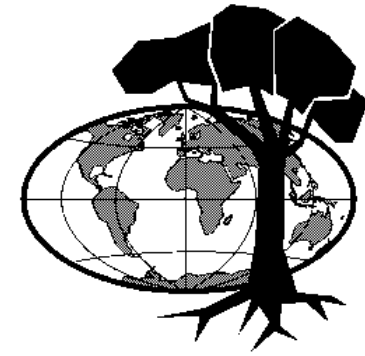




TECHNISCHE  
UNIVERSITÄT  
DRESDEN



**INSTITUT FÜR INTERNATIONALE  
FORST- UND HOLZWIRTSCHAFT**

**J. Pretzsch**

**Co-evolution between ecological and social systems in tropical forest management. Elements of an action-oriented theoretical approach**

1. Introduction
2. Methodological approaches
3. The macro level
4. The micro level: case studies
5. Results and outlook



**Natural  
sciences,  
technological  
progress**

**Human  
sciences,  
reflection,  
understanding**

## Ecosystem dynamics

*forest fires*

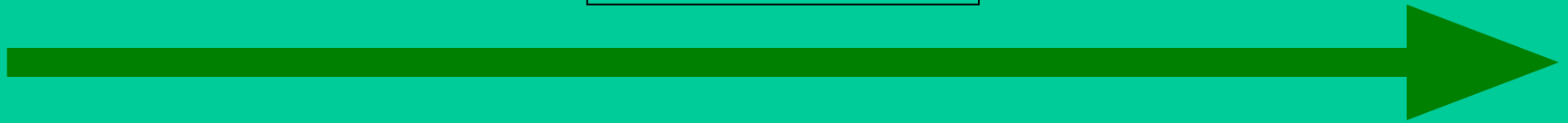
natural

*succession*

*deforestation*

human-caused

*reforestation*



***Co-evolution, lack of active "construction"***



## Dynamics of social systems

- development of adequate forest management systems (pluralism)
- institutional development, organisational learning

# Ecosystem-society Interrelations

## exogenous factors

decreasing importance of primary sector

changing consumption patterns

alienation from forests  
*urbanisation*

increasing population, food production

**forest ecosystem and its use**

**social system**

## endogenous factors

collective good character of forests

long production cycles

decreasing financial net-benefits

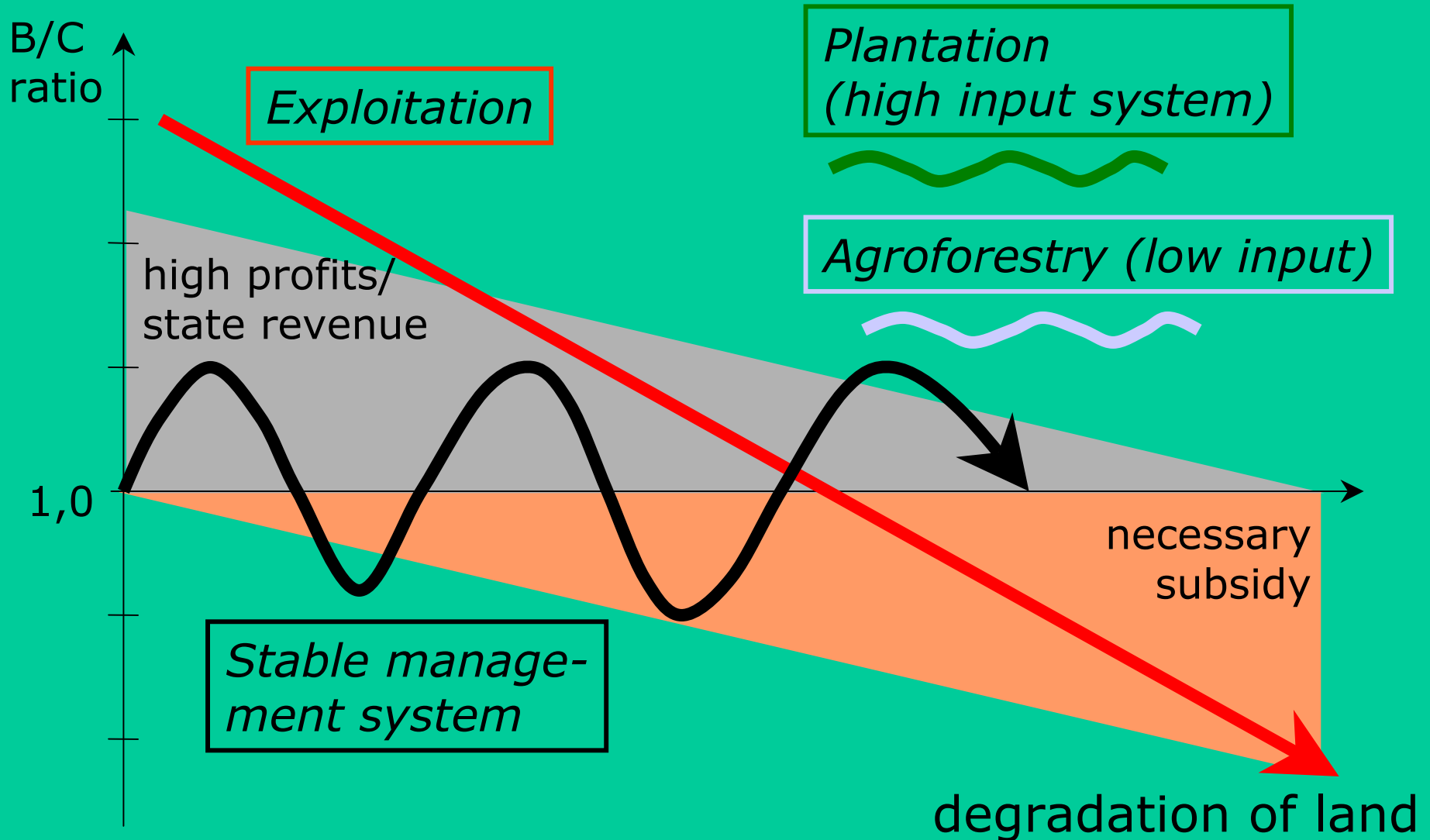
conservative behaviour of professional foresters

lack of intersectoral co-ordination

lack of multi-stakeholder co-ordination

# Benefit-cost ratio of forest management alternatives

Cost-benefit analysis taking in account  
all costs of services and existence values



# Forest encroachment in Chittagong/Bangladesh



# Methodological approaches

- Forest/Farm/Enterprise System Analysis and Research (DILLON & HARDAKER 1993)
- Cultural ecology (BENNET 1976, BARGATZKY 1986)
- Political ecology (ESCOBAR 1996; BRYANT 1992)
- Hermeneutic methods (SEELAND 1997)
- Constructivism (BERGER & LUCKMANN 1967)
- Critical theory (HABERMAS 1965, 1988)

# **The Macro Level: Stages in tropical forestry**

- **Traditional forest use**
- **Colonial forest use**
- **Forest resources as frozen capital**
- **Internationalisation of forest policy**
- **Polarisation of forest policy**
- **Globalisation and privatisation**



