Committee: Environmental Commission

Issue: Preventing land degradation in Sub-Saharan Africa

Student Officer: Georgia Kapopoulou

Position: Deputy President

PERSONAL INTRODUCTION

Dear delegates,

My name is Georgia Kapopoulou and I will be serving as deputy president in this year's Environmental Commission of the 2nd ACGMUN. I attend Pierce - The American College of Greece and I am currently in the 11th grade. I am also keen on scientific issues and particularly the environment.

To start with, it is my great pleasure to welcome you to the 2nd ACGMUN and I wish you a productive and fruitful conference. This conference will be a great opportunity for you to expand your knowledge of environmental treaties as well as the organizations involved and directly address problems that concern the environment all around the world through practical solutions. I expect to see well-prepared delegates and, above all, interesting and fruitful debates.

The purpose of this study guide is to provide you with basic knowledge on the second topic of the agenda, which concerns the prevention of land degradation in Sub-Saharan Africa. Although it will offer you an introduction to the topic, to be sufficiently prepared for participation in the procedures of the Environmental Commission, it is required that you continue your research beyond the study guide. I would also advise you to familiarize yourselves with your country's policy, not only on these topics, but on a variety of major topics that may concern your country so as to be effective and efficient in tackling the issues successfully.

I hope that you will find the topics as interesting and engaging as I do. Do not hesitate to contact me for further information concerning the issues at hand via my personal email: G.Kapopoulou@acg.edu. I will try my best at the 2nd ACGMUN, as I want all of you to experience the amazing and unforgettable experience that MUN has to offer.

Looking forward to meeting you and becoming acquainted with you this March!

Best regards,
Georgia Kapopoulou

TOPIC INTRODUCTION

Land degradation is among the biggest environmental challenges of our time[1]. Sub-Saharan Africa (SSA) has experienced the most severe land degradation in the world. Given that livelihoods of the majority of the rural poor heavily depend on natural resources, SSA countries have designed a number of policies and strategies to address land degradation and to enhance productivity. However, investment from both countries and their development partners has remained low, especially for livestock, which accounts for the largest area degraded[2].

Land degradation has a lot of causes, including extreme weather conditions (particularly drought) as well as human activities that pollute or degrade the quality of soils and land utility negatively. All these affect food production, livelihoods and the production and provision of other ecosystem goods and services[3].

DEFINITION OF KEY TERMS

Desertification

Desertification is land degradation that occurs in drylands. The United Nations Convention to Combat Desertification (UNCCD) defines it as "land degradation in arid, semi-arid and sub-humid areas resulting from various factors, including climatic variations and human activities. When land degradation happens in the world's drylands, it often creates desert-like conditions". It may also refer to "the irreversible change of the land to such a degree it can no longer be recovered for its original use"[4]. Desertification usually results in the desertified land losing its vegetation, water bodies (lakes, streams), and wildlife[5].

Land Degradation

The UNCCD defines land degradation as "any reduction or loss in the biological or economic productive capacity of the land resource base. It is generally caused by human activities, exacerbated by natural processes, and often magnified by and closely intertwined with climate change and biodiversity loss"[6]. Land degradation

[1] The Economics of Land Degradation in Africa - ELD Initiative.
[2] "The Economics of Land Degradation in Africa: Benefits of Action Outweigh the Costs, A complementary report to the ELD Initiative." *ELD Initiative*, ELD Initiative, Oct. 2015.
[3] "Land degradation and desertification." *WHO*, World Health Organization.
[4] The Economics of Land Degradation in Africa - ELD Initiative.
[5] "Desertification: land degradation under a changing climate." *Climatica*, 17 June 2014.
[6] *The Economics of Land Degradation in Africa - ELD Initiative.*

can be viewed as the reduction in the capability of the land to produce benefits from a particular land use under a specified form of land management[7].

Soil Erosion

Soil erosion is also more specific than both land and soil degradation. It refers only to the absolute loss of topsoil and nutrients, the most visible effect of soil degradation. Wind and water erosion are the main processes affecting soils. It is normally a natural process in mountainous areas, but poor management practices contribute to the potential for any soils to erode[8]. In soil, the climate is a key factor[9].

