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# APPROACHES TO RESEARCH IN SUPPORT TO AGRICULTURAL POLICY: THE EXPERIENCE OF THE CAP-IRE PROJECT

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**Abstract.** The Common Agricultural Policy is the main agricultural policy in Europe and one the main chapters of the European Union's budget. It has been subject of several studies, also due to its continuous reform process. The objective of the paper is to present and discuss the approach of the project CAP-IRE and to derive insights from such experience in view of the present perspectives for agricultural policy.
After outlining the present trends and perspectives in the CAP and reviewing the main methods used in the literature to provide policy support, it turns to an illustration of the contents of the project CAP-IRE, its methods and organization.
Some selected results of the project are illustrated, by considering two overarching issues, i.e. the exit mechanisms and farm-household innovativeness. The paper closes with a discussion of the strengths and weaknesses of the approach and an account of the main research needs identified for the future.

**Key words:** Common agricultural policy, policy evaluation, CAP-IRE

## INTRODUCTION AND OBJECTIVES

The Common Agricultural Policy (CAP) is the main agricultural policy in Europe and the main chapter of the European Union's budget. Since its implementation started at the beginning of the 1960s, it has been subject to continuous reforms. In view of the end of the present programming period (2007–2013) a further reform process has been activated to design the new instruments that will cover the post-2013 period. The issues at stake in this reform have been outlined by the recent communication by the EU Commission (672/2010 "The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future").

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Due also to this continuous reform process, as well as for the relevance for EU agriculture and rural economy, the CAP has been widely studied. In particular, a recent wave of research has been stimulated by the perspective of this upcoming reform.

The project CAP-IRE is a project funded under the 7th Framework program of the EU Commission. The objective of CAP-IRE is to develop concepts and tools to support future CAP design, based on an improved understanding of the long-term socio-economic mechanisms of change in rural areas.

The reaction of farm households to CAP reforms is analysed under the lens of six thematic, and one cross-thematic, viewpoints: 1) farm structural adjustment, investment and innovation; 2) chain interactions between agriculture and related economic sectors; 3) environmental sustainability; 4) social sustainability; 5) interactions between rural communities and the rest of the world; 6) farm and rural governance issues; 7) the interplay between the previous aspects.

The objective of this paper is to describe the approach adopted in the CAP-IRE project, present selected results from the project and, based on this, outline some evaluation of the pros and cons of the approach and highlight relevant issues for future research.

This paper relies heavily on project deliverables, available on the project website www.cap-ire.eu, and, in particular, on Viaggi et al. [2010], that provides a summary of project contents, settings and results.

## ISSUES AND METHODS IN THE EVALUATION OF AGRICULTURAL POLICIES

Rural areas represent 93% of the territory in EU-27. Twenty per cent (20%) of the EU-27 population live in predominantly rural areas and 38% live in significantly rural areas [European Commission 2006]. Thinly populated areas have a higher ratio of retired to working population (30%) compared to densely populated (24%), a lower percentage of highly educated people (18% against 28%). However, the employment rate does no differ remarkably on average (Eurostat 2007). Despite the "recent" emphasis on diversification and rurality as opposed to "agricultural", agriculture is still one the characterising components of rural areas. Households are traditionally a major component of agriculture and rural areas. In the EU, the family labour force is about 16 million workers, contributing with about 76% of the total agricultural workforce.

The CAP is the main policy addressing agriculture and rural areas in the EU. According to the Treaty of Rome (art. 33), the objectives of the CAP are: (a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour; (b) thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture; (c) to stabilise markets; (d) to assure the availability of supplies; (e) to ensure that supplies reach consumers at reasonable prices.

The Lisbon Strategy emphasises the objectives of growth and jobs. It also focuses on territorial cohesion objectives and the relevance of the territorial approach. "The guiding principles for the contribution of the Common Agricultural Policy (CAP) to the Lisbon

Strategy were set by the European Council in Göteborg in 2001 and confirmed in the Lisbon Strategy Conclusions in Thessaloniki in June 2003: 'Strong economic performance' that goes hand in hand with 'the sustainable use of natural resources'. These principles have shaped recent CAP reforms." (from DG AGRI website http://ec.europa.eu/agriculture/lisbon/index_en.htm)

The CAP also has a clearly stated role in the EU territorial cohesion policy. In particular: "The first pillar of the Common Agriculture Policy and the support it provides to farmers also has important territorial impacts through the activities and incomes it maintains in rural areas and through the promotion of sound land management" [European Commission 2008].

