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# **Introduction to payments for ecosystem services**

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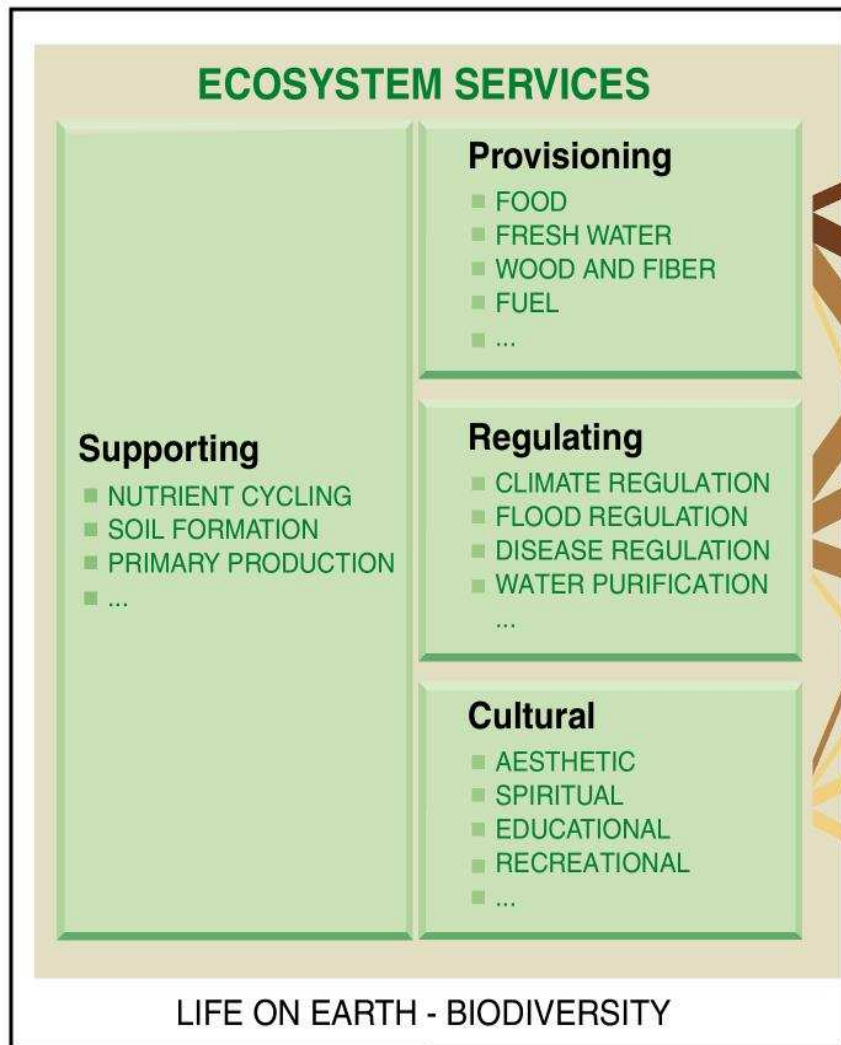
# Overview

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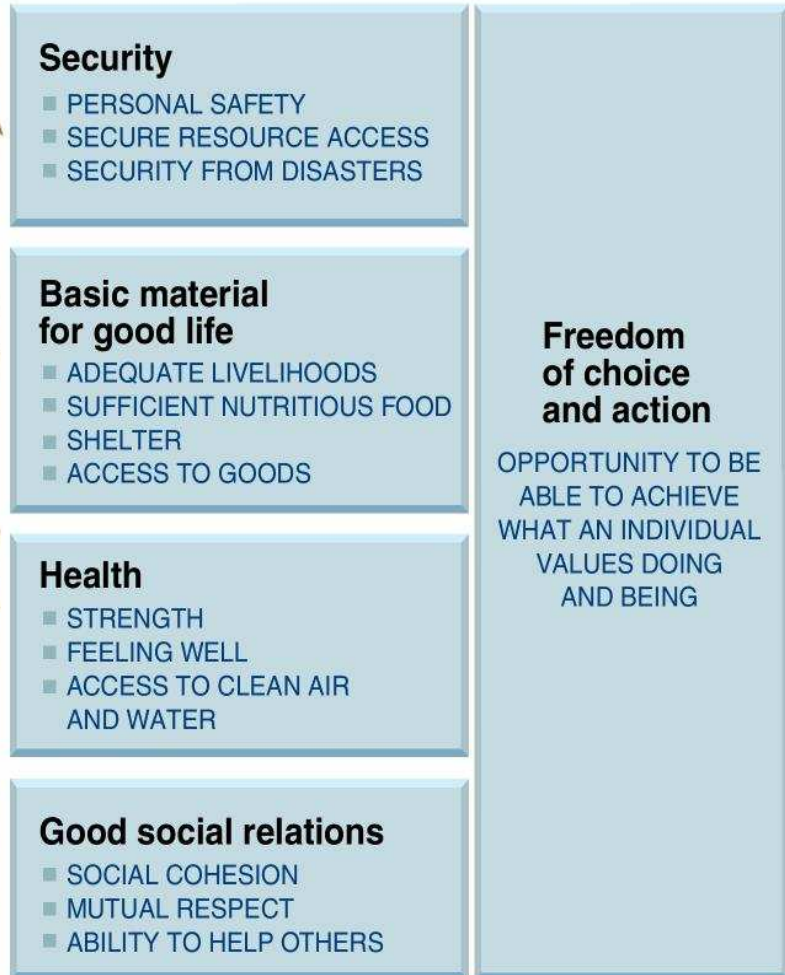
- A. Introduction to ecosystem services (ES)
- B. Payments for ecosystem services (PES)
- C. Working examples
- D. Summary & Conclusions

