Community Development Resource Network

A FRAMEWORK FOR DEVELOPMENT OF SUSTAINABLE REFUGEE SETTLEMENTS IN UGANDA

CLIMATE CHANGE ADAPTATION AND MITIGATION PROJECT (CAMP+)

Community Natural Resources Mapping of Kyangwali Refugee Settlement and Host Community in Kyangwali Sub County, Kikuube District in Western Uganda

With Support from Innovation Fund Morway through CARE Denmark and in Partnership with CARE International in Uganda

2020

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LIST OF ACRONYMS

CAO	Chief Administrative Officer
CDRN	Community Development Resource Network
CBO	Community Based Organisation
CN	Concept Note
CSOs	Civil Society Organisations
DCDO	District Community Development Officer
DDPs	District Development Plans
DNRO	District Natural Resources Officer
DPO	District Production Officer
DRC	Democratic Republic of Congo
ECOTRUST	Environmental Conservation Trust of Uganda
ENR	Environment Natural Resources
FAO	Food and Agriculture Organization of the United Nations
FGDs	Focus Group Discussions
FP	Forestry Policy
GNP	Gross National Product
GPS	Global Positioning System
HFU	Hunger Fighters Uganda
KIIs	Key Informant Interviews
LULC	Land Use and Land Cover
LUT	Land Use Types
LWF	Lutheran World federation
MDAs	Ministries, Departments and Agencies

NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NFA	National Forestry Authority
NGO	Non-Governmental Organisation
NLP	National Land Policy
NR	Natural Resources
NRM	Natural Resource Management
OPM	Office of the Prime Minister
PWD	People with Disability
ReHOPE	Refugee and Host Population Empowerment
RLP	Refugee Law Project
SCDO	Sub County Community Development Officer
SPSS	Statistical Package for Social Scientists
THF	Tropical High Forest Well Stocked
THFL	Tropical High Forest Low Stocked
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNWP	Uganda National Wetlands Policy
UWP	Uganda Wildlife Policy
WFP	World Food Programme

EXECUTIVE SUMMARY

Uganda is a top refugee hosting country in Africa and the third globally, with one of the most "open-door" refugee policies in the world offering opportunities aiming at the resettlement of the refugees. Currently Uganda hosts over one million refugees in the different settlements scattered across the country, specifically in South Western Uganda, and West Nile and Acholi sub regions in Northern Uganda.

While Uganda is lauded for its open-door refugee policy, the protracted refugee situation in Uganda is increasingly having an impact on Uganda's natural resources and biodiversity. Tracks of land in square miles have been cleared to create room for the increasing number of refugees in different locations in Uganda. Kikuube District in South-western Uganda is one of the districts in Uganda hosting refugees. Kyangwali refugee settlement in Kikuube District is located on the edge of Bugoma forest and is host to over 120,000 refugees. The protracted presence of refugees is not only threatening the existence of the natural forest but also the livelihoods of both the refugees and host communities.

To address the consequences of protracted refugee presence on the environment and livelihoods, Community Development Resource Network (CDRN) in partnership with Care International Uganda is currently implementing a pilot phase of a project titled, "Climate Change Adaptation and Mitigation Project (CAMP+). The project, with a focus on creating Green refugee settlements, is an ambitious one with two strategic objectives, namely: (1) addressing natural resource and environmental degradation, and (2) promoting sustainable food systems for refugees and host community. Therefore, we conducted natural resource mapping as one of the preliminary activities intended to inform project strategies.

Objectives of Natural Resources Mapping

The objectives of the mapping were three-fold, namely

a. To establish natural resources shared by refugees and host communities, and determine their current state.

b. To find out existing environmental and livelihoods related challenges facing refugees and host communities.

c. To identify potential intervention options to mitigate pressure on environment, enhance sustainable wood fuel supply, protect existing natural resources, and contribute to building the resilience of both displaced and host communities.

d. Make recommendations for sustainable use of environmental natural resources.

Methodology

Review of the relevant literature, household interviews, key informants' interviews, focus group discussions, community meetings and transect walks were carried out in both the refugee settlement and host community. Refugees and host community members, and leadership at community, sub county and district levels were consulted. Also consulted were Office of the Prime Minister (OPM), United Nations High Commissioner for Refugees (UNHCR), and a cross-section of humanitarian agencies implementing environment and livelihoods related interventions in the settlement.

Key findings

1. Natural resources commonly found and used in the study area include natural forest/ trees, land, wetlands and swamps. The majority of refugees and host community depend on these natural resources for construction, firewood, and food production for domestic consumption and for sale. A section of the community (refugees and host community members) was engaged in charcoal making and other forest products while others had encroached on wetlands and swamps from which they derived their livelihoods.

2. Overall, both the natural forest, and swamps/ wetlands/streams/rivers had been significantly degraded. Some of the degraded wetlands, swamps, streams and rivers include Rwemiseke swamp in Warugaza village, Kobusinge swamp in Kobusinge village, Kitimwa Butoole in Butoole village, Nyakatehe swamp in Kyangwali parish, Nyarubaba in Nyakatehe 1 Village, Nyarubabu Nayhatehe 2 in Nyakatehe village, and Kitakara stream and swamp in Kitakara village. Others include Nguruwe swamp in Nguruwe village, Nyambogo swamp in Nyabogo village, Kinkyeitake River in Block 41 and Block 46, Banyejomba swamp in Musisa village, Musia Swamp on the border of Musia and Rwenyawawa, and Rwenyawawa swamps in Rwenyawawa. Also degraded are, Keitomi river in Keitoma village bordering Bukinda village, Kagoma swamp near reception centre, Mombasa swamp in Block 6 and 7, and tributary of Mombasa stream and Kirokole swamp, and Kavule stream in Block 109. Others are Kavule stream and Kavule river and swamp in block 107 bordering Maratatu.

Table 1: Pictorial summary of degraded wetlands/swamps/rivers/streams

	This is Nguruwe swamp. It is located in Nguruwe village in Kyangwali refugee settlement. It has been encroached for maize, beans, sugarcane, cassava, and banana growing. Parts of the swamp are drying out and therefore gravely threatened
	This is Nyambogo swamp. It is located in Nyambogo Village in Kyangwali refugee settlement. It has been encroached for maize, beans, cassava and banana growing. The water levels have reduced as opposed to the previous years.
	This is Nguruwe swamp. It is located in Nguruwe village near the army barracks in Kyangwali refugee settlement. It has been encroached on for vegetable (cabbage), maize, and cassava growing. It is at the risk of drying up if not addressed urgently. It is at a risk of drying.
	This is Kinakyeitaka stream. It is located in block 46 Kinakyeitaka village, Kyangwali refugee settlement. It has been encroached for vegetables (cabbage), maize, beans, bananas and cassava growing. The Soils being washed away due digging at the banks of the stream and the water levels have reduced
	This is Banyejomba swamp. It is located in Musisa A Village in Kyangwali Refugee settlement. It has been encroached for vegetable (cabbage & eggplants), Maize, Yams, cassava, sugarcane and banana growing. The swamp if on the verge of drying up
	This is Musisa swamp. It is located at the boarder of Musisa and Rwenyawawa villages in Kyangwali refugee settlement. It has been encroached for vegetable (cabbage), maize, yams, banana and sugarcane growing. It is also used for watering cattle
	This is Rwenyawawa swamp. It is located in Rwenyawawa village in Kyangwali refugee settlement. It has been encroached banana, maize and sugarcane growing

	This is Kentomi River. It is located in Kentomi village on the border with Bukinda village in Kyangwali refugee settlement. It has been encroached for maize, banana, and yam growing. The soils are being washed away due to digging near the river Banks
	This is Kentomi River. It is located in Kitooro village bordering Bukinda village. It has been encroached for maize, bananas, and yams growing. The soils are being washed away due to digging near the river Banks
	This is Kagoma swamp. It is located near the Reception Centre in Kyangwali refugee settlement. It has been encroached for maize, vegetable, yams and banana growing
	This is Mombasa swamp. It is located in Mombasa village in Kyangwali refugee settlement. It has been encroached for maize growing, vegetable, bananas yams and sugarcane growing. The water in the swamp has dried up
	This is Mombasa swamp. It is located on block 6 in Kyangwali refugee settlement. It has been encroached for maize, vegetable, bananas, yams, and sugarcane growing
	This is Mombasa stream located on block 7 in Kyangwali refugee settlement. It has been encroached for maize, vegetable, banana, yam, and sugarcane growing. Cultivation on the bank is leading to soil erosion and sedimentation of the stream.
	This is the tributary of Mombasa stream and Kirokole swamp. It is located in Kyangwali refugee settlement. It has been encroached for maize, vegetable, banana, yam, and sugarcane growing. Cultivation on the banks has caused soil erosion, sedimentation of the stream, declining water levels and deterioration of water quality.

	This is Kavule stream. It is located on block 109 Kavule Village in Kyangwali refugee settlement. Its river banks have been denuded of vegetation to pave way for cultivation of maize, beans, vegetable growing, banana and yams growing. Cultivation on the bank has led to soil erosion, siltation of the water and collapsing of the stream banks in somr sections and caused the soils to wash away
	This is Kavule river and swamp. They are located on blocks 107 and 101 bordering Maratatu village in Kyangwali refugee settlement. It has been encroached and clearing of trees were ongoing at the time of the study. It has been encroached for maize, sugarcane and beans growing

1. Satellite images obtained for the last 10 years indicate that up to 20 km2 of forestland had been cleared of its vegetation, implying that Kyangwali on average had been losing its biomass cover (forest) at the rate of 2km2 per year. Illegal forest activities were taking place with charcoal kilns and newly harvested trees from Bugoma forest as pieces of evidence. Both the refugees and host community members had also invaded swamps, wetlands, streams and rivers for growing vegetables and other foods crops such as maize, beans banana and potatoes.

2. The study established that the majority of refugees and the host community members were not only knowledgeable about the existence of natural resources but also aware of the effects and impact of human activities on the environment and their own livelihoods. Increased soil erosion and incidence of drought were reported. Shrinking wetlands and swamps, and receding water tables were also reported. These were linked to the drying up of community boreholes, as water table gets lower and lower. Most importantly, both refugees and host community members reported increasing food insecurity. While food insecurity in the refugee settlement was linked to decrease in the amount of land being allocated leading to over cultivation and soil infertility, there was awareness that environmental degradation also contributed to poor yields both within the settlement and host community.

3. Most of the interventions in the environment sector were geared towards efficient use of energy (firewood). A couple of organisations were promoting use of energy efficient technologies such as charcoal stoves to reduce on the demand for firewood. Some efforts were also being made towards planting of trees by distributing of tree seedlings. However, no efforts were being made to restore the degraded forests and wetlands, and to sensitize the community on sustainable environment and natural resource use.

4. While authorities have instituted regulation on access to the forest to collect firewood by refugees, little if not nothing is being done to stamp illegal logging in Bugoma forest. There was no evidence that illegal activities in the forest were being monitored given the active encroachment that was taking place, meaning that the myriad of environmental protection policies were not being implemented or enforced in the area of study.

5. Plastic waste and polythene bags littered the settlement and were reportedly not only chocking the land where refugees cultivate their food but some had also been washed into the wetlands and swamps and other unprotected sources of water used by refugees. This has the potential of poisoning the water.

6. There is increased use of chemicals by tobacco, vegetable and sugarcane growers and are seeping into the soil and being washed into streams, rivers, and wetlands, which have the potential of poisoning underground waters and the streams and rivers and may be harmful to human beings and plant life.

7. Furthermore, communities around Bugoma experience prolonged droughts, exposing them to a number of climate induced risks including food insecurity. The combination of ecosystem depletion, and increased insecurity due to climate change often drives farmers to short-term resource utilization decisions such as forest exploitation in order to survive. These actions further escalate the risks, compromising the climate resilience of both the natural and productive landscapes. With the increasing population resulting into search for more land for agricultural activities and settlement, the current trend is likely to continue.

8. In a nutshell, the ideal natural resource and environmental management that entails collaborative effort of six stakeholders, namely: public sector, private sector, civil society including Faith Based Organisations (FBO), cultural institutions, and individuals/households playing their different roles in a coordinated manner was non-existent. While Government put in the necessary legal frameworks and/or policy instruments, there was no evidence that the relevant institutions of government were acting in a coordinated manner nor were they playing their roles of coordination, education, research and monitoring. The local governments were financially constrained and could not effectively discharge their mandate of management of forests, wetlands, lakeshore and streams not gazetted as national protected areas. The civil society that we reached out to during the study were more focused towards service delivery and had not tackled its core mandates of watchdog, awareness raising, advocacy campaigns, and eco-labelling. The private sector was largely absent and their roles including production, investment, pollution prevention, re-use and/or recycling and service delivery were not recognisable. Finally, while the household/individuals played their consumption roles, they miserably failed in their core mandates of waste management, NR management and monitoring.

Recommendations

1. A good Natural Resources (NR) management strategy involves the participation of all the four key stakeholders, namely: the public sector, private sector, civil society, Bunyoro Kitara kingdom, Faith Based Organisations and individuals/households working together in a coordinated manner. As a first step, there is need to bring together the four key stakeholders on a round table to have a conversation on how they can work together to address the NR management challenges. The conversation should be able to identify and clearly set the roles and responsibilities of each stakeholder and put in place a mechanism through which the stakeholders will together deliver in the best interest of NR and the environment in general.

2. The heavy encroachment of these natural resources, mainly the forest and wetlands/swamps/rivers/streams in and around the refugee settlement calls for an urgent need to demarcate and protect the natural resources. The protection of these wetlands/rivers/swamps and streams will save not only the natural resources but will also reduce on siltation, soil erosion, flooding, as well as minimise incidence of boreholes which the majority depend on from drying up. Besides, their presence will help in providing the much-needed water for irrigation for kitchen gardening for refugees.

3. Response to NR degradation particularly the forest has mainly focused on distribution of tree seedlings for planting for future wood fuel and introduction of energy efficient cook stoves to reduce on the amount of wood fuel consumed. Not much has been done to restore the degraded environment including the forests and forest-based resources, and wetland and swamps. It is recommended that as efforts are being made to take care of future energy needs of the community, more attention should be directed towards restoring the degraded forests and wetlands. This way, we shall be holistically addressing the climate change challenge and attain green settlements.

4. The third area of focus is livelihoods related challenges as a driver for environmental damage. The current livelihoods strategy by both refugee and host communities is heavily dependent on exploitation of natural resources (NR). For instance, charcoal making, sand mining, brick making and agriculture are all dependent on environment natural resources (ENR). We recommend introduction and scaling up of alternative livelihoods sources that do not entirely depend on use of NR, and skilling particularly the youth as one of the ways of reducing dependence on ENR.

5. Refugees as well as host community members reported food insecurity partly because of reduced ratios by WFP but mostly because the amount of land being allocated to refugee households for food production had significantly reduced, rendering them incapable of producing food that can sustain them throughout the year. To address the food insecurity, efforts should be directed towards promoting sustainable food systems that involve production of food throughout the year. Introduction of production technologies for irrigation, water harvesting, and techniques such as kitchen gardening and sustainable land use management should be encouraged.

The wetlands/rivers/streams/swamps whatever the case may be can be used to provide water for upland irrigation.

6. Set natural resource management committees, build their capacity and equip them with the necessary tools for monitoring and reporting on natural resource related activities, with a focus on forests and wetlands.

7. Trial plots should be set up for the producers to test the chemicals before being used by community members if we are to avoid its negative side effects on human beings as well as the ecosystem.

8. Woodlots with concrete management plans should be developed across the settlement and within the host communities to provide the much-needed wood fuel and building material in order to minimise encroachment on forests. The management plans should spell the details of how the land will be acquired, who will provide the planting materials, who will maintain and provide the necessary security, who will harvest the trees, and how the harvest will be used.

9. Develop a monitoring system at local level to document climate change impacts, and promote climate change mitigation and adaptation measures among vulnerable communities within the project area.

10. Institutionalisation of ENR management in refugee response by all humanitarian agencies and other refugee stakeholders should be taken as an imperative. The OPM should consider leading on this to ensure that all interventions are NR sensitive/ responsive. This should also be part of the initial roundtable conversation.

01 INTRODUCTION AND BACKGROUND

1.1 Introduction

Natural resources (NR) are materials or substances that exist in nature, which can be utilised for economic gain. The natural resources commonly used include land and more specifically, soil, water, natural forests, wetlands, the rocks, wildlife, livestock, and generally flora and fauna. These resources are inter-linked or exist in association, such that disrupting one resource in turn affects the other. For example, clearing a natural forest for cultivation disrupts a potential wildlife habitat, affects the natural flora and fauna, may disrupt water sources, and could lead to increased soil erosion, increases the risk of polluting the water bodies, which in turn disrupts aquatic life. Therefore, while utilizing these natural resources, we need to be mindful of the need to manage them wisely in order not to affect the other components of the environment.