The CAP is now the main chapter of EU expenditure and represents a major driver in rural areas. In addition, since the beginning of the 1990s, the CAP has directly addressed rural development through specific measures now aggregated under the so-called second pillar. The last decade has witnessed two major reforms of the CAP (Agenda 2000 and 2003 reforms). In addition, at the end of 2007, the European Commission undertook the Health Check process. This has reinforced the route already taken with the 2003 reform, with a further move towards the transfer of payments from the first to the second pillar, and the reinforcement/rationalisation of cross compliance in view of the increasingly recognised threats due to climate change [European Commission 2008a, b].

The most recent view about the future CAP is given by the Communication form the European Commission COM 672/2010 ([European Commission 2010] "The CAP towards 2020: meeting the food, natural resources and territorial challenges of the future" (November 2010).

The document evaluates that the current debate agrees on the need of a strong Common Agricultural Policy, structured around three main strategic aims: a) Preserve food production in Europe in times of increasing food needs and recently experienced food crisis; b) Support farming communities that guarantee quality and diversity of food, produced sustainably; c) Maintain viable rural communities in which farming is a core economic activity creating local employment.

According to the Commission, a budgetary decrease of EU agricultural support would have negative effects in terms of overall economy, employment and environmental management.

Three main policy options are envisaged for the post-2013 CAP: a) enhanced status quo; b) more balanced, targeted and sustainable support; c) abolition of market and income support.

The second option would include a focused restructuring of the first pillar payment around four main components (income support, horizontal environmental measures, less favoured areas and coupled support to locally relevant products). The latest option would include a re-focusing of the CAP on the provision of public goods by agriculture.

A number of different methods and approach are used to evaluate agricultural policies. A review of the main approaches is provided by Viaggi et al. [2011], that also describe how different methods fit different evaluation issues. Among the available methods, modelling tools and survey based analyses of stated intentions are gaining a growing space in the literature and show particularly suitable to assess new policy instruments and radical changes. Modelling methods are now widely used and differentiated in terms of scale of

application and approach used. A review of models used at large (e.g. EU) scale is provided in Gohin [2006], while Janssen and van Ittersum [2007] provide a review of farm to regional scale models. The main issues with modelling are connected to the number of behavioural assumptions needed and often to the inability to calibrate the model in a convincing way against the observed behaviour. Stated intentions are also widely used in the literature on economic and social phenomena and form the basis for the widely adopted techniques used to detect preferences in economics and marketing (i.e. choice experiments). Fujii and Gärling [2003] discuss the essence of attitude theory, namely that it is possible to predict actual behavior from stated intentions, and review the conditions which enable one to judge the robustness of such predictions. According to attitude theory, and empirical data, behavioural intention is a better predictor of behaviour than any other measures [Fishbein and Ajzen 1975; Ajzen 1991]. Bougherara and Latruffe [2010] provide a short review of the literature concerning the use of stated intentions in studying farmers' reactions to policy changes. This study generally corroborates the idea that stated intentions reveal the actual behaviour in a relevant share of cases, though they also discuss studies in which the stated intentions correctly predict the actual behaviour in less than half of the cases.

## THE APPROACH OF THE PROJECT CAP-IRE

The project CAP-IRE addresses the wide issue of the role of the CAP in rural economies. In order to do that, the project's approach develops from the policy background and from the available literature, in which a variety of methods are proposed to assess policy effects, adopting the explicit strategy of using a mixed-methods approach aimed at exploiting complementarities of different tools. The CAP-IRE methodological approach is illustrated in Figure 1.

As the main idea of the project is to study future tendencies in rural areas and how the CAP affects such tendencies, the project relies mainly on surveys using stated intentions approaches. The main component of the project following such approach is survey A, using a common questionnaire in 11 Case Study Areas (CSA) in 9 countries and finally providing 2363 usable observations (farm-household interviews). This survey was prepared through a smaller but more detailed survey (survey B) aimed at scoping and selecting key questions and issue, which provided 55 interviews with the same coverage of countries and CSAs. Results of survey A are then submitted to statistic and econometric analysis to explain key behaviours in a thematic perspective related to individual WPs in the project, hence separately addressing: 1) farm structural adjustment, investment and innovation; 2) chain interactions between agriculture and related economic sectors; 3) environmental sustainability; 4) social sustainability; 5) interactions between rural communities and the rest of the world; 6) farm resilience and rural governance issues.

