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# Can experimental approaches help to design a better CAP?

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# Can experimental approaches help to design a better CAP?

Sophie Thoyer

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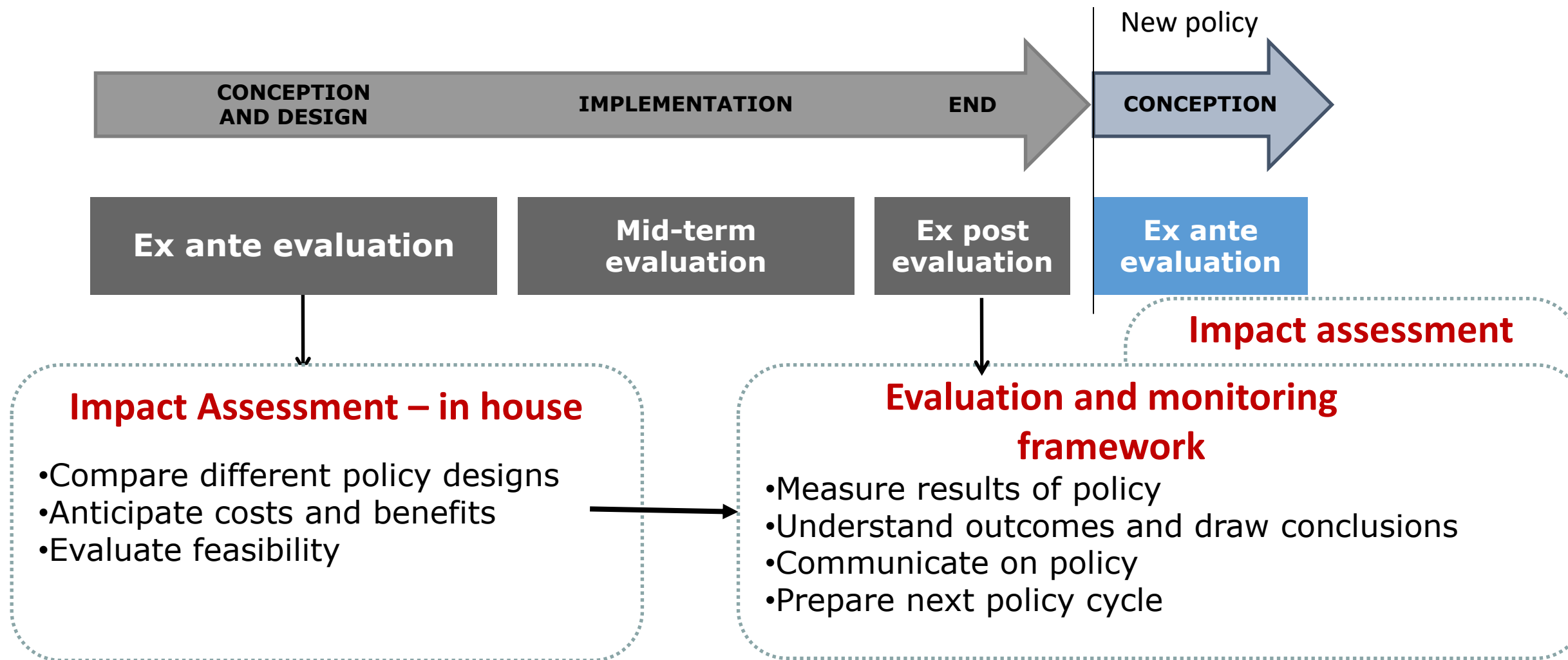
Center of Environmental Economics of Montpellier CEE-M

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- Are evaluation needs changing with the new CAP?
- What can experimental approaches bring to the CAP evaluation toolbox? Three examples
- How can we be better organized as a research community to respond to these needs?

# EVOLVING EVALUATION NEEDS

## The CAP evaluation cycle until now



## Farm to Fork Strategy and 2023 CAP

- Agricultural sector expected to **contribute to EU sustainability objectives**
- «**New delivery model**»: MS must design their National Strategic Plans and demonstrate achievement of self-assigned results – more accountable for their policy choices
- **Ecoschemes**: 25% of direct payments dedicated to environment (14 billion/year) with the objective to have large-scale impacts – more space to innovative tailored measures
- **Enhanced conditionality**: political acceptability and compliance issues

## Evolving evaluation needs

- CAP under more scrutiny - Tough negotiations on CAP budget and CAP measures
  - *Need to demonstrate impact and to measure efficiency: accountability of public money*
  
- Change in evaluation focus: farm-level, compliance, enrolment in voluntary measures, collective approaches
  - *Understand farmers' behavioural drivers (Dessart et al, 2020)*
  
- Acceleration of CAP changes: annual revision of the Strategic National Plans
  - *Less time to evaluate and learn from previous assessments*
  