Natural Resource Management (NRM) is critical for sustainable utilization and management of major natural resources, such as land, water, air, minerals, forests, fisheries, and wild flora and fauna to ensure ecosystem integrity and services for better quality to human life. Natural Resources Management is at the forefront of sustainable development and therefore critical for attainment of the 2030 Agenda for Sustainable Development. In view of the foregoing, there is need for explicit recognition of natural resources in decision making through formulation of appropriate policies and laws that promote sustainable use and management of the resources and ensure that environmental impacts are mitigated or well managed. Natural resources are a vital part of the environment and should therefore be used and managed sustainably in order to protect and conserve the environment.

Uganda's natural resource base is one of the richest and most diverse in Africa[1], resulting in the country's economy relying heavily on nature-based goods and services[2]. For instance, in 2010 forest resource alone was reported to have contributed between 6 to 8 per cent of the national growth income of $1.3 billion annually (NEMA 2011). Similarly, extrapolation based on valuations conducted by Kakuru et al. 2010 showed that wetlands within the country may be contributing an estimated $4.9billion per year. Despite the considerable importance of these and other environmental and natural capital assets, Uganda continues to suffer considerable environmental degradation at a great cost to livelihoods and the economy. By 2002, the cost of environmental degradation was conservatively estimated at between 2 and 4 percent of Gross National Product (GNP),

1 Tukahirwa, M. B. (2002). Policies, People and Land Use Change in Uganda: A Case Study in Ntungamo, Lake Mburo and Sango Bay Sites. LUCID Working Paper Series. Number 17. Kampala: The Environmental Conservation Trust of Uganda (ECOTRUST).

2 Shechambo, F., Karanja, F., Chege, F. and Barrow, E. (2002). Natural Resource Valuation and Accounting in National Planning and Development in East Africa. Policy Brief No. 4. Nairobi: IUCN

while a decade earlier soil and land degradation alone was estimated to lead to a loss of 11% loss of GNP (Moyini et al.2002). As such environmental resources, if used properly, can contribute significantly to Uganda's national economic development.

As part of efforts to ensure effective management of Uganda's environment and natural resources, several policies and institutions such as Forest Policy (FP) 2001; National Environment Management Policy (NEMP), 1994; The National Land Policy (NLP), 2013; Uganda National Wetlands Policy (UNWP), 1995; Environment and Social Safeguards Policy, 2018; and Uganda Wildlife Policy (UWP), 2014 Uganda National Climate Change Policy (2015); The Refugee and Host Population Empowerment (ReHOPE) Policy framework (2017) the Comprehensive Refugee Response Framework (2017) among others have been put in place.

There are also institutions such as the National Forestry Authority (NFA), National Environment Management Authority (NEMA), National Wetlands Management Department, Forestry Sector Support Department, Environment Police, District Natural Resources Department etc. that have been put in place. The Refugee and Host Population Empowerment (ReHOPE) is a policy framework launched in 2017 by the GoU in collaboration with United Nations (UN) agencies and the World Bank. It aims to enhance resilience and self-reliance among refugees and host communities. The Refugee Response Plan is the guiding inter-agency framework for all partners in the refugee response, where Environmental Protection and Restoration is identified as one of six priority outcome areas. It includes the following environment and energy objectives: a) Environment and natural resources protected and restored, and green livelihoods promoted using a catchment-based approach; and b) access to sufficient and sustainable basic energy services for lighting, power, and cooking increased and carbon emissions abated.

Despite the aforementioned efforts, the country's natural resources continue to be degraded. The main causes include excessive logging, wood fuel collection, the expansion of agricultural land, and overgrazing. Deforestation can also be explained by the fact that over 94 per cent of Uganda's total energy requirements are provided by wood fuel, while 92 per cent of the population depends on wood fuel for domestic energy. Environmental degradation jeopardises both individual livelihoods and the country's economic development.

According to the United Nations High Commission for Refugees, Uganda ranks among the top three refugee hosting countries in the world and largest in Africa, with over a million refugees, most of them from South Sudan, the Democratic Republic of the Congo (DRC), Burundi and Somalia. Kenya, Sudan, Eritrea and Ethiopia.

Large-scale arrival and prolonged presence of refugees can have negative impacts on the environment, including deforestation; de-vegetation; erosion; the destruction, degradation and pollution of water sources and catchment areas; illegal poaching and fishing; and overgrazing[3]. In some cases, locals are required to surrender arable land

3 Regarding Tanzania, see Rutinwa and Kamanga (2003); see also UNHCR (2011)

for the establishment of refugee camps or settlement areas; forests may be stripped as refugees need poles for construction of houses and latrines, firewood, medicine, thatching and fodder, and wood fuel (Dzimbiri 1993). Refugees are also often placed in "already environmentally-hostile arid locations with minimal vegetation and variable access to sufficient water, particularly for livestock and growing vegetables" (Martin et al. 2017)[4]. In some cases, they are placed in remote but very fertile and well-resourced locations. Either way, they are forced to use resources that are locally available such as land, water, trees, soil, grass and forest resources and thereby contribute to the depletion of natural resources.

The unprecedented influx has created massive pressures on the environment which are likely to worsen if environmental sustainability is not incorporated in the refuge management practices (NEMA 2016/2017). Refugees need water, energy for cooking Protracted refugee situations, in particular, can exacerbate environmental concerns, including food security and sanitation. They may also be located near national parks or reserves, and natural forests, which can create risks for the conservation of those areas (Shepherd 1995). These remote locations have often been linked to other risks, including risks of sexual and gender-based violence that women may face when they are forced to walk long distances to retrieve firewood (Shepherd 1995). Likewise, whether refugees are able to self-settle or forced to remain in camps or settlements can determine their environmental impact on the host country (Jacobsen 1997). For example, refugees forced to remain in camps in remote areas — as opposed to refugees who choose to self-settle in an urban area — would have to use natural resources differently, perhaps deforesting certain areas.

That said, refugees can also bring positive environmental effects, most noticeably with the attraction of international aid and development actors who may undertake projects to protect the environment. Bonaventure Rutinwa and Khoti Kamanga (2003), for example, note that these efforts have had positive impacts in Tanzania. Moreover, scholars urge caution in arriving at simple conclusions on the environmental impact of refugees, noting that the relationship is complex and relates to a host of wider social, economic and political factors (Black 1994). Research in Ethiopia, for example, indicates that refugee camps had "relatively insignificant impacts to the existing natural resources and conflict and competition in these two camps [Aysaita and Al Addeh] was not as pronounced as previously assumed."

It is important to note that Uganda has one of the richest natural resources base in Africa which also has provided economic benefit to the country in form of goods and services. In the efforts to effectively manage the environment and natural resources, several policies have been put in place over the years. However, degradation of the environment and natural resources has continued to jeopardise livelihoods and economic

4 For more valuable research on the environment, see also Susan Martin et al.'s literature review and reports on environmental resources management online at https://georgetown.app.box.com/s/0utki51aeyatva661lu6vqf7rgaz6j5z and https://isim.georgetown.edu/ Environmental Impact of Refugee Camps, respectively

development. To avert the effects of environment and natural resource degradation, legislators, government authorities, local and international organizations, have to build synergies targeted towards policy development and implementation of restoration and management interventions.

Natural resources and the environment are affected by a number of issues and some of these are as a result of increased population that puts a large demand on the existing resources to accommodate the vast number of people that depend on them for livelihood, food, energy sources, economic activities and recreation among other resources that are associated with the natural resources.

1.2 Background

Kyangwali refugee settlement in Kyangwali Sub County is located in Kikuube District in Midwestern Uganda. Kikuube district was curved out of Hoima District in 2017 and became operational in 2018. Kikuube District is bordered by Lake Albert in the West. Lake Albert lies on the border of the DRC and Uganda. Currently the settlement sits on over 142km^2 of land, on the edge of Bugoma CFR in Kikuube District. With an area of 411 km^2 of protected area, Bugoma CFR is one of the largest remaining blocks of natural tropical forest along the Albertine Rift Valley. According to Plumptre et al. (2010), Bugoma CFR is home to about 500 chimpanzees (10 percent of the Ugandan chimpanzee population). Among other primates, Bugoma CFR hosts a population of Ugandan mangabeys, endemic to this forest and therefore a unique treasure. The bird list consists of 221 recorded species. Biodiversity surveys have recorded 224 species of trees and shrubs, which is more than in any other forest in the region. Furthermore, Bugoma CFR provides forest products and ecosystem services to the surrounding communities.

Figure 1: A Map of Uganda Showing Location of Bugoma Forest Reserve

Uganda's natural forest vegetation may be categorized into three broad types: tropical high forest well-stocked (THF), tropical high forest low-stocked (THFL), and woodlands. In western Uganda, the THFs are mainly found in CFRs (Budongo, Bugoma, Kalinzu-

Maramagambo, and Katsyoha-Kitomi) and in NPs (Bwindi Impenetrable, Kibale, Mgahinga, Rwenzori Mountains, and Semuliki). THFL is rare in the west, while savannah woodland and bushland are confined to drier areas (MWE and WB 2017; NBS 2009). Plantations are meanwhile differentiated into broad-leaved and coniferous plantations (MWE 2018).

Due to financial resource constraints, we did not hire a private consultant to undertake Land Use and Land Cover (LULC) analysis using GIS and Remote sensing technologies. For LULC, we relied on the findings of the study carried out by World Bank and FAO in 2020 on the Assessment of Forest Resource Degradation and Intervention Options in Refugee-Hosting Areas of Western and Southwestern Uganda, including Kyangwali Refugee Settlement. In this study, Geospatial analysis was undertaken to provide information on the status and changes in tree cover, land use and land cover (LULC), and biomass stocks. Remote sensing techniques were used to; identify the area of tree cover loss each year between 2001 and 2018 within the 5 km and 15 km buffer zones from the refugee settlement boundaries. The data on tree cover loss were overlaid with refugee and host community population data to explore potential relationships. In addition, changes in biomass stock between 2000 and 2017 were assessed, based on the LULC changes.

Table 2: Changes in LULC and biomass stock in Kyangwali 15 km buffer (2000-2017)

LULC class	Area in 2000 (ha)	Area in 2017 (ha)	Area change 2000–2017 (ha)	AGB in 2000 (t)	AGB in 2017 (t)	AGB stock change 2000–2017 (t)	AGB stock change 2000–2017 (%)
Built-up areas	0	122	122	0	495	495	—
Bushland	16,781	10,986	-5,795	127,965	83,777	-44,188	-35
Commercial farmland	0	0	0	0	0	0	—
Grassland	11,650	5,656	-5,994	61,924	30,065	-31,859	-51
Impediment (bare soil, bare rock, and so on)	0	0	0	0	0	0	—
Plantations, broad-leaved	0	31	31	0	2,821	2,821	—
Plantations, coniferous	0	0	0	0	0	0	—
Subsistence farmland	52,157	70,460	18,303	527,224	712,234	185,010	35
THF	1,803	737	-1,066	230,132	94,079	-136,053	-59
THFL	11,625	9,195	-2,430	3,181,857	2,516,877	-664,980	-21
Water	49,544	49,795	251	0	0	0	—
Wetland	51	281	230	82	448	366	446
Woodland	6,284	2,631	-3,653	79,441	33,267	-46,174	-58
				4,208,625	**3,474,063**	**-734,562**	**-17**

Source: "World Bank and FAO. 2020. Assessment of Forest Resource Degradation and Intervention Options in Refugee-Hosting Areas of Western and Southwestern Uganda. © World Bank and FAO."

The following 13 land cover unit classes could be recognized in sufficient detail in Table 2):

i. Built-up areas
ii. Bushland
iii. Commercial farmland
iv. Grassland
v. Impediment (bare soil, bare rock, and so on)
vi. Plantations, broad-leaved
vii. Plantations, coniferous
viii. Subsistence farmland
ix. THF (Tropical High Forest Well Stocked)
x. THFL (Tropical High Forest Low Stocked)
xi. Water
xii. Wetland

i. Woodland

From table 2, it can be inferred that 1,066ha of "Tropical High Forest fully stocked (THF)" became deforested between 2000 and 2017. Similarly, 2.430 ha of already depleted Tropical High Forest, 3,653 ha of woodland, 5,795ha of bushland, 5,994 ha of grassland and were lost during the same period. Important to note is that farmland area increased from 52,157ha to 70,460 ha, registering a positive difference of 18,303 ha. Correspondingly, the built-up area increased from zero (0) ha in 2000 to 122ha in 2017.

As already noted, the settlement directly abuts Bugoma CFR, in which high concentrations of biomass were observed. Tree cover loss mainly occurred in the eastern part of the Kyangwali settlement near the CFR, which is characterized by THF Despite this tree cover loss, a moderate increase of biomass within the boundary of the settlement is observed. This is due to the conversion of grassland/bushland to subsistence farmland. From 2000 to 2017, net biomass changes were –17 percent in the 15 km buffer areas, respectively. Again, the percentage loss is greater in the 15 km buffer, suggesting a greater influence of host populations than refugees on biomass loss over this 17-year period.

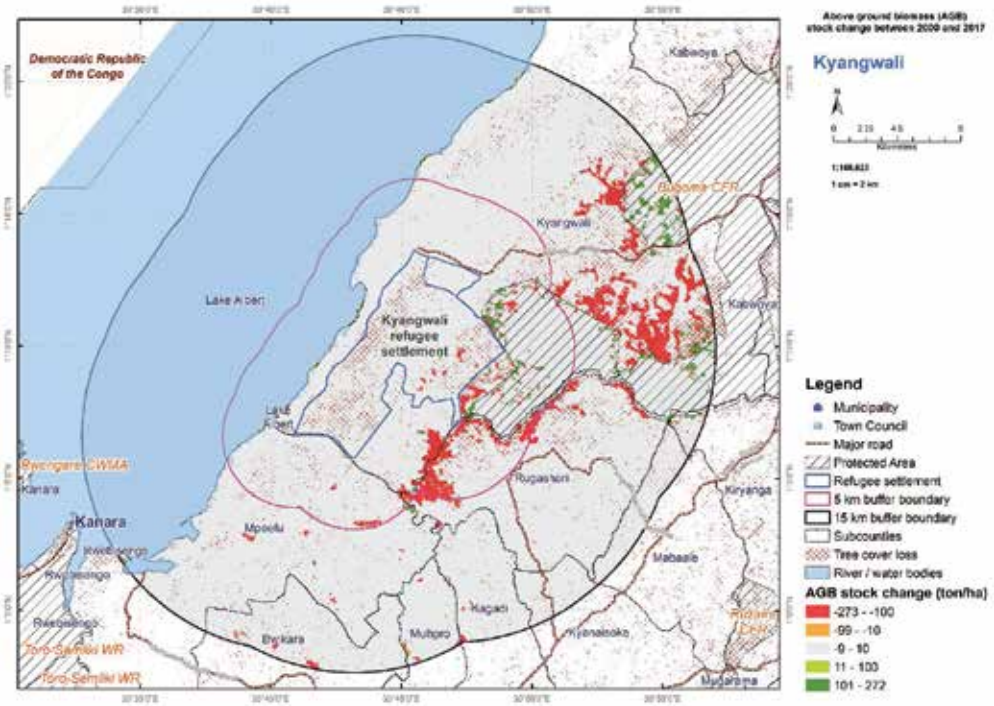
According to ECOTRUST (2019) the widespread and rapid degradation of forests around Bugoma Central Forest Reserve has been going on over the years, resulting in the fragmentation of the once densely forested areas. It is estimated that between 1986 and 2002, over 110 km2 of forest was cleared within 15 km of Bugoma. The loss of vegetation cover has greatly contributed to the reduction in the corridor connectivity functions of the different forested areas in this landscape. This degradation is mainly due to extensive encroachment for agriculture as well as the Refugees camps mainly in Kyangwali, which result into clearance of land for settlements in addition to increasing the demand for fuelwood and building poles. The combination of ecosystem depletion, and increased insecurity due to climate change often drives farmers to short-term

resource utilization decisions such as forest exploitation in order to survive (ECOTRUST 2018). These actions further escalate the risks, compromising the climate resilience of both the natural and productive landscapes

According to UNHCR global guidelines, refugee settlements should be located at least at one day's walking distance from protected areas or reserves. This is not the case with the Kyangwali settlement, which is adjacent to Bugoma CFR. Kyangwali covers 142 km^2 and the decision was made by the OPM to settle Congolese refugees who arrived in 2018 and 2019 in the blocks immediately next to Bugoma CFR, with foreseeable implications for high-value natural assets (**World Bank and FAO, 2020**). The location of these refugee settlements near protected areas is not in line with Uganda's conservation priorities, nor does it align with UNHCR's global planning guidelines for refugee operations.

