Payments for Water Services: potentials and constraints

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Congress: "Vulnerability of the Mediterranean soils to water erosion: State of knowledge and adaptation strategies in the face of global change"
Rabat, 19-20 November 2018

Stages in the modern history of ecosystem services (Gómez-Baggethun et al., 2010)
A long list of policy statement

- Statement of the Ministerial Meeting on forests (Rome, Italy, 14 March 2005)
- UN Commission on Sustainable Development, 13th Session on water, sanitation and human settlements (New York, 30 April 2004 and 11–22 April 2005)
- 9th Meeting of the conference of the contracting parties to the convention on wetlands (Kampala, Uganda, 8–15 November 2005)
- Resolution IX.3: Engagement of the Ramsar Convention on Wetlands in ongoing multilateral processes dealing with water
- International Tropical Timber Agreement (Geneva, Switzerland, 27 January 2006)
ES markets at global scale

Markets for ES: global view
Source: Ecosystem Marketplace, 2017

25 Billion USD on payments for green infrastructure for water and watersheds
About 900 Million USD forest carbon finance commitments
2 to 3 Billion USD in biodiversity projects and markets

In many cases ES are bundled, i.e. multiple services are offered together or combined in a single activity/investment
ES markets in Europe

Source: Etifor & Ecosystem Marketplace, 2017

5.7 Billion Euro on payments for watershed protection in EU (2015) (mostly public finance)

16.1 MtCO₂e, from renewable energy and forestry projects offsets by EU org. (2015)

In EU: 4.4M Euro (forest projects)

62.7 Million Euro in biodiversity offsets and compensation projects in EU (2011-2015)
Outline

• The drivers: the need for new tools in (water related) policies
• Some case studies
• Barriers and challenges for PES development
• Final remarks
Policy instruments to ensure provision of ecosystem services (mod. from OECD, 2006)

**Sticks**
- Command and Control
  - Prohibition bans
  - Licenses/Permits
  - Compulsory Standards (e.g. environmental, emission, process…)

**Carrots**
- Incentives
  - Payments for environmental services (PES) and PES-like
  - Direct markets
  - Tradable permits
  - Auctions
  - Ecolabeling/Certification…

**Sermons**
- Information
  - Awareness campaigns
  - Extension services
  - Information disclosure
  - Research and development…

A “light” State
- Direct involvement of private stakeholders
- Solutions more tailored to the real problems

Market-based instruments (MBIs)
- Payments for environmental services (PES) and PES-like
- Direct markets
- Tradable permits
- Auctions
- Ecolabeling/Certification…

Policy instruments to ensure the provision of ecosystem services
(mod. from OECD, 2006 and Wunder, 2006)

- **Sticks**
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- **Carrots**
  - Payments for environmental services (PES) and PES-like
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- **Sermons**
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  - Extension services
  - Information disclosure
  - Research and development…

- **Economic incentives**
  - Taxes and subsidies
  - Direct management
  - Market-based Instruments to Payments for Ecosystem services (PES)
  - Certification & labelling

- **Directness**
  - Extension services
  - Awareness campaigns
  - Research and development

- **Standards**
  - Liability/Damage compensation
  - Licenses/Permits
  - Prohibition bans
PES: definition


A PES is… (Wunder, 2005):
1. a voluntary transaction in which
2. a well defined ES (or a land use likely to secure that service)
3. is “bought” by a (minimum of one) buyer
4. from a (minimum of one) provider
5. if and only if the provider continuously secures the provision of the service (conditionality)

A “classic” example
Vittel Mineral Water
(Vosges, France)

30-year long contracts with all farmers within the watershed area to reduce the use of nitrates and enhance agriculture and forestry practices:
• 1 700 ha converted from corn to set-aside or other crops
• 92% of the area under some protection form
• About 200 €/ha/yr. compensation to farmers for missed revenues
• About 25 M € invested by Vittel in the first 7 years (i.e. 1.52 €/m³ of bottled water)

→ Similar initiative by Coca Cola in Southern Portugal: 17 €/ha to FSC certified forests hosting and managing water-filtration areas
The PES rationale (Wunder, 2018)

Arguments for PES (Wunder, 2018)

- Why “pay the polluter” principle, not vice versa?
- PES are legitimate (= voluntary, negotiated)
- PES are direct (= quid pro quo contract)
- PES are adaptive (flexible design)
- PES may have efficient and equitable outcomes
PES: the rationale (2/3)

Benefits to ecosystem managers

Costs to society

BAU scenario

Management approach providing ES

Reduced H₂O services
Loss of biodiversity
Carbon emissions

Source: Engel, Pagiola & Wunder, 2008

PES: the rationale (3/3)

Benefits to ecosystem managers

Costs to society

BAU scenario

Management approach with ES payments

Min. payment

Max. payment

Payment for service

Source: Engel, Pagiola & Wunder, 2008
Some PES pre-conditions

- **Conditionality** → service providers are to receive payments only when their efforts to produce detectable changes reflect in the quality/quantity of the service.

