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Factors influencing deforestation in Rwamwanja refugee settlement camp, Kamwenge district, Uganda

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Abstract

The tropical rain forest is facing increasing destruction and degradation and the ones in Africa much more so. The challenges include establishing the activities and factors which are contributing greatly to this situation.

This study therefore critically assessed the influence of arable farming, lumbering and charcoal processing on deforestation in Rwamwanja refugee settlement camp in Kamwenge District, Uganda. This refugee camp is mainly habituated by refugees from the Democratic Republic of Congo (DRC).

The socio demographic data indicates that most of the refugees interviewed were male (94.3%), most of them (60.3 %) were married and ranged between 35 to 50 years old (62.1%).

The results show that all these factors (arable farming, lumbering and charcoal burning) significantly contribute to the high rate of deforestation in this camp. However, the major contributor is lumbering (3.30) closely followed by Charcoal (3.26). The above two factors are mainly fueled by high income from lumbering and lack of energy for domestic use. The results further show that the increasing human population due to increasing number of refugees is resulting in increased settlement which in turn leads to increased deforestation as the above demands grow in this refugee settlement camp.

The study recommends that there is need for a more detailed study to identify practical alternatives which would lead to effective protection of the forests around this refugee settlement. It is also further recommended that education and awareness on tree conservation for the local refugee communities becomes part of the settling in program including identifying other income generating activities and other sources of energy for the refugees.

Keywords: Tropical rain forest degradation; Refugee camps; Rwamwanja; Uganda

1. Introduction and Background

The African rainforest spreads across east, central, and west Africa and covering over 2.2 million square miles (3.6 million square kilometers). However like other rain forests around the world, they are facing major destruction and degradation. Globally the tropical forests are currently estimated to be disappearing at a very high rate of about 10 million hectares per year (2015 to 2020). This is lower than what took place in the 1990s when the rate was 16 million hectares per year. However, another 100,000 km² tropical rain forests are degraded [1]. These estimates are constantly improving based on satellites imagery, and deforestation rate change in response to social-economic conditions as well as quality and accessibility of the remaining forests. Tropical forests once occupied 16 million km², today 8 – 9 million km² remain [2].

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In Ghana for example, the 2010 Global Forests Resources Assessment showed that there was a 2 percent (135,000 ha) loss of forest annually from 1990-2000 [3]. Moreover, most of the country's forest resources are considered to be degraded [4]. The causes of the continuous forest loss are multi-dimensional and they include both internal and external factors. The internal factors include: unsustainable agriculture, conversion to agriculture, wanton logging, wildfires, firewood collection and charcoal production, mining, population pressure, poorly defined land and resource tenure. On the other hand, the external factors include: market failures, international trade, and the imposition of economic programs such as the Structural Adjustment Program [5].

In Kenya authors [6, 7] have reported that forests play critical roles in the social and economic development by providing goods such as timber and other non-timber products (e.g. bamboo, chew stick, game) which help most communities to meet the requirements for rural economy. Forests also provide a variety of goods and services which are under threat from especially human-induced disturbances (and activities).

The National Forest Authority, Uganda [8] reported that Uganda's forest cover reduced from 4.9 million hectares in 1990 to 1.8 million hectares in 2015 translating into a loss of 3.1 million hectares in 25 years or an average annual forest loss of about 122,000 hectares. The biggest average annual forest loss was about 256,000 hectares between 2005 and 2010 during which 1,286,753ha were lost in just 5 years. During the period 2010 to 2015 a total of about 463,000 hectares were lost. This translates into an average annual loss of about 92,600 hectares per year. In terms of acreage, 2.6 million hectares of unprotected forests were lost between 1990 and 2015 while during the same period over 418,000 hectares were also lost from protected areas [9].

In the recent past, Uganda's National Environment Management Authority's Annual report of 2018 / 2019 [10] indicated that, forests are disappearing at a rate of 2 percent per year – the highest in the whole world. That is 600 ha of trees are being cut down every month (72,000 ha in 2006 alone). At this pace, Uganda's forests will have gone in about 50 years.

This situation is not made any better with Uganda's rapidly growing human population estimated at 7.1 births per woman and that by 2050 Uganda's Population will have risen to 130 million people. This is made worse by the increasing number of refugees flowing into the country from South Sudan and the Democratic Republic of Congo. About 97% of the Ugandan population use charcoal and firewood for cooking as a source of energy [11].

The Rwamwanja refugee settlement camp found in Kamwenge district, Western Uganda. Kamwenge district is basically in the tropical rain forest zone which originates from the Congo tropical rain forest belt with a very high number and variety of wildlife plants and animals.

The camp is mainly inhabited by refugees from the Democratic Republic of Congo (DRC). These refugees survive on agriculture which inevitably involves clearing of vegetation as well as using it as source of energy for cooking and production of charcoal for commercial supply to the nearby trading centers and towns such as Kamwenge. This has inevitably seriously affected the tree cover and led to high levels of deforestation in the area [12].