Soil degradation

The Soil Atlas of Africa describes soil degradation as the "process that leads to a deterioration of soil properties and functions, often accelerated by human activities"[10]. Soil degradation could be described as the deterioration of soil quality, or in other words: the partial or entire loss of one or more functions of the soil. Quality should be assessed in terms of the different potential functions of the soil[11].

Sub-Saharan Africa

The term Sub-Saharan Africa (SSA) is used to describe the area of the African continent which lies south of the Sahara Desert. Geographically, the demarcation line is the southern edge of the Sahara Desert[12].

#1 SSA in green

#2 Countries in SSA

[7] "Land Degradation: Meaning, Causes and Prevention of Land Degradation." *Your Article Library*, 9 Dec. 2013.
[8] The Economics of Land Degradation in Africa - ELD Initiative.
[9] "Land Degradation." *Land Degradation - an overview | ScienceDirect Topics*.
[10] The Economics of Land Degradation in Africa - ELD Initiative.
[11] "Land Degradation: Meaning, Causes and Prevention of Land Degradation." *Your Article Library*, 9 Dec. 2013.
[12] "Central Africa." *Central Africa - New World Encyclopedia*.

BACKGROUND INFORMATION

An increasing serious threat

The soil is under increasing threat from a wide range of human activities that are undermining its long-term availability and viability. It is worth noting that 1/3 of the world's agricultural soils, or approximately 2 billion hectares of land, are affected by soil degradation. Water and wind erosion account for most of the observed damage, while other forms, such as physical and chemical degradation, are responsible for the rest. Appropriate soil and water conservation strategies are needed to prevent and combat the effects of soil degradation in the field and at the planning level.

Land degradation is one of the major problems affecting the world. Currently, some 6–7 million hectares are lost annually through soil erosion, desertification affects about 1/6 of the world's population and 1/4 of the world's land, and salinization affects some 20 million hectares of irrigated land. Land degradation through damage to the soil is a serious problem and its causes are often complex and interwoven. Severe damage has already been done to the world's soils, and the impact of climate change needs to be considered seriously[13].

Land degradation is the major consequence of direct interference of human activities in the natural phenomenon. It has accelerated in recent years due to increasing and combined pressures of agricultural and livestock production (over-cultivation, forest conversion and overgrazing), urbanization, deforestation and extreme weather events, for example, droughts and coastal surges which salinate land.

Land degradation can affect human health through complex pathways[14]. As land is degraded and in some places deserts expand, food production is reduced, water sources dry up and populations are pressured to move to more hospitable areas. Some potential impacts of desertification on health are:

- Higher threats of malnutrition from reduced food and water supplies
- More water and food-borne diseases. They result from poor hygiene and a lack of clean water
- Respiratory diseases. They are caused by atmospheric dust from wind erosion and other air pollutants
- The spread of infectious diseases as populations migrate

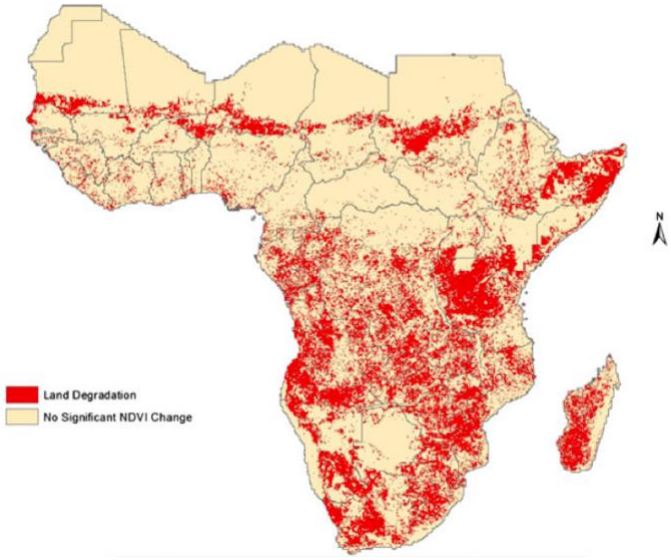
[13] "Land Degradation." *Land Degradation - an overview | ScienceDirect Topics*.
[14] "Land degradation and desertification." *WHO*, World Health Organization.