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# **A. Introduction to ecosystem services**

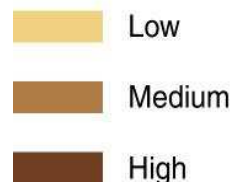


## CONSTITUENTS OF WELL-BEING

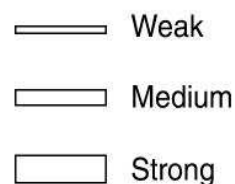


Source: Millennium Ecosystem Assessment

**ARROW'S COLOR**  
Potential for mediation by socioeconomic factors



**ARROW'S WIDTH**  
Intensity of linkages between ecosystem services and human well-being



***"Ecosystem services are the benefits people obtain from ecosystems."***

# Forest environmental services flow

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## Providers

- Rural communities
- Private landowners
- Local government bodies
- others w. land use rights

### Sustainable Forest Management

- Plantations
- Agroforestry
- Protected natural forest
- Production of NTFPs
- Mixed-use forest

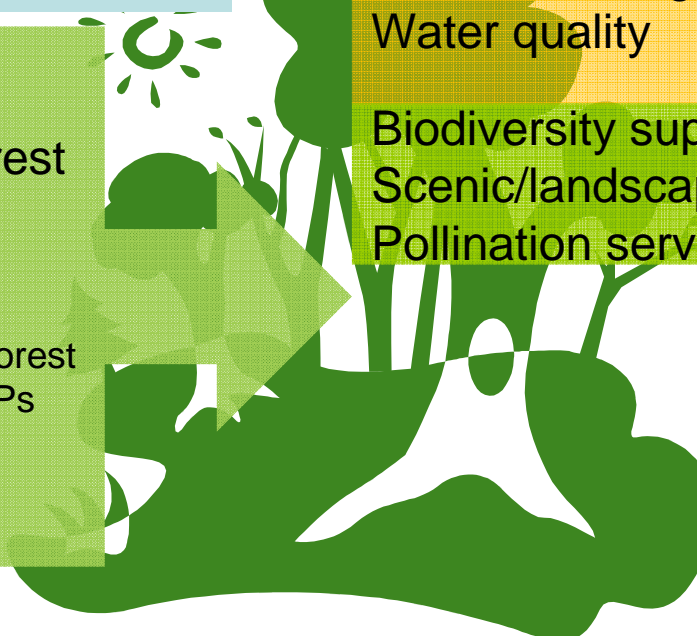
Climate change mitigation:  
CO<sub>2</sub> sequestration

Soil erosion control  
Aquifer recharge  
Water flow regulation  
Water quality

Biodiversity support  
Scenic/landscape beauty  
Pollination services

## Beneficiaries

- Global economies/  
societies
- Hydropower co.
- Beverage co.
- Water utilities
- H<sub>2</sub>O users
- Agroindustry
- Ecotourism co.
- Agro-industry
- Rural communities



