

# Can Economic Experiments Contribute to a More Effective CAP?

Les expérimentations économiques peuvent-elles contribuer à rendre la PAC plus efficace ?

Können ökonomische Experimente zu einer effektiveren GAP beitragen?

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## How is the CAP evaluated?

The EU budget allocates more than €50 billion per year to support the agricultural sector under the Common Agricultural Policy (CAP). Evaluating the effectiveness and efficiency of the policy means assessing its results against the objectives set, the funds spent, and the policy instruments used. To do so, a Common Monitoring and Evaluation Framework has been developed, and has been applied to both pillars since 2014. It includes a set of rules, procedures and indicators to assess CAP performance. But this framework, and more generally the CAP evaluation toolbox needs to evolve together with CAP objectives and instruments. The switch to decoupled payments requires a change of the unit of evaluation from market to farm, and farmers' behaviour needs to be better understood. Evaluation tools must capture the farm-specific implementation of policies and how different measures influence an individual farmer's strategy regarding farm structure and farming practices. In addition, there is a need to understand the acceptability of and compliance with the increasing number of regulatory constraints. The need to account for psychological drivers is also key for CAP measures based on farmers' voluntary enrolment. Last but not least, the New Delivery Model grants more

discretion to Member States to implement both first and second-pillar payments. This requires more flexible evaluation tools in order to assess local variations of CAP implementation.

Good practices in policy evaluation include making use of the complementarities between different evaluation tools and triangulating the results drawn from different methods. To predict the likely impact of a policy change on farms and markets (*ex-ante* evaluation), simulation models can be used. For example, the Agricultural Policy Simulator (AgriPoliS) can simulate the evolution of agricultural structures (e.g. farm sizes, production system) under different price or policy scenarios. Such computer models must rely on assumptions regarding the behaviour of simulated decision makers, usually assuming that farm agents aim at maximising profit (Appel *et al.*, 2018). On the other hand, to analyse the impact of a measure after its implementation (*ex-post* evaluation), evaluators most often rely on case studies and in-depth interviews with stakeholders, or statistical analysis of farm-level data, including sophisticated techniques to evaluate the true net impact of a measure. We argue in this article that economic experiments, presented below, should be a welcome addition to the CAP evaluation toolbox.

## What have experiments to offer for the CAP evaluation?

Experiments are situations built by the experimenter that allow the study of decisions in controlled and reproducible environments. Participants in such experiments (such as farmers, when CAP measures are evaluated) are allocated to different 'treatments', as in medical trials where patients randomly receive either the medicine or a placebo. By comparing decisions in these different treatments (for example with and without a CAP measure, or alternative designs of a measure), one can assess the effect of the policy and the relative performance of alternative designs.

“ Les expérimentations peuvent fournir des réponses en peu de temps et à un coût bien inférieur à celui des approches par tâtonnement dans le monde réel. ”

The economic experiment spectrum is broad (Thoyer and Préget, 2019). At one end, there are the so-called

Randomized Controlled Trials (RCT) conducted in real settings in which stakeholders take decisions in everyday life with real outcomes in response to a randomly implemented programme or policy, often unaware that they are part of an experiment. Such approaches are already widely used for assessing social, education or employment policies and aid programmes. For example, the 2019 Prize in Memory of Alfred Nobel was awarded to three researchers 'for their experimental approach to alleviating global poverty', including the experimental analysis of interventions in the agricultural sector. RCTs have not been used to evaluate the CAP up to now (Behagel *et al.*, 2019).

At the other end of the spectrum, experiments can be conducted in a laboratory, instead of observing behaviours in a natural setting. Laboratories used for economic experiments are neutral rooms in which participants can make decisions, usually using a computer, individually or through interaction with others, anonymously and in an entirely controlled setting, isolated from potentially disturbing environments (illustrated below). Laboratory experiments are mostly conducted observing participants' choices over decontextualised tasks designed to mimic real-life decisions and to be easily reproduced. Tasks and choices are usually formulated in an abstract way in order to ensure that the results are not influenced by the framing of the experiment. To improve the realism of the tasks, participants receive a payment linked to their decisions in the experiment, recreating the economic consequences of day-to-day decisions.

