

Ecosystem Sustainability for Improved Refugees' Livelihood: A Case of Kalobeyei Integrated Settlement, in Turkana County, Kenya

Hans-Armel Nogbou and Reginald Nalugala

ABSTRACT

Ecosystem degradation in and around refugees' settlements caused a dire problem for the livelihood of refugees. Therefore this study sought to examine the perceived relationship between ecosystem sustainability and refugees' livelihood in Kalobeyei integrated settlement. The study used a mixed method and descriptive survey research design. The study employed Cochran's (1977) sample size computation for ordered categorical data at a 95 % confidence level and an acceptable error margin of ± 4.2 %, generating an expected sample size of 137. Quantitative data were collected using a questionnaire from among 80 participants, and qualitative data was collected by means of focus group discussions involving 48 respondents. Interviews were held among 9 key informants. Thus, the total sample size was 137. The results showed that respondents perceived a high impact of the ecosystem on their livelihood as such, there is an imbalance between utilization and conservation of the ecosystem. The respondents of the study are very optimistic that harmonization of ecosystem sustainability and refugees' livelihood is possible in the Kalobeyei settlement. The study advocates for the use of sustained supervision of the dryland forests by applying quantifiable measures that monitor resource utilization and conservation and the implementation of the Kenyan refugee bill act 2019 passed in 2021. This advocacy for the sustainability of the ecosystem in order to improve the livelihood in Kalobeyei integrated settlement.

Keywords: Aid, Autonomous, Ecosystem, Integrated Settlement, Livelihood, Refugees, Sustainability.

Published Online: August 2, 2022

ISSN: 2736-660X

DOI: 10.24018/ejdevelop.2022.2.4.122

H. A. Nogbou*

Catholic University of Eastern Africa
Tangaza University College, Nairobi,
Kenya.

(e-mail: nogbouhans@gmail.com)

R. Nalugala (Ph.D)

Tangaza University College, Nairobi,
Kenya.

(e-mail: reg.nanales@gmail.com)

**Corresponding Author*

I. INTRODUCTION

The ecosystems maintain the function of the earth, and human life depends on the benefits the ecosystems provide for health, well-being, and economic growth. The human population depends on their surroundings for water, food, shelter, medicine, and green areas for recreational and cultural gatherings. However, a worrying trend wielding future catastrophe is that human beings are using the resources of the ecosystem faster than they can naturally recover. According to Morgan (2011), change in lifestyles and global warming is gradually posing a great danger to the ecosystem. Around 12 million hectares of forest in the world's tropical regions were lost in 2018, including the Amazon (McGrath, 2019). In the Amazon alone, around 17 % of the forest has been lost in the last 50 years (World Wildlife Fund, 2019).

Wei (2018) posits that Africa has the highest concentration of biodiversity on the planet even though it is currently experiencing rapid changes that result in the loss of biodiversity. The Africa Living Planet Index shows a reduction of 39 % in animal populations over the 38-year period (1970 to 2008). Today, nearly 400 million people living in Africa's 36 largest river basins experience water scarcity for at least one month each year (Abdeen, 2010). The continent is also characterized by deep, multifaceted poverty where people's livelihoods highly depend on natural resources. The continued rapid increase of population in Africa is a clear threat to biodiversity and the biodiversity-related benefits due to the destruction of natural habitats and many ecosystems. This amplifies the plight that deforestation in Africa is mainly caused by human activities. Countries like Côte d'Ivoire and the Democratic Republic of the Congo experience higher levels of habitat loss each year through uncontrolled logging and clearance of land for agriculture - 2,900 and 1,800 square kilometers of forest per annum, respectively (Engineering & Environmental Services section, 2001). Furthermore, the various movement of people in Africa due to conflicts in countries such as Mozambique, Somali, Tanzania, Rwanda, Burundi, Sudan, South Sudan, Cote d'Ivoire, Ethiopia,

Democratic Republic of Congo, and Uganda among others has led to the creation of refugee camps and settlements. The refugee camps and settlements constitute a dire environmental problem in many regions of the world especially in Africa (Tureti, 2016). Most often, refugees have usually been settled in arid and semi-arid, agriculturally marginal areas, or near national parks or forests reserves (Shepherd, 1995). An estimated 795 million people suffer from hunger and 1.2 billion live in water-stressed areas. Refugees are part of the most vulnerable populations who rely on the ecosystem and its natural resources for living. However, large, refugee camps and settlements like Dadaab in Kenya or Zaatari in Jordan (Miller, 2018) most often are built in environmentally hostile and arid locations with minimal vegetation and difficult access to sufficient water, particularly for livestock and growing vegetables (Martin *et al.*, 2017).

In Kenya, the majority of the refugee population is in camps, jointly run with the UNHCR (Tureti, 2016) and refugee camps and settlements are generally built in areas that were previously occupied by the host community or used as a grassing fields for their animals. Kalobeyei settlement for instance is established in the area that was serving as a wet pasture for Turkana pastoralists (Betts *et al.*, 2019). The ecosystem and environmental deterioration impact not only the refugees but also on host population's livelihoods. Low-quality water affects the health of large numbers of people, in a situation where there is a high risk of infectious diseases multiplying rapidly. Deforestation gradually forces women and children to walk further for wood, putting women in particular in danger of physical assault. Children may have to miss school to help; cooking time is shortened, and drinking water is not boiled (Shepherd, 1995). The ecosystem resources (water, food, fauna, flora, air, soil, and so on) are used more and faster than they can recover. Refugees, being part of the most vulnerable populations in the world, rely more on their surrounding ecosystem and its natural resources for their livelihood. While in most countries, refugees are put in the most difficult areas with harsh climates such as in the ASAL regions.

