

Environmental concerns in Kenya.

There are several environmental concerns in Kenya. The major ones include

- i. Water resources (The major one)
- ii. Animal poaching
- iii. Deforestation
- iv. Littering and solid waste collection
- v. Flooding

Let us now discuss each in detail.

1. Water resources

Water resources in Kenya are under pressure from agricultural chemicals and urban and industrial wastes, as well as from use for hydroelectric power. The anticipated water shortage is a potential problem for the future. For example, the damming of the Omo river by the Gilgel Gibe III Dam together with the plan to use 30% to 50% of the water for sugar plantations will create significant environmental problems. It is estimated that up to 50% of Lake Turkana's water capacity will be lost. Had there been no planning of the irrigation of sugar plantations, the dam itself might have had a net positive effect to the environment, due to the emission-less power generation of the dam. Water-quality in Kenya has problems in lakes, (including water hyacinth infestation in Lake Victoria), have contributed to a substantial decline in fishing output and endangered fish species.

Water scarcity in Kenya

Water scarcity in Kenya is affecting the Kenyan population which relies on water resources, not only for drinking but also for agriculture and fishing. For example, wetland grasses are used to feed and keep livestock. Human populations throughout Kenya have been affected by a lack of clean drinking water due in large part to the overuse of land and increases in community settlements. A specific example of this is in the Mau Forest, in the highlands of Kenya, that is a major watershed for the country. In the Mau Complex, individuals have used land for their personal gain, creating homes and farms at the expense of the natural biodiversity. The destruction of trees throughout the forest has caused severe soil erosion, which pollutes the water. This phenomenon exists all over the country and with the addition of animal and human waste into already polluted water, it has made finding clean water generally more difficult for Kenyans. The current water conditions have caused a number of issues including many diseases and tribal conflicts over the remaining water resources. Additionally, as clean water becomes harder to find, women are forced to walk for many miles each day to find the water needed for the family. Another huge problem with clean water in Kenya has been an influx of individuals moving to large cities such as Nairobi, which creates large slum areas that have some of the worst living conditions and most polluted water in the country. This interaction between humans and water is currently at a crucial point in Kenya as the nation faces a major shortage in the ability for citizens to

receive the water they so desperately need. Significant improvements in land management and environmental policies can help make sure that this country has the water it needs on its way to becoming a developed country.

Population growth

Understanding Kenya's environmental situation requires looking not only at the environment but social, economic, and political factors that play an important factor in a still-developing country. With a quickly expanding population, sustaining the environment and sustaining the growing population is a challenge. The population continues to increase while the economy and resources struggle to keep up. Kenya's population faces high rates of poverty, up to 43% in 2000. In a population that relies heavily on agriculture as a way of life, it is difficult to limit agriculture and protect the environment without taking away a resource many people in this growing population need to survive. The quickly growing population puts pressure on water resources through agriculture, land and energy uses as well as other factors. The geographic location of water resources in Kenya is also a key factor. Water is not distributed equally throughout the country, leaving large places of drylands. About 80% (percent) of Kenya's water resources are completely unprotected but not undamaged by the growing population and agricultural practices.

Wildlife

Kenya's water systems are recognised internationally for their importance to species diversity and bird migration. Water issues directly affect wildlife, since the availability of drinking water is a necessity for survival. Wildlife is also indirectly affected by the human population's use of water to support livestock and agriculture, which compete with wildlife for limited water resources. Kenya is known for its species diversity and richness; it is in the top 50 countries of species richness. It also has one of the highest percentages of threatened mammal species.

Impact of deforestation on water resources

Forests are important in protecting water catchment areas. When large areas of forest are logged, ecosystem services such as water supply may be negatively affected. Kenya has one of the most diverse forests in East Africa, but these forests are threatened because they are heavily used as a source of fuel or converted to agricultural land. Logging for fuel is one of the main reasons forests are threatened. Out of 22 million tons of wood products used in Kenya, 20 million are used for fuel. Large areas will continue to be deforested if current logging rates and population growth do not decrease. An additional problem when land is deforested for agriculture is that forests often grow on poor soils that are unsuitable for agriculture. Therefore, farmers continue deforesting new areas when soil nutrients become too scarce to support crop-farming. There is a great deal of activism surrounding water resources in Kenya. The communities that are affected by these water issues have many solutions to these problems. There are also many organisations that aid these communities.