Last but not least, it is worth mentioning that there are many side effects related to soil and land degradation. For example, dust storms or eroded sediment cause problems such as damage by mudflows, siltation of dams, or pollution of drinking water in downwind or downstream areas.

SSA - The most affected area

It is worth noting that nutrient depletion as a form of land degradation has a severe economic impact on a global scale, especially in SSA. The economic impact of land degradation is extremely severe in densely populated SSA[15]. Land degradation currently leads to the loss of an average of more than 3 percent annually of agriculture Gross Domestic Product (GDP) in the SSA region.

The extent and rate of soil degradation in SSA are still under debate. Nevertheless, certain soils are losing their ability to provide food and essential ecosystem services, and we know that soil fertility depletion is the primary cause[16].



#3 Extent of land SSA. Red color indicates degradation after correction for rainfall variability and carbon fertilization. Gray color indicates areas that did not experience degradation after correction for rainfall variability and carbon fertilization[1]

An estimated 83% of Sub-Saharan Africans are dependent on the land for their livelihoods, yet 40% of Africa's land resources are currently degraded[17]. In many African countries, land degradation is higher than 65%. Land degradation erodes the productivity of farming systems, thereby reducing income and food security. Land degradation reduces the resilience of ecosystems and populations, particularly in the face of climate change. It also has negative impacts on populations at a national/regional level (by reducing the capacity of land to support economic development and negatively affecting the climate and water cycle and ecosystem services), and at a global level (greenhouse gas emissions and climate change, biodiversity loss), potentially driving increased poverty, hunger, unemployment, forced migration and conflict.

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[15] "Natural Resources Conservation Service." *Land Degradation: An overview | NRCS Soils*.
[16] Tully, Katherine, et al. "The State of Soil Degradation in Sub-Saharan Africa: Baselines, Trajectories, and Solutions." *Sustainability*, vol. 7, no. 6, 2015, pp. 6523–6552., doi:10.3390/su7066523.
[17] *Action Document: Reversing Land Degradation in Africa by Scaling-up EverGreen Agriculture*. EN-European Commission, 2016.

According to the Food and Agriculture Organization (FAO), agricultural production in SSA is falling by 3% a year as a result of land degradation[18], with potentially disastrous implications for sustainable development. This provides a strong justification for governments to pro-actively mitigate the impacts of land degradation. In Ethiopia, GDP loss from reduced agricultural productivity is estimated at $130 million per year. In Uganda land degradation in the drylands threatens the country's economy and escalates poverty. This is because these drylands constitute the Uganda cattle corridor, which accounts for over 90% of the national cattle herd and livestock production contributes 7.5% to the GDP and 17% to the agricultural GDP"[19].

The United Nations Convention to Combat Desertification (UNCCD) points out that land degradation is intricately linked to poverty and that addressing this problem requires the participation of the resource users and, where appropriate, providing them with alternative livelihood options[20].

Processes

Seven main groups of land degradation processes are normally distinguished.

Mass movement

Mass movement is the movement of soil and/or rock downslope, under the influence of gravity, without necessarily being influenced by water or ice. Nevertheless, water or ice may make mass movement even more catastrophic. Mass movement classifications are based on the material (mud, soil, earth, rock and debris) or movement type (falls, topples, slides, lateral spreads and flows)[21]. Mass movements affect many elements of the environment such as the topography of the earth's surface (particularly the morphologies of mountain and valley systems), both on the continents and on the ocean floors. Moreover, it affects the character and quality of rivers, streams, groundwater flow and the forests. The habitats of natural wildlife are also affected[22].

Water erosion

Water erosion is the removal of topsoil (up to 20 cm) due to the action of water. It is divided into the following 3 types based on increasing severity: Sheet

[18] McKenzie, Fiona C., and John Williams. "Sustainable food production: constraints, challenges and choices by 2050." *SpringerLink*, Springer Netherlands, 12 Mar. 2015.
[19] *Africa Review Report on DROUGHT AND DESERTIFICATION*.
[20] *State of the Environment and Policy Retrospective: 1972–2002. UNEP*.
[21] "Slope Processes, Mass Movement and Soil Erosion: A Review." *Pedosphere*, Elsevier, 26 Dec. 2016.
[22] Schuster, Robert L., and Lynn M. Highland. "Overview of the Effects of Mass Wasting on the Natural Environment." *Environmental and Engineering Geoscience*, GeoScienceWorld, 1 Feb. 2007.

