Tropical Forests, Climate Change and Perspectives of Geo-Engineering in Africa

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Presentation structure

- Introduction
- Tropical Forests and Climate Change in Africa
- Importance of Forests in Climate Mitigation and Adaptation Efforts
- PLAN “B”: Climate Engineering Initiatives
- Perspectives of the Success of CE in Africa
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Introduction

- Forests are major casualties of climate change. The later leads to the loss of both direct wood benefits and other environmental functions that the forests provide including soil and climate stabilisation, biodiversity reservoir, water and food storage.
- As a Party to the UNFCCC, Africa has an obligation to contribute to the global effort of conserving and managing forests sustainably to provide sinks for CO2.

Natural forests

Sustainable forest management through industry based approaches that develop and disseminate technologies in forest management, eco-tourism and Payment for environmental services to enhance forest regeneration and support mitigation of and adaptation to climate change in the tropics.

Drylands

There is thus a need for developing Institutional capacity and infrastructure through investment, collaboration, training and research.
Recent Holocene – ca. 2000 yrs BP to Present

- Reconstitution and re-extension of dense tropical humid forests to the present limits
- Probable diminution ou stop between 15th and 18th century (Little glacial age).
- Recolonisation dynamics experienced in several parts of d’ central Africa during 20th century

Modern era corresponds to the recent Holocene

The last glacial maximum - the Würm glaciation - ended there about 15,000 years and was featured by major climatic droughts in Africa (Maley & Brenac 1998).

Glaciations are associated with important fragmentation of dense tropical humid forests and the extension of savanas (Doumenge, 2014)
Prediction of precipitation decrease in the African rainforest under the low B1 scenario in Dec–Feb. and Jun–Aug.

Hulme et al. (2001)
Importance of Forests in Climate Mitigation and Adaptation Efforts

How forest management helps tackle climate change

- **Carbon sequestration** through increases in forests and trees and forest carbon stock enhancement
  - Afforestation, reforestation and forest restoration
  - Increase of tree cover in farming systems (agroforestry), rural landscapes and cities
  - Enhancement of carbon stocks and sequestration capacity through management practices

- **Forest carbon stocks conservation** through reduction of deforestation and forest degradation
  - Sustainable practices of forest management and use
  - Integrated fire management
  - Management of forest health and vitality
  - Management of forest biodiversity
  - Management of protected areas and wildlife

- **Strengthening adaptive capacity of trees and forests** especially in fragile forest ecosystems
  - Management of forest biodiversity
  - Forest health and vitality to reduce vulnerability
  - Intensifying fire management systems
  - Adaptive management practices

- **Strengthening adaptive capacity of forest dependent communities**
  - Strengthening coping strategies
  - Diversifying forest management-related employment opportunities and livelihoods
  - Adaptive land use planning and management
Importance of Forests in Climate Mitigation and Adaptation Efforts

REDD+ Projects
REDD+ : Reducing Emissions from Deforestation and forest Degradation

1. Sequester carbon by protecting threatened forests
2. Save endangered wildlife
3. Improve the quality of life for local communities
REDD+ Readiness Activities

Phase One: formulation of a Readiness Preparation Proposal (RPP)

Readiness Preparation Proposal (R-PP) proposes work to be undertaken and funded to prepare the following:

i. An assessment of the situation with respect to deforestation forest degradation;
ii. REDD+ strategy options to reduce deforestation and/or forest degradation;
iii. A REDD institutional framework necessary to realize these options;
iv. A monitoring system to measure success of proposed REDD+ strategies.
v. A multi stakeholder consultation and participant plan.

Kenya R-PP has been approved for implementation by the Participants Committee of the FCPF
Phase two: RPP Implementation Phase
This phase implements of the various activities outlined in the R-PP and this will involves the development of:

(i) A national REDD+ strategy,
(ii) A Reference Emission Level/ Forest Reference Level or baseline against which REDD+ implementation will be assessed, and
(iii) A Monitoring System to assess performance of activities.

