

Study unit 5: The Different Natural Resources, Challenges and Strategies for Their Management

5.0 Overview

Uganda's economy relies heavily on natural resources such as land, water, fish, wetlands, livestock, forests, minerals. These are a source of livelihood and are a means of overcoming poverty for the majority of the population. At present, the natural resources contribute 54% of the country's GDP. Uganda's population living in rural areas and employed in natural-resources-based activities, particularly agriculture, is over 85%. This calls for the sustainable use of natural resources while ensuring continued poverty reduction (Kabanda, 2003). This unit looks at the different components of the environment, how they relate to development and their contribution to peoples livelihood. It also looks at the inter-relationship between these components so that one is able to know the importance of conserving all of them as one and acknowledge the notion of environmental unity. It also highlights challenges, threats and strategies for management of natural resources and environment

5.1 Land resources

Uganda's land consists of 35% farmland, 21% grassland, 20% forest/woodland, 15% water bodies, 6% bush land and 3% commercial farms/urban areas. Settlement patterns vary, ranging from densely populated to uninhabited (SoER, 2002). In Kenya, agriculture is the leading sector of the national economy employing 80% of the population and accounting for 26% of Kenya's GDP. However, Kenya has not yet put its available land resource to full use. Out of the 9.4million of potentially cultivable land, only 2.8million is devoted to agriculture which heavily relies on rain fed production with very little irrigation. This has resulted into food insecurity in the country.

5.1.1 Important aspects of land;

- crop production
- grazing livestock
- settlement (building homes, institutions, business premises)
- industrial production

- fish farming
- road construction
- source of raw materials such as clay, brick/block making and stone quarrying
- filters water
- source of minerals such as copper, petroleum, gold etc) and
- Provides a base for lakes and rivers, housing structures, space for roads and recreation grounds.

5.1.2 Challenges facing the land resource

Soil erosion is one of the major environmental problems in Uganda. It accounts for over 80% of the total cost of environmental degradation in Uganda (SoER, 2000/2001). Mountainous and hilly areas such as Kabale, Kisoro and Mbale experience this problem the most. Human activities, without paying attention to establishment of soil erosion controls, have greatly contributed to the degradation of this resource. Some of these activities are bush burning, deforestation, over grazing, farm waste burning, continuous cropping of land, and cultivation of sensitive areas such as hilly areas, forests and wetlands. These practices weaken and loosen the soil, and in the event of a down pour, it just washes away the soil; taking with it all the fertile soils that is meant to support agricultural productivity.

In addition to this, population increase has also contributed to degradation. Land has continued to become scarce and yet the population has kept increasing. This has resulted in land fragmentation and over cultivation of these small pieces of land which has also made the soil lose its fertility.

Urban sprawl is another threat to the land resource. Due to population explosion, urbanization as well as industrialization has been on the increase. This has made people over cultivate the land to meet the food demand for the population and the industries have degraded the land by dumping their waste on the land.

Other challenges include;

- over grazing of land
- use of agro-chemicals
- Continuous cropping without manuring the soil.

5.1.3 Action to minimise land degradation

- Mulching, planting trees, providing vegetation cover over the soil, better designing of landscape. Where applicable keep a permanent soil cover in over the land such as recreation
- Other forms of minimising land degradation include, for example, large scale agricultural projects that are required to undertake EIA before commencement of business, should adhere to the EIA mitigation measures.
- Local leaders should discourage communities burning bushes
- Control population growth
- Link farmers to services of agricultural extension officers
- Monitor and report issues relating to land use to relevant authorities
- Make and enforce bye-laws for proper land use e.g.in Kampala suburbs there are notices that “no dumping fine 50000”

5.2 Water Resources

The water resources include surface water and underground water. The surface water includes wetlands, lakes, rivers and streams while underground water includes protected springs and boreholes.

Water is very important to life. Animals and plants life depend 90% on water. In Uganda, the water bodies constitute 15% of the area, which is about 36,280km² (SoER 2000/2001). Water can be for domestic use like washing, bathing and cooking or for industrial use for running machines and cleaning them.

5.2.1 The benefits and uses of water resources

- source of water for domestic and industrial purposes
- source of food e.g. fish
- transport and navigation
- climate regulation
- habitat for fresh and marine life
- Source of tourism because of the beauty hence bringing income to communities.

However, some countries, Uganda inclusive, are experiencing a water crisis which is mainly caused by activities such as poor irrigation methods, deforestation and water reclamation or diversion.