In parallel to this analysis, also more specific exercises have been carried out under the label of "in-depth analyses". These are differentiated by thematic area, each using different methods to be applied in different CSAs, in order to provide specific insights on a selection of locally relevant issues. This includes simulation tools, such as mathematical programming, as well as additional surveys examining specific behaviours and attitudes on more focused topics (e.g. input provision).

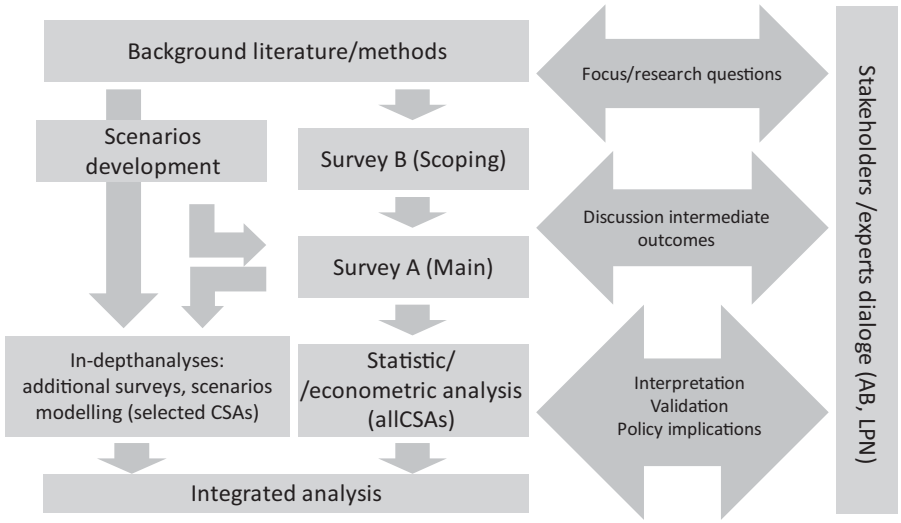


Fig. 1. CAP-IRE methodological approach
Rys. 1. Schemat metodologiczny projektu CAP-IRE

Source: CAP-IRE project.
Źródło: Projekt CAP-IRE.

As the project looks at the future, a scenario exercise was needed to build a background to both survey and modelling exercises. Rather simplified scenarios were used in the surveys to collect reactions to different future by farmers, while more elaborated scenarios were used in the in-depth analysis as an input to modelling.

In parallel to this workflow, the project benefited of a continuous interaction with stakeholders, providing inputs to focusing research questions, on-going reactions on intermediate results, interpretation and validation of final results, and support to the discussion of policy implications.

In the following paragraphs, three main components of the methods used are further discussed: a) scenario analysis; b) Survey A; c) in-depth analyses.

The scenario analysis was developed on two levels.

For the purposes of the survey A, in which scenarios supported the collection of stated intentions, two simple and extreme scenarios were developed:

- A baseline scenario based on the CAP as it was implemented in 2009 (time of the survey).
- A NO-CAP scenario assuming the complete removal of the CAP starting in 2013.

For the purposes of the simulations exercises in the in-depth analysis, four main scenarios were considered:

A. Baseline scenario: CAP continues in the current form.
B. Liberalisation scenario: The CAP is completely abolished starting in 2013.
C. Regionalisation scenario: after 2013 the CAP budget is reduced by 50% from current levels, while the relative importance of pillar1 and pillar 2 remains as in baseline.
D. Environment scenario: after 2013 the CAP budget is reduced by 50% from current levels, while the relative importance of pillar1 and pillar 2 is reversed.

Two of the scenarios – Baseline and No Cap – can be considered as the same as those used in the Survey A of the project. Details of scenarios, background documents and motivations are available in Cristoiu et al. [2009].

The main survey ("Survey A") contained questions concerning farm/household characteristics, patterns of change in a baseline scenario (present CAP) and reactions to an extreme "NO-CAP scenario" [Majewski et al. 2011]. The main sampling features of survey A are summarised in Table 1.

