

April 2024

Case studies submitted for consideration by the Executive Committee of the Warsaw International Mechanism for Loss and Damage

Climate Refugees prepared the following four case studies for the WIM ExCom's efforts to update the technical paper on non-economic losses. The submissions are based upon our field visits to and subsequent [reporting](#) on Kenya's Great Rift Valley.

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Case Study Submission 1 from [Climate Refugees](#) to the Warsaw International Mechanism for Loss and Damage to Update the Technical Paper on Non-Economic Losses in the Context of Loss and Damage Associated with Climate Change Impacts

Provided by [Climate Refugees](#) based on excerpts derived from our August 2023 report "[Climate Change is Controlling Everything. Let Them Compensate Us](#)": *Stories of Loss and Damage in Kenya* by Amali Tower and Ryan Plano

Loss of Territory and Related Losses

Location: Baringo County, Rift Valley, Kenya

Population: Ilchamus People (ethnic minority)

Climate Change Events: Slow-Onset Flooding

Non-Economic Loss and Damage: Displacement

Over two years from 2020 to 2022, flooding and drought, in almost equal measure, [internally displaced](#) nearly 700,000 Kenyans from their homes. Displacement could actually be much higher in consideration of cross border movement in the IGAD region.

Since 2010, Kenya's Rift Valley lakes have been rising and expanding. Among others, these include Lake Baringo and Lake Bogoria. Scientists have [concluded](#) that to a great extent, increased rainfall since 2010 explains lake levels' rise. A Kenyan government [report](#) released last year found that while tectonic activity in the Rift Valley is partly to blame, excessive rainfall, driven by the climate crisis, is the main cause of lake rise.

With the effects of climate change increasing in frequency and intensity in Kenya, there are many forms of mobility, sometimes even immobility, occurring concurrently in response, but overall, movement here is forced.

Lake Baringo

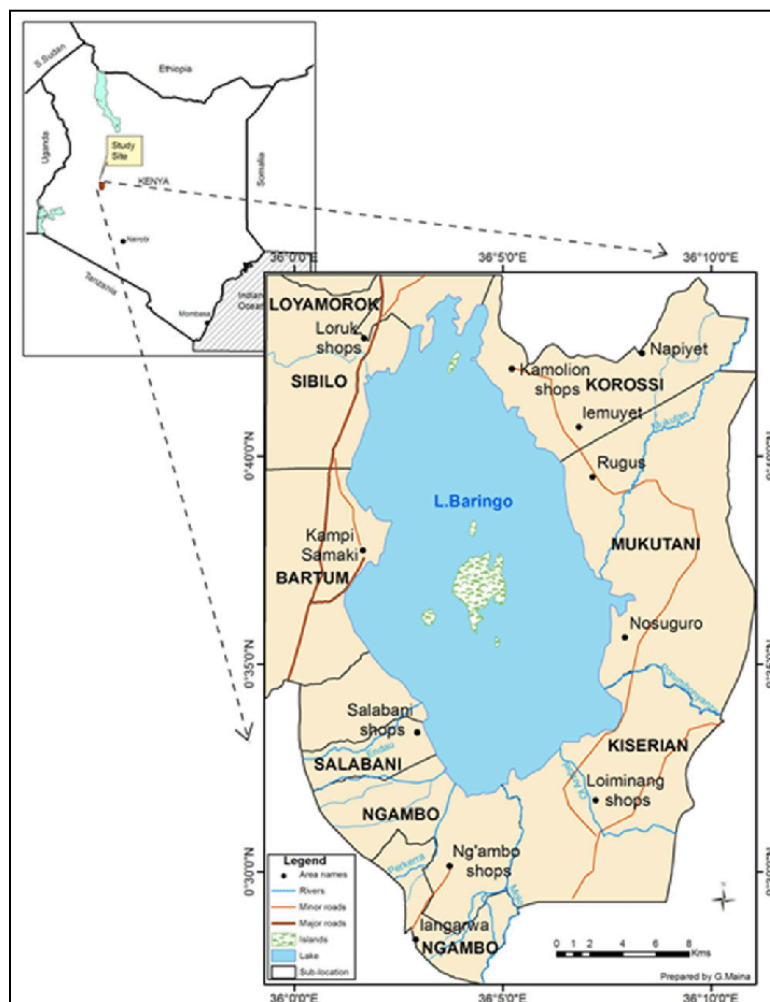
Lake Baringo is a freshwater lake in Baringo County. It has always seen seasonal shifts in settlement and economic activity based on rainfall and 'normal' swelling of the lake, but nothing like what has been happening in [recent years](#), notably in the past decade. In that time, climate change-driven heavy rains have raised Baringo's water levels [12 meters](#). As arid and semi-arid

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lands, Baringo County is highly [vulnerable](#) to rainfall variability and catastrophic and severe droughts, with average annual rainfall projected to decline over time.