II. PROBLEM STATEMENT AND OBJECTIVES OF THE STUDY

The influx of refugees; 500 new arrival / week (UNHCR, 2022) in the hot and dusty county of Turkana in Kenya has considerably increased the population and seriously affected the ecosystem, causing dire environmental problems such as deforestation, water, and sanitation challenges, and increased more the risk of intercommunity conflicts over scarce resources. Minimal prospects for livelihood options coupled with the Government's encampment policy present challenges to resilience and self-reliance. Population increases alongside factors such as hostile climate, low annual rainfall, inadequate arable land, bush clearing, indiscriminate harvesting of natural and live vegetation (Yasin, 2011) for expanding human habitats, and also human activities degrade the ecosystem, pollute the insufficient and low-quality water that constitutes a real threat to the livelihood of the Kalobeyei settlement community in Kenya. The degradation of the ecosystem poses a dire need for the sustainability of the ecosystem. Though many studies (Betts *et al.*, 2019; Betts *et al.*, 2018; Butler *et al.*, 2003; Yasin, 2011; UNHCR, 2018; FAO, 2018) have been carried out separately on ecosystem sustainability and refugees' livelihood, there seems to be no known research about their correlation. Therefore, this research was to examine the perceived relationship that exists between ecosystem sustainability and refugees' livelihood in Kalobeyei integrated settlement.

In this regard, the study was guided by the following questions derived from the objectives:

- i. In what ways Kalobeyei settlement ecosystem is conserved?
- ii. To establish the perceived extent of the relationship between the ecosystem sustainability and the livelihood of refugees in the Kalobeyei settlement?
- iii. Which are the strategies to harmonize the ecosystem sustainability and the refugees' livelihood in Kalobeyei integrated settlement?

It is envisioned that the findings of the study assist the development actors for a better understanding of the relationship between ecosystem and livelihood when it comes to the establishment of the refugees' settlement. Also, the findings intend to increase the awareness of refugees and host communities on the protection of the ecosystem for a better livelihood; and finally, the finding would benefit knowledge acquisition for practitioners, researchers, and scholars in the field of sustainable rural development.

III. LITERATURE REVIEW

Ecosystem conservation is the act of protecting the earth's natural resources for current and future generations (National Geographic, 2019). Conservation seeks the sustainable use of natural resources by humans, for activities such as hunting, logging, mining, and so on, and it is important to know what each piece of the natural ecosystem does for all the others. The ecosystem is then dynamic and can change based on external or internal factors. The normal functioning of an ecosystem provides humans with an abundance of services that we depend upon. Wallace (2014) and World Wildlife Fund (2020) defend that proper management of human activities especially new technology and exploitation are very important in

ecosystem conservation strategy. However, the World Wildlife Fund (2020) explains that human activities and products that make modern life possible are contaminating ecosystems and polluting the world. These technologies can be harmful and negative to the ecosystem if not used in a responsible way. According to Moreira (2019), policy formulation is a key factor in mitigating the impact of ecosystem degradation on human livelihood. Policy on ecosystem conservation curtails deforestation and pollution, as well as promotes afforestation, and proper waste disposal, and regulates land management and wildlife trade. It is good to notice that an efficient policy on ecosystem conservation is supported by a community organization and sensitization and education which constitute the important pillars in the prevention and reduction of pollution, deforestation, and degradation. Proper waste disposal is also an important factor for the conservation of the ecosystem.

Livelihood is defined as the methods and means of making a living. It revolves around resources such as land/property, crops, food, knowledge, finances, social relationships, and their interrelated connection with the political, economic, and sociocultural characteristics of an individual community (Tanveer, 2016). According to Chambers and Conway (1991), a livelihood comprises the capabilities, assets - stores, resources, claims, and access-and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its assets, and provide sustainable opportunities for the next generation. A sustainable livelihood contributes to the net benefits of other livelihoods at the local, continental and global levels and in the short and long term. Livelihoods perspectives have been central to rural development (Scoones, 2009). According to UNDP (2005), the elements constituting livelihood are interdependent in such a way that Traders rely on farmers to produce goods, processors to prepare them, and consumers to buy them. Therefore, understanding such dynamism in the community's livelihood is particularly important when planning livelihood assistance for marginalized communities, refugees, and poor people in society. Rural communities need a good social, economic, and political context and policies in order to enhance their livelihoods. Livelihood involves assets that can enable people to make a living. These assets, such as food stores and cash savings, as well as trees, land, livestock, tools, and other resources or claims, assistance, as well as information, education, health services, and employments (International Recovery Platform, 2005) are all essentials in making the living.

For refugees, however, the right to work and access to labor markets are prerequisites for allowing them to secure sustainable livelihoods, thereby reducing vulnerability, enhancing resilience, and enabling a dignified life (Zetter & Ruadel, 2018). In Uganda for instance, the Government has made self-reliance a central point in its approach to hosting refugees, where refugees generally enjoy the right to work, freedom of movement within the country, and access to basic services. Such policies have an important role in facilitating refugees to engage in business activities and enable them to become embedded within local and national markets and industries (Omata, 2018). In a study conducted by Betts *et al.*, (2019), it is found that food security and dietary diversity are poor in both Kakuma and Kalobeyei and 79 % of South Sudanese in Kalobeyei are food insecure. However, agriculture in rural areas remains one of the essential elements to improve the livelihood of the community. Most individuals and households have limited assets however they are able to cultivate their allocated plots of land and 36 % of South Sudanese have kitchen gardens in Kalobeyei (OCHA, 2018).