According to the Ugandan Bureau of Statistics (www.ubos.org), population density is high and growing faster than the national rate of 3.2%. A significant proportion of the inhabitants are immigrants from the Democratic Republic of Congo (DRC), Rwanda, Sudan and southern Uganda. Land is mainly under customary tenure, passed on through inheritance and with no formal titles. The main underlying driver of subsistence farming is the shortage of farmland and too many people depending on natural resources for subsistence and cash. The lack of knowledge to increase or maintain productivity of the existing fields propels the conversion of forest to farmland.

Figure 2: Biomass stock changes in Kyangwali settlement in 15 km buffers (2000–2017)



Source: "World Bank and FAO. 2020. Assessment of Forest Resource Degradation and Intervention Options in Refugee-Hosting Areas of Western and Southwestern Uganda. © World Bank and FAO."

The rapid conversion of these remaining forest fragments to farmland is driven by subsistence and cash crop farming together with unsustainable extraction for timber. Adding to this problem is the low productivity of the fields, high population density and growth, large demand for timber and immigrants moving into the area looking for land. These forests mainly along rivers are in various states of degradation. The key deforestation driver is conversion of forest to farmland for subsistence and commercial agriculture by the resident community. Forests have also been cut to control crop-raiding by wildlife, mainly by immigrants but with the permission of the resident community (Akwetaireho et al. 2011). Degradation drivers include the commercial extraction of timber for export, and to a lesser extent charcoal for urban markets and fuel wood for local use. Agriculture is extensive using hand tools and fire. Fuel wood is gathered from local forests. Cash crops cultivated are sugarcane, tobacco, cotton, maize, rice, beans and potatoes (Leal M.E et.al, 2011).

As long as there is instability in the DRC, it is likely that either the settlement will expand to accommodate the already sprawling settlement hence further degrading the environment, or the amount of land allocated to refugees will reduce further hence putting livelihoods of the refugees at stake. Today, the maximum size of land available for allocation to new refugees within the settlement is not more than half an acre of land. If more refugees come in, the size of land will decrease further hence putting some of the self-reliance strategy in abeyance. What this means is that strategies should be put in place to address both the environmental concerns as well as livelihoods.

Informed by the knowledge and observations over years where the rate of refugee influx in Uganda keeps on increasing with resultant environmental degradation and diminishing livelihoods options amidst a changing climate and its effects, CDRN brainstormed over the broad impact of these refugees in the country and how to mitigate the impacts. CDRN responded to an innovation challenge aimed at reversing the harmful effects of refugees particularly on the environment but also to ensure that refugees as well as the host communities are supported to engage in sustainable livelihoods options. The initiative therefore does not only address the impact of refugees on the environment, but in a rather holistic manner responds to the challenge of climate change.

In November 2019, CDRN received funding worth approximately US$100,000 from the Innovation Fund Norway through CARE Denmark and in partnership with Care International Uganda to undertake a pilot project titled "Climate Adaptation and mitigation Project (CAMP+) - a precursor to an anticipated 5-year project. Prior to the receipt of funding and in the first quarter of funding, a number of discussions between Care International Uganda and CDRN were carried out to agree on the key result areas of the project. Some

of the initial thoughts such as the use of digital technology in monitoring and reporting on forest activities were suspended while new ones including promotion of sustainable food systems, recycling of solid waste management and use of solar energy for cooking were introduced and adopted and have either been launched in the case of sustainable food systems, or expected to be launched in the case of promotion of solar cookers and recycling of solid (plastic) waste into valuable products such as roofing materials.

Our interaction with other development and humanitarian agencies has indicated that of recent, some agencies have started encouraging refugee populations to become more closely involved with environmental management and rehabilitation. However, most of their programmes only address the wood fuel issues through management strategies (i.e., improved stoves and cooking practices), and indeed savings of up to 40% have been reported with improved stoves. However, little is being done to address rampant degradation of forests, wetlands and river banks; air and water pollution, soil erosion, solid waste and in particular the challenge of plastic waste, damage to ecosystems and biodiversity. This is perhaps one of the glaring gaps that exits in refugee response in all refugee settlements across the country that CAMP+ intends to address *ceteris paribus*.

With our experience rooted research and capacity development, we understand that the key to reducing environmental damage caused by demand for environmental natural resources lies in identifying and understanding the interaction between human needs and behaviour as well as the local environment. It is for this reason that we believe that a community natural resource mapping of Kyangwali Sub County in particular, and Kikuube District in general, was imperative in coming up with solutions that can not only address environmental challenges occasioned by refugee presence in the sub County and District in a holistic manner, but also challenges that are brought about by climate change.

1.3 The Rationale for the Mapping

Evaluation of the natural resource plays a decisive role in management and sustainable development planning. This study was specifically carried out to generate information on natural resources that are shared between refugees and host community. It looked at occurrence, distribution, access to, and use of natural resources; and activities of the community from the perspective of community members, challenges, and efforts in place for sustainable use.

This exercise proposed an assessment of environmental changes related to large refugee settlement, where information about environmental conditions essential for the establishment of the state the natural resources are so as to determine interventions needed to improve address environmental change. The information is important because it informs interventions not only by CDRN and its partner Care International Uganda, but also by different refugee agencies, government and private sector organisations operating or intend to operate/innovate in refugee settlements where the exercise was conducted or elsewhere across refugee settlements in the country. It is also meant to rally support from Uganda's development partners and the Government of Uganda to prioritize addressing refugee issues from the perspective of the environment.

Community natural resource mapping, a participatory activity, which according to Raina (2003), not only raises the level of education, awareness and livelihoods, but with concomitant legislation, the right to information. Participatory resource mapping makes access to information and transparency in local governance a reality. The resource maps graphically represent the communities' perception of how they view and use their environment. The process of drawing/making the map, the questions raised, and features chosen to be included on the map provide information on community use, ownership and access to the resources (Verooy, R. et al 2000). The maps provide a wealth of information on the environment and social setting for resource use. Through participatory mapping, spatial inventories of natural resources, property status, land use rights and perceived problems can be created for more equitable and sustainable resource management but need to foster transfer of decision making power and financial responsibility to local level government (Deichmann & Wood, 2001).

In a nutshell, this activity was carried out in order to promote an environmentally sustainable refugee settlement by firstly establishing the current status and trends of the shared natural resources, gain enough local knowledge on the land use changes that have occurred over time, the causes of the different changes, their effect, and the current efforts that are geared towards maintaining and restoring the depleted resources and prevent further depletion. Information attained is intended to assist in the development of an implementation plan for sustainable management/revival of the shared natural resources to ensure a sustainable refugee settlement.

1.4 Objectives of Resource Mapping

The natural resource mapping was carried out as one of the preliminary activities intended to inform project strategies. It was conducted in the Kyangwali refugee settlement and the host communities. The objectives of the mapping were three-fold, namely:

1. To establish natural resources shared by refugees and host communities, and determine their current state.
2. To find out existing environmental and livelihoods related challenges facing refugees and host communities.
3. To identify potential intervention options to mitigate pressure on environment, enhance sustainable wood fuel supply, protect existing natural resources, and contribute to building the resilience of both displaced and host communities.
4. Make recommendations for sustainable use of environmental natural resources.

02 METHODOLOGY

2.1 Introduction

The section describes the methodology used for the mapping exercise. It presents what was done during the preparatory stages; the design used for the mapping; data collection strategies and analysis and reporting. It also covers the limitations faced during the mapping study.

2.2 Preparation for the study

Preparation for the mapping exercise started with a discussion within CDRN and with Care International in Uganda on how to take CAMP+ forward. One of the issues that informed the decision on the way forward was the importance of the protection of natural resources as a key component of CAMP+. Given the ambitious nature of CAMP+, there was a consensus that a natural resource mapping was an imperative that would inform the future of CAMP+. Following this consensus, it was agreed that a natural resource mapping exercise be carried out first before project implementation.

In order to move forward, a Concept Note (CN) was developed to guide the mapping exercise. The CN was shared with Care Uganda team to provide technical input where necessary and also to foster ownership by both Care Uganda and CDRN since CAMP+ is a joint programme. The concept explained the purpose of the mapping, the target community and the methodology that would be used to undertake the mapping. It also contained the purpose for which information generated would be used. After consensus was generated between the partners and the CN was approved, study tools were developed and shared with Care International Uganda for purposes of harmonisation and to ensure that desired information is gathered and for purposes of quality assurance.

2.3 Study approach

In order to achieve the objectives of the mapping exercise, we ensured that the exercise was conducted in a highly participatory, interactive, and consultative manner so that all the stakeholders at various levels effectively participated. The first steps towards the mapping exercise was identification and assembling of human resource and logistics necessary for smooth conduct of the study. Secondly, we identified key informants and established their contacts, which we used to schedule the appointments. Thirdly, we mobilised local leaders within the communities and together with them developed a programme for community meetings, focus groups discussions and key informants' interviews, and transect walks where necessary.

2.4 Study Design

A cross-sectional study design was used in this mapping exercise. The choice of this design was influenced by Bryman (2008, p44). Bryman refers to cross-sectional survey design as a study that entails the collection of data on more than one case in a single point in time in order to collect a body of quantifiable data in connection with two or more variables (usually many more than two), which are then examined to detect patterns of association". In terms of time, Cohen, Manion, & Morrison (2007) assert that a cross-sectional study is one that produces a "snapshot" of a population at a particular time, in support of Bryman. In this case, data were collected at one point in time from 10 villages in both the refugee settlement and the host community on two variables (the population and their relationship with the natural resources).

The study used a 'mixed methods research' strategy - research that crosses the two strategies (combines both quantitative and qualitative approaches). Both quantitative and qualitative data were handled using this approach. According to Bryman, mixed methods research is preferred because it involves a mixture of research methods involved and not just using them in tandem. To that effect, the mapping ensured that there was complementarity between the two approaches.

2.5 Scope of the Study

Issues explored related to the current state of the environment, impact on livelihoods, socio-economic practices that have affected the environment, current plans for restoration and management of the shared natural resources. We also assessed the role that the local environment authorities are playing to protect and to develop shared natural resources. Geographically, the study was carried out in 10 villages, 8 of which were in Kyangwali refugee settlement and two (2) were from the host community.

2.6 Study Population

The study population comprised of refugees in Kyangwali refugee settlement and members of the host communities in Kyangwali Sub County as primary respondents. Other respondents included District and Sub County technical and political leaders, leaders of Refugee Welfare Council, Office of the Prime minister (OPM), United Nations High Commissioner for Refugees (UNHCR) and humanitarian agencies involved in refugee work in Kyangwali refugee settlement.

2.7 Sampling

2.7.1 Sample Size Determination

We interviewed up to 389 individuals (household heads). This sample size was arrived at using a formula that has a margin of error of +-5 for a population of about 120,000 individuals by Scott M. Smith, PhD. The formula used to arrive at the desired sample was:

$S = X^2 NP(1-P)/d^2(N-1) + X^2P(1-P)$

- Where S = required sample size
- X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level is 3.841
- N = The population size
- P = The population proportion (assumed to be 0.50 since this provides the maximum sample size)
- D = The degree of accuracy as a proportion (0.05)

$S = X^2NP(1-P)/d^2(N-1) + X^2P(1-P)$

$= 3.841 \times 1021 \times 0.50 \times ((1-0.50)/0.05^2) \times (120{,}000-1) +1) + 3.841 \times 0.50 (1-0.50)$

$=383$

$\underline{S = 383}$

We created an allowance of additional 10 elements to ensure that non-response was taken care of resulting in a minimum of 383 and a maximum of 393 individuals.

2.7.2 Sample Selection

(a) Selection of Villages

A sample of 10 villages was selected from both the host and settlement and these included; Kavule, Maratatu, Kyebitaka, Kagoma, Nguruwe, Nyakatehe, Namakakale, Ngogoli, Nyambogo and Rwensambya. These villages were selected through simple random sampling using a lottery method. To do this, a list of all the villages in each of the two target areas (Host and settlement) was drawn and used as a sampling frame. Each village was assigned a number and each of the numbers was written on a piece of paper and folded and put in a basin. Using a lottery method, up to 10 folded pieces of paper were randomly picked and the villages with assigned numbers corresponding to the numbers in the pieces of papers picked were taken as the sample villages from which household interviews and focus group discussion were carried out.

Table 3: Villages selected in the settlement and Host community

ZONE	VILLAGE
A	Kyebitaka
	Ngurwe
	Nyambogo
B	Kgoma
E	Maratatu B
	Namakakale
F	Kvule
Host Community	
	Nyakatehe
	Rwemisanga
	Rwensambya

(b) Selection of Household Respondents

The total number attained after sample size determination was distributed between the refugee settlement and the host/neighbouring communities at the ratio of 70:30 for refugees and host community respectively, in line with Government policy on refugee assistance. The households were selected from both the host and the settlement. In light of the above, up to 118 respondents were from the host community and 275 were from refugee settlement. From the above, certain considerations were made, and these included age, sex, and duration one has spent in their respective locations. This was necessary because we intended to make the samples representative of all categories of people.

(c) Selection of Key Informants

Key informants were purposively selected at community, Sub County and District levels. The criteria for their selection included but not limited to the following: being in leadership position at community, Sub County or District levels; having expert knowledge on subject matter at any level; being a technical person at District and Sub County levels; being an opinion leader at community level; and being a representative of OPM and humanitarian agency or NGO.

In light of the above, the following agencies were identified for key informants' interviews: UNHCR, Refugee Law Project (RLP), Lutheran World Federation (LWF), Hunger Fighters Uganda (HFU), and at sub-county level, we interviewed; the Sub-County Chief, the Sub-County Production Officer, Environment Officer and the Sub-County Secretary. We also conducted key informants' interviews at Kikuube District level with the Chief Administrative Officer (CAO), District Community Development Officer (DCDO), Environment Officer, District Production Officer (DPO), District Natural Resource Officer (DNRO), and District Planner. A total of 15 Key Informants were selected and contacted to participate in the key informant interviews.

Table 4: List if Key Informants Interviewed

Role of the interviewed	Seat/Location	Interview Number
Refugee Law Project (RLP)	Kyangwali Refugee Settlement	1
Hunger Fighters Uganda (HFU)	Kyangwali Refugee Settlement	1
Lutheran World Federation (LWF)	Kyangwali Refugee Settlement	1
United Nations Refugee Council	Kyangwali Refugee Settlement	2
Local Councils 1, 2, 3	Kyangwali Host Community	3
Sub-County Chief	Sub-county Head quarters	1
Sub-County CDO	Sub-county Head quarters	1
Sub-County Production Officer	Sub-county Head quarters	1
Sub-County Environment Officer	Sub-county Head quarters	1
Sub-County Secretary	Sub-county Head quarters	1
District Production Coordinator	Kikuube District Head Office	1
District Natural Resources Officer	Kyangwali Refugee Settlement	1
District Community Development Officer	Kyangwali Refugee Settlement	1
District Agricultural Officer	Kyangwali Refugee Settlement	1
District Environmental Officer	Kyangwali Refugee Settlement	1
District Chief Administration Officer	Kyangwali Refugee Settlement	1
Camp commandant	Kyangwali Refugee Settlement	1
TOTAL		**20**

(d) Selection of Focus Group Discussion participants

Eight FGDs were organised for refugee and host community. Of these, six were conducted in the selected villages within the refugee settlement and two within the host communities. FGDs comprised of 8-12 people with consideration of the gender and age. An FGD guide was administered to the groups. All FGDs were audio-recorded with the permission and consent of the participants. Discussions took approximately 1.5 hours. All FGDs were convened at a venue convenient to most participants, for example within close range of their homes in the refugee and host communities. Each FGD was conducted by three research associates: one interpreter, one moderator and the third person did the audio-recording while also taking supplementary hand-written notes.

(e) Selection of Community Meeting Participants

Two community meetings were carried out, one was held in the settlement (Kavule) and one in the host community (Nyakatehe). Participants for community meetings were mobilised with the help of the local council chairpersons. All categories of people community leaders, elders, youth women, men, people with disabilities (PWD), cultural and religious leaders participated in community meetings. During community meetings, participants were asked to draw maps of their respective areas and plot the different natural resources.