It is further reported [13] that refugees depend on natural resources for their survival, namely; crop cultivation (Arable farming), lumbering, charcoal processing, collection of firewood, among others and as a result, approximately 63.6% of the area has been deforested. Knowing these factors but being unaware of how they actually cause deforestation is the reason why this study was conducted.

The main objective of the study was therefore to establish the influence, contribution and role of arable farming, lumbering, and charcoal processing to deforestation in Rwamwanja refugee settlement camp in Kamwenge district, Uganda.

The specific objectives were:

- To establish the influence of arable farming on deforestation in Rwamwanja refugee settlement camp, Kamwenge district, Uganda.
- To assess the contribution of lumbering towards deforestation in Rwamwanja refugee settlement camp, Kamwenge district, Uganda.
- To investigate the role played by charcoal processing on deforestation in Rwamwanja refugee settlement camp, Kamwenge district, Uganda.

2. Material and methods

2.1. Locale of the study

The study was conducted in Rwamwanja refugees settlement camp in Kamwenge district in southwestern Uganda. Rwamwanja is a home to over 70,000 refugees from the DRC whose main economic activity is subsistence farming [12, 13].

2.2. Research Design

The researchers used descriptive research design guided by both quantitative and qualitative data collection approaches and relevant questionnaire tools.

2.3. Study population

The study area has a total of, 45 villages. Each village is headed by a local council chairperson one (LC1) making a total of 45 and a combination of three to four villages is headed by Local council chairperson two (LCII) making a total of 13 in the refugee settlement [12, 13].

These local village leaders were used to collect information because they are fully knowledgeable about their villages, the activities and how the forest cover is being destroyed. But because they were only a total of 58, they were also considered to be the target population.

3. Results and discussion

3.1. Socio-Demographic Characteristics

The social demographic factors profile of the respondents included only their age, gender, occupation and marital status revealed in Table 1 below

Table 1 The socio-demographic characteristics of the respondents

ITEMS		FREQUENCY / NO.	PERCENTAGE
Gender of respondents	Male	55	94.8
	Female	3	5.2
Occupation	LC1 leaders	45	77.6
	LC2 leaders	13	22.4
Marital status	Married	35	60.3
	Single	10	17.2
	Divorced	13	22.4
Age (Years)	>50	10	17.2
	35 – 50	36	62.1
	20 – 34	12	20.7

n=58

The demographic data shows that the majority (94.8%) were male, 60.3% were married and 62.1% were between 35 and 50 years old.

Influence of arable farming on deforestation in Rwamwanja refugee settlement, Kamwenge district, Uganda.

Table 2 below shows the significance of some selected arable farming activities on deforestation in the refugee camp.

Table 2 Influence of Arable Farming on Deforestation in Rwamwanja refugee settlement, Kamwenge district, Uganda

Description	Mean	Std. Deviation	Interpretation
More forested land is being cleared to create land for crop cultivation in Rwamwanja refugee settlement	2.96	0.90	High
Slash and burn are used in cultivation of some crops like millet, maize which at times leads to burning of more vegetation.	2.94	0.94	High
Young trees are being cut to be used as staking for beans and Tomatoes without discrimination.	3.02	0.48	High
The most visible cause of forest destruction is growing of beans and millet.	3.11	0.63	High
Average Mean, standard Deviation	3.00	0.73	High

n=58 Mean range: 4.SA-Strongly Agree (Very High 4: 3.25-4.00), 3.A-Agree (High 3: 2.50-3.24), 2. D-Disagree (Low 2: 1.75-2.49), 1. SD-Strongly Disagree (Very Low 1: 1.00-1.74)

The results in Table 2 above shows that arable farming practices listed above highly influence deforestation. With an average Mean of 3 and SD of 0.63, it meant that most of the respondents agreed that growing of beans and millet are the most arable farming activity causing deforestation.

The above results agree with those reported earlier by several authors [14] who argued that cultivation with shifting cultivation in particular is considered a major driver of deforestation. They [14] further reported that globally, until recently, shifting cultivation had accounted for 61% of overall tropical forest destruction. Nevertheless, the practice persists since it provides subsistence livelihoods to at least 300 to 500 million people worldwide and is intricately linked to cultural, ecological, and economic aspects of communities.

3.2. The contribution of lumbering towards deforestation in Rwamwanja refugee settlement, Kamwenge district, Uganda

Table 3 Assessing the contribution of lumbering towards deforestation in Rwamwanja refugee settlement, Kamwenge district, Uganda

Description	Mean	Std. Deviation	Interpretation
Lumbermen select best trees for timber which has led to extinction of some natural tree species	3.42	0.58	Very High
Rwamwanja refugee settlement is known supplier of forest related products such as timber to the nearing towns like Kamwenge.	3.27	0.54	Very High
Increase in prices of timber and timber products have motivated more refugees into lumbering business.	3.44	0.67	Very High
Timber business is seen as a source of employment to carpenters, transporters in the camp.	3.07	0.70	High
Average Mean, Standard deviation	3.30	0.62	High

n=58; Mean range: 4.SA-Strongly Agree (Very High 4: 3.25-4.00), 3.A-Agree (High 3: 2.50-3.24), 2. D-Disagree (Low 2: 1.75-2.49), 1. SD-Strongly Disagree (Very Low 1: 1.00-1.74)

Table 3 shows that lumbering highly contributes to deforestation in Rwamwanja refugee settlement, Kamwenge district, Uganda (Average Mean = 3.30; SD = 0.62) implying that most of the respondents agreed.