In such a situation, achieving a harmonized society with nature involves minimizing and reducing the negative impacts of human activities on natural capital while increasing positive behaviors of ecology and preserving the ecosystem through ecosystem conservation activities (UN, 2019). People need to identify and quantify the negative impact their activities have on natural capital with the aim of minimizing them. The initiatives to preserve ecosystems through reducing the negative impacts on natural capital caused by unsustainable human activities should be part of all the development programs to promote positive behaviors. The creation of protected forests and greenbelts around sensitive areas, the construction of water pans, and space for biologic agriculture are some of the strategies that help in minimizing our negative impacts and behavior on and toward the natural capital and create a better harmony between us, especially the refugees and host community of Kalobeyei and the environment. Being in a difficult environment such as Kalobeyei, the choice of an appropriate business' site can help in the sustainability of the ecosystem as well as the improvement of waste disposal, and recycling of waste. Planting native species trees and setting up biotopes during the establishment of refugees' camps and settlements as well as the management is very important. The use of rainwater where it is possible to harvest through tanks, water pans, and so on are among other useful strategies implemented also in Kalobeyei to protect the environment. Value chains also can play a key role in ecosystem sustainability by confirming the impact on biodiversity by investing in development projects such as agriculture and small businesses as it is in Kalobeyei.

According to Millennium Ecosystem Assessment, MEA (2005), ecosystem harmonization to livelihood is realized through the preservation and conservation of water, the planting of fruits trees, vegetables, and trees that can have medicinal benefits. With all these elements, minimizing the degradation of the environment is possible with pollination, waste decomposition, water purification, erosion and flood

control, and carbon storage with a good policy of climate regulation. The ecosystem guides our cultural, intellectual, and social development by being a constant force present in our lives since a well-maintained ecosystem provides us goods and resources and human beings have always relied on the ecosystem for its services and goods (CBD, 2008; National Wildlife Federation, 2020). The role played by the community in minimizing the negative impacts on the Kalobyei ecosystem can be presented by the involvement of refugees and local communities in conservation efforts such as tree planting. The sensitization on ecology behavior and the engagement of non-profit organizations and other companies working within the county in ecosystem conservation help in reducing the negative behaviors and impacts of human beings on the ecosystem. The social contribution may also take the dimension of tree planting and erosion control as a way of implementing desert greening and afforestation activities.

Therefore, Enhancing the contribution of social activities such as forest conservation, ecology sensitization, and afforestation, are among other strategies that directly contribute to ecosystem conservation and sustainability that call for the adoption of sustainable and equitable practices towards nature and the livelihood of the population. Harmonizing the ecosystem and livelihood through minimizing the negative impacts and enhancing the positive behaviors is very important because it creates an equilibrium between human life and the ecosystem. Therefore, the control of the human actions in the Kalobyei settlement is important for the population and ecosystem sustainability since they go hand in hand.

IV. THEORETICAL FRAMEWORK

The theoretical framework initiates and depicts the theory that explains why the research problem under study exists (Swanson, 2013). It helps to demonstrate an understanding of the theories and notions that are pertinent to the topic of the research paper. This study was based on the theory of sustainable human ecology and the theory of the circular bio-economy. These theories were chosen because of their complementarity.

A. Theory of Sustainable Human Ecology

The sustainable human ecology theory developed by Kumar (2001) explains the relationship between ecology, human population growth, economic growth, and the role that each one plays towards others. Kumar (2001) argues that human beings depend on, and are influenced by, natural and managed systems for both basic needs and amenities, however, population growth has an influence on environmental conservation, as well as the economy and resource management. Therefore, to achieve the idea of sustainable human ecology, Kumar (2001) on one hand urges scientists to make further research, in developing a new generation of safe and effective contraceptive agents and devices to control and reduce the excessive rate of human population growth in order to affect positively many dimensions of environmental change and therefore stops environmental degradation. This idea is shared by Kumar and Kumar (2009), who shows that lightly a country is populated more it retains its original vegetation and wild animal populations than a country with a dense human population, for instance, Australia (4 people/sq. km) is likely to face wood or water shortage compared to Bangladesh (1800 people/sq. km). On the other hand, Kumar (2001) insists that it is important to establish a solid and strong coupling between food production, poverty reduction, and a sustainable ecosystem in order to improve livelihood. According to FAO (2018), supporting sustainable agricultural livelihood and socio-economic empowerment, will help in addressing the livelihood needs of rural communities to increase and diversify asset base and environmental protection. It is then necessary that food production goes hand in hand with poverty elimination, environmental protection, and conservation. Conservation of natural resources through sustainable ecosystem management and development is the key to our secured future.