- More innovation and heterogeneity in CAP implementation at Member States level
  - *Need to test before implementation for different contexts/ location*

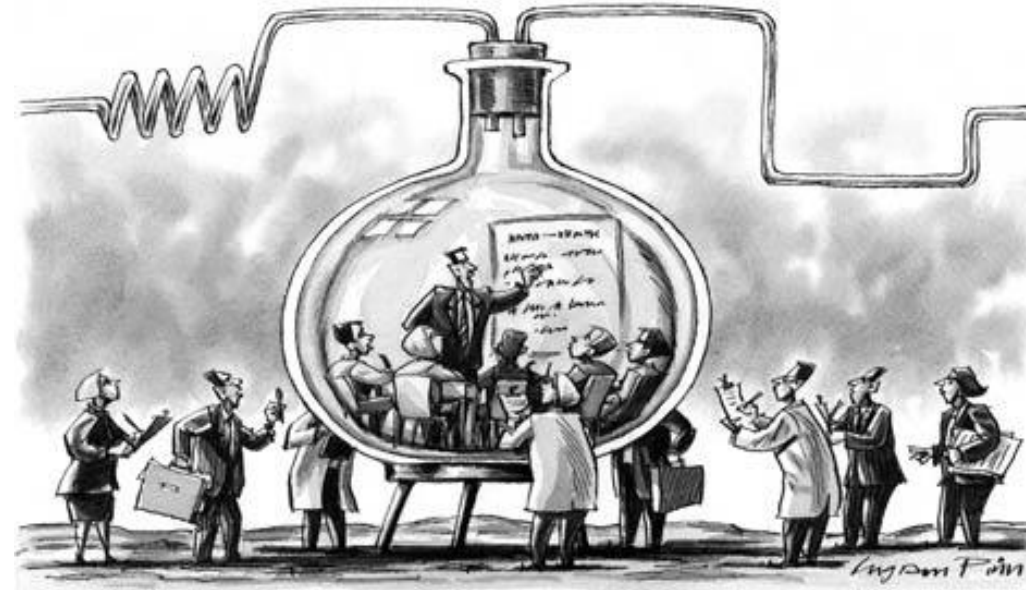
## What can experimental approaches bring to the evaluation toolbox?

- Ability to demonstrate the **causal impact** of the policy by identifying the proper counterfactual and overcoming the selection and time-trend biases
- **Pre-test innovative policy designs** to check that they can be effective
- **Elicit farmers' preferences** and understand their reactions to policy in the presence of behavioural factors (risk and loss aversion, social norms, intrinsic motivations, time inconsistencies ...)
- **Communicate convincingly** on evaluation results with policy-makers