The FCPF, UN-REDD and other development partners in the country are supporting the country in undertaking the activities described above.
Mitigation options under REDD+

- Reduce the rate of **Deforestation and forest Degradation** through reduced forest conversions, efficiency in wood utilization, improved FLEG, Charcoal regulation,
- increasing the forest area through afforestation and reforestation - **Carbon sinks**
- Maintaining carbon density through **Forest conservation and SFM**;
- **Enhance carbon stocks** using longer forest rotations, enrichment planting, fire management, and protection against insect damage;
- Enhancing product substitution using forest-derived biomass to substitute products with high fossil fuel requirements. Use of wood from sustainable sources is considered **Carbon neutral**.
The principle of large-scale geoengineering has been backed strongly in 2009 by Sir Martin Rees of the Royal Society, who concluded that it may be necessary to have a "plan B" if governments could only reduce too little GHG emissions or if it’s too late to do so.
# Perspectives of the Success of CE in Africa

<table>
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<th>Geo-Engineering initiatives aiming to tackle climate change by sucking CO2 directly out of the air or limiting the sunlight reaching the planet (i.e. adding aerosols into stratosphere) are ranked from less to highly controversial due to finance, feasibility and long term side effects on biological Lives</th>
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<tr>
<td><strong>Climate Ready Crops</strong> that reflect light and are drought resistant. <strong>Results</strong>: Highly Needed, Useful, Safe and Effective but may be fantastically expensive and water unfriendly in some ecosystems</td>
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<tr>
<td><strong>Artificial trees</strong> for sucking CO2 out of the air and burying it in the ground. <strong>Results</strong>: Needed, Useful, Safe and Effective but may be fantastically expensive and water unfriendly in some ecosystems</td>
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<td><strong>Biochar</strong> for burning then burying agricultural waste to the ground to increase soil carbon and reduce carbon dioxide emission. <strong>Results</strong>: Fairly safe and Effective but may likely exacerbate famine</td>
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<td><strong>Carbon Capture and Storage (CCS)</strong> from coal or other fossil fuel power plants and then pumped underground. <strong>Results</strong>: Feasible but expensive and not needed because increasing the fuel needs of a coal-fired plant by 25%-40%</td>
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<td><strong>Ocean nourishment</strong> by growing biomass then burying it or dumping it in the sea to enhance biological productivity to remove carbon dioxide from the atmosphere. <strong>Results</strong>: Fairly cheap but ecologically damaging, Ineffective (because it can't be scaled up sufficiently) and likely to exacerbate famine</td>
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<tr>
<td><strong>Dumping lime or calcium or magnesium silicates into the sea</strong> to react with carbon dioxide and reverse ocean acidification. <strong>Results</strong>: Fairly safe and Effective but Expensive due to the amount of quarrying required to produce the rocks</td>
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Perspectives of the Success of CE in Africa

Broadly speaking, the cheap and effective options are dangerous; the safe options are expensive or useless. This isn't always the case. Seeding the oceans with iron filings, for example, is probably both useless and dangerous.

Whitening clouds to reflect more sunlight, and spraying salt water into the air to precipitate rain. **Results**: Middling cheap, Middling useless and Middling dangerous

White Painting of buildings and roads and covering deserts in reflective plastic sheeting to reflect sunlight back into space and ensure that the earth absorbs less of the sun's heat. **Results**: Safe but Expensive and Useless

Space mirrors to be sent into in orbit to deflect sunlight back into space. **Results**: considered unrealistic due to the scale needed, the expense and the potential unintended consequences

**Tethered boom delivery system**

- Balloon
- Fine spray of water droplets
- 1km
- Pipe
- Pipe tethered to a ship
- Pipe connected to a ship
Global warming is steadily increasing while forest cover is drastically decreasing. The principle of large-scale Geo-Engineering may be acceptable as a "plan B" to supplement governments’ efforts to reduce planned GHG emissions and avoid suicidal climate mitigation and adaptation strategies. CE shall be scaled up when it’s too late to mitigate climate risks and adapt to the change. But we don't need to invest in harebrained schemes, which impacts are yet uncertain.

**African Position vis-à-vis CE:** "We are going to have to look at new [agronomic] technologies which could suck CO2 out of the air. But we don't need to do this invest in harebrained schemes to reflect sunlight into space when we have no idea at all what impact this may have on weather systems around the globe". (Mike Childs, head of science, policy and research at Friends of the Earth UK)
THANK YOU ALL!
VIELEN DANKE!
MERCI A TOUS!
SHUKRAN!

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