



Article

Factors Affecting European Farmers' Participation in Biodiversity Policies

Siebert, Rosemarie, Toogood, Mark and Knierim, Andrea

Available at <http://clock.uclan.ac.uk/6491/>

Siebert, Rosemarie, Toogood, Mark ORCID: 0000-0003-2403-0338 and Knierim, Andrea (2006) Factors Affecting European Farmers' Participation in Biodiversity Policies. Sociologia Ruralis, 46 (4). pp. 318-340. ISSN 0038-0199

It is advisable to refer to the publisher's version if you intend to cite from the work.
<http://dx.doi.org/10.1111/j.1467-9523.2006.00420.x>

For more information about UCLan's research in this area go to <http://www.uclan.ac.uk/researchgroups/> and search for <name of research Group>.

For information about Research generally at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the [policies](#) page.

Factors Affecting European Farmers' Participation in Biodiversity Policies

Rosemarie Siebert,* Mark Toogood and Andrea Knierim

Abstract

This article reports the major findings from an interdisciplinary research project that synthesises key insights into farmers' willingness and ability to co-operate with biodiversity policies. The results of the study are based on an assessment of about 160 publications and research reports from six EU member states and from international comparative research. We developed a conceptual framework to systematically review the existent literature relevant for our purposes. This framework provides a common structure for analysing farmers' perspectives regarding the introduction into farming practices of measures relevant to biodiversity. The analysis is coupled and contrasted with a survey of experts. The results presented above suggest that it is important to view support for practices oriented towards biodiversity protection not in a static sense – as a situation determined by one or several influencing factors – but rather as a process marked by interaction. Financial compensation and incentives function as a necessary, though clearly not sufficient condition in this process.

Introduction

This article reports the findings of an interdisciplinary research project which aimed to synthesise key insights into farmers' willingness and ability to co-operate with biodiversity policies.¹ Specifically the article reports a review of academic, governmental and other research about farmers' responses in six EU nations to a range of policies designed to enhance and maintain biodiversity and environmental values and quality.

In contrast to their traditional function as components in the food production chain (Halfacree 1999; Buller and Morris 2003), European Union (EU) policy increasingly constructs farmers as actors central to the delivery of rural development and biodiversity conservation. It has indeed become a truism that without the integration of agriculture there is no effective EU biodiversity conservation policy. In terms of participation, the EU could claim some success in this regard. For example, roughly 20 per cent of EU-utilised agricultural area (the equivalent of 900,000 EU25 holdings) is participating in agri-environmental programmes (AEPs). Nevertheless, farmers' co-operation with policies designed to bring about greater levels of

agricultural biodiversity protection and enhancement differs across the EU; the level and quality of co-operation, in particular, vary spatially from country to country and from one specific context to another.

Farmers are very heterogeneous and differ in their decision-making in relation to their holdings (Gravsholt Busck 2002). They cannot be assumed to be automatically willing to collaborate – or to have no problems with collaborating – with such policies and instruments. Their willingness and ability to co-operate in biodiversity is not reducible to the location of their holding nor to their attitudes or values towards such categories as ‘nature’ or ‘authority’; and neither is their co-operation a simple function of economic factors. The purpose of the study is partly to demonstrate that the reality of the conservation of European biodiversity is a much more complex set of issues. There is an intricate interaction of contingencies affected by locality and specific context, such as agronomic, cultural, social and psychological factors. Each of these factors plays interwoven roles in each national, regional and specific farm context. These in turn affect the individual farmer’s response to biodiversity-promoting policies for agriculture. One of the most interesting aspects of this study is how these factors help illuminate the complex relationship and balancing act between EU policy, local environmental governance and the distinctively situated knowledge of the farmer. However, conceptualising and drawing out the implications of such relationships is one of the challenges for the present study. Two other factors are important here. Related to the last point, such insights can also illuminate the putative trend in agriculture away from its function as a component in the vertical production chain towards a supposedly more horizontal component of a more local and multipurpose agriculture. Lastly, and more relevant to the immediate concerns of policy implementation, such investigation can map the relationship between policy instruments and the farm community, and it therefore can potentially inform assessments about the likelihood of farmers’ acceptance of particular policies. That knowledge can then inform the choice of particular instruments appropriate for specific contexts.