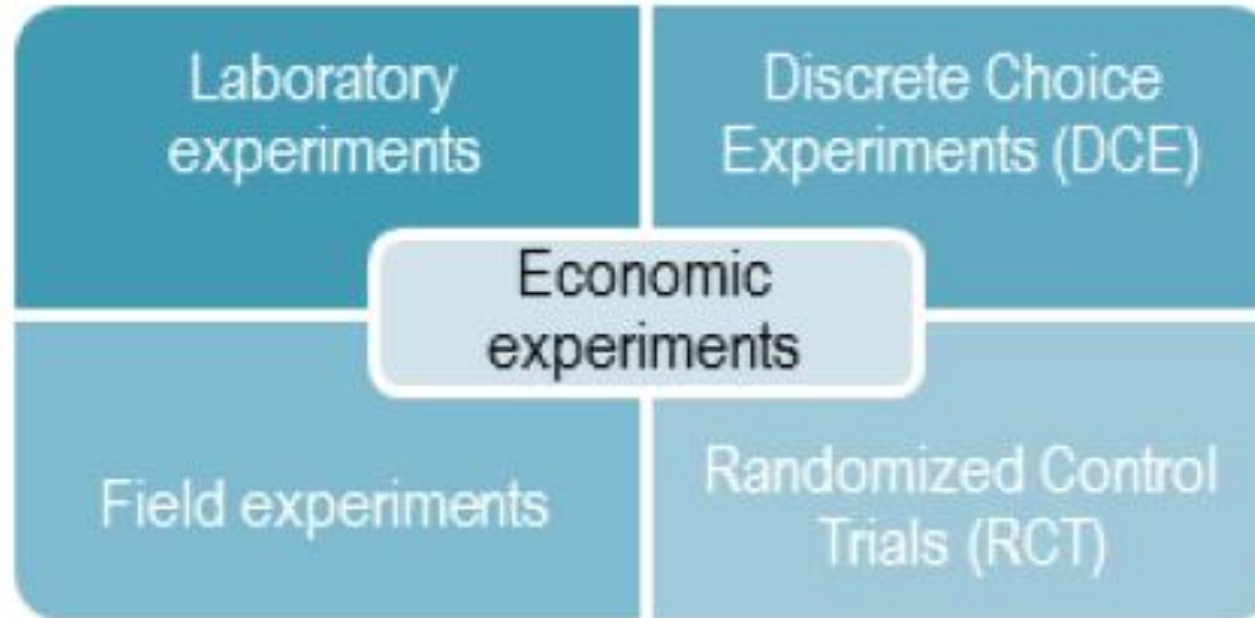


# What is an experiment?

- Data generation controlled by the experimenter
- In a **controlled setting**: comparison of a treated group with a control group
- Ensuring replicability and representativity. **Randomization** procedure for subject selection and treatment assignment
- Often rely on **revealed preference methods** (behaviour is usually incentivized)



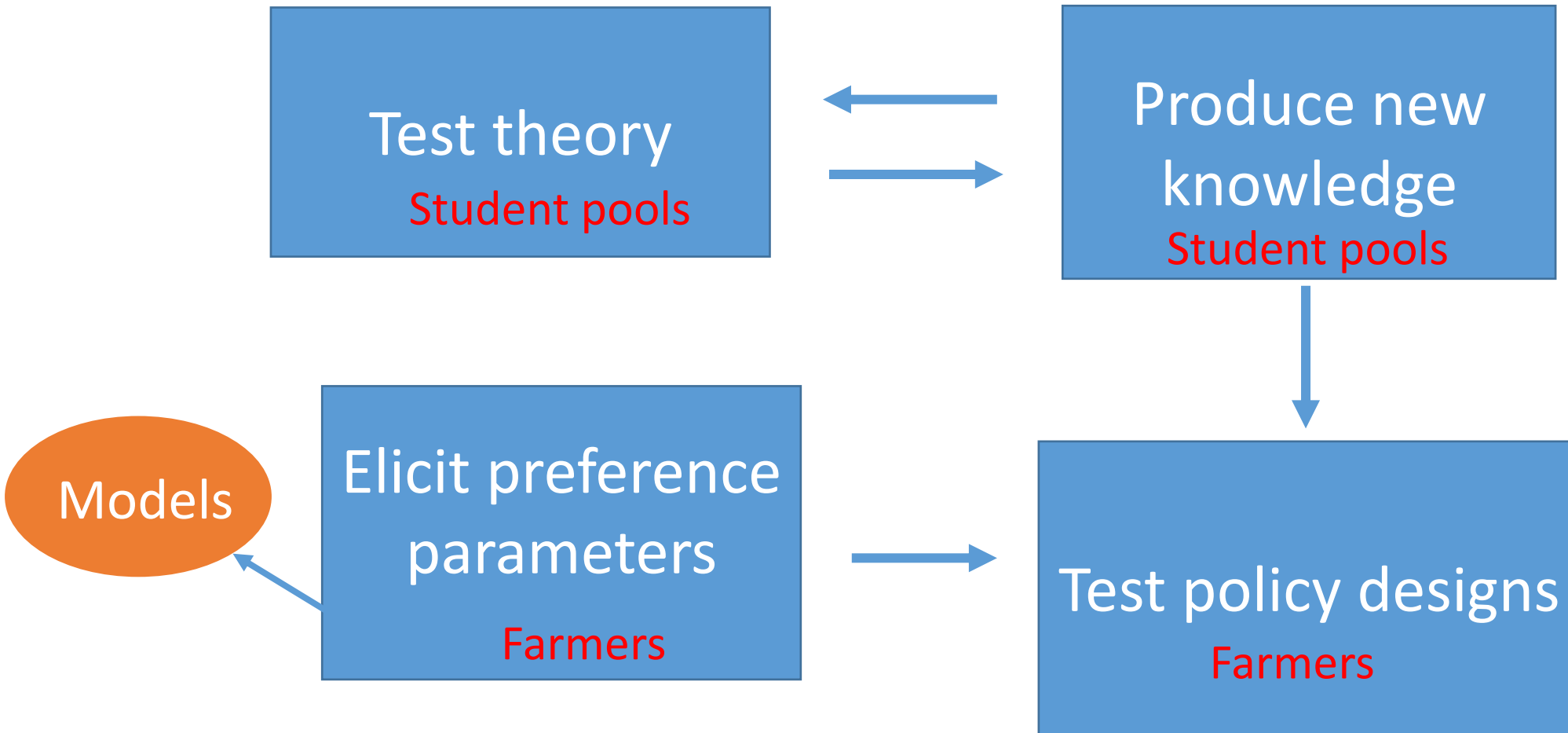
# Types of experiments



	Alternative A	Alternative B	Current situation
Reduction of herbicides use in proportion of present use <sup>1</sup>	30% reduction 	60% reduction 	
Supplementary localized use of herbicides (max 10% of the committed area) <sup>1</sup>	Allowed 	Allowed 	
Collective and final bonus for each farmer committed if 50% of <sup>1</sup>		Final bonus 150€/ha 	
Administrative and technical assistance <sup>1</sup>	Not included 	Included 	
Payment per year and per hectare subscribed <sup>1</sup>	170 €/ha/an	330 €/ha/an	
Choose your preferred option →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Subject pools and research objectives



