

Introduction

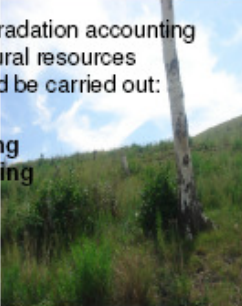
- Mongolia is a traditional agriculture country , dominated by pastoral herdsman and is also a forest deficit nation
- The forest area of Mongolia is 127 million ha and total growing stock is 1.27 billion cubic meters and the volume of commercial forest about 301.9 million cubic meters (2006)
- Forest degradation accounting considered, as value of the changes of extent of forest resources and its adjustments with economic development indicators of the country
- Traditional calculation of GDP in National accounting system in Mongolia underestimates the true value of natural resources and essentially ignores the value of natural resources and forests

Almost 70% of community members surveyed in Batsumbar sum, Tuv aimak, in July 2009, says that forest degradation is higher than other NR, and 63% of respondents answered that it also highly impacting to the local community livelihood.

Methodology

Forest resources degradation accounting is similar to other natural resources accounts and it should be carried out:

- Physical accounting
- Monetary accounting






Physical accounting

Physical accounting defined by forest area by stock

Physical accounting by stock is defined as:

OPENING STOCK - quantity harvested + timber growth - quantity by deforestation - reductions in stock due to fire / insects +, - other changes =
CLOSING STOCK

Monetary accounting




The concept of economic rent (R) is central to forest resources degradation accounting.

The total rent for forest resources in the beginning of the year can be defined as:

$$R_t = p \cdot H - C(h)$$

Where :

- p - world market price per m³ of resources harvested
- H - volume of timber harvest, including illegal logging
- C(h) - cost of timber harvesting

Methodology

Value of the resources at the beginning of the accounting period (V₀) are defined as:

$$V_0 = \sum \frac{R_t}{(1+r)^t}$$

Intermediate cost of resources:

$$VSI = V_0 - \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t} + \sum \frac{R_t}{(1+r)^t}$$

Forest resources degradation value:

$$FDV = VSI - V_0$$

FDV can be also be calculated as follows:
 $FDV = (L_0 - L_1) + (L_1 - L_2) + (L_2 - L_3) + \dots + (L_{n-1} - L_n) + L_n$

Where:
 R_t - annual growth of forest,
 D_t - forest area deforestation, forest loss due and
 H_t - timber harvest (legal or illegal)
 p - world market price of timber
 C(h) - cost of timber harvesting, including a forestation 3.5 \$, for timber logging, reforestation 1.5 \$-2\$, in average 2 \$/m³
 L_t - total value of non-timber benefits
 C_t - total timber production value
 D_t - total timber production value
 U_t - value of other benefits of forest
 n - number of years

Macroeconomic adjustment

Environmentally adjusted green Net National Product (gNNP):
 $gNNP = GNP - Dc - FDV$

Where:

GNP = Gross National Product

NNP = Net National Product

Dc = Depreciation of non-made capital or fixed assets

FDV = Degradation of Forest resources

GS = NS - FDV

Where:

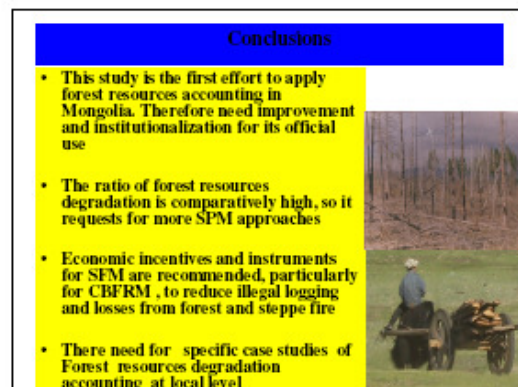
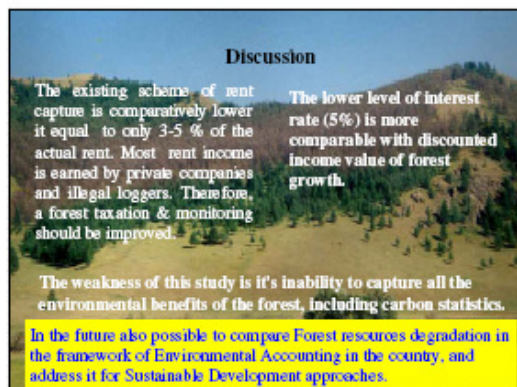
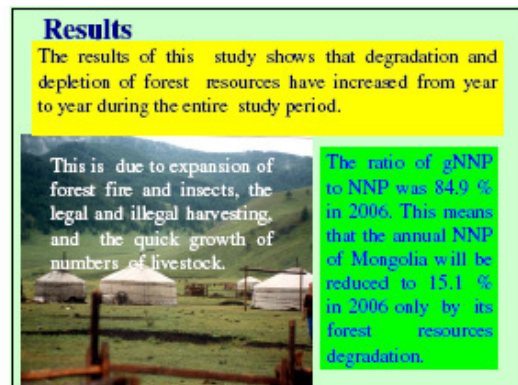
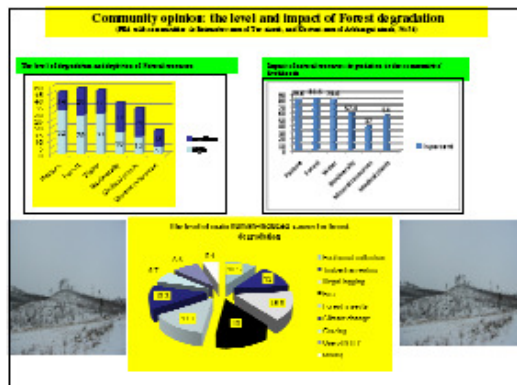
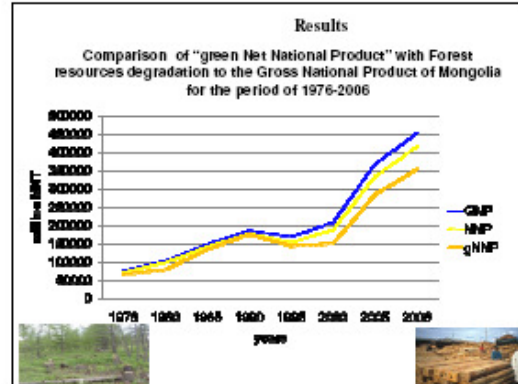
GS = Genuine Saving



GS = NS - FDV

Where:

GS = Genuine Saving

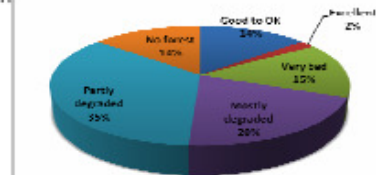


ASSESSMENT OF FOREST DEGRADATION BY LOCAL COMMUNITIES: THE CASE STUDY OF GHANA



INTRODUCTION

- Degradation of forests in Ghana is alarming
- Forest land declined from 8.1 million ha to 2.1 million ha within the last century
- Remaining forested areas are in poor condition



Condition of forest reserves in the High Forest Zone of Ghana

- Degradation impact negatively on human livelihood and the environment
- Therefore urgent measures needed to curb continuous degradation
- Hence an ITTO-funded project implemented by the Forestry Research Institute of Ghana (FORIG) to rehabilitate some degraded forests with collaboration of local communities
- However, due to limited resources proposed project sites had to be prioritized based on the level of degradation
- To ensure active local participation & transparency, indicators for assessing degradation were developed in collaboration with the local communities

Development of indicators

- PRA and workshops were used
- Questions focused on:
 - present state of forests as compared to about 20 years ago,
 - products obtained from the forest some years back and which are no more available,
 - fertility of the land at present as compared to some 20 years ago, and
 - present state of streams and rivers in the forests compared to some years ago
- Answers compiled and list of final indicators agreed upon through four separate workshops with local communities

Indicators used for assessment of degradation

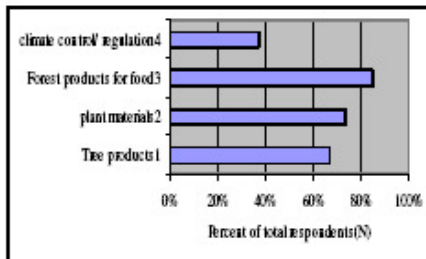
- State of flora resources: timber and NTFPs that communities depend on (Biodiversity)
- State of streams/rivers in the forest (Protective functions)
- State of fire incidence and soil fertility (Health of the forest)

Method for assessment

- Vegetation survey for the assessment biodiversity
- Habitat assessment method for assessment of protective function
- History of fire incidence for state of health of the forest

RESULTS AND DISCUSSION

Percent of local respondents indicating resources obtained from the forest in the past but which are no more available (total respondents: (N) = 441)