The first part of the article provides essential background information about the development of policies in the EU, addressing the negative consequences of agriculture for the environment as well as those related policies providing incentives for farmers to enhance biodiversity and environmental value. The article then describes the scope of the study, the countries involved and the methods used. The main section presents the key overall findings of the reviewed studies. We conclude by tentatively drawing out some of the strengths and gaps in research and policy making for biodiversity conservation.

Agriculture, environment and EU policy

A series of directives since the 1970s issued by the EU attempted to integrate into agricultural policies concerns that certain practices have had a negative impact on the environment (Brouwer and van der Straaten 2002, p. 5).² These EU measures have from the outset faced the problem of how best to integrate diverse national agricultural interests and widely differing historical experiences, different ecological, geographical and cultural environments and diverse institutional priorities and assumptions about nature conservation.

The first EU-wide (EU 15) agri-environmental policy was Regulation 2078/92 which, following the series of moves to reform the Common Agricultural Policy (CAP), made the introduction of agri-environmental programmes throughout the EU obligatory. Across the EU, about 160 different programmes with roughly 2,500 measures have been implemented on the basis of this directive (Plankl 2001, p. 2). From the viewpoint of EU policymakers, and for some member states in particular, AEPs constituted a significant contribution to international obligations in biodiversity protection (Juntti and Potter 2002, p. 216). Whether this policy can be considered a success in its aims to be a significant contribution, however, remains an open question. Even within the terms of its own aims, the significance of the regulation was affected by the very diversity of the EU itself. The extent to which the regulation was implemented in the different countries varied, reflecting specific local contingencies and each nation's interests within the EU framework.

An EU-wide comparative study on AEPs (Schramek *et al.* 1999a) emphasised that different national priorities exist in terms of setting objectives, as well as in organisational forms and in the content of the programmes (including considerable variations in premium rates). In a similar fashion, Agenda 2000 (EEC 1999) reflects a diversity of objectives, particularly as the agri-environmental component has been strengthened by integrating it into rural development policy (Plankl 2001, p. 2). This mirrors wider concerns about rural society as well as agriculture and biodiversity. The focus of agricultural policy at the EU level is broadening towards the concept of a multi-functional agriculture. It is noticeable that in Agenda 2000 the environmental objective has been prioritised over other development objectives and it is expected that funds spent on AEPs will be larger compared to the 1990s (Plankl 2001). The introduction of elements such as 'modulation' and 'cross-compliance' are intended to facilitate the adaptation of a more environmentally friendly agriculture to specific national conditions and interests. This trend was reinforced by the recent reform of the CAP, decided at the ministerial round in June 2003 (EU 2003).

In a similar fashion, the establishment of the Natura 2000 network (part of the Habitats Directive, EEC 1992) has also been analysed in terms of how it acted as a standardising network on a range of initially incompatible and unruly priorities and assumptions about conservation.

Looking at the OECD level, the World Trade Organisation concept of trade liberalisation has guided the OECD member countries in their policy formulations. Here, collective agreements about how to respond to the demands of environmental and nature conservation are still lacking. Countries such as Austria, France, The Netherlands and others show that voluntary and co-operative approaches may be successful when directed at integrating biodiversity, habitats, wildlife or landscape protection into agricultural policies (OECD 2000, pp. 111–121). However, the question remains as to which factors induce farmers to respect and foster those issues.

The study – purpose and methodology

The general purpose of this study is to develop an overview of the current state of knowledge on factors affecting farmers' attitudes to biodiversity conservation. The

Table 1: *Overview of publications reviewed*

	International*	Finland	Germany	The Netherlands	Spain	UK	Hungary
Empirical	8 and 9	10	23	16	15	40	
Other			3	14	10	2	10
Total	17	10	26	30	25	42	10

* Consisting of eight cross-country and nine country studies

results of the study are based on the assessment of about 160 publications and research reports from six EU member states (Finland, Germany, Hungary, The Netherlands, Spain and the UK) and from international comparative research (Table 1). Altogether, there is a broad mixture of theoretical concepts and approaches, with about 15 different scientific disciplines represented in the sample.

