Potentialities for CDM in Africa

Sudan case
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Sudan
Forest Cover

Background

- Forest area in the Sudan declined from 43% (estimated by and Harrison and Jackson (1958) to 38.5% estimated by FAO (1970) and in 1990, the forest resource assessment indicated that the forest cover had shrunk to 19% of the total country area.

- Recent forest inventory (1995/1996) conducted for northern Sudan (between latitudes 10° and 16°N by the Forest National Corporation (FNC), in cooperation with the FAO, estimated forest area at 12% of inventoried area in this part of the country.

- FRA (2000) indicated forest cover to be around 17 percent of country's area plus an additional 10 percent as other wooded land in the year 2000 with an annual deforestation rate of -1.4%.
Threats

- High dependency of population on forest resource Biomass as a major source of energy (78.5% of Sudan’s total energy consumption of which 70.5% was in the form of woody fuel)

- Climate Change and Drought is considered as one of the most important phenomena that Sudan faces. Two major droughts periods during 1967-1973 and 1980. In addition to localized droughts during 1987, 1989, 1990, 1991, and 1993 in western and central Sudan

- Since the early 1900s, extensive areas of forest have been converted to agricultural use and cleared for large-scale mechanized rain fed farming system in Eastern, Central Sudan

- Lack of sustainable management plans of natural forest and woodlands

- Over grazing of livestock, fires…..etc
Factors contributing to Climate Change

- Variability of rainfall and Temperature
- Vulnerability of ecosystems (Forest sector contributed by 75% in total carbon emissions resulting from deforestation as estimated in the national communication report Sudan)
- Over exploitation of marginal lands
- Fragility of the production systems
Sudan is a part of UNFCCC participating actively in all COPs and aware about the requirements for CDM projects, have eligible land, experience and communities. Sudan needs projects
Mitigation Initiatives in the Non-Energy Sector

- Sudan identified under the UNFCCC a set of appropriate options to sequester carbon in non-energy sectors

- The Comprehensive Mitigation Assessment Process (COMAP) computer model was used to analyze the forestry and rangeland options and to estimate the potential for CO$_2$ sequestration and the associated cost and benefits

- Land use assessment carried in Sudan between latitudes 10° to 22° north (covering 190 million hectares) identified nine major land use types, indicating that 50% of Sudan is currently classified as desert land, with an additional 24% consisting of scattered trees and shrubs. Only 9% of the land is used for agricultural purposes.
## Land Use in assessed area

<table>
<thead>
<tr>
<th>Land use type</th>
<th>Area (000 ha)</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Forest land (above 10% crown)</td>
<td>7,890</td>
<td>4 %</td>
</tr>
<tr>
<td>2. Scattered trees &amp; shrubs</td>
<td>44,693</td>
<td>24 %</td>
</tr>
<tr>
<td>3. Grassland</td>
<td>20,110</td>
<td>11 %</td>
</tr>
<tr>
<td><strong>4. wastelands</strong></td>
<td><strong>15,699</strong></td>
<td><strong>8 %</strong></td>
</tr>
<tr>
<td>5. protected land (sanctuaries and National parks)</td>
<td>3,352</td>
<td>2 %</td>
</tr>
<tr>
<td>6. Irrigated &amp; perennial</td>
<td>3,172</td>
<td>2 %</td>
</tr>
<tr>
<td>7. Rain – fed Agriculture</td>
<td>14,070</td>
<td>7 %</td>
</tr>
<tr>
<td>8. others (canals, urban, dams, and roads)</td>
<td>519</td>
<td>0 %</td>
</tr>
<tr>
<td>9 Desert</td>
<td>79,878</td>
<td>42 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>189,383</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
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Future Mitigation Initiatives in the Non-Energy Sector

- Two main groups of mitigation options are considered for increasing carbon sequestration and storage (within policy issues)
  - Afforestation and rehabilitation options.
    - Afforestation and rehabilitation of wastelands (Bare land in Gum Arabic belt and land left bare due to mechanized farming since 1970s option for CDM).
    - Afforestation of 10% of the rain fed land and 5% of the irrigated agricultural land (Government option).
  - Management options
    - Sustainable natural resource management approach for the purpose of conservation and rehabilitation of degraded forests (reserves and outside the reserves)
Land tenure

Land tenure systems in Sudan greatly influence the management of natural resources.

The 1970 Unregistered Land Act of Sudan stated that all unregistered land (i.e., rangelands and other uncultivated or non residential land is state owned,

In theory all land is owned by the state but in practice and by course of time the individuals have acquired usufruct rights over the land to the extent that they are considered to be the rightful owners of such lands, (example communities reservation)
Potential of Mitigation

- Afforestation and Rehabilitation on bare land (since 1970s) option to increase the biomass stock on wastelands (CDM option) and agricultural lands (5% and 10% government policy issue)

- Incentives from forest products (wood particularly fuel and non-woody, fruits and animal fodder), and achieving carbon sequestration targets, considered as an important development priority and a factor for the sustainability and the durability of the carbon stored
Potential of Mitigation

- Potential species suitable for reforestation and providing incentives particularly for CDM
  - Based on ecological, socioeconomic factors *Acacia spp* were selected for afforestation of wastelands mainly *Acacia senegal* (Hashab) and *Acacia seyal* (Talih) in rain-fed areas and *Eucalyptus spp* for irrigated areas
  - Perennial grasses were considered for establishing a form similar to the natural form of scattered trees and shrubs as this combination is considered to be a more productive form of rangeland.

