Exploring the potential of forest ecosystem services: from values to payments

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Forests' contribution to human well-being

Ecosystem services are the benefits people obtain from ecosystems

Source: Millennium Ecosystem Assessment (2005)

Provisioning services

Products obtained from ecosystem

Timber, fuelwood, food, fibres, cork, resin, mushrooms, berries etc.

Regulating services

Benefits obtained from the regulation of ecosystem processes

Climate regulation, water regulation, water purification, pollination, etc.

Cultural services

Non-material benefits obtained from ecosystem

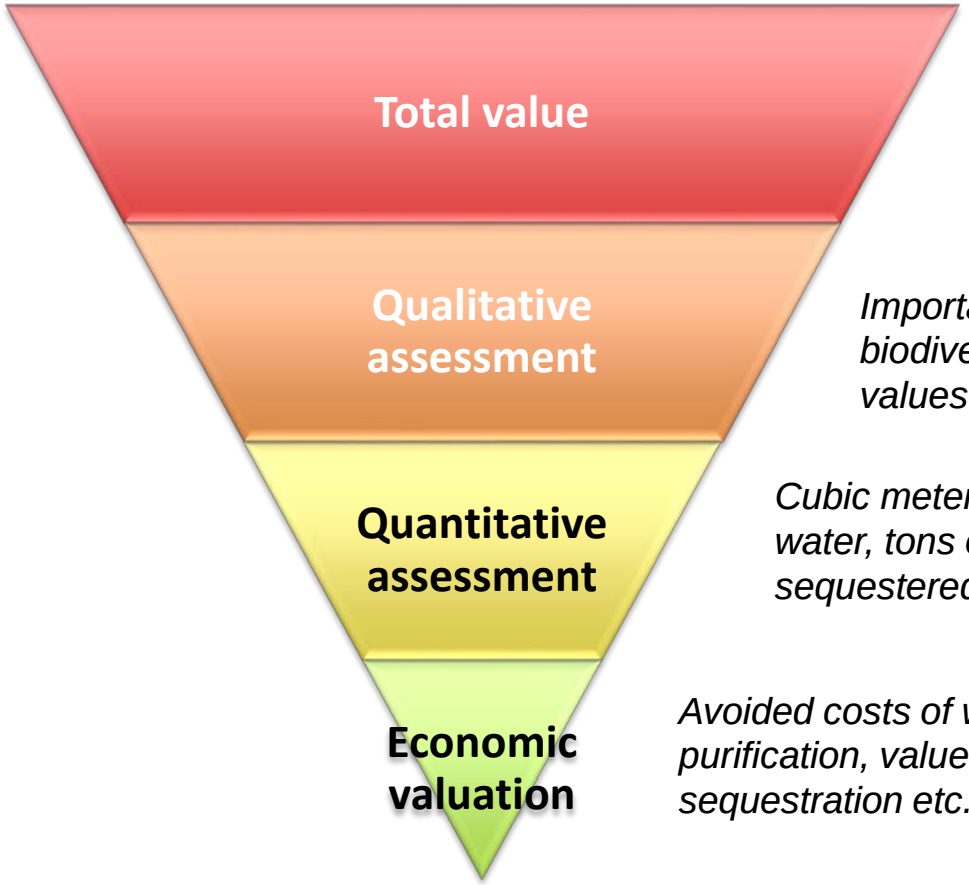
Recreation, ecotourism, aesthetics, education, cultural heritage, sense of place, etc.

Supporting services

Services necessary for the production of all other ecosystem services

Soil formation, nutrient cycling, seed dispersal, primary production, etc.

It’s impossible to value all...



