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Journal of Ecology and Natural Resources
ISSN: 2578-4994

Population Growth and Natural Resources Exploitation in Rural Uganda: A Case Study of Lobule Sub-County, Koboko District

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Review Article

Volume 7 Issue 2

Received Date: May 04, 2023

Published Date: June 23, 2023

DOI: 10.23880/jenr-16000339

Abstract

There are global arguments on how population growth has been the main cause of natural resources exploitation. These differences in opinion have led to the need to establish whether this is true in all situations or not. Uganda, for example, has had a very fast population growth and hence would lead to an increased exploitation of natural resources. In the above respect this study was conducted to ascertain the relationship between population growth and natural resource exploitation using Lobule Sub County in Koboko District of Uganda as a sample. Specifically, the objectives were to establish the level of population growth and the state of natural resource exploitation in Lobule Sub-county; and finally determine the relationship between the above two factors. Using a questionnaire data was collected and analyzed from a sample of 89 respondents including key informants from local leaders, local non-government organizations and relevant experts at the district level. The results show that with r=0.277 and p=0.078 being greater than 0.05 there was an insignificant impact of rising human population growth on natural resources exploitation in this sub county. The effect of human population on natural resources exploitation was found to be only 7.7%. This indicates that there are other factors not studied here which were more significant in natural resources exploitation than rising human population in Lobule subcounty, Kotido District in Uganda.

Keywords: Natural Resources Exploitation; Population Growth; Rural Uganda

Abbreviations: CBD: Conventions Like the Convention on Biological Diversity; CITES: Convention on Illegal Trade of Endangered Species; MDGs: Millennium Development Goals; SDGs: Sustainable Development Goals; DRC: Democratic Republic of the Congo.

Introduction and Background of the Study

The human population and natural resources have a very intricate nexus between them and the increasing human populations inevitably places increasing demand on all types of natural resources including affecting climate [1,2]. Population of a country at a period of time, has a number of quantitative (size, growth and spatial distribution) and qualitative characteristics including age-structure, health, education, skill, income and consumption patterns which have both negative and positive impacts on natural resources [3].

Several authors [4-8] have reported how human population has over the years developed specific social systems, institutions and technologies to interact with

their natural system and the environment to gain livelihood support. And there have been views that as population enlarges, there is smaller amount of per person natural resources such as water, arable land and forest. More people lead to increased exploitation of natural resources resulting in degradation of environment. Under a changing situation, a growing population means smaller allocation of resources resulting to low productivity of food and goods, less drinking water, less sweet water for agriculture and industrial activities, and hygiene may become less and less healthy due to increasing contamination by human uses and waste generation. In the environment there are different interactions between animals, plants, soil, water and other living and non-living things [6].

In addition to population pressure, many observers and analysts [9-12] also point to the poor who are inevitably forced to address their needs using quick fix approaches even if their actions contribute to the long-term depletion and degradation of the natural resources. Yet the poor are often the most vulnerable and least able to cope with environmental changes and the impacts of "natural" disasters and hazards. It is further argued by the researchers listed above that it is reasonable to relate population pressure to the depletion of the finite natural resources base.

According to MacRae D, et al. [13] as quoted by Encyclopaedia Britannic, reported that Thomas Malthus stressed that if the human population continued to grow, food production would not be able to keep up with demand and there would not be enough food to go around. The result, he warned, would be a terrible famine that would kill many people but Boserup E, et al. [10] challenged Malthus's conclusion that the size of the human population is limited by the amount of food it can produce. She suggested that food production can and will increase to match the needs of the population.

On the basis of a hypothetical world, population of one billion in the early nineteenth century and an adequate means of subsistence at that time, it is evident that extremely high population density of Bangladesh has contributed to the intense use or over use of land, water, fisheries and forest resources. Bangladesh has both scarcity and abundances of water [14]. The demands for fresh water for different sectorial uses such as agriculture, fisheries, navigation, industry, domestic uses and for other livelihood activities have increased greatly in the recent years with the gradual increase of population and expansion of economic activities [15].

More cultivable land has been made available by clearing forests and by reclaiming wet lands, ponds and green belts. Advanced agriculture requires utilization of more water, more fertilizers and more pesticides. Application of fertilizers and pesticides makes the soil infertile. Different types of pollutions are causing a number of problems in the physical environment that are further affecting the biological environment seriously [16].

In 2022 the world population was 7.96 billion people. That is almost 8 billion bodies that need to be fed, clothed, kept warm and ideally, nurtured and educated [15]. These 7.96 billion individuals are busy consuming resources, are also producing vast quantities of waste and the numbers continue to grow. The United Nations [17] estimates that the world population will reach 9.2 billion by 2050. However, the ever-increasing pressure on these resources resulting mainly from population growth, affluence, poor planning and policy failure, the state of many of the global commons is worrying. The repercussions from the deteriorating state of environment and natural resources have been evidenced in depletion and extinction of species, ecosystem destruction, pollution and climate change [18].