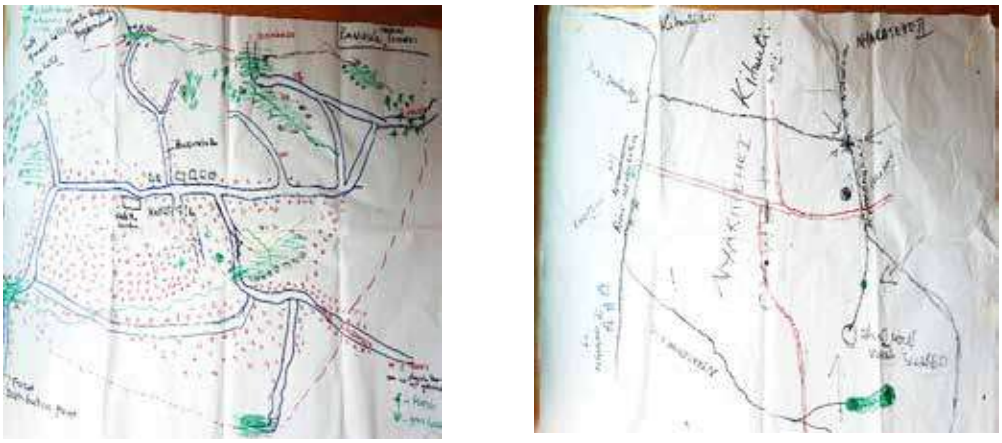


Figure 3: Resource Maps of Kavule and Nyakatehe villages drawn by communities

2.8 Data Collection and Analysis

Both quantitative and qualitative data were collected. Quantitative data were collected using a semi-structured household questionnaire while qualitative data was collected using key informants', focus group discussion, and community meeting interview guides, and community transect walk.

(a) Semi-structured Household Questionnaire

A semi-structured questionnaire was developed to guide data collection at household level. Research assistants administered the tools to household heads or representatives of selected households within the refugee settlement and host community.

(b) Key Informants' Interview Guide

Members of the research team from CDRN administered key Informant's interview guide to representatives of United Nations High Commissioner for Refugees (UNHCR), the Hunger Project Uganda (HPU), and Lutheran World Federation (LWF), Refugee Law Project (RLP), and Office of the Prime Minister (OPM), which is also the governing authority in Kyangwali Refugee Settlement. The guide was used to generate information on the status and trends of the natural resources, different environment related plans and projects, environment management policies and their implementation, and challenges and gaps in implementation of environment related plans and projects.

(c) Focus Group discussion interview guide

A focus group discussion interview guide was developed to generate information from focus groups. The guide was designed to enable respondents reflect on the environment and livelihoods related issues over the years and to generate consensus how best the situation can be handled. Team members from CDRN's administered the guide.

(d) Community meeting interview guide

A community meeting interview guide was developed to capture community perception of the environment including their knowledge, attitude and practices. It also helped generate information on how best they would want the issues of the environment and their livelihoods to be addressed.

(e) Transect walk observation tool

A transect walk observation tool was developed to document visible features such as the status of trees, wetlands, swamps, soil conditions and land use/cover, and economic such as farming, business, etc.

2.9 Data Management and Analysis

Analysis of Quantitative Data

Two types of data were collected, namely: quantitative and qualitative data. In this mapping, the final unit of analysis was households and as such, responses from individual respondents to the mapping issues were quantified. As a start, filled-in questionnaires were checked end of each day for their completeness to establish whether both the structured and unstructured sections had been properly filled. It also helped to establish whether there were any missing data since it needed to be taken into account during data analysis.

Filled-in questionnaires were brought to office and a data entry screen was developed in Statistical Package for Social Scientists (SPSS). Data from the questionnaires were manually entered and cleaned to ensure that correct entries were done and made ready for analysis.

Frequency distribution was performed. Frequency distribution technique was used with a focus on how frequently the specific values were observed and what their percentages were to the same variables. Thereafter, descriptive statistics including frequencies and percentages were produced.

Analysis of Qualitative Data

Information collected from key informants and focus group discussions were qualitatively analysed. To begin with, data from key informants' interviews were transcribed into meaningful texts and content analysis technique was used to analyse the data. Content analysis entailed coding of responses into categories from which themes

were developed. Coding was done to deconstruct the data into manageable chunks in order to facilitate an understanding of the phenomenon in question. The themes were assigned colours based on the dimensions under each main variable. Corresponding responses were identified and categorized according to the theme under which they fell. Once this was completed, analysis was made based on the themes and, logically interpreted and processed.

2.9 Limitations

We were unable to use GPS technology for geo-referencing the study sites and physical features to enable us determine what the situation of the environment was beyond areas we could physically reach.

Related to the above, we were also unable to develop land use maps of the area covered by the survey because of the limited resources available to use to hire a professional company or consultant to undertake GIS and Remote Sensing analysis, but we relied specifically on the land use and land cover analysis findings from the study undertaken by World Bank and FAO in 2020 on Assessment of Forest Resource Degradation and Intervention Options in Refugee-Hosting Areas of Western and Southwestern Uganda.

The exercise took place at the time when COVID was setting foot in Uganda and was ravaging elsewhere in the world. One of the team members, an intern from University of Copenhagen with specialisation in natural resource management had to leave a few days into the exercise because of an urgent recall. This affected data collection because of lack of professional input into the exercise.

The COVID 19 lockdown meant that we could not continue with the exercise and as such some of the planned focus group discussions, community meetings and transect walks could not be carried out. Likewise, due to resource constraints and limited time, we were unable to meet other civil society organisations/institutions that could have been involved in NR advocacy in the region.

03 FINDINGS

This section presents study findings. It starts with a presentation of characteristics of respondents; knowledge, attitudes and practices regarding natural resources; environmental and livelihoods related challenges facing refugees and host community; and roles and responsibilities in environment management. The study covered 10 villages, seven (7) of which were from within the refugee settlement and three (3) were from the host community. Up to 389 household respondents were interviewed. Of these, 52.8% were male and 47.2% were male.

3.1 Demographic Characteristics of Respondents

To begin with, the study examined the countries of origin of respondents, gender, age distribution, the years they had spent in their current places (both refugees and host community members), level of education, and their main sources of livelihoods

The study established that the majority (60.2%) of respondents originated from the Democratic Republic of Congo (DRC), 5.7% from South Sudan, 0.8% from Rwanda, and the remainder (33.4%) were Ugandan nationals. The dominance of refugees from the DRC in Kyangwali refugee settlement can be attributed to the proximity DRC has to Kikuube District.

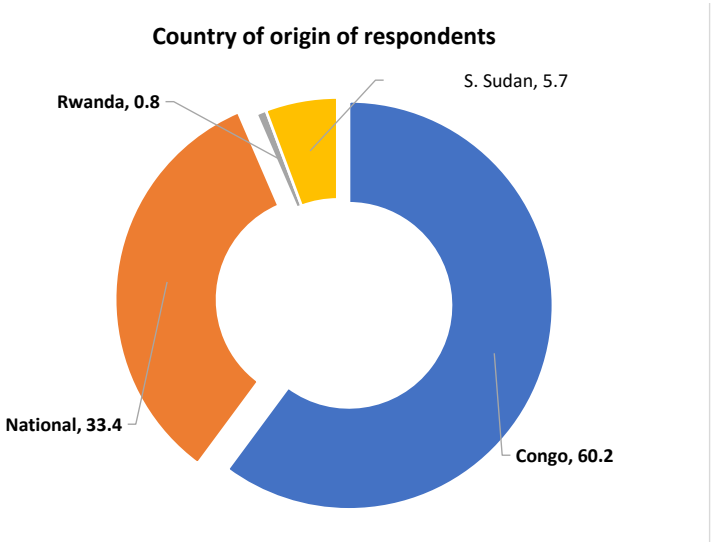


Figure 4: Countries of origin of respondents

As can be seen in Figure 3, the majority (84.1%) were below the age of 50 years and only 3.1% were 70 years and above. In light of this, it may be concluded that the majority of residents' population in the settlement is youthful. What this means is that the majority of respondents are not only in their most productive years, but also in their reproductive years, and as such it is possible that they have young families that they have to fend for. Such a population structure has implications for environment natural resources.

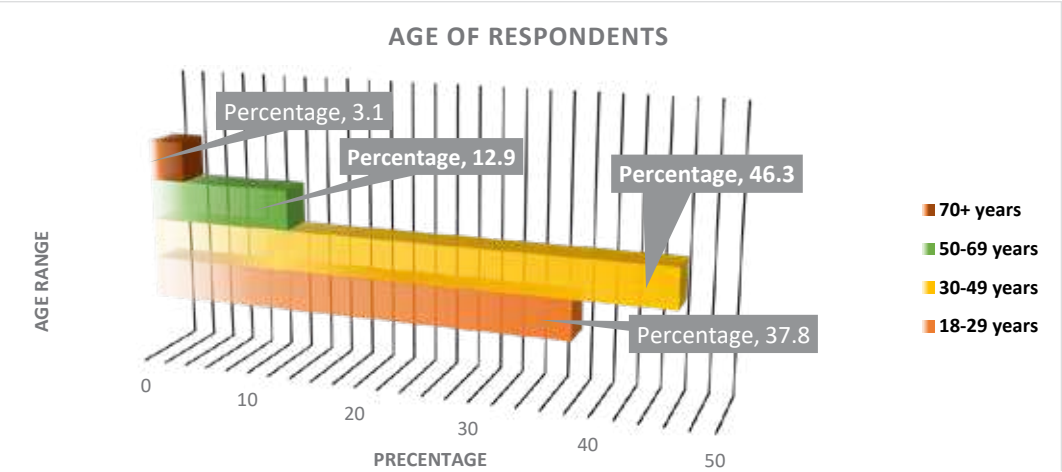


Figure 5: Age distribution among respondents

The study wanted to establish the duration respondents had spent in their respective locations (in the settlement and host community) in an attempt to determine its implications to the environment.

The study established that most (50.1%) of respondents had spent at least 7 years in the settlement/host community and up to 41.1% had spent 10 years and above in the settlement and/or host community. Of the 41.1% who indicated that they had spent 10 years and above, 55.2% were host community members while 44/8% were refugees, meaning that on average the majority of refugees had spent shorter time than host community members had. This partly explains progressive disappearance of vegetation in the last 10 years as depicted in Figure 8 satellite image

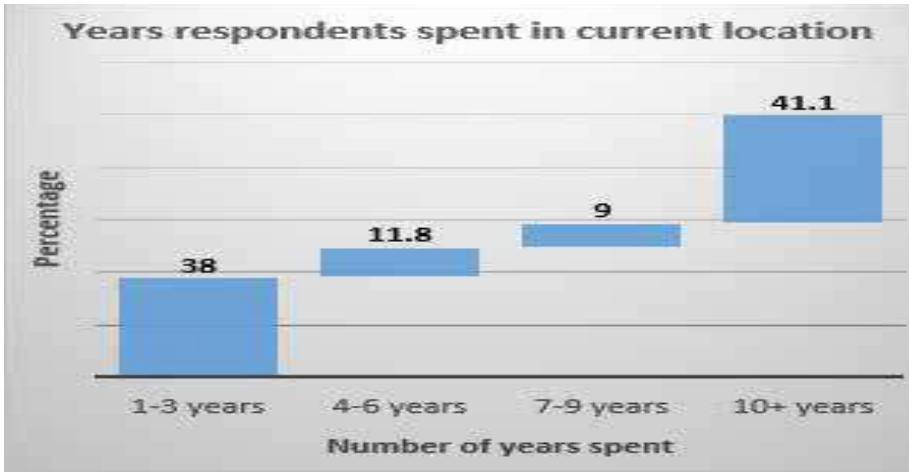


Figure 6: Number of years spent

The study assumed that education level influences livelihoods choices that people make. In light of this, the assessment wanted to establish level of education of respondents to determine potential impact on the environment.

Findings show that over 80% of respondents did not go beyond primary school education. In fact, 29.3% never went to school at all, 35% did not complete primary education and only 11.6% completed primary school. Only 1% had completed vocational education and 1.5% had university education.

What this statistics show is that the majority of respondents did not have employable skills. *Figure 5* shows that the majority of respondents depended on natural resources for their livelihoods therefore corroborating the assumption that education influences livelihoods choices individuals make

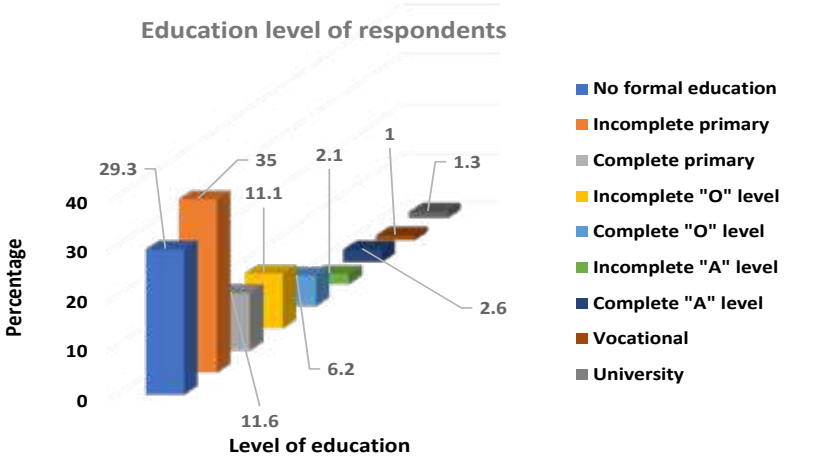


Figure 7: Highest education level attained

Livelihoods in Uganda are inextricably linked to sound environment natural resource management since the majority (over 70%) derive their livelihoods from farming. The study wanted to establish the main source of livelihoods of the target community in order to determine strategies for sustainable environmental use.

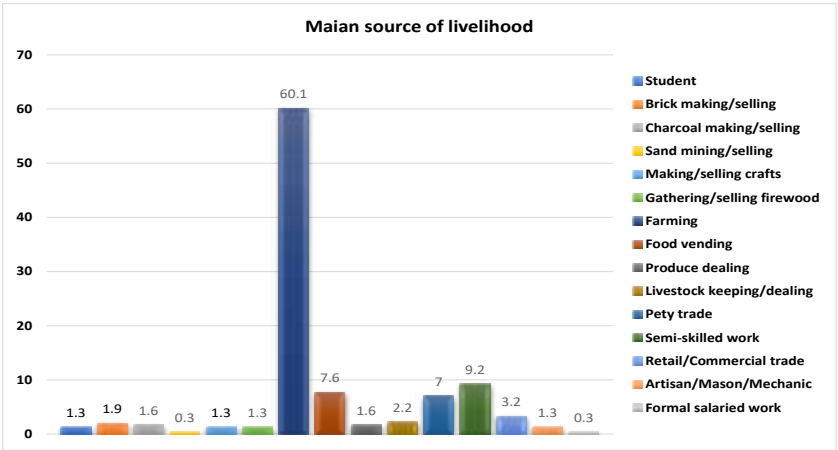


Figure 8: Respondents' main sources of livelihoods

Figure six (7) shows that the majority (66.5%) depended on the natural resources as their main source of livelihood. Up to 60.1% of all respondents reported that farming was their main source of livelihood, 1.9% reported brick making and selling, 1.6% said charcoal making and selling, 1.3% said they depended on making and selling crafts, 1.3% depended in gathering and selling firewood, and only 0.3% reported that sand mining and selling as their main source of livelihood.

On the other hand, only 0.3% were engaged in formal salaried work, 9.2% in semi-skilled work, 7% engaged in food vending, 7% in petty trade, 3.2% retail and commercial trade, 2.2% livestock keeping and selling, and 1.3% involved in artisan/mason mechanical work.

While household interviews showed that dependence on charcoal making for commercial purposes was only 1.6% and that farming was the major source of livelihood, focus group discussions revealed that charcoal making was the most common activity in the area because it was a quick source of income. They attributed this to the inadequate financial and food support offered by humanitarian agencies yet refugees had families to feed. The same views were held by district and sub county officials that they majority derived their livelihoods from exploitation of environmental natural resources. However, they hastened to report that local communities were not only depending on land for farming, but had also invaded wetlands and forest reserves for farming, which had not only led to a reduction in forest/tree/vegetation cover, but had also led to the declining of water tables and water levels in small rivers and their streams. They noted that a number of community boreholes had started drying up and incidences of soil erosion had significantly increased.

They attributed heavy dependence on natural resources to high poverty levels in the local community, but also agreed that this was because of lack of employable skills, particularly among the youth who resort to the use of environmental resources as a source of livelihood. They also noted that environmental challenges go beyond planting trees and protecting them but also require skilling and creating alternative sources of livelihoods, not only for the youth, but also for people from both refugee and host communities in the district.

3.2 Knowledge, Attitude and Practices

The study considered knowledge, attitude and practice as fundamental in sustainable natural resource use and in addressing environmental challenges. Therefore, the study explored what respondents knew about the environment natural resources, their attitude towards the environment and some of the environmental practices that they were using. In the first instance, respondents were asked to name the natural resources that they knew that were being shared between refugees and members of the host communities.