For the past few seasons, residents and researchers alike have been concerned that Baringo might even merge with nearby saltwater Lake Bogoria, which would have devastating ecological [consequences](#). In just a decade, the [distance](#) between Baringo and Bogoria has halved, and the two lakes are now just six miles apart. The threat of saltwater incursion has the potential to impact over [100,000 people](#) who depend on Baringo for income from agriculture and fishing, with the possibility of intergenerational loss. The tourism industry has also seen major impacts. Entire hotels and restaurants, which would generally employ large numbers of people, have been [submerged](#) or otherwise rendered unusable.

With the biodiversity, habitats and nature reserves surrounding both Lakes Baringo and Bogoria, tourism has traditionally been a huge source of revenue for Baringo, a county with a poverty rate of 52.2%. With the impacts of floods and the Covid-19 pandemic, Baringo County has [lost](#) an estimated 95 million shillings (nearly 700,000 USD) in tourism and infrastructure in 2021.



Source: ResearchGate

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Hotels submerged by Lake Baringo. Photo by Amali Tower/Climate Refugees

Homes have been flooded, leading to displacement. The government of Kenya [estimates](#) that the number of households severely impacted by Baringo flooding is over 3,000. Many have had to [move](#) or have decided that their only viable option is to move away from the area, despite having strong cultural or ancestral ties to the land, which can result in [worse employment prospects and higher risk of poverty](#) as people lose their livelihood and have to start over. And neighboring communities are largely unprepared to receive new arrivals from Baringo, often struggling to adapt to the pressure placed on housing, water resources, and the healthcare system, according to activist Paul Chepsoi. This is a clear example of how displacement can [“extend loss and damage beyond the boundaries of the areas initially affected”](#) by climate change. As Chepsoi [explains](#), some displacement is now inevitable; the flooding is so severe that only a severe drought - with its own negative impacts - would stop the rising waters of Baringo. Reports indicate heavy rains during the 2020 Covid-19 lockdown led to the complete submersion of [11 schools](#) in Marigat, a major town in Baringo county.

A joint 2021 Kenya government and UNDP [report](#) found that rising lake waters in the Rift Valley have “displaced” 75,987 households with 379,935 people “requiring urgent humanitarian assistance.” These figures generally align with [media reports](#) and our own discussions with Associated Press (AP) journalist Julie Watson, who covered the Rift Valley floods. People we spoke to told us flooding around Lake Baringo is considered to be the most severe, with more than 3,000 households destroyed. This [video](#) news story from Daily Nation reveals 20 villages submerged by rising water levels in 2020.

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Kokwa Island

Kokwa Island is one of eight islands in Lake Baringo. Around 2,000 minority tribespeople live on the island. The Ilchamus people comprise the majority population, along with a smaller number of Tugen and Turkana people. Residents here live right at the water's edge. Many disclose, they are dealing with the dual effects of climate change-driven drought and flooding.



Kokwa Island by Amali Tower/Climate Refugees

Most people are native-born residents, but some moved to the island for tourism jobs. The communities here are mainly fisherfolk, as pastoralism of goats, sheep and cows are increasingly disrupted by a lack of land and lack of grazing land. Agriculture is not possible here due to uneven, rocky terrain.

Displacement is not a new phenomenon for residents here. Starting in 2008, some arrived here following localized conflict with the Pokot tribes people. Living on the island has saved them from repeat raids but they are now more vulnerable to climate change, and even climate change-induced displacement.

“Many of us have experienced one or more displacements,” one resident said. Residents told us many families who have the financial means to do so have moved to higher ground on Kokwa Island, while others “migrated out” to surrounding islands of Lake Baringo or left the region completely. Most of the community members consulted were living in makeshift huts, having lost their homes to the lake’s waters. They all asked for international assistance to rebuild their submerged homes on higher ground.

