



The effects of changing regional Agricultural Knowledge and Innovation System on Italian farmers' strategies

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ABSTRACT

The aim of this paper is to identify and assess the role played by innovative extension services in affecting farmers' strategy. More specifically we implement a multivariate probit model to evaluate the effects of different types of extension services introduced by a reform in the domain of Agricultural Knowledge and Innovation System (AKIS) in Italy. The results show that both generalist and specialized services could play a major role in farmers' value creation strategies. They also confirm that different strategies for creating value are jointly implemented. Finally, they show that a further improvement in the quality of public provision of extension services within regional AKIS and a greater (systemic) interaction between farmers, rural actors and local networks should be supported.

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1. Introduction

Over the past decades the Agricultural Knowledge and Innovation System (AKIS) has been mainly organized by public agencies. More recently, several policy interventions have sought to reform AKIS, introducing elements of privatization and decentralization (Rivera, 2008). This has been particularly evident in the European context (Laurent et al., 2006; Labarthe, 2009), where interest in AKIS reform and its impact on farmers' strategies has been rekindled by the debate surrounding EC Regulation 1698/2005 on rural development. Accordingly, each regional AKIS is supposed to stimulate European farmers to achieve more complex and broader objectives, such as more sustainable management of their businesses (Council of the European Union, 2005). Moreover, all member states have to reform their regional AKIS to align them with Europe's overall rural development strategy.

In the literature on AKIS reform the emphasis has recently been laid mainly on the tendency to privatize and/or de-centralize public extension services in different agricultural systems (Qamar, 2005; Knickel et al., 2009; Swanson and Rajalahti, 2010). In contrast, the way farmers re-act to AKIS reform and how this reform impacts their overall strategies still remains puzzling and not completely addressed in this research domain. Indeed some studies analyzed the

impact of AKIS reforms for example on farmers adoption of innovations (Wadsworth, 1994; Leeuwis and Van Den Ban, 2004), agri-environmental outcomes (Morriss et al., 2002), sustainable use of natural resources (Fujisaka, 1994), market performances (Dinar et al., 2007) and risk management (Pennings et al., 2005; Isengildina et al., 2006). Their main results indicate that the potential effect of AKIS reform on farmers decision-making lies in its organization, for example in the way extension services are provided to farmers (Kidd et al., 2000; Morriss et al., 2006). However, only a minority of them analyzed in more details the links between the use of different types of extension services and farmers' strategies (Kidd et al., 2000; Klerkx and Leeuwis, 2008; Knickel et al., 2009).

The objective of this paper is to cover this gap and therefore to better understand the effects of AKIS reform in promoting innovation and impacting on farmers' strategies. Methodologically speaking we decided to evaluate these effects via a case study approach and implementing a discrete choice modeling such as the multivariate probit model. In this way we directly analyzed the effects of an AKIS reform on the strategies made by a selected group of farmers (443) in a region of central Italy (Marche). Despite other papers our approach allowed to control for combination of different strategies and to analyze potential synergies or trade-offs between them.

The paper starts by reviewing the relevant literature on the role of the AKIS in setting farmers' strategies (Section 2). In Section 3 we discuss our conceptual model on AKIS reform. In Section 4 we present the content of the Marche Regional Administration (MRA) reform and evaluate the effects on farmers' decision making

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processes. In Section 5, using data from the case study, we implement a multivariate probit model to represent the farmer's choice. The main results of the model are presented in Section 6 and further discussed in Section 7. In the final section some concluding remarks are provided.

2. Literature review

2.1. Traditional models of organizing AKIS

In a traditional perspective AKIS is considered as a tool for enhancing productivity and competitiveness of the agricultural sector by accelerating the rate of innovation adoption (Holt and School, 1985). This system has often been defined as the “linear process” of innovation transfer (Godin, 2006; Knickel et al., 2009). The linear model is limited to a mechanism where new products and processes are conceived within the research and/or education systems and transferred to *farmers* and *other rural actors*. In this model, AKIS is mainly organized by public agencies or by other support systems, such as farmers' organizations and input suppliers (Rivera et al., 2005; Knickel et al., 2009).

The linear model is closely linked to the (material) goals given by society to agriculture (Holt and School, 1985). These goals are mainly related to what have been defined by rural sociologists as the “modernization” paradigm of agriculture² (Van der Ploeg et al., 2000, 2002). In this paradigm the role of AKIS is to provide a service to facilitate technological changes (Holt and School, 1985). This mechanism is based on the idea that, regardless of the socio-economic, institutional, environmental and organizational characteristics of the farming system, a transfer of knowledge would produce a profit-enhancing technological change for farmers (Stephenson, 2003). The cost of this model is completely or largely externalized on society (taxpayers). AKIS is mainly organized as a system of hierarchical organizations, regardless of the specific needs of the single farmers, and mainly responds to power signals (i.e. from policy-makers and/or bureaucrats) rather than price (market) signals. Thus the rate and direction of innovation and technological change in the agricultural sector and in rural areas are hugely conditioned by public-funded hierarchies (bureaucracies) which were lacking in terms of bottom-up feedback (Kidd et al., 2000). Within this model innovations are mainly incremental (what rural sociologists call first-order innovations) rather than radical (second-order innovations) (Brunori et al., 2008).