**Traditional forest use:  
Maya civilisation**



# Traditional forest use: Sacred forests in Laos



# Liquidation of frozen capital: Logging in Côte d'Ivoire



# Large scale colonisation: Tree pusher in Paraguay



# Dominance of large scale planning: Bancruptcy of a pulp mill project in Argentina



**Farm forestry:  
Woodlots in  
Choré/Paraguay**



**The proud farmer  
with the results**



# Historical Stages in Tropical Forest Policy

**traditional forest use**



**„holistic“, endogenous linkages,  
local knowledge**

**colonial forest use**



**specialisation, fragmentation**

**forests for national  
growth**



**capital accumulation**

**internationalisation**



**technology orientation**

**polarisation**



**industrial forestry**



**social forestry**



**conservation**

**globalisation**



**democratisation, devolution**



**(neo-liberal) privatisation,  
deregulation**





# Paradigmatic Changes in Forestry Development Strategies

**Forests as common property (*patrimonium*)**

**First institutional rules for forest management (*Forstordnungen*)**



**Individual land property and forest use rights (*dominium*)**



**Conventional forestry, strict ordination & control by forest departments**

**Principal-agent problem, authorities act *self-determining***



**Non-governmental forestry**  
**Deregulation, privatisation, devolution, diversification**

# Linking the Macro Level to the Field: Case studies

- Gum arabic tapping in Sudan (TAHA 1999)
- Joint forest management in Bangladesh (BATEN 2002)
- Ejido community forestry in Quintana Roo/Mexico (HESS 1996)
- Forest use systems in the Brazilian Amazon Region (PRETZSCH et al 2002)
- Loss of administrative power in Tripura/India (SHRIVASTAVA 1999)
- Kor Jor Kor movement in Thailand (PYE 2002)

# Income generation by non timber forest products in Sudan



# Gum arabic production in Sudan



# Benefits of Gum (*Acacia senegal*) cultivation:

## Direct benefits:

- fodder for cattle
- fuelwood
- *Gum arabic* production

## Indirect benefits:

- soil erosion/ run-off reduction
- nitrogen fixation
- desertification buffer
- (CO<sub>2</sub>-fixation)

# Local survival depends on gum arabic production



# Joint forest management in Bangladesh



# Joint forest management in Bangladesh

Minimum household needs

other social services

Products and cash for sustenance

Forest farm output

non marketable benefits

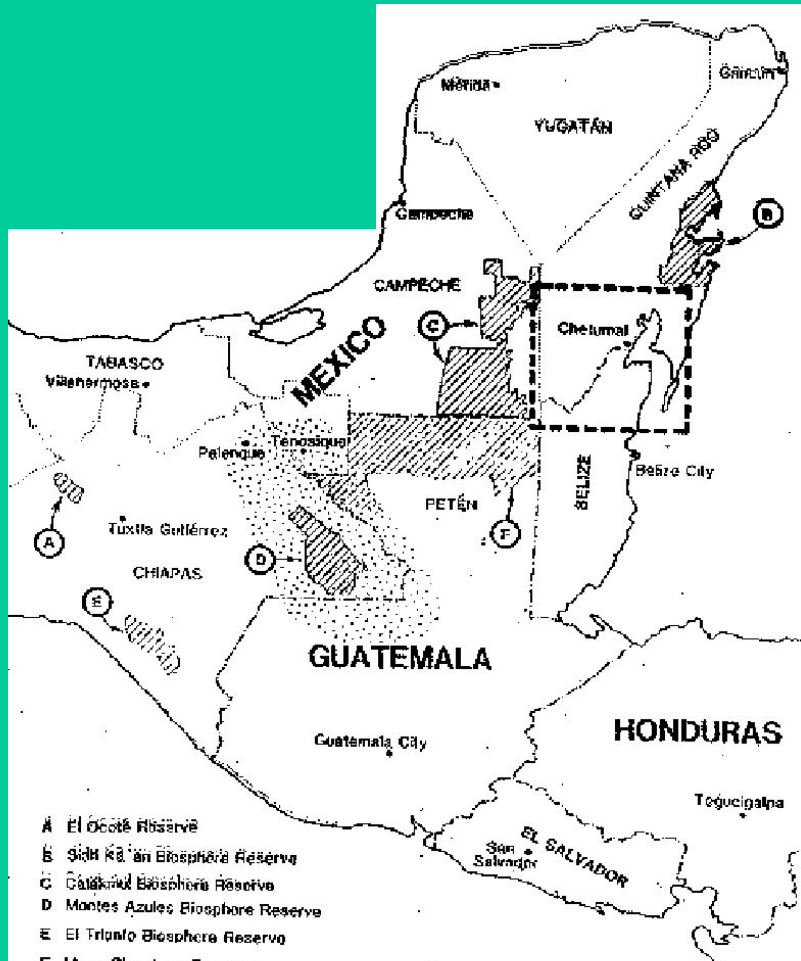
agricultural products  
fuelwood  
timber  
NTFP  
livestock


**Deficit**


**50 % government share for timber**



# Community Forestry in Yucatan/Mexico




 SOCIEDAD DE PUEBLOS INDIGENAS FORESTALES DE QUINTANA ROO, "TUMBEN CUKTAL", S.C.

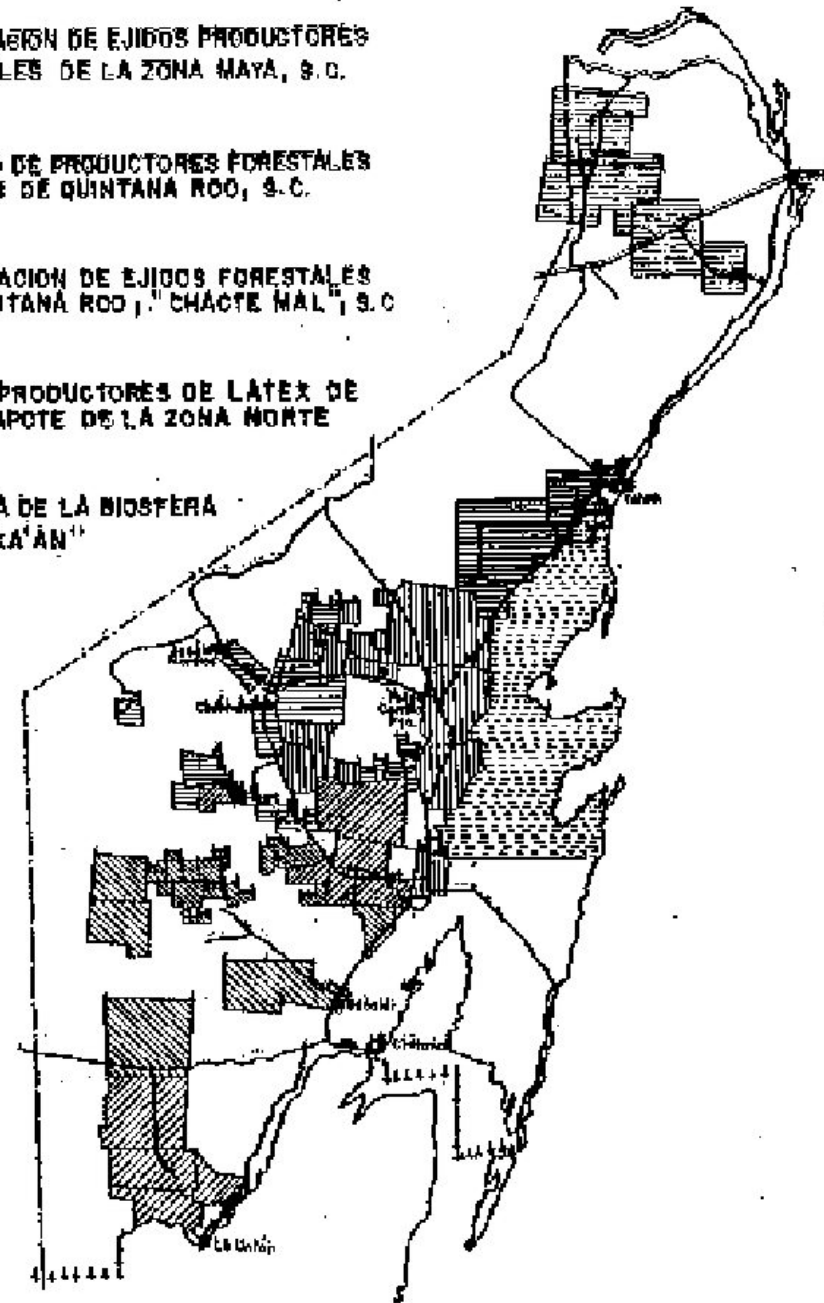
 ORGANIZACION DE EJIDOS PRODUCTORES FORESTALES DE LA ZONA MAYA, S.C.

