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Overcoming challenges in the design of Payment for Ecosystem Service schemes.

Improving decisions at the food, water, energy and environment nexus: Values and valuation

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Overcoming challenges in the design of Payment for Ecosystem Service schemes: *Can stated preference methods help?*

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Main issue

- Can we use **valuation methods** (stated preferences) to help in the design of **Payment for Ecosystem Service (PES) schemes.**

- PES: a "buyer" offers a payment to a "seller" (eg a farmer) who offers to change their land management in order to deliver **more** of an ecosystem service / more biodiversity

- Voluntary contract

- Establishes a financial reward for providing the ES/biodiversity which the market does not pay for.

What are the main economic problems with PES that need to be recognised?

- Variation in costs amongst sellers (how much does it cost them to supply the ES/biodiversity?)

- Lack of information on seller's "type" (high, low cost) on the part of the buyer

- Possibly high costs of monitoring conservation effort

- Spatial variation in ecological productivity

example

- Offering contract payments to farmers to change how they farm so we get more lapwings
- We don't know the costs each farmer incurs in undertaking the set of actions specified in the contract
- We don't know how these costs vary across farms
- It is very expensive to monitor what a farmer is doing in terms of the contract anyway
- The environmental impacts of a particular set of actions (eg improving wetlands, changing grassland management) might produce environmental different outcomes on different farms.

What are, therefore, the main "design questions" for a PES scheme?

- Establishing the "correct" payment rates, and maybe the spatial variation of these rates

- Length of contract offered

- Deciding whether to pay for actions or outcomes, or a mix of these

- Sometimes, the need to incentivise spatial coordination

- Whether need to ban/mandate certain actions

- **Stated Preference methods can answer many of these questions**

1. Price offered for the contract

Using either Contingent Valuation or Choice Experiments (CE), we could estimate probability of a seller accepting a particular payment for a particular contract.

The "price offered" can instead be an *attribute* in a CE.

Which option would you choose?

	Contract A	Contract B
Price offered per hectare ($)	50	100

I would choose: option A [ ]   option B [ ]   Neither of them [ ]

2. Length of contract

Yes, most obviously as an attribute in a CE

Which option would you choose?

	Contract A	Contract B
Price offered per hectare per year ($)	50	100
Length of contract	**3 years**	**6 years**

I would choose: option A [   ]   option B [   ]   Neither of them [   ]

3. Paying for outcomes or actions:

- Could be an attribute in a CE

Which option would you choose?

	Contract A	Contract B
Price offered per hectare ($)	50	100
Length of contract	3 years	6 years
Payment offered for:	**Reduction in pesticide use of 50%**	**Each species of bee found on your farm**

I would choose: option A [ ]   option B [ ]   Neither of them [ ]

4. Incentivising spatial coordination:

- CE could investigate this if an "agglomeration bonus" is included as an attribute;
- or if need to bid as a collective is specified.

Which option would you choose?

	Contract A	Contract B
Price offered per hectare ($)	50	100
Length of contract	3 years	6 years
Payment offered for:	Reduction in pesticide use of 50%	Each species of bee found on your farm
Spatial bonus offered if neighbour enrols	25 euro	No bonus

I would choose: option A [   ]   option B [   ]   Neither of them [   ]

OR:

Which option would you choose?

	Contract A	Contract B
Price offered per hectare ($)	50	100
Length of contract	3 years	6 years
Payment offered for:	Reduction in pesticide use of 50%	Each species of bee found on your farm
Collective bids favoured?	yes	No

I would choose: option A [ ]   option B [ ]   Neither of them [ ]

5. Should specific actions be banned or made compulsory if a contract is accepted?

- Example: use of specific pesticide, rather than level of pesticide use in general

- Can do as CE attribute

Which option would you choose?

	Contract A	Contract B
Price offered per hectare ($)	50	100
Length of contract	3 years	6 years
Payment offered for:	Reduction in pesticide use of 50%	Each species of bee found on your farm
Spatial bonus offered if neighbour enrols	25 euro	No bonus
Ban on neonicitinoid seed dressings	**no**	**yes**

I would choose: option A [ ]   option B [ ]   Neither of them [ ]

Recent growing use of choice experiments for the design of PES schemes

- 2 illustrative examples developed here:
  - Danish forest owners
  - French wine growers

Danish forest owners (Broch and Vedel, 2011)

- Investigate effect of attributes of agri-environmental contracts on forest owners' preferences
  - Purpose of afforestation (recreation, ground water quality, or biodiversity)
  - Flexibility: Option of cancelling the contract (5, 10 years or permanent contract)
  - Monitoring (1, 10 or 25% of participants monitored)
 - Compensation (3600 to 5600 €/ha one time payment)

▸ Data collection

‣ Internet survey sent to 3609 farmers

‣ 1027 answers (28.5%)

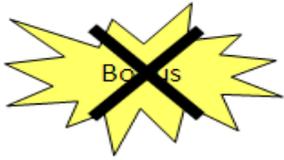# Design of an AES for herbicide use reduction in vineyards

- Voluntary 5 year-enrollment contracts
- In France, very low adoption rates for contracts concerning pesticide use reduction
- What design of contracts could increase these participation rates?
- Our proposal: Introduction of a **bonus** paid only if a predefined participation rate (50%) is collectively reached, among local farmers.
→ Propose to winegrowers various AE contracts with different attributes (choice experiment)
   - → Different levels of reduction (30%, 60%, 100%)
   - → Flexibility term (yes/no)
   - → Free advising (yes/no)
   - → Bonus (yes/no)
   - → Payment (from 90 to 500€/ha)
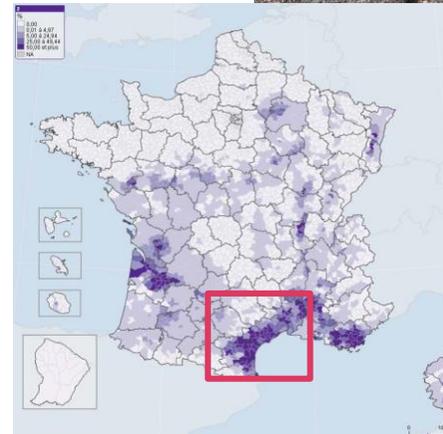
▶ Data collection

   ▶ Internet survey sent to 3100 winegrowers

   ▶ 317 complete answers (10,2%)

Example of choice card

	Alternative A	Alternative B	
Reduction of **herbicides** use in proportion of present use ℹ️	**30 %** reduction	**60%** reduction	
Supplementary localized use of herbicides (max 10% of the committed area) ℹ️	Allowed	Allowed	Current situation
Collective and final bonus for each farmer committed if **50% of** ℹ️	~~Bonus~~	Final bonus 150€/ha	
Administrative and technical assistance ℹ️	Not included	Included	
Payment per year and per hectare subscribed ℹ️	170 €/ha/an	330 €/ha/an	
Choose your preferred option →	☐	☐	☐

Each winegrower makes 6 choices

Future directions?

- Combine with revealed preference data (actual deals)?

➔But this is complicated, due to basic problem facing impact analysis of real schemes (lack of counter-factual)

- Combine with field experiments with real payments?

➔ Could be a way of calibrating stated preference studies.

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