In between, there is a large diversity of economic experiments, the most relevant to CAP evaluation being 'field experiments', which are very similar to those in a laboratory with the exception that they are conducted with the actual population concerned (such as farmers); these can sometimes include some elements of context. Finally, 'choice experiments' refer to questionnaires in which farmers are presented with a series of different realistic, yet hypothetical, scenarios and are asked to state their preferred choices.

The challenge is to keep a balanced eye on what experiments can do to improve, or complement, other methods used for CAP evaluation. Colen *et al.* (2016) show that while traditional non-experimental approaches perform well in estimating the economic, environmental and social effects of large reforms at the regional or market scale, experiments can complement and enhance these methods in the following ways.

First, experiments are particularly useful for examining the expected effects of new policy proposals or alternative policy designs before implementation (*ex-ante* evaluation). Prior experimentation can help identify improvements in policy design to maximise effectiveness and to avoid unintended outcomes.

Experiments can provide answers in a short time and at a much lower cost than trial and error in the 'real world'. The time necessary to set-up an experiment depends on the type: laboratory, field, or choice experiments with farmers and other stakeholders are relatively rapid to set-up, while RCTs require more time and interaction with various partners.

Second, experiments offer the possibility to isolate the effect of a policy from other factors. By using the control group principle and assigning participants randomly to groups, experiments allow for a better causal inference than observational data studies. Responses to a set of alternative policy designs can be tested, and differences can be attributed to specific elements of a policy.



Farmers protest against the CAP in May 2020, Lyon, France © Sophie Thoyer.

Third, combined with other methods, experiments provide insights into the complex puzzle of farmers' decision-making, which can help refine predictions based on economic models or to interpret results from observational studies. This is particularly relevant when social, psychological and other behavioural factors are expected to be important drivers of the decision-making process, deviating from the common assumption of profit-maximisation. Dessart *et al.* (2020) discuss the growing evidence that understanding and accounting for these factors are key to a transition to sustainable farming systems.

### The potential of experimental approaches for agricultural policy making

The arguments above are not theoretical. Practitioners have walked the talk and we present two examples that illustrate the potential contribution of experimental approaches to the evaluation of agricultural policy measures.

#### Testing a collective bonus in agri-environmental schemes.

The efficiency of agri-environmental schemes (AES) is often questioned, as voluntary participation by farmers has, in many instances, led to low enrolment rates and disappointing environmental improvements. This is the case, for example, with AES that target a reduction in the use of fertiliser. The concentration of phosphorus and nitrogen in surface water must fall below a given threshold to significantly reduce eutrophication risk. Too few contracts signed means that enrolled farmers are paid for their fertiliser reduction efforts, even though the environmental benefit is not obtained because collective efforts are insufficient.

One potential solution is to propose a conditional subsidy system in which farmers receive financial support only if a collective threshold of participation is attained. This policy option would avoid wasting public money when there is no environmental benefit, but it may discourage

participation since farmers are not guaranteed to receive the subsidy.

To test how conditionality of a subsidy affects participation decisions, a first (rapid and cheap) step was to conduct a laboratory experiment using university students (Le Coent *et al.*, 2014). Students had to make decisions on their contribution to a public good (the reduction of fertiliser use) under two incentive systems: half of them were offered an unconditional subsidy paid to all contributors; the other half of the participants were offered a conditional subsidy paid only if the sum of all individual contributions reached a threshold. Results showed that participation rates were the same, on average, and that the conditional subsidy system did not discourage students, at least in the lab context, from contributing to the production of a public good. Of course, students are not farmers, and a choice made in the comfort of a lab may be different from a decision made in real life. Therefore, this first encouraging result had to be tested with farmers, who may behave differently, even if the

underlying decision mechanisms are similar. But, following discussions with policy makers and farm unions, it appeared that conditional payments would be politically difficult to defend. Instead, a variant policy option was tested: achieving a given threshold in the collective enrolment rate of farmers in a given target area would lead to a bonus payment paid to each farmer, on top of his or her agri-environmental contract payment.

