United Nations Environmental Programme

Geoengineering to reverse desertification

Research Report

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Forum: *United Nations Environmental Programme*

Issue: *Geoengineering to reverse desertification*

Position: *Deputy President*

Introduction

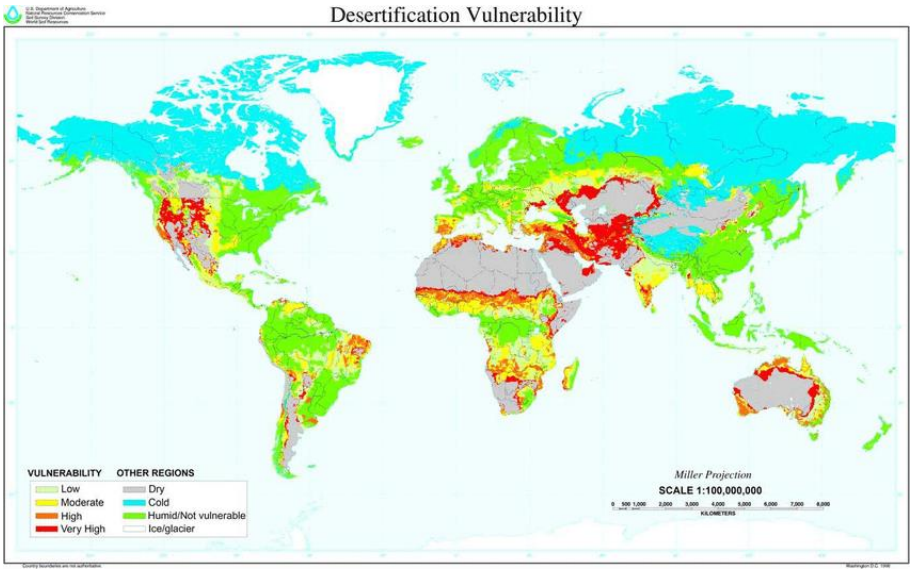
Due to desertification, 23 hectares of fertile land is lost every minute. While interpretations of the term desertification vary, the concern centres on human-caused land degradation in areas with low or variable rainfall known as drylands: arid, semi-arid, and sub-humid lands. These drylands account for more than 40 percent of the world's terrestrial surface area and provide livelihood and habitat for a significant segment of its population. It is the aforementioned areas which are the main concern of the organisation provided that drought is threatening locals' lives and income.

Desertification is not only a consequence of global warming but it is also a huge contributing factor to further climate change. But climate change is not the only cause of desertification, other causes involve overgrazing, overpopulation, unsuitable agricultural techniques, urbanisation and deforestation.

Just like the reasons, desertification has a long list of consequences too. The damaged vegetation and infertile soil will eventually lead to high food prices, famines, mass migration and ending of civilizations (etc.).

As the issue is in a frightening state, radical steps must be taken to make a change and reverse this process. One of the possible and plausible solutions is geo-engineering as it is the most controlled and quickest way of addressing the problem. However, the … takes

into account that such interventions may result in local drawbacks and introduction of unknown climate risks.



Definition of Key Terms

Geoengineering:
the large-scale manipulation of a specific process central to controlling Earth's climate for the purpose of obtaining a specific benefit.

Desertification:
land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.

Drought:
lack or insufficiency of rain for an extended period that causes a considerable hydrologic imbalance and, consequently, water shortages, crop damage, streamflow reduction, and depletion of groundwater and soil moisture.

Sustainable development:
an approach to economic planning that attempts to foster economic growth while preserving the quality of the environment for future generations

Developing country:
a nation that fares poorly on the HDI (**H**uman **D**evelopment **I**ndex) and has low levels of industrialization has low industrial and economic activity and where people generally have low incomes

Climate change:
periodic modification of Earth's climate brought about as a result of changes in the atmosphere as well as interactions between the atmosphere and various other geologic, chemical, biological, and geographic factors…

Abbreviations

UNEP: United Nations Environmental Programme

UNCCD: United Nations Convention to Combat Deforestation

SDG: Sustainable Development Goals

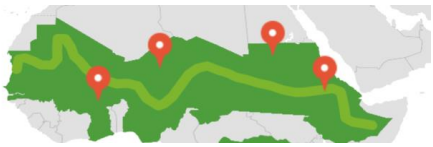
LDN: Land Degradation Neutrality

General Overview

For the longest time, combating desertification and land degradation has not been the greatest priority of governments compared to other sectors. However, today desertification is not only an environmental but also an economic crisis too, on this account in 1994 the UNEP established the United Nations Convention to Combat Desertification. Currently having 197 parties, the main motive of the organisation is to avoid, reduce and reverse land degradation, which also contributes to achieving the aims of the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity as well as other environmental conventions.

