

Agricultural Activities, Rural Areas and Natural Environment: Drawing Up the Frontiers of the Multifunctionality Concept

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Abstract

The chapter provides a discussion of some relevant issues concerning the concept of multifunctionality and its application to the field of agriculture. The first section presents the positive approach of multifunctionality, which refers to supply-side aspects of agricultural activities. The second section deals with the normative approach, which supports the Model of European Agriculture. The last section presents some key elements for building an analytical framework bound to evaluate the multifunctional dimension of agricultural public policies.

Keywords: multifunctionality; agricultural policy; sustainability; model of European agriculture

1 Introduction

Multifunctionality has been a successful object of scientific research as the contribution of van Huylbroeck et al. (2007) recently proves. Initiated in

the economic sphere of international institutions like the OECD, the FAO or the EU, the thinking over this concept has gradually spread over to other disciplines (sociology, ecology, agronomy ...) what has widened its initial scope.

Applied to the field of agriculture, multifunctionality accounts for the fact that the former is an economic activity that produces various non-commodity outputs (NCOs) to society which are associated with a wide range of benefits, such as environmental benefits (recreational amenities and aesthetic values of the rural landscape, non-use values of biodiversity and habitat protection, intrinsic values of ecosystem and watershed functions) and socio-economic benefits (food security, food safety, animal welfare, rural employment and the viability of rural areas, cultural heritage) (Hediger 2004).

More recently, multifunctionality has been a key element in the debate over the definition of agricultural policies at the international level in combination with arguments concerning the introduction of public support programs (Garzon 2005; Glebe and Latacz-Lohmann 2007). One main issue has been to look at a better accommodation of the agricultural policies with the rules of the WTO. In this respect, the search for a shared framework for analysing and implementing domestic policy aimed at non-trade functions of agriculture has been the starting point of an academic research process on the multifunctionality concept. From this viewpoint, the debate on multifunctionality has moved progressively from a trade-related question to an issue connected with rural development concerns.

Those debates have led to two visions of agricultural multifunctionality that have, in turn, given rise to two distinct analytical approaches. According to the first one, supported by the OECD, multifunctionality is a property of the agricultural production process, which attaches a set of social and environmental functions to the farming production. That vision has set the basis for the positive approach of multifunctionality.

At the same time, other international organisations like the FAO or the EU have suggested their own vision of the agricultural multifunctionality. Beyond the multifunctional feature of agricultural activities and land use that are intrinsic, they recognise that multifunctionality can be a target of public policy at national, regional or international levels, which may support the sustainable development of rural areas. This conception has given rise to the normative approach of the multifunctionality and has attracted the attention of other academic fields than economics.¹

¹ See Le Cotty et al. (2004) for a general survey about the European research referring to multifunctionality.

The positive approach allows analysing the rationality of agricultural policies by addressing their economic efficiency regarding the provision of non-commodity outputs (NCOs). On the other hand, the normative approach favours the analysis of policies which take the agriculture as a central element of the sustainable development of rural areas, while putting aside some of the issues concerning their efficiency (either addressed in terms of provision costs or with respect to trade distortions).

An *ex ante* assessment of multifunctionality-promoting policies may however probably require to combine those two approaches (Mahé 2001) and to build a specific, analytical framework for a better understanding of the issues at stake.

The chapter is organized into three sections. The first section presents the positive approach of multifunctionality, which refers to the supply side aspects of agricultural activities. The second section deals with the normative approach, which supports the Model of European Agriculture. This model tries to find a new balance between social, spatial and ecological dimensions. In addition, it encompasses the interlinked objectives of farmers and society with respect to the production, territorial, and social aspects of multifunctionality. The last section presents some key elements for building an analytical framework of this concept regarding agriculture. In particular, the questions about the relevant scales (space, time) to retain for implementing public policies or assessing the environmental sustainability of rural areas (through adequate indicators) are discussed. The chapter concludes with some further developments on these topics.