However, this has not solved the problem. There are simultaneously many forces that work against the solution to the water problem in Kenya. There are several organisations that work towards helping cope and solve the water problem in Kenya. Quest4Change, water.org and WaterRelief are examples of such organisations. Through their work, they have provided clean water to many people who need it. Building wells is one thing that these organisations often do. Though the actual production of the well only takes a few days, the planning takes a few months. It is found that when communities request help building a well, these communities are more successful in maintaining their water supply than communities that are approached and just given a well. A water committee is elected to guide the well building process. Many materials such as stones need to be hauled to the site. Geological surveys show if there is a good site. The hole is drilled and once water is hit a pump is installed and cement cap put in place. This allows people in Kenya to have a safe, accessible water source. These organisations also build small dams for communities. This allows communities to have water sources in times of droughts and gives them more reliable access to and consumption of clean water. Education is another important aspect of these organisations. They teach people the importance of having clean water and proper sanitation to prevent disease and increase health.

Mau Forest

The Mau Forest has lost a fourth of its original cover since the 1980s. Ogiek people have traditionally occupied the forest. They maintain a hunter-gatherer lifestyle that is very sustainable. There has been an increase in the population in the forest. Much of the growth has been due to immigration. This new population has cleared forest land and lead less sustainable lifestyles. The land is now being used for housing and industrial purposes. This urban encroachment has led to encroachment and excessive use of the river waters. The drying up of these rivers is very concerning. Many communities use these rivers downstream of the headwaters. Since these rivers are being threatened at their source, they are not providing as much water for the many people that need it further downriver. It also threatens many other natural aspects of the forest. The rivers are important for river flow regulation, flood mitigation, water storage, reduced soil erosion, biodiversity, carbon sequestration, carbon reservoir and microclimate regulation. There have been community movements to save and restore the state of this forest. However, restoring the forest requires the displacement of a little less than 2,000 people who hold land deeds in the forest. There are other efforts to help the people living in the forest do so in a more ecologically friendly way. The Greenbelt movement pays people to plant trees. This is an incentive, but the outcome still seems bleak as these tribes are more interested in their own wellbeing than that of people miles down the river.

Government in Kenya's water crisis

Kenya's government does not have the funds to maintain strong piping systems. More than half of Kenya's population does not have regular access to piped water, and for those that do the water is often dangerously unsanitary thanks to poorly constructed systems suffering from

malfunctions and vandalism. A number of acts and reforms have been put into motion to aid Kenya's situation, but the country still suffers from a water crisis worse than almost any other in the world. In 1974, the government launched the National Water Master Plan, with the goal of having drinkable and available water within walking distance of every household by the year 2000. Due to a conflict between urban areas that have undergone water privatisation and rural areas where investors have been advised against developing, the funds have not been supplied to make this happen. Some corporations have seen a fair amount of success from their efforts to contribute to a healthier water supply. The National Water Conservation and Pipeline Corporation has offered a great deal of aid since its establishment in June 1988. The organisation works to develop dams and dykes, manage flood control, and help with land drainage. They also work for the conservation and sustainability of water throughout the year and the re-use of ground and flood water. Groups operating outside of Kenya have been pitching in as well. Since 1997 the Danish Refugee Council has been providing relief services and contributing to the development of sanitary water systems throughout Kenya and other parts of East Africa. Millions in Kenya have also had water supply systems built by volunteer organisations and self-help groups, usually with funding from donations and support from the Department of Water Development. Still, the country suffers, as do those who share its water sources. Over a dozen countries share basins with Kenya, and at this point there has been no international framework to organise the management of these shared water resources.

Water supply and sanitation in Kenya

Water supply and sanitation in Kenya is characterised by low levels of access to water and sanitation, in particular in urban slums and in rural areas, as well as poor service quality in the form of intermittent water supply. Seasonal and regional water scarcity exacerbates the difficulty to improve water supply. The Kenyan water sector underwent far-reaching reforms through the Water Act No. 8 of 2002. Previously service provision had been the responsibility of a single National Water Conservation and Pipeline Corporation as well as of a few local utilities established since 1996. After the passage of the act service provision was gradually decentralised to 91 local Water Service Providers (WSPs). These were linked to 8 regional Water Services Boards (WSBs) in charge of asset management through Service Provision Agreements (SPAs) with the WSPs. The Act also created a national regulatory board that carries out performance benchmarking and is in charge of approving SPAs and tariff adjustments. With the Water Bill, 2014, the functions of the 8 WSBs were transferred to 47 Water Works Development Boards in each county of Kenya. The Ministry of Water and Irrigation remains in charge of policies for water supply, while the Ministry of Public Health and Sanitation is in charge of policies for sanitation. Although urban water tariffs are high by regional standards (60 KSh or US\$0.60 per m³ on average in 2014), these tariffs only allow the recovery of operating costs, but not the recovery of capital costs. Full cost recovery is not achieved due to various reasons, including a high level of non-revenue water (average of 42%). Based on the unit cost of production, the nationwide losses due to non-revenue water in 2014 were estimated at 5.2 billion KSh, equivalent to US\$52 million. Another reason is the need to tap distant water sources at a high cost in some locations. For example, Mombasa is supplied from a source located 220 km from the city. Although 16% of Kenyans in urban

areas have access to sewerage, there is no sewerage levy in Kenya, making this expensive service essentially free of charge.