erosion (water moves horizontally over a large area), rill erosion (small incisions take place as the water begins to collect along parts of the land at lower elevation) and gully erosion (entire sections of the soil can be washed off)[23]. When soil erosion removes the topsoil, it can have adverse effects on plants. Soil erosion causes a diminished water capacity, which reduces carbon and nutrients in the water, resulting in decreased crop productivity. Another negative effect is flooding, as the swept-away topsoil cannot absorb the rainwater. Moreover, the absence of topsoil reduces water quality and increased pollutants affect wildlife negatively. Additionally, after the eroded topsoil reaches water sources, it increases the presence of nitrogen and phosphorous in the water. This results in reduced water oxygen levels and diminished water quality[24].

Wind erosion

Wind erosion occurs when strong winds blow over light-textured soils that have been heavily grazed during periods of drought[25]. Wind erosion has many impacts. Firstly, fertility is reduced since the majority of plant nutrients are concentrated in the soil that is blown away. This reduces the capacity of the soil to support productive pastures and sustain biodiversity. Secondly, it makes it difficult for the land to revegetate the land, since there is a lack of nutritious soil for the plants to grow in.

Salinity

Salinity in agricultural terms is the excess of salts above the required plant level. Most often it poses constraints on the growth and productivity of the plants and, therefore, it is a serious concern. Mingling with other environmental factors such as precipitation, temperature, flooding, soil profile, and water table exaggerates the catastrophe[26].

#4 Soil Erosion

[23] Saurab. "Land degradation: Role of water erosion." *Eco-Intelligent*, 3 Oct. 2016.
[24] Christensen, Dianne. "Negative Effects of Water Erosion | Hunker." *Hunker.com*, Hunker, 17 July 2017.
[25] *Community-Based wind erosion monitoring across Australia*. Department of Environment and Resource management, Feb. 2011.
[26] "Causes of salinity and plant manifestations to salt stress: A review."*Journal of Environmental Biology*, Journal of Environmental Biology, 2011.

Chemical degradation

Chemical degradation refers to the accumulation of toxic chemicals and chemical processes which impact on chemical properties that regulate life processes in the soil[27]. Changes in one or more of these soil chemical properties have a direct and indirect adverse effect on the chemical fertility of soils. Chemically degraded soils have the presence of large amounts of toxic chemicals interfering with activities of soil life processes. These toxic chemicals may also interfere with nutrient availability. Chemical soil degradation is hard to spot and thus may be overlooked.

Physical degradation

Physical soil fertility is the ability of the soil to allow the flow and storage of water and air into it, to permit root growth and to anchor the plants. To be fertile, a soil needs abundant and interconnected pore space. Pore space refers to the volume of soil voids that can be filled with water and/or air. Pore space generally depends on aggregates of soil particles held together by soil organic matter. Unfortunately, intensive or inappropriate tillage practices have been a major contributor to land degradation. Soil tillage breaks down aggregates, decomposes soil organic matter, breaks pore continuity and forms hard pans which restrict water and air movement and root growth. On the soil surface, the powdered soil is more prone to sealing, crusting and erosion. Improving soil physical fertility involves reducing soil tillage to a minimum and increasing soil organic matter.

Biological degradation

Soil biological fertility refers to the quantity and diversity of soil flora (all plant life) and fauna (all animal life) present in the soil[28]. Biological activity is necessary to break down crop residues (roots, etc.) into humus (the organic component of soil). Soil fauna (including earthworms, termites, insects, etc.) also transfer crop residues into the soil, increase soil porosity and pore continuity, and can help break down compacted layers. This means that a constant food source is necessary to maintain soil fauna and flora. A bare soil means low levels of biological activity. Tillage (we mention many of its disadvantages in physical degradation) also disrupts the tunnels and habitat of organisms. The best way to increase soil biological activity is to get as close as possible to a natural system. That means, stop soil tillage and leave plant residues such as mulch on the surface.