2 A Positive Approach of Multifunctionality

According to OECD (2001, p. 8), which subscribed to this approach, “the key elements of multifunctionality are: (i) the existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture; and (ii) the fact that some of the non-commodity outputs exhibit the characteristics of externalities or public goods, with the result that markets for these goods do not exist or function poorly.” More precisely, “Multifunctionality refers to the fact that agriculture, besides satisfying the basic demand of food, fulfils at the same time other functions society requires, such as biodiversity, pollution control, amenity values, cultural heritage, food safety, rural settlement and retention of economic activities in less favoured areas”. Accordingly, commodity outputs (COs) refer to the satisfaction of material needs, while non-commodity

outputs (NCOs) to the satisfaction of other needs expressed by the society (Belletti et al. 2002). Furthermore, the fact that some of the NCOs exhibit the characteristics of externalities and public goods may require a public intervention to provide the quantity demanded by the society for such goods (Cahill 2001).

2.1 Multifunctionality and Jointness

The first and main aspect of multifunctionality refers to the question of the jointness between COs and NCOs. Originally (Boisvert 2001), joint production refers to a technical link between the productions of two outputs. In the case of agriculture, the multifunctional feature of the production process arises from the biophysical link that supports the production of different outputs. Based on a list of several joint NCOs in agriculture [employment, food security, landscape, biodiversity, environmental quality (soil, air, water), cultural heritage...], empirical investigation about the relationships between COs and NCOs brings some useful insights (Casini et al. 2004).

Firstly, characterising the links between the productions of COs and NCOs (i.e. the degree of jointness) provides clear results only when the NCO are connected to negative externalities. Let us take the example of an agricultural process, which is associated to water pollution and soil erosion. Then, a higher production of the CO would bring about an increase in the level of water pollution and/or soil erosion, whose magnitude would depend on the features of the jointness considered.

Secondly, even if multifunctional effects are generally associated with positive externalities (Glebe 2003), jointness may cover both goods and bads (undesirable outputs). For example, waste and rural amenities may be jointly produced with the commodity output. Yet, when negative and positive externalities are overlapping, characterising the jointness of the agricultural production process may be a difficult task to carry through. In general, the production of the NCOs increases with the production of the CO, except in some cases where the production of the CO has reached a threshold beyond which the production of NCOs may decrease (Vatn 2001).

Moreover, given the mutual influence that the productions of the NCOs may have on each other, some conflicts may occur between social functions (employment and rural viability) and environmental functions of agriculture. For example, (partial) decoupling will in general bring about a fall in employment in the farming sector (directly or indirectly because of

the weakening in competitiveness) at least if no measure is decided upon to compensate for the lower production of the COs (von Huylenbroeck 2003).

Finally, the analysis of jointness may be useful if we want to assess to what extent the non agricultural provision of NCOs which are demanded by the society may be implemented, or, in other words, if we want to evaluate a possible decoupling of the production of the NCOs from that of the COs. The answer may not be a technical but an economic one.

If the jointness between the two productions is strong, the agricultural activity will be the only way to provide the NCOs (von Huylenbroeck 2003) and then subsidies for supporting this provision are justified. Otherwise, the NCOs may be provided by other economic activities than agriculture. However, even if the separation of the production of the COs and of the NCOs is technically feasible, there may be potential economies of scope in the joint provision of COs and NCOs (implying that the joint production will be cheaper than a separate production of these outputs (Casini et al. 2004).

To conclude, if both negative and positive externalities have to be considered in accounting for the multifunctional characteristics of agricultural activities, it is only in the case where negative externalities prevail that a significant relationship between NCO and COs can be established (loss of biodiversity, water pollution from nutrients and erosion, threats to animal welfare, irrigation-related problems, greenhouse gas emissions). There is not as much a consensus when positive externalities are considered. It follows that it is important to emphasize the technical linkages between the NCOs and the COs and the relationships between the production factors which give rise to such linkages (Ferrari 2004; Blandford et al. 2005). In addition, as jointness is implemented at a farm level, the quantity of the NCOs depends on specific farm practices, systems or technologies. It ensues that elements, which are exogenous to the production process, contribute to define the conditions in which the jointness takes place.

2.2 Multifunctionality, Externalities and Public Intervention

A second relevant element of multifunctionality within the positive approach is related to the externality and public good characteristics of the NCOs. Externality may be defined as an unintended side effect of the agricultural activity. The reason why we have to discuss externality and public good aspects together is that externalities alone are not necessarily a

source of market failure. It can be shown that only externalities with public good characteristics require policy intervention. Indeed, the economic inefficiency, which is associated with these externalities, arises only when there is a gap between the marginal social cost and the marginal private cost.