B. Circular Bio-Economy Theory

The Circular Bioeconomy postulated by Stegmann *et al.* (2020) theorizes that the circular bioeconomy is an economy that focuses on the sustainable valorization of biomass in integrated multi-output production chains, like biorefineries, while also making use of residues and wastes and optimizing the value of biomass over time via cascading. Such an optimization focuses on economic, environmental, and social aspects which ideally considers all three pillars of sustainability. To the European Commission (2017), the Circular Bioeconomy (CBE) is the application of the Circular Economy (CE) concept to biological resources, products, and materials. It implies more efficient resource management of bio-based renewable resources by integrating circular economy principles into the bioeconomy (D'Amato *et al.*, 2018).

The Circular Bioeconomy (CBE) emphasizes value retention for renewable resources and increased circularity in material cycles (Temmes & Peck, 2019). This theory is relevant in fulfilling the first, and the third objective of the study, which is to identify ways in which the Kalobyei settlement community ecosystem is conserved, to find out strategies to harmonize the ecosystem sustainability and the refugees' livelihood in the Kalobyei integrated settlement. Societies and economies everywhere are in transition,

and the effort to create more sustainable societies and economies requires new types of thinking (Nayha, 2020). In line with the Sustainable Development Goals of the UN agenda 2030, the Bioeconomy (BE) encompasses the production of renewable biological resources and the conversion of these resources and waste streams into value-added products such as food, feed, bio-based products, and bioenergy (European Commission, 2012) and the Circular Economy (CE) where the value of products, materials, and resources is maintained in the economy for as long as possible, and the generation of waste minimized (European Commission, 2015). As a response to these critical discussions, the concepts of BE and CE are increasingly merged leading to the 'Circular Bioeconomy' (CBE) which appeared around 2015 and is increasingly used in scientific publications since 2016 (Stegmann, Londo, & Junginger, 2020).

The Circular Bioeconomy is very important because it leads to the utilization of organic side and waste streams from agriculture, forestry, fishery, aquaculture, food, feed, and organic process waste to applications such as aquaculture feed and all kinds of chemicals and materials. Biodegradable products are being returned to the organic and nutrient cycles such as in the case of permaculture in order to help the rural community to grow crops and sustain their soil which is poor in nutrients.

V. RESEARCH METHODOLOGY

Kalobeyei integrated settlement is located in Turkana County northwestern Kenya approximately 150 km to the west of Lodwar town, and about 30 km from Kakuma Town and camp, along the Lodwar-Lokichogio road. The Kalobeyei integrated settlement was originally estimated to host a total population of 60,000 people and today is home to 38,546 people (UNHCR, 2019). The study population included refugees, the local community (Turkana and Kenyans from other parts of the country), the local government administration officers, UNHCR Officials, and the NGOs officials working in the Kalobeyei integrated settlement.

This study used a descriptive survey research design used to establish an association between variables. The data of this study was collected using a combination of quantitative and qualitative methods. The quantitative data was collected using a questionnaire, and the qualitative data were collected by means of focus group discussions, and interviews were held among key informants. The research design was used to solicit the view, opinions, and comments on how the refugees perceive the ecosystem sustainability in relation to the improvement of their livelihood in the Kalobeyei integrated settlement. The study used Cochran's (1977) sample size computation for ordered categorical data. The study had the alpha level set at a priori level of 0.05 and had planned to use a 5-point Likert scale at the acceptable error of 4.2 % (± 0.042), with the estimated standard deviation of the scale as 1.25 (5; the number of points divided by 4; a number of standard deviations on a 5-point Likert scale). The following Equation (1) shows Cochran's formula for sample size computation for the survey.

$$n = \frac{(t)^2 * (s)^2}{d^2} \quad (1)$$

Where;

t = value for a selected alpha level of 0.025 in each tail = 1.96 (the alpha level of 0.05 indicates the level of risk the researcher is willing to take that true margin of error may exceed the acceptable margin of error)

S = estimate of standard deviation in the population = 1.25. (estimate of variance deviation for 5-point scale calculated by using 5 [inclusive range of scale] divided by 4 [number of standard deviations that include almost all (approximately 98 %) of the possible values in the range])

d = acceptable margin of error for mean being estimated = 0.21. (number of points on primary scale * acceptable margin of error; points on primary scale = 5; acceptable margin of error = 0.042 [error researcher is willing to except]).

We found a sample size of 137 respondents. The researcher broke down the sample size of 137 respondents given by the formula as 120 refugees and 8 local community members and further used a convenience sampling to select 9 development actors which are (2 UNHCR officials, 1 WFP official, and 5 NGOs officials, 1 local government official). At the office level, the researcher adopted a purposive sampling technique to pick the 9 development actors who participated as key informants.

TABLE I: NUMBER AND PROFILE OF PARTICIPANTS

Respondent breakdown	Questionnaires	FGD	Interview	Total
Refugees	74	46	—	120
Local community	6	2	—	8
Development actors	—	—	9	9
Total	80	48	9	n = 137

The data of this study were collected during a period of one month (September 2021) using a combination of quantitative and qualitative methods. Questionnaire for the quantitative method, FGD, and KII for the qualitative method. Questionnaires, interview guides, and focus group discussion guides were the main instruments used by the researcher to collect the data. A questionnaire survey was used as an instrument to collect data for this study the questionnaire was administrated to refugees and the local community. In the study, Cronbach's alpha was used to measure the internal consistency of the data collected. The Cronbach's alpha (α) generated from SPSS (V22) for the quantitative questionnaire was 0.641. This Cronbach's alpha of 0.641 is acceptable and according to Creswell (2013), the Cronbach's alpha of 0.6 and above would still be considered adequate internal reliability for data analysis.