This policy option was tested with winegrowers in France for herbicide reduction contracts (Kuhfuss *et al.*, 2016). Farmers responded to a survey in which they had to choose their preferred alternatives among several hypothetical contracts: some of the contracts included the conditional bonus, others did not (see Figure 1). The experiment concluded that the bonus could enhance the scheme's efficiency by increasing the total area under contract. It boosted the enrolment of respondents (in the experiment), even when contract payments were significantly lower. This indicated farmers' preferences for contracts

Figure 1: Alternative scenarios presented to farmers in Kuhfuss *et al.* (2016)

	Alternative A	Alternative B	Current situation
Reduction of herbicide use in proportion of present use <sup>1</sup>	Reduction by 30% 	Reduction by 60% 	
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 the vineyard is engaged <sup>1</sup>	<del>Bonus</del> 	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	
1. Choose your preferred option →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Source: Sophie Thoyer



Setting up a lab for experiments with farmers during a workshop at the University of Giessen, Germany. © Julia Höhler

which encourage the participation of all. This type of experiment has been repeated in other contexts with mixed conclusions, showing that context matters and that solutions must also be tested locally. Another approach could be to organise an RCT, comparing participation rates in randomly selected regions, some offering an AES with a conditional bonus, and others not. The flexibility brought by the new CAP delivery model could allow this type of experimental policy implementation.

**Greening of CAP direct payments post 2020: assessing farmers' responses.** In 2013, the introduction of the 'greening payment' blurred the boundaries between mandatory and voluntary measures, since policy makers considered the set of practices targeted by greening as mandatory, but farmers could voluntarily accept the penalty of losing about 30 per cent of their single payment entitlements by not accepting to implement mandatory greening farming practices. To encourage the uptake of more environmentally-friendly farm practices, the post-2020 CAP policy architecture combines both mandatory (conditionality) and voluntary (agri-environmental and

climate measures) approaches. The former are required in order to receive direct payments, while the latter – if selected by farmers – trigger additional payments. Understanding farmers' responses to this new post-2020 regulation is therefore crucial. The current greening proposal was evaluated *ex ante* using two agro-economic simulation models: CAPRI (Gocht *et al.*, 2017) and IFM-CAP (Louhichi *et al.*, 2018), where farmers were assumed to adopt the mandatory greening practices as if they wanted to avoid losing payments. Evidence from experiments conducted before greening implementation showed that not all farmers had the intention to comply with greening requirements. In an assessment of the current CAP, Schulz *et al.* (2013) identified a significant share of farmers likely to opt-out of 'greening' and voluntarily forgo part of their single payment entitlements. This study highlighted the challenges of ensuring farmers' participation in voluntary measures when up-scaling from the niche nature of agri-environmental schemes. This question is a topical issue for current CAP reform, since the European Commission proposal for the greening architecture adds less demanding eco-schemes as

voluntary measures in the first pillar (reducing the budget available for direct payments) to the more demanding voluntary measures that remain part of the second pillar.

To understand the basic behavioural economic underpinnings in the presence of voluntary or mandatory measures, Thomas *et al.* (2019) carried out an incentivised online experiment. Farmers had to decide how to run a hypothetical farm by choosing the share of their land to farm with environmentally-friendly agricultural practices. The average farmer chose to apply pro-environmental practices on around one-third of the farm and to face the costs associated with this, even in the absence of an agri-environmental regulation. The introduction of a payment for voluntary adopters (like agri-environment-climate measures) increased this share to about two thirds. Interestingly, also the introduction of a conditionality requirement similar to the greening led to a share of land managed with environmentally-friendly practices of about two thirds. Thus, farmers forwent part of the 'green payment' in order to avoid full compliance with stricter environmental regulation. The results in this case suggest that voluntary approaches do not lead to fewer environmental benefits than compulsory approaches.