[27] Richmond, Narh Tetteh. "Chemical soil degradation as a result of contamination: A review." *Journal of Soil Science and Environmental Management*, vol. 6, no. 11, 2015, pp. 301–308., doi:10.5897/jssem15.0499.
[28] Thierfelder, Christian, and Patrick C. *The Problem of Soil and Land Degradation*.

Causes

There are five main causes of land degradation[29].

Deforestation

Deforestation is taking place at a faster rate due to increasing demands for timber, fuel and forest products, which result in a degradation of land resources.

Overgrazing

Overgrazing refers to the excessive eating of grasses and other green plants by cattle. It brings about a reduced growth of vegetation, reduced diversity of plant species, excessive growth of undesirable plant species, soil erosion, and degradation of land due to cattle movement.

Agricultural practices

Modern agricultural practices, excessive use of fertilizers and pesticides, have adversely degraded the natural quality and fertility of cultivation land.

Industrialization

The development of industries for the economic growth of a country leads to excessive deforestation and utilization of land in such as way that it loses its natural up gradation quality.

Urbanization

Increasing growth of population and demand for more residential areas and commercial sectors are also reasons for land degradation.

Consequences

The main consequences of land degradation are[30]:

- Loss of natural fertility of soil due to the loss of nutrients. Soils lose fertility when the qualities that support plant growth and soil health are degraded.
- Less vegetation cover. Vegetation cover refers to the number of plants growing on a certain area of land.

[29] "Land Degradation: Meaning, Causes and Prevention of Land Degradation." *Your Article Library*, 9 Dec. 2013.
[30] "Land Degradation: Meaning, Causes and Prevention of Land Degradation." *Your Article Library*, 9 Dec. 2013.

- Changes in the characteristics of soil. The characteristics of soil are composition, color, texture, structure, water, organic matter and chemistry.

- Changes in climatic conditions. Climate is the long-term pattern of weather in a particular area. Weather can change from hour to hour, day to day, month to month or even from year to year. However, for periods of 30 years or more, distinct weather patterns occur. Climate is measured by assessing variations in temperature, atmospheric pressure, humidity, wind, precipitation, atmospheric particles and other meteorological factors.

- Pollution of water resources. When pesticides and fertilizers have been sprayed, they don't disappear totally. Some of them mix with the water and seep into the ground. Thus, the local streams that are supplied water from the ground become contaminated with small amounts of mercury, arsenic, lead and cadmium, as do the animals that eat these harvests and plants.

MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED

SSA countries

The countries in SSA, grouped in areas, are[31]:

- Central Africa: Democratic Republic of Congo, Republic of Congo, Central African Republic, Rwanda, Burundi
- East Africa: Sudan, Kenya, Tanzania, Uganda, Djibouti, Eritrea, Ethiopia, Somalia
- Southern Africa: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe
- West Africa: Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Equatorial Guinea, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo
- African island nations: Cape Verde, Comoros, Madagascar, Mauritius, São Tomé and Príncipe, Seychelles
- Territories, possessions, départements: Mayotte (France), Réunion (France)

All SSA countries are threatened by land degradation. It is noteworthy that 46 out of 50 of them have ratified the convention on biological diversity. Protected areas provide both local and international benefits—especially when policies and strategies involve communities surrounding the protected areas in managing them. For example, seven community-based protected areas management in Uganda had

[31] "Central Africa." *Central Africa - New World Encyclopedia*.

significantly lower bush burning, logging, and encroachment than nine other protected areas without local community involvement[32].

Food and Agriculture Organization

The Food and Agriculture Organization (FAO) is the specialized agency of the United Nations that leads international efforts to defeat hunger[33]. The goal of the FAO is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active and healthy lives. With over 194 member states, the FAO works in over 130 countries worldwide. People in the FAO believe that everyone can play a part in ending hunger.

Strategy (2008-2018) to combat land degradation and desertification

UNCCD adopted a 10-year Strategy (2008-2018) to combat land degradation and desertification. By bringing together at the same time countries affected in whole or in part by desertification and land degradation, and developed countries, the UNCCD has mobilized the necessary political will and funding[34].

TerrAfrica

TerrAfrica was established in 2005 in order to support and strengthen the implementation of the United Nations Convention to Combat Desertification (UNCCD), the Comprehensive Africa Agriculture Development Programme (CAADP) and the New Partnership for Africa's Development (NEPAD) Action Plan of the Environment. It endorses the principles of country-level partnership, knowledge management and harmonized, aligned and upscaled investment. Its mission is to create an enabling environment for mainstreaming and financing effective, nationally driven, sustainable land management strategies[35].