***5-30 M** existing species*
***1,5 M** species described*
***0,5 M** species with known economic potential*

Importance of diverse ES and biodiversity: spiritual and cultural values

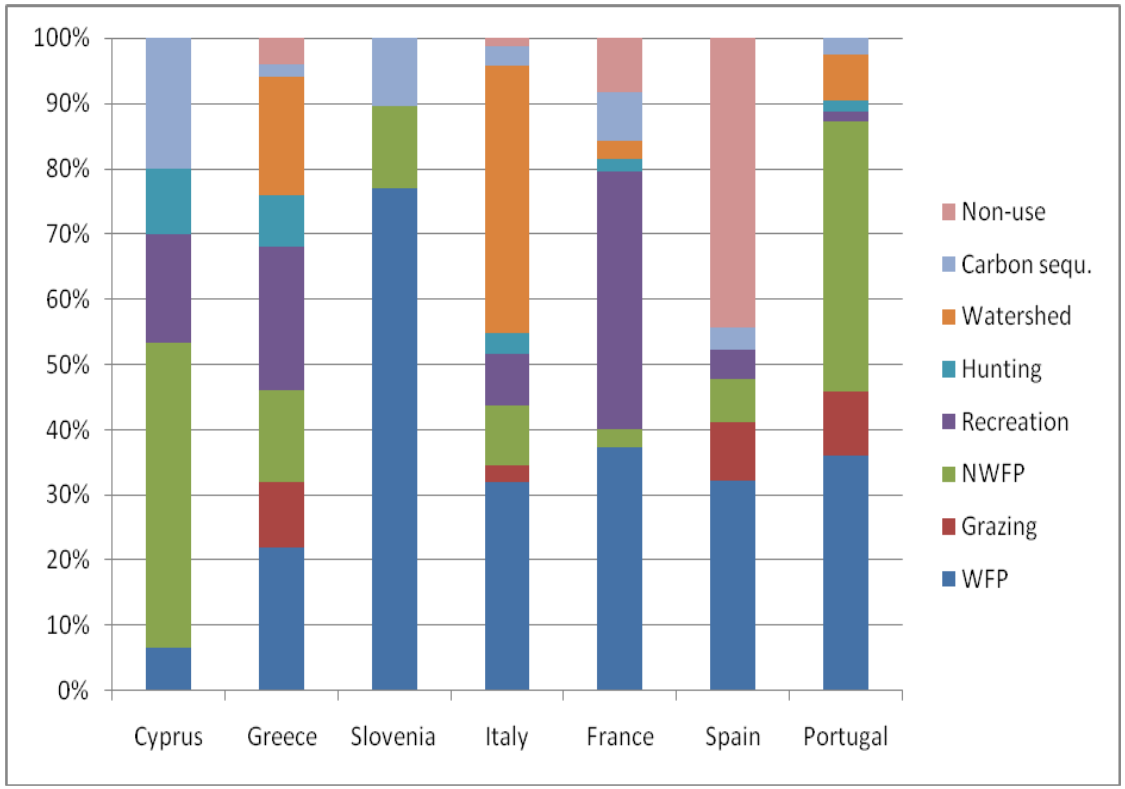
Cubic meters of purified water, tons of carbon sequestered etc.

Avoided costs of water purification, value of carbon sequestration etc.

Economic valuation methods

Methods		Description	Examples of ES
Direct market prices	Market prices	Observe market prices	Provisioning services
Market alternative	Replacement costs	Finding a man-made solution as an alternative to an ES	Pollination, water purification
	Damage cost avoided	How much spending was avoided because of the ES provided?	Damage mitigation, carbon sequestration
	Production function	How much is the value added by the ES based on its input to production processes?	Water purification, fresh water availability, provisioning services
Revealed preference	Hedonic pricing	Consider housing market and the extra amount paid for higher environmental quality	Recreation, leisure, air quality
	Travel cost method	Cost of visiting a site (car, fares, etc.)	Recreation and leisure
Stated preference	Contingent valuation	How much is a person willing to pay to have more of a particular ES?	All services
	Choice modelling	Given a menu of options with different levels of ES and different costs, which is preferred?	All services

Mediterranean forests: estimated ES values



Value per hectare of different forest goods and services. (Merlo & Croitoru, 2005)