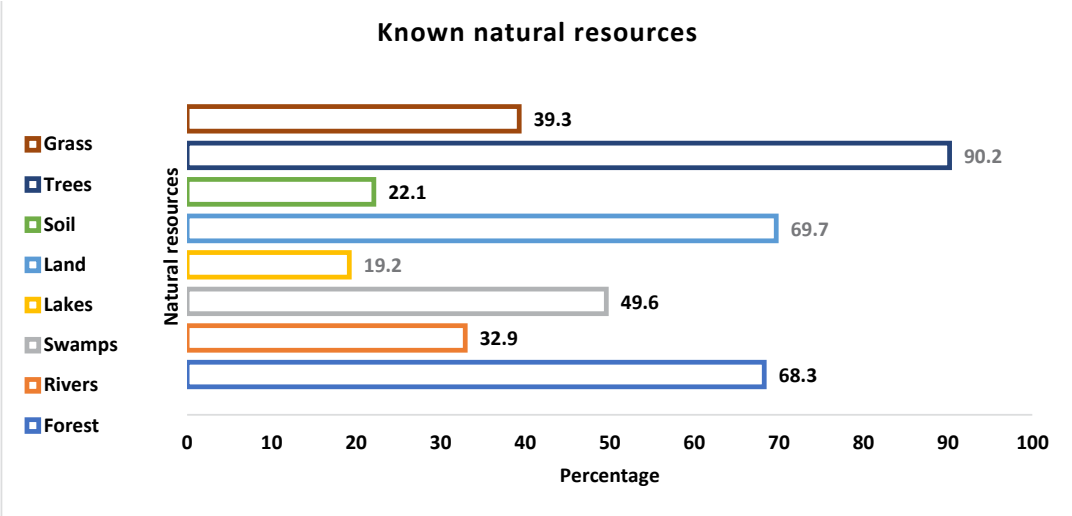


Figure 9: Known natural resources

As seen in Figure 8 above, most shared natural resources were trees (90.2%), land (69.7%), forest (68.3%), and swamps (49.6%). Others were grass (39.3%), rivers 32.9%), soil (22.1%), and lakes (19.2%). While the study did not inquire why many of them indicated trees, land, forest, and swamps in that order, it appears they based their prioritisation on the frequency of use and importance attached to these natural resources, particularly in regard to how the resources contribute to their livelihoods.

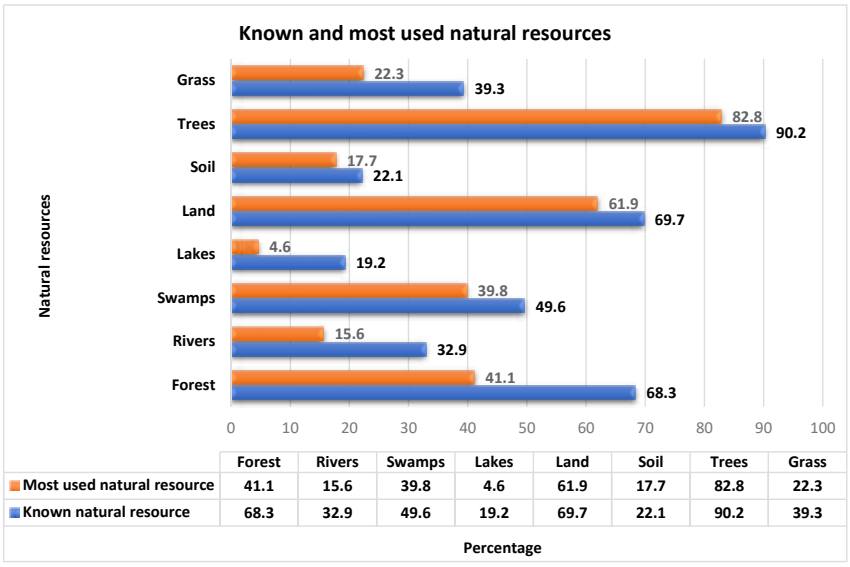


Figure 10: Comparison of known and most used natural resources

When asked which of the shared natural resources was the most used, the majority (82.8%) reported that trees were the most used, followed by land (61.9%), forests (41.1%), and swamps (39.8%). Others were grass (22.3%), soil (17.7%), rivers (15.6%), and the least used was lakes (4.6%).

Figure 11: Refugees fetching firewood from Bugoma forest on the edge of the settlement

When asked why the trees and land were the most shared and used natural resources, they noted that it is because trees and land provide the basics from which refugees start their lives and continue to support their livelihoods while in the settlement. They pointed out that they all used trees for construction, firewood for cooking and for making charcoal and crafts, and that, they used land for producing food. The District and Sub County leaders as well as focus group participants corroborated these findings. They argued that both refugees and host community needed land, shelter and food as basic needs to live a relatively comfortable life and as such, they frequently used land to grow food and trees from which they obtained materials for construction of shelter as well as charcoal and firewood for sale and cooking.

Respondents also reported that forests and swamps were the third and fourth most used natural resources respectively, firstly because forests provide the trees for construction and firewood for cooking, as well as materials for making crafts by both refugees and host communities. On the other hand, swamps are used a source of fish food, water, and other swamp-based natural resources that they used to sustain life.

The above findings help explain why the formerly forested area have been stripped off its trees when refugees got settled in the area, but also goes ahead to explain the shrinking of the Bugoma forest over the last 10 years as depicted in the satellite image **(Figure 8).**

3.2.1 Physical Changes in the Environment

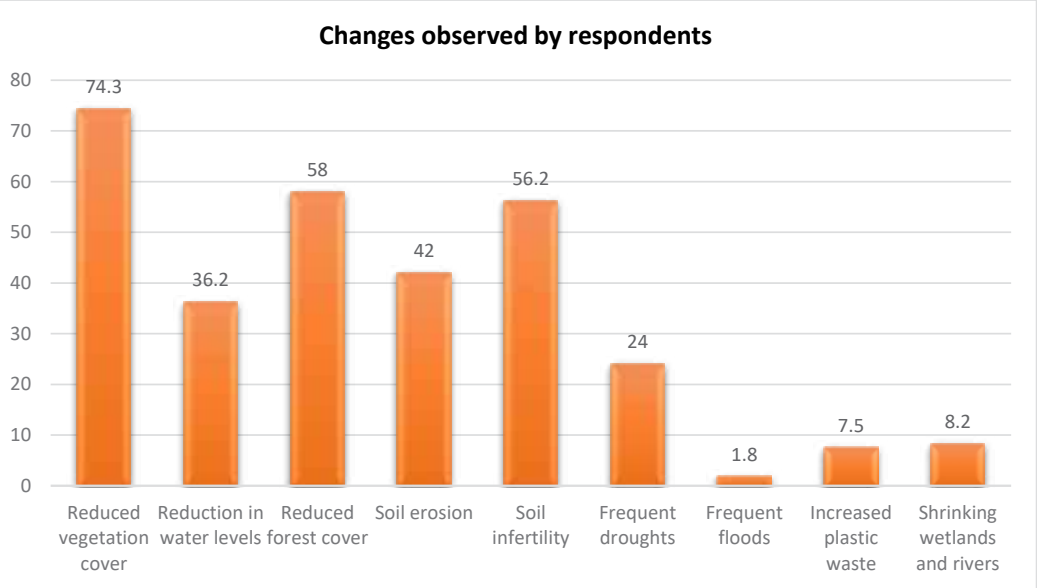


Figure 12: Environmental changes that have been observed by respondents

In order to determine the state of the environment and by extension natural resources, respondents were asked to state physical changes in the environment that they observed since they started staying in this community.

As can be seen in figure 11 above, the majority reported reduced vegetation cover (74.3%), reduced forest cover (58%), and soil infertility at (56.2%). Moderate changes

Figure 13: Part of Bugoma Forest on Kavule hill near IOM water reservoir cleared for Maize growing

Degraded wetland/swamps streams and rivers

Although shrinking wetlands/swamps and rivers/streams do not appear to be of big concern, our investigation indicates that wetlands/swamps and rivers/streams have been heavily encroached. These natural resources were being used for various purposes, mainly for growing of food crops ranging from vegetables, maize, sweet potato, and banana among others. Other uses to which they are being put include sand mining and brick making. The extent of degradation varied from one to another from wetland/swamp/stream/river to another. While some have been heavily degraded along the course, others are just being encroached on. The pictures below show the activities being carried out on the different wetlands/swamps/streams/rivers within both the refugee settlement and the host community. We documented the following degradation of wetlands/swamps and rivers/streams.

Similarly, local leaders and focus group participants reported that there were noticeable changes in the environment. They attributed the changes to actions of refugees and host communities. Participants in both communities said that extensive deforestation was a result of the struggle to meet their fuel needs, building materials needs and incomes. They were aware that their actions contributed to increased soil erosion, retreating water levels and drying of water sources due to long droughts. The long droughts were reported to have contributed on low food production.

It is important to note that Kyangwali refugee settlement is seated on part of Bugoma forest and the forest is the major source of wood fuel (firewood and charcoal) and poles for building materials for refugees, and yet the forest is also not safe from encroachers and illegal loggers. Without a major intervention, the forest is likely to be cleared off its vegetation at an alarming rate, which may trigger a huge environmental challenge if not tackled now.

Note should also be taken on the reported increased soil erosion, reduction in water levels and the frequent droughts. These have direct effect on the capacity of refugees and host communities to have sustainable livelihoods. Again, while the observed changes may be attributed to the global climate change, the unsustainable exploitation of the environment as evidenced by feedback from respondents means the part of the challenge is arising from unchecked reduction in vegetation cover already discussed above.

Use of Agro-chemicals in Tobacco, Vegetable and Sugarcane Growing

Further consultations with humanitarian agencies and the community suggest that there is a lot of use of agro-chemicals in the growing of crops in and round the settlement. Uncontrolled use of agro-chemical does not only lead to soil contamination but they also contaminate underground water systems. Similarly, when the chemicals are washed into the streams, rivers and wetland, they contaminate. This does not only put aquatic life at risk but also the lives of animals and human being who consume the water.

3.2.2 Perceived Causes of Changes in the Environment

The study wanted to establish the level of awareness about the changes in the environment. Respondents were asked to name what they perceived to be the causes of the changes they had reported on.

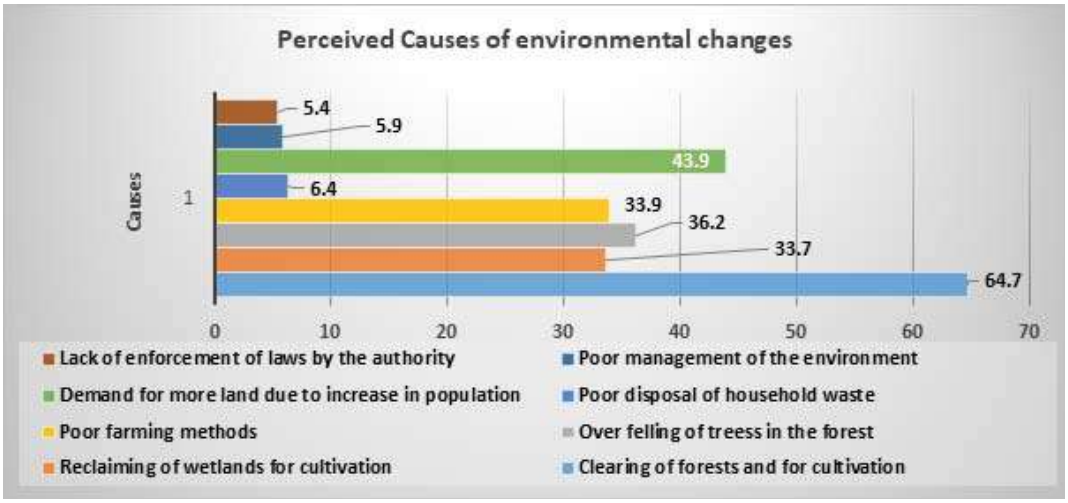


Figure 14: Perceived causes of environmental changes

As can be seen in the figure 13 above, clearance of forests for cultivation (64.7%) was reported as the most prevalent cause of environmental changes. This was followed by demand for more land for cultivation due to increased population (43.9%), over felling of trees (36.2%), poor farming methods (33.9%), and clearing of wetlands for cultivation (33.7%). The least reported cause of environmental changes were poor disposal of household waste (6.4%), poor management of the environment (5.9%) and lack of enforcement of laws by authority (5.4%).

Key informants, community leaders and focus group participants corroborated this finding. They reported that the main causes of environmental changes were clearing land for expansion of the settlement and for cultivation, felling of trees for construction and fuel supply, clearing of grass lands and wetlands for farming and poor disposal of household waste.

The study also examined the state of natural resources and respondents were asked to name three shared natural resources that they thought was on the verge of depletion. The feedback from the community identified the three most threatened as depicted trees, forests, swamps, and land:

Feedback from the community suggests that the three natural resources that are most threatened by depletion were trees (83.3%), forests (60.9%), and swamps (46.7%). Equally threatened was land at 42.4%. From the responses, it would appear that there is need to urgently address issues of trees, forests, and swamps.

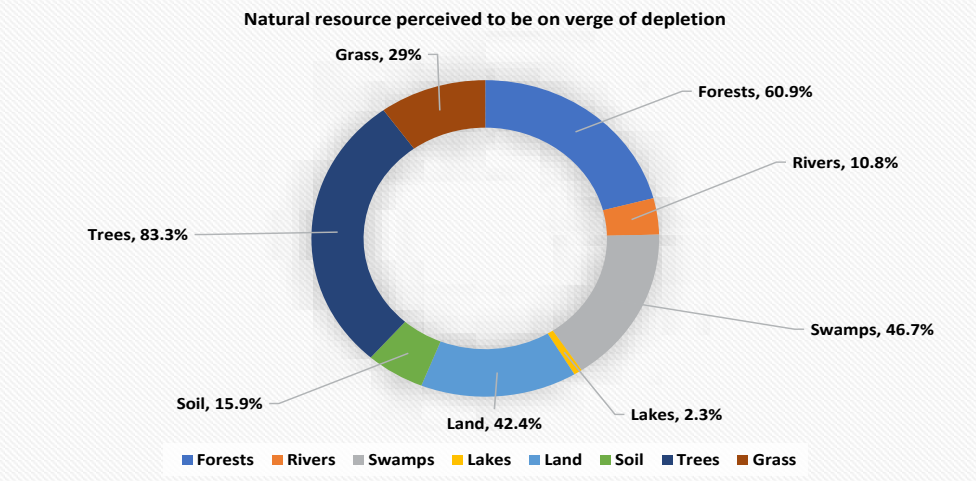


Figure 15: Natural resources on the verge of depletion

A lot of evidence abound showing the extent to which Bugoma forest that lies on the edge of Kyangwali refugee settlement had been creamed of some of its ecologically and economically valuable trees. During a transect walk, the team came across an earth mound charcoal kiln which had just been emptied of the charcoal made from tree cut from Bugoma forest. Charcoal making is one of the activities reported as being a source of livelihood for a section of the population in the settlement and the host community

Figure 16: A charcoal kiln discovered in Bugoma forest during transect walk

Recent developments have the potential of wiping out the Bugoma forest. With about 22miles^2 reportedly surrendered to Hoima Sugar by the NEMA for sugarcane growing, it is likely that within a short time, Uganda will lose one of its few surviving natural forests and the consequences will be grave in terms of loss of biodiversity, climate change, Lake Albert fisheries and ecotourism.

A number of reasons were given to explain perceived threat to certain natural resources. Although some respondents reported that the forests were already cut down by the time

they came to live in the community, and these were largely respondents who indicated they lived in the area for 1-3 years, others said that the reduction in the forest cover was as a result of clearing of the forest for vegetable cultivation. Other respondents said the community had needs such as finances, firewood and construction materials so they resorted to the most available resources to make ends meet and the forest and its trees were the most available. They further noted when water levels dropped during the dry seasons, residents descend on the swamps and cultivate them and increasingly this has led to the depletion of swamps.

> *"Things have changed with many trees being cut down for charcoal burning and for firewood. The amount of land that is being given out now is smaller compared to what we were given when we had just arrived here in 2008."* ***Sanyu Nema a respondent from Kagoma Village in Kyangwali Refugee Settlement.***

They also noted that the increasing population in the settlement was a major contributing factor particularly on land and the resources. According to OPM, population in the settlement surged from 30,000 to over 120,000 in the last three years and this had put a lot of strain on natural resources, including the amount of land being allocated to refugee families. They noted that whereas in the earlier days some refugees had up to 10 acres of land, the influx had reduced land allocation to about a half an acre per family and this explains the perception that land was getting depleted.