The Great Green Wall Initiative

One of the main projects of UNCCD is the Great Green Wall Initiative in Africa,which focuses on the restoration of the continent's degraded landscapes and fertile soil in the Sahel region. The programme was launched in 2007 and ever since then it has been implemented by 22 African countries and is led by the African Union Commission and the Pan-African Agency of the Great Green. The ambitious objectives of the initiative include:



- installation of a 8000 km long green area;
- restoration of 100 hectares of degraded land;
- creation of 10 million jobs supporting sustainable development;
- sequestration of 250 million tons of carbon dioxide;
- creation of a steady and secure food support for millions by 2030.

Land Degradation Neutrality

The main focus of the programme is to protect and restore land resources that have been lost due to human alteration. The impacted area is believed to be 70 percent of all the non-ice covered land, which affects 3.2 billion lives. There are three primary aims of the institution:

1. making sure that no further land is lost by degradation;
2. adopting appropriate agricultural means, therefore reducing existing degradation; and
3. research and apply ways to return the land to a more fertile and neutral state.

The goal of the organisation is individual to each country; from the 196 parties, 129 countries have committed to setting LDN targets to date, from which 100 have already set theirs.

Sustainable Development Goal 15: Life on Land

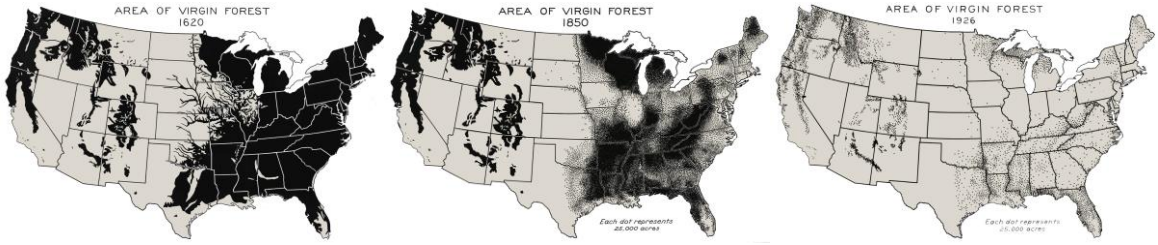
This goal focuses particularly on managing forests sustainably, halting and reversing land and natural habitat degradation, successfully combating desertification and stopping biodiversity loss. Even though steps were taken to tackle the issue of desertification the UN realises that mitigating the effects of drought has not met the expectations and therefore a more radical approach is needed to minimise the devastation.

Even though efforts have been made in the past, the progress in mitigating the effects of drought and combating desertification has not fulfilled the objectives, it is why setting a new and more effective plan of action is highly needed that fits in the framework of SDG.

Major Parties Involved

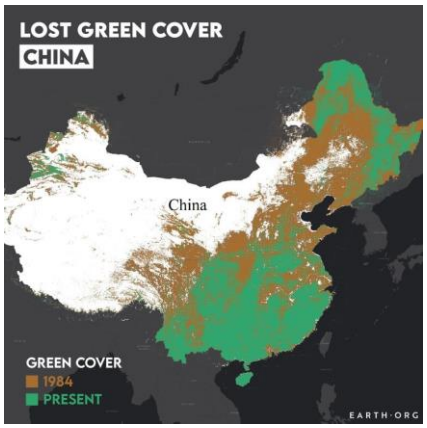
USA

The US was the first government to ever authorise funding for the research of geoengineering. On the other hand, it was this country that blocked the resolution the UN Environment Assembly wrote at the conference in Nairobi. But it is not the only aspect of the involvement of the USA as 90% of the North American arid land is severely affected by desertification.