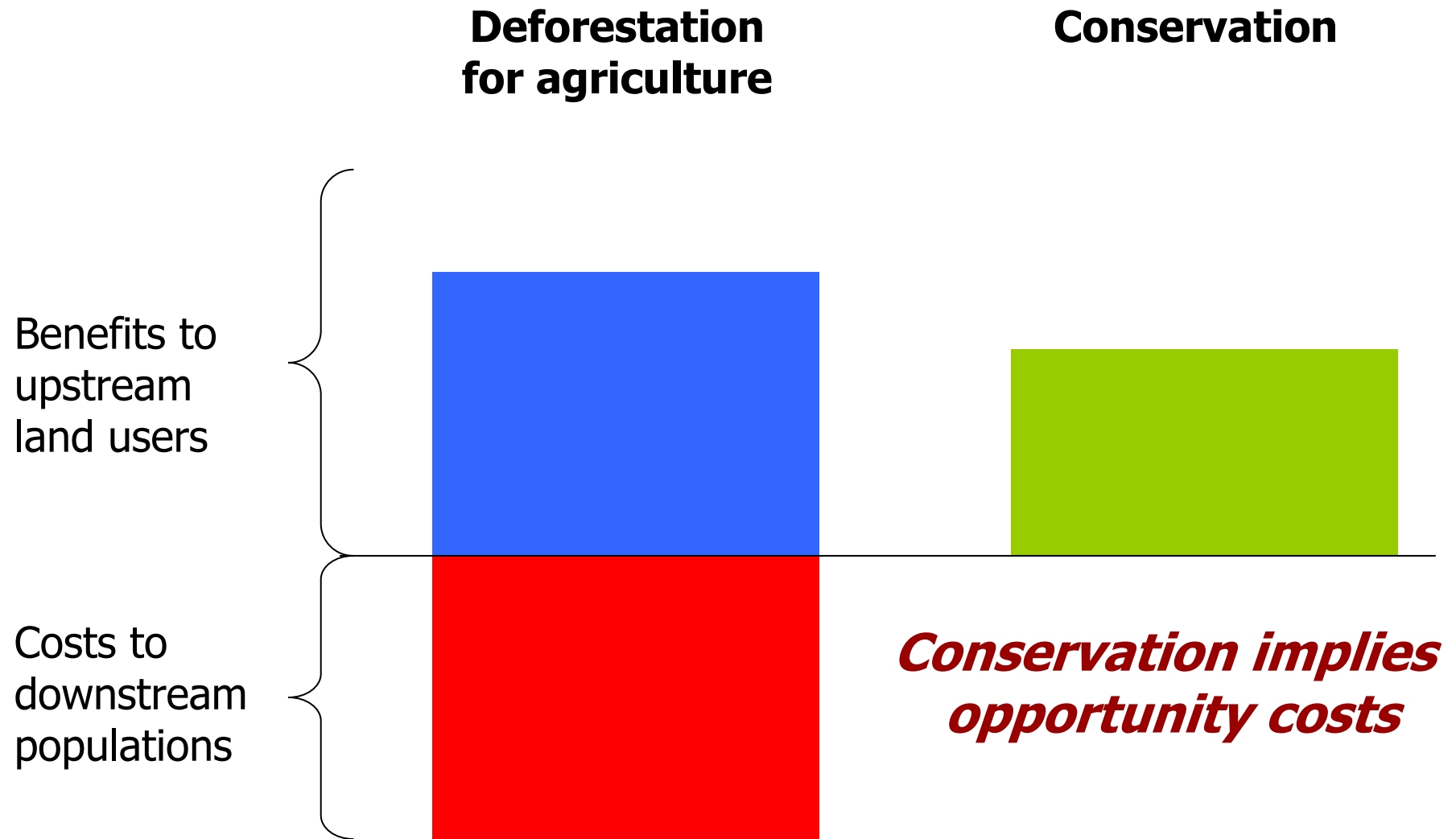
## Current status & trends of ES

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- *60-70% of ES are currently under threat.*
- *The degradation of ES could grow significantly worse by 2050 and is a barrier to achieving the MDG.*
- *By the end of 21<sup>st</sup> century, climate change and its impacts may be the dominant direct driver of changes in ES globally.*

# The problem

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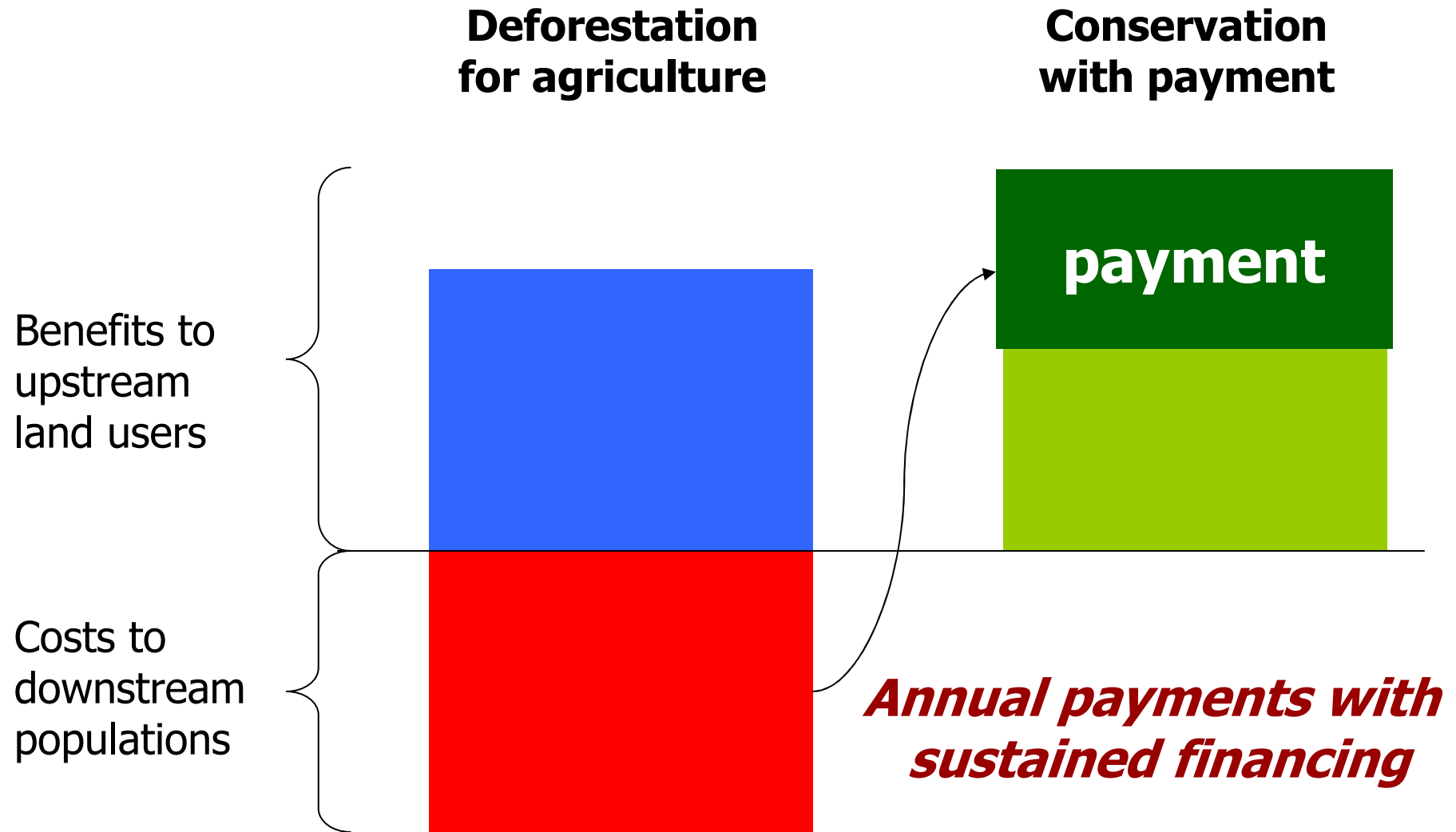
Source: adapted from Pagiola & Platais 2005

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## **B. Payments for ecosystem services**

# The logic of PES

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Source: Pagiola & Platais 2005