Data sources and interpretation

Collecting reliable data on the Kenyan water and sanitation sector is difficult because reporting is often incomplete and different definitions are being used. Two sources of nationwide representative information are censuses carried out every ten years, with the next one scheduled for 2019, and Demographic and Health Surveys carried out every five years by the Kenya National Bureau of Statistics. The data thus collected are analysed by the Joint Monitoring Programme for Water Supply and Sanitation of WHO and UNICEF to assess progress towards achievement of the Sustainable Development Goals. These data only assess the availability of water and sanitation infrastructure. They do not assess whether water is safe to drink, sufficient in quantity, continuously available or affordable. Another important source of information is the annual "impact report" published by the water regulatory agency WASREB since 2008. Through this report much more detailed information is publicly available today on many water service providers than in the past and than in many other countries. However, data in the report refer only to the population served by Water Service Providers, which is not the entire population of Kenya, omitting particularly parts of rural areas.

Water quality. In 2015 WASREB reported that 23 utilities provided good quality water (defined as more than 95% compliance with standards), 15 acceptable quality and for 53 utilities water quality was not acceptable (defined as less than 90% compliance). The two parameters measured were residual chlorine (40% weight) and compliance with bacteriological standards (60% weight). If the number of samples taken was lower than foreseen in the standard, the compliance was rated lower. The highest compliance was achieved in Kericho and Kisumu with 100% each. A citizens' report carried out in Nairobi, Mombasa and Kisumu in 2007 provided information about customers' perception of water quality: around 70% of households using water from connections to the mains said they found the taste and smell of water acceptable, and that the water was clear. Even so, the vast majority of respondents treat water prior to consumption, which shows continuing uncertainty about its quality.

Wastewater treatment. According to an assessment report carried out in 2009, there are 43 sewerage systems in Kenya and waste water treatment plants in 15 towns (total population served: 900,000 inhabitants). The operation capacity of these wastewater treatment plants is estimated at around 16% of design capacity. The main reasons for this inefficiency are inadequate operation and maintenance and low connection rate to sewers. In Kenya, the estimated connection rate is 19%. Of the wastewater that enters the sewer network, only about 60% reaches the treatment plants. The most common solution used for wastewater treatment in Kenya are waste stabilisation ponds. One of them is the Dandora Waste Stabilisation Pond System which treats the industrial and domestic sewage from the city of Nairobi and is the largest pond system in Africa. Mixing industrial effluent and domestic

sewage in mixed sewer system, however, often causes poor performance in Kenyan pond treatment systems. The Citizen Report Card moreover indicates that septic tanks are often used for the disposal of wastewater from flush toilets in Mombasa. Pit latrine users from Nairobi, Kisumu and Mombasa indicated that some wastewater empties into storm sewers, soak-aways and cess pits designed for kitchen waste, thus causing environmental pollution. In 2001 a pollution incident occurred in the town of Embu. Raw sewage was discharged from sewage treatment works into a nearby river and caused the death of 28 people who used the water downstream for domestic purposes.

2. Animal poaching

There are a wide variety of wildlife species in Kenya, whose habitats are threatened by encroachment of man and the poachers that live in rural Kenya. Michael Werikhe aka Rhino Man, pioneered Kenyan wildlife conservation. Werikhe walked thousands of kilometres and raised millions of dollars to fund White Rhino conservation projects. The Blue Wildebeest is currently abundant, but like other more endangered species feels the pressure of habitat reduction. This wildlife consists of lions, elephants, gazelles, and rhinos. Between 1970 and 1977, Kenya lost more than half of its elephants. Though elephant hunting has been banned for 40-years in Kenya, poaching has not reduced. Given the poverty of many of the people, and the high value of elephant tusks, they are shipped overseas and sold on the black market. Although Kenya has many national parks and reserves protecting wildlife, elephant populations are still at risk, a problem which is made worse by corruption and some officials supplementing their income with permitting poaching. In 2020 February, Poachers in Kenya Killed two White Giraffes. The Female White Giraffe and her calf were found dead in Garissa County which is the North east part of the country. This left the country and the world with only one white male giraffe.

3. Deforestation

Forestry output has also declined because of resource degradation. Overexploitation over the past three decades has reduced the country's timber resources by one-half. At present only 2% of the land remains forested, and an estimated 50 square kilometres of forest are lost each year. This loss of forest aggravates erosion, the silting of dams and flooding, and the loss of biodiversity. Among the endangered forests are Kakamega Forest, Mau Forest and Karura Forest. In response to ecological disruption, activists have pressed with some success for policies that encourage sustainable resource use.