Some lake residents hold title deeds to the land lost around the lake. Thus, legal challenges may arise due to a [loss](#) of 1106 Km² of land around the lakes. Some owners of submerged land had also encroached on riparian lands, and may need to be relocated to safer areas. It has been recommended that the Kenyan government determine new high-water levels on riparian lands and work with community members to communicate and enforce safe guidelines since many populations could be at further risk of flooding and land loss during short rainy seasons.

Kiwanja Ndege Internally Displaced Persons Camp

The camp, located near Marigat in Baringo County, is composed of residents from 10 villages whose homes are submerged under Lake Baringo. One hundred fifty households; 1,000 Ilchamus people reside in the camp that has limited access to humanitarian services and protection programming. The residents identify as 100% climate displaced since their homes were submerged in 2020 when Lake Baringo waters swelled past human habitability. When asked what had displaced them, they replied with one simple word: **water**.

Gradual expansion and rise of the lake was first noticed by communities in 2002. The first village to be partially displaced was Ngambo village in 2012, and the secondary school was relocated to higher ground as a temporary solution. “During these initial floods, we received much outreach from the Red Cross”, they said, “but no compensation or lasting solutions like relocation were provided.”

Residents here live in fear of forced eviction and long-term displacement as the camp is situated on government land allocated for a future airstrip. They have suffered increased poverty and food insecurity, lost jobs, livelihoods and access to clean water, death and rising disease due to submerged healthcare facilities and lack of social protections.

The Kenyan Red Cross were last present in 2020 when the camp was initiated. The community here is in need of total compensation for their displacement and relocation to a new planned community.

Solutions must be accessible at the community level through Kenya’s sub-county ward planning committees, which provides the opportunity for local knowledge and development priorities to be integrated and funded through [Ward Development Plans](#). These include:

- Relocation
- Legal and economic compensation for loss of homes, schools, healthcare facilities, livelihoods
- New livelihoods

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Case Study Submission 2 from [Climate Refugees](#) to the Warsaw International Mechanism for Loss and Damage to Update the Technical Paper on Non-Economic Losses in the Context of Loss and Damage Associated with Climate Change Impacts

Provided by [Climate Refugees](#) based on excerpts derived from our August 2023 report "[Climate Change is Controlling Everything. Let Them Compensate Us](#)": *Stories of Loss and Damage in Kenya* by Amali Tower and Ryan Plano

Loss of Territory, Biodiversity and Cultural Heritage

Location: Baringo County, Rift Valley, Kenya

Population: Indigenous Endorois People

Climate Change Events: Slow-Onset Flooding and Drought

Lake Bogoria

Lake Bogoria is a saline, alkaline lake that due to increasing precipitation is getting increasingly closer to freshwater Lake Baringo, threatening to [wreak havoc](#) on the Baringo ecosystem. With some 88 km² of land around the lake now [submerged](#), humans and animals have been displaced, and invasive species have gained a foothold, with obvious impacts on livelihoods. If the trend continues and the two lakes do eventually merge, the result would be nothing short of an "[ecological disaster](#)", according to a Kenya Wildlife Service official.

Like Baringo, Lake Bogoria has experienced [notable expansion and flooding](#) since rainfall began significantly increasing in 2010, with some formerly intermittent inflow rivers now flowing into Bogoria year-round. While local human activities may partly account for such a phenomenon, the available evidence [suggests](#) that climate change and weather dynamics - primarily heavier rainfall - are the main contributors to flooding. Increases in mean annual rainfall of up to 30% in the region's catchments between 2010 and 2020 increased nearby Lake Solai from 3km² in 1984 to nearly 12km² in 2014 and 2020, a [four-fold increase](#).

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Lake Bogoria is also home to an important and once lucrative tourism industry. The [Lake Bogoria National Reserve](#) is home to some of Kenya's most iconic geothermal hot springs, geysers and a bird lover's paradise with 135 distinct species, including pink flamingos that once drew people from all over the world to witness. Communities interviewed said flamingoes that once numbered two million are now reduced to 200. Today much of that industry and biodiversity has been impacted by the climate change losses in this region, and along with it, tourism jobs and revenue that communities once depended upon.

