



A NEW ROLE FOR FORESTS IN THE GREEN ECONOMY

Developing commercial
markets for the environmental
services of forests



Forest Services

Carbon Sequestration

Micro
Climate
Regulation

Biodiversity
Conservation

Ecotourism
Recreation
Spiritual
Values

Watershed
Protection

Land
Rehabilitation

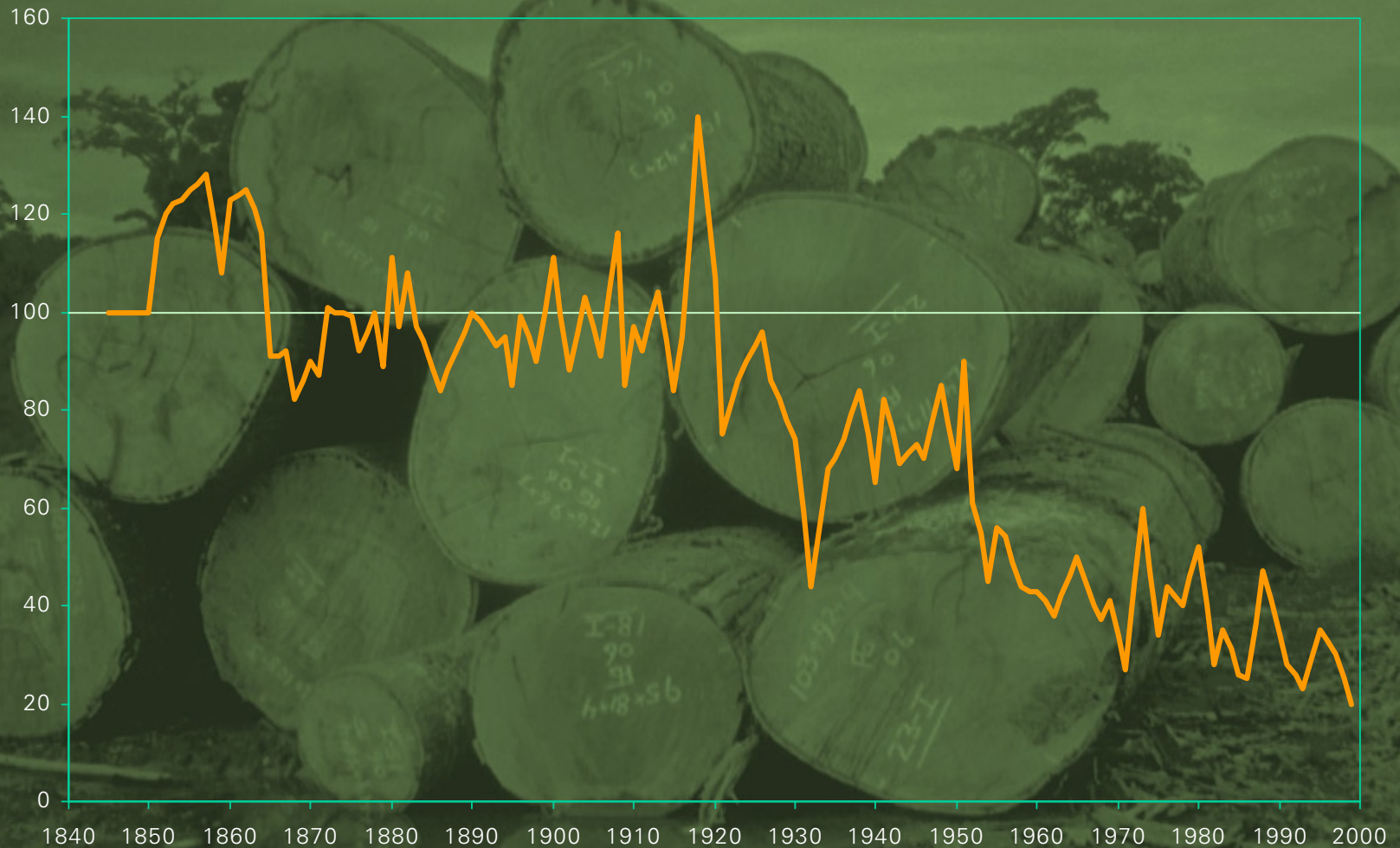
Soil Fertility
Maintenance

Reality

- ◆ Cut timber only real value
- ◆ Liquidation value of forests is high creating strong economic incentive of conversion
- ◆ Financial markets reward short-term returns over long-term ones