## Definition of PES

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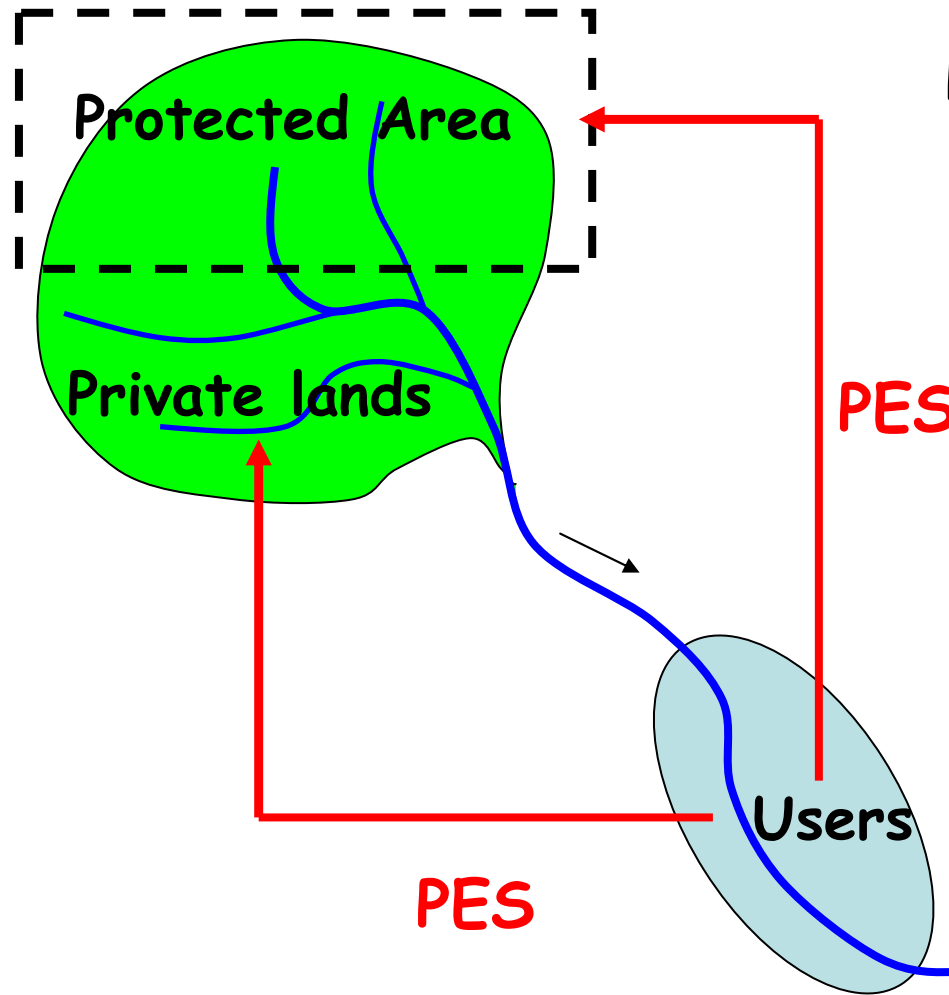
Payments for ecosystem services are

- voluntary transactions in which
- a well-defined ES (or a land use likely to secure that service)
- is bought by a (minimum of one) buyer
- from a (minimum of one) provider
- if and only if the provider continuously secures the provision of the service (conditionality).

Source: Wunder (2005)

# Payments for water services

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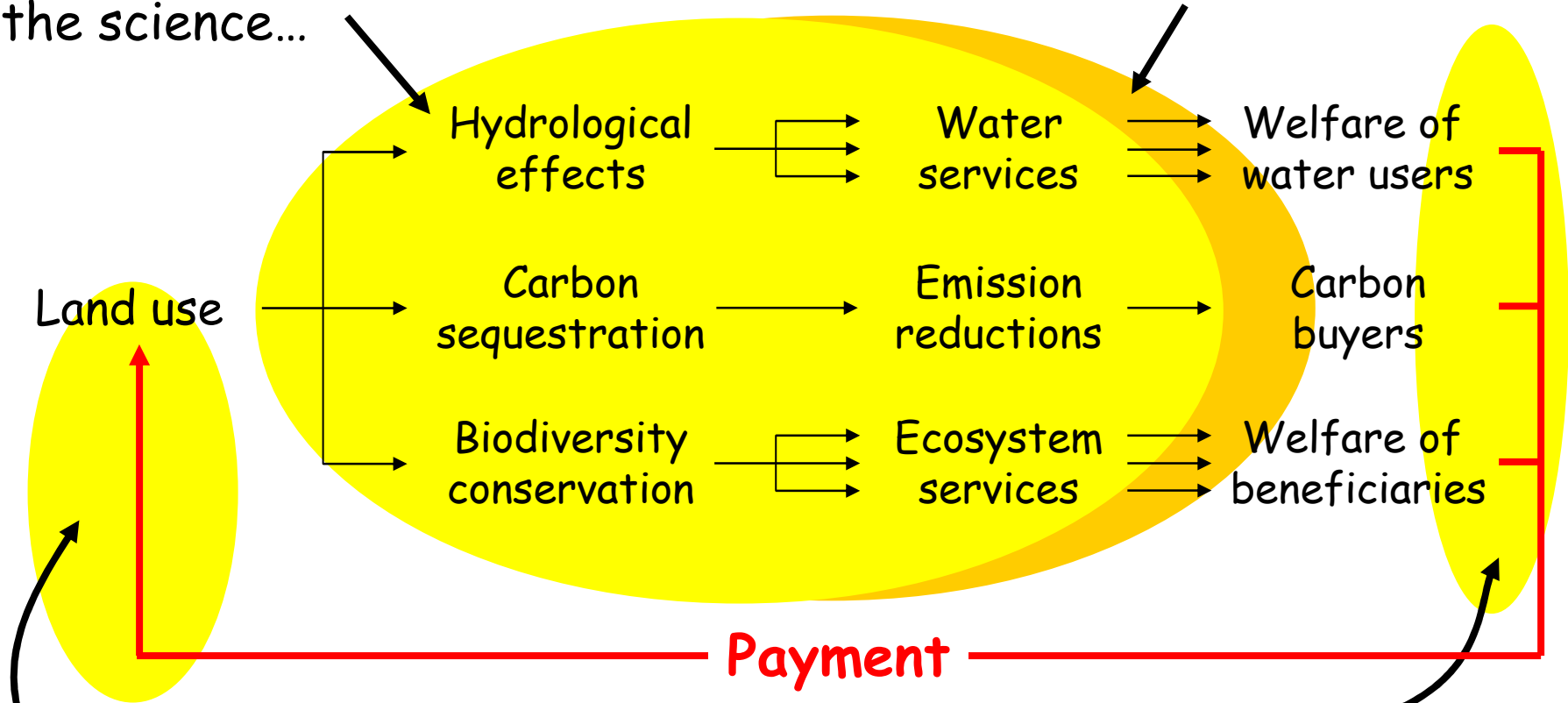
Payments can go to:

- Private landowners (including buffer zones and biological corridors)
- Protected Area budgets

# From theory to practice

1. Understanding the science...

... and the economics



2. Charging service users

3. Paying service providers

Source: Pagiola & Platais 2005

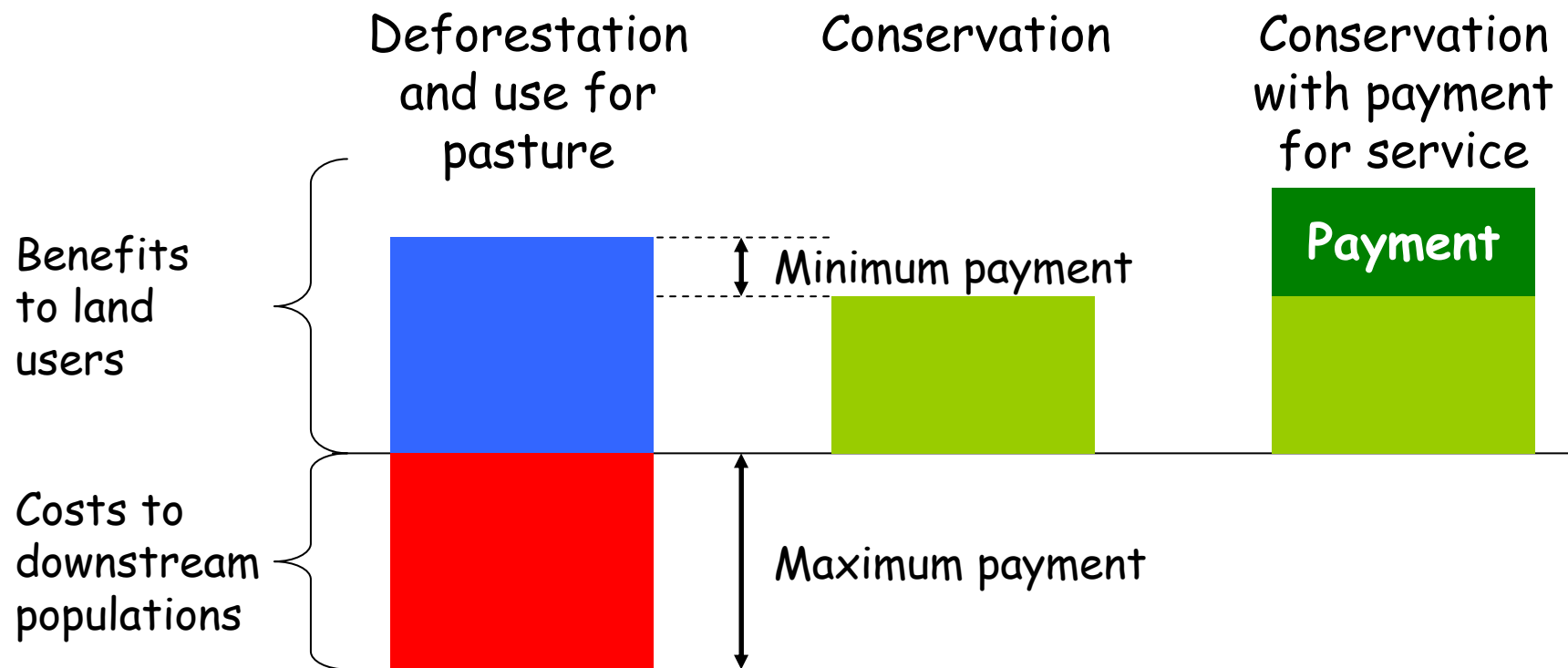
# Understanding the science

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- What ES is demanded ? – e.g. water quality services, water flow, flood control
- What land uses preserve or generate the demanded ES ?
  - e.g.
    - reforestation/afforestation -> carbon sequestration
    - forest conservation → water quality services, reducing emissions from deforestation etc.
    - sustainable forest management → reducing emissions from deforestation and forest degradation
- How much of this service is generated ? – e.g. pure forest conservation may provide more biodiversity conservation services than reforestation/afforestation

# Getting the price right

- value the benefits (maximum payment)
- value the opportunity costs (minimum payment)