Estimated values in Catalonia

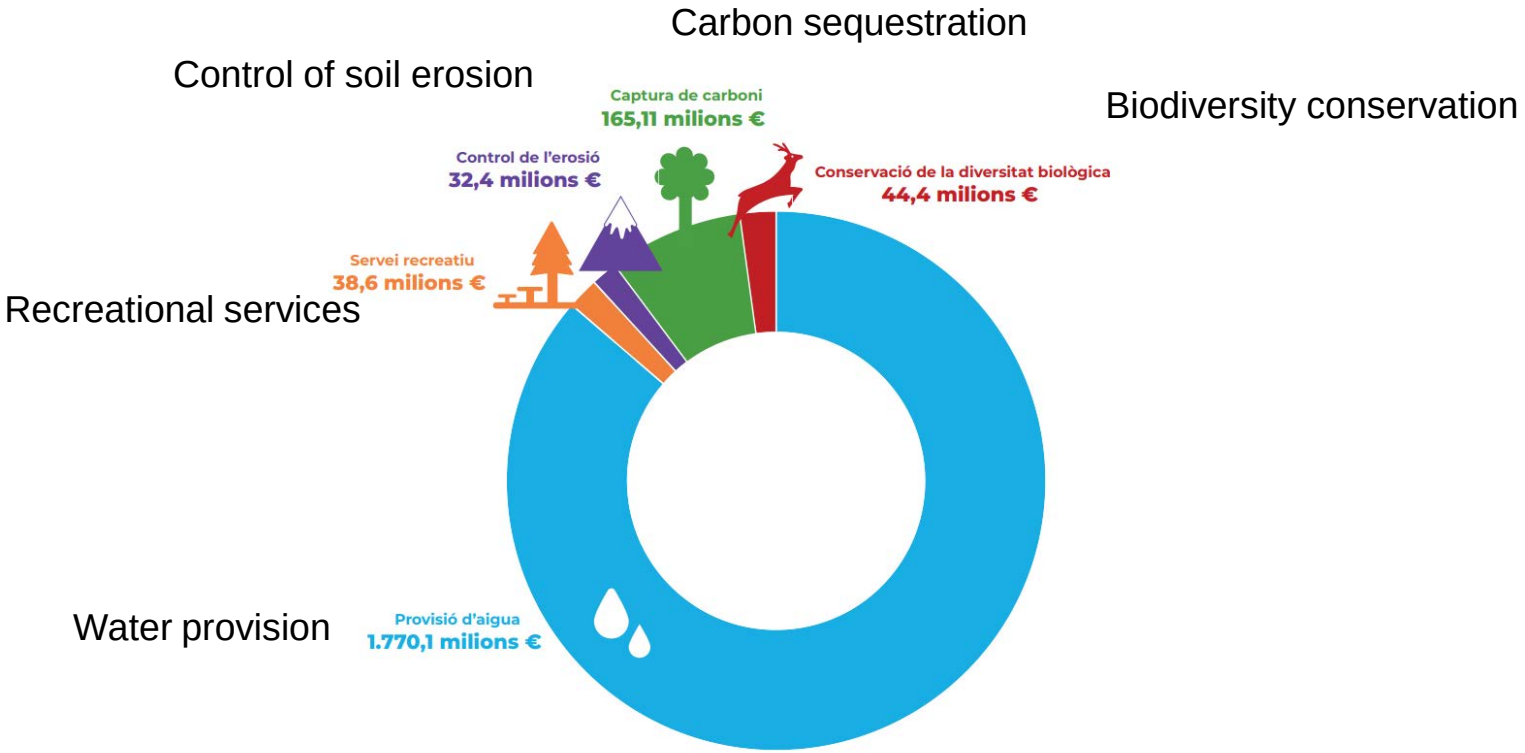


Figura: Valor dels serveis ecosistèmics a Catalunya. Dades del IFN4.

Why do we need to value ES?

- **Raising awareness** about the contribution of ecosystems to human well-being to support public policy making
- Supporting decision-making for assessing the **relative economic impact** of alternative actions/policies
- Obtaining information about the **relative importance of ES** and preferences for their provision across different stakeholder groups
- Identifying **potential winners and losers** when adopting a certain management alternative
- Evaluating the **impacts of environmental policies**
- Establishing **incentive schemes** or markets for ecosystem services

Markets fail to capture most ES values

- Wide range of forest ecosystem services are **not accounted** for
- **Under-provision** or **excessive use** of ecosystem services
- **Public policies** – what for?
  - Integrating ES values into price signals
  - Putting adequate institutions, regulations and financing in place

Command-and-control regulations	*Concessions, quality standards, protected areas, licenses, permits*
Information and education	*Technical assistance, educational campaigns, labeling, certification*
Economic incentives	*Subsidies, grants, tradable permits, payments for environmental services, market creation*

