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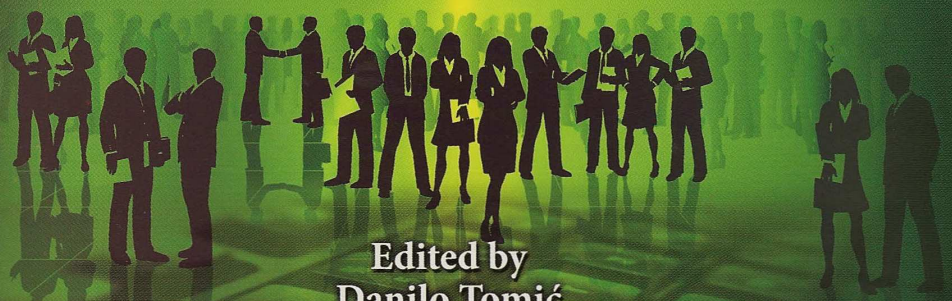

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KNOWLEDGE PRODUCTION, MULTIFUNCTIONALITY OF AGRICULTURE AND PUBLIC DECISIONS: CRITICAL ISSUES OF CONTEMPORARY CONTROVERSIES.

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Abstract

Various theoretical models of public policy analysis are used to treat situations of decision-making in which public deciders have to take into account the multifunctionality of agriculture. For some, science-society relations are not really problematical. Others acknowledge the current attempts of these policy-makers to find adequate scientific knowledge, and the difficulties they encounter. These difficulties stem partly from the very content of knowledge produced by research. Could other modes of production be more efficient? The status of the knowledge produced by these approaches is a subject of debate. Bridging the divide between science and policy more effectively is not only a question of knowledge brokerage. Accessibility and reliability of the existing evidences are also problems to be addressed. The debates around evidence-based practices may provide some landmarks in this new situation although they also emphasize the limits of the tools that can be built for this purpose.

Key words: Multifunctionality, agriculture, knowledge, policy, sustainable development

Introduction

The necessity of taking into account the multiple functions of agriculture (economic, social, environmental) is regularly reasserted by policy-makers (EC 2003). Agreement is increasingly widespread in the community of agricultural economists, as well as in other disciplines, on the need to reshape current analyses of agriculture accordingly (de Janvry 2009). Opinions differ, however, when it comes to the role that scientific knowledge[6] can play in the emergence of new policies.

As this issue of the relations between science and policy has been analysed from very different standpoints, it is difficult to obtain a clear picture of what is at stake in the current controversies. In recent years some epistemic confusion has consequently been the source of many misunderstandings between researchers themselves and between researchers and

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[6] "Scientific knowledge" i.e. knowledge related to a theory and which meets specific validation criteria: making the validation procedures explicit, and setting them out to be presented to peers, so that the knowledge produced transcends the individual subjectivity of the researcher concerned.

policy makers (Laurent 2003). The aim of this paper is to provide some insights to contribute to overcoming such misunderstanding.

First, we examine the various theoretical models of public policy analysis that serve as a reference in the study of those decision-making situations in which public deciders wish to take the multifunctionality of agriculture (MFA) into account (Laurent C. 2001). While some consider that the situation is not really problematical, others rely on findings showing that in many situations policy-makers try to mobilize validated knowledge for decision making but encounter many difficulties (Section 1). This is partly due to the content of the knowledge produced by research. Might new modes of knowledge production be more efficient? The status of knowledge produced by various approaches is a subject of debate (Section 2). The question of bridging the gap between science and policy more effectively is not only one of knowledge brokerage, for while the actual content of knowledge is often not adequate to deal with MFA issues, in addition its reliability and accessibility are problematical. Debates around evidence-based practices may provide some landmarks in this new situation (Section 3). This analysis shows the possibility of playing on the complementarities between different approaches to take the MFA into account more fully.

1. Are research outputs likely to contribute to policy-making? Discord between public policy decision models

While in the economic analysis of firms it is recognized that knowledge is a key resource, the same does not apply to public policy-making. For example, to predict and evaluate the effects of alternative agricultural policies on the protection of biodiversity, or the impact of environmental policies on the functioning of farms, one needs some knowledge on the mechanisms through which economic, social, biotechnological and ecological processes are articulated. But there is a lack of adequate knowledge and up-dated data, highlighted in the Millenium Ecosystem Assessment reports (Carpenter *et al.* 2006).

In such a situation, is it necessary to undertake specific actions so that available scientific knowledge can be better adjusted to the needs of public policy-makers? The answers differ as to the extent to which public intervention could be based on scientific knowledge. The models designed to account for how this knowledge enters public policy-making have been extensively described, and are a lasting source of controversy (Lindblom 1959). Schematically, theses models highlight three main types of logic.

(i) The ideal type of the “rational model”, embedded in the theory of rational choices, describes a situation where policy-makers proceed rationally via a series of logical, ordered phases, assess and compare all options, and calculate all the social, political and economic costs and benefits of a public policy. In this model, researchers and policy-makers (or any other actor) collaborate "naturally"; they have the time, competencies and material means enabling them to assess all available information. The mobilization of scientific knowledge is not really problematical, but improvement of the current situation are sought to reduce asymmetries of information and to update data. This type of representation has guided research aimed at proposing standard tools so that MFA can be taken into account in public policies (OECD 2001).