A vast majority of Uganda's population is dependent on natural resources. For example, the forest cover declined by 60.4% between 1990 and 2015 and this is attributed to the increasing demand of land for agriculture and wood as fuel by the rapidly increasing population growth including wetlands cover reducing to only 3.15% by 2017 from 13% in 1990. The high rate of population growth also increases poverty levels and threatens opportunities for wealth creation by negatively affecting future gains in agricultural production and food security through pollution of air, land and water [19].

In 1991, the national population census estimated the district population at 62,300. The 2002 national census estimated the population at 129,100, of whom 65,400 (50.6 percent) were female and 63,800 (49.4 percent) were male. The annual population growth rate, between 2002 and 2012, was calculated at 6.4 percent. In 2012, the population was approximately 236,900. This increase could be attributed to the influx of refugees in the late 1990s that are living within the town. Another reason could be the fact that the district was insecure and many of the residence who fled to the neighbouring countries had returned by 2002 census. Given the high growth rate, the district needs to expand substantially its entire infrastructure especially in education, health, and water supply in order to enhance the welfare of its population. This means increasing the utilization of the natural resources that could easily lead to depletion of the scarce natural resources for the future generation. As a result, the land productivity is getting reduced. It is widely known that "The stones are growing" and this "growth of

stones" due to top soil being washed away and this is not widely known. Land degradation, contributed largely by soil erosion, has reduced soil fertility and agricultural potential [19,20].

The Koboko District five-year development plan (2010/11-2014/15) ensured a well guided framework for land use management and sustainable development in the district; Promotion, planning and resource mobilization for sustainable developments. The high rate of population growth also increases poverty levels and threatens opportunities for wealth creation by negatively affecting future gains in agricultural production and food security through pollution of air, land and water [19]. However, as reported [17,21] over exploitation of natural resources such as water, arable land and forests have resulted into low productivity of food, less drinking water, and increasing poor hygiene due to poor human waste management among others. Therefore, there was need to establish the relationship between population growth and natural resources exploitation in this district using the Lobule Sub-County as a case study.

Objectives

The main purpose of the study was to investigate the relationship between population growth and natural resource exploitation in Lobule Sub-county, Koboko district. The specific objectives were to:

- Examine the level of population growth in Lobule sub-county.
- Assess state of natural resource exploitation in this sub-county.
- Establish the relationship between population growth and natural resource exploitation in the sub-county.

Brief Literature Review

Globally there have been reports by several authors [21-24] on the direct relationship between increasing human population and the use and destruction of natural resources like plants and animals, water, arable land, etc. This exploitation has been directly linked to the use of natural resources for economic growth in both the developed and developing countries. The environmental degradation has resulted into low productivity of food, less drinking water, poor hygiene and related poor health due to increasing contamination by humans, industry and related activities. The world has been reported to have lost 6 million km^2 of forests, in addition, the degradation of land to the point that its biotic function has almost been irreparably damaged [21].

Major approaches through establishing global conventions like the Convention on biological diversity (CBD), Convention on illegal trade of endangered species (CITES), the Ramsar Convention on wetlands, the Millennium development goals (MDGs) and even the most recent Sustainable Development Goals (SDGs) among other issues focus on how the increasing human population and its equally increasing needs may be managed in such a way as to minimize the negative impact on the environment in general and specifically to natural resources [21,25-31].

Other countries like India, and African countries like Côte d'Ivoire, Ghana, Nigeria, and Cameroon have also reported loss of large acreage of forest cover due to increased human population [32-34].

In East Africa there has been a dramatic increase in human population averaging 85.6% per year and the total population has risen from 257 million in 2000 to over 477 million today Worldometer [35]. Uganda has had the highest birth rate (3.2% per annum) and highest increase in human population in this East African region with population rising from 24 million in 2000 to over 45 million in 2023 [19],

According to the Global Forest Watch [36], in 2010 Uganda had 6.93MHa of forest covering 29% of the total land area. But by 2021 Uganda had lost 49.2Kha. Uganda has also had dramatic decrease in its wetlands cover from 15.4% of total land area in 1994 to only 8.9% in 2015 [37]. While this is true for the whole country it is not known if this is the case for all administrative areas in this country. This is important because it enables the policies and policy implementers develop and implement more accurate and effective programs in managing natural resources depletion and reclamation activities.