 SOCIEDAD DE PRODUCTORES FORESTALES EJIDALES DE QUINTANA ROO, S.C.

 ORGANIZACION DE EJIDOS FORESTALES DE QUINTANA ROO, "CHACTE MAL", S.C.

 EJIDOS PRODUCTORES DE LATEX DE CHICIZAPOTE DE LA ZONA NORTE

 RESERVA DE LA BIOSFERA "SIAN KA'AN"



# Ejido managed forestry in Quintana Roo/Mexico



# Logging by Ejido-members in in the Plan Piloto Forestal, Quintana Roo/Mexico



**Tree planting on logging trails In the PPF  
Quintana Roo/Mexico: Not always a success**



# Organisational Structure of Community Forestry in Mexico

## Communities

Petacacab

Noh-Bec

Chacchoben

Divorciados

Avila  
Camacho

Plan de la  
Noria

Nvo.  
Guadalajara

Caobas

Tres  
Garantias

F. Botes

**GENERAL ASSEMBLY OF  
MEMBERS**  
(Assembly of delegates)

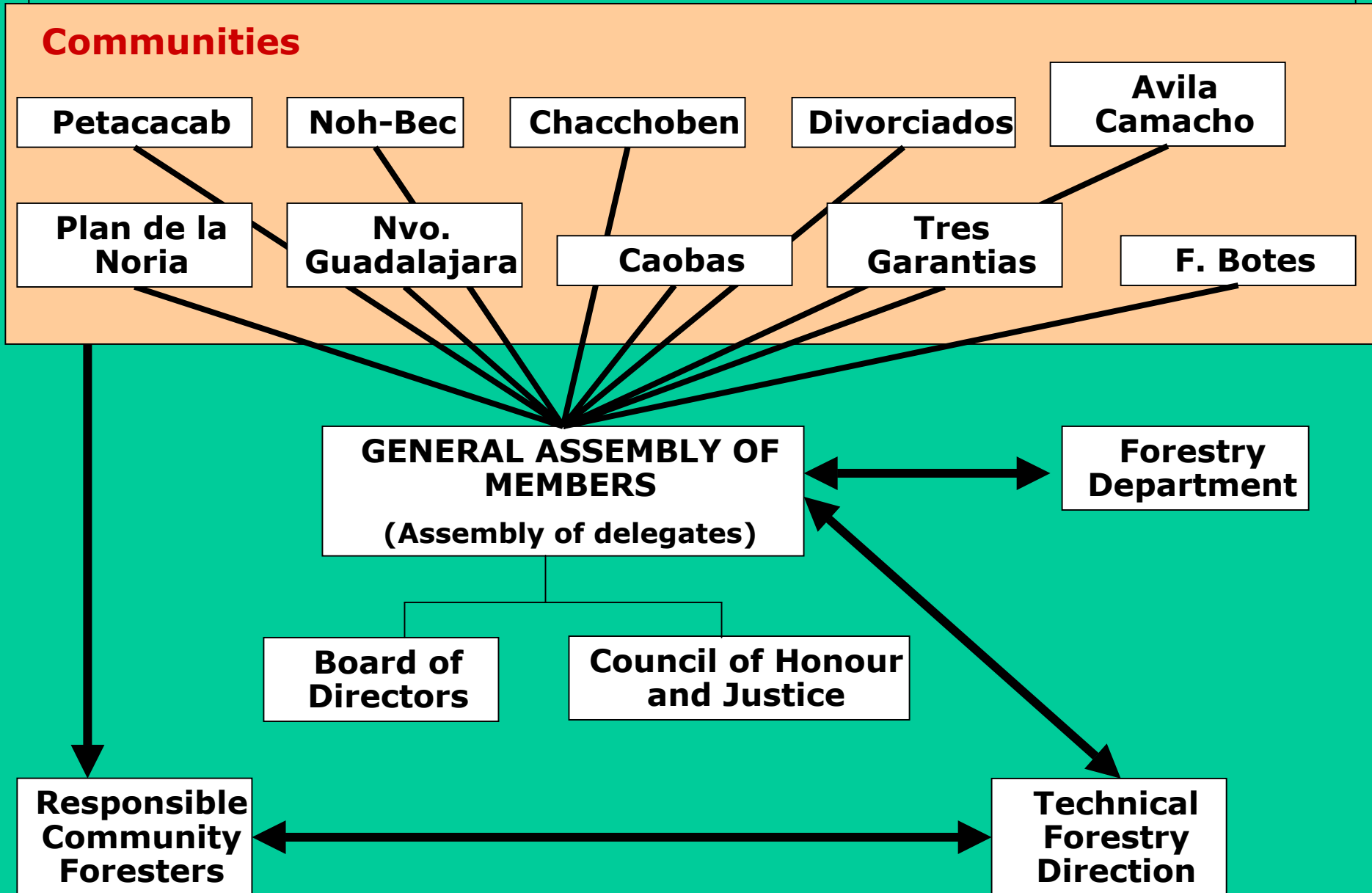
**Forestry  
Department**

**Board of  
Directors**

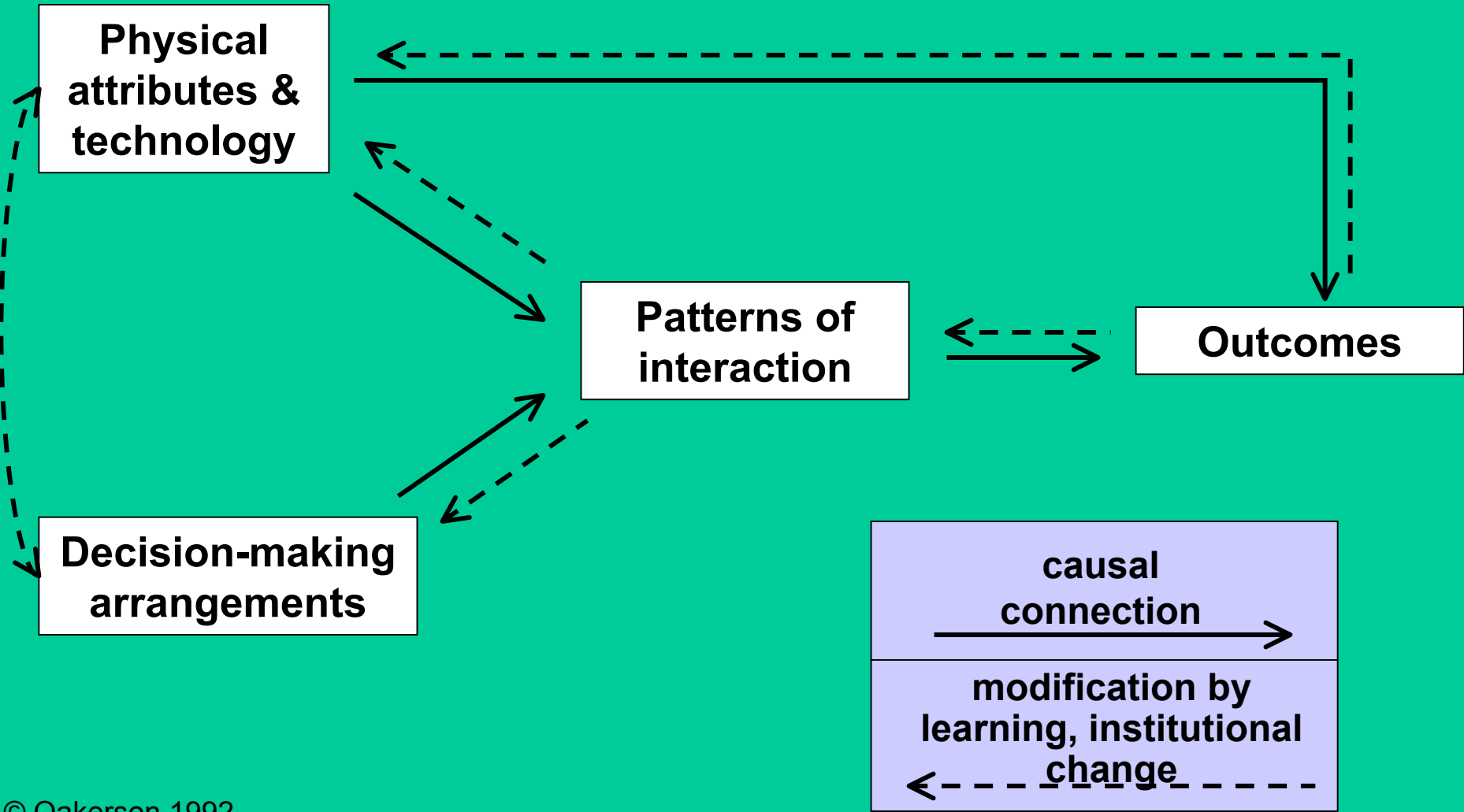
**Council of Honour  
and Justice**

**Responsible  
Community  
Foresters**

**Technical  
Forestry  
Direction**



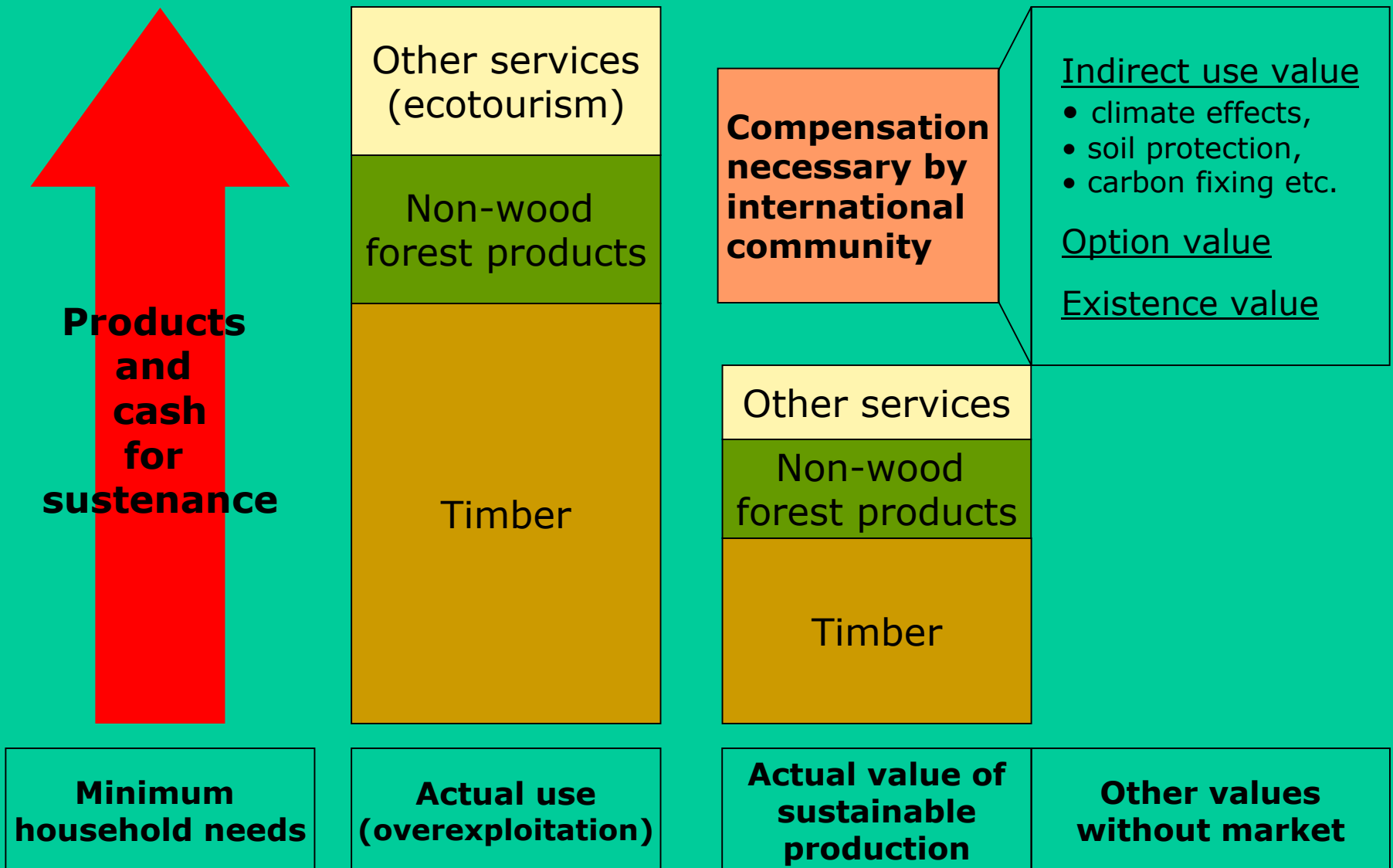
# Dynamic Framework for Analyzing the Commons