2.2. From linear to systemic models of innovation transfer

When industrialized societies, such as Western Europe, started to re-conceptualize the role of agriculture, a new paradigm gained consideration. In this paradigm the sustainable use of natural resources, creation of public goods, equity and food quality are considered increasingly as providing value for society (Brunori et al., 2008). Local traditions and cultural values, for example, have started to be a new potential sink of resources for generating value if properly used by farmers. According to this model, AKIS has also become a more complex concept which implies systemic rather than linear relationships between the stakeholders involved

² The paradigm of modernization has been defined also as the “productivistic” model since it has two types of goals: (a) from a society perspective agriculture provides foods and fibers according to a set of public standards based on the reduction of negative externalities, trade-distorting support and the increasing of food security and safety commitments; (b) from a private point of view (e.g. farmers) the goals are mainly related to the (continuous) increase in productivity and efficiency of factors (namely land, labor and capital) used in the production process, subject to two types of constraints namely compliance with public standards and the fulfillment of customer requirements. For a further discussion the reader can also refer to Brunori et al. (2008) or Knickel et al. (2009).

(Knickel et al., 2009; Labarthe, 2009). In this sense farmers have become increasingly sensitive to innovation opportunities not only related to technology changes, but also related to strategy, marketing, organization and management (Labarthe, 2009). Many new actors now have a role within the innovation adoption mechanisms (Labarthe, 2009). In this new paradigm the AKIS centralized model provided by the linear adoption system is substituted by a more de-centralized, privatized and demand-led model (Qamar, 2005; Rivera, 2008).

3. Conceptualizing the effects of AKIS on farmers' strategies

In this new AKIS model the effects that information and knowledge provision have on farmers' strategies have been greatly amplified (Brunori et al., 2008; Knickel et al., 2009). We propose a conceptual framework which takes this mechanism into account by adopting what rural sociologists have termed the “multifunctional model of European agriculture” (Van der Ploeg et al., 2000, 2002). This model is based on the idea that, starting from conventional activities, such as the production of food and fibers, farmers can move towards different paths for creating value, such as diversifying their activities³ (Van der Ploeg et al., 2002). In this model the role of AKIS is much more complex than in the “traditional” one (Godin, 2006; Knickel et al., 2009). With the adoption of the multifunctional perspective, value creation is not only due to the capacity of improving the production efficiency of standardized foods and fibers, but also aims to extract value from a larger number of activities and transactions. In this model, differentiation rather than specialization is a key element (Brunori et al., 2008). Following this perspective we analyze the most common type of AKIS described in the literature and referred to the European context. In this way we try to formulate hypotheses on the influence they have on farmers' strategies (Table 1).

We classify different types of extension services first according to the content and/or type of activities they should promote (*content-wise dimension*). Then we consider the level of decision making they mainly work at (*decision-making dimension*). Finally, we indicate the type of participation they require from the involved stakeholders, namely whether they are based on single-farm participation, group or collective action, or mixed (*participatory-dimension*).

Content-wise, we distinguish between three types of services pointed out in the literature with different names but that we can generally define as (i) *assistance and consultancy services* (ACS), (ii) *dissemination, information and animation services* (DIAS) and (iii) *specialized services* (SAS) (Rivera, 2008; Swanson and Rajalahti, 2010). ACS play a major role in different steps of the value creation mechanism by mainly affecting the farmer's decision-making process at the level of strategy adoption and development. A typical ACS is a service oriented towards (a) process innovation (e.g. quality management, collective and/or private labeling, technological innovation transfer, sustainable practices management, animal welfare management), (b) supply planning and management (marketing, food chain networking, non-farm activities networking, legal assistance), (c) multifunctional activities

³ Van der Ploeg et al. (2002) identified three main “directions” in defining farmers' strategies: (i) they refer to *deepening* strategies when agricultural activities are transformed, expanded or re-linked to other actors and agencies in order to deliver products entailing more value added per unit (Van der Ploeg et al., 2002, p. 12). Organic farming, high-quality and regional products, and short-supply chains are typical examples. (ii) When the “rural side of farm enterprise might be reorganized and amplified” they talk about a process of *broadening*. Examples are agri-tourism, new on-farm activities, diversification, and nature and landscape management. (iii) Finally a process of “mobilization of resources” defines a strategy of *re-grounding* of farmers' activities, such as seeking off-farm income and introducing low input agriculture.

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