- Experience of communities association for partnership in project development (Previous projects)

- Management Option (inside and outside forest reserves) by government
  - Twenty seven million hectares of forest reserves are proposed to be brought under a proper management system
CDM projects are attractive

Regarding cost effectiveness all the land categories on which the mitigation options are to be applied have very attractive economics and all have very low initial cost and present value of costs per ton of carbon sequestered.

If successfully implemented, the combined effect will substantially increase the amount of carbon sequestered and stored in Sudan.

In addition, such options are expected to have substantial environmental and socio-economic benefits (biodiversity conservation, watershed protection, combating desertification, provision of forest products and grazing resources, employment, poverty reduction, food security and general economic development).
Implementation Modalities

Implementing mitigation options require:

- Coordination across relevant ministries and institutions
- Favorable institutional and legal environment
- Adequate technical and financial capacities.
- Proper policies and legislation particularly on land tenure and land use issues since the security of land tenure arrangements and land use rights are considered to be the most
Poverty Alleviation within Gum Arabic belt of the Sudan within CDM perspectives

Based on Sudan experience in project-community partnership
Gum Arabic belt

The most important forest in the Sudan lies within low rain savanna with an area of 520000 km² across central Sudan accounting for one fifth of the country total area. It accommodates a round one fifth of the total population and two thirds of livestock population. The belt acts as a natural barrier to protect more than 40% of the Sudan from the desert encroachment. The belt represent a site of intense and diverse human activities where most of agriculture and animal production are practiced.
General objectives

To promote gum production and productivity, rehabilitate traditional gum cultivation cycle and strengthen 2000 newly organized gum producing associations with the view of alleviating poverty, combating desertification and enhancing food security.
Specific objectives

- To support the existing GPAs through planting & restocking of 500000 ha with special emphasis be given to planting of gum-producing trees and fodder tree species.
- To improve back-yard gardens for production of rain-fed vegetables, sustain women farming and diversify food supply.
- To adopt sustainable land use farming system and restore traditional gum cultivation cycle.
Location and implementation of the project

- Area assessed and classified into land use categories including the bare land areas identified and located since 1970s
- Assessment relied on remote sensing application
- Implementation will be based on CDM system and requirement
Communal organizational set up and land security

More than 2000 Gum Producers Associations (GPAs) were formed within gum arabic belt in order to carry on the process of production and marketing of Gum Arabic as an income generating activity.

Forest National Corporation led the effort that has resulted into formation of GPAs that involve more than 24 thousand households (more than 200 thousand members; women constitute about one third of the total number).

Land tenure: more than one million hectares are now owned by GPAs (from state ownership to societies and farmers ownership)
Issues to be addressed
Women involvement and participation

Women play an effective roles in the economic and social life of the household. Of the more than one million members comprising the GPAs, women constitute about one third. Back-yard gardens, being their especial activity in farming, would be targeted for increased production by introduction of water harvesting techniques as well as increasing the range of crops produced.
Environmental effects and desertification control

- Without checking the current environmental degradation in the gum belt area, the existing systems of production would hardly be sustainable in the long run.
- Rehabilitation of the hashab cover as a main activity of the associations lead to
  - Combat desertification
  - Improve production per unit area
  - Holistic treatment to address all farming components
  - Better incomes to the farmers and women, etc.
  - Synergy between CCC and CCD
Improvement of marketing systems:

1. Sustained organic crop production (gum, sesame, hibiscus, etc) in terms of quantities and timely delivery could lay the bases for a sound negotiation ability of producers with buyers to secure better marketing opportunities and increase farmer’s returns from their produce.

2. Great national concern about gum arabic development and farmers incentives based on improvement of marketing system
Rehabilitate and strengthen social infrastructure

4 Drinking water is the major problem during the gum production period specially. The water problem shall be addressed by assisting the water situation in the targeted villages and adopting the most feasible options to solve water shortages.

4 Water centers development to be supported by government but managed communally
Project Components

Project Components
Plantation of *Acacia senegal*

- Planting programme of 500000 ha in gum arabic belt communal and private lands through adoption of proper land use system (eg Agro-silvo-pastoral systems)

- Gum production improvement through sound methodological approach based on conducting appropriate technology supporting the local communities.
Establishment of Nurseries and Extension Services

- Establishment of ten GPA central nurseries in the gum belt for production of needed seedlings annually.
- Other community nurseries will be constructed at different localities with the idea of income generating activities and educational purposes.
- Efforts to be directed to improve the extension services (personnel and equipments).
Sustainable improvement in quality of marketable Gum Arabic

- This component will be executed with the view of addressing a technical package regarding the different production processes such as tapping, collection, and storage.
- Introduction of micro processing tools and techniques at the local producer level in order to improve quality and add value and hence increase income of grass-roots level communities and disadvantaged groups, especially women.
Improvement of social infrastructure for supporting forestry in Gum Arabic producer communities

Wherever possible some efforts should be directed towards improvement of infrastructure at community level, such as water facilities during the production season.
Capacity building

Capacity building will include professionals and building organizational, management and administrative capacities of GPAs in the area of production, business management, book keeping, finance and administration aspects.
Research

- Gum production (quantity and quality)
- Farming system (improvement of crop and fodder production)
  - Agroforestry system
  - Agro-silvo-pastural system
  ✓ (Design, competition, facilitation- densities and arrangement)
Implementation modality

- Main emphasis will be given to involvement of local community (GPAs) based on participatory and partnership approaches at the phase of detailed planning, project design and appraisal, implementation and monitoring and evaluation.

- FNC (government provides technical backstopping and local component input)
Thank you