
Sustainable Management of Various Biomes and Threats They Are Faced Against

Shrublands

These areas mostly covered with shrubs, scrubs or woody plants not taller than 5m. They are predominantly used as habitats for browsers and a few grazers such as giraffes, goats, zebras, camels etc. Shrublands occur in arid and semi-arid areas. In Kenya they can be found in Northern Rift Valley region and the North Eastern region of Kenya. Other shrublands are found in transitional zones of deserts. For example, in the transition of American deserts around the Great Plains, the Sahara in North Africa, the Kalahari and Namib in the Southern parts of Africa. One of the largest shrublands in the world is the Nullarbor Plain in Australia that covers around 200,000 square kilometres (Nullarbor Roadhouse, 2017).

Threats

Energy development on shrublands: The vast land masses make them perfect for harvesting fossil fuels, wind and solar energy. Harvesting these forms of energy involves drilling and construction which ruin the shrubland aesthetic. For instance, in the Great Plains of North America up to 24% of shrublands is negatively impacted by the energy developments (Monaco, Schupp, Pendleton, & Kitchen, 2010). Furthermore, according to the International Energy Agency (2017), global energy demand will have grown by around 30% in 2040. As a response, developing countries that have shrublands will exploit them by mining and drilling for fossil fuels to meet their growing populations' energy demands (IEA, 2017). The threat posed by energy harvesting may not disappear any time soon, making it a problem demanding environmental consideration.

Sustainable management

Shifting global energy demand from fossil fuel to renewable sources of energy: Almost 80% of the world energy demand is expected to be met by non-renewable sources of energy (Monaco, Schupp, Pendleton, & Kitchen, 2010). If countries with massive portions of shrublands, such as Australia and USA, decide to exploit renewable sources, less energy developments in shrublands will take place, thus reducing the area of this ecosystem that is currently under degradation and destruction. This will also encourage energy companies from exploiting shrublands in developing countries for fossil fuels and instead opt for green energy.

Grasslands

Grasslands are areas where vegetation is dominated by a continuous cover of grass. They cover about 25% of the earth and are 2 major types of grasslands; tropical grasslands and the temperate grasslands (Oregon State University, 2019). The tropical grasslands are found within the tropics i.e. the savanna grasslands in Africa, while temperate grasslands are found beyond the tropics i.e. the steppes of Eurasia. Grasslands have thousands of grass species and this flora diversity makes them the main source of food for livestock farming and other agricultural

activities (Oregon State University, 2019). Consequently, making grasslands suitable for economic activities such as tourism, by giving habitat to grazing and browsing animals and their wild preys.

Threats

Overgrazing: According to the Kenyan Ministry of Environment and Natural Resources (2016), cumulative extensive grazing from pastoral communities with large herds of cattle has reduced the carrying capacity of Kenyan grasslands leading to soil erosion, depletion of grassland vegetation and thus, desertification. Overgrazing wears out grass that protects the soil from degradation and agents of erosion. If this process continues, pastoral communities will incur losses in their living standards and tourism will see a decline in wildlife habitat.

Sustainable management

Limiting grazing practices: Rotational grazing and reduction of herd sizes in the Masai lands are recommended by the Kenyan Ministry of Environment and Natural Resources (2016). However, one may argue that having pastoral communities reduce their herds and practise rotational grazing would be interfering with their culture and main source of livelihood. On the other hand, if pastoralists consider these sustainable aspects of grazing, it will allow for more fodder crops to grow, hence, creating an educating sustainable relationship between grasslands and agriculture as an economical benefit. This will not only improve the quality of the currently degrading Kenyan grasslands, but also the quality of yields from livestock farming.

Savannas

These are mixed woodland and grassland ecosystems. The trees are scattered sufficiently to allow for sufficient sunlight, water and other plant nutrients to favour the growth of ground vegetation such as grass. Savannas are found in African transition zones of grasslands and woodlands. They have a wide range of biodiversity from exotic bird species and large mammals, to acacia trees and hundreds of grass species. Savannas are famous for their biodiversity making them perfect tourist destinations that contributing largely to national economies. Furthermore, the vast types of vegetation and fertile lands make these areas suitable for agriculture.

