Adaptation to the threats of climate change ; forests and wildlife

By

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Background status of the sector

Forest and wildlife Conservation – Buddhist philosophy
1st sanctuary - King Dewanampiyathissa in 246 B.C
Subsequent King - Appointment of Kale Korala
British Colonial Era - exploitation of forest

learing of

wet zone forests at mid and high elevate
→ coffee tea, and rubber plantations
wet lowland and coastal areas
→ coconut and cinnamom plantations

ost- independence period – Forest clearing

- Expansion for irrigated agriculture
- Land settlement and colonization
- Shifting cultivation

ense forest cover

- 1900 - 80% Land area
- 1956 - 44% Land area
- 1999 - 22.4% Land area

orest degradation

Growing stock reduced by 20% during 1995-2005

i Lanka is one of the bio diversity hot spots in the world

Group	species			Endemic species		
	Number	Species		Number	Endemic species	
		National criteria	Global criteria		National criteria	Global criteria
dophytes	314	90 (29%)	36 (11%)	57 (18%)	30 (53%)	35 (61%)
nosperms	1	1(100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
osperms	3368	487 (14%)	413 (12%)	879 (26%)	227 (26%)	399 (45%)
rflies	>242	81 (33%)	3 (1%)	14 (6%)	11 (79%)	3 (21%)
ers	>400	14 (4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
mollusks	266	152 (57%)	0 (0%)	201 (76%)	152 (76%)	0 (0%)
nwater fishes	65	30 (46%)	19 (29%)	29 (45%)	28 (97%)	19 (66%)
nibians	48	29 (60%)	0 (0%)	29 (60%)	29 (100%)	0 (0%)
les	162	113 (70%)	9 (6%)	79 (49%)	78 (99%)	1 (1%)
	419	56 (13%)	8 (2%)	24 (6%)	17 (71%)	6 (25%)
mals	89	39 (44%)	9 (10%)	12 (13%)	11 (92%)	0 (0%)

aunal Bio diversity –

v studies of large vertebrates

ephant and leopard -decrease in diversity)

eforestation

rest reduction Results – bio diversity loss even extinction of some species

Groups	Species	Endemics	Extinct species	Extinct endemics
Dipterocarps	58	58	1 (1.7%)	1 (1.7%)
Snakes	162	79	14 (8.6%)	13 (16.5%)

Major impacts of climate change on Forests

Changes in the distribution of forest types

Distribution based on ⟹ temperature + rainfall

Predictions :-

1. Extent of tropical dry mixed evergreen forest thorny scrubs will increase
2. Extent of tropical wet low land forests montane forest areas will decrease

Effect on plants and faunal migration.

1. Species extinction
2. Lowering of bio diversity
3. Changes in the way species interact

may be severe in Sri Lanka as most of the plants and animal species are endemic and confined to small forest areas

Effect on Costal ecosystems

Sea level rise

Inundation of mangrove areas ⟹ effect on fishing

Warmer temperatures ⟹ change distribution of corals

Incidence of forest fires and outbreaks of insects and pathogens

forest health questions

Outbreaks of insect , pathogens } **Result** defoliation, growth loss, even diebacks

Drought - heavy losses to commercial forestry

Timber supply and prices

Increase co_2 level → Increase vegetation growth →

Increase timber production → reducing or conserving the prices

Occurrence of invasive species

as some species thrive - Some species Invasive

others being more vulnerable - may become rare or extinct

ummary of climate change impacts on forest ecosystems

limate factor	Cell level	Organism level	Species level	Ecosystem level
ease	Photosynthetic rate increase. Stomatal onductance reduction.	Growth rate increase Water use efficiency Increase. Seed production Increase.	Decreased seed mortality. Increased recruitment. Period for individuals to reach maturity. Changes in individual density ?	Biomass production increase. Alterations in species competitiveness. Changes in species Composition.
nperature ease	Photosynthesis increase or decrease. Photosynthetic period can increase. Transpiration increase	Primary production positive or negative changes. Seed production changes .	Regeneration rate Changes. Possible increase in tree mortality. Negative consequences for species sensitive to temperature changes	Alterations in species competitiveness. Species' composition changes. Soil mineralization increase.
fall me nges	Growth rate decrease	Seed mortality rate increase	Increase of mature individuals' mortality rate	Alterations in species Competitiveness. Species composition Changes.