Table 1. Survey A – Sample features
Tabela 1. Sposób gromadzenia danych w Survey A

| CSA | Number of interviews (farm-households) | Way | Response rate |
|---|---|---|---|
| 1. Emilia-Romagna (Italy) | 300 | Telephone | 62% |
| 2. Noord-Holland (Netherlands) | 300 | Postal | 21% |
| 3. Macedonia and Thrace (Greece) | 300 | Telephone/Face to face | 55% |
| 4. Podlaskie (Poland) | 249 | Face to face | 95% |
| 5. North East of Scotland (UK) | 168 | Telephone | 68% |
| 6. Andalusia (Spain) | 201 | Face to face | 75% |
| 7. South-East Planning Region (Bulgaria) | 273 | Face to face | 92% |
| 8. Centre (France) | 140 | Face to face | 35% |
| 9. Midi-Pyrénées (France) | 155 | Face to face | 31% |
| 10. Lahn-Dill-District (Germany) | 117 | Postal | 20% |
| 11/1 Ostprignitz-Ruppin/ /North-East Brandenburg (Germany) | 160 | Postal | 15% |
| Total | 2363 | | |

Source: CAP-IRE project.
Źródło: Projekt CAP-IRE.

The sample was selected by random methods from the list of beneficiaries of CAP payments in each CSA, with appropriate stratification according to the features of each area. The survey was carried out mostly between April and June 2009, with some latest interviews up to September 2009. More details about sample characteristics and descriptive outcomes are given in Raggi et al. [2010] (D2.13-23). Further information about the individual CSAs is available from Deliverables D2.1-12 of the project.

Analyses of survey A included statistical and econometric analyses to explain the determinants of the current direction of change and the impact of the CAP concerning: a) exits form farming; b) farm size and structural change; c) innovation; d) chain connections; e) labour use; f) input use; g) resilience, networking and governance structures.

In depth analysis were carried out using different methods in different areas to address specific complementary issues compared to survey A. In particular, in-depth analyses included:

- Real option models simulating technology adoption in Emilia Romagna (IT), Midi-Pyrénées (France), Podlaskie (Poland), Noord-Holland (Netherlands), South-East Planning Region (Bulgaria).
- Spatial tracking analysis to explore the linkages between farm households and their immediate local economy in North East Scotland (United Kingdom), Podlaskie (Poland).
- SAM-based analysis to capture linkages between farm households and the regional economy in North East Scotland (United Kingdom).
- Indicator-based analysis (Driving forces-Pressures-State-Impact-responses – DPSIR) in Andalusia (Spain).
- Scenario analysis based on multi-criteria decision making in order to assess the impacts of different policies on social indicators in Macedonia and Thrace (Greece), Andalusia (Spain), South East Planning Region (Bulgaria).
- New institutional economics to represent connections between different households and different issues in North East Scotland (United Kingdom), Noord-Holland (Netherlands), South-East Planning Region (Bulgaria), and Centre (France).

## KEY RESULTS AND INSIGHTS

We now turn to discuss some of the main results of the project considering three main components of such results: a) the straight results of the main survey; b) the identificaiotn of determinants of future behavior through econometric analyses; c) the results of scenario simulation through mathematical modeling.

The main outcome of the project are the results generated in survey A; a summary of such results under baseline and no-CAP scenario is provided in Table 2.

The main figures show a relevant trend towards households exiting from the farming activity in the baseline (–25%). Against such tendency, the removal of the CAP would bring an exit of further 30% of the farms, showing the importance of such policy for the continuation of farming activities. In addition, while the farms exiting in the baseline represent a negligible share of the sample in terms of land (7%) and labour, the farms that would leave if the CAP was removed would account for about 30% of both land and labour. Land reallocation would occur mainly through selling (growing in the no CAP scenario) and renting out.

As for the other parameters, the majority of farms that would continue would have no change (50 to 80% in most cases). However, a relevant share would show increases of resource endowment, with a rather higher amount in the baseline. The cases for which increases are most frequent are machinery endowment and land renting-in, letting alone increase in animal reared, which tendency to increase is however emphasised by the fact that the total is represented by livestock farms only. On the contrary, innovation adoption and the legal status of the farm show the lower changes in the baseline.

The removal of the CAP would have most frequently a negative effect on the willingness of increasing the selected parameter by those staying in farming. The most relevant effects (drop of intended increase) are related to machinery endowment and animal rearing. On the contrary, “increase in the use of credit”, “involvement in other activities”