(ii) At the other extreme, certain studies highlight situations of organizational anarchy, where public deciders do not even try to inform their decision with any reliable scientific knowledge whatsoever. As irrationality prevails, it is posited that no one endeavours to overcome the obstacles. Such cases can indeed be found, for instance when some

administrations sometimes hurriedly put together arguments for international negotiations on various functions of agriculture.

Yet a convergent set of findings shows that in many situations public deciders do not behave according to the "rational model" and still seek reliable knowledge to facilitate decision making. This is the case for example when the technical services of the ministries in charge of agriculture and the environment have to define the technical content of agri-environmental measures (Laurent *et al.* 2008).

(iii) Models based on other sets of hypotheses – especially models of bounded rationality – have been developed to account for the actual motivations, difficulties and strategies encountered in mobilizing available knowledge in situations where political, economic, ecological and other constraints are combined. Each of them (bounded rationality models, incremental model, iterative model, etc.) sheds light on a particular aspect of the way in which scientific knowledge may enter into public decision-making.

For action, this leads to two different points of view:

- Some researchers and policy-makers maintain that it may be useful to consider the methods and tools which facilitate *a more judicious use of available knowledge*, especially knowledge produced by research, even if science is always incomplete and even if the decision-making process never corresponds to the ideal type of the "rational model" (Nutley 2003). For instance, in the 2000s various institutions (European Commission, ministries in charge of agriculture and the environment, local authorities, etc.) commissioned numerous states of the art, to take stock of available knowledge so that policies taking MFA into account could be implemented.

- Other studies consider that "the problem is not in the data" but in the ability of institutions to *learn* in situations of uncertainty (Parsons 2002); even if public deciders sometimes try to use available knowledge effectively, this project will fail. These approaches have been developed in the field of MFA, for example to build systems for managing water catchment (Ison *et al.* 2007). The social sciences are called on no longer primarily to provide basic knowledge on economic and social mechanisms or those linking social with ecological processes, validated according to academic norms (peer reviewing), but rather to contribute to the learning process on how to manage uncertainty and to produce a new type of knowledge with other stakeholders. According to some extreme epistemic positions such as post-normal science, such knowledge will be assessed on new bases by the wide range of stakeholders concerned: "science is no longer imagined as delivering truth, and it follows a new organizing principle, that of quality", "quality" involving "usefulness", "ability to generate consensus in decision making", "adequacy to local context" (Funtowicz & Ravetz 1994).

2. What kind of research output? The epistemic status of various types of knowledge

Thus, the environment and its relations with various productive sectors – including agriculture – is a field of intense controversy over the types of knowledge that should be produced by research to be mobilized for action. Gibbons *et al*. (1994) and Nowotny *et al.* (2003) point out that alongside the traditional mode of production of scientific knowledge (Mode 1) a new type of research has developed (Mode 2) with various streams, such as post-normal science, mentioned above. These are based on "transdisciplinary" approaches, i.e. approaches associating scientists and non-academic stakeholders not only to decide on priorities for

research, but also to conduct research and to evaluate it by focusing on the contextualization of the results and their ability to be used for action, rather than on traditional academic validation criteria. In so doing they identify certain devices which can improve one of the key aspects of science-society relations: the social relevance of research results.

Nevertheless these authors say nothing of one of the critical points of some Mode 2 approaches: the status of scientific knowledge compared to other forms of knowledge (tacit knowledge, traditional knowledge, etc.). Whereas for sociological analysis it may be interesting to consider all types of knowledge at the same level, in order to examine how they are combined in various decision-making situations, for when it comes to action not all types of knowledge are equivalent. Regarding research, we can assume that society expects scientists to provide scientific knowledge whose limits of reliability are tested by means of explicit procedures.

In this respect there is a major divide between communities of researchers (Shinn & Ragouet 2005), including those working on MFA. While some consider that scientific knowledge has particular epistemic properties (resulting from the modalities of its validation), others refuse this idea or avoid the question in their research practices and in building the models that they propose for decision-making.

Hence, studies that recommend involving non-academic partners in all stages of research can produce sophisticated models combining heterogeneous types of information and knowledge; variables and parameters may stem partly from validated scientific facts but also partly from the opinions of the people participating in the process (collected for instance through role-playing). Some studies on MFA adopt these principles, especially as regards collective water management. The opinions of the non-academic actors involved in research can thus be substituted for (and not complementary to) scientific evidence, especially for social science results. The scientific knowledge that is injected into such models consists primarily of data from ecology or biophysical and biotechnological disciplines. The socio-economic aspects are often reduced to the self-assessment, by the stakeholders involved in the project, of the socio-economic acceptability of alternative technical solutions. In this way they avoid costly processes of compiling reliable databases necessitating economic and social data (on the structures and functioning of different types of farm, on systems of households' work, their insertion in regimes of land-ownership, power relations, social contradictions, etc.). From the point of view of the social sciences, the nature of the outputs thus produced and their reliability are questionable.