Drought

The Horn of Africa is experiencing an [unprecedented drought](#), the worst to strike the region in 40 years, pushing the region to the brink of famine. Despite the contribution of the Covid-19 pandemic and resulting economic slowdown, protracted conflicts, a global food shortage with markets hard-hit by the war in Ukraine, and a major shortfall in humanitarian funding, five rainy seasons have failed since 2020 in parts of Ethiopia, Kenya and Somalia, and researchers now contend it would not have happened without human-induced climate change. "Climate change has made events like the current drought much stronger and more likely; a conservative estimate is that such droughts have become about [100 times more likely](#)." Researchers found the combination of low rainfall and high evapotranspiration driving the exceptional drought to be the result of global warming. The region's two rainy seasons - the "long rains" from March to May, and the "short rains" from October to December have largely failed. Since October 2020, an unprecedented long dry spell has persisted, occasionally interrupted with short intense rainfall that has often led to flash floods. The first rainy season of 2023 brought above average heavy rains and flash floods across the same region. Overall, the conditions in the region are an extreme example of a phenomenon seen across the globe, where drought has complex and cascading impacts, which are only [likely to increase](#) in severity and frequency. The situation is made worse in combination with high temperatures: the number of "very hot days", where the daily maximum is above 35°C, is [expected to increase](#), especially in the ASALs of Kenya.

The Endorois People

The Endorois are an Indigenous minority group who live around Lake Bogoria and environs. They consider the lake and forest sacred grounds. They were first displaced by land conservation when they were [forcibly dispossessed](#) of their lands in the 1970s to make way for Lake Bogoria National Reserve. Today, the community living within the periphery of Lake Bogoria has been progressively displaced yet again by climate change-induced rising waters. Although climate-induced losses could have been anticipated by both the international community and Kenyan government, the historic marginalization of the Indigenous community cannot be overlooked as a contributing factor that increases their vulnerability.

The interviewed community members highlighted challenges of failed compensation for loss of homes, farms and culture, increased human-wildlife contact and social ills such as child exploitation, early marriage and prostitution driven by high poverty levels. Here, too, urgent

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humanitarian needs exist amongst the whole community with food insecurity and malnutrition rising.

Rising lake waters have led to the displacement of at least 200 households. The community has reported this data to the Kenyan government, but mentioned the compensation they seek has been elusive. Displacement assessments in Bogoria are lacking, but one account [indicates](#) 116 households have been affected with 700 people displaced.

Community leaders told us the lake is six kilometers closer to the shore today than its initial position. Many people, they said, were initially displaced to their neighbor's homes, stripping them of whatever land they once owned. Eventually, they were displaced from their homes and locations all together. Family dynamics have been disturbed, they explained. "In our culture, the men provide, but now they are languishing in poverty when displaced."

They recalled acute lake rise beginning in 2010-2011, as well as again in 2012 through 2013. The lake expansion led to the displacement of multiple families and has now cut across bypass roads to schools, leading to several disruptions even before the community was displaced. In an article in Cultural Survival, Endorois community leader Carson Kiburo [writes](#) "these enormous climate change challenges have led to rural-urban migration, thus disdaining our People's way of living and eroding our language."

In response to the effects of drought, the Endorois have taken up climate-smart agroecology farming that incorporates drought-resistant crops and tubers to minimize water usage and ensure food security. Livestock and crop diversification, as well as supplementary livestock feeding, are long-term [local adaptive practices](#) for the Endorois. Communities tell us, recent lake-rise displacement though, has disturbed the sustainability of these adaptive practices.

Jobs once held in tourism are now lost, the community tells us. "Our tourism economy is devastated, reduced because geysers are submerged, although you can still see them bubbling underwater." When asked how they have adapted to the loss of these jobs and revenues, they pointed to social ills of early marriage, prostitution and the break-up of families as negative coping mechanisms forced upon them in the absence of meaningful support.

The [IPCC](#) notes the increased vulnerability that Indigenous people face of seeing their "cultural points of reference disappearing." The UN Declaration on the Rights of Indigenous Peoples affirms Indigenous peoples rights to the conservation and protection of their environment, lands and resources, and spells out [States' obligations](#) to assist such without discrimination. Indigenous people also have the right to determine how their lands and resources are used through free, prior and informed consent, and methods for redress must exist when there are negative environmental and cultural impacts.

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These policy frameworks and international laws must be viewed through the reality that Endorois traditional knowledge is intertwined with nature, symbolized in totems. For instance, clan systems where customs are attached to totems depicted by animals, plants and

ecosystems have already [been lost](#), first via forced evictions, and now again, via climate-driven land loss and displacement.