Table 2. Summary of survey A results under Baseline and no-CAP scenario
Tabela 2. Podsumowanie wyników dla Survey A w scenariuszu „baseline" i „no-CAP"

| Variable | Baseline | No-CAP | Difference (No-CAP--Baseline) |
|---|---|---|---|
| Percentage of farm households that would continue farming | 76% | 45% | –30% |
| Share of land operated by those exiting farming | 7% | 31% | 23% |
| Percentage of those exiting that would sell the farm | 31% | 40% | 8% |
| **Percentage of those continuing that…** | | | |
| …would increase household labour on farm | 22% | 19% | –4% |
| …would increase non-household labour on farm | 21% | 15% | –5% |
| …would increase owned land | 27% | 19% | –8% |
| …would increase land rent in | 29% | 19% | –9% |
| …would increase the number of animal (only farms with animals) | 44% | 31% | –13% |
| …would increase other activities | 15% | 18% | 3% |
| …would increase the use of fertilisers and pesticides | 12% | 10% | –2% |
| …wold increase farm endowment of machinery | 32% | 15% | –17% |
| …would increase the use of credit | 16% | 25% | 10% |
| …would change who they sell their product to | 14% | 14% | 0% |
| …would increase the production under contract | 17% | 14% | –4% |
| …change the legal status of the farm | 9% | 8% | –1% |
| …adopt robotization/precision farming innovation | 14% | 9% | –4% |
| …adopt energy/energy crop innovation | 22% | 19% | –3% |
| …adopt e-commerce innovation | 8% | 10% | 2% |

Source: Raggi et al. 2010, based on Survey A (2363 observations, all CSAs).
Źródło: Raggi i in. 2010 na podstawie Survey A (2363 obserwacji, wszystkie regiony badań).

and "adoption of e-commerce" would apply to a higher share of remaining farms if the CAP was removed.

Altogether, the contribution to avoid exists seems to be the main role of the CAP; however, it also reveals non-neutral with respect with farm selection and changes.

An analysis of determinants of different farm reactions is provided in Table 3, with reference to two key elements of the future of f farm-households: decision to exit the farming activity and attitude to innovation.

The table shows that a number of classical variables (age, farm size, etc.) remain key determinants of the studied behaviour. Age and farm size are particularly important for exits, while structural adaptation and organisational variables seem to be more affected by a variety of determinants. It is relevant to note that location, particularly with reference to Eastern Europe has a major role in structural change and innovation.

Selected results from scenario simulation are summarised in Table 4.

Table 3. Analysis of determinants from thematic WPs
Tabela 3. Analiza determinantów z poszczególnych obszarów roboczych

| Dependent variable | Model type | Baseline | | No-CAP | |
|---|---|---|---|---|---|
| | | Positive effect | Negative effect | Positive effect | Negative effect |
| Decision to Exit (1) | Logit | Age<br>Land rent out | Advisory services<br>Selling products to private<br>Land owned<br>Live on farm<br>Number of Household members<br>Part time worker | Age<br>Land rent out<br>SFP per farm<br>Sell to other farms | Land owned<br>Land rent-in<br>Live on farm<br>Number of household members<br>Percent of household income from farming |
| Number of innovations (2) | Zero inflated multinomial logit | Location in Plain<br>Location in Hill<br>Number of full time equivalents<br>More than 50 ha UAA<br>Unemployed<br>SFP payment higher than 1000 euro<br>Mediterranean<br>High level of education Rent in land form relatives<br>Part time worker<br>Age | Less 10 ha UAA<br>Specialisation cows<br>Specialisation grazing livestock<br>Age<br>Location in Eastern EU<br>More than 50% of income from farming | Number of full time equivalent<br>Total land operated<br>North Location in northern EU<br>Household activities<br>Use of advisory system<br>Contracts for selling products<br>Part time worker<br>Age<br>Low level of education | Less than 10 ha UAA<br>Specialisation grazing livestock<br>Specialisation mixed crop and livestock<br>Specialisation mixed livestock<br>Age<br>Location in eastern EU<br>More than 50% of income from farming |

Sources: Mishra et al., 2010; Bartolini et al., 2010.
Źródło: Mishra i in.2010, Bartolini i in. 2010.

Table 4. Summary of scenarios simulations (% of farm adopting the innovation)
Tabela 4. Podsumowanie scenariuszy symulacji

| Case | Baseline | No-CAP | Subsidiarity (regionalisation) | Environment |
|---|---|---|---|---|
| Real option models simulating adoption of Methane digester in Emilia Romagna (IT) | 0% | 0% | 0% | 2009–2013: 0%<br>2014–2020: 4% |
| Concentration in livestock and robotisation in dairy farm Podlaskie (Poland) | 0% | 0% | 2009–2013: 0%<br>2014–2020: 1% | 2009–2013: 0%<br>2014–2020: 12% |

Sources: Bartolini et al., 2010.
Źródło: Bartolini i in. 2010.