To go further, Dessart *et al.* (2021) undertook an online-incentivised experiment with 600 farmers from three Member States. They tested the impact on farm environmental performance of different combinations of single farm payments conditional on mandatory practices and payments linked to voluntary enrolment. Results suggest that enhancing the conditionality of direct payments may increase farmers' adoption of environmentally-friendly practices, even though doing so may deter them from enrolling in voluntary schemes. Farmers seem to consider voluntary and mandatory contributions to the environment as close substitutes. However, shifting budgetary



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expenditures to voluntary measures may not necessarily increase total environmental contributions, if voluntary schemes do not entirely compensate for farmers' income losses. This research constitutes a first piece of behavioural evidence on the effect of the newly proposed CAP green architecture on farmers' decisions.

#### Challenges ahead for further contributions to policy evaluation

Although experiments are increasingly applied to a number of agricultural and environmental policy questions, their integration with policy cycles and execution at larger scales remain a major challenge.

#### **Integration in the policy process.**

Experimental approaches need to find their place within the policy evaluation cycle. Results from field and choice experiments are useful to build expectations on farmers' responses to changes in programme modalities (mandatory/voluntary) or new incentive mechanisms

(results-based/group-based). They can also help to predict differences in uptake with different requirements or monetary reward levels. Such experiments can deliver results in a relatively short time, which makes them suitable for *ex-ante* impact assessment. Their design relies on a close collaboration between researchers and policy makers to shape policy instruments.

“ Experimente können in kurzer Zeit und zu wesentlich geringeren Kosten Antworten liefern als Versuch und Irrtum in der realen Welt. ”

RCTs may also be useful in *ex-ante* policy assessment during the pilot phases of a policy: the

new intervention is implemented at small scale and the beneficiaries selected randomly. This allows for evaluation of the policy's causal impact before deciding whether or not to scale up the intervention. But in the CAP reform cycle, small-scale pilots are not foreseen: once new policy instruments are approved, they are implemented simultaneously across the EU. An exception is the use Ireland has made of the European Innovation Partnership for Agriculture Productivity and Sustainability (EIP-AGRI) to test the potential of results-based agri-environmental schemes (<http://burrenprogramme.com/eip-agri-irelands-operational-groups-2019>). A specific protocol on pilot projects, and on politically and ethically acceptable randomisation strategies in programme assignment would be needed for randomised evaluations to be implemented more widely.

**Methodological challenges.** Early experiments used student subjects rather than farmers or landowners.

Laboratory experiments can measure more abstract behavioural responses, they allow more experimental control, and they can also be more easily replicated, thereby significantly enhancing scientific credibility. Because of their lower cost and greater control, laboratory experiments with student subjects are useful to refine experimental designs before they are taken into the field. In contrast, results from experiments with the real decision-makers may not necessarily apply in other locations and timeframes.

However, they are generally preferred, and particularly informative, where the research questions concern specific policies (e.g. programme evaluation), or where researchers are interested in measuring specific characteristics (e.g. risk preferences) of a particular population (Cason and Wu, 2019).

“ Experiments can provide answers in a short time and at a much lower cost than trial and error in the real world. ”

The recruitment of farmers for participation in field experiments remains a major challenge. Unlike short surveys, experiments often require a good understanding of the instructions, which can be time-consuming for respondents, leading to farmers dropping out of the experiment. In such cases, the experimenter may end-up with a biased sample, not representative of the overall population. The risk may be even greater when conducting experiments via the internet, instead of in-person, potentially excluding farmers who lack reliable internet connections, who are not interested in the subject of the experiment or are insufficiently digital-literate.