Solutions must be accessible at the community level through Kenya's sub-county ward planning committees, which is essential given the historic marginalization of the Endorois People. This also provides the opportunity for Indigenous knowledge and culturally-appropriate solutions to be integrated and funded through [Ward Development Plans](#). These include:

- Relocation
- Legal and economic compensation for loss of livelihood, schools, homes, land, cultural sites, healthcare and lives
- New livelihood training and opportunities

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Case Study Submission 3 from [Climate Refugees](#) to the Warsaw International Mechanism for Loss and Damage to Update the Technical Paper on Non-Economic Losses in the Context of Loss and Damage Associated with Climate Change Impacts

Provided by [Climate Refugees](#) based on excerpts derived from our August 2023 report "[Climate Change is Controlling Everything. Let Them Compensate Us](#)": *Stories of Loss and Damage in Kenya*, by Amali Tower and Ryan Plano

Human Rights Losses and Development Setbacks

Location: Baringo and Turkana Counties, Rift Valley, Kenya

Climate Change Events: Slow-Onset Flooding and Drought

Loss of Education

Kokwa Island, Lake Baringo, Baringo County

The rising lake waters submerged large sections of the only school on Kokwa island, including its teachers' quarters and toilets from 2012 to 2021. For many school-goers, this was the only latrine accessible for their use. Teachers were secured for the school through the provision of living quarters. Thus when those facilities were submerged, the teachers were displaced and education was disrupted for nearly 10 years. While the school dormitory was almost submerged, large parts of it became inaccessible due to the drop in temperatures and wildlife intrusion of crocodiles and hippopotamus. The school serves 240 boys and girls. The girls dormitory was particularly affected, therefore impacting girls education more acutely.

Rugus, Lake Baringo, Baringo County

On the mainland of Baringo, Rugus residents were quick to point out that the school where our group discussion was held had been flooded multiple times by rising Lake Baringo. In 2007, the lake's shores were two kilometers away, they said, but by 2013, the water had started reaching the school. In 2019, it got much worse, the water went well beyond the school. During this time, children could not reach the school, let alone attend school.

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Atalokamusio Village, Lokiriama, Turkana County

“We have not taken our children to school. Drought has destroyed all livestock,” one woman in this remote Lokiriama village told us. “We used to sell livestock to afford education. But now we can’t afford the school fees to send our children to school because there are no livestock to sell.” This undermining of [educational opportunities](#) due to the impacts of climate change is unfortunately seen well beyond the communities we visited.

Kaekoroe-Akwaan Village, Lokiriama, Turkana County

Kaekoroe-Akwaan Village is incredibly remote, poor and underdeveloped. Residents here say they have only one early education school but lack teachers to ensure robust and consistent attendance. There are no provisions for primary or high school education. Now scarcity of water and food has diminished attendance in the early education school since the feeding programs that so many village children depend upon is not guaranteed. We observed many children fetching water - traveling great distances to water points or water holes that are increasingly drying.

Lake Turkana, Turkana County

Having borne the brunt of historical injustices, the rise of Lake Turkana water levels have caused a further challenge to school-going children in the El Molo community, who would previously walk to school but now have to use boats to cross the lake, an expense that is not only financially difficult but also dangerous. Hundreds of homesteads have been submerged including their loved ones’ graves as a result. The extreme marginalization of this community is evident as no hospital is built on either Komote island or Laiyeni village. The community reported high cases of water borne diseases and malnutrition among children. It is extremely challenging to access services on the mainland, a financial burden for the residents of Komote and Laiyeni. There are about 2,500 residents of Komote and Laiyeni island recording high food insecurity.

Loss of Healthcare

Kokwa Island, Lake Baringo, Baringo County

The only medical dispensary on Kokwa Island was submerged in 2012 by flooding. Construction for a new facility began in 2018. In the interim, the community had no access to medicines. When the dispensary submerged, medical professionals who ran the facility stopped coming and/or left the island.

Beyond the losses caused by inundated fields and buildings, flooding has [other impacts](#), such as making it more difficult to access basic health services when roads are flooded or washed

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out. [Six healthcare facilities](#) have been submerged, which reduces the availability of healthcare, and exacerbates other health-related impacts of flooding. Inundated infrastructure has led to electricity outages, increasing the risk of water-borne diseases and respiratory conditions due to dampness and cold. In 2020, flooding in this area inundated sanitation facilities, which led to a surge of water-borne illness.

