

Conference "The New Challenges of the Forest"  
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## The value of forests' drinking water supply: an Italian experience

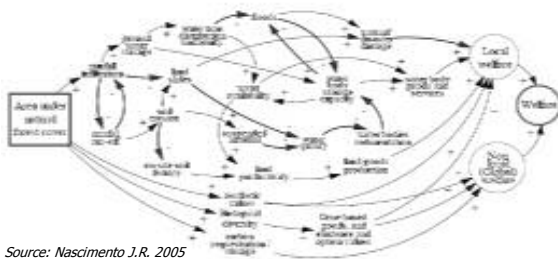
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## How the presentation is organised

1. Problem setting: core aspects
2. Market-based payments for water supply service
3. Methodological problems: an Italian case-study
4. Final considerations

## Problem setting: core aspects

Causal diagram showing the linkages among an area covered with natural forests and welfare.<sup>1</sup>



Source: Nascimento J.R. 2005

## Growing interest in market-based payments for hydrological services

1. Those who manage forests for water supply service usually receive little or no compensation = no incentives for conservation



2. Traditional regulatory (*command & control*) approaches often ineffective

## To apply the Payment for Environmental Services principle: 2 main problems

- **Economic valuation** of hydrologic and sediment-related impacts of land use  
→ *methodological, scientific problem*
- **Payment mechanisms** to share the resulting benefits/costs between upstream and downstream people in rural watersheds  
→ *political, ethical problem*

## Economic valuation

Economic value of water-related services often under-estimated or unrecognised: difficulties in correctly water pricing

Upstream - downstream: power and wealth gap between upland/rural & lowland/urban society

1. With/without approach: strict legislation for soil & water protection (incremental value of the service)
2. Limited economic investments for catchments management
3. Gradient of management responsibilities among forest/land owners
4. Site specific conditions/results
5. Other values connected to water services: biodiversity, recreation & tourism, landscape protection, etc.
6. Costs of valuations

In addition: few, not well consolidated practical experiences in valuation

## Types of market-based payments for hydrological services (Perrot-Maitre & Davis, 2001)

- Voluntary Contractual Arrangements**
  - = direct negotiations between water users and landowners
  - *La Esperanza hydropower producer pays the NGO Monteverde Conservation League for maintaining existing forest cover in the upper catchments - Costa Rica*
- Public Payment Schemes**
  - = direct payments to farmers/forest owners for management practices that protect water quality
  - *Council Regulation 1698/2005 for Rural Development 2007-2013 (Axis 2)*
- Trading Schemes**
  - = trade of "credits" between companies and landowners for exceeding the requirements on water use or pollution limits
  - *The Tam-Panlico Trading Program in USA*

## Examples

(Johnson *et al.* 2001 – modified)

	Voluntary Contractual Arrangements	Public Payment Schemes	Trading Schemes
<b>Case-study</b>	Perrier Vittel's Payments for Water Quality - <b>France</b>	Nossana Valley's Forest Management for Bergamo City's Water Supply - <b>Italy</b>	Irrigators Financing of Upstream Reforestation - <b>Australia</b>
<b>Water-related service provided</b>	Drinking water quality	Drinking water quality, quantity and regularity	Reduction of water salinity
<b>Suppliers of water service</b>	Upstream farmers and forest landowners	Watershed authority (BG <i>Servizi Idrici Integrati</i> ) and upstream landowners	State Forests of New South Wales
<b>Payers for water service</b>	A bottler of mineral water	Water users and watershed authority	An Association of irrigation farmers
<b>Payment mechanisms</b>	Upstream farmers and forest owners paid by bottler for improved agricultural practices and reforestation	Taxes on water users; payments by watershed authorities to landowners	Water transpiration credits earned by State Forests for reforestation and sold to irrigators
<b>Intended impacts on the forests</b>	Reforestation (but little impact because program focuses on agriculture)	Improved forest management; expansion of forests; protection	Large-scale reforestation (with desalination plants & deep rooted trees)

## An Italian experience

In Italy = a new Law on water resources management in 1994 (L. 5.1.1994, nr. 36):

- creation of (public) companies (*Ambiti Territoriali Ottimali*) for catch basin and water works management
- possible internalization of watersheds management costs in water pricing

Case-study:  
Nossana Valley catchments supply water to 240.000 inhabitants in Bergamo city (Lombardia region, Northern Italy)

## Some methodological problems

Drinking water supply value



Watershed/catchments management



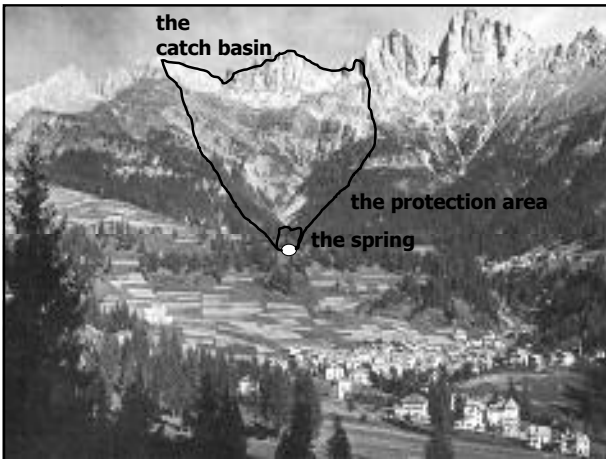
Costs/benefits linked to management operations and impacts

## 1. Not clear, direct links between water supply service and land uses

- Time lag between management operations in field and related impacts on water quantity & quality
- Lags & effects of land use changes vary within the same catch basin depending on different factors (local soils characteristics, precipitation, forest composition, etc.)
- The economic impacts of changes in water quantity and quality vary depending on the final water use and on water-related ecosystems vulnerability
- Impacts have often long-term effects and can hardly be corrected

## 2. What has to be valued?

- The product/service ( $S_w$ )**
  - $m^3$  of water supplied by the hydrogeological system
  - $m^3$  of water used
- The interested area ( $V_w$ )**
  - the spring  $V_{w(so)}$
  - the catchments area (basin)  $V_{w(bi)}$



### 3. Which economic valuation approach?

- Indirect approaches:

- Market value 21,478.16 €/ha
- Cost & Opportunity-Cost value 12,159.02 – 6,092.01€/ha
- Substitution value 9,657.34 €/ha

- The Additional Costs Approach 10.00 – 50.00 €/ha

- The Added Value Approach:

- Advertising Behavior 4,352.61 – 6,442.56 €/ha
- Contingent Valuation 6,528.92 – 9,663.84 €/ha

### Final considerations (1/2)

- The precise impact of forested catchments on water supply varies dramatically between places  
→ Generalizations are difficult

- Broad range of economic values
  - considering Substitution value, Opportunity-cost value, ... precautionary principle: *high values*
  - considering Additional costs: *low values*



### Final considerations (2/2)

- A "political" dimension of valuation: *pricing policies* (to define fees-privatization)  
→ *ethical considerations*
- BMP's multifunctionality in catch areas: water supply is only one of the key elements  
→ increasing need for participatory & integrated watershed management...

... not "the forest buffet" for free!