# **Ejido sawmill: Annual negotiation between salaries and profits for Ejido members**



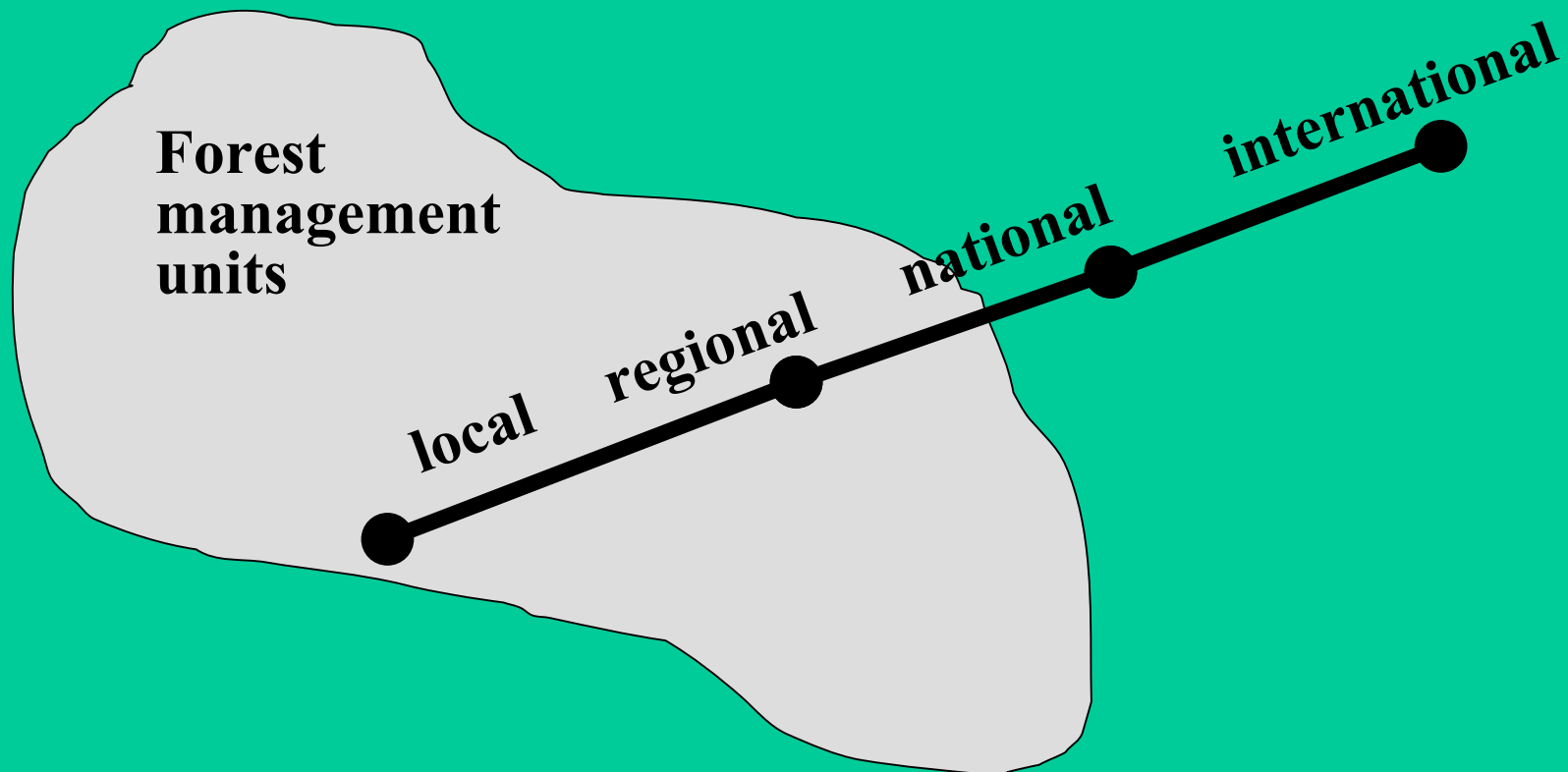
# Stability model for the use of tropical forests





# Comparative analysis of forest use systems in the Amazon region: Farm households, conventional timber enterprises and (certified) large world market oriented enterprises

Theoretical background: Linkage between forest based product/service chain and forest management unit