The data obtained from the questionnaires were analyzed using Statistical Package for Social Science (SPSS) version 22. Descriptive statistic was used to obtain the general perception of the participants. The results from descriptive statistics were presented in terms of charts, tables, photography, and quotes. The data from interviews with development actors and the focus group discussions with refugees and the local community was analyzed using both thematic and content analysis.

VI. DISCUSSIONS OF MAJOR FINDINGS

A. Perceived Extent to which the Ecosystem Impacts Community Livelihood Among the Study Participants

The study found that 46.3 % of the participants perceive that there is a high impact on the relationship between the ecosystem and the livelihood of refugees in the Kalobeyei settlement (high + very high) as shown in Fig. 1.

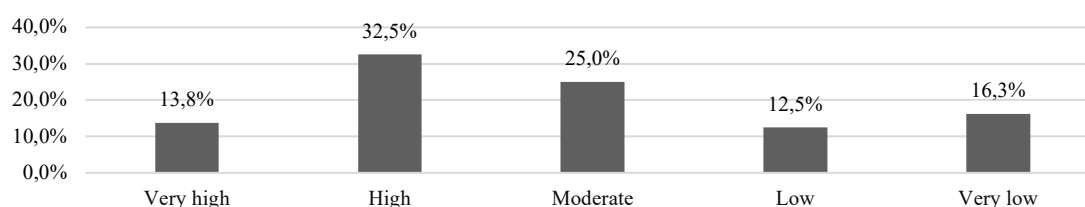


Fig. 1. Perceived extent to which the ecosystem impacts community livelihood among the study participants.

This is because people depend on the ecosystem (its vegetation) for firewood for cooking, and light. The ecosystem (rivers and vegetation) is also supporting animal production (since the host community is predominantly pastoralists), and other productive sectors like agriculture, and sustainable water supply:

“(…)the leaves of the trees around are used to feed our animals in the village, we know trees are important for us and our animals” (FGD (#1))

As a result, there is a high dependency on the ecosystem for the livelihood of the refugees and host community. The soil in Kalobeyei is fertile and more productive, and when conserved through agro-forestry, agriculture production increases. Water too is a product of the ecosystem; when more trees are planted and greenbelts protected, water has been conserved. A refugee selling vegetables at the market of Kalobeyei village 1 said:

“(…)For us selling vegetables, we depend on the cold room of the market to conserve our vegetables, but it has stopped working for long now and since then we can no longer keep the vegetables inside. This situation makes us work at a loss because by the time the vegetables will reach Kalobeyei some are already spoiled and the remaining cannot stay for two days if they are not sold. But if the weather of Kalobeyei was good, with many trees around and sufficient water to produce and conserve our own vegetables, we would have stopped importing vegetables from Kitale, this could have helped us to make more profit. Indeed, the ecosystem here has a very big impact on our business” (FGD participant (#2))

Young students of Kalobeyei perceive that the ecosystem has a very high impact on their education in the way it affects them, as it was said in the FGD in Kalobeyei village 2:

“(…)when the sun is too much and it gives us a headache and we cannot focus well in class. Also, there is no water. Sometimes people don't go to school because the sun is too hot. If there were many trees around, the rain will be more frequent and the weather would have been good which would have helped us to learn better. We want to plant more trees but there is no water” (FGD participant (#3))

With few economic opportunities in Kalobeyei, the vast majority of refugees there depend, at least partly, on food rations, water from aid organizations, cash for firewood (Bamba Kuni), and so on. From the study

findings, the integrated nature of the Kalobeyei settlement allows both the host community and the refugees to highly depend on the ecosystem for their livelihood (poles, firewood, supporting animal production, and other productive sectors like agriculture and sustainable water supply). As a result of this, while the situation seems sustainable currently, with the growing population, the sustainability of the aid-to-trade model is highly likely to be affected. These are the struggles of Kalobeyei to pass from the emergency model to a full self-reliance model of integrated settlement.

To understand the strategies put in place to harmonize the ecosystem sustainability and the refugees' livelihood in Kalobeyei Integrated Settlement, the participants were asked the extent to which they agreed with different statements on a 5-point Likert scale. The statements represented strategies to harmonize the ecosystem sustainability and the refugees' livelihood in Kalobeyei integrated settlement. The percentages of the strategies in Table II were computed by adding the proportion of the participants who agreed or agreed strongly. The results shown in Table II indicate that about 73.8 % of the participants interviewed confirmed that UNHCR officials ensure that the strategies to harmonize ecosystem sustainability and livelihood in the Kalobeyei settlement are implemented. In 2018, UNHCR released Kalobeyei Integrated Socio-Economic Development Plan in Turkana West (KISED P) to be an integral part of the County Integrated Development Plan (CIDP II). The County Government and UNHCR organized a number of multi-stakeholder consultations which included representation from refugees, host communities, as well as the Government of Kenya, the World Bank, UN agencies, the private sector, and NGOs. The KISED P envisions that both refugees and host communities should benefit from strengthened national service delivery systems, increased socio-economic opportunities along with sustained investments in building people's skills and capabilities in order for them to become the drivers of economic growth in Turkana West (Participant from Food Security & Livelihoods office of the DCA). 65 % of the participants are optimistic that harmonizing the ecosystem sustainability and community livelihood is possible in Kalobeyei. This high participation in tree planting and ecosystem conservation shows the high level of consciousness and optimism that participants have in the harmonization of the ecosystem and their livelihood. In addition, the natural resource management office of the County government of Turkana believes that UNHCR and other interested partners should deploy more quantitative measures to regulate the utilization and conservation of the natural resources within the Kalobeyei ecosystem. For example, there should be permits to access the forested areas; incentivizing people for conserving the environment and expanding the already vandalized greenbelts. In other words, interested parties should use sustainable management practices to handle dryland forests and resources. However, 23.8 % of the respondents indicated that nobody ensures that the strategies to harmonize the ecosystem and livelihood are implemented. That is one of the factors which presents why part of the population are dissatisfied with their lives, the high prevalence of food insecurity, the limited access to healthcare, and most refugees report being completely or mostly dependent on food and humanitarian aid.