- **Additionality** → payment should yield environmental benefits that *would have not have been occurred* without it.

- **Permanence** → the scheme should be self-sustained. How long will it remain in place after public funding is finished?

- **Leakage** → avoidance/management of *indirect negative effects* and trade-offs occurring on the same ecosystem service or on the same ecosystem providing the service.

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PES, PES-like and other incentives

- **Are the 5 key-PES criteria always met?**

  - Any payment for any environmental service by anybody (e.g. reforestation subsidies)
  - 1 or more key-PES criteria missing (e.g. EU agro-environmental schemes) → quite common

  **Theory and some cases (private PES)**
Outline

- The drivers: the need for new tools in (environmental) policies
- **Some case studies**
- Barriers and challenges for PES development
- Final remarks

Case studies, with special reference to the experiences in Italy

1. **PES**
   - Water table enrichment: *Bosco Limite*
   - Water catchment and storage: the *Romagna Acque* experience with the Ridracoli dam for providing drinking water

2. **PES-like**
   - Galli Law for drinking water tariff definition
   - Water catchment and storage for hydropower generation
1. PES case studies

*Bosco Limite*

The problem: lowering of the water table + problems associated to farmland intensification
Providers
The farmers owning and managing the land

Payers (beneficiaries)
Private citizens (planted trees), students (env. education), bee keepers, hunters, …

Local public authorities
sponsors, supporters, some incentives connected to EU Rural Development Program
Impacts

- 1,500 tons of CO$_2$ sequestered in 30 years
- 12,000 m$^3$ stored every year
- 200 l/sec of infiltration (1 M m$^3$/ha/yr)

www.boscolimite.it

1. PES case studies
   Romagna Acque
   and the Ridracoli dam (1/2)

- A public company controlled by the local administrations (Province and Municipalities)
- A dam built in 1982; capacity of 33 M m$^3$; more than 100 M m$^3$ of high quality drinking water provided/year
- Almost 50% of the total Romagna drinking water consumption
Romagna Acque and the Ridracoli dam

- From 1982 to 2007: **25 years** of constant *forest management investments* in the catchment basin area: an almost fixed amount of **4%** of the total company revenues from water tariff, equal to a **annual PES of 5-600,000 €**
  - Initial sediment transport volume (1982): 42,600 m$^3$
  - Today sediment transport volume: <30,000 m$^3$
- Now: no more investments needed (a part from ordinary maintenance works and environmental education)
From *Romagna Acque* experience a lesson learned →

National Frame Law: no. 36 in 1994

### 2. PES-like case studies

- Till **3% of the tariff payment** can be used by Water authorities for **public works in the catchment areas**
- Only 2 (3) Regions have decided to implement the law: Piedmont, Veneto (and Emilia-Romagna).
  - Piedmont: funds are managed by the Unions of Mountain Municipalities only for **ordinary maintenance**
  - Veneto: **all public works** in the catchment area are financed
Is this a PES?

- Payments are activated only through lobbying (the representatives of the land owners are weaker than the local water authorities, always oriented to reduce their tariff)
- Investments in the catchment areas are **not always based on clear criteria** (in Veneto they are used for all public works, some of them – i.e. mountain road construction – having negative externalities on water quality!)
- In any case, a PES-like scheme based on a public regulative frame with **no direct payment to the externality providers**

2. PES-like case studies

Hydro power generation

- In the past the **first source of renewable energy** in Italy (5.1% of total final consumption)
- **Long-lasting discussion:** the poor “Mountains” providing energy to the rich “Plain”
  - National frame law: no. 959 in 1953: **compulsory compensation**
  - Payment based on **power of hydroelectric plant (>220 kW): 30.4 €/kWh installed/year**
  - **Extra payment** for the Municipalities that have the catchment area or host the power plant (5.3 €/kWh)
  - **Beneficiaries:** Municipalities, frequently organised in Consortia (BIM – *Bacini Imbriferi Montani*)
  - Numbers: 69 BIMs; 1,684 Municipalities involved; 252 dams; 518 power plants
Criteria to distribute the payment among the Municipalities (Source: Decree Ministry of Public Works)

- **10% flat rate** shared equally among Municipalities
- **20%** paid in relation to the **territorial area** of each Municipality
- **30%** paid in relation to the **population** of each Municipality
- **40%** paid in relation to the localisation of various **infrastructures** (dam, power plant, torrents, channels, …)

Use of money raised by the PES

- **Public works**: infrastructures, social services, cultural events (recently: renewable energy generation and distribution)
- <5% administrative costs
- **Local politicians** are the decision makers (aim: to raise the voters’ consensus)
Is this a PES?

