ASSESSING AND REVERSING FOREST DEGRADATION THROUGH GLOBAL PARTNERSHIP

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Introduction to FLR and GPFLR

Forest Landscape Restoration brings people together to identify, negotiate and implement practices that restore an agreed optimal balance of the ecological, social and economic benefits of forests and trees within a broader pattern of land uses

Underlying principles :

- Multi-functional:
- Situation specific:
- Participation:
- Scale:
- Adaptative Management

Global Partnership on Forest Landscape Restoration

Aims

- Support partners in effectively restoring degraded forest landscapes
- Establish and improve relationships among different interest groups involved in forest landscape restoration
- Encourage the development and use of innovative FLR approaches and methodologies

GPFLR Learning Network GPFLR

- Research phase (Jan-March 09), Scoping phase with learning sites (April- Sept 09), Operational phase (October 2009 onwards
- See www.ideastransformlandscapes.org

Shinyanga, Tanzania:

- Encroachment & conversion of forests & woodlands
- Narrowing of productive base overtime
- No real emphasis on importance of trees & tree products to livelihood security
- Policies tended to reduce people's security over their lands & resources
- In 1986 there was around 600 ha of ngitili

POSTIVE LANDSCAPE LEVEL CHANGE BUT BENEFITS NOT SPREAD EQUALLY

- *Shinyanga, Tanzania*

  The *"Desert of Tanzania"* now benefits from:
  - USD 1200/household/yr in economic assets
  - 500,000 ha of new assets
  - Contributes x1.6 compared to regional average income
  - Benefits extend to 2.5 million people but still issues of underlying disparity

Shinyanga - Preliminary outcomes

Issue	Outcome
Economic value of restored Ngitili in $s per person per month	$1.4 (which is higher than the national average rural consumption of $8.50 per month per person)
Costs of wildlife damage as a result of the restored forest	Approximately $65 per family per year
Average value of 15 natural resource products used per annum	Per household $1,200 per annum Per village $7,00,000 per annum Per district $89,600,000 per annum
Species of tree, shrub and climbers found in a typical Ngitili	152
Other flora found (dry season only)	Up to 30 different families of grass, and herbs
Bird species recorded (dry season only) and mammals	145 bird species and 13 mammals
Reduction in time for collecting various natural resources	Reduced collection time by ... Fuelwood 2 to 6 hours Pole 1 to 5 hours Thatch 1 to 6 hours Water 1-2 hours Fodder 3-6 hours
Percentages of house hold using Ngitili products for various reasons in the 7 districts	Education 39% (10% to 61%) Directly nutrition 23% (1%-43%) Fodder and forage 21% (10%-31%) Medicinals (over 20 spp) 14% (5%-39%) Fuelwood 61% (54% to 63%)

South Platte Watershed

Buffalo Creek Fire - 1996

- 11 miles burnt in half hour
- 11,900 acres burned
- Multiple flooding events
- Loss of life and homes
- Total costs USD 25 million

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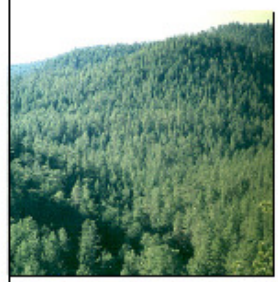
STARTING POINT



- Dense uniform forest
- Susceptible to pest attack
- Vulnerable to crown fires

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Expected benefits of landscape restoration in South Platte Watershed

- Reduced risk of catastrophic crown fire and post-fire erosion; return to natural fire regime
- Reduced forest density
  - converts understory to grass and shrubs
  - favors rapid understory recovery after fire and reduced post-fire erosion
- Increased runoff water for riparian areas
- Improved habitat for wildlife

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Ideal restored landscape in Denver means:

- **Diverse landscape structure**
- **Openings**
- **Low-density forest**

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CONCLUDING THOUGHTS

- FLR is an obvious remedy to degradation as currently defined and is a useful way of framing the enhancement of carbon stocks
- Flexibility is required – no single blueprint (specifically the REDD opportunity should not become a carbon straight-jacket)
- Several learning sites indicate that countries are not bound to follow the forest transition curve.