**WHAT CAN EXPERIMENTAL  
APPROACHES BRING TO THE CAP  
EVALUATION TOOLBOX?  
THREE EXAMPLES RELATED TO CAP  
MEASURES**

## Example 1 - Eliciting farmers' risk preference parameters in different countries

### Why?

- To provide estimations of the heterogeneity of farmers' risk across contexts
- To identify best-fitting decision models in risky situations: expected utility versus cumulative prospect theory
- To feed simulation models with robust loss aversion and risk aversion parameters

### How?

- Replication of a lab-in-field experiment (Bocqueho et al, 2014) across 11 samples of farmers in 10 different MS: 1400 farmers participating to a multiple price list survey (Tanaka et al, 2010)
- Study jointly conducted by 10 research teams under the coordination of Jens Rommel (SLU) and Julian Sagebiel (Idiv, Leibniz)

## Eliciting farmers' risk preference parameters in different countries

**Table 4. Structural estimates of EUT model**

	New samples pooled	BJR2014	BJR2014 (weighted)	Austria	Croatia	France_I	France_II	Germany	Italy	Netherlands	Poland	Slovenia	Spain	Sweden
$r$	0.214 [0.206; 0.223]	0.227 [0.201; 0.254]	0.212 [0.173; 0.251]	0.232 [0.202; 0.261]	0.229 [0.202; 0.257]	0.183 [0.137; 0.229]	0.187 [0.119; 0.256]	0.229 [0.208; 0.251]	0.193 [0.164; 0.223]	0.240 [0.218; 0.261]	0.212 [0.187; 0.237]	0.206 [0.173; 0.239]	0.140 [0.089; 0.192]	0.232 [0.214; 0.249]

**Table 6. Structural estimates of CPT model**

	New samples pooled	BJR2014	BJR2014 (weighted)	Austria	Croatia	France_I	France_II	Germany	Italy	Netherlands	Poland	Slovenia	Spain	Sweden
$\sigma$	0.314 [0.307; 0.320]	0.297 [0.276; 0.318]	0.280 [0.255; 0.306]	0.322 [0.297; 0.348]	0.333 [0.313; 0.354]	0.289 [0.254; 0.325]	0.284 [0.232; 0.337]	0.334 [0.318; 0.350]	0.297 [0.269; 0.324]	0.314 [0.294; 0.333]	0.304 [0.286; 0.322]	0.322 [0.298; 0.345]	0.284 [0.253; 0.315]	0.329 [0.315; 0.342]
$\lambda$	1.601 [1.529; 1.674]	2.174 [1.852; 2.497]	2.274 [1.804; 2.744]	1.531 [1.316; 1.747]	1.817 [1.575; 2.059]	1.701 [1.358; 2.044]	1.751 [1.074; 2.428]	1.574 [1.386; 1.763]	1.457 [1.181; 1.733]	1.187 [0.979; 1.396]	1.807 [1.563; 2.051]	1.848 [1.577; 2.120]	2.162 [1.843; 2.480]	1.352 [1.185; 1.520]
$\gamma$	0.574 [0.555; 0.594]	0.681 [0.580; 0.781]	0.657 [0.507; 0.806]	0.643 [0.579; 0.707]	0.595 [0.535; 0.655]	0.563 [0.464; 0.661]	0.562 [0.401; 0.723]	0.571 [0.516; 0.625]	0.546 [0.485; 0.607]	0.627 [0.566; 0.689]	0.591 [0.527; 0.656]	0.562 [0.498; 0.625]	0.487 [0.404; 0.570]	0.552 [0.506; 0.597]

**Rommel et al, 2022, Farmers' risk preferences in eleven European farming systems: A multi-country conceptual replication of Bocquého et al. (2014) - submitted**

## Example 2: Enhancing collective participation in agri-environmental contracts

### Why?

Need to coordinate enrolment at landscape level to increase environmental benefits

What type of agri-environmental scheme design to improve participation without increasing public spending?