One can also question how far the choices made by farmers in an experiment, with hypothetical choices and low financial stakes, correspond to real-world decision making. Farmers may perceive the decision task as artificial and may not react in the experiment as they would on their farm. Moreover, their main motivation to take part in an experiment could be to influence the design of CAP payments in their favour. This strategic bias may exist, although it can be minimised through methodological precautions.

Another challenge is the administration of payments contingent on performance, which often involves handling substantial cash amounts or vouchers, posing administrative, income tax, data protection, or other legal challenges. These challenges differ across Member States, further complicating the aggregation of evidence across countries.

**Ethical challenges.** Ethical challenges in experiments often arise from the researcher's need to randomise benefits or to apply treatments without the informed consent of participants. If a treated group receives benefits that a control group does not receive, this may be perceived as unfair by programme managers, policy makers, and farmers. Opaque manipulations of behaviour without the explicit consent of participants may raise questions about the researchers' legitimacy, therefore we highlight the need for researchers to:

- (i) engage in deliberative processes when designing experiments, aligning with open science principles;
- (ii) design experiments and implement practices that can address these ethical challenges (e.g. benefits to the control group may be delayed rather than withheld, obtain informed consent from participants before the experiment and organise debriefing after the experiment);

- (iii) investigate further the overall acceptance of experimental approaches among farmers and other stakeholders (Morawetz and Tribl, 2020).

### Valuable tool in policy development

Economic experiments provide a valuable tool, complementary to observational data or simulation models, to evaluate how farmers will respond to changes in policy design or to new policies. However, additional efforts are needed to establish further proof-of-concept by running more – and more robust – experiments related to the CAP. This can happen only by including these approaches in the design phases of policy making and addressing seriously ethical and practical challenges. To do so, researchers would benefit from a concerted European effort to build a multi-national panel of farmers willing to participate in experiments on a regular basis. Without such critical infrastructure to gather evidence systematically, the risk of blind spots due to a lack of committed researchers and infrastructure in some Member States or biases from non-representative samples may be high. In addition, cross-country efforts are needed to promote this methodology in Member States with little experience in conducting economic experiments, particularly with farmers in the field. Finally, the replication in time and across Europe of experiments can help confirm the stability of results in different contexts. Steps are being taken in this direction in the EU by the Research Network of Economics Experiments for CAP evaluation (REECAP). While such research is supported by the US Department of Agriculture through the Center for Behavioral and Experimental Agri-Environmental Research (CBEAR), there is no equivalent support in the EU yet. Future collaborations between the different stakeholders involved in agricultural policy and researchers will be vital to ensure that economic experiments can find their place in the CAP evaluation toolbox and support the development of a more effective CAP.

## Note

The authors are active members of a European network of experts in experimental methods and the evaluation of agricultural policies, which was set up in 2017: The Research Network of Economic Experiments for CAP evaluation (REECAP). REECAP members conduct experiments and contribute to raise awareness of the potential of these methods for the evaluation of agricultural policies. In particular, we have

worked with the European Commission to facilitate the integration of experimental methods into the CAP evaluation toolbox.

## Acknowledgment

We are grateful to anonymous referees and the Editor John Davis for helpful comments and suggestions. This research was conducted within the framework of the Institute for European and Global Studies Alliance Europa, with funding from the Pays

de la Loire Region (Research-Education-Innovation Program). Jens Rommel has received funding from the European Union's Horizon 2020 research and innovation program under grant number 818190.

## Disclaimer

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

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# Summary

## Can Economic Experiments Contribute to a More Effective CAP?

 In order to keep pace with the evolution of the objectives and means of the EU's Common Agricultural Policy, evaluation tools also need to adapt. A set of tools that have proved highly effective in other policy fields is economic experiments. These allow the testing of a new policy before its implementation, provide evidence of its specific effects, and identify behavioural dimensions that can influence policy outcomes. We argue that agricultural policy should be subject to economic experiments, providing examples to illustrate how they can inform CAP design. We identify the additional efforts needed to establish further proof-of-concept, by running more – and more robust – experiments related to the CAP. This can happen only by integrating experimental evaluation results within the policy cycle and addressing ethical and practical challenges seriously. To do so, researchers would benefit from a concerted European effort to promote the methodology across the EU; organise the replication in time and across Europe of experiments relevant for the CAP; and build a multi-national panel of farmers willing to participate in experiments. Steps are being taken in this direction by the Research Network of Economics Experiments for CAP evaluation (REECAP).