Market failures associated with externalities occur when there is no market, which can be established to trade the externality between the producers and the consumers. In this context, the market price of the CO serves as an indicator of the provision cost of the NCO. Depending on the level of social demand for this externality, the production of the agricultural good may result in an under provision of the NCO. Public intervention then becomes necessary. However, it is important to analyse public good aspects of externalities in order to define the nature of public intervention, since the latter depends on the kind of the former. Depending on the degree of excludability and rivalry they are associated with different kinds of public goods may be defined. A good is non-exclusive if it is physically or institutionally (e.g. through laws) impossible, or very costly, to exclude individuals from consuming the good. A good is non-rival when one unit of the good can be consumed by one individual without diminishing the consumption opportunities available to others with respect to the same unit. Pure public goods are goods that meet both of the criteria while private goods are defined by the existence of excludability and rivalry properties. Impure public goods lie in-between and are classified according to the degree of excludability and rivalry we may associate with them.

On this basis, public intervention may face different operational constraints that we briefly describe as follows.

Firstly, even if the public authority decides to provide pure public goods, it is often difficult to estimate people's true willingness to pay for those goods (i.e. the marginal values that they will attribute to them). There is therefore a substantial risk of policy failure associated with the over- or underestimation of the willingness of the society to contribute to the provision of a pure public good.

Secondly, for excludable but non-rival goods, private provision may be sustained by user fees. But, in this case, efficiency losses may occur as the private providers will take only the people who can pay the price of the public good (based on the provision cost) into account, and ignore all other users whose willingness to pay is positive but inferior to this price. However, it may be that the impact of market failures would be smaller than the one caused by policy failures associated with public provision. Indeed, private provision could at least force users to reveal their true

willingness to pay, what is often difficult to obtain in the case of public provision.

Finally, new institutional practices have recently emerged in connection with the provision of the NCOs by agriculture. Direct transactions between producers and consumers have been observed for COs stemming from environmental-friendly, agricultural processes (OECD 2005).

3 The Normative Approach of Multifunctionality: The Model of European Agriculture

Within the normative approach, agriculture is given the objective of fulfilling certain functions for the society. In this respect, multifunctionality is not merely a feature of the production process but becomes a policy objective in itself. In this context, societal demand refers to various entities: on the one hand there is the agricultural product and its characteristics while, on the other hand, stay the farm, the landscape and the rural areas. Multifunctionality also involves various stakeholders. Within the Earth Summit of Johannesburg in 2002, stakeholders have been defined as people who have an interest in a particular decision, either as individuals or representatives of a group. The definition of multifunctionality, which is implicitly adopted here, does not presuppose any specific definition of the common good or of specific objectives. It is open to the full range of societal needs and demands without passing a value judgment on their desirability. It is only when the content of the related policies will be defined that it will be possible to precise the outlines of what is meant by a multifunctional agriculture.

Connected to this vision, the Model of European agriculture (MEA) was introduced into the terminology of the Common Agricultural Policy (CAP) with the Agenda 2000 reforms at the end of the 1990s. It is based on the suggestion that European farming provides multifunctional side effects which are generally associated with positive attributes and may include food security, food safety, animal welfare, cultural landscape, biodiversity and rural development (Glebe 2003).

The CAP is a widely debated policy, notably with respect to its budget and its instruments. It has evolved from its initial objectives, which were set out in Article 32 of the Treaty of Rome. Those were to increase agricultural productivity, to ensure an equitable income for farmers, to stabilise agricultural markets, to ensure the availability of food and agricultural products and to guarantee reasonable prices for consumers. Forty five years later, the perspective has changed on the objectives that the CAP has to follow: competitiveness rather than productivity is the

guideline, the supply of food by agriculture must not only be abundant and affordable but also healthy and safe, markets must still be kept stable but essentially for food security reasons (Gomez and Atance 2004). The rise in the public awareness of the importance of maintaining rural communities has probably been one of the main driving forces in the recent evolution of the CAP in 2003. As a result, agriculture must not only provide an adequate income for farmers but also respond to its social and territorial dimensions. Furthermore, in the course of the past few decades, knowledge of and concern for the environment have also increased substantially in Western Europe that has brought about seeking an adequate management of the relationship between agriculture and environment.