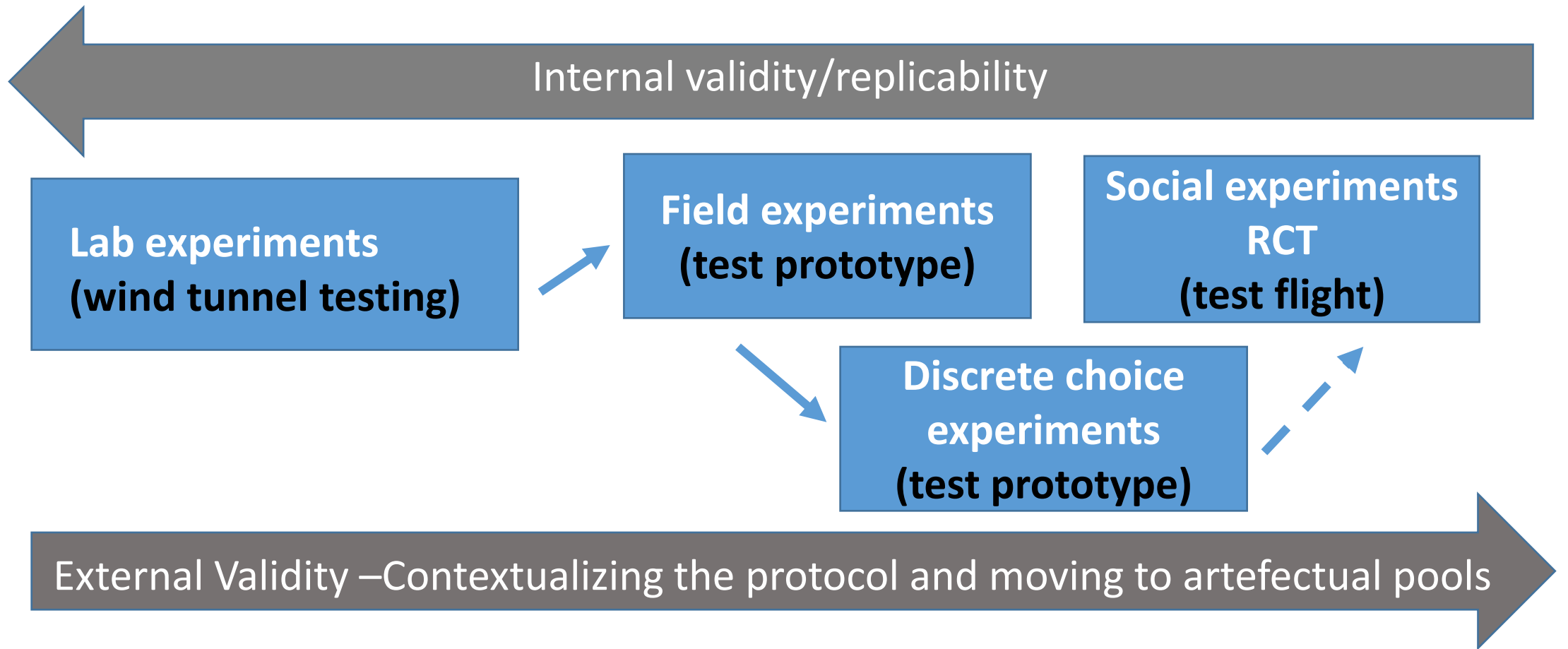
**Many solutions** proposed and tested with farmers, but often imply greater costs (Mamime et al, 2020)

### Start with a simple one:

Pay farmers only if a collective threshold of participation is attained

Would such a condition deter participation?

## Adopt an incremental approach – from lab to field





## First step: In the lab with students and a decontextualized protocol

Framed as a **threshold public good game**, played in the lab with 220 students

- **Unconditional subsidy** paid to public good contributors proportionally to their contribution
- **Conditional subsidy** paid to contributors only if the threshold is reached by the group

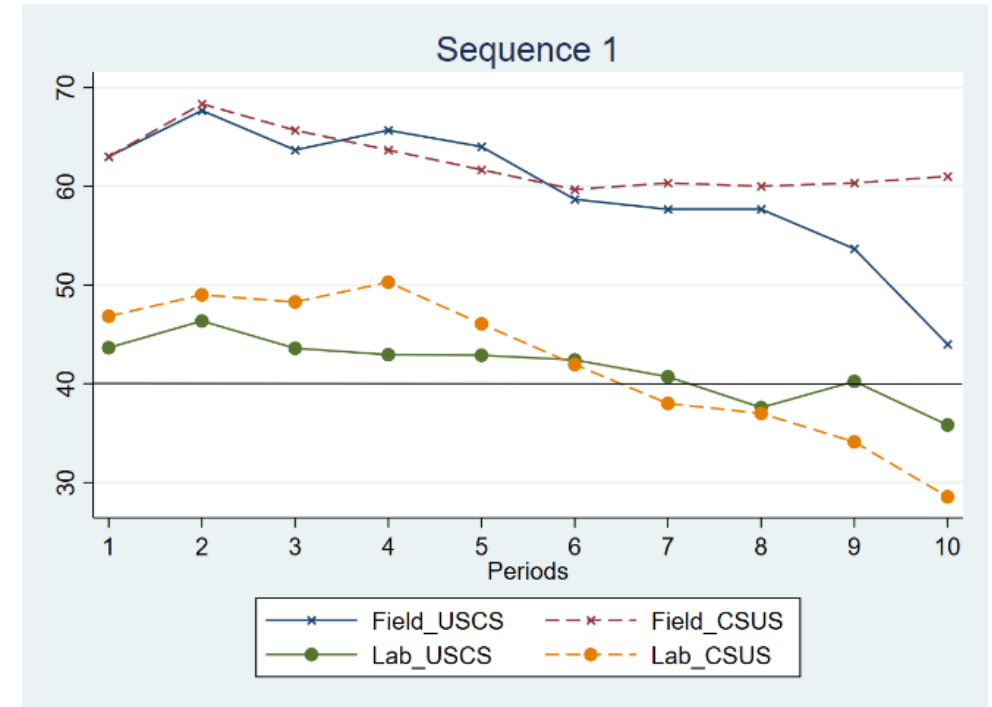
Nash predictions (multiplicity of equilibria) are the same