These approaches are in sharp contrast with evidence-based practices, which consider that not all types of knowledge are equivalent for action, and which recognize that there are difficulties in using the available knowledge – especially scientific knowledge – but propose various organizational and analytical tools to facilitate its rational use.

3. How to make the most of existing scientific knowledge for MFA issues? Learning from debates on evidence-based practices

If one recognizes that: i) the way in which knowledge contributes to public decision-making differs substantially from the "rational model", yet that ii) there are situations in which policy-makers would like to make a more judicious use of the available knowledge, especially scientific knowledge, to meet policy objectives, and that iii) this is no extravagant wish, for there is room to improve the existing situation as regards knowledge produced by both the social sciences and the natural sciences, then it would be useful to investigate more

fully the conditions allowing for knowledge spawned by research to be used as judiciously as possible.

This is how a new field of investigation – and controversy – is developing, primarily around the notion of "evidence-based" practices which aim to improve the use of knowledge in decision-making, especially (but not exclusively) scientific knowledge (Nutley 2003). As Omamo (2004) points out, these studies are not specifically embedded in one model of policy-making, even if they stem from the statement that the underlying hypotheses of the rational model are unrealistic (impossibility of having access to most of the available knowledge, asymmetry of information between actors, limitation of intellectual capacities of any individual, etc.). Overall, they acknowledge the transformation of the regime of access to scientific knowledge (increasing abundance of research production, lack of meta data on knowledge reliability, etc.) and the need to elaborate new tools to bridge the science–policy divide more effectively.

Improvements are therefore sought in three main directions:

i) The production of synthetic analyses on precise questions intended for different types of actor, notably in the form of "systematic reviews" (i.e. particular presentations of states of the art, describing available knowledge so that it can be used to address an issue in practical terms). Such studies have been undertaken to back up policies to protect biodiversity, for example when decisions have to be made on the technical content of agri-environmental measures (recommended practices, etc.) (e.g. the Centre for Evidence-based Conservation, Birmingham University). Other MFA issues (especially regarding the socio-economic impacts of environmental policies) are however still in an embryonic form.

ii) Making explicit the quality criteria of evidence used to assess the reliability of available knowledge for action, and to enable potential users to make informed choices. This consists in establishing frameworks of analysis so that an opinion is not considered to provide the same level of proof as the conclusions drawn from a monograph, or as knowledge based on the findings of controlled comparisons for which the degree of significance of the results can be tested. It also consists in drawing up an inventory of the fields for which the level of evidence remains low, and identifying major knowledge gaps for programming research (e.g. in various aspects of organic farming and its technical and economic performance).

iii) Finally, the setting up of ad hoc organizations to facilitate direct access, by the various actors concerned, to available knowledge (knowledge bases in open access, with systematic reviews, databases, etc.). In the field of agriculture, the British Department for Environment, Food and Rural Affairs (DEFRA) has partially reorganized its activities to promote such synergies.

Yet these approaches, like the preceding ones, have many limits which are often described – difficulties in ranking competing evidence from different disciplines or presented by different interest groups, high cost of systematic reviews, etc. – and they fail to address many of the institutional aspects of decision-making. Still, as argued by S.Nutley (2003) "neither definitive research evidence nor rational decision making are essential requirements for the development of more evidence-informed policy".

Conclusion

It is important to have the clearest view possible of the various ways of conceiving of the role of scientific knowledge in public decision-making involving MFA, for they result in very different guiding principles for subsequent action.

Regarding the "rational model", there is widespread agreement that it can be described but not practised except for relatively simple problems and even then, in somewhat modified forms. This does not however mean that no attempts are made by public deciders to partially base their decisions on scientific knowledge. In the MFA area, several ways are explored. Although they may appear mutually exclusive from a theoretical standpoint, each of them makes it possible to illuminate different facets of complex systems where public decision-making brings into play networks of actors with sometimes conflicting objectives. Yet the mobilization of these approaches in a spirit of complementarity has hardly begun.

The stakes are not only academic. Knowledge, like land, capital and labour, is an instrument of power as well as an essential resource for social and economic development. It is a resource whose quality, reliability and accessibility matter, to support debates on alternative ways to development, and to seek the most effective actions according to objectives set by the actors for different types of action. This resource has to be integrated as such into the economic analysis of development models and their mode of regulation.

It is important not to overlook this dimension in the interdisciplinary scientific debates in which MFA-related issues are discussed. Following some extreme points of view, the social sciences can be relegated to a narrow role of assisting learning processes because they do not produce the same kind of knowledge as the natural sciences; the advantages of them producing verified knowledge can be denied. A considerable amount of conceptual and methodological knowledge (e.g. on structural changes), which is invaluable for reasoning in terms of MFA, can thus be left aside. Economists have a specific responsibility in this respect, as many studies show the limits of economic approaches that multiply prescriptions but exempt themselves from all empirical verification and refuse to set the limits of the validity of their own recommendations. That is why it seems necessary to the develop a third way where individuals' and organizations' capacities for adaptation have to be improved, where knowledge gaps on MFA has to be reduced by producing the most reliable evidences possible, explicitly showing the limits of their own validity.

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