Methods

Locale of Study

Koboko District is located in the extreme north-western part of Uganda and shares its border with the Republic of South Sudan to the north and the Democratic Republic of the Congo (DRC) to the west. The district covers a surface of about 770 km2 and has a population of 229,200 people [19]. The district is made up of 6 rural sub-counties namely Kuluba Ludala, Abuku, Midia, Dranya and Lobule and one peri-urban Koboko Municipality.

Lobule sub-county was chosen as the study sub county due to its high population (range 3491- 4320) and proximity to the peri urban municipality.

Research Design

The researchers used descriptive research design guided by both quantitative and qualitative data collection

approaches and relevant questionnaire tools.

Study Population

Lobule Sub-County has total population of about 3491-4320 people. But the researcher chose a population size of 120 as guided by Krejcie and Morgan formular KENPRO [38] in his analysis for determining sample size for a finite population

Sample Size

Basing on the population of 120 a sample size of 92 was determined and used to collect the data. Some categories of persons were picked by purposive sampling while others were picked by census depending on their numbers as indicated in Table 1 below. The categories included environment staff of Lobule sub county, non-governmental organizations working in this sub county, the Local Council chairs from level 1 to 3 and members of the local communities who are the majority.

Category	Population (N)	Sample size (S)	Sample technique
Lobule Sub county staff (handling environment issues)	4	4	Census
NGOs (DRC, ACAV, PICOT & HADS)	4	4	Census
LCs (1&3)	20	18	Purposively
Local community	80	66	Census
Total	**120**	**92**	

Table 1: Showing category of population, sample size and techniques.

Of the target sample of 92 a total of 89 respondents (96.7%) were able to participate. The researcher used questionnaires and interview to collect data from respondents.

Results and Discussions

The bio data of the respondents was collected and this included gender, age and levels of education (Table 2).

		Frequency	Percentage
Gender	Male	62	69.7
	Female	27	30.3
Age	18-35 yrs	63	70.8
	36-53 yrs	24	29.2
Highest Education Qualification	None	10	11.2
	Certificate	38	42.7
	Diploma	15	16.8
	Bachelors' Degree	7	7.9
	Primary	19	21.4

Table 2: Bio-data information of the respondents.

The results from Table 2 above show that the majority (69.7%) of the respondents were male and were mainly youth aged 18 to 35 years (70.8%). The majority (88.8%) had received some level of education of which 67.4% had received tertiary education.

This was good because it means the respondents had a very good comprehension of the issues under investigation.

The results on the level of population growth in this subcounty was collected using 3 major factors namely birth rate, death rate and migrations, and is shown in Table 3 below.

	Mean	Std. Deviation	Interpretation
Birth Rate			
So many new babies are born every year in Lobule S/C	4.34	0.87	Very high
Fertility rate is high among couples in Lobule S/C	4.36	0.73	Very high
There are no facilities for birth control measures in place in Lobule S/C	2.44	1.29	Low
People have poor attitude towards birth control practices in Lobule S/C	3.65	1.23	High
Aggregate Mean and standard deviation	3.7	1.03	High
Death Rate			
The number of people dying yearly in Lobule is low	3	1.18	Moderate
Strategies are in place to reduce death rate per year in Lobule S/C	3.59	1.2	High
Life expectancy is high in Lobule Sub County	3.11	1.19	Moderate
Causes of mortality are known and preventable in Lobule	3.36	1.27	Moderate
Aggregate Mean and standard deviation	3.27	1.21	Moderate
Migration (In coming into the sub county)			
Many new people come to Lobule every year	3.66	1.09	High
Less people move out of Lobule S/C yearly	3.86	1.08	High
There are a number of pool factors that attract population to Lobule S/C	3.33	1.21	Moderate
There is no entry restriction to ban entry into Lobule S/C	3.45	1.63	High
Aggregate Mean and standard deviation	3.58	1.25	High
Grant mean and standard deviation	3.52	1.16	High

{Legend 1: very low level (1.00 -1.79), low level (1.8- 2.59), moderate level (2.60 – 3.39), high level (3.40 – 4.19) and very high level (4.20 – 5.00)}.

Table 3: The Level of Population Growth in Lobule Sub-County, Koboko District.

The results in Table 3 above clearly show that this sub-county has a very high birthrate (Aggregate Mean 3.70 and Standard Deviation of 1.03). The death on the other hand is very low (Aggregate Mean of 3.27 and Standard Deviation of 1.21). Migration in terms of incoming population was found to be high (Aggregate Mean of 3.58 and Standard Deviation of 1.25). The above three factors together yielded a Grand Mean of 3.52 and Standard Deviation of 1.16 which is high resulting in a high population growth (1.3%) in the sub-county. The major factors causing this situation includes high fertility rate due to minimal birth control practices (25.3%), reduced death rate and large number of in-coming migrations (38.7%) from other sub-counties.