Of the factors used to assess lumbering it was established that increase in prices of timber and timber products have motivated more refugees into lumbering business, and the fact that lumbermen select best trees for timber which has led to extinction of some natural tree species were the most significant activities in deforestation of the refugee camp.

These results are also supported by the Food and Agricultural Organization of the United Nations [15] which reported that logging is one of the major causes of deforestation and that over 80% of world's ancient forests have been destroyed or degraded by logging. Many of the forests in South East Asia for example have existed since dinosaurs have walked the earth approximately 70 million years ago. The most commercial valuable trees are normally found in ancient forests because they have some of the highest biodiversity ecosystem producing very large trees and lumbers target them.

3.3. The role played by charcoal processing on deforestation in Rwamwanja Refugee settlement, Kamwenge district, Uganda

In particular charcoal burning activity was used to establish the role played by charcoal processing on deforestation. The results are given in table 4 below.

Table 4 The role played by charcoal processing on deforestation in Rwamwanja refugee settlement, Kamwenge district, Uganda

Description	Mean	Std. Deviation	Interpretation
Charcoal processing today is considered as a source of income to many refugees.	3.20	0.61	High
Charcoal processing by the refugees in the camp is a threat to forests in the area.	3.25	0.63	Very high
Charcoal has available ready market in Kamwenge town which motivates many refugees in the camp to practice charcoal processing.	3.17	0.59	High
Sometimes charcoal is not well covered while being processed and fire spreads to the whole forest, leading to great forest cover loss, hence deforestation in Rwamwanja.	3.44	0.49	Very high
Average Mean, Standard Deviation	3.26	0.52	Very high

n=58; Mean range: 4.SA-Strongly Agree (Very High 4: 3.25-4.00), 3.A-Agree (High 3: 2.50-3.24), 2. D-Disagree (Low 2: 1.75-2.49), 1. SD-Strongly Disagree (Very Low 1: 1.00-1.74)

The results above in Table 4 shows that charcoal processing has a very high contribution to deforestation in Rwamwanja Refugee settlement (Average Mean = 3.26; SD = 0.52) implying that most of the respondents strongly agreed.

Information that Charcoal processing by the refugees in the camp is a threat to forests in the area is a significant part of information on charcoal process (Average Mean 3.25). However the fact that sometimes charcoal is not well covered while being processed and as a result the fire spreads to the whole forest is considered the most important activity which causes wide forest cover loss and hence deforestation in Rwamwanja.

The above results in Table 4 (above) indicate that with an aggregate mean of 3.26, charcoal burning plays a big role in deforestation in Rwamwanja refugee settlement. This is further supported by a researcher in Kenya [16], who stated that charcoal production has turned out to be one of the main economic activities in most parts of the world and that in Laikipia district of Kenya, it has resulted in excessive destruction of trees in an already fragile eco-system, especially in areas which are also characterized by a high population growth rate (both natural and immigrants), that puts the natural resource base under great pressure.

This study finally investigated what other factors the respondents know which influence deforestation in this refugee Camp. Several factors were named and duly recorded in Table 5.

The findings in Table 5 above clearly revealed that the major (43.1%) other factor influencing deforestation in Rwamwanja refugee settlement is the increasing number of refugees leading to increased human settlement. These results strongly agrees with many other researchers [15, 17] who have reported that increasing human population results in increasing settlement which in turn leads to deforestation both in the urban and rural areas.

Table 5 Other factors influencing deforestation in Rwamwanja refugee settlement, Kamwenge district

Responses	Frequency	Percentage
Human settlement since more refugees are still coming in which leads to deforestation.	25	43.1
Livestock farming influences deforestation since most people have animals in the camp	10	17.2
Firewood collection by the refugees.	13	22.4
Road construction	10	17.2
n=58		

4. Conclusion

The study assessed the influence of arable farming, lumbering and charcoal processing on deforestation in Rwamwanja refugee settlement camp in Kamwenge district, Uganda. In conclusion, the results show that arable farming, lumbering and charcoal burning are certainly major factors in deforestation and that lumbering and charcoal are the leading factors. The results also indicate that the increasing human population is resulting in increased settlement which in turn leads to increased deforestation in this refugee settlement camp.

The study recommends that there is need for a more detailed study to identify possible ways in which to effectively protect the forests around this refugee settlement. It is also further recommended that education and awareness on tree conservation for the local refugee communities becomes part of the settling in program including identifying other income generating activities and other sources of energy for the refugee.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest. The sponsors and supporters had no role in the design, execution, interpretation, or writing of the study.

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