A first key element of the reformed CAP is a single farm payment for EU farmers, which is independent from the production level (decoupling). This payment is made contingent upon the respect of different standards (regarding environment, food safety, animal and plant health and animal welfare) as well as the requirement to keep all the farmland in good environmental conditions (cross-compliance).

In addition, the 2003 reform has given to the rural development policy bigger financial support. This policy referred to in Agenda 2000 as the second pillar of the CAP, includes special environmental measures, known as agri-environment measures. According to the latter, subsidies are granted to the farmers which commit to go beyond good agricultural practices. They constitute an important environmental policy instrument, being compulsory in all rural development programmes and based on a voluntary commitment by farmers to a greener agriculture (European Commission 2005). They also convey the idea that farmers have a tremendous responsibility for the sound management of environmental resources and that this responsibility must be valued.

This rural development policy is also a relevant tool for creating the conditions of a sustainable farming. Sustainable agriculture means ensuring that future generations can enjoy the benefits of Europe's unique environmental heritage and natural resources, as the current generation does today. Achieving sustainability faces three challenges: an economic challenge which goes through strengthening the viability and competitiveness of the agricultural sector; a social challenge through improving the living conditions and economic opportunities in rural areas; and an ecological challenge through promoting good environmental practices as well as the provision of services linked to the maintenance of habitats, biodiversity and landscape (Casini et al. 2004). For the farmers involved, the concern for sustainability means having to take both the effect that their activities will have on agriculture in the long run and how the technological processes they use shape the environment into account.

To conclude, within the Model of European Agriculture, the multifunctional approach considers a wide range of services going from those related to the agricultural sector and land use to those, which concern the society as a whole. In this context, Gomez and Atance (2004) consider that the CAP requires two kind of corrective actions from the part of the policymaker: first, the optimal identification of public objectives which have to be achieved and, secondly, a suitable choice of policy instruments to be implemented. These aspects are shared by the recommendation lastly suggested by the OECD for policies aiming the multifunctionality of agriculture (OECD 2007).

However, we must recognize that, so far, EU and regional policy makers have lacked tools to assess the impact of multifunctionality-oriented measures. In this perspective, the next research agenda would have to go further on the relationships between agriculture, landscapes and societal demand.

4 An Analytical Framework for Assessing the Impact of Multifunctionality Oriented Policies: The Sustainability Issue

The multifunctional dimension of the EU's Model of European Agriculture contributes to the objective of sustainable rural development, by reducing negative externalities and providing NCOs, which are backed by societal demand. Such a mechanism is built upon a connection of supply and demand side aspects of multifunctionality. In this respect, two main points have to be addressed: first, the linkages between CO and NCOs outputs in agriculture; second, the question of the change in the spatial scale (from a farm to a landscape level).

Up to now, and since the notion of externality refers to the origin of the NCOs but not to the scope of the impact of agricultural activities on NCOs, assessing the impact of public intervention in this domain may be hampered by specific, operational constraints. Indeed, as agricultural externalities are not traded on a market, they do not have any observable monetary value. Therefore they cannot be used as an indicator for NCOs, which are demand-oriented. Usually, according to the positive approach of multifunctionality, the demand is estimated through the willingness to pay. To this aim, economic valuation methods are based on the preferences of economic agents who enjoy the public good.²

² For more details, see OECD (2001).

But, while the supply of NCOs depends on the farm activity, the different beneficiaries, are not necessarily attached to this spatial level, nor are the values that they attribute to the NCOs. For example, as far as food safety and food security are concerned, the consumers of foodstuffs are the principal beneficiaries of these services that they attach directly to the farm activity and value accordingly. On the contrary, for all landscape functions like the safeguarding of the biodiversity and ecological functions, to which the farm activity also contributes to, the beneficiaries are mainly the residents and/or visitors of the region considered, which attach the corresponding landscape amenity values to a larger spatial area than the farm. It ensues that, as far as the demand evaluation is concerned, we have to distinguish between agricultural multifunctionality when the non-commodity output becomes one attribute of the food product from landscape multifunctionality when the non-commodity output is considered at a larger spatial level than the production level (Casini et al. 2004).

In addition, farmer's activities have to be considered as joint productions of NCOs: it is for instance the case of an agricultural landscape to which a kind of biodiversity may be attached. Up to now, however, conventional economic valuation methods go through drawing up monetary indicators for NCOs taken separately but not for joint NCOs, which may arise from multifunctional activities (like agriculture). Thus, these conventional methods may be not appropriate to correctly evaluate multifunctionality-oriented policies (Bonnieux 1998).