Refugees and host community members who have lived longest reported that water level and quality from the natural resources had deteriorated because residents had stated washing clothes in the river and wetlands/swamps, dump waste such as plastic bottles and garbage into the water etc. They also noted that some of the wetlands/ swamps had been reclaimed including those located within the settlement itself for growing vegetables.

> *"The swamps have been reclaimed for agriculture leading to a reduction in water levels, our rivers have also dried since there is no water coming from the swamps that used to fill the rivers. This has affected our water sources both for our domestic use and for animals" said one of the respondents in the host*

Community leaders both in the settlement and host community noted that not only was there increase in population, but that the level of poverty had increased and that it has led many people to reclaim swamps and wetlands for agriculture and to cut down of trees for charcoal making and for timber which they sell to make ends meet.

The above findings call for an urgent need to protect the remaining swamps and forests and reclaim and restore those that have been encroached on and destroyed by refugees and members of the host community. However, it also requires that the drivers of encroachment and depletion of these natural resources must be addressed through

provision of alternative sources of income but also by involving the community in the protection and restoration of the natural resources.

The study also teased out respondents' perceptions on human activities that they considered to be having negative consequences on the environment. The following human activities were perceived by respondents as negatively affecting the environment.

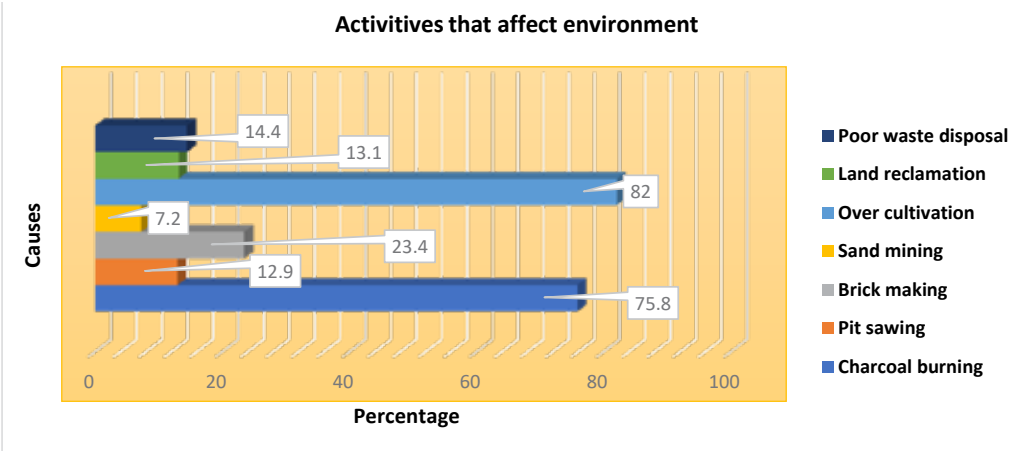


Figure 17: Activities perceived to be negatively affecting the environment

Most respondents reported that over cultivation (82%), and charcoal making as major human activities that were most negatively affecting the environment. Others including pit sawing (12.9%), brick making (23.4%), sand mining (7.2%), land reclamation (13.1%) and poor waste disposal (14.4%) were not considered to be having very harmful effect on the environment.

The above findings clearly show that over cultivation and charcoal making are the two human activities that are most negatively affecting the environment. This is mainly arising from the huge population of refugees being hosted in the settlement. A huge population means increased demand for land and wood for fuel and building materials. In order to sustain themselves, they require bringing more land under cultivation and/or over cultivation that lead to exhaustion of the land and more trees felled to give space for cultivation and to provide building materials and fuel needs in the form of firewood and charcoal.

We are of the view that these two activities contribute to climate change and the resultant impacts and as such need to be addressed through conservation in places that have not been touched and restoration where they have been destroyed, but it also means that those who depend on them should be provided with alternative sources of livelihoods.

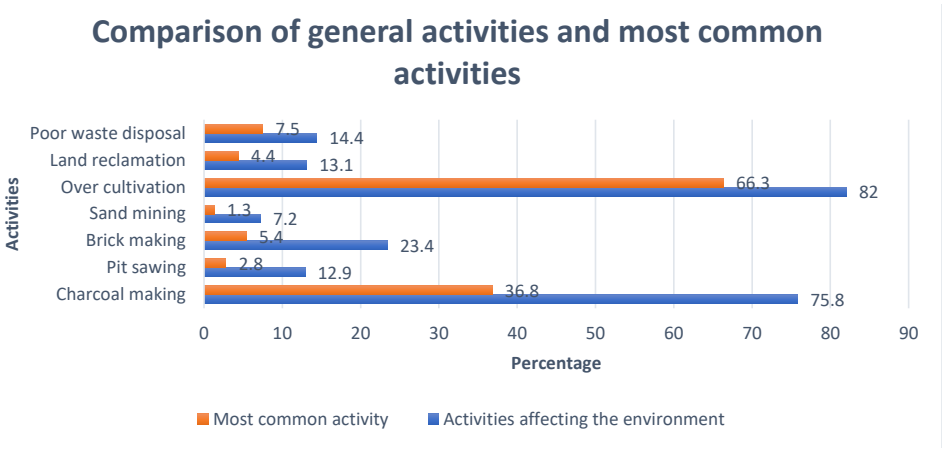


Figure 18: General activities and most common activities affecting environment

Just like their views on human activities they felt were affecting the environment, the study established that over cultivation (66.3%) and charcoal making (36.8%) were also considered the most common human activities in the environment. The study established that charcoal making was for sale while over cultivation was for food production for domestic consumption as well as for sale. In the course of the study, we established that refugees in particular had a bumper harvest and most of them were selling maize grains.

3.2.3 Knowledge of effects of human activities on environment

The study also established that the community understood the effects of human activities on the environment as presented in the figure 19 below:

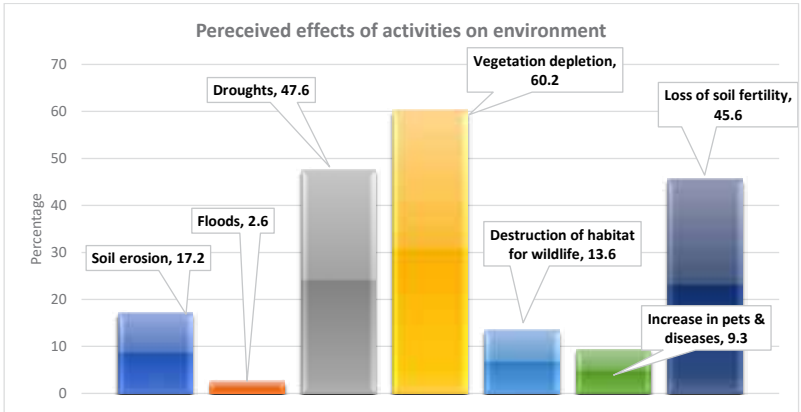


Figure 19: Community perception of effects of human activities on environment

According to figure 1*, the most common known effects of human activities on the environment were vegetation depletion (60.2%), droughts (47.6%), and loss of soil fertility (45.6%). Other effects included soil erosion (17.2%), destruction of habitat for wild life (13.6), increase in pests and diseases (9.3%), and floods at 2.6%.

Based on this analysis, it would appear that the most members from both the refugee settlement and host community were aware of the negative effects of environmental degradation. However, when asked why they continued to cut down trees and destroy swamps despite the negative effects it had on the environment and their livelihoods, they reported that they had no alternative sources for building materials and fuel for cooking. They further said that some of them had resorted to felling trees for firewood and charcoal making because they had either limited or no other sources of income to meet their domestic needs.

3.2.3 Impact of environmental degradation on livelihoods

Respondents reported that the changes in environment had impacted their livelihoods. The impacts were as follows:

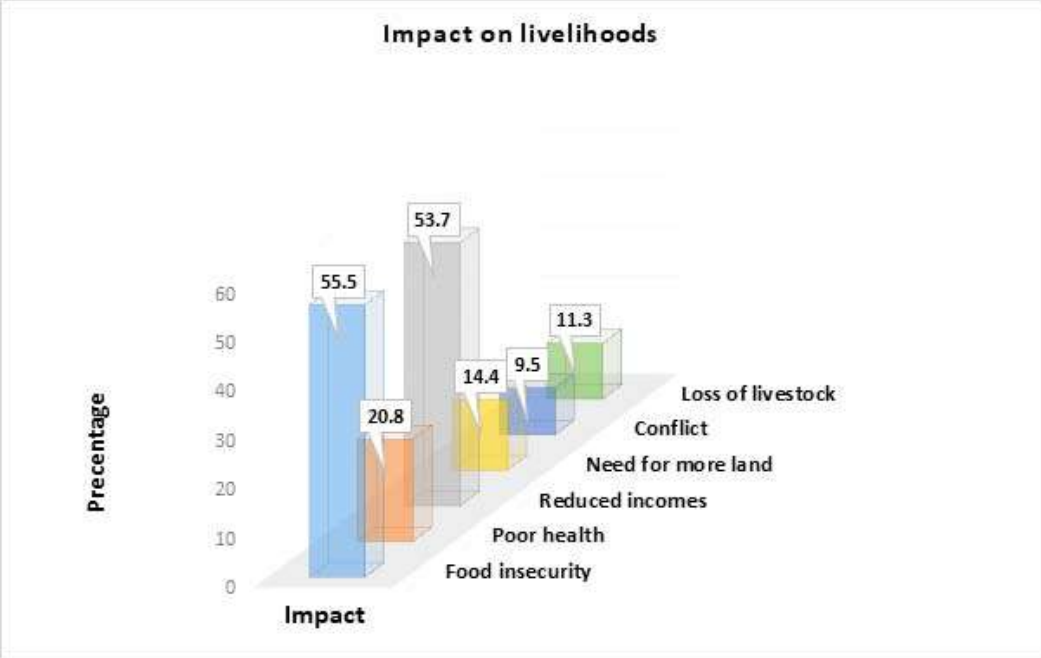


Figure 20: Impact of environmental change on livelihoods

The most common impacts on livelihoods were increased food insecurity at household level (55.5%) and reduction in household incomes (53.7%). Only 20.8% reported that the change in environment had led to poor health and 14.4% reported increased need for more land because the land they held had lost fertility and in the case of refugees, land allocated had reduced to unsustainable levels. Thirteen point three (11.3%) reported loss of livestock and only 9.5% said that there was increased conflict within and between communities because of the change in environment.

Similarly, local leaders were of the view that there was growing food insecurity, poverty, and low crop yields. They also noted that there was loss of pastures for animals and that there was increased conflict in the communities over use of natural resources.

3.2.4 Challenges faced as a result of environmental degradation

In order come up with appropriate response strategies, the study sought to understand environment related challenges faced by refugees and host community.

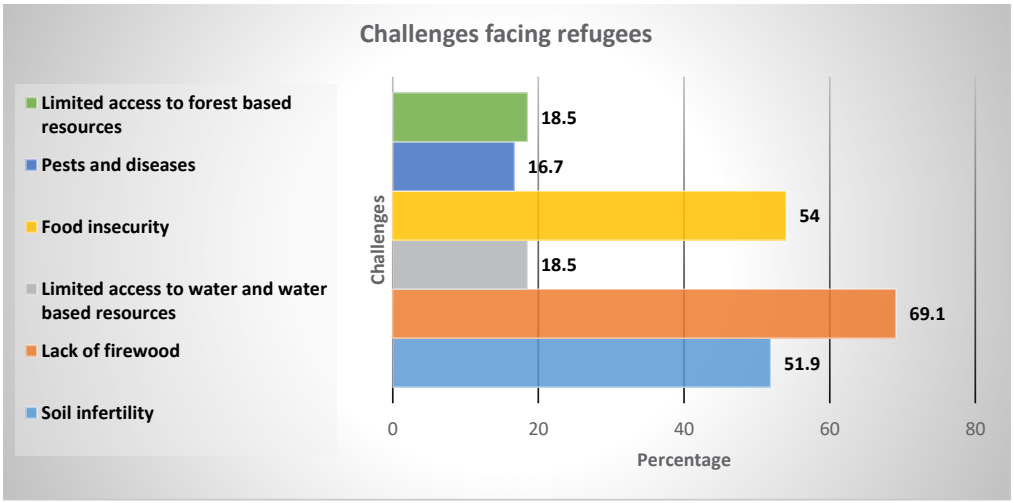


Figure 21: Challenges faced by refugees and host community

Overall, lack of firewood, food insecurity, and soil infertility were reported as the biggest challenges facing refugees and host community. Up to 69% indicated that their challenge was lack of firewood, 54% food insecurity, and 52% soil infertility. 18.5% reported limited access to water and water-based resources as a challenge and another 18.5% reported access to forest and forest based resources as a challenge, and only 16.7% of respondents reported pests and diseases and a challenge.

In the discussions with focus group participants, and during community meeting and transect walk with members of the two communities, it was reported that access to the forest was being regulated, and that refugees were allowed only once a week to access Bugoma forest on the edge of the settlement to collect firewood for their cooking. They noted that the restricted access contributed to increase domestic and gender-based violence. This partly explains why a significant number of respondents reported lack of firewood. Given their social responsibility of cooking for the household as required according to the social norms, women tend to walk long distances in search for wood-fuel to prepare food and to assist their husbands in taking care of the children and the household while the husbands are away. The long distances therefore delay the women and thus causing conflicts in the homes and thus fuelling domestic violence. The finding also points out to the other dimension to natural resource that had not been envisaged in the study, which was the effect these had on the gender and family relationship.

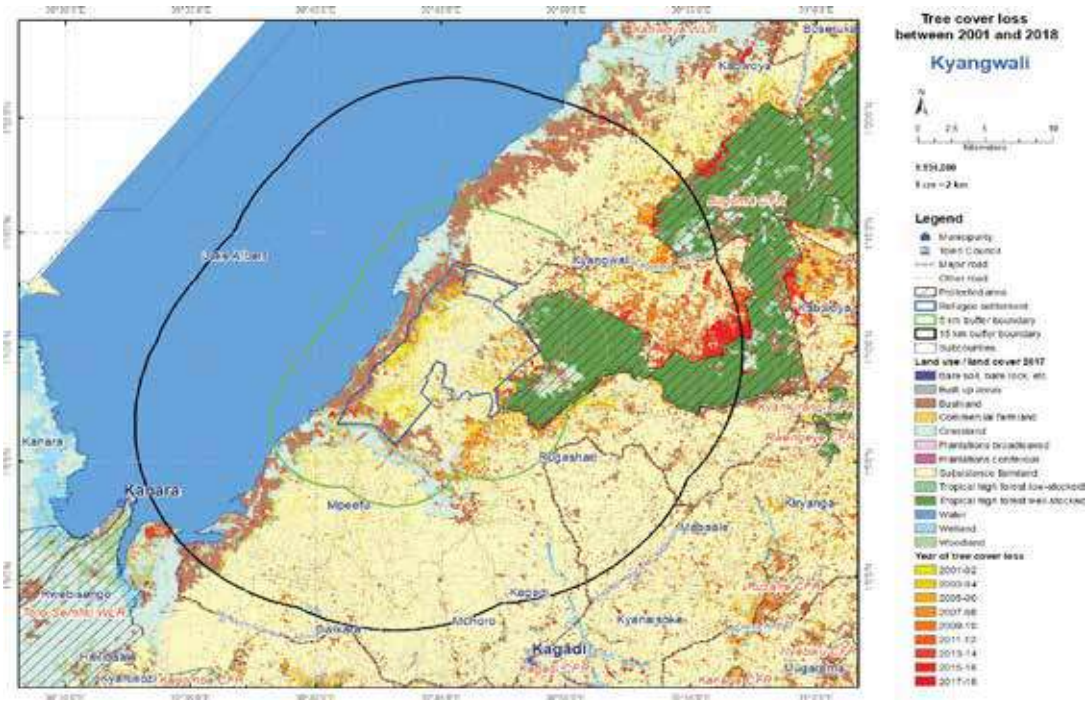


Figure 22: Annual tree cover loss from 2001 to 2018 in Kyangwali

As can be seen in figure 21 above, the forest has continued to recede. This map has not yet been updated to show where the degradation has reached. However, the situation is likely to worsen as Uganda continues receiving more refugees from the DRC. Anecdotal information suggests that Bugoma forest is being lost at the rate of two square miles (2 miles^2) per year and if this continues unabated for the next 10 years, the forest will be no more.

Food insecurity and soil infertility were reported as the second and third most prevalent challenges being faced by residents. Two reasons were advanced for the food insecurity. Nearly all respondents who reported food insecurity were refugees from the settlement. They attributed this to the limited amount of land being allocated to them. The study also learnt the current land allocation was about a half an acre per refugee household, which is way below what a refugee household requires to be food secure. The second reason for food insecurity relates to the second challenge, soil infertility. Refugees noted that because land allocated was very small. They also reported that because land allocated to the is very small, they use it throughout the year without rest, and because of that, land had lost their fertility and as such its leading poor yields hence the food insecurity.

