

SITUATION OF CURRENT LAND DEGRADATION IN LESOTHO

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Roads engineering: higher mountain construction leads rockfalls, landslides and mudflows.
Lowland construction: clayey subsoil is susceptible to piping.

Sanitary landfills: Solid wastes
Radioactive wastes

2.0 HAS LAND DEGRADATION (LD) BEEN QUANTIFIED? HOW IS IT MONITORED? IS THERE ANY VERIFIED DATABASE ON LAND DEGRADATION?

2.1 LD Quantification

Biodiversity: (i) Aquatic environments
(Few)

(ii) Wildlife environments (rodents, birds, reptiles, game, etc.)

Soils and Water: quality in terms of biological, chemical and physical properties.

Economic and social aspects:

2.2 LD monitoring

Not adequately validated by peer reviews.

- Agri-environmental vs pension schemes

Flexible schemes must be designed to promote **best alternative landuse management practices (BAMP)** for farmlands at high erosion risk, so that there is payment of **BAMP** participants by society for the environmental service delivered, rather than for ordinary right of citizen.

2.3 LD database

A database is urgently necessary.

Wetland restoration can be used for a variety of purposes, such as filtering and storing nutrients and organic matter, providing habitat for a variety of species, and re-establishing natural buffer zones for flood control.

3.0 METHODS/APPROACHES TO ASSESS LAND DEGRADATION IN LESOTHO

3.1 Transect (ranging from about 100 to 150 m long) measurements of plant cover

A data point-quadrant method is used during the growing seasons to follow temporal changes in species composition of the plant community along permanently established transects within a specific ecosystem (e.g.

deep and shallow wetlands; and grazed and differentially grazed rangelands).

4.0 MAJOR CAUSES OF LAND DEGRADATION IN LESOTHO

4.1 **Climatic drought and Rainfall erosivity**

Rainfall occurring in the region during winter season is too sporadic/spatial and erratic/temporal, and mostly falls in small amounts.

4.2 **Lack of plant cover and rainfall erosivity**

Higher intensity storm events of more than 1–3 mm min⁻¹ that can generate runoff in the agricultural landscape are common following dry winter spell before adequate crop cover is established in the early spring, often producing flash flooding that generates serious muddy floods.

4.3 **Widespread conventionally tilled monoculture of row crops on steep hillslopes**

Muddy floods occur when water flowing from cultivated agricultural fields carries with it large quantities of soil as suspended sediment load. Dense network of rills can concentrate runoff result in ephemeral gullies. The geomorphic effect of muddy floods is an accumulation of soil eroded material in the form of beds of mud in depressions, where the inclination of runoff pathways diminishes.

4.3 **Rangelands**

- **Historical widespread use of fire**

Herbivores were at a comparative advantage since they were mostly preferred by herders and hunters who have been in favor of the grasses over tree. This had negative effects insofar as they reduced diversity of plant communities, as well as of local animal species.

- **Subsequent overgrazing**

The development of population pressure by the herders, more than the hunters, evolved an ecosystem of grazing domestic animals on grasslands.

4.4 **Woods deforestation**

Apart from fuelwood, cultural circumcision school traditions (mophato) still continue the removal of the native forest trees, but without any means of replacement by propagation strategies.

4.5 **Shallow soil depth**

- Shallow soil depth to bedrock

4.6 **Slope steepness**

- Steep hillslopes

- 4.7 **Low water infiltration capacity of duplex soils in the lowlands**
- 4.8 **high ratio of dispersible clay fraction to labile organic carbon fraction**
- 5.0 MERIT OF LADA IN LESOTHO
- 5.1 **Incentives on high LD risk agriculture, environment and land use planning policies**
Regarding erosion mitigation, there is a need to formulate specifications (norms = a series of *agricultural and environmental standards and rules* applicable to those fields that have at least 50 per cent of their area (or minimum 0.5 ha) with a slope steeper than 10 per cent). Land users or farmers need to achieve a minimum specified standards and rules in order to qualify for receiving the totality of their subsidies.
- 5.2 **Wetlands ecosystem**
As the wetlands developed, environmental factors, including water temperature, depth, and pH should be measured. In conjunction with the Lesotho Highlands Water Development Project, there is a need to study changes in species composition that occurs in both submerged wetlands and emergent plant communities as the wetlands are maturing. Water depth, temperature, and pH were lower in areas with emergent marsh vegetation compared to submerged vegetation, all of which, in turn, can affect carbon cycling and storage rates. *Higher mountain carbon sequestration study*: needed to investigate use of permanent shallow flooding to mitigate aerobic decomposition of old soil carbon substrates, and to assess the effect of water depth on carbon storage in restored wetlands.
- 6.0 INSTITUTIONAL ARRANGEMENTS AND CAPACITY FOR LAND DEGRADATION ASSESSMENTS
- 6.1 No official attempt to collect data on flooding or property damage costs due to muddy floods by the flood-prone municipalities.
- 6.2 Ministry of Forest and Land Reclamation (MFLR) is responsible for forest and rangelands policy, and thus for control of erosion and muddy flooding through the installation of soil and water conservation engineering structures to support silvi-pastoral measures. The MFLR has embarked on policy of *contour terracing with rock-wall bunds (CtRB)* and *indigenous tree hedgerow planting (ITP)* at the upland watershed level, mainly on the steep, stony, and thin topsoiled lacking water retention capacity. The primary challenge is to concentrate surface runoff where it could be useful for plants and underground water recharge over time, while also minimizing the destructive potential of flash flooding.

- 6.3 Strategic planning (is an on-going effort through SCARDA-SADC-FANR support) to build capacity for teaching, research and development through a coordinated multi-sectoral partnerships under the Lesotho Center for Agricultural Research for Development (LCAR4D).
- 6.4 Ministry of Agriculture and Food Security (MAFS) is in charge of the *policy for green cover crop (GCC) and grass+tree buffer strips (GtBS)*, to ensure the: (i) installation of **GtBS** and (ii) sowing of **GCC during dormant autumn-winter season** on at least 3 per cent of the cultivated land surface. Cross compliance of farmers can be awarded or granted input subsidies, in order to meet more general objectives (e.g. conversion to sustainable farming and integrated landscape management focused on improving water quality
- 7.0 GOVERNMENT COMMITMENT TO ASSESS AND REVERSE LAND DEGRADATION/USING =AND DEGRADATION SENSITIVITY AS LAND USE PLANNING TOOL. RELEVANT GOVERNMENT=POLICIES/ACTS COULD BE LISTED.
- 7.1 Studies evaluating the costs induced by on- and off-site impacts of muddy floods are very rare.
- 7.2 Mitigation of muddy floods is at the crossroads of different ministry policies: Agriculture, Forestry & Land Reclamation, Tourism & Environment, Land use planning (Local gov), Public Works, and Natural Resources Management.
- This makes any ‘hydrologically-consistent’ supervision very difficult in watersheds. For instance, reservoir water development project managers must cope with siltation of rivers without any possibility to control erosion on the cultivated land draining to the rivers.