5.2.2 Challenges faced by water resource

Human activities have reduced the quality and quantity of water. Dependency and over reliance on agriculture has made people search for fertile lands and they have resorted to river banks and lakes. As they practice agriculture, they use fertilizers and insecticides to improve on their crops productivity. This has led to pollution and has created eutrophication of the water bodies. Eutrophication is the growth of algae (algal bloom) in the water bodies due to increase of nutrients (phosphorus and nitrogen) in the water body. When the water is eutrophied, the algae cover the top layer and block the sunlight and oxygen exchange in the water body. So, all the aquatic life (fish, plants, animals etc.) end up lacking the two components and soon die. When they die, they contribute to sedimentation of the water body thus making the water poor for human consumption.

Encroachment on the river banks and lake shores for agriculture has also led to silting of the water and frequent flooding.

Channeling of water from its natural course for fish ponds have sometimes contributed to drying of water bodies such as streams and artificial dams in hot seasons.

Poor planning and scarcity of land has also affected the water resources. Pit latrines have been constructed near sources of water such as wells. This has also polluted the water because the waste goes straight to the water body without any treatment. Related to this, is the dumping of household and industrial waste into the water bodies.

The increase in industrialization and urbanization has also threatened the life of water bodies. Apart from using them as a dumping ground for waste, transportation and exploration of oil has also affected the water bodies. Oil spills are usually experienced as tankers transport the oil from one place to the other. There are also cases of accidents on the water bodies involving motor boats, ferries and ships. The deliberate dumping of oil into the water system has happened in some places. This oil blocks the oxygen and sunlight exchange thus causing death to aquatic life.

Related to the water resource, is the fisheries industry. It has reduced on the water resource potential due to the poor fishing methods by the fishermen. They use trawlers and chemicals in order to increase on the catch. This has resulted in over-fishing and the disturbance of breeding zones thus affecting the fish diversity.

Although to some extent the water hyacinth is on the decline in the water bodies of Uganda, it still remains a major pollutant. Suspension of decaying organic matter from the weed as well as changes in water color and the unpleasant odour are not suitable for most fish species (NEMA, 1997). The infestation of the water bodies by the water hyacinth also affects the fisheries resources of Uganda through reduced level of production, a reduction in species composition of the catch. Poor quality fish, rising costs of operation resulting in low incomes to the operators and a higher price of fish and their products is also experienced due to the water hyacinth. However, it is important to note that government has tried to respond to this problem through a combination of biological (using weevils), chemical, manual and mechanical methods to control this water hyacinth and slowly its being tamed. They have also involved all stakeholders-the public (central and local governments), private sector, civil society organizations and fisher folk communities to tame the water hyacinth (SoER, 2002).

5.2.3 Strategies to control water resources degradation

- Promotion of proper sanitation and hygiene in households since these are the main pollutants e.g. access and availability of pit latrines since their absence leads to scattering of faecal matter which is washed by run off to water bodies hence increase in disease epidemics.
- Related to the above is proper management of solid waste which also due to poor management ends up finding its way in water bodies and increases on the Eutrophication and hence affecting the aquatic life.
- Need to enforce the regulations and standards of effluent from industries as they are also contributing a lot to surface and underground water pollution. Polluter pays principle needs to be enforced seriously.
- Review of policies and laws managing water resources since the present laws seem to be weak to effect proper management.

5.3 Wetland Resources

Wetlands have been defined differently by different people and so there is no definite definition. However, in simple terms a wetland is a vegetated area of land that is flooded either permanently or seasonally. In Uganda, wetlands are normally referred to as swamps and in most cases they border rivers and lakes. Wetlands cover about 30,105km² representing 13% of the total area of Uganda (SoER, 2000/2001). Wetlands have both direct and indirect

income generating opportunities for the people in form of goods and services that would improve the quality of their living conditions. Wetlands contribute to the livelihoods of people, especially those in rural areas where households engage in activities like papyrus harvesting for making crafts in order to bring income to the households. Wetlands also have direct and indirect benefits/ values.

5.3.1 Benefits of wetlands

Direct benefits (socio-economic functions) are assessed in terms of the direct use of the resource for the satisfaction of human needs and they include;

- source of water for domestic and industrial use
- fishing, wood fuel
- construction materials
- land for agriculture/cultivation(margins)
- transport
- tourism
- pasture/forage for livestock
- medicinal plants
- craft materials (papyrus) and
- Mulching materials.