Threat

Desertification: Desertification is the process where an originally fertile land becomes more like a desert by the loss of vegetation cover and the reduction of moisture receive annually (Allaby, 2006). According to scientists, the Sahara Desert has increased by around 18 percent over the last 100 years (Weisberger, 2018). This means that the transition zone, the savanna is reducing in size and becoming more like a desert. The cause of this desertification is credited to longer drought cycles being experienced in the Sub-Sahara due to changing rainfall patterns.

Sustainable Management

Afforestation and reforestation: Countries found in the transition between the Sahara and the savanna should fund the Great Green Wall. In 2015, governments and international donors

pledged about 4 billion dollars to fund the Great Green wall over the next five years (Pashley, 2015). In order to sustain this project, countries between Djibouti, where the wall starts, and Dakar, where it ends, should realize the importance of the savanna as an ecosystem. African funding of the wall will create a sense of ownership which will encourage other methods of sustainable management. Conservancy efforts such as green belts should be encouraged at the borders of the Sahara in order to stop desertification. These conservancy efforts should involve planting trees in order to help the savanna retain its top soil to facilitate further plant growth and stop soil degradation in these areas. Vegetation holds the soil and prevents it from being carried away by agents of soil erosion such as wind.

Woodland

Woodlands are densely forested areas. They can be classified as temperate woodlands and tropical woodlands. Temperate woodlands are found beyond the tropics such as the deciduous British woodlands, the temperate coniferous forests in North America and the Scandinavian woodlands. They are characterized with warm summers and cold winters, hence some of them go through a season of shedding. Tropical woodlands are found within the tropics. A good example is the Savanna woodlands found in the Sub-Sahara with the largest being the Miombo woodlands that run from Angola to parts of Eastern Tanzania. They are characterized with a rich animal diversity ranging from grazers to browsers and their preys. These biomes contribute to ecology as water catchment areas and carbon sinks.

Threats

Deforestation: The geographical location of the largest woodlands in the world is in developing countries witnessing a population boom. As population grows, so does the demand for land. For instance, in a study of Fazao-Malfakassa National Park in Togo (2018), locals indicated that clearing forests for agriculture, settlement and cutting down trees for charcoal were “major drivers” of deforestation. In addition, the situation is critical in Togo because of their 3% rate of population growth causing the national park’s canopy to have reduced by around 4% between 2001 and 2015 (Atsri, Konko, Cuni-Sanchez, Abotsi, & Kokou, 2018).

Sustainable management

Strong government support: For example, in the Miombo woodlands, forestry establishments are unable to lobby governments for sustainable forestry management as the same national governments have not created strong policies to protect the ecosystem. In many countries in the Miombo area, huge chunks of woodland were set as reserves, but, no institutions were set up to manage the areas and educate locals (Gumbo, Dumas-Johansen, Muir, Boerstler, & Xia, 2018). A strong government policy would ensure public education, national protection and government-based research secured by the national law. These measures will help understand the benefits of the woodlands and therefore carry out other management strategies such as sustainable forestry.

Deserts

A desert is an ecosystem that receives less than 250mm of rain annually. It is important to note that only this lack of moisture, not temperature, is what makes a desert, hence, there are cold

and hot deserts. About 20% of the earth is a desert (National Geographic, 2019). The extreme hot temperatures during the day and the chilly temperature of the night make hot deserts almost inhabitable by man. Examples are The Sahara, The Namib and The Kalahari in Africa and The Arabian in Asia. Cold deserts are characterized by extremely low temperatures throughout the year. Examples are The Gobi Desert and parts of the polar regions. Despite these extremes, deserts can be very biodiverse and important to the global environment and economy. Hot deserts are known for their aesthetic value with sand dunes, while cold deserts host a rare biodiversity.

Threats

Depleting ground water: For developing nations in the Sahara and the Arabian Desert, irrigation accounts to about 90% of all the water used (Allaby, 2006). Most of this water comes from aquifers which can be accessed by wells. For instance, in Egypt ground-water use is four times faster than the Nile can replenish the aquifers (Allaby, 2006). If such practices continue, growing populations in deserted regions may not be able to meet their needs.

Climate change in cold deserts: In July 2017, a 1 trillion-ton iceberg separated itself from Antarctica. This break away was due to increasing global temperatures making the ice-sheets in Antarctica melt faster (Kluger, 2019). As the Antarctic reduces in size, the biodiversity that depends on the area for food and mating will also decrease in size.