The 2030 Agenda for Sustainable Development

It recognizes the importance of the conservation and sustainable use of terrestrial ecosystems and of reversing land degradation and achieving Land Degradation Neutrality (LDN) by the year 2030. The objective of LDN is to ensure that the productive land resources we depend on for ecosystem services (water, food, rainfall, etc.) remain at least stable or are being regenerated. Two joint actions need to be taken to make land degradation neutrality happen: avoid further land

[32] "Ephraim Nkonya." *SpringerLink*.
[33] *"About FAO." Food and Agriculture Organization of the United Nations*.
[34] *United Nations Convention to Combat Desertification (UNCCD). State of Play and Perspectives for West Africa. Dry riverbed (Source: SOS Sahel, 2013.*
[35] "IFAD." *The Strategic Investment Program for Sustainable Land Management in sub-Saharan Africa.*

degradation and recover already degraded land[36]. The new UNCCD 2018-2030 Strategic Framework is the most comprehensive global commitment to achieve LDN and it is consistent with the 2030 Agenda for Sustainable Development.

The Global Alliance for Resilience Initiative

The European Commission launched it in 2012 to strengthen nutrition and secure the livelihoods of vulnerable households, improve sustainable agricultural and food production, and build the resilience of communities to climate change and land degradation in West Africa and the Sahel region[37].

The Global Environment Facility

The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit to help tackle our planet's most pressing environmental problems[38]. Since then, the GEF has provided over $17 billion in grants and mobilized an additional $88 billion in financing for more than 4,000 projects in 170 countries. Today, the GEF is an international partnership of 183 countries, international institutions, civil society organizations and the private sector that addresses global environmental issues.

The Global Soil Partnership

It was established by the FAO in 2012 and since then it has been strongly supported by the European Union. This partnership aims to improve global soil governance to achieve healthy and productive soils for a food secure world, as well as to sustain other essential ecosystem services[39].

The Global Water Partnership

It was founded in 1996 with the support of the World Bank, the United Nations Development Programme and the Swedish International Development Cooperation Agency. It is an international network created to foster an integrated approach to water resources management. Its vision is for a water secure world. The network offers practical advice for sustainably in managing water resources[40].

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[36] *Action Document: Reversing Land Degradation in Africa by Scaling-up EverGreen Agriculture*. EN-European Commission, 2016.
[37] "AGIR." *RCPCA - OECD*.
[38] "Global Environment Facility." *Global Environment Facility*.
[39] "FAO." *Global Soil Partnership | Food and Agriculture Organization of the United Nations*.
[40] "Global Water Partnership." *Global Water Partnership - GWP*.

The New Partnership for Africa's Development

It is an economic development program of the African Union. It was adopted at the 37th session of the Assembly of Heads of State and Government in July 2001 in Zambia. It aims to provide an overarching vision and policy framework for accelerating economic co-operation and integration among African countries[41].

The Southern African Development Community (SADC) Protocol on Shared Watercourse Systems

It calls for equity and shared responsibility among riparian states in the utilization and management of watercourse systems. Member states are obliged to strive for a higher standard of living for their peoples, and conservation and enhancement of the environment to promote sustainable development. Signed in 1992 by eight of the 12 members. Its protocol w revised in 2000[42].

The Comprehensive Africa Agriculture Development Programme

The Comprehensive Africa Agriculture Development Programme is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all. In Mozambique, in 2003, the African Union Summit made the first declaration on this program as an integral part of the New Partnership for Africa's Development[43].

The Strategic Plan for Biodiversity 2011–2020

In 2010 Parties to the Convention on Biological Diversity adopted the 2011–2020 Strategic Plan for Biodiversity. It's a 10-year framework for action by all countries and stakeholders to safeguard biodiversity and the benefits it provides to people[44].