# Farm household system in the Varzêa



# Açaí palm fruits (*Euterpe oleácea* ) as cash crops



# Conventional logging enterprise



Skilled  
chainsaw  
workers in a  
certified  
world  
market  
enterprise

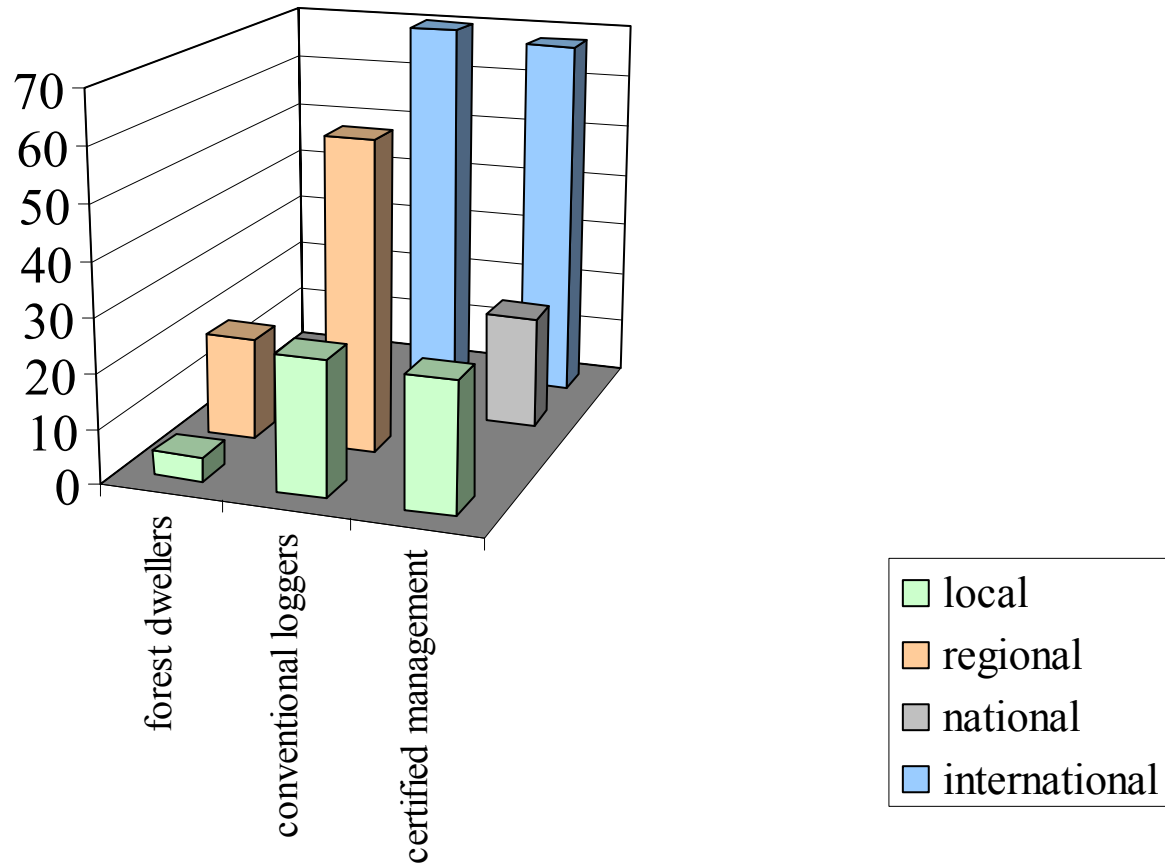


Enterprise  
with low  
impact  
logging  
technology



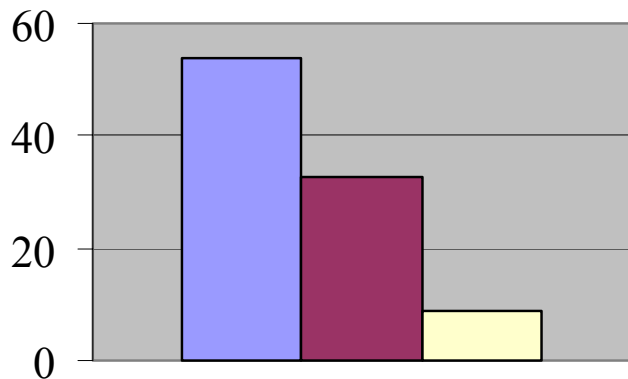
# Production line, different market levels