For a while the community managed by traveling across the lake to the mainland hospital, but then that was disrupted as well when the hospital was submerged for a period. Today, community members are mostly reliant on a mobile clinic called “Beyond Zero” housed within a container on the island, but access to the clinic via motorbike is cost-prohibitive. Reflecting on this barrier to access, many members said the limitation can “even cause death.”

Water-borne diseases are frequent and rising, according to community members. Typhoid, dysentery and cholera have been documented. Accounts exist of submerged Lake Baringo hotel latrines’ wastewater flowing into and polluting the lake. In addition, community members noted a major uptick in incidents of malaria.

These stories, while specific to Kokwa Island, are not unfamiliar to other marginalized groups and populations vulnerable to the climate crisis. They demonstrate setbacks in efforts to advance the UN SDG Goal 3 to “ensure healthy lives and promote well-being,” and growing evidence of the risks climate change poses to human health.

Endorois People, Lake Bogoria

Many of the Endorois People, the elders told us, feel climate change is their fault. As a result, the increasing health problems they face, like mosquito borne illnesses, water-borne diseases and even water insecurity, they think is a result of their own actions.

Medical clinics and hospitals the community once accessed around Lake Bogoria are now lost. The loss of maternity services is particularly acute with maternal mortality rates rising and young girls bearing children at earlier ages. The community representative for women and children shared, “it’s even taboo for us to report deaths, like that of a child to the chief in our culture, so many such issues are going underreported, especially now that we are all scattered from displacement.”

Minority Rights Group International is supporting the Endorois community with healthcare services. Their community health workers confirm the submerged clinics have now forced “our people to have to walk several kilometers elsewhere to access even basic medicines.” Government promises to build another health facility have not yet come to fruition. “Since the water submerged several villages, people moved to temporary settlements and many have not built new latrines.” As a result, there is open defecation, putting the Endorois at increased risk to

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waterborne diseases. The submersion of clean water springs and pit latrines by lake expansion has now [exposed](#) locals to water-borne diseases such as cholera.

With one voice, the community elders told us they are suffering “psychological torture” - trauma from the many climate change-induced losses their people are facing. “We are landless, our living standards are greatly reduced, and all this has affected the lives and health of old and young people.”

Atalokamusio Village, Lokiriama, Turkana County

In the underdeveloped and harsh terrain of Turkana, communities in Atalokamusio Village say deaths resulting from drought stricken malnutrition are rising, and also because the nearest medical dispensary is 6 kilometers away by foot. The nearest hospital is 50 kilometers away in Lorgum. They say sick residents who are too weak from hunger cannot make the journey by foot. Young people told us they have accompanied people who have died along the way from weakness and lack of water.

Sadly, these residents’ plights are representative of the long standing drought plaguing Turkana, where hunger reached Emergency levels of food insecurity (IPC 4) between March and June earlier this year.

The Intergovernmental Panel on Climate Change (IPCC) [points out](#) that food insecurity, malnourishment, and chronic hunger due to failed crops are often overlooked losses of human assets as a result of climate events. This situation was made worse by Russia’s decision to pull out of a grain deal that allowed the export of Ukrainian agricultural goods which Horn of Africa countries are wholly dependent upon. Ayan Mahamoud, a climate resilience expert with the East Africa Intergovernmental Authority on Development (IGAD) trade bloc [said](#), “ending the Black Sea Grain Initiative is adding challenges for countries already experiencing the effects of a changing climate.”

Diminished Access to Clean Water

In many of Kenya’s most vulnerable communities, long-standing marginalization and underdevelopment are converging with climate shocks to exacerbate drought conditions for populations who have never had safe, sustainable access to clean water. Now climate change is making that vulnerability downright deadly for some communities we met. In Turkana, 90% of the population lives below the poverty line, and [only 40%](#) of the population has access to clean water.

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Loss of Life

Lorengippi Village, Loima sub-county, Turkana County

Residents in Lorengippi village echoed many of the same challenges shared by other Turkana pastoralists, as well as alarming details of several community members who have died in recent years at community water holes. With increasing water scarcity, residents have had to repeatedly dig new, deeper and wider water holes in Lorengippi, requiring several people to create an assembly line of water collection. During these collections, several water holes have collapsed, killing multiple people. Deaths resulting from collapsed water holes even inform the name of the village. In Turkana, “Lorengippi” literally translates to “red water.”

Another water hole, “Akinpipu” means “girls”, so named because the water point is used by many young girls who fetch water for their families, and who lost their lives in the process. People here depend on shallow wells they dig themselves. As pictured here, for many, this is their only source of water. This is certainly reflective of failed development in this region, but now also the increasing effects of climate change.