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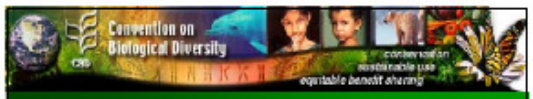
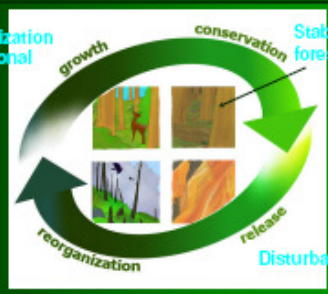


The relationship between forest biodiversity and ecosystem resilience

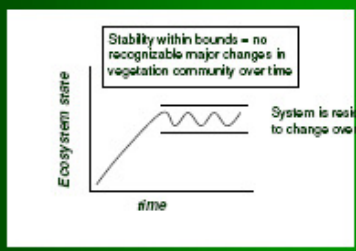
Ian Thompson, Canadian Forest Service
Brendan Mackey, Australian National University
Alex Mosseler, Canadian Forest Service
Steve McNulty, US Forest Service

Rome, Sept. 2009

Resilience is the capacity of an ecosystem to recover after disturbance



Stability of a forest state is a concept related to resilience



Boreal forests are not especially resistant to fire, but they are resilient

This boreal conifer forest will self-replace within 50 years, hence it is highly resilient

Tropical wet forests are resilient and stable gap dynamics forests

Tropical forests undergo gap dynamics in space and time, but the characteristic species remain the same and so these forests exhibit long-term resilience and resistance to change

Resilience is an emergent ecosystem property

- Resilience of a forest is a function of biodiversity at many scales: genes, species, and regional diversity among ecosystems
- Most primary forest ecosystems are resistant and resilient to natural disturbances
- Biodiversity also underpins the ecological goods and services from the forest
- Loss of biodiversity may alter the forest resilience and will result in reduced goods and services
- Loss of resilience means uncertainty about future forest condition

Tipping points exist where the resilience capacity is overcome and the system moves to a new state

- e.g., if a forest becomes dry, it loses species, is subject to increased frequency of fire, and moves to a savannah or grassland state
- this new state is stable and will require considerable change to move to another state
- the biodiversity has been lost and so have most of the goods and services from the ecosystem

Tropical dry forest → Drier climate → savannah

Degraded forest systems may be highly stable or unstable

- In many systems, loss of functional species*, or invasion by superior competitors, can result in new stable and resilient states
- New functional species now 'control' the system by occupying most niches or out-competing endemic species
- Most often, degraded forests are unstable because they lack diversity and functionality
- Degraded forests always provide fewer ecosystem services

** Functional species are key 'drivers' of the system. They are not necessarily the most abundant species.*

Two examples of invasive species forming highly resilient but highly degraded ecosystems

Removing invasive acacia forest in California

Invasive black wattle (*Acacia mearnsii*) in South Africa - a very stable and resilient system

Mechanisms for the linkage between biodiversity and ecosystem stability and resilience

- biodiversity results in strong functional connectivity in the system: e.g., pollinators adapted to plants and vice versa, decomposers adapted to inputs
- diseases and disturbances do not affect all species equally, more diversity = less loss to these factors
- redundancy among species - lose one driver, another previously less important species fills the vacated role
- genetic capacity within species enables adaptation to environmental changes
- general tendency for greater productivity in diverse forest = more goods and services (e.g., carbon storage)

Ecological principles for restoring degraded forests to improve stability and resilience

- biologically diverse systems tend to be more productive, stable, and produce more goods and services than simple ecosystems (e.g., monotypic plantations)
- re-forest by using native species and by using natural forests as models
- maintain landscape connectivity
- manage to maintain genetic diversity (e.g., reduce selective harvest of 'best' trees) and plant several seed stocks
- protect primary forests and species at the edges of their ranges
- plan to reduce invasive species

Conclusions

- evidence supports the concept that biodiversity confers resilience within a forest ecosystem at many scales
- mechanisms include redundancy, resistance to disease, increased productivity, genetic capacity to adapt to change
- loss of biodiversity can result in an ecosystem condition that is difficult to change or that provides an uncertain future condition
- biodiversity also provides most ecosystem goods and services
- degraded forests may be stable, although more often they are not, but they will provide reduced goods and services