**Results:** the conditional payment **does not deter contribution** to the public good. Therefore **scheme efficiency is improved**. But heterogeneous patterns of group and individual behaviour: elicitation of risk preferences and beliefs on others' contributions helped disentangle drivers of cooperation

*Le Coënt, Preget and Thoyer (2014) Why pay for nothing? An experiment on a conditional subsidy scheme in a threshold public good game, Economics Bulletin, 34(3)*

## Second step: taking the lab to the field- framed field experiment

- **Contextualizing** the protocol: (Harrison & List, 2004)
  - Tokens → hectares enrolled
  - Contribution to public good → adoption of low-input practices on ha enrolled
  - Threshold Public good → water quality
- **Enrolling farmers** into the experiment: less risk averse, higher beliefs on others' contributions
- Farmers' contributions higher - Importance of the **first period to signal cooperation**










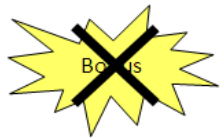





*Limbach, K, Rozan, A., Le Coent P., Préget, R. and Thoyer S., 2022, Can collective conditionality improve agri-environmental contracts? From lab to field experiments, on-going work*

## Third step - Measuring farmers' preferences in the field

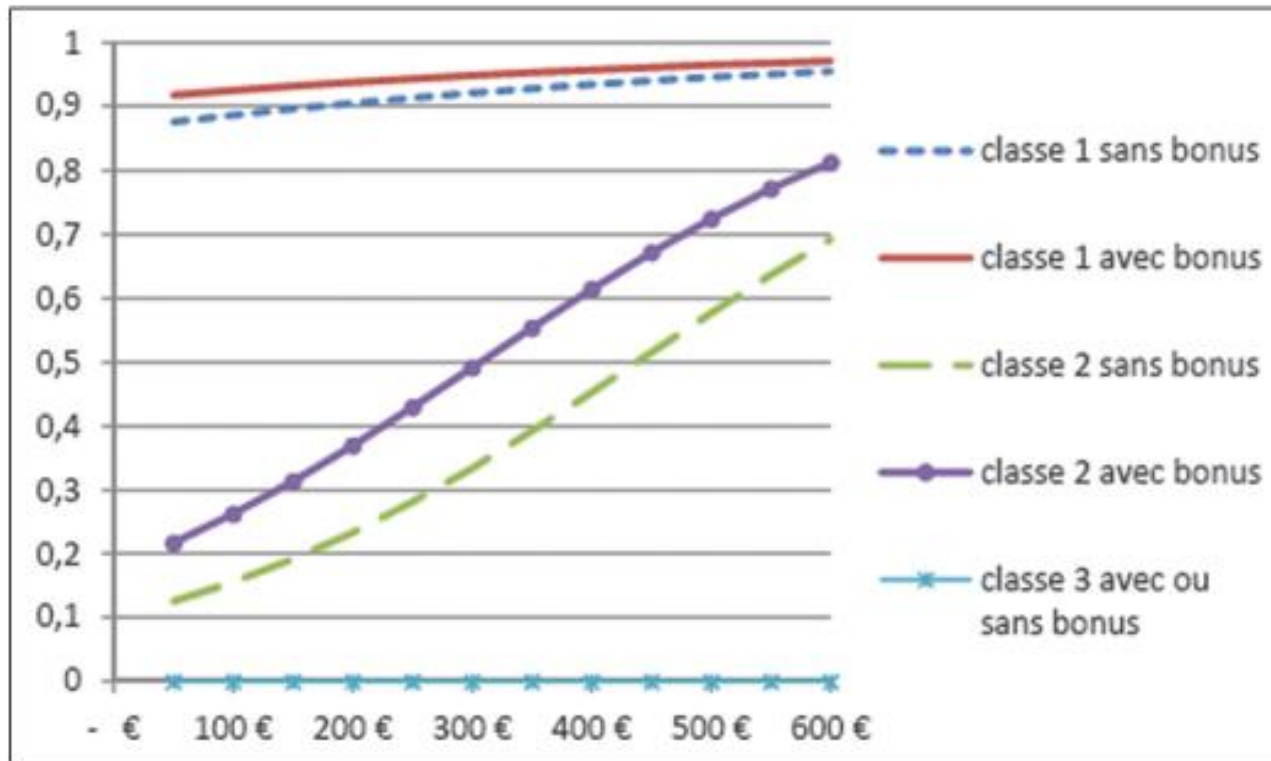
**Question:** would the introduction of an individual bonus paid when a collective participation threshold is attained have a positive effect on farmers' participation, without increasing public expenditures?