Moreover, existing methods are applicable only to assess the impact of public intervention for well-understood landscape functions (recreation, rural amenity values). In this respect, de Groot (1992) stresses that it is likely that there are many environmental functions that have not been discovered but that may have significant socio-economic importance. While some landscape functions are not yet completely well understood such as biodiversity and habitat, others like regulation functions operating at the level of ecosystems are increasingly relevant in connection with the climate change (floods and droughts notably) (Wiggering et al. 2006). Since landscape functions rely on the states, structures and processes of ecological systems, it would be more relevant to adopt proper, scientific knowledge of landscape functions in order to define the concept of landscape multifunctionality. This raises also the necessity to address the concept of multifunctionality within an interdisciplinary approach of landscape (crossing the pure economic and ecological ones).

Furthermore, a global approach of landscape functions may also contribute to a sustainable development of rural areas. For this purpose, social sciences try to deal with societal needs and expectations by asking users and stakeholders directly. On this basis, a list of the landscape

functions expected at the regional level could be drawn. However, in order for such a list to be used for the specific problem of the sustainable development of rural areas, three issues would have to be solved.

Firstly, a relevant selection from the list must be performed that meets the information needs of all stakeholders (local population, non local population, farmers). This is the sectoral and normative/governance dimension.

Secondly, it has to be checked whether the way the landscape functions are specified in the analytical framework fits the problem at hand. This point is related to the spatio-temporal and descriptive-factual dimensions.

Third, it must be sure that no relevant function is missing that may be specific to the local region at stake.

Thereafter, a set of indicators is necessary to link the societal demand and the dynamics of land use.

Finally, depending on the objective assigned to public policy, different measures and outcomes may be emphasised. If the major objective of the policy is the sustainability of the production process, it implies a preference for a reduction of negative NCOs alongside promoting the positive contribution of agriculture for social well-being. But if the objective is to favour the multifunctionality of specific agricultural systems, then public policy will encourage environmental friendly measures through, for example, the preservation of rural landscapes by using organic farming, as it is already the case within the Model of European Agriculture.

Moreover, if the focus has to be pointed on the importance of safeguarding the provision of positive agri-environmental goods, this aspect cannot be sufficient for defining multifunctional policy. Indeed, when the agricultural production process involves negative and positive NCOs (what is generally the case and may be analysed through the positive approach), the multifunctional characteristic of agriculture may not be sustainable because the production process may not guarantee a sustainable use of environmental resources (space, water, energy ...) in the long run. It also appears that the time dimension, which is inherently present in the agricultural process, is an essential element to be taken into account for supporting the multifunctionality of agriculture and for giving solid grounds to multifunctionality promoting policies.

5 Conclusions

The link between sustainability and multifunctionality is not univocal: the sustainable dimension may encompass the multifunctional dimension of

the agricultural activity considered, but the converse is not true. In addition, the time dimension of the link cannot be ignored.

Yet, the analysis of the multifunctionality is, up to now, mainly implemented in a static framework, which does not call into question how the sustainability of the agricultural production processes can be performed in the long run. For example, the analysis of the production of NCOs does not refer to such temporal aspects. It ensues we cannot establish the very moment at which agricultural producers respond to incentive payments and carry out the necessary measures in this domain. Moreover, the pattern of the adjustments at farm level is not clearly established while changing preferences (on the demand side) may also impinge on the dynamics of joint production.

As long as the dynamics of supply and the dynamics of demand are not independent from each other, the analytical framework of multifunctional policies should take the time dimension associated with the sustainability of the agricultural processes into account. Two main challenges follow from this mere observation.

The first would be to more precisely analyse the “co-evolution” of supply and demand for NCOs so as to think at a more efficient implementation of multifunctionality-oriented policies in the field of agriculture.

The second would be to bring into the analytical framework of multifunctionality the dynamics of agricultural landscapes in a way, which would integrate all dimensions of sustainability. The analyses performed on agro-ecosystems (Dalgaard et al. 2006) would deliver some useful insights in this perspective.

Trying to face those two challenges would constitute as many as fruitful areas of research for the next future.

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