## Les expérimentations économiques peuvent-elles contribuer à rendre la PAC plus efficace ?

 Face à l'évolution des objectifs et des moyens de la politique agricole commune de l'Union européenne, les outils d'évaluation doivent également s'adapter. Les expérimentations économiques sont un ensemble d'outils qui se sont avérés très efficaces dans d'autres domaines d'action des pouvoirs publics. Elles permettent de tester une nouvelle politique avant sa mise en œuvre, fournissent des informations sur les effets spécifiques de cette politique et identifient les dimensions comportementales qui peuvent influencer ses résultats. Nous soutenons que la politique agricole devrait être l'objet d'expérimentations économiques et fournissons des exemples pour illustrer comment celles-ci peuvent éclairer la formulation de la PAC. Nous identifions les efforts supplémentaires nécessaires pour établir d'autres preuves de concept, en menant des expérimentations liées à la PAC plus nombreuses - et plus robustes. Cela ne peut se faire qu'en intégrant les résultats des évaluations expérimentales dans le cycle de la politique et en s'attaquant sérieusement aux défis éthiques et pratiques. Pour ce faire, les chercheurs bénéficieraient d'un effort européen concerté pour promouvoir la méthodologie à travers l'Union européenne ; organiser la réplication dans le temps et à travers l'Europe d'expérimentations pertinentes pour la PAC ; et constituer un panel multinational d'agriculteurs désireux de participer à ces expérimentations. Des mesures sont prises dans ce sens par le Réseau de recherche sur les expérimentations économiques pour l'évaluation de la PAC (REECAP).

## Können ökonomische Experimente zu einer effektiveren GAP beitragen?

 Um mit der Weiterentwicklung der Ziele und Maßnahmen der Gemeinsamen Agrarpolitik (GAP) mithalten zu können, müssen auch die Evaluierungsmethoden angepasst werden. Eine Methode, welche bereits in anderen Politikbereichen sehr effektiv eingesetzt werden konnte, sind ökonomische Experimente. Diese bieten die Möglichkeit, eine neue Politik vor ihrer Umsetzung zu testen. Sie liefern Erkenntnisse über ihre spezifische Wirkung und identifizieren Verhaltensbereiche, die die Ergebnisse der Politik beeinflussen können. Aus unserer Sicht sollte die Agrarpolitik Gegenstand von ökonomischen Experimenten sein. Wir zeigen anhand von Beispielen, wie diese zur Gestaltung der GAP beitragen können. Darüber hinaus weisen wir auf zusätzlich Anstrengungen hin, die für einen weiteren Machbarkeitsnachweis erforderlich sind, nämlich die Durchführung von mehr - und robusteren - Experimenten in Bezug auf die GAP. Dies kann nur durch die Einbindung von experimentellen Evaluationsergebnissen in den Politikablauf und die ernsthafte Auseinandersetzung mit ethischen und praktischen Herausforderungen umgesetzt werden. Um dieses Ziel zu erreichen, wäre es für die Forschung sinnvoll, wenn eine konzertierte europäische Initiative die Methode in der gesamten EU verbreiten würde. Die Initiative müsste auch die zeitliche und europaweite Wiederholung der auf die GAP bezogenen Experimente organisieren. Des Weiteren müsste ein multinationales Panel an Landwirtinnen und Landwirten aufgebaut werden, die bereit wären, an den Experimenten teilzunehmen. Schritte in diese Richtung werden bereits vom Forschungsnetzwerk für Ökonomische Experimente für die GAP-Evaluierung (REECAP) unternommen.