**Discrete choice experiment** conducted with 317 winegrowers in the South of France on the acceptability of herbicide reduction contracts

**Attribute: conditional bonus** paid to each enrolled farmer per hectare enrolled, at the end of the 5-year contract **if** 50% of the area of the local vineyard is enrolled in the AES

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

## Adoption probability of a herbicide reduction measure (60%) for 3 classes of farmers



**Interpretation:** Consistent with the hypothesis that farmers are more willing to provide environmental efforts when their neighbours also do so: signal of a social norm?

**Is this result replicable elsewhere,** for other types of changes of practices? Can it be mobilized at larger scale ?

→ Mixed responses (Sumrada et al, 2021)

**Towards RCTs?** (Behaghel et al, ERAE, 2019)

*Kuhfuss, Préget, Thoyer and Hanley, 2016, Nudging farmers to enrol land into agri-environmental schemes: the role of a collective bonus, ERAE, 43(4), 609-636*

## Third example: Supporting small farms differently?










### Why?

- Small farms get little financial support from CAP (ha-based payment)
- But they contribute to the provision of public goods (landscape, biodiversity)
- Public opinion in favour of small farms and more equity in farm payments
- Need for simplification

### Proposal for a simplified payment scheme for small farmers (SFS) in 2014 CAP:

- Lump sum payment of max 1250 € per farm in place of direct payments / ha -
- Self-selection of farmers in the SFS
- Would conditions on wage employment and environmental certification be acceptable instead of the no-condition no-control system, with a higher lump sum payment?

**Lecole P., Préget R. and Thoyer S., 2022, Designing an effective small farmer scheme in France, Ecological Economics, 107229**

	Program 0	Program A	Program B	I prefer to remain in my current situation
Environmental condition				
Employment condition				
Commitment condition				
Lump sum payment	1250€/year	5000€/year	7000€/year	3600€/year

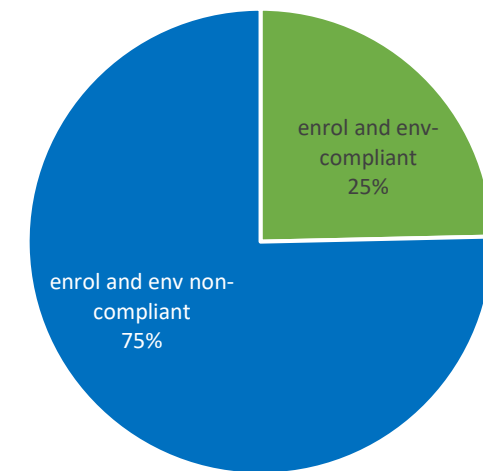
Design set-up with farm union (via campesina in France)  
Discrete choice experiment -Online survey -608 full responses  
But biased sample

## Weighted simulations at the scale of France

	Number of farmers joining the scheme	% of enrollment of total non retired farmers	Additional cost
SFS (1250€/farm/ no condition)	42,673	12%	129 million € (1,87%)
Programme 3000 € /farm and environmental certification	117,938	33%	55 million € (0,79%)

### Reaching policy makers

- Conduct similar experiments in other EU countries
- Simulate enrollment and budgetary costs
- Discuss with DG Agri and Parliament
- A tangible impact? The implementation of a specific support scheme for vegetable growers in France (3ha max and 1588€/ha)



**How can we be better organized as a  
research community to respond to  
evaluation needs?**



# Avoiding pitfalls when communicating results to policy-makers and stakeholders

## Improve quality and replicability of results (Brodeur et al, 2016)

- Publication bias: overestimation of the magnitude of results*
- Imprecision of results due to high signal to noise ratio*