Prices US\$/m<sup>3</sup>, roundwood equivalent

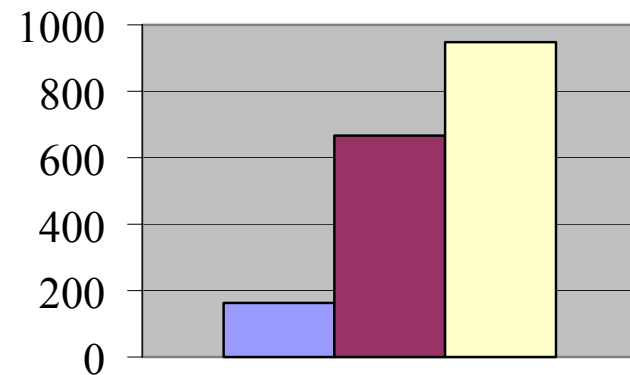


# Productivity in different forest use systems, Amazon, Brazil

## Timber harvest m<sup>3</sup>/ha



## Labour productivity m<sup>3</sup> roundwood/worker/a

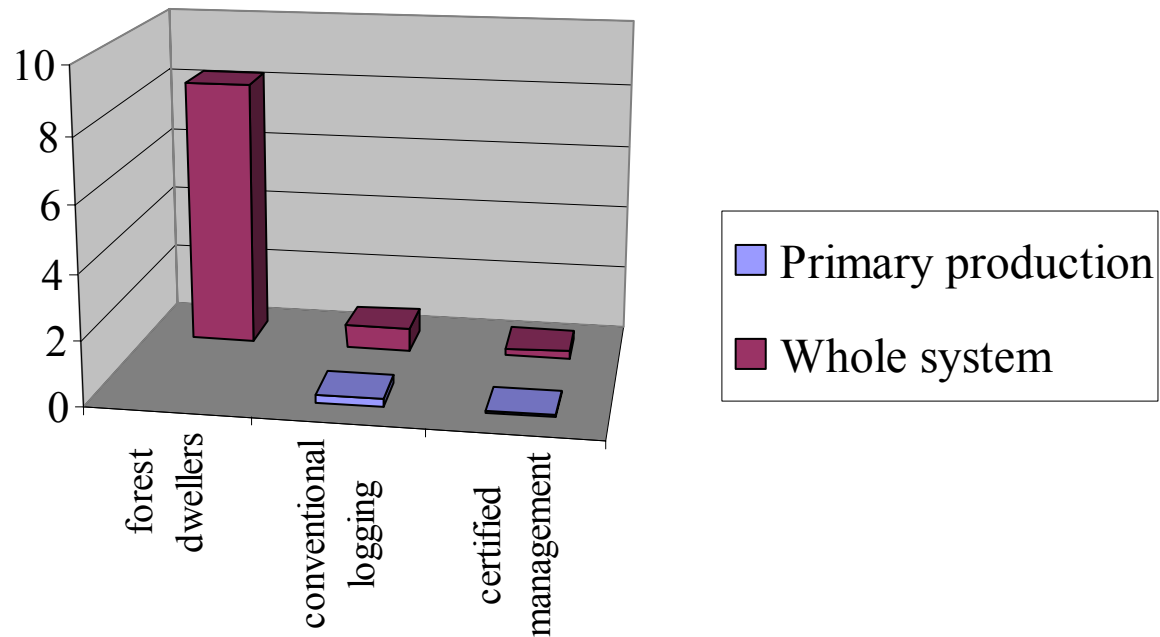


- forest dwellers
- conventional logging
- certified management



# Current capacity jobs/km<sup>2</sup> different systems, Amazon, Brazil

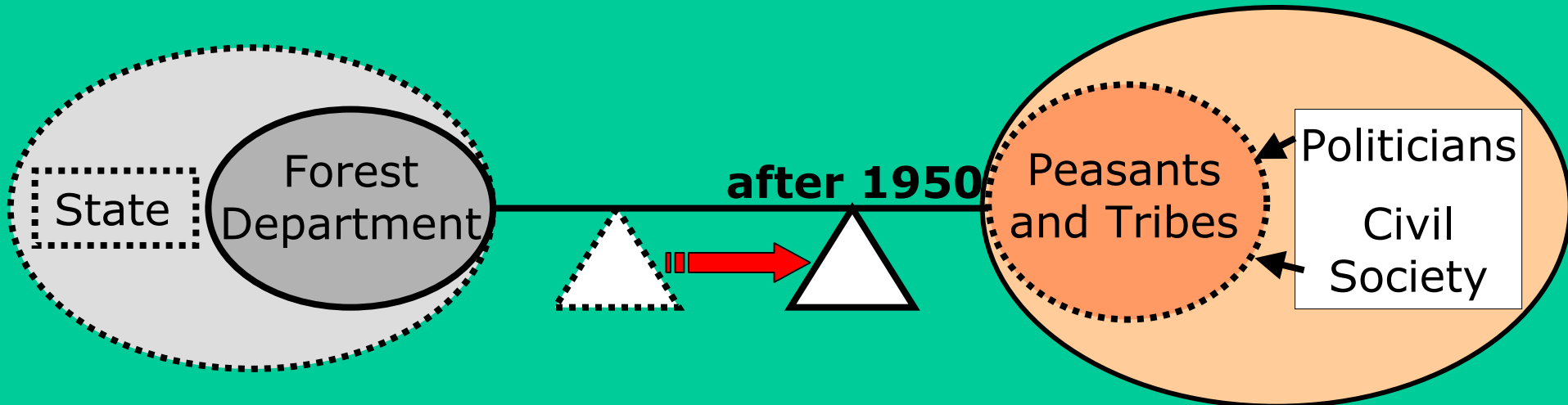
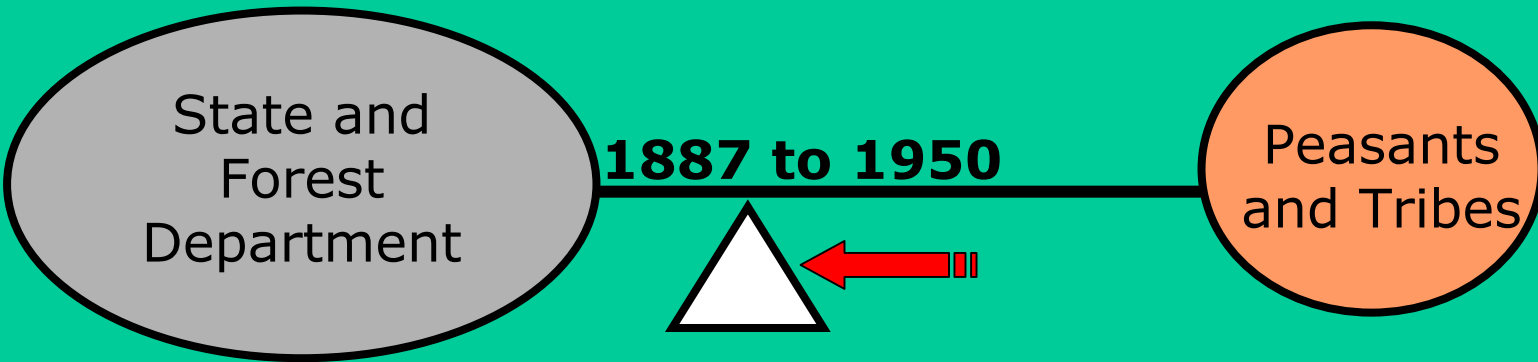
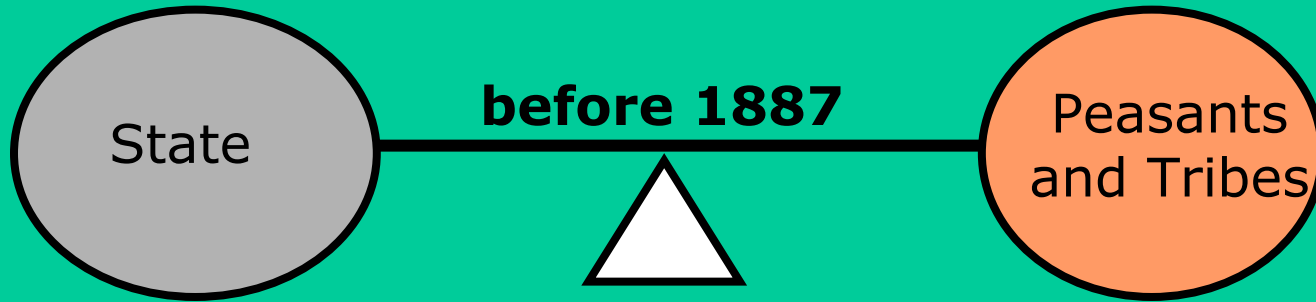
	forest dwellers	conventional logging	certified management
Whole system	8,3	0,7	0,26
Primary production		0,24	0,07



# Negotiation on Joint Forest Management in Madhya Pradesh/India



# Strategic Groups and Conflict



**Forest  
conflicts in  
Thailand**



# Paradigmatic shift of forest policy in Thailand

**statically used  
conventional forestry  
knowledge  
(power-knowledge)**

**local knowledge  
counter-strategic  
forestry (dynamic social  
forestry & community  
development concepts)**

**traditional  
STRATEGIC  
GROUPS:**

- Royal Forestry Department
- Paper Industry
- Military

**empowerment  
by conflict**

**COUNTER-  
STRATEGIC GROUPS:**

- Farmer Associations**
- Civil Society
  - Universities
  - NGOs

# Lessons learnt....



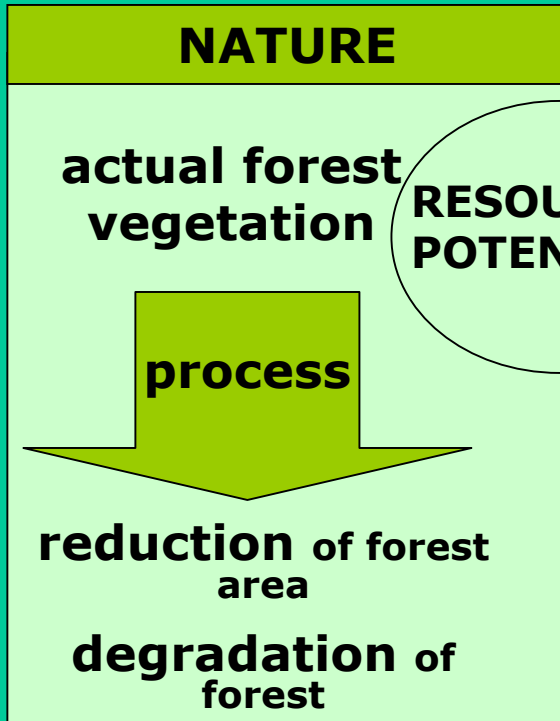
*Forests should be used intelligently — not abused. Unwise practices will hurt the next generation too.*

**“Forests should be used intelligently -  
unwise practices will hurt the next generation“.**

# Lessons learnt

- Case study research has to be better integrated in theoretical constructs.
- More **pluralism in theoretical approaches** might bridge the gap between makro/micro and ecological/social research on forest management systems.
- Disturbance of forest ecosystem - society interrelation is attributed to rapidly changing exogenous and endogenous factors.
- (Conventional) Foresters attitude is often internally focused, passive and hierarchy linked.