With the exception of Hungary, empirical material predominates in the case of every country. The UK has the highest number (42) of relevant publications, while Finland is at the other end of the scale with 10. Both situations are related to the countries' respective timetable of attaining membership of the EU and introducing biodiversity relevant policies. The newest member, Hungary, does not yet have any empirical research on this topic, while Finland, which became a member in 1995, has produced less research on this topic than the other countries.

In the UK and Germany there is a great diversity of publications both in terms of disciplinary as well as methodological approaches. In contrast, the amount of empirical material for Spain and Finland is significantly smaller (see Table 1).

From the 160 studies, 27 can be classified as representative quantitative research, while 35 are mixed, combining qualitative with quantitative methods. The large majority of studies (74) applied qualitative research methods. Other publications are literature reviews, or model calculations, or they cannot be clearly classified.

There is a relative lack of international comparative research across EU states that specifically addresses the conservation of biotic resources by farmers. We therefore decided to include some national publications from other European countries which highlight the key issues from perspectives not yet considered (Table 2). Four of these publications are the results of EU research projects (Drake *et al.* 1999; Schramek *et al.* 1999; Deffuant 2001; Brouwer *et al.* 2002), one is a proper EU document (Fay 1999), and another one is from the OECD. Four publications rely on a selection of case studies, whereas four others refer to representative data at the regional and/or national level (Drake *et al.* 1999; Fay 1999; Plankl 2001; Ribbe 2002). With the exception of Deffuant (2001), the publications have a broad but clearly economically based theoretical approach.

Conceptual framework

We developed a conceptual framework to systematically review the existent literature for our purposes (Figure 1). This framework provides a common structure for analysing farmers' perspectives regarding the introduction into farming practices of

Table 2: Countries covered by the comparative studies

Country	BE	DK	DE	EL	S	FR	IE	I	L	NL	A	P	F	SWE	UK	AU	CA	NZ	Other	Total	
Author(s)																					
Brouwer <i>et al.</i> 2002			x			x				x			x								5
Deffuant 2001						x		x							x						3
Fay 1999; Plankl 2001; Ribbe 2002	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						15
Drake <i>et al.</i> 1999			x	x		x		x			x			x							8
OECD 1998										x						x	x	x			4
Schramek <i>et al.</i> 1999a, 1999b		x	x	x	x	x				x	x	x		x					CH		10
BIOFACT			x							x									HU		6
Total nos. of countries	2	2	5	3	3	5	1	3	1	5	3	2	3	3	5	1	1	1	2		51

A, Austria; AU, Australia; BE, Belgium; CA, Canada; CH, Switzerland; DE, Germany; DK, Denmark; EL, Greece; F, Finland; FR, France; HU, Hungary; I, Italy; IE, Ireland; L, Luxembourg; NL, The Netherlands; NZ, New Zealand; P, Portugal; S, Spain; SE, Sweden; UK, United Kingdom.