Falling to Earth

The Economist industrial commodity-price index, in real* \$ terms



*Adjusted by US GDP deflator

Ecosystem Service

Climate regulation

Disturbance
regulation

Water regulation

Water supply

Soil formation

Erosion control

Ecosystem Functions

Regulate global temperature, precipitation, and other biologically-mediated climatic processes at global and local levels

Provide storm protection, flood control, drought recovery and other responses to environmental variability mainly controlled by vegetation structure

Regulate hydrological flows

Store and retain water

Support soil formation processes

Retain soil within an ecosystem

Nutrient cycling

Store, internally cycle, process and acquire nutrients

Pollination

Support pollinators for reproduction of plant populations

Biological control

Enable trophic-dynamic regulation of populations

Food production

Convert a portion of gross primary production into food

Raw materials

Convert a portion of gross primary production into raw materials

Genetic resources

Produce unique biological materials and products

The Economic Value of Ecosystem Services

<i>Ecosystem</i>	<i>Area (millions ha)</i>	<i>Value (\$/ha/yr)</i>	<i>Global value (\$trillions/yr)</i>
Open ocean	33,200	252	8.4
Coastal	3,102	4,052	12.6
Tropical forest	1,900	2,007	3.8
Other forests	2,955	302	0.9
Grasslands	3,898	232	0.9
Wetlands	330	14,785	4.9
Lakes & Rivers	200	8,498	1.7
Cropland	1,400	92	0.1
Total Biosphere worth:			\$33.3

Reference: Costanza *et al.*, 1997

Success Stories — Carbon Sequestration

◆ Bolivia

- Buying back logging concessions in biologically rich areas
- American Electric Power, Pacific Corp., BP America, The Nature Conservancy, Noel Kempff National Park
- \$9.5 million

◆ Brazil

- Restoring tropical forests in Mato Grosso State
- Peugeot, Pro-Natura, Ministry of Agriculture, Community of Juruena

◆ Australia, NSW

- Afforestation on pasturelands
- State forests of NSW - Pacific Power, Delta Power

Success Stories — Watershed Protection

- ◆ Water quality
 - NYC -- Catskill watershed
- ◆ Water supply
 - Quito, Ecuador and the cloud forests in the Antisana
- ◆ Water regulation
 - Salinization control credits in New South Wales
- ◆ Aquatic productivity
 - "Salmon-safe" certification in Oregon

Success Stories — Biodiversity

- ◆ Brazil
 - Tradable development rights
- ◆ U.S.A.
 - Conservation easements
- ◆ Global
 - Forest certification

The Challenge

Markets around forest services are:

- ◆ Limited in scope
- ◆ Emergent in nature
- ◆ Small in scale

Frontier Forest



The Challenge

- ◆ Expand the menu of services with real markets
- ◆ Extend the coverage to all places

The Challenge

Adapted from Richards (1990)

Market Based Instruments	Tackles market failure	Tackles policy failure	Impact on user incentives	Revenue raising	Experience in using mechanism	Technical problems	Political will needed
Polluter & beneficiary' pays	**	**	**	**	some	med-high	med-high
Differential land use taxes	**	**	**	**	very little	med-high	high
Concession bidding	**	**	**	**	some	medium	med-high
Performance bonds	**	**	**		very little	high	med-high
Area-based payments	**	*	**		none	very high	very high
Markets							
Carbon trading	**	*	**	**	increasing	very high	med-high
Timber certification	*	*			some	high	medium
Bioprospecting deals	*				some	low-med	low
Marketable FPMOs	**	*	**		none	very high	very high
Mobilizing portfolio capital				**	very little	low	medium
Tradeable development rights	**	*	**	*	very little	very high	very high

The Challenge

Flip the economic equation

- ◆ Environmental services of forests more valuable than conventional products

The Challenge

Every market will have a different structure — need to custom design

- ◆ Carbon in atmosphere — global
- ◆ Salinity — every catchment a different profile
- ◆ Biodiversity — even more complex



THE WORK AHEAD

Developing commercial
markets for the environmental
services of forests