Indicators of degradation provided by local communities

- Fire: presence of burnt areas and fire adapted grasses;
- soil erosion due to burning of grasses;
- Fire related suspended particulate matter;
- Reduction in soil fertility
- Reduced water supply and quality;
- Reduction in forest food, medicines and herbs;
- Decrease in game, wild animals and birds;
- Reduction in materials for shelter and households;
- Reduction in income from NWFPs
- Reduction in rainfall amount and pattern;
- Destruction of plantations;
- Reduction in provision of services (e.g. shade and wind breaks);
- Vegetative cover destruction;

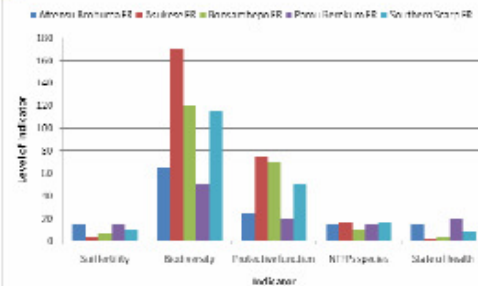
Summary list of final indicators of degradation

No Indicator

- 1 Number of plant species in the forest
- 2 Level of soil fertility as indicated by the presence of indicator plants
- 3 State of riparian vegetation
- 4 Number of plant species used as Non-Timber Forest Products
- 5 State of fire attack in the forest

Field inventory were based on these indicators

Summarized results on levels of degradation



CONCLUSION

- The approach relies on skills that are locally available in many communities and indicators based mainly on visual assessments
- Case study demonstrates high potential for active involvement of local communities in the assessment of degradation
- This assessment could be replicated in other areas upon improvement in local capacity
- However, the only constraint against such replication and capacity building are financial resources

RECOMMENDATION

- Need to build capacity of local communities
- Tailor-made manual for local communities be produced
- Guidelines for the development of indicators for assessment need to be made
- Approach could be improved using statistical analyses and additional indicators/data including participatory mapping



**Land Degradation Assessment in Drylands (LADA):
A focus on the local level assessment**

by
Sally Bunning FAO, Land and Water Division,
Natural Resources and Environment Department
for the Technical Meeting on A&M of Forest Degradation 8-11 September 2009

WHAT ARE WE ASSESSING ?

Land degradation (LADA definition):

"The **reduction in the capacity** of the land to perform ecosystem functions and services that support society and development"

Status and Trends of degradation (& improvement):

- Soil properties and soil erosion
- **Water quality and quantity**
- **Vegetation/land use and biodiversity**

Causes & Drivers: focus on human induced degradation (SLM)

- land use management practices
- capacity (knowledge, equipment, access to services...)
- policies and legislation (tenure, market, PES...)

Impacts on

- Ecosystem services: Environmental, Productive & Socioeconomic
- Livelihoods: Natural, Physical, Human, Social & Financial assets

Assessment Process, Methods and Tools

Participatory Process

Multi-scale

- Global level
- National level
- Local Level

Integrated (human and environmental)

- Socioeconomic (livelihoods and vulnerability analysis)
- Biophysical : soil, water, vegetation/biodiversity ; on-site and off-site (wider watershed/ landscape level)
- DPSIR and Ecosystems analysis

OBJECTIVES & OUTCOMES OF LOCAL LEVEL LADA

OBJECTIVES

1. to establish a baseline of LD information at local scale
2. to provide basis for a (future) LD monitoring (geo-referenced system)
3. to validate the LD Hot Spots (GLADA-NDVI) and national LD assessment
4. to enable causal analysis of land degradation and human/socio-economic factors (Drivers - Pressures - State - Impacts - Responses)
5. to identify remedial action for sustainable land management (SLM).

OUTCOMES

- Methods and Tools
- LADA-Local manual (parts 1 and II)
- Local Study Areas assessed
- Documentation of SLM measures (using WOCAT tools, incl costs and benefits)
- Curriculum for training (in LADA countries and by UNCCD member states)

Degradation types : National (LADA/WOCAT) and local

W: Soil erosion by water

- W1 - loss of topsoil by water
- Wg - gully erosion
- Wm - mass movements
- Wr - rillbank erosion
- Wc - coastal erosion
- Wo - offsite effects (sediments, flooding...)