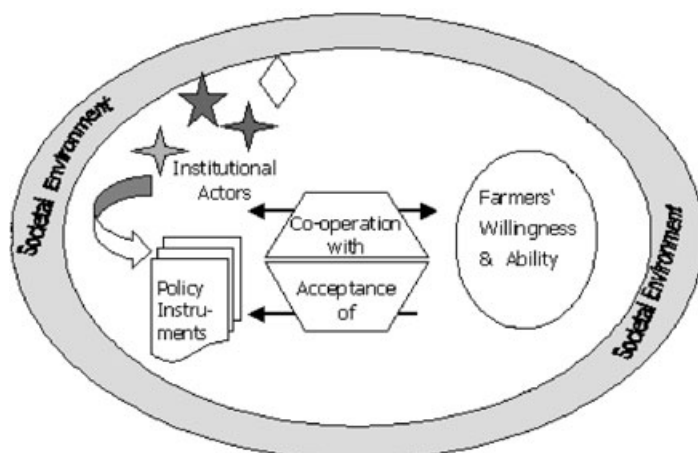


Figure 1: *The key issues in the conceptual framework*

measures relevant to biodiversity. The conceptual analytic framework for a social scientific analysis of the motives and influencing factors behind farmers' actions needs to be broad enough to integrate sociological, psychological and economic concepts of influence, decision-making and farmer behaviour to capture the relationship between ideas, knowledge and action. The aim of the analysis was not to delimit or to assess the validity of scientific theories, but to bring together existing findings and to reveal, both in terms of content and conceptual approach, the points where they overlap, where they mutually inform one another and where there are gaps in the literature. The analysis is coupled and contrasted with a survey of experts, the results of which reflect existing knowledge of the subject in agricultural administrative bodies, in the field of research and among interest groups.

The framework is a qualitative, heuristic model consisting of three hierarchically overlapping levels of analysis (Figure 1):

- 1 the individual level (willingness and ability) includes the subjective and objective factors that have an effect on the manager of the business;
- 2 the level of direct social interaction and wider social influences includes all those factors at work in direct exchanges – processes of communication and interaction – between actors concerned with biodiversity protection and the subjectively perceived cultural and social norms and values as well as the rules transmitted indirectly by society via policy making, legislation and public discourses, and
- 3 the level of the policy influences, includes the design and the implementation process of biodiversity enhancing policies.

A further level of analysis emerges when the influencing factors present at the different levels are taken together and viewed in terms of their dynamic interaction.

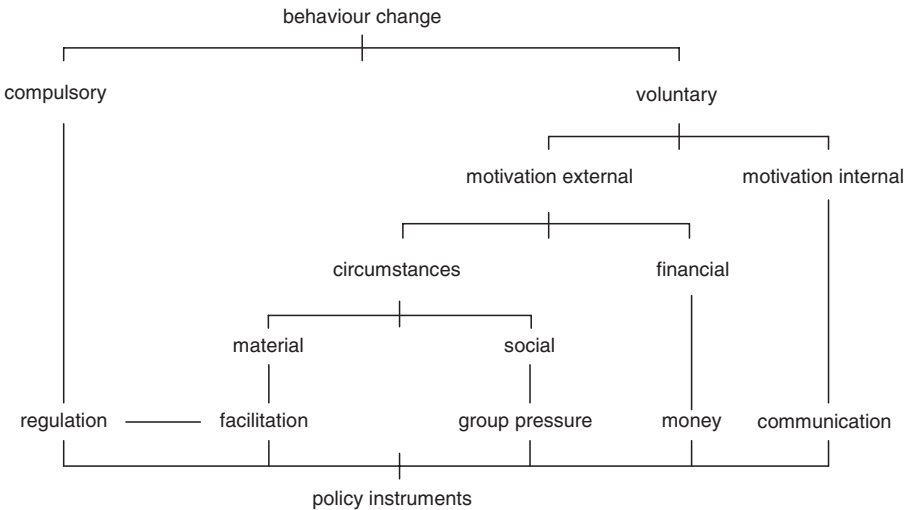


Figure 2: *Policy design and change of behaviour* (Aarts and van Woerkum 2000)

The theoretical background to the analysis consists in theories regarding motivation and control, which establish a link between political instruments (different forms of institutional arrangements) and human behaviour. Aarts and van Woerkum (2000, p. 27) identify compulsion and voluntariness as essential psychological principles of control, whereby voluntary behaviour is distinguished according to extrinsic and intrinsic motivation (Figure 2). The latter is very difficult to grasp scientifically, however, and many empirical studies in economics, sociology and (social) psychology concentrate on specific extrinsic incentives to act. The notion of individual choice based on rational-choice theory (Simon 1955) posits individual behaviour as a means of maximising personal utility. Models exist in sociology, cultural theory and social psychology which fundamentally call this approach into question (e.g. the group value model, Lind and Tyler 1988) or else build on it by adding normative elements (e.g. theory of planned behaviour, Ajzen 1991).