B. Strategies to Harmonize the Ecosystem Sustainability and The Refugees' Livelihood in Kalobeyei Integrated Settlement

The study found that 74 % of the respondents appreciate the work done by UNHCR and its implementing partners and believe that most of the policies are being implemented. Building on the findings, the study argues that dryland conservation strategies must focus on residents and the end-users of the ecosystem resources, whether for present or future generations. In this context, and in line with the precepts of the convention on biodiversity, successful management of drylands depends on the collective ability to formulate and implement appropriate policies and design/conduct proper field activities (Bonkougou, 2001). The core strategy should be to maintain and restore the dryland ecosystem in Kalobeyei through conservation, sustainable use of biodiversity, and the fair and equitable sharing of benefits.

In the past, in-situ conservation strategies have tended to focus mostly on parks and protected areas. There is increasing recognition, however, that it is no longer sufficient to protect isolated fragments of land and water, given the critical role of biodiversity in maintaining human livelihoods, and vice-versa (Bonkougou, 2001). Current approaches to both ex-situ and in-situ conservation have a common serious constraint that limits their chances of success and impact.

The problem concerns the fair and equitable sharing of benefits arising from conservation and more generally, the issue of incentives for conservation (Berkes, 2004). Within this general KISED P framework, however, programs and projects on the ground must be specific to ecosystem types since ecological processes and root causes of land degradation vary between different villages in the Kalobeyei settlement. Enabling environments seem to have deteriorated to the point where conservation and sustainable use of biodiversity can only be part of integrated strategies to promote sustainable economic growth and social development.

TABLE II: EXTENT TO WHICH PARTICIPANTS AGREE WITH DIFFERENT STRATEGIES TO HARMONIZE THE ECOSYSTEM SUSTAINABILITY AND THE REFUGEES' LIVELIHOOD IN KALOBYEI INTEGRATED SETTLEMENT

Strategies	Not at all	Strongly disagree	Disagree	Agree	Strongly agree	Agree + Strongly agree
UNHCR officials ensure that strategies to harmonize ecosystem sustainability and livelihood in Kalobeyei settlement are implemented	8.8	7.5	10.0	56.3	17.5	73.8 %
Harmonizing ecosystem sustainability and community livelihood is possible in Kalobeyei	23.8	3.8	7.5	42.5	22.5	65.0 %
Village elders (Mlango Kumi) ensure that strategies to harmonize ecosystem sustainability and livelihood in Kalobeyei settlement are implemented	21.3	2.5	23.8	40.0	12.5	52.5 %
NGO officials ensure that strategies to harmonize ecosystem sustainability and livelihood in Kalobeyei settlement are implemented	17.5	5.0	25.0	28.8	23.8	52.5 %
The Police/ Game Rangers ensure that strategies to harmonize ecosystem sustainability and livelihood in Kalobeyei settlement are implemented	21.3	22.5	16.3	30.0	10.0	40.0 %
Chiefs and Sub Chiefs ensure that strategies to harmonize ecosystem sustainability and livelihood in Kalobeyei settlement are implemented	22.5	16.3	27.5	22.5	11.3	33.8 %
Nobody ensure that strategies to harmonize ecosystem sustainability and livelihood in Kalobeyei settlement are implemented	38.8	27.5	10.0	15.0	8.8	23.8 %

The study found out that it is possible to balance utilization and conservation of the Kalobeyei ecosystem since 65 % of respondents are optimistic and believe that it is possible. However, there has been a failure to achieve this because most of the projects aimed at harmonization of the ecosystem and livelihoods tend to focus more on utilization than conservation. Nevertheless, the strategies on the ground seem to lack quantitative measures to balance, for instance, the density of trees removed, and the quantity returned through reforestation. In other words, the Kalobeyei ecosystem lacks quantitative sustainable management of the dryland forests.

In supposition, the study identified four major strategies that would harmonize the sustainability of the Kalobeyei settlement and ensure an equitable balance between the ecosystem resources with the livelihood of refugees.

First, there is a need to regulate the utilization of natural resources, especially the forest covers. One way to do this would be to have permits for those allowed to access the surrounding forests. This strategy would be important in reducing pressure on the forests by reducing the number of people who have access to the forest to cut trees.

Secondly, the concerned bodies should design new awards and strengthen the existing reward program to incentivize those who are conserving and protecting the environment. They should not only be given incentives but their stories should also be shared on wider channels like websites, social media, and conventional media (national & international televisions, newspapers, climate talk platforms, etc).