## Payments to PSA participants in Costa Rica

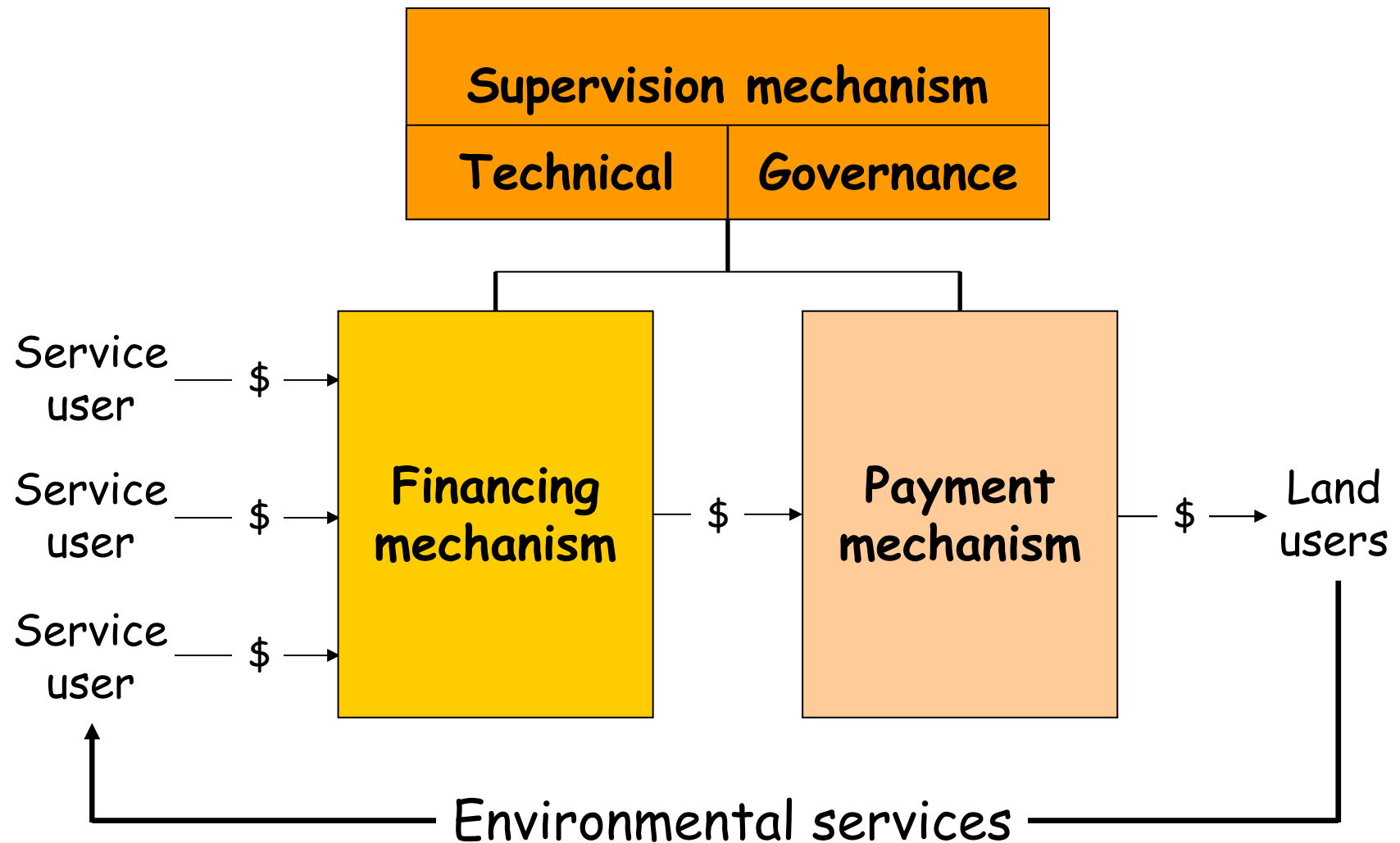
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Contract	Amount (\$/ha)	Distribution of payments (year)				
		1	2	3	4	5
New plantation	538	269	108	81	54	27
Established plantation	210	42	42	42	42	42
Forest conservation	210	42	42	42	42	42
Agroforestry (150 trees)	116	75	23	17		

- **Based on opportunity costs**
- 350,000ha contracted (cumulative), > 800,000ha pending
- 83% of contracts for forest conservation
- Only 7% of contracts for plantation establishment