The concept of attitudes is clearly a matter of academic dispute. For many sociologists, anthropologists and cultural theorists the conceptualisation of attitudes differs from mainstream theory based on particular individualistic models of the human. Those approaches place more emphasis on historical and cultural contexts (i.e. social identity, social pressures, values and ideas) as intimately and dynamically related to practices in which local knowledge, cultural rules and habits and social interaction are treated as factors that directly or indirectly influence (farmers') behaviour. Approaches based on local agricultural knowledge (Nagel 1979; Röling 1988; Murdoch and Clark 1994; Ellen and Fukui 1996) or process-oriented management of change concepts have been applied to foster sustainable land use and nature conservation (e.g. Röling and Wagemakers 1998; Borrini-Feyerabend *et al.* 2000). These concepts usually include a strong component of social pressure (as it is called by Aarts and van Woerkum (2000) – see Figure 2). However, the term, 'pressure' is possibly too narrow

to describe a voluntary change of behaviour, which suggests that a more dynamic model of culture that includes group support, values and practice, (such as in the group value model of Lind and Tyler [1988]) is more relevant. Other analyses, following theoretical developments emerging from science studies, emphasise that farmers' attitudes are themselves contingent, that they are not singular, or fixed, but constantly negotiated in a relational sense. In this approach the identity of actors is viewed as being co-constructed by particular social interactions such as the recruitment of farmers as actors to fulfil aspirations in biodiversity policies.

Our framework for what affects individual decision-making was not rigidly defined, given the multidisciplinary nature of the team and the range of disciplines in the literature we encountered. Although general agreement now exists in some disciplinary fields studying decision-making about the degree to which generalised decision-making rules can be mapped and predicted, the details are still being debated. For example, some psychologists propose a model of action capable of explaining behaviour that encompasses five identifiable components,³ but controversy remains as to how much significance each one should be accorded (Hunecke 2002, p. 16). The rational economic model of the individual was also regarded as too narrow for this study. As previously noted, decisions and actions can also be understood in interactionist terms, that is, as being valid within a particular framework or situation, (Rost 1996; Hunecke 2002). Burton (2004a) has argued that understanding farmers' decision-making can be related to their own models of their self-identity. Where that social and cultural identity is subject to threat by policy changes, those changes may be resisted.

This approach can be contrasted with that in studies adopting a relational approach to analyse farmers' identity in relation to agri-environment policy, noted above. That approach defines identity as partial or multiple, depending on local contingencies (Latour 1999; Law 2004), such as the way action is accomplished in a performative sense between farmers and other actors trying to recruit them into biodiversity policy. Farmers' willingness and ability to take part in biodiversity, like agri-environment policy, can therefore be seen as co-construction,

a creation of collectives in which the actors and organisations involved attempt to enrol actors in the network, tie other actors to their goals and how all the actors evolve through this event and are forced to reinterpret their goals. (Kaljonen 2006, p. 206)

Given the wide range of geographical and disciplinary diversity in the study's sample of the literature, our categorisation of effects on farmer decision-making was kept fairly simple. We developed a basic categorisation of the following factors: (1) those factors affecting farmers' willingness to participate; (2) those factors affecting farmers' ability to participate; (3) more general social influences and (4) the effect of policy.