3.2.5 Need for regulation of human activities in the environment

Given that respondents were already informed about the state of the environment, effects of the change in the environment, the possible causes of the changes in the environment, and the impact of the environment on their livelihoods, the study wanted to established whether they were positive about having environment related activities regulated and the following outcomes were realised:

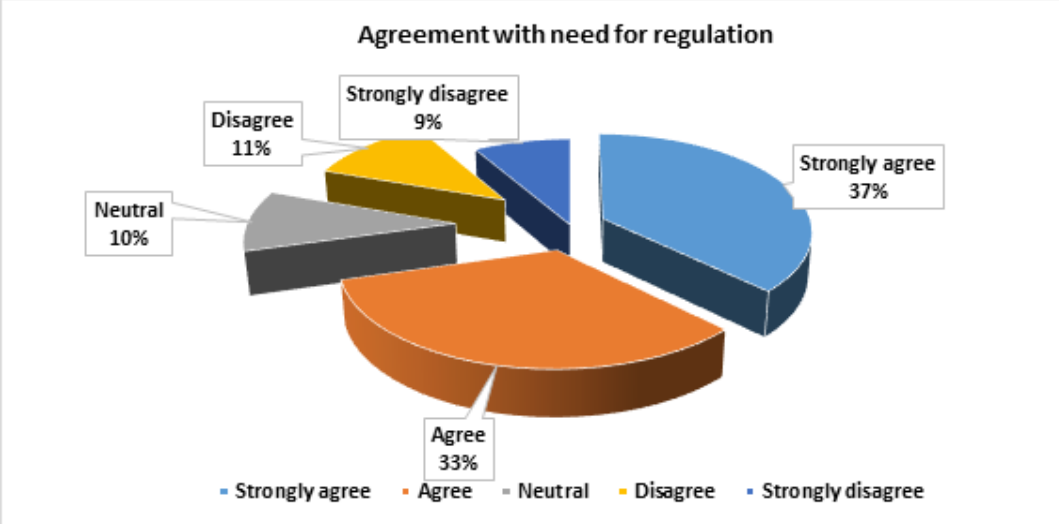


Figure 23: Views of community on regulation of use of natural resources

Up to 70% of respondents were in agreement that human activities in the environment ought to be regulated and only 20% disagreed while 10% were not sure whether it should be regulated. Those who were in support argued that when environmental activities are regulated, the weather would become favourable once again, soil fertility would be restored, there would be improvement in food security of households as they would register better yields, rainfall would become more reliable and the frequency of occurrence of drought would reduce among others.

However, concerns were raised by those opposed to regulation. They argued that when regulation is instituted, they would not be able to access firewood for their domestic use and sale and they would not be able to make charcoal, which hitherto had been a major source of their livelihoods. Others argued that regulation meant that they would not be able to get land for cultivation of their crops and their food security would be at stake.

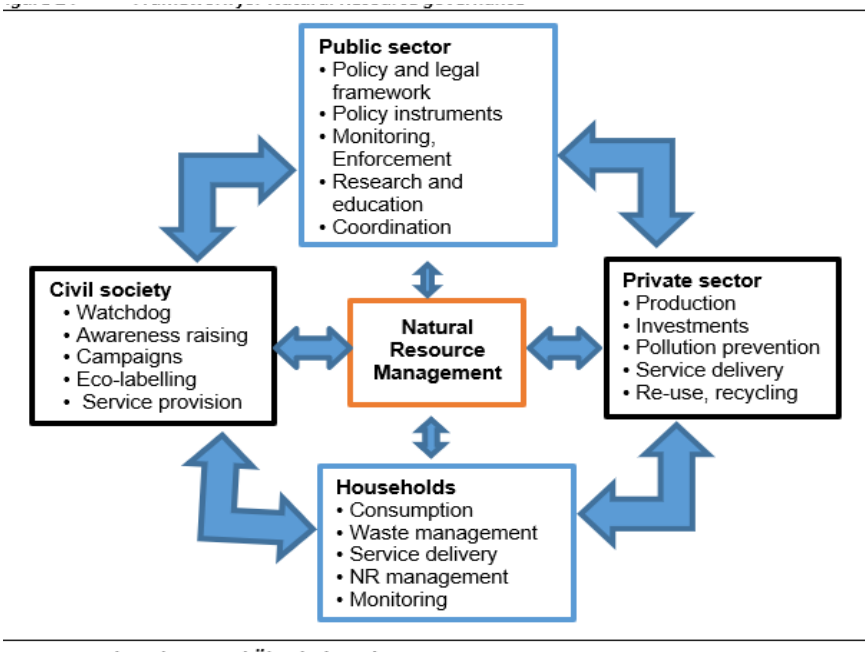
While concerns of those who do not agree with regulation are genuine and ought to be taken into account, regulation in this case does not necessarily mean denial of access to the forest, but carrying out the activity in a manner that does not degrade the forest. Given that the majority of respondents were in favour of having human activities regulated, stakeholders in the environment sector particularly the regulatory authorities such Ministries, Departments and Agencies (MDAs) have an entry point. Ministry of Water and Environment (MWE), Ministry of Local Government (MLOG), and Kikuube District Local

Government; and agencies and departments such as National Environment Management Authority (NEMA), National Forestry Authority (NFA), and the Environment Protection Police have their work cut and should strategies to take advantage of this. Their efforts need to be supported by humanitarian action by humanitarian agencies. UNHCR, bilateral agencies/development cooperation agencies, and national and international non-governmental organisations (NGO) with coordination from the OPM to provide the necessary resources to protect environment natural resources that have not yet been affected; restore areas that have been depleted off the resources; and provide alternative sources of livelihoods to refugees and host communities that depend on environment natural resources. They should also involve affected communities in the protection and conservation of the environment in order to ensure that regulation is not carried out with a human face and in a non-disruptive manner to minimise causing more stress to a population, which is already stressed by their circumstance.

3.3 Current Efforts in NR Management by Key NR Stakeholders

Government at different levels including MDAs, UN agencies including UNHCR, WFP, FAO, UNDP etc.; humanitarian agencies, communities and individuals; and the private sector have a role to play in the protection, restoration and maintenance of the natural resources in particular and the environment in general. In other words, effective natural resource management involves the public sector, private sector, non-governmental organisations, and individuals/households

Figure 24: Framework for Natural Resource governance



Source: Based on Slunge and ÖlundWingqvist, 2011

In light of the above, the study sought to establish what the different stakeholders were doing or planning towards addressing challenges in the country in general and in Kikuube district and Kyangwali refugee settlement in particular.

3.3.1 Overview of Central Government in Management of Natural Resources

In Uganda's context, at the helm is the Ministry of Water and Environment (MWE), and the National Environment Management Authority (NEMA) in partnership with several Agencies and Departments such as National Forestry Authority and others. The Ministry works in tandem with these agencies to implement its mandate and deliver planned activities. It is important to note that the ministry is more focused on the policy development and monitoring while the agencies pursue implementation of these policies.

It is important to note that in 1991, Uganda launched its first National Environmental Action Plan (NEAP) process. The main purpose of the NEAP was to integrate environmental concerns into the overall socio-economic development process and further to address concrete modalities for the conservation of Uganda's natural heritage. The NEAP process resulted in several environmental policies, legislation, institutional arrangements and an investment plan. This forms Uganda's *de facto* conservation strategy today[5]. Uganda has also developed a number of policies put in place institutions intended to address natural resource issues and established a number of institutions. In fact, Uganda is known as one of the countries with the best legal and policy frameworks on the continent, but the implementation processes of the forest related policies and frameworks have often left a lot to be desired. Among the key forest laws include Uganda Forest 2001, National Forestry and Tree Planting Act 2003. Article 189 of the Uganda Constitution gives the mandate of environment protection to central government while the local governments are empowered to enact district ordinances to fit within the local context. The National Forestry and Tree Planting Act 2003, provides for the establishment the NFA mandated to manage Central Forest Reserves (CFRs), DFSS mandated to manage and oversee forest activities on private land and FSSD mandated to monitor and provide technical guidance to NFA and DFSS.

While all these mandated agencies fall under the Ministry of Water and Environment, there is limited coordination in enforcing rules and regulations in the management of the respective forest resources. This coupled with the limited staffing and budget to implement forest activities at district level has compromised enforcement hence leading to continuous encroachment and illegal trade in forest resources. It is also important to note that implementation of natural resource and environment decisions and legislations is highly dependent on the effectiveness and efficiency of national environment institutions. The current practice, however, in Uganda has tended to limit environment issues in the economic development agenda, implying that existing natural resource management institutions are not very relevant to the development process.

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3.3.2 District and Sub County Local Governments

Our discussion with the local authorities revealed that the decentralization process which transferred responsibilities and resources from national level to local government is not clearly understood by the community particularly on the roles and responsibilities of the districts in as far as the management of forests are concerned. This appears to be compounded by communities' limited understanding of their rights, responsibilities and entitlements in this regard. Equally, their interests are not adequately represented in the local structures.

According to local authorities, shrewd businesspersons and the rich access forest resources using illegal permits to extract forest resources, and there appears to be support for illegal forest activities from above for that continue to undermine effective use of forest-based resources. They noted that there are contestations over Bugoma forest with even a threat to sell the forestland for sugarcane production. These practices continue to marginalise citizens and especially severe on the poorest who mostly depend on public services and natural resources for their livelihoods.

Secondly, in spite of the obvious advantages accruing from the presence of wetlands in the region, they are increasingly being depleted and government has entirely ignored the situation. The ever-increasing human population has led to unplanned development pressures within the wetlands, causing many direct threats to most of the important ecosystems and endangered species. This has posed a significant threat to biodiversity and environmental sustainability and hence indirectly affecting the livelihoods of the people. Activities in the wetland such as cultivation, livestock grazing, brick making, firewood collection, water supply, hunting and fishing, are unregulated and thus encroaching on the very wetlands they depend upon.

However, local authorise informed the study of the plans for managing the challenges being faced within the district among which are; to give out more tree seedlings for planting from the district nursery beds. They noted that this effort has been faced with a challenge of scarcity of tree seedlings to reach the entire settlement and the host communities. The district also plans to introduce quick to grow species to be used for fuel wood as well as acting as buffers at the edge of the forests to help preserve the natural forest cover from being encroached on. The other plan is to engage in and support sensitization programs for the beneficiaries. The district environment officers were in plans of developing a working a map of natural resources in Kikuube District at the time of this study. The district hopes that the map will help stakeholders in the planning and management of natural resources in Kikuube District. At Sub County level, there for procurement of tree seedlings for distribution within the community for reforestation, protection of river Masika from pollution and blockage attributed to car washing activities that take place at the river, and sensitization of the people that they lead on environment protection and management. The sub-county officials pointed out that financing of interventions has been a challenge and community attitudes are still negative towards planting of trees.

3.3.3 Other Stakeholders –UNHCR, Other Humanitarian Agencies & Community

(a) Office of the Prime Minister

The OPM reported that while pressure had been put on natural resources as result of the increasing population of refugees, encroachment into the natural resources was not necessarily linked to the lack of land and that it was not only the refugees invading the natural resources. They noted that on several occasions they arrested and handed over to the police people who they found cutting down the forests for timber but to their dismay the culprits are usually released.

They further noted that as long as there is no stability and consistency by agencies implementing environment interventions in the settlement. They were of the view that UNHCR was in the habit of changing partners implementing environmental programmes and that it was the changes that were making work on the environment a problem in the settlement. They proposed that UNHCR implementing partners in the environment should be maintained in order to create the consistency necessary for more meaningful intervention.

OPM also reported that very little effort was being directed towards creating awareness on environment in the settlement and the host community by environment related agencies, and that the fact that some refugees and member of the host community did not know the effects of degrading the environment was a sign that the implementers were not doing enough to advocate and educate on the effects of degrading the environment. They noted that there was a challenge of funding as most partners don't have enough funds to support effective interventions towards environment and natural resource conservation.

They proposed that awareness creation should target schools as well as households and that efforts should be made to establish environment clubs in schools both within the refugee settlement and in the community. They noted that at household levels was suggested and creation of environmental clubs can help in supporting the process of sensitization.

They also proposed that provision of alternative sources of livelihoods for both refugees and members of the host community be given more attention in order to enable the refugees and host community members to diversify their sources of livelihoods. They noted that this should start with a study on livelihoods needs of refugees and host community in order to come with relevant intervention.

(b) UNHCR

UNHCR indicated that they usually undertake regular quarterly assessments of the settlement to determine the needs of the settlement and thus plan according to the results. They also have a waste management plant set up in Kavule and Maratatu villages of the settlement and this has been instrumental in reducing pollution of the natural resources such as swamps and rivers. UNHCR also informed the study that it

plans to support and implement sensitization on proper feeding and importance of the food trees through engagements with community members. UNHCR further informed the study that they have a million trees capacity within the four acres of land owned and plans to use the trees to support tree growing.

UNHCR like other stakeholders echoed the need for building synergies that support the planning and implementation of environment related programs. They noted that in collaboration with the environmental police they would work towards reducing illegal activities that negatively affect the environment. They suggested putting in place well equipped security with allowances to help track down illegal activities in the forests.

(c) Other Humanitarian Agencies working in Kyangwali Refugee Settlement

During the study, we interacted with Hunger Fighters Uganda (HFU), Lutheran World Federation (LWF) and Refugee Law Project (RLP). While noting that they had different intervention areas, all of them reported that they had plans to support tree planting and community sensitization on the importance of the natural resources and the protection of the environment. Some indicated that had already started up tree nurseries with plans of giving tree seedlings to the refugee community and was willing to partner with other organizations to effectively implement the tree planting activities in the settlement and the host community. However, they pointed to the challenge of overwhelming number of households that they needed to reach with the intervention vis-à-vis the available resources.

Lutheran World Federation (LWF)

The LWF supports refugee and host community resilience and promotes the use of clean and renewable energy, tree planting and conservation of endangered tree species and also lobbying for bylaws for environmental conservation. They hoped that their interventions would contribute towards reducing poverty within the two communities, which they believe is the driving force behind the rapid environmental degradation. They also expect their intervention to reduce domestic violence caused by poverty and delays arising from scarcity of firewood. LWF plans to increase the number of bio-mass energy stoves to other areas of the settlement above the two areas currently benefiting from the bio-mass stoves intervention.

Refugee Law Project (RLP)

The RLP's work in respect to conserving the environment (environmental Justice), focuses on sustainability through tree planting and monitoring, in coordination with stakeholders at different levels. In Kyangwali, they have been specifically engaging adult learners under the English for Adult (EFA) Programme in activities which promote environmental management such as proper disposal of plastic materials, briquette making as an alternative to cooking energy, and advocating for tree planting. They sensitize the community members on issues of environment management, through educating the community about environmental laws, and highlighting the offences

and punishment in case of violation. In this sense, the communities are also made to understand the different environmental bodies

The Community

The study established that in Nyakatehe, one of the host community villages of Kyangwali refugee settlement, members of the community were offering tree seedlings for planting instead of laying wreaths on the coffin of the dead, which is not only for remembrance of the deceased but also to help in restoring trees that have been lost over the years in the community. It is the official policy of Bunyoro-Kitara kingdom to all subjects to embrace tree planting at burial ceremonies. The study believes that this is an innovation that can be supported, as it is likely to have a great impact on the restoration of the forests in Kyangwali and Kikuube district.

04 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Sustainable use of natural resources underpins all of our livelihoods, and community well-being. It is an important area of community concern, both domestically and internationally. Successful management of natural resources involves sound technical practices, good policy, and often most importantly, collaboration between government, the private sector, civil society, and individuals and groups with different interests within a landscape.

In as much as Uganda's policy environment is supportive of natural resources management and has always presented opportunities of addressing some of the current challenges and sustainable coexistence of the population with the natural resources, there still remains the need of enforcement of the existing policies mostly in areas with major occurrences of degradation.

While it may not wholly take the responsibility for environmental degradation in Kyangwali refugee settlement, the protected and increasing presence and influx of refugee in Kyangwali refugee settlement appears to have significantly contributed the degraded state of natural resources and environment in general in Kyangwali sub county in particular and Kikuube District in general. The settlement has been an attraction from outsiders who have taken advantage of the opportunities that the presence of refugees in the area has brought. The number of human settlements are not only increasing but the settlements are also expanding and the majority of these people who are regarded as host community are dependent on the natural resources.