“Water holes are increasingly dry,” Lorengippi residents say, creating situations where multiple holes need to be dug ever deeper, where once the water runs dry, another hole, even deeper, is dug again. This process has led to further deaths.

Nakanjakal water point is one such where three people died in 2021 when the water hole collapsed upon them. Kapesa water hole collapsed in 2020, killing eight people. At Lowsobani water hole, two people were killed in 2014.

The World Meteorological Organization’s State of the Climate in Africa report [warned](#) “water stress and hazards like withering droughts and devastating floods are hitting African communities, economies and ecosystems hard.” Focusing specifically on water, scientists [concluded](#) that four out of five African nations are unlikely to have sustainably managed water resources by the end of this decade.

All of these deaths have been reported to the Kenyan federal government, who have retrieved the bodies. The high risk of increasing deaths in this manner are a deep concern for community members, who are experiencing increasingly treacherous conditions in Kenya’s current drought. Unfortunately, water holes are vulnerable to more than just collapse and drying out. Flooding events often destroy boreholes too, such as in 2020 when at least [32 boreholes](#) around Lake Turkana were submerged or otherwise destroyed, including several that supplied Lodwar, northwestern Kenya’s largest town. As more boreholes are destroyed, residents are forced to keep drilling, which can weaken the land and lead to [sinkholes](#), further reducing the utility of remaining land. The result is a vicious cycle that will only worsen as water scarcity increases.

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In the absence of adequate development initiatives to meet this most basic human need - which is also enshrined in the Sustainable Development Goals - in a way that is sustainable and safe, communities in the region will continue to rely on boreholes, whether government-dug or self-dug, even if they become less reliable and more dangerous with worsening climate conditions.

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Environmental Degradation:

The Case of Prosopis Juliflora or Mathenge in Kenya

Location: Baringo and Turkana Counties, Rift Valley, Kenya

Population: Indigenous Endorois People, Turkana, Ilchamus and several other minority groups

Climate Change Events: Slow-Onset Flooding, Extreme Heat, Rainfall Variability

An evergreen thorny shrub or small tree, *Prosopis juliflora* is a mesquite plant producing small pods found throughout Mexico, South America and the Caribbean. The plant is considered an [invasive species](#) in Kenya and throughout East Africa. In the arid and semi-arid regions (ASALs) of Kenya, it has been found to [negatively impact](#) livestock cultivation in pastoral communities, which is now being exacerbated by climate change.

During Climate Refugees' visit, Mathenge was observed growing wildly throughout Turkana and Baringo Counties, blanketing the region. It's especially problematic in Baringo where the plant was [introduced](#) in 1982 seemingly by the Kenyan Government's Kenya Forestry Research Institute (KFRI) and the FAO.

The plant's introduction to Baringo was part of the [Fuelwood Afforestation Extension project](#), initiated as a means to protect natural vegetation from overexploitation from growing populations, reduce soil erosion, prevent desertification, reduce the effects of dust storms and to provide firewood and livestock fodder for pastoralists.

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While it has done some of that, the plant has taken over all other natural and indigenous plants in the area. It is notoriously hard to manage because it bears constant fruit, germinates and grows on contact to any moisture, and when cut, regrows rapidly. Today, the plant is considered one of the world's [100 worst](#) invasive plants.

Mathenge thrives in high temperatures and humidity, and once grew rapidly during periods of El Nino rains - climate change impacts that are now a mainstay in Kenya. According to Mongabay, "it restored the landscape, but also [displaced](#) native vegetation and people."

The plant is so invasive the Ilchamus community of Baringo County brought a lawsuit against the Kenyan government in 2006. The residents' [complaint](#) charged that they were misled to believe that *Prosopis juliflora* would curb deforestation and provide livestock fodder and firewood, while in reality the plant's rapid overgrowth killed indigenous plants in the area, causing a loss of pasture land and livestock and led to the blockage of roads, footpaths and rivers.

Other communities in Turkana see the effects of the drought being amplified by deforestation and the Mathenge plant. "Our forests are damaged. We used to have acacia trees everywhere that provided shade. Now trees are dying; we not only have no water, we also have no shade to protect us from this heat."