Results of the study – factors affecting farmers' participation

A. Farmers' willingness

'Farmers' willingness and ability' refers to the personal disposition of the individual farmer: his or her internal disposition, on the one hand, and the structural

characteristics of a given personal situation on the other. Here, 'willingness' is understood as the combination of subjectively perceived factors that influence the farmer, such as interests, values, norms, problem awareness and self-perception. The term, 'attitude' is frequently used to describe these factors. However, for many academics the conceptualisation of attitudes is highly problematic. In psychological approaches, attitudes are traditionally theorised in three ways. Firstly, they are theorised as internal mental activities (such as values) that mentally position the individual to respond to objects and activities. Attitudes are therefore dispositions that relate to behaviour. Secondly, attitudes are organised systematically, that is to say, people relate their views on one topic (e.g. the environment) to their views on other topics (e.g. family responsibilities) in a consistent way. Thirdly, people share attitudes (such as widespread stereotypes) and hereby mutually confirm group affiliation and gain social recognition. Other social scientists place greater emphasis on historical and cultural contexts (i.e. social identity, social pressures, values and ideas) as being intimately and dynamically related to practice; that is, what people do in everyday life, the constraints they face, and the specific and general influences on their actions. The literature reviewed in this article seems to reflect this debate about the structuring of farmers' attitudes: there are psychological approaches reflecting the more individualistic conceptualisation of attitudes; and cultural and constructivist approaches emphasising the knowledge-based, discursive and group construction of meaning and socialisation and its relationship to behaviour and practice. Accounts can also be found that use models which more traditionally reflect the rational-choice model of the optimising individual with access to perfect knowledge in his or her decision-making. Obviously, other disciplinary and conceptual approaches exist in the literature besides those mentioned here, such as sociological models of relations to power within the community and relationships to institutions, but the models discussed here are the most critical ones for our topic of interest.

Many analyses reviewed by us argue that the economic incentive is a prime factor for farmers to adopt policy measures. Our analysis showed that economic interests are of eminent importance when farmers think about participation in measures enhancing the environment and biodiversity. Results from case studies done by Deffuant (2001) and the OECD (1998), as well as several comparative studies (Drake *et al.* 1999; Schramek *et al.* 1999a, 1999b), emphasise farmers' economic reasons for participating in agri-environmental measures or in other programmes with environmental conservation objectives. These findings are not surprising, because farmers need to operate in an economically sound way. However, it has to be noted that economic interests are expressed in various terms, such as profit maximisation, long-term farm viability and/or risk minimisation (Lettmann 1995; Schramek *et al.* 1999a; Lütz and Bastian 2000; Weis *et al.* 2000). Another decisive criterion for farmers' view of a measure is whether it fits into their own farm development plans (Lettmann 1995, p. 98; Weis *et al.* 2000). Although economic reasons are almost always brought up in interviews, they are accompanied – when the interview techniques allowed multiple listings – by other reasons and explanations. For example, ecological arguments like the 'wish to promote environmental conservation' are endorsed (Schramek *et al.* 1999b, pp. 27–28), as well as 'maintenance or improvement of the natural environment' (Drake *et al.* 1999, p. 99). And equally, social

reasons often play a role in the decision-making process, such as the maintenance of the farm for future generations, having a satisfactory job and recapturing legitimacy in society (Velde *et al.* 2002).

Accounts based on economic reasoning are increasingly paralleled by research emphasising that economic interests are not necessarily something that automatically guide farmers' action. The Finnish, UK and German literature all contain studies which emphasise non-economic influences. For example, Silvasti (2001) demonstrates in the case of Finland that if the *possibility* of the farmer utilising land is not endangered, a farmer may make a conscious decision to protect nature voluntarily, but when this possibility is felt to be in jeopardy, the farmer may utilise the land without hesitation and with little consideration for nature. Thus, economic interests in conservation programmes seem to have a close connection to values concerning farmers' self-determination and independence.

In the current situation where the general eligibility for subsidising programmes of farms is uncertain, the threat of economic losses is constantly present. One problem connected to economic interests in Finnish nature conservation has been the slow process of paying compensation to farmers whose land has been included in conservation programmes. The insufficient funding earmarked for implementation of conservation in the state budget has caused uncertainty and anxiety among farmers in Finland.