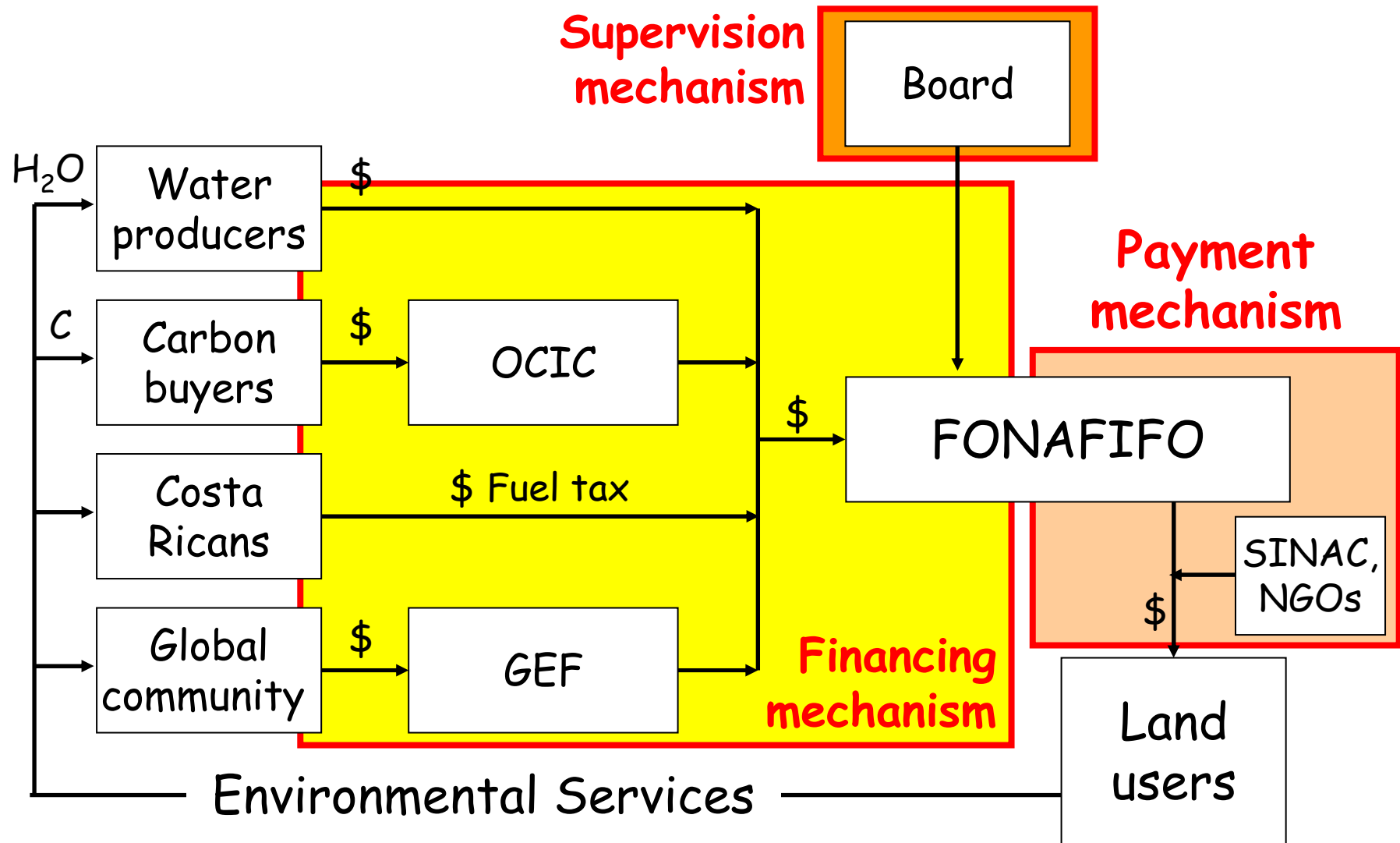
# Getting the institutions right

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Source: Pagiola & Platais 2005

# Components of Costa Rica's PSA program



Source: Pagiola & Platais 2005

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## **C. Working Examples**

## Working examples

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- National PES schemes – Costa Rica, Mexico, China
- Asia – behind but increasing interest – Viet Nam, Indonesia, Philippines, Nepal
- Some watershed-level schemes – see work of ICRAF/RUPES, international NGOs, long standing arrangements in Japan

**→ PES is increasingly expanding in the tropics**

# New York City's Watershed Management



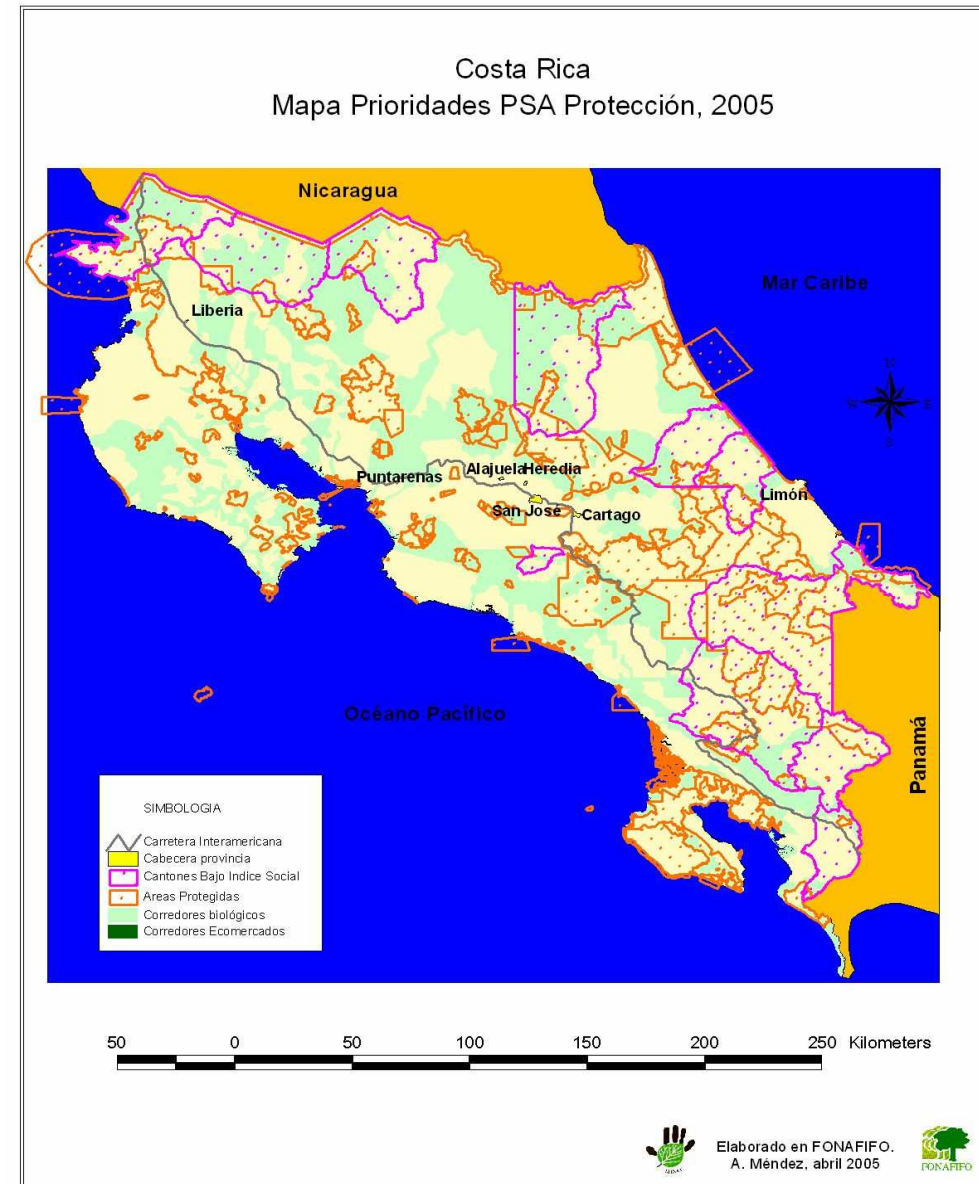
NY city government faced two options to restore water quality:

1. invest in water treatment plant costing \$ 4-6 billion to build and \$ 300-500 million/year to operate, or
2. system of payments for watershed protection services costing US\$ 1.4 billion over 10 years

**→ The city opted for opt. 2 which resulted to be a success !**

# Costa Rica's PSA system

- Problem - high deforestation rates in 1950-1980s
- National Forest Law of 1996 recognizes 4 FES and allows private landowners to be compensated for ES provision
- Demanders buy ES certificates or make special contracts to secure specific areas. Private sector payments – US\$7 million
- New water concession fee



# Costa Rica's PSA system

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- Special programs for women, indigenous communities without formal land tenure
- NGOs contracted to assist with monitoring, promotion of the programme, assist landowners with contracts etc.
- Works together with SINAC – national protected areas system to prioritize area coverage

**→ CR's PSA system, contributed to reversing deforestation rates !**

# Republic of Korea's system to control water quality

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- Problem: deteriorating water quality since 1960s ; and technical measures – incl. sewage treatment facilities of 27 trillion won by 2005 - were unable to meet demand for clean water
- 1998-2001:  
**Comprehensive Water Quality Mngt Measures** for Huan River, Nakdong River, Kum River and Youngsan River

## Republic of Korea's system to control water quality

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- Measures include 1) a joint system of upstream & downstream residents and 2) riparian buffer zone management with government land purchases & forest conservation measures on private lands in upstream basin
- Financing: additional water use fee (110-113 won/ton) paid by downstream residents to compensate upstream residents and to build/operate basic environmental facilities
- 2004: **Total Maximum Daily Load Mngt System**, as additional complementary measure

**→ Result: improvement of water quality**

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## **D. Summary & Conclusions**

# Summary

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- ES are crucial for human well-being and demand will increase in the future
- PES are demand-driven instruments that provide direct positive incentives to valorize ES as part in NRM strategy
- PES are especially adequate for win-lose or lose-win scenarios – e.g. when trade-offs exist between private & societal objectives.
- PES have the potential to raise new funds, especially from private sector
- The most novel feature of PES is its “business-like” conditional payment form

# Summary

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## HOWEVER

- PES are not a universal solution
- PES require clear identification of the ES demanded & provided, and the links between land uses and ES
- PES require sound and flexible institutions (monitoring & sanction mechanism)
- PES need to be matched with other mechanisms and policies (e.g. national development plans) to ensure coherence
- PES should ensure that the poor can participate

# Applicability of PES systems

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		<i>Opportunity costs of service providing land use</i>	
		<i>Low</i>	<i>High</i>
<i>Benefits from ecosystem services</i>	<i>High</i>	Yes	Possibly, but difficult to make work
	<i>Low</i>	Possibly, but not very useful	No

Source: Pagiola & Platais 2005

# Conclusions

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- Increasing local demand for ES, especially water-related
  - from local companies (hydropower companies – e.g. in Costa Rica ; drinking water companies – e.g. Vittel in France)
  - from local governments (cities – e.g. New York City)
- Increasing international demand for ES, especially climate-related
  - from international carbon markets (post-2012 Kyoto regime, EU-ETS)
  - from voluntary markets (WB Forest Carbon Partnership Facility, international NGO's, Chicago Carbon Exchange)

# Conclusions for Asia

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- To capitalize on growing ES demand, national governments will need to
  - explicit national policies and legislation re ES, while considering synergy between ES policy and national development plans
  - develop ES finance strategy, based on both international and local demand for ES
  - empower local governments
  - induce payments or other forms of investment from the private sector, e.g. fiscal policy support for CSR

# ESDD/ESCAP – IDDRI Study

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- To investigate markets for ES from forests in Asia-Pacific selected countries
- To support government action to secure ecosystem services
- Focus on international demand for ES (carbon sequestration and biodiversity) and mechanisms for benefits at national level - PES as key mechanism

## Further reading on PES

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- ES concepts (key reference): Millennium Ecosystem Assessment - [www.millenniumassessment.org](http://www.millenniumassessment.org)
- PES concept: presentation by Pagiola & Platais 2005 - [siteresources.worldbank.org/INTEEI/214584-1115796410065/20887700/IntrotoPES.ppt](http://siteresources.worldbank.org/INTEEI/214584-1115796410065/20887700/IntrotoPES.ppt)
- Views from Asia and the Pacific: Results from the ESCAP policy maker forum in May 2007 - [www.unescap.org/esd/environment/services/meeting/2007\\_05\\_28/](http://www.unescap.org/esd/environment/services/meeting/2007_05_28/)
- Organizations active on PES/ES in Asia: IUCN, ICRAF/RUPES, Winrock, WWF, USAID, ...
- Other organizations active on PES: CIFOR, World Bank, Forest Trends ...
- Specific queries: Environment Section, ESDD/ESCAP