E: Wind erosion

- E1 - loss of topsoil by wind
- Ed - deflation and deposition
- Eo - offsite effects of wind erosion

C: Soil chemical deterioration

- Cn - fertility decline and reduced OM content not by erosion e.g. by leaching, fertility mining, oxidation and volatilisation (N)
- Ca - acidification (lowering of soil pH)
- Co - soil pollution with toxic materials
- Cs - salinisation/alkalinisation of topsoil leading to a productivity decline

P: Soil biophysical deterioration

- Pc - compactness by trampling or machinery-weight/ frequent use
- Pk - sealing of pores and creation of impervious layer at soil surface obstructing infiltration of rainwater
- Pw - waterlogging, human induced hydromorphism (excl. paddy fields)
- Ps - subsidence of organic soils, settling of soil
- Pu - loss of bio-productive function due to construction, mining etc.

V: Vegetation and biodiversity degradation

- Vr - reduction of vegetation cover
- Vs - quality & species composition decline (above and below ground)
- Vq - reduced biomass/production due to clear felling, forest fire, etc.

H: Water degradation

- Ha - aridification/soil moisture problem
- Hp - water quality decline (pollution)
- Hq - water quantity decline (groundwater, surface water)

Rapid assessment of vegetation + land use

1. Obtain an overview of vegetation and land use patterns
2. Make a rapid assessment of vegetation in each LUT
 1. plant and litter cover
 2. structure and composition
 3. habitat and species diversity
 4. plant health/vigour
 5. productivity
3. Develop initial ideas on relationships between vegetation and LD/SLM practices:
 - effects of vegetation degradation on erosion, soil quality, the water cycle, biomass/ productivity; and livelihoods (food, other products, vulnerability)
 - effects of SLM practices on vegetation resources and productivity

→ to help select detailed assessment sites
4. Conduct Detailed assessment of status and trends
 - scoring of pasture quality/condition
 - forest/woodland status and trends
 - natural vegetation in croplands

Focus group discussion on vegetation resources

1. Identify plant indicators - change in pasture quality (3) + soil quality (3).
2. Information on the grazing regime and stocking rate
3. Information on fires, drought risk/resilience and coping strategies
4. Information on laws and regulations that affect vegetation quality
5. Describe the reasons for current vegetation status (and change dynamics)
back up from household interviews, technical specialists, secondary information

Analysis of Effects on Ecosystem Services LADA (N+L)

P Productive services

- P1 - production (quantity + quality) incl. effects on biomass; and assoc. risks
- P2 - water (quantity + quality) for human consumption, animals and vegetation
- P3 - land availability

E Ecological services (regulating + supporting)

- E1 - water cycle (hydrological regime)
- E2 - organic carbon content (soil/vegetation)
- E3 - soil cover (vegetation, mulch)
- E4 - condition of soil surface (e.g. crusting)
- E5 - nutrient cycling
- E6 - soil formation
- E7 - biodiversity
- E8 - effects on greenhouse gas emissions

S- Socio-economic services + human well being

- S1 - spiritual, aesthetic, cultural landscape, heritage value, recreation, tourism
- S2 - education and knowledge (e.g. indigenous)
- S3 - conflicts
- S4 - food security, health and poverty
- S5 - infrastructure private and public (buildings, roads, dams, etc)

Need to develop a scoring system for LADA- L for assessing ecosystem services

CHALLENGES AND CONCEPTS

As with forest degradation assessment

Degradation is a process so we need to assess

- type and severity of land degradation (observation)
- land condition (quality and quantity of soil, water and biological resources) (measurement and observation)
- change /trend over recent past e.g. 10 years (information from land users, technical sectors, policy makers (take into account varying perceptions and also look at historical context to understand land users behaviour and policy decisions) backed up by LUCC analysis at national level)
- Impacts (human; environmental) and thereby determine remedial measures

Problem of Baseline : so comparison is important in the field to compare degraded and well managed land (e.g. between fields, farms, catchments)

- Aim : not the assessment itself but the capacity to use results to inform decision making (by land users, technical sectors, policy makers) and action to improve land resources and ecosystem management (Prevent ; Mitigate ; Restore/rehabilitate)

Closing remarks

- LADA local is being adapted and validated in range of situations
- Manual available
- Requests for scaling up (How can we collaborate with FO)
- Technical collaboration between LADA and FO forest degradation process
- Suggestion to prepare a forest degradation module for LADA

Details on local, national and global level assessment process on website

www.fao.org/nr/lada

Please see also the LADA fliers