# Relation Nature - Society, Regulating Principles and Main Rationalities behind Scientific Research

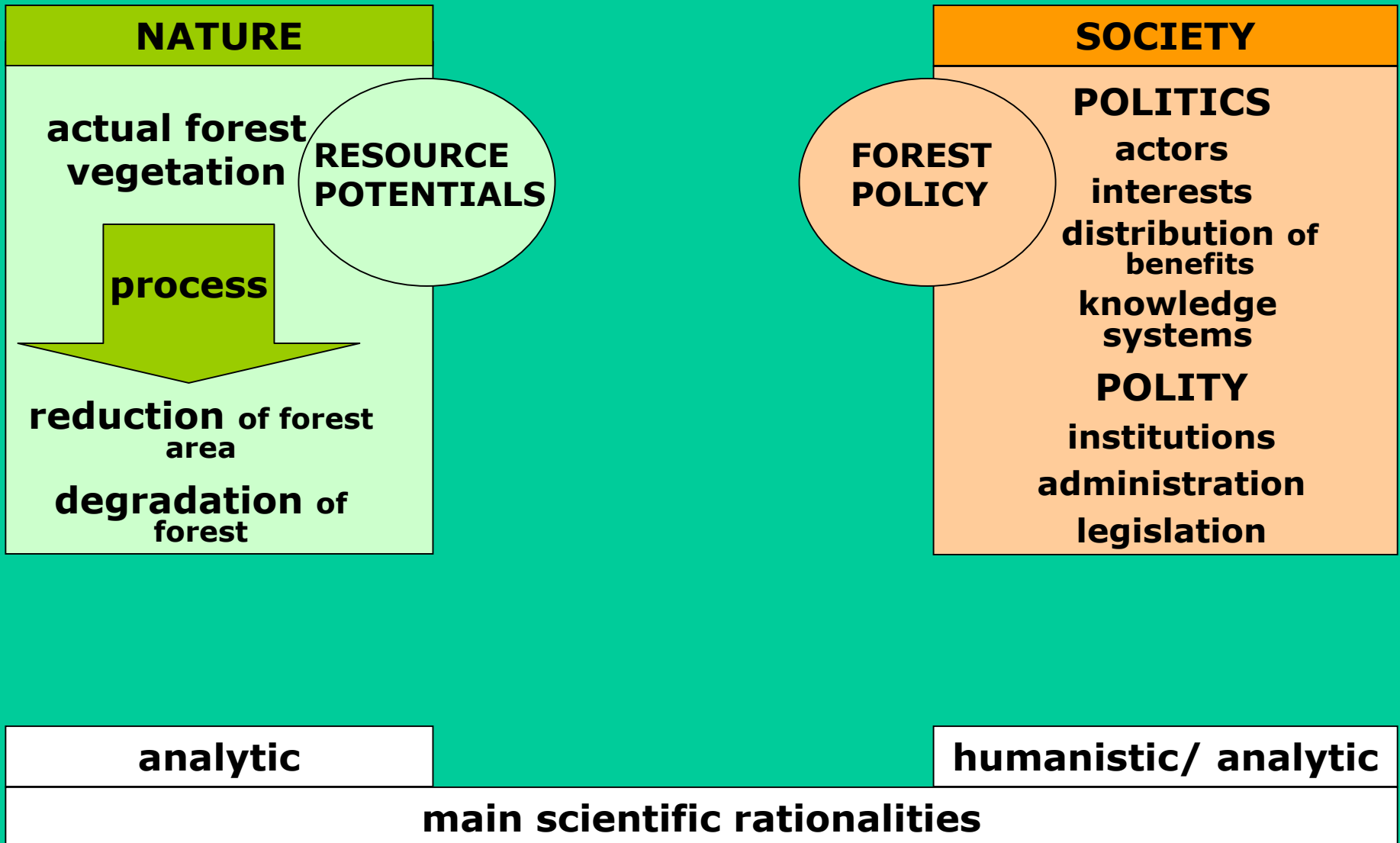


**analytic**

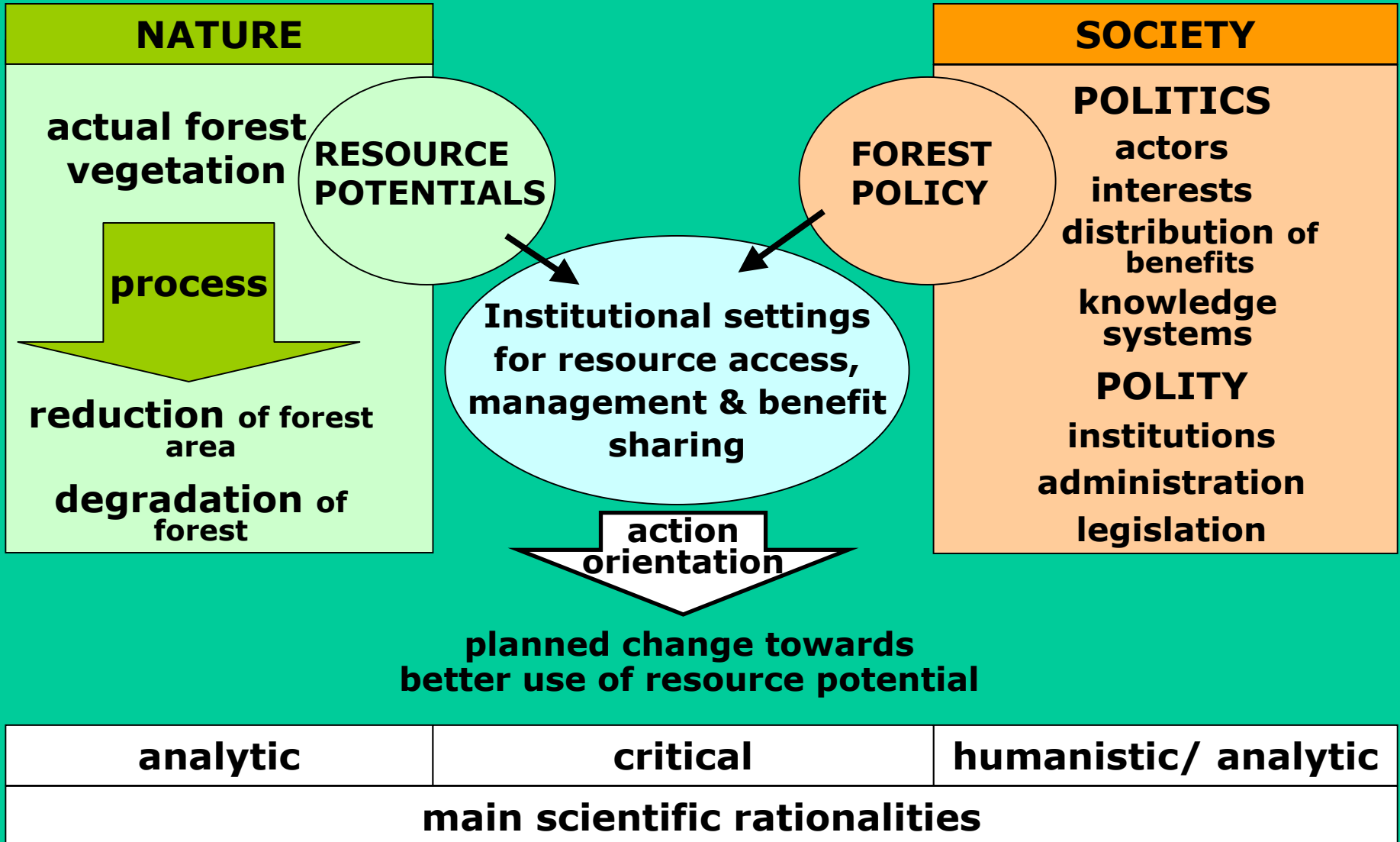
**main scientific rationalities**



# Relation Nature - Society, Regulating Principles and Main Rationalities behind Scientific Research



# Relation Nature - Society, Regulating Principles and Main Rationalities behind Scientific Research



# Reconstructing forestry image

## Lessons for scientists

**Combination of scientific rationalities:**

**Analytical science &  
technology**



**Control of the  
environment**

**Humanistic  
science**



**Understanding  
the world**

**Critical  
science**



**Emancipation &  
empowerment**

# Outlook

- use the huge amount of existing case studies for theory development in a more efficient way
- create a forum for theory- and action-oriented research in tropical forestry
- facilitate *theory driven* practical inputs for implementation organisations (which have an increasingly *pragmatic* focus)
- elaborate pro-active visions, concepts and strategies in forest management
- reinforce scientific discourse (HABERMAS 1988)



**Natural  
sciences,  
technological  
progress**

**Human  
sciences,  
reflection,  
understanding**