The results are derived from real options models simulating selected innovations in Italy and Poland under different policy scenarios. The models allow to generate information about the farm-household behavior under changing external conditions, and, in particular, under policy change. The selected results reported here show that neither the baseline, nor the No-CAP scenario would stimulate technology adoption, compared to the intermediate scenario. The main advantage of intermediate scenarios is that they provide for an increase of funds addressing investment on farm, of which farm-household can benefit. They also show the relevance of taking into account timing, as the selected innovation (in the case studies reported) would be likely adopted after 2013, when the new policy setting would become clear to the farmers.

## DISCUSSION AND CONCLUSIONS

The main strength and weaknesses of the project are directly connected to the methods used. In particular, surveys of stated intentions about the future have the strength of bringing direct perceptions elicited by the concerned actors, but rely on the ability of the methods to collect realistic perception, avoiding misunderstandings about future policy options and strategic behavior. The combined use of survey and models allow however a cross-checking of the main results, bringing strength to the overall messages arising from the project.

The main policy conclusions arising from the results of the project CAP-IRE highlight the relevance of the CAP, and, as a consequence, corroborate political perception of a need to maintain a strong policy in agriculture. At the same time, they highlight the complexity of policy effects and somehow encourage to review the policy currently in place in the direction of a higher finalization of its instruments.

In terms of needs for further scientific research, that are the main focus of this discussion, the project suggests a variety of future avenues, due also to the large number of thematic fields addressed. Some of the main topics emerged are discussed below.

First, the project has shown once again how difficult it is to understand the links between farms and rural areas, in particular due to the lack of available data regarding the economic environment of farms, and the difficulties in modeling such links, even when data are collected through surveys. Accordingly, the study of the interplay between farms, farm-households and rural areas through their multiple social and economic connections remains a key issue in supporting evidence-based policy for agriculture and rural areas.

A key topic here is the process of farm exit, which is itself a complex issue which needs to be understood beyond the mere reduction in the number of farms, and requires a more focused analysis. For example, a key issue is how land is reallocated and if land re-allocation is virtuous (e.g. in terms of farm size and innovation) or rather a vicious process (e.g. in terms of land abandonment)? Also, the new perspectives encourage in going beyond the historical issue of exits and to look rather to the mechanisms of entry into the sector and entrepreneurship.

A second key topic concerns the complex and evolving modes of farm governance, including ownership and leasing, but also taking into account all sorts of contractual and ownership connections with the networks in which farm-households are more or less embedded.

A third issue, in connection with the previous one but also related to the growing market volatility concerns the way the resilience of farm households and rural areas to changes in the social and business environment can be improved.

The research also highlights data needs and their limitations. The results suggest that there is a case for extending the existing FADN (Farm Accountancy Data Network, the EU-wide network collecting accounting information on farming) survey by adding additional questions on farm household purchasing and sales decisions, similar to those included in the USDA ARMS (the Agricultural Resource Management Survey carried out regularly in the USA).

Finally, in terms of research directly related to policy evaluation and design, there is a need for a better understanding of the interplay between the different components of the CAP with respect to farm behavior but also environment and social output expected. For example, as the environmental issue is concerned there seem to be a contrast between the positive effect of the CAP in supporting environmentally friendly practices and the negative effect of stimulating the use of polluting inputs; the unit reduction of pollution vs. production increases due to support; the interaction between cross-compliance and agri-environmental schemes.

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## BADANIE WSPARCIA POLITYKI ROLNEJ – DOŚWIADCZENIA Z REALIZACJI PROJEKTU CAP-IRE

**Streszczenie.** Wspólna polityka rolna jest jedną z głównych polityk UE i dominującą pozycją we wspólnotowym budżecie. Z powodu swojego znaczenia jak też zachodzących zmian jest ona od pewnego czasu obszarem zainteresowań licznych badań ekonomicznych. Głównym celem opracowania jest prezentacja wybranych wyników projektu CAP-IRE w zakresie perspektyw wspólnej polityki rolnej. Po przedstawieniu aktualnych trendów i możliwych kierunków rozwoju wspólnej polityki rolnej zaprezentowano strukturę, metody i organizację projektu CAP-IRE. Wybrane wyniki zostały przedstawione przez odniesienie się do dwóch najistotniejszych kwestii, tj. obecnie istniejących mechanizmów i możliwych do wdrożenia innowacji. Opracowanie kończy się dyskusją nad silnymi i słabymi stronami zastosowanego podejścia i identyfikacją głównych potrzeb badawczych na przyszłość.

**Słowa kluczowe:** wspólna polityka rolna, ocena wspólnej polityki rolnej, projekt CAP-IRE

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