In the UK, although many farmers may be motivated by financial needs, there may also be a significant number of farmers who are unsure of whether the payments will bring about relative advantage to their farm business. Many studies argue that farmers' willingness and ability is profoundly affected by social and cultural context (see, for example, Harrison *et al.* 1998; Morris *et al.* 2000; Fish *et al.* 2003). In addition, a further dimension to a 'positive' conservation attitude may be the concern as to how the agri-environmental aid scheme (AES) can be used to enhance the field sports potential of the holding (Morris *et al.* 2000; Walford 2002).

However, it is not only concrete interests that appear to be relevant for the farmer's attitude regarding nature conservation. An increasing range of studies emphasises that values and beliefs play an important role in influencing farmers' behaviour. For example, stewardship values as well as long-term family concerns seem to be the most important values guiding farmers' reasoning (Schramek *et al.* 1999a; Nieminen 1999, 2003; Saaristo 2000; Oksanen 2003).

With regard to family values, several studies from Finland proved farm continuity to be the most important value among farmers (Palviainen 1996; Kumpulainen 1999; Nieminen 1999, 2003; Saaristo 2000; Silvasti 2001; Oksanen 2003). According to the notion of farm continuity, a farm does not belong to its present individual owner, but to the family – to past and future generations. The landowner is obliged to pass on the land in as prosperous and valuable a condition as it was when he or she became its manager (Nieminen 1999; Oksanen 2003). Selling land to the state for biodiversity protection (or for any other reason) is a violation of this value, and is interpreted by others as showing that the farmer has not fulfilled his or her obligations to the family and to widely held notions of tradition in the farming community. In other words, unwillingness to participate in biodiversity protection schemes in many cases may be conditioned by such discourses. As the aforementioned case demonstrates, it is

important, therefore, to recognise that decisions made by farmers are the result of complex interactions of social and cultural as well as economic and policy influences.

Similarly, when a policy does not take account of such cultural and social factors the policy can become weakened. A good example is the central concern of farmers in The Netherlands with the survival of their farm. A study that evaluated farmers' behaviour after the nature policy plan was set up and announced observed that this concern constitutes a very fundamental discourse among Dutch farmers. Being confronted with a long list of requirements issued by the government, farmers felt an increasing antipathy towards those developments that constituted a threat to their right to exist in the shorter or longer run. In reaction to this, they withdrew and behaved in a manner that said, 'as long we can avoid the threat we won't do anything' (Aarts and van Woerkum 1999).

Comparing the results available on the country level, we identify more mixed interests and diverse values voiced in The Netherlands, the UK and Germany, while several studies indicate a more distinctive production and profit-maximising orientation in southern European countries (Spain, Portugal, Greece). These findings underline the importance of analysing farmers' values in relation to specific national histories and agricultural constitutions and the societal and political-economic environment.

B. Farmers' ability

Ability, in contrast to willingness, refers to conditioning factors influencing the individual farmer that include the farm holding and business (e.g., the type and organisation of the farm) and the bio-geographical conditions of the farmland and its surroundings, as well as the specific characteristics of the farmer such as age, education and so on. These factors may be considered to be objective, for they are often quantifiable, or legitimated in law or else exist in written form and usually represent an external perspective and assessment of the farmers' behaviour. However, a factor such as an individual farmer's education clearly shows the interrelatedness of so-called internal and external dispositions: if a willingness to participate exists then, it has been argued, the farmer with a higher level of education may be more likely to take advantage of the training and information, and be better able to surmount the bureaucracy related to successful participation than one with less education. A farm's geographical location, landscape and environmental conditions obviously have a considerable influence on its biodiversity value. Thus, policies assume that certain locations, landscapes or biodiversity conditions are a prerequisite for the opportunity to participate in relevant measures. These policy assumptions will affect conditions of applicability and, therefore, will affect farmers' ability to participate.

Some studies reveal that agri-environmental measures are mainly adopted in regions of relative extensive land use of agriculture (Buller 2000; Osterburg 2001). Farm organisation also plays a major role in farmers' participation in measures such as agri-environmental programmes. There is evidence for fodder crop farms in Germany (Osterburg 2001) and for dairy farms in The Netherlands that participation in AEMs brings economic benefits and that net farm income is higher among participants than among non-participants (van den Ham 1998). These economic

aspects hold similarly for grassland extensification measures at the regional level in Europe generally, but are less evident for agri-environmental measures on arable land (Schramek *et al.* 1999a).