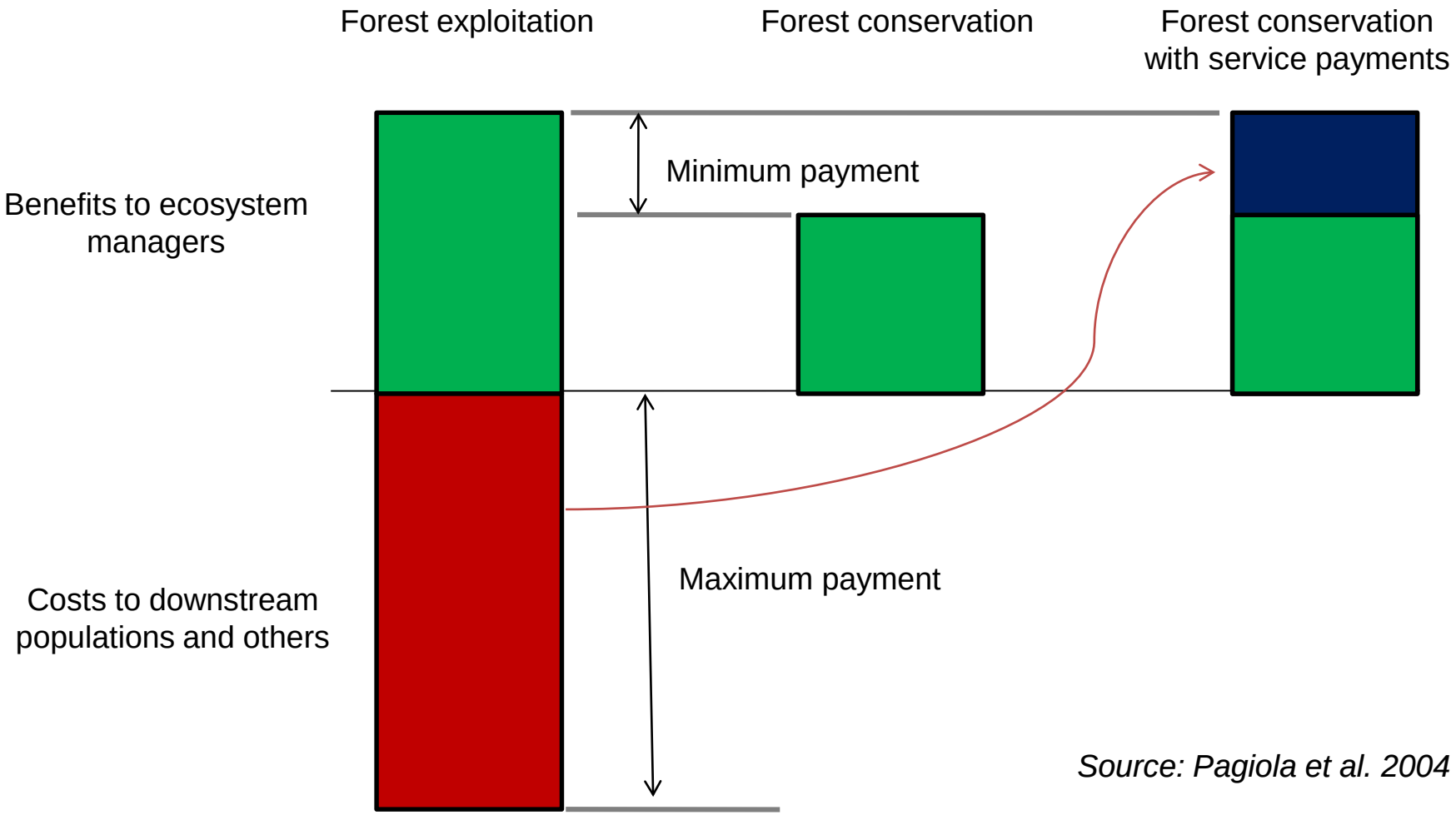
Payments for environmental services (PES)

PES are

1. **voluntary** transactions
2. between **service users** and **service providers**
3. that are **conditional**
4. on agreed rules of natural **resource management**
5. for generating **offsite services**.