daptation - Way forward

lational level framework should be established
entral axis → Development policy

trategies to be incorporated in to development policy
→ to avoid conflict with other sectors

mpact of climate change will effect productivities of the
orestry sector → Diminish benefit to the society

ociety adaptation should be included in the sector decision making.

Vhile formulating institutional framework relationships of other sectors.
) Energy- (specially bio-energy)
) Agriculture
) Industry
) Tourism – (specially eco-tourism)

daptation should focus on the society that likely to suffer
ather than assessment of impacts of climate change

Lanka policy framework for adaptation –
gn to suit to existing institutional, social and economic situation

uld include

strategy to reduce vulnerability
coordinated actions related to climate change with action in other
sectors

hould include elements in

Capacity building
Identification and establishment of financial resources
formulating and implementing adaptation projects

principles underlining framework concept should include the following

A short term adaptation activities for extreme events and the
starting point for reducing vulnerability to long term climate change
Adaptation policies and measures → within the
overall development polices
Adaptation should pursue at different levels. (National , Regional
and Local levels)

Issues to be dealt while designing

a) To what extent can adaptation reduce vulnerability to climate change (in relation to cost)
b) What institutional arrangements have to be developed, implement and finance the adaptation measures

framework should start-up programmes on,

a) Vulnerability assessment
b) Institutional development
c) Training
d) Implementation of concrete concepts on adaptation measures

Vulnerability assessment

orestry sector focus on direct, indirect as well as

remental impacts.

Direct impact -

impacts on availability and quality of forest goods and service are not very well understood even globally

In Sri Lanka quality and quantity of data ?

Indirect impact –

should include impacts on community

Incremental impacts –

include the impacts generated by the implementation of policies and programmes in other sector

ational Forest monitoring System

ost important aspect of monitoring of vulnerability assessment

st- effective and quality controlled information to gather data on

Dimension	**Issues**
Sociocultural	❖Rural livelihoods ❖Indigeneous people's rights ❖Ritghts of access ❖Tenure and land ownership
Economic	❖Poverty ❖Food security ❖Wood productivity and supply ❖Valuation of forest products and service ❖Equity ❖Trade ❖Energy
Environmental	❖Biological diversity ❖Soil and water protection ❖Climate change ❖Desertification ❖Air pollution ❖Invasive species ❖Wildfire ❖Pests

Recent development

Not only measurements of trees and other biological features interviews with local forest managers and other stake holders.

Monitoring of

a) health in the forest

b) mitigation of climate change → forest management by storing Carbon in the forest eco system → an economic and financial tool for forestry.

Monitoring of Carbon storage is closely related to variables covered by conventional national Forest inventories

→ growing stock, growth and yield and area of Forest

Basic data collection methods for national forest monitoring systems

ata ollection ethod	Feasible variables	Pros	Cons
eld easurements	Biophysical properties	Precise	High cost Limited to measurable variables
eld bservation	Biophysical properties Land use	Wide range of variables possible	Relies on field staff judgments
emote ensing	Area measures for some variables	Cost-effective(?) Supports fieldwork performance	Low accuracy Few relevant Parameters possible
terviews	Remote sensing Interviews	Only way to capture local socioeconomic information	Demanding methodology Difficult to Control bias,

ri Lanka has to establish a cost effective forest monitoring ystem → all required information

apacity building

bling the social system

specially institutions to create adequate framework and develop action → adaptation

ptation issues to be analyzed

Creating communication channel to generate and provide scientific and technical information.