Sustainable Management

Sustainable farming in hot deserts: For instance, instead of relying heavily on ground water, Saudi Arabia has turned to desalination (Allaby, 2006). Desalination is the process of removing salt from ocean water to make it available for domestic activities such as farming. This reduces heavy dependency on ground water which takes hundreds of years to be renewed.

Global cooperation to curb global warming: Nations all over the world should start monitoring their statistics on emissions to curb climate change hence limit global warming. Consequently, warming in Antarctica will reduce or stagnate allowing the environment to restore balance.

Tundra

Tundra is an ecosystem found furthest from the tropics, high in the polar latitudes and on the summits of high mountains in the world which experience similar low average annual temperatures (Moore P. D., 2006). Tundra differs from cold deserts in terms of annual precipitation received: the tundra receives more than 250mm per year in form of rain or snow. Tundra vegetation is low and scattered. These regions have very strong winds that do not favour the growth of tall plants. In terms of animal life, these regions are famous for hosting polar bears, arctic foxes and arctic penguins. Apart from tundra being associated frequently with the polar regions, The Alpine Tundra found on the summits of mountains such as the Alps, has many similarities to The Polar Tundra.

Threats

Biodiversity loss: According to UN-HABITAT (2017), the narwhal is ranked 7th of the most

endangered arctic tundra species due to over hunting. These whales are hunted for their skin rich in Vitamin C and ivory tusk. Furthermore, if the current trend of global warming continues, the global mean temperature is likely to become 2° more than it is now by 2050 (Moore P. D., 2006). Due to this global rise in temperature, “the Arctic is warming twice as rapidly ... diminishing the sea ice forcing polar bears to embark to the mainland where they desperately forage for food” (Milman, 2018). This reduction of habitat is exposing polar bears to hunting and starvation, consequently hastening their extinction.

Sustainable Management

Cooperation on managing biodiversity: Nations that agreed on the Vienna Convention of 1985 and the Montreal Protocol of 1987 to control climate change and reduce effects of it to polar regions should revisit these treaties and make them more applicable to today’s environmental concerns and lobby for more countries to join the agreement (Moore P. D., 2006). This will reduce green house gas emissions and reduce the rate at which global warming occurs due to the enhanced greenhouse effect.

Education: Educating the masses on the importance of the tundra ecosystem will prevent hunting of narwhals and straying polar bears. Once this generation understands the ecological adversity that has been brought by their ignorance, it will pass on this knowledge to the next generation which will be eco-friendlier.

Wetlands

Wetlands are transitional zones between terrestrial and aquatic lands that are waterlogged for a certain amount of time. Wetlands are characterized by soils of high-water retention, a unique hydrology and vegetation able to tolerate waterlogging. These areas are mostly found in flat parts of the earth's surface in the inlands of continents or majorly at mouths of major rivers forming a delta or an estuary. They are characterised by vegetation that thrive on large capacities of nitrogen and phosphorous due to anaerobic respiration. There are three major types of plans; emergent, submergent and floating. Wetlands may range from coastal/marine wetlands to inland wetlands. Some examples of wetlands include the Niger delta, the Nile valley and the Okavango delta in Africa. Special wetlands are known as Ramsar Sites.

Threats

Global high rate of wetland loss: In America, wetlands are converted to farmlands at a rate of about 600,000 acres per year while the wetlands in the Niger Delta are reducing in size due to development of dam (Moore, 2006). Even after the Ramsar Convention, wetlands still have no international legal protection thus, conservation efforts may be futile in some countries.

Population: Agricultural practices upstream of wetlands cause chemical pollution. Despite its persistence in ecosystems, DDT is still being used in developing nations. This pesticide upstream finds its way into wetlands via surface runoff. It leads to biodiversity loss as the chemical has been cited to persist in bodies of fish-eating birds (Berg, Manuweera, & Konradsen, 2017).

Sustainable Management

Education: Most people do not have the knowledge to understand the importance of wetlands to the environment and how their sustainable management will lead to socio-economic benefits. For instance, if the Nigerian government could understand the moisture retention nature of wetlands, it would limit economic activities around the area and therefore reduce the rate at which dams and flood-protection infrastructures are being crated in the Niger Delta (Moore, 2006).

Global cooperation: More countries should sign similar treaties to the Ramsar Convention. The environmental delegates of other countries should lobby for Ramsar Sites, such as the Pantanal in Brazil, to get international legal protection (Moore, 2006). This will prevent countries from illegal reclamation of wetlands for economic activities such as agriculture and grazing.

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