Thirdly, UNHCR, the county government of Turkana, and the concerned bodies need to implement strict laws to protect the greenbelts which are currently being destroyed. d) Lastly, UNHCR, UN-Habitat, WFP, the county government, and the concerned bodies need to come up with innovations and technologies to be able to drill water in Kalobeyei settlement. Surveys carried out in 2018 had shown that the land in Kalobeyei was fertile and with a well-thought-out plan, rainwater harvesting was feasible and could support agricultural activities. That WFP, FAO, and county government embarked on water harvesting structures in supporting agriculture (Khavetsa & Karimi, 2020). Coming up with new technologies to drill water in Kalobeyei, the residents will have more access to potable water for human consumption and for their kitchen garden. These strategies will help to harmonize the ecosystem and the livelihood of residents of Kalobeyei.

VII. CONCLUSION

The study found a high impact of the ecosystem on refugees' livelihood and an imbalance between ecosystem utilization and conservation to be a major challenge in the Kalobeyei ecosystem. It also identified serious struggles for Kalobeyei's autonomy for sustainable income generation and socio-economic infrastructural empowerment. As a result, there is weak harmonization between ecosystem sustainability

and livelihoods in Kalobeyei. Also, due to the huge climate variability, the place is prone to drought and floods, thus affecting agriculture, livestock, and human livelihoods. The intensifying refugee migration crisis keeps relief agencies focused on providing basic needs such as shelter, water, medical care, and basic food rations. Whilst there are important efforts put by the UNHCR, WFP, and their partners in transforming the lives of the refugees and local community, the study pointed out the struggle from an emergency assistance aid model to a self-reliance model of handling livelihood situations in the settlement. To ensure Kalobeyei becomes self-reliant in terms of diverse income-generating activities; and improved socio-economic infrastructure and services, there should be a clear consciousness-raising among the residents to be able to outline the ecosystem benefits in terms of fuel, building materials, agriculture, livestock, and sustainable water supply in their lives. Such highlights will be necessary for the process of advocacy for the conservation of the ecosystem through afforestation and reforestation and the improvement of the livelihood in the settlement. Furthermore, there is a need to use quantitative measures that check the density of trees removed and replaced so that there is regulated utilization and conservation of the ecosystem resources.

VIII. ADVOCACY PLAN FOR SOCIAL TRANSFORMATION

The study came up with an advocacy plan for social transformation which will allow having a sustainable ecosystem in the settlement that will help to improve the livelihood of the population. The advocacy plan shown in Table III is a twelve months activities program that goes by: the identification of the stakeholders involved in the ecosystem management of the settlement; the empowerment and the consciousness-raising of the refugees and local community about the importance of the sustainability of the ecosystem within a settlement; the training and formation of the different groups of refugees and local communities (students, small farmer holders, small business holders, the FBOs, the CBOs) on good practices on environmental conservation, and build their capacity in that domain. The training and workshop will be on techniques of afforestation, tree conservation, and planting in a dry area like Kalobeyei.

TABLE III: ADVOCACY IMPLEMENTATION PLAN FOR ECOSYSTEM SUSTAINABILITY TO IMPROVE REFUGEES' LIVELIHOOD IN KALOBEYEI

Months (weeks)	Actions	Actors	How/ strategy	Expected outcome
January, February, March (12weeks)	Identification of the different stakeholders	Researcher, environmental activists, community leaders.	-Meetings with zone representatives, NGO, FBOs, school environmental clubs, Environment activists, development partners, small business holders, and small farmer holders. Lobby	Mobilization of refugees, local community, internal and external partners
April, May (8 weeks)	Empowerment and consciousness-raising	Social minister acting as catalyst, facilitators, environment activist, community leaders	Community organizations, people encounter, environmental festivals, radio programs, community meetings for critical consciousness raising.	Creating awareness on environmental matters, people make a contribution to environment policies, social transformation at the local and national level
June (4weeks)	Providing people with environmental conservation skills	Agencies organizing environmental programs, environment institutions, projection of documentaries on ecology, environment conservation	Training on afforestation, land management, trees conservations, soil conservation, water harvesting and conservation, radio teaching programs	Acquisition by the refugees and local community on environmental conservation skills (soil, water, vegetation). Benefit from education systems programs and training programs in terms of ecology, environmental conservation
July, August (8weeks)	Inspiring people ecological spirit and providing environmental conservation skills	Environmental mentors, ecological entrepreneurs, inspirational talk, radio programs	Travel in areas which have succeeded to transform their arid and desert environments into forest (within Kenya, Burkina Faso, Algeria) in order to get more knowledge on the techniques applied. And how the harmonization between ecosystem and livelihood is possible. Come back to teach and implement what we have learnt, trees planting (4 trees/person/year)	Enabled people to become socially and environmentally empowered
September, October (8weeks)	Creating a networking system, alliances, collaboration, partnership	CBOs, FBOs, public agencies at the county, national level as well as international associations and organizations, larger alliances, civil society, politicians (MPs, MCAs).	Building linkages with: national and international social and environmental associations/organizations, environmental agencies able to provide know-how, training on environment conservation. Policy-makers to influence policies on environment and laws in refugees' settlement.	Strengthen advocacy on refugees and environment issues, improved delivery services in refugees' settlement.