Scientists' findings concur with community experiences, pointing to the invasive nature of the plant that has now spread rapidly into natural shrubs, grasslands and croplands. A [2019 study](#) undertaken by researchers at the Institute for Climate Change and Adaptation at the University of Nairobi found that the plant's rate of invasion is a major threat to the environment, economy and people, precisely because it depletes the groundwater table, suppresses rural livelihoods, negatively impacts livestock health and production, and increases costs of crop cultivation.

Using satellite data, the study also documented the shrub's rapid expansion from 882 hectares in 1988 to 18,792 hectares in 2016. In that same period, grasslands declined by 86%, irrigated croplands by 57% and rainfed cropland by 37%. The authors [concluded](#) that besides weather changes, deforestation, overgrazing and land clearing, the "Prosopis invasion was the cause of over 30% of these negative changes and the biggest driving force behind shrinking grasslands and croplands in the region." The authors say the extensive growth of *Prosopis* is accelerated from seed spread by livestock and wildlife to [extreme climatic events](#) like the 2013 floods, causing significant economic damage by severely limiting livestock production, increasing agricultural costs and consuming a lot of water.

Kenya's Environment and Forestry Cabinet Secretary recently declared *Prosopis* a threat to national security. Speaking in Baringo County on 2022 UN's World Day to Combat

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Desertification and Drought, Tobiko [cited](#) the plant's devastating effects in 20 Kenyan counties, spreading at a rate of 15% yearly and occupying 2 million hectares of land.

Local residents told Climate Refugees they feed their livestock the seed pods that Prosopis produces, and following a plant management program instituted by the Kenyan government, communities harvest the mesquite trees to produce charcoal, a carbon-based fuel, and other commercial products as sources of income. Charcoal production is prolific throughout the region, and was widely observed during Climate Refugees' travels.

Turkana county is believed to have the most Mathenge trees in the country, amounting to twice the size of the massive Masai Mara National Reserve. Impoverished Turkana residents are concerned about the plant's impacts on farms, animals and groundwater, but survive on contracts to supply firewood to Kakuma Refugee Camp and through [production of charcoal](#). A youth leader in the Turkana village of Loya spoke passionately about the uncontrolled spread of Prosopis "contributing a lot" to challenges like a lack of grazing land and water. "Governments must come together to solve the problem of the Prosopis," he said. "We don't need short-term food relief, we need long term solutions like eliminating the Prosopis tree and replacing it with good trees."

Until recently, the Kenyan government has been controlling the spread of Prosopis through a 'management by utilization' method, filling shortages in firewood and charcoal that about 70% of Kenyans rely upon, however the strategy has not stemmed the [annual growth rate](#) of 4 to 15%. Not only is the plan ineffective in curbing the plant, it is also unsustainable. The government pursued a deforestation alongside reforestation policy by encouraging communities to reseed harvested areas with grass to sustain livestock, possibly explaining the observed increase in grassland between 2009 and 2016. However, the [study's results](#) concluded the plant management scheme is ultimately ineffective because residents do not completely remove the plant stumps, resulting in the plant's continued regrowth.

Even if reforestation had been successful, the deforestation part of the plan is counter-productive to efforts to curb climate change. According to the UN, an estimated [1 to 2.4 gigatons of CO₂e](#) of greenhouse gasses are "emitted annually in the production and use of fuelwood and charcoal, which is [2-7% of global anthropogenic emissions](#)." With about 70% of Kenyans reliant on charcoal for energy, the high carbon emissions in charcoal production via traditional kilns exacerbate the already extreme climate effects and pose health risks to highly vulnerable communities. According to one study by the Environment and Forest Ministry, the totality of Kenya's Mathenge trees could produce [30 billion Kenyan shillings or 295 million USD](#) worth of charcoal. Thus alternate clean fuels or in the absence of that, sustainable charcoal production that reduces emissions and lower health and climate risks must be a top priority.

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Noting the utilization methods ineffectiveness, the Kenyan government has now introduced a National Strategy and Action Plan to [manage](#) the colonizing plant through a combination of biological, chemical, mechanical and utilization methods that will involve communities in prevention and intervention systems.

Solutions:

The plant is having devastating impacts on peoples' lives. Their testimonies and the legal actions pursued by local communities more than confirms that. In the era of the climate crisis, there is a need for their concerns to be heard, further studied and truly addressed, chiefly to definitively assess whether *Prosopis juliflora* is contributing to adverse impacts of climate change, and to incorporate the realities of the plant into any existing and future environmental, climate, economic, and human security policymaking.