



## Farmers' stated preference analysis towards resources use under alternative policy scenarios

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### ABSTRACT

This paper considers farmer's stated responses to CAP scenarios, identifies the extent to which these plans would be influenced by the introduction of CAP abolishment from 2014 and considers the implications in terms of likely changes (i.e. increases or decreases in the deployment of chemicals and water resources on the farm). The analysis uses data from a large sample survey of household farmers across 11 case studies in 9 EU countries. Intended responses of farmers to the CAP scenarios are analysed by means of logistic regressions. The results indicate that CAP abolishment would not stimulate strong agricultural changes in resource use, rather it appears to be reinforcing many existing trends, namely towards decreasing chemical use and steadying water use. However, CAP abolishment would impact unevenly on the farm community and different farming situations are associated with different types of reaction. In addition, significant regional differences have been found according to the model regression. Indeed, in the case of New Member States, farmers show a greater preference to decrease chemicals and water use if the current CAP support was abolished. On the basis of the results presented in this paper some policy implications emerge.

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### Introduction and objectives

The application of large amounts of mineral and organic fertilizers in intense agricultural regions of Europe contributes to excessive nutrient loads in soils, and water bodies. For instance, the contribution of agriculture to nonpoint source pollution of surface water is estimated to be 55% for the European Union (Volka et al., 2009). Average fertilizer consumption in the EU-15 is 174.1 kg ha year<sup>-1</sup>. This high application rate of fertilizers, combined with its often inappropriate use, generates a surplus of nitrogen in the soil of 83 kg N ha year<sup>-1</sup> (OECD, 2008). Although nutrient balance in Western Europe has usually experienced reduction trends in the past decade (Parris, 2011) consumption is still far above the early 1960s levels, while in Eastern Europe the rates are increasing slightly (Baldock et al., 2002).

Furthermore, the danger of pesticide pollution in both surface and groundwater is listed. In effect, while recent trends indicate that the pressure from farming on water quality is diminishing absolute levels of pollution remain among the highest across many OECD countries<sup>1</sup> (Parris, 2011).

Additionally a continuing increase in irrigation areas and the introduction of less adapted crop species are both responsible for the unsustainable pressure coming from agricultural water use in Europe (Massarutto, 2003). This can reach as much as 80% of total water use in Mediterranean river basins (Berbel et al., 2007; Dworak et al., 2007).

On the other hand, it should be mentioned that the same areas experienced decreasing agricultural intensity in recent years (EC, 1998; Zebisch, 2002; Westhoek et al., 2006; Parris, 2011). Such trends are not only influenced by general driving forces like macroeconomic developments and demographic changes but also by policy instruments such as the Common Agricultural Policy (CAP) with also the support of agro-environmental measures (Rossing et al., 2007), or by the implementation of environmental programs such as the European Environmental Directive (e.g. Nitrates Directive 91/976/EEC, Water Framework Directive 2000/60/EC).

Decoupling was included as a key strategy in the last CAP reform (2003) in order to reduce incentives to production, which in turn could reduce the agriculture pressures on the environment. The idea of decoupling is to make the subsidies independent of crop production therefore it is likely that the overall intensity of farming will decrease as there are less economic incentives to produce high-yield crops (Andersson, 2004; Interwies et al., 2006). However, while the agricultural policy has changed from production orientation into the forms of payment decoupled from production, there is little evidence that farmer's behaviour has also adjusted

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<sup>1</sup> For instance France and Italy account for 52% of total pesticides consumed in the EU-15 in 2002–2003, and show out of 26 OECD countries the highest amounts.

towards a reduction in input use, namely fertilizers and pesticides, and water resources. Although the payments were to be decoupled from production decisions, they were effectively re-coupled to a basic land management requirement and so would continue to have an impact on land management decisions and inevitably, production (Lobley and Butler, 2010).

A few studies in recent years have attempted to assess empirically the impact of CAP decoupling on farm, taking into account the farmer's reaction towards chemical and water use. Some exceptions come from the researches carried out by Bonfiglio (2011) with reference to the use of fertilizers and pesticides for arable farms in a central region of Italy, and Dos Santos et al. (2010) which focus on farmer's attitudes regarding water at a micro-regional level in Portugal. The first author estimated by means of neural networks a reduction in the use of fertilizers and pesticides of 20% under current decoupled payment, meanwhile complete removal of direct payments as an alternative to a decoupling regime would produce a decrease in the consumption of fertilizers and pesticides of more than 40%. On the other hand, results of the analysis of farmer's reactions using the theory of planned behaviour in the case of water use, found that farmers are not sensitive to CAP changes (Dos Santos et al., 2010). This was justified because that group of farmers had quite similar production structures and production systems and all of them came from the same region. Indeed, the main shortcoming of these studies arises from the relatively small areas analysed, with quite similar farm structures and specializations, while some findings may be case-specific.