A casual assessment of natural resources including Bugoma forest, which is natural forest that lies on the edge of the settlement and other biomass, land, wetlands, water, and in general, flora and fauna shows indicators of severe degradation. Clearing of part of the natural forest for cultivation to expand the settlement and unsustainable harvest of trees for building materials, firewood and charcoal making by refugees and host community members has led not only to the loss of biodiversity but has also upset the entire ecosystem. Reports of shortage of wood fuel for cooking, frequent droughts, and increased soil erosion have been reported by both refugees and host community, and by the district and sub county authorities. Reclaiming of wetlands for food production has led to a reduction in the water table, shrinking swamps and water sources (boreholes drying up) as well as loss or swamps and wetland-based resources such as fish. The shrinking amount of land allocated to refugees has led to over cultivation, which has in turn led to loss of soil fertility and poor crop performance leading to a rise food insecurity.

Overall, much of the degradation has been attributed to high levels of poverty among the refugee and host community population and that it makes them dependent on natural

resources, and because they have no alternative sources of livelihoods. They engage in unsustainable environment practices such as charcoal and brick making which depends on availability of tree/forest resources, as well as reclamation of swamps and wetlands for food production.

Interestingly, both refugees and host communities alike are not only aware of the availability of natural resources and the importance of these natural resources to their livelihoods. They are informed about both the effects and impacts of unsustainable use of the natural resources on their livelihoods and have called for regulations to ensure that the natural resources are used in such a way that guarantees their access while at the same time giving opportunity for posterity. The communities as they stand are willing to contribute to restoration and conservation; however, they lack the push to do so.

There are concerns about the effectiveness of regulatory institutions such as NEMA, NFA and other government institutions. Government institutions have not been very effective in discharging their roles and responsibilities. At national level, there is a significant difference between what natural resources governance policies say and policy implementation practice. While government has put in place the policy and legal framework and instruments, there is a challenge with policy elements such as monitoring, enforcement, research and education, and most importantly coordination. This has left an opening for the private sector to exploit the gap at the expense of the community whose livelihoods are heavily dependent on natural resources. Bugoma natural forest is seriously threatened and anecdotal information suggests that plans are underway to clear it for sugarcane production. The district and sub county local governments appear not to be in charge due to constraints of resources and other logistics.

The civil society appears to be performing their role; however, the extent to which they go is limited. Not much has been done in terms of awareness creation, environmental campaigns, eco-labelling, and in terms of playing their watchdog roles. Notwithstanding, some efforts are being made in service provision in terms of promotion of use of energy efficient technologies. Similarly, little is being done in terms of solid waste management and use of renewable technologies.

4.2 Recommendations

Despite the challenges discussed above, there are opportunities at different levels that can be harnessed to improve natural resource management, not only for refugees and for host communities in Kyangwali refugee settlement in Kikuube District, but also for their counterparts in the districts hosting refugees across the country.

4.2.1 Strategic Recommendations

Central Government

The legal framework and policy instruments for natural resource management are in place; however, what is lacking is coordination, research and education, monitoring, and enforcement of the policy instruments. We recommend that Government should

streamline the coordination mechanism on how the MDAs work together to deliver on natural resource management; conduct comprehensive research on the state of natural resources across the country and in refugee hosting districts in particular and institute natural resource education to sensitize and create awareness on the importance of natural resource conservation to the economy. It should also monitor and enforce the implementation of the policies.

Office of the Prime Minister

OPM should allocate pieces of land within the settlement for woodlots and provide the security for watching over the woodlots so that the trees are protected from being used prematurely, and should work together with the different agencies to develop woodlot management plans. Similarly, it should work with the different agencies in the settlement to ensure that natural resource management and environmental protection are integrated/mainstreamed into the activities of all humanitarian agencies.

United Nations High Commissioner for Refugees

The UNHCR needs to enter into meaningful and longer term partnerships with agencies implementing environment related interventions, provide the necessary resources to support the interventions, and ensure that there is consistency in the way partnerships are managed.

Local Government

The roles of different stakeholders and in particular the roles of local government in the management of natural resources are clear, however, local governments do not have the necessary resources to discharge their responsibilities. There are some powers (including law making, monitoring and enforcement, and arbitration powers) that local governments are supposed to wield, but cannot because they lack the financial and human resources necessary to do so. Having no resources is tantamount to having no powers at all. At the moment, environmental activities are being driven by donor funds. This brings into question the long-term sustainability of these programs. Local governments have to find a way of increasing local revenue and running their activities with "home-grown" resources. At present, there is a tendency for local governments to look to donors for grants or to try to cede their powers to civil society organizations. This is a dangerous erosion of their powers and can lead to serious social conflict.

While it is not our desire that local governments should continue ceding their responsibility to donors, the urgency with which the degradation needs to be addressed cannot wait for the local governments to get the necessary resources. We recommend that development partners with natural resources mandate should consider providing the necessary resources to support demarcation, sensitisation of communities that depend on these resources for their livelihoods, and to support alternative sources of livelihoods for the community. Availability of alternative sources of livelihoods that do not depend on that will take people away from further degrading the natural resources.

Civil Society

The civil society should work towards strengthening stakeholder collaboration and coordination at community and district, and where necessary at national levels to tackle illegal actions such as trade in charcoal and timber from Bugoma forest and surrounding conservation areas, and reclamation of wetlands and swamps by individuals are companies. Civil society organisations, community groups and other humanitarian agencies working in and around refugee settlements should come together to advocate against corruption tendencies like sale of conservation areas and forest land in and around refugee settlements, and illegal permits to extract forest resources not only in Kikuube but also other refugee hosting districts.

4.2.2 Specific Recommendations

Demarcation of Natural Resources

Given the importance of wetlands/swamps/revers/streams and forests to environment sustainability, we recommend that the district be supported to document, demarcate and mark all the fragile ecosystems such as forests, and wetlands/swamps/streams/rivers in the district including Kyangwali sub county where the settlement is located as a first step towards protecting them. The evidence generated by this study show that nearly all the swamps, wetlands, streams, and rivers within both the community and refugee settlement have been heavily encroached at different sections.

Restoration of Degraded Natural Resources

Forests and wetlands have been the most degraded natural resources. Unfortunately, most of the interventions by most humanitarian agencies so far are focused towards promotion of energy efficient technologies and little is being directed towards restoring the degraded forests and wetlands. We propose that restoration of the degraded natural resources such as forests should be done through replanting while at the same time promoting tree growing at individual/household level both within the settlement and the host community. This will go a long way to address both the short and long terms energy needs of the two communities while at the same time promoting conservation.

Building Capacity of Community to Monitor Natural Resources Use

Since the community engages with natural resource on a daily basis, they are in a better position to monitor how it is used. Communities should be mobilised and have their capacity built to monitor and report on natural resource use. One of the ways to do this is by introducing digital monitoring tools such as tablets for real-time monitoring and reporting. Digital tracking allows a much wider and cost-effective real time, and large coverage, including the tracking of the riskiest sites where illegalities are taking place in the environment.

Efforts should be made to nurture the culture of environmental conservation among children in schools and build their capacity to appreciate the importance of the

environment and how to protect it including encouraging them to participate in tree growing and monitoring natural resource use.

Promoting the Use of Energy Efficient Technologies

The current regulations put on access to firewood from Bugoma forest to a day in a week does not only have the risk of making refugee households go hungry but has manifestly led to domestic violence. The traditional technology of the three stones for cooking are wasteful especially now that restrictions on access to firewood has been put in place. A number of energy efficient technologies are being piloted with the objective of reducing on the amount of energy consumed by refugee households. A few organisations are providing energy efficient to refugees in zones, villages and blocks where they are working. Kavule village, the newest village where CDRN is working in Kyangwali refugee settlement houses up to over 4000 new refugees. These refugees do not have other alternative sources of energy for cooking other than firewood unlike their older counterparts who have access to maize cobs that they have produced. We propose that energy efficient cooking stoves such as the Berkeley Darfur Stoves, which use both charcoal/briquettes and firewood, and has thermal efficiency of about 40%, which is above efficiency of the usual clay-lined energy stoves be adopted to help newly arrived refugee settle quickly but also to enable them cope with the regulation put in place. This will not only reduce on the overall energy needs but will also contribute to the reduction in degradation that has been cause by use of less efficient energy stoves as well as reduce on energy related domestic violence.

Promotion of Community Based Tree Nurseries

In order to promote tree planting and tree growing, there is need to support the establishment of community-based tree nurseries. This will go towards complementing one of the innovations in the community where when a person passes on, members of the community bring tree seedlings and plant them in and around the compound of the deceased for memorial purposes but also as a contribution towards restoration of the environment. Therefore, availability of tree seedlings within the community will not only fulfil this custom but will also go a long way in promoting tree planting and growing thereby contribution towards the restoration of the environment.

Establishment of private woodlots for energy and other purposes

Woodfuels are the main source of energy for cooking for both refugee and host communities in Uganda. Demand is expected to increase with rising population, as other energy options for cooking are often unaffordable or deliver inferior performance. As forest resources are depleted, especially for agricultural expansion, the imbalance between demand and sustainable supply will increase. This will place growing strains on the well-being of both hosts and refugees and may contribute to environmental impacts in refugee-hosting areas.

We recommend that OPM considers allocating land dedicated for development of woodlots across the settlement to meet the growing demand for poles for building and firewood as refugee population grows. The types of trees chosen should be quick maturing trees. However, all the woodlots to the established should have management plans detailing how they will be managed, right from the time of acquisition of the land to disposal of the products. The objective of this intervention is to maximize biomass production in a short time and increase tree density to reach the optimum growth per unit of area. Fast-growing tree species and short-rotation coppice management should be adopted to enable early harvesting for firewood. The use of multipurpose species can increase people's motivation to manage trees effectively because of the provision of other benefits such as building poles and fence posts. It is important to highlight that labor needed for planting and tending for trees is particularly intense for at least the initial three years before they produce an appreciable quantity of biomass.

Develop Management Plans for Woodlots

All woodlots developed should have concrete management plans that provide the details of how the land will be acquired, who will provide the planting materials, who will maintain and provide the necessary security. It should also state clearly who will harvest the trees and when the trees will be harvested, and how the harvest will be used to benefit refugees and members of the host communities.

Development of agroforestry systems

In order to restore degraded lands, it is recommended that refugees and host communities be supported to adopt agro-forestry practices. The objective of the intervention is to increase food and nutrition security as well as soil and water conservation through access to productive natural assets and skills enhancement in agroforestry production systems, in which suitable nutritious crops, as well as trees, will be intercropped. Agroforestry is designed to address land degradation while also providing woodfuel, food (for example, edible leaves, fruits, and nuts), timber, fodder for livestock, and other NWFPs. The integration of trees into production systems can enhance livelihood opportunities and increase the resilience of both host and refugee communities, contributing to food and nutrition security and generating income.

Awareness and Sensitization on Sustainable Natural Resource Use

Findings have indicated that not much is being done to sensitize refugees and host community on sustainable environment management. As part of general intervention, sensitization and awareness creation on sustainable environment management should be institutionalised in all interventions by humanitarian agencies involved in refugee work, not only in Kyangwali refugee settlement but also in refugee settlement across the country.

Strengthening Community Livelihoods

In order to reduce on unsustainable use of natural resources especially forest-based products and wetland, efforts should be directed towards supporting alternative sources of livelihoods of both the refugees and host community members. Strategies such as skilling the community, particular the youth should be explored. Another strategy should be in terms of support to non-natural resource-based income generating activities such as poultry, piggery, and other innovative but profitable ventures.

For effective and efficient implementation, the partners need to bring the communities on board to have successful implementation of environment related programs and projects. There also needs to be a revision of the charity model that is currently being used by humanitarian agencies and an assessment of what the community members can be able to do and what can be done by the partners. This will help the community members to appreciate the interventions.

Support to Use of Small-Scale Irrigation in the Settlement and Host Community

One of the challenges established during this mapping study was frequent occurrence of drought, which in away is contributing to food insecurity for both refugees and host communities. This has consequently led to encroachment on the swamps and wetlands both within the settlement and in the host community for purposes of growing vegetables. We propose that simple irrigation schemes that use water from the wetlands/swamps/rivers/streams be introduced to support production of villages outside the wetland and swamps as one of the ways of restoring the degraded wetland and swamps. The wetlands within both the refugee settlement and host community need to be assessed to establish their potential to support irrigation.

Support to Solid Waste Management

Throughout the settlement, that have been irresponsible disposal of solid waste particularly polythene bags and plastic bottles, but also organic waste. The settlement is littered with plastic polythene bags and water bottles that are chocking that land which refugees use for food production while some are being washed and filling up wetland and swamps. This pose the danger of contaminating unprotected water sources while at the same time reducing on the yields derived by refugees from their gardens. Likewise, organic waste is being disposed in a manner that is not only hazardous as they end up being washed to the streams, but also in a wasteful manner because it can be used for making manure for gardening and briquettes for cooking. IOM is also doing some work around organic waste but it isn't adequate and therefore needs to be augmented, but we also propose that that a plastic recycling plant be established to help address plastic waste management.

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ANNEXES

Annex 1: Pictorial of degraded wetlands/swamps/streams/rivers




This is Nguruwe swamp. It is located in Nguruwe village in Kyangwali refugee settlement. It has been encroached for maize, beans, sugarcane, cassava, and banana growing. Parts of the swamp are drying out and therefore gravely threatened.


This is Nyambogo swamp. It is located in Nyambogo Village in Kyangwali refugee settlement. It has been encroached for maize, beans, cassava and banana growing. The water levels have reduced as opposed to the previous years.

This is Nguruwe swamp. It is located in Nguruwe village near the army barracks in Kyangwali refugee settlement. It has been encroached on for vegetable (cabbage), maize, and cassava growing. It is at the risk of drying up if not addressed urgently. It is at a risk of drying.

This is Kinakyeitaka river. It is located on Block 41 Kinakyeitaka village, Kywangwali refugee settlement. It has been encroached on for vegetables (cabbage), maize, beans, banana, and cassava growing. The soils are Soils being washed away due digging at the banks of the river and the water levels have significantly reduced

This is Kinakyeitaka River. It is located in block 46 Kinakyeitaka village, Kyangwali refugee settlement. It has been encroached for vegetables (cabbage), maize, beans, bananas and cassava growing. The Soils being washed away due digging at the banks of the stream and the water levels have reduced.




This is Banyejomba swamp. It is located in Musisa A Village in Kyangwali Refugee settlement. It has been encroached for vegetable (cabbage & eggplants), Maize, Yams, cassava, sugarcane and banana growing. The swamp if on the verge of drying up.


This is Musisa swamp. It is located at the boarder of Musisa and Rwenyawawa villages in Kyangwali refugee settlement. It has been encroached for vegetable (cabbage), maize, yams, banana and sugarcane growing. It is also used for watering cattle.

This is Rwenyawawa swamp. It is located in Rwenyawawa village in Kyangwali refugee settlement. It has been encroached banana, maize and sugarcane growing

This is Kentomi River. It is located in Kentomi village on the border with Bukinda village in Kyangwali refugee settlement. It has been encroached for maize, banana, and yam growing. The soils are being washed away due to digging near the river Banks

This is Kentomi River. It is located in Kitooro village bordering Bukinda village. It has been encroached for maize, bananas, and yams growing. The soils are being washed away due to digging near the river Banks



This is Kagoma swamp. It is located near the Reception Centre in Kyangwali refugee settlement. It has been encroached for maize, vegetable, yams and banana growing.


This is Mombasa swamp. It is located in Mombasa village in Kyangwali refugee settlement. It has been encroached for maize growing, vegetable, bananas yams and sugarcane growing. The water in the swamp has dried up.

This is Mombasa swamp. It is located on block 6 in Kyangwali refugee settlement. It has been encroached for maize, vegetable, bananas, yams, and sugarcane growing.

This is Mombasa stream located on block 7 in Kyangwali refugee settlement. It has been encroached for maize, vegetable, banana, yam, and sugarcane growing. Cultivation on the bank is causing the soils to wash away,

This is the tributary of Mombasa stream and Kirokole swamp. It is located in Kyangwali refugee settlement. It has been encroached for maize, vegetable, banana, yam, and sugarcane growing. Cultivation on the banks has caused soils to wash away.




This is Kavule stream. It is located on block 109 Kavule Village in Kyangwali refugee settlement. It has been encroached for maize, beans, vegetable growing, banana and yam growing. Cultivation on the bank and caused the soils to wash away.


This is Kavule stream. It is located in block 107, Kavule village in Kyangwali refugee settlement. It has been encroached for maize, beans, vegetable, yam, and sugarcane growing. Clearing the stream off the trees was ongoing by the time of this study.




This is Kavule river and swamp. They are located on blocks 107 and 101 bordering Maratatu village in Kyangwali refugee settlement. It has been encroached and clearing of trees were ongoing at the time of the study. It has been encroached for maize, sugarcane and beans growing.



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