Indirect benefits (Ecological functions) are assessed in terms of the functions or roles that contribute to human satisfaction, but are a result of something such as the physical make up of the wetland. These benefits include;

- flood control
- water filtration
- ground water discharge and recharge (it acts as an outlet for ground water and inlet point for surface and ground water)
- sediment/silt retention
- micro-climate regulation
- shore stabilization
- wildlife habitat and
- Cultural sites.

5.3.2 Challenges faced by wetland resource

Human population and human activities have contributed to degradation of the wetland resources. Wetlands have been drained in search of fertile land for agriculture and dairy farming. They have been filled with murram, rocks or any other solid matter for industrial and residential developments

Resources have been over-extracted for craft materials (e.g. Papyrus), and some have been burnt for easy access to the clay and sand as well as other natural products.

The wetlands have been used for brick making, sand mining and clay extraction, as well as discharging solid and liquid waste. For example, wetlands in Ethiopia are very valuable areas for rural communities. They contribute directly to food security by providing vegetables in the early rainy season when the supply of food from the upland fields is running out for many families. However, wetlands are being degraded due to human related activities such as draining for agriculture, cattle grazing, industrial pollution and unsustainable utilization of resources. This has been made worse by the lack of a Wetland's Policy at the national level. All these activities have made the potential and values of wetlands disappear, hence affecting the ecosystem and peoples' livelihood.

5.3.3 Effect on the wetlands and people's livelihoods

Unsustainable use of these wetlands has resulted into loss of wildlife, such as fish, which not only contributes to economic growth through export, but also supports subsistence living. Some plant and animal species have become threatened, meaning that the future generations may not see some of this wildlife if they become extinct. For example, there are certain animal species (like Sitatunga) that depend on wetlands for survival, and are a tourist attraction. However, with high degradation of the wetlands, these birds will have no habitat and so they will have to die. Burning of wetlands, and over extraction of wetland resources, has affected the wetland by making it lose its biodiversity (flora and fauna) and this has resulted into lack of wood fuel, herbal medicine, craft materials and building materials.

There has been a reduction in the water supply and quality, because the soils and vegetation that help in filtering and retaining water, so it can be supplied in the dry season, have been destroyed. This has led to reduction in crop yields, hence famine.

In addition to this, the water catchments and flood control function of wetlands has also been impaired, hence contributing to increased cases of strong floods and higher incidences of diseases.

Using wetlands as dumping areas for solid and liquid waste has affected the water quality and this, in turn, has increased the costs for water treatment as well as the incidence of diseases.

Wetlands play an important role of climate regulation. However, with the unsustainable utilization of its resources, this function will not be performed. This would cause a reduction in rainfall and humidity, a reduction in crop yields and hence famine and poverty.

Many of these problems have come about because of population pressure, lack of enforcement of environmental laws and regulations on wetlands and confusion still persists over the rights and obligations of ownership and management. There are also information gaps regarding the functions, values and importance and alternative sources of income have not yet been identified. With these effects in mind, there is a need for man to change his ways and attitudes about these wetlands, since they are such valuable resources that promote peoples' livelihood and development.

5.3.4 Strategies to control wetland degradation

- Review of policies and laws governing wetlands and making sure that communities are involved in enacting and implementation of these policies since most times they are not understood.
- Improving soil fertility so that people don't have to look at wetlands for agricultural use.
- Promotion of sustainable aquaculture (fish farming) as an alternative to fishing in the wetland and other water resources.
- A lot of sensitization and awareness campaigns on the value of wetlands to the communities and leaders through various methods such as use of demonstrations, charity walks, role plays and drama.
- Collaboration and coordination of different institutions, NGO's, CBO's, international organization, politicians and communities in planning and management of these resources.
- Local leaders should conduct community awareness on the importance of wetlands

- Local leaders should mobilise community members to form wetland user groups and participate in planning and management of wetland resource
- Monitor and report any wetland management concerns to relevant authorities like local environment committees, district environment officer or NEMA
- Local leaders should make and enforce bye laws for better management of wetlands
- Local leaders should discourage the burning of wetlands
- Local leaders should educate their communities about policies and laws governing wetland in Uganda, and that no one is allowed to develop a wetland for any reason without getting NEMA's approval.
- Local leaders should discourage over harvesting wetland products
- For any cultivation activities that may lead to wetland drainage, the district environment officer should be consulted for guidance and advice.