Studies concerning the influence of 2003 CAP reforms on farm structural change (Douarin et al., 2007; Tranter et al., 2007; Geniu et al., 2008; Gorton et al., 2008; Lobley and Butler, 2010) including investments and adoption of innovations (Gallerani et al., 2008; Viaggi et al., 2011), or land idling due to decoupling from production (Bougherara and Latruffe, 2010) are available instead. As a whole, farmers' reactions to policy reforms emerge to be rather modest or at least more modest than expected. Essentially, independent behaviour on CAP change (i.e. farmer's plans do not seem to be influenced by CAP decoupling) is related to farm size, farm ownership and land tenure, specialization, as some productive sectors receive little assistance from the CAP (i.e. pigs and poultry), farmer's age and membership of a farmers' union. At the same time, location in a LFA (Less Favourable Area), low level of formal education and farmers from the New Member States (NMS) recognize its dependency on CAP reform.

Although previous experiences with decoupling were generally expected to have slight effects on farmer's decisions, other examples, where policy packages including area payments unrelated to production decisions were implemented, leading to the necessity to consider issues such as socio-economic farmer's features, institutional environment such as regional policies, as well as farm assets or location for an understanding of farmers' responses to policy changes (Dos Santos et al., 2010). This is also important in taking into account the last enlargement of the European Union to the NMS where the introduction of the CAP payments from 2004 constituted an important increase in the payments received by farmers (Douarin et al., 2007). How farmers in the NMS view EU agricultural policy and the nature of their behaviour is thus of great importance for predicting the future chemical and water use of an enlarged EU. While there has been some research on the attitudes of key agricultural policy actors in Central and Eastern Europe (Slangen et al., 2004), to date evidence on farmers' attitudes and their behavioural intentions in the NMS has received little attention. Indeed, Gorton et al. (2008) studied the farmer's structural reactions to decoupling in five European States (France, Lithuania, Slovakia, Sweden and England) and found that the behaviour of farmers varies significantly between states in the enlarged EU due to the different historical traditions of farming and incidence of support. However,

influence on farmer's decisions concerning chemicals and water use was not investigated.

In light of this the main objective of the paper is to consider farmers' stated reactions to CAP scenarios and identify the extent to which these intentions would be influenced by the introduction of a CAP change starting in 2014. In particular the stated responses are analysed in order to stress the influence of a CAP abolishment on the farmer's decision to use more or less resources (i.e. chemicals and water) on farm. In addition, the paper seeks to identify whether there are any significant variations in the pattern of farmer response associated with key structural and socio-demographic variables. Indeed, determinants of farmer's stated behaviour under different policy scenarios are evaluated using logistic regressions.

This paper draws on the CAP-IRE<sup>2</sup> project carried out during 2008/2010 that established a scenario hypothesis with two extreme states of CAP policy: (i) a baseline scenario of the CAP framework in year 2009, that includes the current (2009) level of payments plus the already planned measures such as milk quota abolition at year 2015, as well as the decoupled scheme and cross-compliance as currently implemented, and (ii) a scenario assuming a complete abolition of all CAP instruments.

The elicitation of the farmer reaction to a hypothetical CAP withdrawal is based on stated behaviour.

The material is a sample of 1328 farm-households located in 9 EU countries (The Netherlands, The United Kingdom, Germany, France, Italy, Spain, Greece, Poland and Bulgaria).

For Poland and Bulgaria, the payment in place was the Single Area Payment Scheme (SAPS). SAPS was started in Poland and Bulgaria in 2004 and provided payments attached to land. However, payments were differentiated according to specific categories of crops (Viaggi et al., 2011).

The second component of the CAP, the so-called Pillar II is rather more complex. First, it is composed of various measures organized into three axes plus the Leader one, with each measure having a specific territorial application. Secondly, some measures are specially designed to provide compensatory payments for disadvantaged areas. In spite of this articulation, we do not consider the separate effect of each policy component but rather stick to the overall effect.

In the context of scientific debate this research attempts to (i) prove whether current decoupled schemes will not affect farmer's decisions on chemical inputs and water resources by the 2020 horizon; alternatively if the CAP removal will influence farmer's behaviour towards an increase or decrease in the use of these resources; (ii) given the large survey carried out by 9 European States, this research gives the opportunity to test CAP influence across the broad context of the last EU enlargement.

The remainder of the paper includes a description of materials and methodology in "Materials and methods" section, "Results" describes the main results and finally "Discussion and concluding remarks" makes some discussions and concluding remarks.

## Materials and methods

This section aims at providing a general description of samples and developing a framework analysis of intended farmer's responses to alternative CAP scenarios.

### Data source and collection

In the spring of 2009, a questionnaire to farm-households across 9 member states of the EU was applied and a dataset of 2363

<sup>2</sup> Assessing the Multiple Impacts of the Common Agricultural Policies on Rural Economies ([www.cap-ire.eu](http://www.cap-ire.eu)).

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