Africa

Developing countries in Africa experience the most tragic consequences of deforestation and effects of drought. It is particularly crucial for the sustainable economic development of those countries to combat this issue and mitigate the already existing effects of it. Research has shown that between 1990 and 2005 over 63 million hectares of forest was cut down, meaning an annual loss of 4.4 hectares. In other words, the continent lost 9.1% of its woodland area in the matter of 15 years.



China

According to recent studies, over 25% of China's land has undergone desertification. The root of the problem is the overpopulation of the country; however, this issue seems to be solved as with 0.034%, China this year had the slowest population growth rate in decades.

Timeline of Events

1994	Foundation of UNCCD
2002	China's Law of Prevention and Control of Desertification
2007	The Great Green Wall of Africa
2011	Geoengineering to Combat Global Warming
2019	UNEP meeting in Nairobi on geoengineering
2021-2030	United Nations Ecosystem Restoration Decade

Possible Solutions

Involving local society in the process

Combating desertification, as many other consequences of climate change, should be addressed by educating the people and involving them in the process of sustainability. That, in action would mean establishing small local organisations spreading the means of a more economically conscious life that can contribute to sustainable development.

Artificial trees

In the past decades a significant amount of research has been put into the installation of artificial trees. These mechanical devices, just like trees, could absorb large amounts of carbon dioxide from the atmosphere. 10 million trees, each costing an estimated $20000, would sequester 3.6 billion tons of CO2 annually, in other words 10% of all the global emission.

Slowing down global warming processes

Up to this point the main area of geoengineering research has been the ways of tackling the issue of climate change by reversing the global warming processes. These ideas could indirectly lead to the stopping of land degradation. There are two main branches of geoengineering: Solar Radiation Management (SRM) and Greenhouse Gas Removal (GGR). Some of the possible solutions include:

- installation of space reflectors;
- introducing stratospheric aerosols;
- enhancement of albedo;
- fertilisation of oceans to increase algal productivity;
- afforestation, ect.

While these projects sound safe, many UN scientists have shown concerns about them, thus some of them need more in depth research before the application.

Bibliography

https://www.britannica.com/

https://www.statista.com/statistics/1286878/deforestation-rate-in-africa-by-region/

https://earth.org/data_visualization/how-desertification-has-affected-these-9-countries-since-1984/

https://catalogue.unccd.int/1551_GGW_Report_ENG_Final_040920.pdf

https://storymaps.arcgis.com/stories/ca82356571bf4af6a99f9d80c23cbb46

https://www.unccd.int/sites/default/files/2022-02/cop21add1_SF_EN.pdf
SDG15_Brief.pdf (unep.org)

https://sdgcompass.org/sdgs/sdg-15/

https://www.unccd.int/our-work/ggwi

https://www.unep.org/resources/report/geoengineering-combat-global-warming-unep-global-environmental-alert-service-may

https://www.unep.org/explore-topics/sustainable-development-goals/why-do-sustainable-development-goals-matter/goal-15

https://wedocs.unep.org/bitstream/handle/20.500.11822/25765/SDG15_Brief.pdf?sequence=1&isAllowed=y

https://www.scientificamerican.com/article/u-s-blocks-u-n-resolution-on-geoengineering/

https://www.bing.com/search?q=china+overpopulation+rates&cvid=2cfd3e6742ea4dfc8190380f317eddc1&aqs=edge..69i57.8104j0j1&pglt=427&FORM=ANNTA1&PC=ACTS

http://www.geoengineering.ox.ac.uk/www.geoengineering.ox.ac.uk/what-is-geoengineering/what-is-geoengineering/#:~:text=Geoengineering%20is%20the%20deliberate%20large-scale%20intervention%20in%20the,management%20%28SRM%29%2C%20and%20carbon%20dioxide%20removal%20%28CDR%29.%20

https://agri3.com/about/

https://science.jrank.org/pages/2021/Desertification-Desertification-in-North-America.html

https://en.wikipedia.org/wiki/Deforestation_in_the_United_States#/media/File:Virgin_Forest_in_United_States,_1926.png