5.4 Forest Resources

A forest is an aggregation (or natural occurring) of indigenous tree species that are self renewing, continuously changing (dynamic) and covering large areas. Currently, Uganda has about 490,500km² of forests consisting of tropical high forests and Savannah woodland (SoER, 2000/2001).

However, it is important to note that natural forests have kept on reducing due to human activities. Planted forests are therefore being promoted and have become common. The difference between a forest and woodland is that woodland is characteristically shorter than a forest and the canopy is dense for a forest. Forestry makes a substantial contribution to the economic development and the well being of the people of Uganda. Some tropical high forests include Kalinzu, South Maramagambo, Budongo, Bugoma and Mabira forest reserves.

5.4.1 The benefits from these forests include;

- Timber products
- wood fuel
- poles
- food (fruits, vegetables, mushrooms, and meat)
- handcraft materials
- water

- medicine and
- They bring in income and employment.

Forests, like wetlands, also have indirect benefits such as;

- Soil erosion control,
- climate regulation,
- soil fertility maintenance (through nitrogen fixation and mineral recycling),
- shelter from strong winds,
- habitats for plants and animals,
- oxygen renewal and carbon-absorption,
- recreation and beauty and
- cultural heritage etc.

Ovington Derreck (1965) has estimated that the existing forested area of the world represents approximately one half of the original forest area. This indicates that forests have certainly vanished in the face of human onslaught such as with fire, axe, and bull dozer (Dasmann, 1984).

Forests have kept decreasing at an alarming rate worldwide, yet they contribute a lot to our wellbeing. They have been cleared for urbanization and industrialization, as in the case of the Namanve forest reserve in Uganda which was cleared to set up a Coca Cola plant.

The forests have been encroached upon for agricultural purposes as well. For example, the Mabira forest reserve has had indiscriminate felling of trees to rid the area of wild animals which threaten farming activities, and more deforestation due to the harvest of forest products such as timber and logs for construction. There is also bush burning as a result of hunting, grazing and other illegal practices.

5.4.2 Effect on the environment and people's livelihoods

The loss of forests has caused increased soil erosion on hill slopes and in some instances, landslides have occurred in hilly and mountainous areas. This contributes to loss of soil fertility because the top soil is washed away. The washed soil pollutes the water, thus reducing on its quality as well as affecting the water supply for humans and animals.

Forests are water catchment areas, so when they are degraded this benefit is lost. The result is irregular weather patterns and severe drought. This has had an effect on crop and animal yields as well as reduced food security and incomes from agriculture.

Deforestation has also contributed to the reduced supply of basic forest benefits, such as timber, and this in turn has led to reduced employment opportunities and incomes. There has also been the loss of cultural and recreational values and benefits.

Deforestation has led to decline in the animal species diversity. For example, out of the 30 antelope species originally occurring in Uganda, the White bellied, the Bongo and Bay drinker are considered extinct (Mugabe & Clark, 1989). In the 1960s, the African Elephant population stood at 30,000 but today it is about 2,500. This great decline has an impact on the country's tourism potential as well as other values that these animals provide e.g. medicinal value.

With these effects, one can conclude that there is need to manage these forests for sustainable development. There are many ways to manage and one of them is to leave them alone. However, this is not possible since we do not have alternatives, hence the need to think of ways of promoting development, while managing the forests. This can be done by looking at all forest values because, it is by recognizing these values that we shall stop looking at forests as only a source of trees.

5.4.3 Strategies to control forest resources degradation

- There is need to encourage re forestation and afforestation in the country since now, it is not only looked at in terms of environmental rehabilitation but as a source of income from carbon trading.
- Improvement in soil fertility to divert from looking at the forest for agriculture.
- Promotion of alternative wood fuel consumption strategies such as wood fuel saving stoves so that less is harvested and use of bio gas that can be got from animal and human wastes. Subsidizing on electricity tariffs as well as promotion of rural electrification can also reduce on the deforestation since people will have access to use of electricity as a source of energy.
- Promotion of agro forestry in communities since it can even be done on a small piece of land. This will not only save forests but it will promote food security in homesteads and act as a source of income in the long run.
- Collaborative forest management can be encouraged especially for the conservancies so the communities feel the sense of ownership while promoting conservation.

- Training and sensitizing leaders and politicians about the indirect values of these forests and their inter relationships so that they understand and are able to support conservation and proper management of these resources.