The techniques of water harvesting and management, the following activity of the advocacy program is to create some environmental groups and associations in Kalobeyei in order to link these groups to the national network of environment protection and also with the influential decision and lawmakers. After this, the next action will be to strengthen the knowledge and skills the members acquired during the previous activities through some motivational encounters with champions of ecology and environment protection, and also through some “study trips”. The advocacy activity here will be a peaceful demonstration where government people will be involved. The expected outcome is the advancement of better protection and management of the natural resources in areas where refugees are put.

CONFLICT OF INTEREST

This article is the product of a Master’s research from the Catholic University of Eastern Africa. As authors and co-authors, we declare that we have no conflicts of interest.

REFERENCES

- Abdeen. (2010). *Africa the driest continent*. New York: Novinka.
- Berkes, F. (2004). Rethinking community-based conservation. *Conservation biology*, 18(3), 621-630.
- Bonkougou, E. G. (2001). Biodiversity in drylands: challenges and opportunities for conservation and sustainable use. *Challenge Paper. The Global Drylands Initiative, UNDP Drylands Development Centre, Nairobi, Kenya*.
- Creswell, J. (2013). *qualitative Inquiry & Research Design: Choosing among five approaches*. Thousand Oaks: SAGE.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, 16(3), 297-334.
- DePoy, E. A. (2013). *Introduction to Research: Understanding and Applying Multiple Strategies*. London: Elsevier Health Sciences.
- Dudovskiy, J. (2021, March 18). *Business Research Methodology*. Retrieved from <https://research-methodology.net/sampling-in-primary-data-collection/snowball-sampling/>
- Engineering & Environmental Services section. (2001, January 01). *UNHCR: The UN Refugee Agency*. Retrieved from <https://www.unhcr.org>.
- Khavetsa, C., & Karimi, M. (2020, October 2). *medium.com/world-food-programme*. Retrieved september 26, 2021, from medium.com/world-food-programme: <https://medium.com/world-food-programme-insigh>.
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.
- Martin, S. F., Howard, D. A., Smith, L., Yossinger, N. S., Kinne, L., & Giordano, M. (2017). Environmental Resource Management in Refugee Camps and Surrounding Areas: Lessons Learned and Best Practices, Report for the US Department of State, Bureau for Population, Refugees and Migration.
- Matti, P. & Erkki, L. (2003). *AFRICAN DEFORESTATION: CAUSES AND SCENARIOS*. Quebec City: the XII World Forestry Congress. Retrieved from [fao.org](http://www.fao.org): <http://www.fao.org>.
- McGrath, M. (2019). *Deforestation: Tropical tree losses persist at high levels*. BBC News. Retrieved 10 21, 2019, from <https://www.bbc.com>.
- Miller, S. (2018). *Assessing the Impacts of hosting refugees*. Centre for International Governance Innovation.
- Morgan, S. (2011, August 15). *National Geographic*. Retrieved January 23, 2020.
- Shepherd, G. (1995, September). The Impact of Refugees on the Environment and Appropriate Responses. *HPN*. Retrieved March 16, 2021, from <https://odihpn.org>.
- Swanson, R. (2013). *theory building in applied disciplines*. San Francisco: C.A: Berret-Koehler Publisher.
- Tureti, M. (2016). *Impact of refugees on host communities: the case of Kakuma Refugee Camp, northwestern Kenya, 1992-2002*. HAL: archives-ouvertes. Retrieved from <https://dumas.ccsd.cnrs.fr/dumas-01302775>.
- UNHCR & WOLD BANK GROUP. (2020). *Kalobeyei Socioeconomic-Report*. UNHCR & WOLD BANK GROUP.
- UNHCR. (2019). *handbook and guidelines on procedures and criteria for determining refugee status under the 1951 convention and the 1967 protocol relating to the status of refugees*. UNHCR.
- UNV. (2021, january 15). *unv+jobs+Nairobi*. Retrieved from <https://www.unvjobsNairobi>: <https://www.unvjobsNairobi>
- Wei, F., Wang, S., Fu, B., Zhang, L., Fu, C., & Kanga, E. M. (2018). Balancing community livelihoods and biodiversity conservation of protected areas in East Africa. *Current Opinion in Environmental Sustainability*, 33, 26–33. <https://doi.org/10.1016/j.cosust.2018.03.013>.
- WWF. (2019). *deforestation-and-forest-degradation*. Retrieved 10 21, 2019, from www.worldwildlife.org: <https://www.worldwildlife.org/threats/deforestation-and-forest-degradation>
- Yasin, A. (2011). *effects of refugees on the natural environment a case study of dadaab refugees camp, garissa district*. Nairobi: University of Nairobi.



Hans-Armel NOGBOU is from Côte d’Ivoire. He is a Brother in the Society of Missionaries of Africa. He is currently working in Uganda at St Paul Catholic Parish of Tapac (Karamoja region) as the Coordinator of Justice and Peace and Integrity of Creation (JPIC).

He holds a Master’s Degree of Arts (M.A) in Social Transformation with a specialization in Sustainable Rural and Urban Development from the Catholic University of Eastern Africa (CUEA) in Nairobi Kenya, where is pursuing an advanced diploma in ethics and social justice. He also hold a Diploma in Theology from Tangaza University College in Nairobi Kenya and a B.A in Philosophy from the “Institut Supérieur Privé de Philosophie Maison Lavigerie” of Ouagadougou in Burkina Faso.

Mr. NOGBOU worked as a teacher of the French language at the “Centre Culturel et de Documentations Saharienne (CCDS)” of Ghardaïa in Algeria (2014-2016).