- Payments are **based more on damages** due to infrastructures **than on land services** (water provision, sedimentation reduction). Some infrastructures are providing positive externalities.

- Payments are given to **public institutions** that are **not exactly** the same responsible for mountain development.

- So, a PES-like scheme based on a public regulative frame with **no direct payments** to the externality **providers**

Outline

- The drivers: the need for new tools in (environmental) policies
- Some case studies
- Barriers and challenges for PES development
- Final remarks
Some barriers in the development of PES initiatives

<table>
<thead>
<tr>
<th>Barrier category</th>
<th>Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational</td>
<td>Lack of awareness among beneficiaries and providers</td>
</tr>
<tr>
<td>Technical</td>
<td>Scientific uncertainty, Baselines, Leakage, ES valuation, Excludability and free riding, Shortage of skills and experience</td>
</tr>
<tr>
<td>Spatial</td>
<td>Spatial variability of ES</td>
</tr>
<tr>
<td>Temporal</td>
<td>Permanence, Time lags, Different time horizons</td>
</tr>
<tr>
<td>Financial</td>
<td>Perceived risks, High start-up and Transaction costs</td>
</tr>
<tr>
<td>Institutional</td>
<td>Perverse incentives, Complex policy environment</td>
</tr>
<tr>
<td>Legal</td>
<td>Property rights and other issues</td>
</tr>
<tr>
<td>Cultural</td>
<td>Aversion to paying for ES, Lack of trust, Terminology</td>
</tr>
<tr>
<td>Equity</td>
<td>Perceived unfairness</td>
</tr>
</tbody>
</table>

Source: modified from DEFRA, 2011

Some barriers in the development of PES initiatives

- **Scientific/Technical barriers**, e.g. cause-effect links not always clear between ecosystem functions and ES (more direct for carbon, less evident for water-ES)
PES: the rationale

Supply of services:
Upstream land uses affect the Quantity, Quality, and Timing of water flows

Demand for services:
Possible downstream beneficiaries:
- Domestic water use
- Irrigated agriculture
- Hydro-power
- Fisheries
- Mineral water company
- Recreation
- Downstream ecosystems

Source: Pagiola and Platais, 2005

Some barriers in the development of PES initiatives

- **Scientific/Technical barriers**, e.g. cause-effect links not always clear between ecosystem functions and ES (more direct for carbon, less evident for water-ES)
- How to set ES prices for the market?
How to set ES prices for the market?

- The prevailing approach by State actors → cost of provision (a robust framework adopted by EU Rural Development Program, EU WFD,…); high normative baselines might be a limitation

- An alternative criteria: the value of the service → beneficiary’s WTP (normally higher than the cost of provision)

Some barriers in the development of PES initiatives

- Scientific/Technical barriers, cause-effect links not always clear between ecosystem functions and ES (more direct for carbon, less evident for water-ES)
- How to set ES prices for the market?
- Many actors, negotiation needed, several middlemen → increased transaction costs, possible conflicts
A “classic” example
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10-year long negotiation process!

Some barriers in the development of PES initiatives

- A consolidated perception: ES given for granted → why should we pay (more) for them?

- Definition/reform of property rights
Financialization and commodification of natural resources (Kill, 2014)

A process whereby the natural functions and processes of forests, woodlands, meadows, mountains and other natural areas become treated as a range of 'ecosystem services' including biodiversity, regulation and filtration of water, carbon storage and sequestration, the economic value of which can be calculated and expressed in monetary terms. **Financialization** transforms both everyday perceptions and policy, and involves not only the framing and valuation of these natural spaces in economic terms via commodification, monetization, commercialisation, but also their integration into financial markets as a tradable asset.

Some barriers in the development of PES initiatives

- **Ethical issues:**
  - financialization and commodification of nature (Kill, 2014)
  - market-based instruments and ethical motivations to manage public goods (“I will supply an ES only if they pay me”)
  - distribution effects, equity

- **Institutional and governance issues** → a new role for public institutions (facilitators)
Outline

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• Great emphasis on ES and PES by policy makers, environmentalists, academia but a limited number of pure PES initiatives implemented so far
• WTP higher for small-scale, local initiatives, with well-identified, local beneficiaries; a problem in scaling up
• Several examples of quasi-PES (PES-like) initiatives: border with ordinary financing mechanisms not always clear
• A number of initiatives and experiences aiming to value ES but lack of a systematic approach and common vision
The broad set of tools to promote ES needs a new role and much higher level of **multi-level & multi-sectoral governance by public institutions**

…but public institutions are not always open and reactive to a rapidly changing world.

Presentation available on the web. Search for “pottenella”