The good tree planting and management practices include the following;

- Trees nurseries to produce healthy seedlings: good site selection ,proper nursery size, appropriate shade, proper watering, weeding, hardening off
- Planting woodlots especially on hill slopes and fragile areas
- Agro forestry practices
- Home compound gardens
- Scattered farm trees
- Replanting of harvested areas
- Tending of trees e.g. pruning and thinning
- Selective harvesting of trees

5.4.4 The roles of local leaders in tree planting and management include:

- Support local initiatives for production of seeds and seedlings
- Organise annual tree planting days
- Monitor and report issues related to tree cutting to relevant authorities
- Formulate and implement bye-laws and regulations to guide tree planting
- Support protection of forests form illegal activities like encroachment
- Conduct community awareness on importance of trees ,natural forests and woodlands
- Participate in planning and implementation of forestry plans for gazetted forests
- Regulate use of forest resources through the formulation and implementation of the bye-laws especially for un gazetted natural forests
- Harmonize forest use among the various stakeholders e.g. communities, tourists, pit-sawyers, charcoal burners, researchers, and environmentalists among other users.

5.5 Wildlife Resources (Plants and animals)

These include animals living in the wild and are not domesticated. Some of these animals are lions, antelopes, leopards and elephants. Undomesticated plants in their natural setting such as wild trees and grass fall in this category as well. When looking at Wildlife management,

focus is both on the wildlife in “protected areas” and wildlife resources in unprotected areas. The **protected areas**, where this wildlife is found, include National parks (Queen Elizabeth National park, Lake Mburo National Park), sanctuaries, forest reserves e.g. Sango Bay forest reserves, Mabira forest reserve e.t.c., water bodies, controlled hunting areas, wetlands. Examples of the **non-protected areas** are gardens, ranches and community forests.

5.5.1 The values and benefits of the wildlife resource include;

- Aesthetic purposes (beauty)
- tourism industry
- climate modification (which contributes to steady and high crop yields thus better incomes)
- medicine
- game meat
- fresh air to breath (air purification)
- fruits and
- Clean water.

Wildlife problems or threats are mainly due to the poor management in the wildlife reserves. They have always experienced problems of coordination and monitoring of these reserves. An example is the lack of demarcation of boundaries, which the neighboring communities take advantage of, and end up hunting, co-owning the land and poaching.

The revenue got from tourism is meant to benefit the communities and help in management of the reserve. However, in most cases this is not happening and has led to conflicts between the reserves’ authorities and the nearby communities. This is because they do not see the benefits of protecting the land yet they could use the land for agriculture, settlement and grazing.

Therefore, with the increase in population and scarcity of land, communities have encroached on these reserves for ranching, crop production and settlement.

Communities near the wildlife reserves have also experienced problems of crop/property raids by the wild animals. However, the victims have not been compensated by the government accordingly. This also creates more conflict and leads to more encroaching and poaching in the reserves.

5.5.2 Strategies to wildlife conservation

- Promotion of collaborative management with the neighboring communities to avoid human – wildlife conflict.
- Setting up proper boundaries and frequent monitoring of the activities taking place in these boundaries.
- making sure that the communities around share the benefits from the tourism industry such as having access to infrastructure (proper roads), health facilities and services, education, veterinary services etc. this will motivate them to conserve and protect wildlife sustainably.
- Issuance and effective monitoring of hunting permits and serious and heavy punishment to poachers.
- Enhance local community participation in the management of protected areas through the development of parks management advisory committees, parishes and sub parishes committees
- Provide more direct benefit to local communities from protected area activities including the return a percentage of revenue to them
- Reactivate the management capacities of institutions involved in the management of protected wildlife resources through training and logical support
- Promote the sustainable use of wildlife resources through private sector activities.
- Maintain the ban on trade in endangered species and monitor and control trade in non endangered wildlife and wildlife products
- Promote the rehabilitation and establishment of appropriate infrastructure for tourism industry while ensuring that all infrastructure development relating to protected areas is subjected to EIA
- Demand to subject the introduction of exotic wildlife species and any other wildlife related activities on large scale to EIA
- Articulate wildlife issues affecting the community members with the relevant authorities such as Uganda wildlife authority
- Liaise with wildlife management authorities, to devise ways and means to minimise conflicts between communities adjacent to protected areas and the wildlife management authorities

- Ensure integration of wildlife management into the local government development plans
- Mobilise community members to participate in the implementation on agreed activities.

Self-Review Questions (SRQ) For Study Session 5

1. Explain the various functions of wetlands
2. Account for some of the strategies that can be employed to save forest resources from degradation