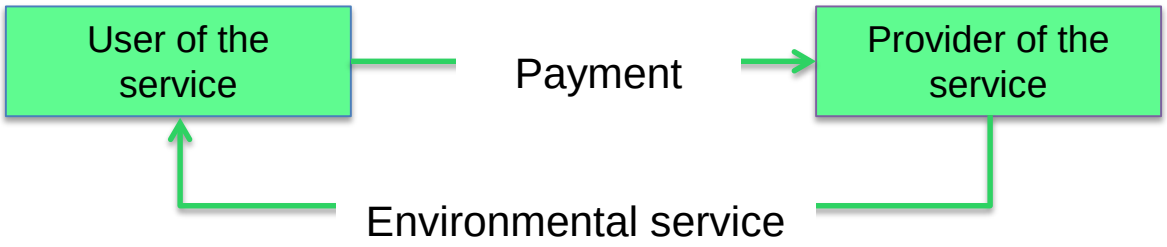
Wunder 2015

PES principle



Source: Pagiola et al. 2004

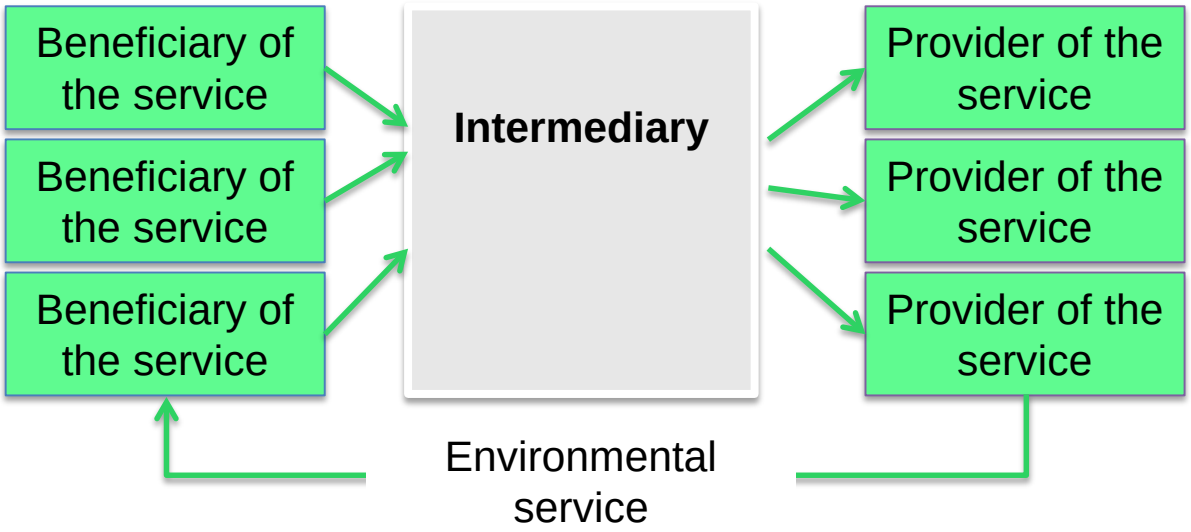
User-financed PES



- Clearly identifiable beneficiaries/users
- Strong conditionality
- Ecosystem services with a strong use value (e.g. water)
- At a small scale
- Efficient

Ex: Vittel pays farmers to reconverting to extensive farming practices to maintain good water quality (France)