United Nations Convention to Combat Desertification

Established in 1994, the United Nations Convention to Combat Desertification (UNCCD)[45] is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses the drylands, where some of the most vulnerable ecosystems and peoples

[41] "OSAA, Africa, UN and Africa, United Nations and Africa, Special Adviser, UN, United Nations, NEPAD, African Union." *United Nations*, United Nations.
[42] *GEO-2000: Chapter Three: Policy Responses - Africa - MEAs and non-binding instruments*.
[43] "OSAA, Africa, UN and Africa, United Nations and Africa, Special Adviser, UN, United Nations, NEPAD, African Union." *United Nations*, United Nations.
[44] "UN Debate on Biodiversity." *To implement the Strategic Plan for Biodiversity 2011-2020.*
[45] "United Nations Convention to Combat Desertification." *United Nations Convention to Combat Desertification*.

can be found. 196 parties that participate in the Convention work together to improve the living conditions for people in drylands, to maintain and restore land and soil productivity, and to mitigate the effects of drought. The UNCCD is committed to a bottom-up approach, encouraging the participation of local people. Moreover, the UNCCD facilitates cooperation between developed and developing countries, particularly around knowledge and technology transfer.

United Nations Development Programme

The United Nations Development Programme (UNDP) is the UN's global development network. It advocates for change and connects countries to knowledge, experience and resources to help people build a better life. It provides expert advice, training and grants support to developing countries, with emphasis on assistance to the least developed countries. It promotes technical and investment cooperation among nations[46].

World Health Organization

The World Health Organization (WHO) is committed to engaging actively in the United Nations Framework on Climate Change with member states and relevant partners to promote effective climate and health policies which promote health protection[47]. The WHO develops discussion papers, guidance documents, and recommendations to improve health protection in international health and climate change negotiations and agreements.

TIMELINE OF EVENTS

Date	Description of Event
1945	Establishment of the "Food and Agriculture Organization"
1948	Establishment of the "International Union for Conservation of Nature"
1966	Establishment of the "United Nations Development Programme"
1972	Establishment of the "United Nations Environment Programme"

[46] "United Nations Development Programme." *UNDP*
[47] "Health policy and climate change." *World Health Organization*, World Health Organization.

1973	Establishment of the "United Nations Sudano-Sahelian Office"
1992	Establishment of the "Global Environment Facility"
1992	Establishment of the "UN Convention on Biological Diversity"
1992	Establishment of the "UN Framework Convention on Climate Change"
1994	Establishment of the "UN Convention to Combat Desertification"
1995	Establishment of the "Southern African Development Community Protocol on Shared"
1996	Establishment of the "Global Water Partnership"
2001	Establishment of the "New Partnership for Africa's Development"
2003	Establishment of the "Comprehensive Africa Agriculture Development Programme"
2005	Establishment of TerrAfrica
2008	Release of the "Strategy (2008-2018) to combat land degradation and desertification"
2010	Signature of the "Strategic Plan for Biodiversity 2011–2020"
2012	Establishment of the "Global Alliance for Resilience Initiative"
2012	Establishment of the "Global Soil Partnership"
2015	Signature of the "2030 Agenda for Sustainable Development"
2017	Release of the "UNCCD 2018-2030 Strategic Framework"

PREVIOUS ATTEMPTS TO SOLVE THE PROBLEM

National Plans and Strategies

All SSA countries have ratified:

- The United Nations Framework Convention on Climate Change (UNFCCC) and 2/3 of them have submitted their National Adaptation Program of Actions.
- The UN Convention to Combat Desertification (UNCCD) and prepared their National Action Plans (NAPs).

NAPs implementation follows a bottom-up approach. Unfortunately, NAPs have lacked monitoring and evaluation systems. Limited funding has generally been common across SSA countries. It is worth noting that NAPs have been largely funded by donors. Limited funding from national governments is a common problem across all countries.

Twenty-two countries have submitted their Nationally Appropriate Mitigation Actions to the UNFCCC. Accordingly, many SSA countries are reducing their CO_2 emissions and use of ozone-depleting substances. Although forest policies in SSA countries have increasingly incorporated sustainable forest management, public investment for forest development and the environment remains low.