Promoting and creating awareness → climate change problems. especially the motivation of private sector and civil society participation

Ensuring an adaptation component included in national investment and development plans:

integrating climate change into public and private education

National, regional and local levels

ensuring technical and financial support

ensuring the continuous improvement → adaptation policies and programmes

hould be able

- Understand the direct, indirect and international impacts of climate change on the forest sector and forest ecosystems
- Establish, spread and use possible synergies between forest sector and other sectors
- Establish, communicate and solve possible conflicts with other sectors
- Promote and implement monitoring of polices programmes, plans and projects, in the forest sector that are aimed at reducing vulnerability to climate change

inancing

Additional obstacle due to uncertainty of adaptation projects do not produce direct or tangible benefits

financing part of national framework for adaptation

ssible financing sources

ource	National	International
ublic	Taxes and Transfers Government programmes	Bilateral cooperation agencies Multilateral cooperation agencies Multilateral banks Regional development bank
ivate	Forest sector investments National foundations Banks and the financial sector	Investment from multinational companies Private foundations and funds

nvironmental service which can be used as adaptation option

limate risk	Impact	Environmental service	Adaptation option (examples)
hanges in rainfall egime	Droughts, floods	Water system regulation	Watershed management; plantations of species with high regulation capacity; agro forestry, etc.
xtreme events (e.g. rrential rains, urricanes)	Damage to Infrastructure; floods		
hanges in rainfall egime	Droughts and floods	Micro-climate regulation	Restoration and rehabilitation; forest enrichment; research in forestry
verage temperature hanges	Change in ecosystems structure. Habitat loss for some species		
xtreme events (e.g. rrential rains, urricanes, fires)	GHG emissions	Carbon fixation and storage	Mitigation projects in hand use change and forestry Fire control
hanges in rainfall egime	Change in ecosystem. Habitat loss for some Species; Loss of species (fauna and flora). Loss of genetic Pool; Epidemics	Conservation of biological diversity (including pollination, seed distribution, habitat and natural pest control)	Bioprospecting studies; Sustainable management of forests; conservation, restoration and rehabilitation; sustainable plantation management
xtreme events (e.g. rrential rains, urricanes)			
emperature changes			
hanges in rainfall egime.	Erosion	Soil protection	Restoration and rehabilitation; forest enrichment. Plantations ;with soil protecting species in highly degraded areas
xtreme events (e.g. rrential rains, hurricanes)	Landslides		

ossible forestry projects according to adaptation process.

ptation process	Examples of projects in the forest sector
e I: Vulnerability ssment	**Assessment and valuation of:** -loss or potential appearance of species (fauna and flora) - decreased/increased timber production - impacts on micro and macro watersheds - impacts on soil erosion/degradation, especially in mountain ecosystems - increments in desertification processes - indirect effects (e.g. on employment in the timber sector, decrease of Available water for power generation or irrigation)
e II: Improvement in city and design of ures	-Intersectoral forest resource planning for reduction of vulnerability -Capacity building among affected social groups (for understanding and reduction of vulnerability to climate change) -Integration of vulnerable social groups in the sector's strategic planning Improvement of governance in the forest sector -Incorporation of adaptation components into forest management plans
e III: Implementation of tation measures	-Watershed management for regulation of water flows -Plantations to reduce landslide risk -Agroforestry to improve food security -Selection felling and/or reduced-impact logging, according to site condition~ Sustainable forest management for integrated vulnerability reduction -Mangrove management for flood control

Although it is estimated that around 18% of carbon emission comes from the forestry sector no forest expert was involved in negotiations of UNFCC in the past.

Thus forest sector not recognized as an important aspect of mitigation and adaptation.

This is changed as REDD come in to focus.

COFO – FAO March 2009 and UNFF – 2009
Resolutions ⟶ importance of forest experts in UNFCC negotiation team

Sri Lanka to include of forestry expert

Thank you.....