Third-party-financed PES



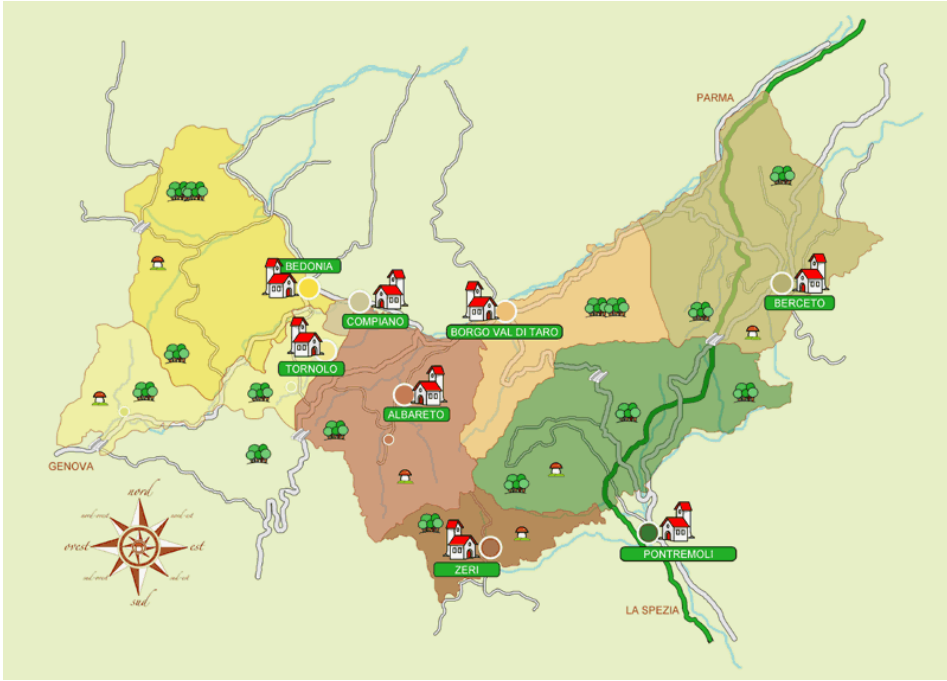
- **Companies** – e.g. tourism operators paying local residents not to develop the land so as to promote wildlife conservation (some countries in Africa)
- **Municipalities** – e.g. channeling compulsory water fees from downstream water users to upstream landowners for watershed management (e.g. Ecuador)
- **Government bodies** – e.g. government run PES programmes (incl. Agri-environmental programs in EU)
- **NGOs or international bodies** –e.g. some schemes in Latin America

Catskills and Delaware watersheds, NYC

- Protection of Catskills and Delaware watersheds (90% of water consumed, 4000 km^2, 77000 inhabitants)
- 1989: Safe Drinking Water Act
- Cost-benefit analysis:
  - Water filtration plant: construction cost 6-8b$, operational 300-500 M$/a
  - Acquisition of critical watershed lands and contamination reduction programmes: 1,5b$
  - Mechanisms:
    - Land acquisition and preservation
    - Local land-use incentive programmes (PES)
    - Regulation of local land uses
  - Taxpayers bill increased 9%, instead of 100%

Fungo di Borgotaro, Italy

- Forest conservation and management
- Borgotaro area in the Apennines
- Re-investment of proceeds from wild mushroom permits in forest maintenance
- Providers: community forest owners
- Financing: user fee – sale of mushroom picking permits (6-15€/day)
- Payment: cash transfer, differentiated according to productivity of the area, length of picking season, etc.
- Payment amount: 15-19€/ha/year
- Total number of permits: 25-36.000 (2005)
- Annual revenue from permits: 300-420.000€ (2005)



Opportunities for bioeconomy

- **Large potential** for the exploitation of ecosystem services and non-wood forest products (e.g. mushrooms, berries, aromatic plants, birch sap, etc.)
  - 25% of European population (incl. Russia) harvests non-wood forest products
  - 90% of European population consumes non-wood forest products
- **Diversification** of rural income opportunities (innovations, entrepreneurship), **distribution** of wealth and jobs (e,g, SMEs)
- Delivery of smart and **inclusive growth**

More information

- Ecosystem Marketplace: http://www.ecosystemmarketplace.com/
- The Katoomba Group: http://www.katoombagroup.org/
- The Economics of Ecosystems and Biodiversity (TEEB): http://www.teebweb.org/
- StarTree project: http://www.star-tree.eu/
- SINCERE project: http://sincereforests.eu/

sincere
Innovating for Forest Ecosystem Services

This project has received funding from the European Union's H2020 research and innovation programme under grant agreement No 773702

Newforex
New ways to value and market forest externalities

SEVENTH FRAMEWORK PROGRAMME

StarTree

Multipurpose trees and non-wood forest products: a challenge and opportunity

Four year FP7 project – 12 countries, 14 case study regions, 24 partners.

Started Nov 2012, end Oct 2016

www.star-tree.eu

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 311919

Thank you

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