Many environment agencies in SSA countries (Uganda, Kenya, Madagascar, Burkina Faso, Congo and Togo, etc.) have prepared 'National Conservation Strategies', 'National Environmental Action Plans', 'Forestry Action Plans' and 'Plans of Action to Combat Desertification', often with the support of international organizations that include the 'International Union for Conservation of Nature', 'Food and Agriculture Organization', 'UN Environment Programme', 'UN Development Programme', 'UN Sudano-Sahelian Office' and the 'World Bank'[48].

However, these plans often run parallel to overall national development plans and are not linked or integrated with other economic and sectoral plans. Many of them, therefore, lack the full involvement and support of key ministries whose cooperation is needed to ensure effective implementation. Some of them have other weaknesses with general recommendations that lack strategic details, as the assignment of a specific implementing agency, detailed cost estimates, time targets and funding arrangements. Most of them also focus only on national issues, without considering the transboundary implications of the proposed actions.

[48] *GEO-2000: Chapter Three: Policy Responses - Africa - MEAs and non-Binding instruments*.

Fertilizers and improved seeds

A number of countries—including Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Rwanda, Senegal, Tanzania, and Zambia have subsidized fertilizer and improved seeds in efforts to increase farm crop yield level fertilizer application. Kenya, Malawi, Rwanda, Tanzania, and Zambia subsidies were targeted to either the poor or priority crops and reached many farmers. About 65% of farm households in Malawi benefited from the subsidy program. Likewise, about 95% of the 2.7 million rural households in Kenya benefited from the subsidy program that targeted the universally grown maize crop.

Range of Investments

Investment as a share of agricultural budget ranged from 11% in Burkina Faso to 59% in Malawi[49].

POSSIBLE SOLUTIONS

A variety of measures may lead to the solution of the problem. Here are some of them[505152].

Crop Rotation

It is an agricultural practice in which different crops are grown in the same area following a rotation system which helps in the replenishment of the soil. Crop rotation is a very old technique that has been proven to help the environment, improve the soil and many other things[53]. Crop rotation helps in productivity by replacing fallow periods with growing different crops that replenish soil nutrients. Additionally, it helps to battle erosion. Rotating crops helps to improve soil stability by alternating between crops with shallow and deep roots, accordingly. Additionally, annual crop rotations affect the root structure over a period. For crops having either tap or fibrous roots, diversity in the root structure enhances the biological, physical and chemical structure of the soil. Better soil structure creates several macrospores and enables the growth of new roots. Improving soil organic matter and nutrient

[49] "Ephraim Nkonya." *SpringerLink*
[50] "Land Degradation: Meaning, Causes and Prevention of Land Degradation." *Your Article Library*, 9 Dec. 2013.
[51] *Community-Based wind erosion monitoring across Australia*. Department of Environment and Resource management, 2011.
[52] "Ephraim Nkonya." *SpringerLink*.
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pools is also a benefit of crop rotation that results in better water-holding capacity of the soil.

Adequate levels of cover on the soil surface

A very effective method of controlling erosion by both wind and water is to maintain adequate levels of cover on the soil surface. To achieve this on grazing lands, stock numbers need to be managed to match the current and expected seasonal conditions. Trees and shrubs help to reduce wind velocities and so provide protection from wind erosion. The importance of plant cover in controlling water erosion is widely accepted. In the short term, vegetation influences erosion mainly by intercepting rainfall and protecting the soil surface against the impact of rainfall drops, and by the management of row crops reduces erosion compared with systems involving more frequent or more extensive tillage. Woody crops reduce water erosion by improving water infiltration, reducing impacts by water droplets, intercepting rain and snow and physically stabilizing soil by their roots and leaf litter. Harvesting of woody plants may be followed by increased erosion. Forestry clearcutting, especially on steep slopes, often results in a large increase in water erosion[54].

Increase donor funding as well as government funding and effectiveness

Donor funding reduces the cost of land degradation. This underscores the role played by donors in land improvement. It also shows the favorable impact of investment in preventing land degradation. Education, awareness programs and guidelines for landowners on how to make their practices sustainable will help in the fight against land degradation. It will be a promising perspective if governments in SSA countries improve the accessibility and level of technical information on solving land degradation problems using public consultancies as well as government agencies. Direct government funding for major land care projects would be welcome. Unfortunately, current public allocation to land-based sectors is only about 5% on average. Surely, improvements in government effectiveness in SSA will result in the reduction of the cost of land degradation and cropland expansion.

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