## Be aware of the voltage effect (Al-Ubaydli et al, 2019)

*Treatment effect size diminish when the policy is rolled out at larger scale*

## Learn how to communicate better on results

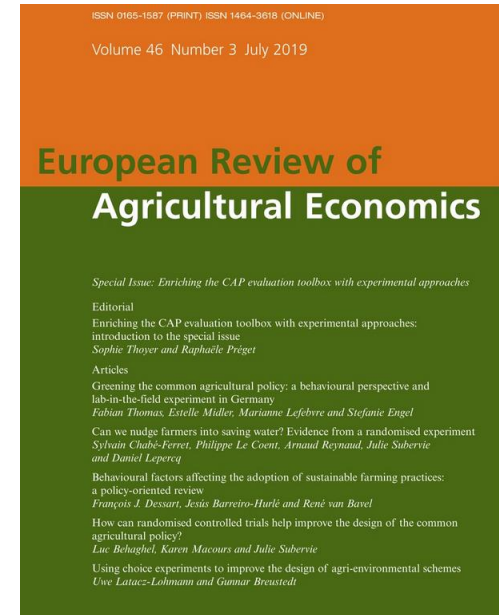
- Confirmation bias of policy makers (Hallsworth et al, 2020)*
- Do lab experiments approximate real life behaviour? (Frigau et al, 2019)*
- Do students behave like farmers? (Peth and Musshof, 2020)*

- Pre-register protocols, share data and code – Ethics approval
- Run replications and publish them (Camerer et al, 2016, Brodeur et al 2016)
- When a result is promising, get organized to check its robustness in different settings and contexts
- Think together on ethical issues related to farmers recruitment and randomization and share proposed solutions (Clot et al, 2018, )
- Conduct meta-analysis (Chabe-Ferret et al, 2018)
- Associate stakeholders and policy-makers to the prediction of results (DellaVigna et al, 2019): helps to identify best research questions and overcome confirmation bias (Hallsworth et al 2020)
- Write policy briefs and share results with policy-makers



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**Economic Experiments as a Tool for Agricultural Policy Evaluation: Insights from the European CAP**

Liesbeth Colen ✉ Sergio Gomez y Paloma ✉ Uwe Latacz-Lohmann ✉ Marianne Lefebvre ✉ Raphaële Préget ✉ Sophie Thoyer ✉



Volume 64, Issue 4  
**Special Issue: Applications of Behavioral and Experimental Economics to Decision Making in the Agricultural, Food, and Resource Sectors**  
December 2016  
Pages 667-694

# Reference list

Al Ubaydli, O., List J. and Suskind D., 2019, The science of using science: towards an understanding of the threats to scaling experiments, Working Paper, 2019-73

Brodeur, A., Lé, M., Sangnier, M., & Zylberberg, Y. (2016). Star wars: The empirics strike back. *American Economic Journal: Applied Economics*, 8(1)

Camerer, C. and Hogarth R., 1999, The effects of financial incentives in experiments: a review and capital-labour production framework, *Journal of Risk and Uncertainty*, 19:1-3,7-42

Cason T. and Wu, S., 2019, Subject pools and deception in agricultural and resource economics experiments, *Environmental and Resource Economics*, 73: 743-758

Clot, S., Grolleau G. and Ibanez L., 2018, Shall we pay all? An experimental test of Random Incentivized Systems, *Journal of Behavioural and Experimental Economics*, 73, 93-98

DellaVigna S., Pope D., and Vivaldi E., 2019, Predict science to improve science, *Science* 366(6464):428-429

Ferraro P., and Shukla P., 2022, Is a replicability crisis on the horizon for environmental and resource economics?

Frigau, L., Medda T. and Pelligra V., 2019, From the field to the lab. An experiment on the representativeness of standard laboratory subjects, *Journal of Behavioural and Experimental Economics*, 78: 160-169

Hallsworth et al, 2020, Behavioural government, Behavioural insight team report, 58 pages

Heckelei T., Hüttel S., Odening M., and Rommel J., 2021, The replicability crisis and the p-value debate – what are the consequences for the agricultural and food economics community? Discussion Paper 2021:2 University of Bonn

Mamime, Fares and Minviel, 2020, Contract designs for adoption of agrienvironmental practices: a meta-analysis of DCE, Ecological Economics, 176, 106721

Peth D. and Musshoff, O., 2020, Comparing compliance behaviour of students and farmers. An extra-laboratory experiment in the context of agri-environmental nudges in Germany, Journal of Agricultural Economics, Vol 71 (2)

## For more general insights into the subject

Herberich, D., Lewitt S., and List, J., 2009, Can field experiments return agricultural economics to the glory days?, American Journal of Agricultural Economics, 91(5), 1259-1265 - proceedings

European Review of Agricultural Economics special issue on « Enriching the CAP evaluation toolbox with experimental approaches », 2019, Vol 46, No 3

Colen, L., Gomez y Paloma S., Latacz-Lohmann U., Lefebvre M., Preget R., Thoyer S., 2016, Economic experiments as a tool for agricultural policy evaluation: Insights from the European CAP, Canadian Journal of Agricultural Economics, Vol 64, No 4, pp 667-694