The 2004 Nobel Peace Prize went to the Kenyan environmentalist, Wangari Maathai, best known for organizing a grassroots movement in which thousands of people were mobilized over the years to plant 30 million trees in Kenya and elsewhere and to protest forest clearance for luxury development. Imprisoned as an opponent of Former president, Moi, Maathai linked deforestation with the plight of rural women, who are forced to spend untold hours in

search of scarce firewood and water. Widespread poverty in many parts of the country has greatly lead to over-exploitation of the limited resources in Kenya. Cutting down of trees to create more land for cultivation, charcoal burning business, quarrying among other social and occupational practices are the major threats of environmental degradation due to poverty in rural Kenya. Regions like Murang'a, Bondo and Meru are affected by this environmental issue. Kenya had a 2018 Forest Landscape Integrity Index mean score of 4.2/10, ranking it 133rd globally out of 172 countries.

Impacts

The impact of deforestation in the Kenyan water has been one of the most notorious; This is present in lake Naivasha and its surrounding communities. Lake Naivasha, located west of Nairobi, receives its water from the Aberdares mountain where the rivers and streams that originate in the mountains serve as transport of water. The forest in the Aberdares mountains traps moisture and keeps temperatures fresh, provides cloud cover, and creates the rainfall that feeds the streams and rivers. The high levels of deforestation in the area have interrupted this natural cycle and affected several lakes such as Naivasha. With many trees in the Aberdares mountains gone, the forest is no longer trapping moisture or creating rainfall; thus, the water levels in Lake Naivasha have decreased. The scarcity of water has directly impacted flora and fauna of the region and It has also impacted local communities whose source of water is lakes such as Naivasha. Deforestation in Kenya, specifically in the Mara River basin, has also caused soil erosion and an increase in flooding. Deforestation increases land erosion because forests help hold in place essential nutrients in the soil. From the early '70s to the early 2000s, the savannah, grassland, and shrub-land in the Mara river basin have decreased by 27% in part due to agricultural land usages doubling during the same period. As a result, land erosion has increased in the upper catchment while lower areas have experienced an increase in flood by 7% and a 387% increase in Mara wetland during the same period that deforestation increased.

Response

As a result of high deforestation rates and its negative impacts, the Kenyan government has made efforts to stop it. The first signs of forest conservation in Kenya happened in 1957 with a policy that sought to preserve the forest in order to protect water catchments and promote sustainable development of the forest industry. As a result of research and detailed data, in the early 2000s, the Kenyan government further pursued the protection of forests by enacting a policy that both addresses socioeconomic and environmental challenges. One of the most notorious examples being the 2005 Forest Act that continues to be an example of forest policy today. The 2005 Forest Act required public participation and collaboration with local communities to develop forest management plans while respecting their cultural traditions. In addition, the 2005 forest act acknowledged the ability of sustainable practices to reduce poverty and sustain necessary environmental resources. More recently the Kenyan government has sought new legislation that further incorporates local communities and promotes economic development. Some critical aspects of today's forest reform include the

creation of the Kenya Forest Service, public and professional involvement in resource management, creation of a conservation fund, and conservation of the complete forest ecosystem, which includes water, flora, and fauna. Additionally, other forest conservation efforts have been implemented with agricultural reform. The Kenyan Agriculture act included new measures that required every agricultural landholder to conserve 10% of forest cover in their land.

4. Littering and solid waste collection

Littering and the illegal dumping of rubbish is a problem in both urban and rural Kenya. Almost all urban areas of Kenya have inadequate rubbish collection and disposal systems. This affects the environment. There's a problem of plastic and nylon papers and other industrial grade litter that negatively impacts on the ecosystem endangering some animal species such as some birds and fish.

5. Flooding

There is the risk of seasonal flooding during July to late August months. In September 2012, thousands of people were displaced in parts of Kenya's Rift Valley Province as floodwaters submerged houses and schools and destroyed crops. It was especially dangerous as the floods caused latrines to overflow, contaminating numerous water sources. The floods can also cause mudslides. Two children were killed in September 2012 following a mudslide in the Baringo county, which also displaced 46 families.

Summary.

Unless we take care of the environment which in turn takes care of all living creatures, we are slowly killing our livelihood and biodiversity and the coming generations are going to pay for it. Courses such as this one have been introduced to create awareness and sensitization to students who will impact positively in making changes.

The main causes identified for the loss of biological diversity are:

- (i) Habitat loss, fragmentation and modification;
- (ii) overexploitation of resources; and
- (iii) chemical fertilizers, pesticides and oil pollution.

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