most significant impact and poor marketing having the least constraint. Other constraints which profoundly affected agricultural productivity in the study area included the short duration of farming, types of crops cultivated and the overall size of farmlands used in agricultural practices. These constraints had a reverberative effect on the standard of living, leading to poverty in the communities and a threat to conservation and sustainability of the natural resources of Kainji Lake National Park.

5.0 RECOMMENDATIONS

In order to overcome these constraints, the following recommendations are suggested:

- Modern farming equipment should be provided at subsidized rates by the government to farmers in the communities.

- Provision of short and long time loans for the farmers in the communities to combat the problem insufficient funds
- Farmers co-operative society should be established in order to encourage better marketing of the agricultural products
- Government should create better roads for ease of transportation and encourage more commuters in order to reduce the high cost of transportation
- Creation of awareness by extension officers on improved agricultural practices should be encouraged

REFERENCES

1. Adebayo, A.F. (1985). The Implication of Community Leadership for Rural Development Planning in Nigeria, *Comm. Dev. J*., 20:24-31.
2. Amusa T. O., Jimoh S. O., Aridanzi P. and Haruna M. (2010). Ethnobotany and conservation of plant resources in Kainji Lake National Park. www.ethnobotanyjournal.org/vol8/i1547-3465-08-181.pdf.
3. Boserup, E. (1996), Development theory: An analytical framework and selected application, *Population and Development Review*, pp. 505-515.
4. Ejidike B. N. And Ajayi S. R. (2012). Trends in wildlife conservation practices in Nigeria. International Journal of Biodiversity and Conservation Vol. 5(4), pp. 185-191, April 2013. http://www.academicjournals.org/IJBC. DOI: 10.5897/IJBC11.127
5. Food and Agricultural Organisation of the United Nations (2006). Unequal access to natural resources. www.fao.org/newsroom/en/news/2006/1000342/index.html.
6. Global Environmental Facility (GEF) World bank assisted project as at June, 2009.
7. Hammond R. and Mccullagh P.(1978) Quantitative techniques in Geography , Oxford University Press Limited. 113pp
8. Malthus, T. (1826), *An Essay on the Principle of Population*, Cambridge University Press, edited by Patricia James (1989)
9. Norton – Griffiths, M. (1996) Property rights and the Marginal Wildbees: An Economic Analysis of Wildlife Conservation Options in Kenya. *Biodiversity Conservation.* 5:1557-1577.
10. O Leary, R. and Bingham, L. (2003) The promise and performance of environmental conflict resolution. Resources for the future. Washington D.C.
11. Olawepo, R.A. (2010) Determining rural farmers' income: A rural Nigeria experience. *Journal of African Studies and Development* Vol. 2(3), pp. 99–108
12. Oramah I. T. (2006). The effects of population growth in Nigeria. *Journal of Applied Sciences*. Volume **6**: 1335-1337. https://scialert.net/abstract/?doi=jas.2006.1332.1337.
13. Sekitoleko, V. (1993) Resolution of Conflict between Agriculture and Environment Protection in Uganda. *Nordic Journal of African Studies* 2 (2): 103-108.

14. Yoram, Yom-Tiv and Heinrich, M. (1998) Changes in the distribution abd abundance of vertebrates in Israel during the 20th Century. *The Zoogeography of Israel.* W. Junk Publishers.
15. Young, J., Nowicki, P., Alard, D., Henle, K., Johnson, R., Matouch, S., Niemela, J. and Watt, A.D. (2003) Conflicts between human activities and the conservation of biodiversity in agricultural landscapes, grasslands, forests, wetlands and uplands in Europe. *A Report of the BIOFORUM Project.* CEH, Banchory.
16. Young, J., Watt, A.D., Nowicki, P., Alard., D., Clitherow, J., Henle, K., Johnson, R., Laczko, E., McCracken, D., Matouch, S., and Niemela, J. (2005). Towards sustainable land use: identifying and managing the conflicts between human activities and biodiversity conservation in Europe. *Biodiversity and Conservation*, 14 (7): 1641-1661.