The state of natural resources exploitation was examined through the following three major aspects – Soil/ Land degradation, forests and water bodies were examined and the results given in Table 4 below.

	Mean	Std. Deviation	Interpretation
Soil/ Land Degradation			
There is little waste excreted in Lobule every day	3.65	1.26	High
Land fragmentation is common in Lobule sub county	3.95	1.14	High
The soil productivity is still high in Lobule sub-county	3.74	1.14	High
Land for agricultural production is not affected by population growth in Lobule Sub County	2.27	1.42	Low
waste excreted is properly managed in Lobule sub-county	3.00	1.46	Moderate
Aggregate Mean and standard deviation	**3.32**	**1.28**	**Moderate**

Forests			
There is low rate of forest destruction in Lobule S/C	2.50	1.25	Low
The rate of indigenous species disappearing is low in Lobule S/C	3.12	1.35	Moderate
There is high replacement rate of depleted forest in Lobule S/C	2.76	1.25	Moderate
There are no policies guiding tree cutting in Lobule S/C	2.88	1.43	Moderate
Many people plant more trees every year in lobule sub-county	2.99	1.37	Moderate
Aggregate Mean and standard deviation	**2.85**	**1.33**	**Moderate**
Water Body			
There is high number of people per water source in Lobule S/C	4.15	1.27	High
Many water bodies in Lobule are of high yield yearly	2.45	1.12	Low
Little waste is dumped in the available water points in Lobule S/C	3.15	1.31	Moderate
Measures to control water pollution are in place in Lobule S/C	2.67	1.30	Moderate
Penalties are readily available for offenders of law on exploitation of water bodies in Lobule S/C	2.69	1.43	Moderate
Aggregate Mean and standard deviation	**3.02**	**1.29**	**Moderate**
Grant mean and standard deviation	**3.06**	**1.04**	**Moderate**

{Legend 1: very low level (1.00 -1.79), low level (1.8- 2.59), moderate level (2.60 – 3.39), high level (3.40 – 4.19) and very high level (4.20 – 5.00)}

Table 4: The State of Natural Resource Exploitation in Lobule Sub-County.

The results on the state of natural resources exploitation Table 4 shows that soil and land degradation was moderate (Aggregate Mean of 3.32 and Standard Deviation of 1.28); forest destruction was also moderate (Aggregate Mean of 2.85 and Standard Deviation of 1.33) while water body degradation was also moderate (Aggregate Mean of 3.02 and Standard Deviation of 1.29). The overall assessment of the Grand Mean 3.06 and Standard Deviation 1.04 are moderate. This means that waste excreted is properly managed despite absence of policies guiding tree cutting and the high number of people per water source. Also the measures to control water pollution are in place, and penalties are implemented on offenders.

Finally in the general assessment by respondents on the state of natural resource exploitation the results showed that 46% of the respondents agreed that deforestation and wetland reclamation were taking place and 20% argued that water levels were going down and that water was nor clean. 13.3% were of the view that arable land was not enough and it was not fertile enough for agricultural purposes.

However only 8% agreed that environmental policies and regulations were not being implemented effectively and the same percentage reported that despite all the above challenges the land is relatively fertile. 10.7% argued for improvement in environmental protection awareness. Only 4% agreed malnutrition was high but did not relate it to increasing human population and or lack of relevant food nutrients.

The above results were subjected to regression analysis to establish the level of relationship between population growth and natural resources exploitation (Table 5).

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Sig. sig Estimate**
1	.277[a]	.077	.044	.47998 .078[a]
Predictors: (constant), migration, birth rate, death rate N = 89				

Table 5: Relationship between Population Growth and Natural Resource Exploitation in Lobule Sub County, Koboko District.

The regression analysis showed that there was an insignificant positive relationship at r = 0.277 which implied a very weak influence. Therefore, it can be concluded that even if migration, birth rate and death rate are there, they have an insignificant effect on natural resources exploitation as exhibited by p-value of 0.078 which is greater than the level of significance of 0.05. This further meant that 92.3% effect is by other factors that were not studied in this case but need to be considered seriously [39,40].

Conclusion and Recommendations

In conclusion despite the increasing hi8man population due to migrations / refugees and not using family planning practices, this high population has not yet caused heavy damage on the environment but this cannot be taken for granted. The demand on natural resources is certainly growing in this sub county.

It is therefore recommended that there should be clear measurers established and implemented on migrations into the area so that natural resources are not over exploited. This may be coupled with community education and awareness on the significant role played by natural resources and how to sustainably use them [11].

Acknowledgements

The authors wish to thank Bugema University School of Graduate Studies for the time and resources to research and write up of this paper. Further appreciated is Bugema University for meeting the publishing costs for this paper.

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