The effect of single factors such as the farm type or its size and land tenure on the acceptance of a measure is not without ambiguity. The issue of whether full-time or part-time farms are more likely to participate in biodiversity-enhancing measures is controversial, throughout the countries investigated. While in Spain more part-time farmers participate in AEPs, in Germany (Weis *et al.* 2000) more full-time farmers are engaged in implementing nature conservation and biodiversity enhancing measures. Here, there seems to be a recent tendency for large, full-time modern farms to participate, rather than part-time and small-scale farms (Weis *et al.* 2000). Land tenure has also been investigated as an influencing factor in the UK, where landowners show a greater degree of involvement than tenant farmers (Walford 2002). Again, these findings can not be confirmed for EU countries in general (Schramek *et al.* 1999b). Similarly, size appears to be correlated with participation. The larger the farm, the more probable is its participation: (Kazenwadel *et al.* 1998; Schramek *et al.* 1999a, b; Drake *et al.* 1999; Kornfeld and Wyrzens 2003 for contract-based nature conservation; Petersen 1998; Paniagua 2001), yet the opposite correlation can also be found (where relatively smaller farms are participating in deep and narrow measures).

Looking at both comparative and national studies, one can identify a general but not uniform pattern in which there are more younger and better educated farmers among the participants in agri-environmental policies compared with non-participants. While the relevance of age varies among the studies, the significance of education for participation is confirmed throughout. However, Schur (1990) shows that specialised knowledge does not prevent the use of environmentally damaging farming practices. The significance of the variable, 'experience', measured by the proxy indicators of length of active farm management and residency, seems to be low, while former participation in a similar scheme is a strong indicator (Potter and Lobley 1992; Morris and Potter 1995; Wilson 1996, 1997a, 1997b; Battershill and Gilg 1997; Lobley and Potter 1998; Drake *et al.* 1999; Schramek *et al.* 1999b; Wilson and Hart 2000, 2001). Comparing the four variables of farmers' characteristics (age, education, experience and succession status), the only one that seems to be apt for forecasting purposes is former participation (as an indicator for experience), while the other three variables vary in their effects on farmers' participation. Little information could be gleaned from the literature reviewed regarding farmers' characteristics in Spain, The Netherlands and Finland. Moreover, a noticeable research deficit is the neglect of sex as a possible determinant, with some notable exceptions (Little and Panelli 2003).

C. Direct and wider social influences

Direct and wider social influences comprise both direct social interaction as well as the indirect influences of socio-cultural, political and juridical frame conditions. In this section we attempt to give an account of the range and salience of social influences identified in the European literature as significant to farmers' participation in biodiversity maintenance or enhancement.

The local farm community, neighbouring farmers and social networks in the local farm community play a significant role (Drake *et al.* 1999; Deffuant 2001). According to the Finnish study by Vehkala and Vainio (2000), the influence of neighbours is important both with regard to opposition to a measure and to the decision to start negotiations. Of especial importance are neighbours' experiences of successful negotiations with environmental administrators, which serve as a positive model for one's own actions. On the other hand, some farmers who have negotiated with administrators and, say, sold their land for biodiversity protection have been confronted with disapproval from neighbouring farmers. Support from neighbours has proved to be very important for farmers with the most negative attitudes towards biodiversity protection policies. Oksanen's (2003) study on the planning of the NATURA 2000 network proposal in Finland indicates that in some cases farmers felt the pressure from the local community to be so strong that they complained about the proposal, even if they themselves were not opposed to it. Neighbours and colleagues are usually closely watched and their farming practices are continuously noticed and judged (Retter *et al.* 2002). Thus, a kind of 'commonsense agriculture' is established on the village level over time – which might support or prevent a community-level trend towards a more biodiversity-friendly agricultural practice. Luz (1994) found that a negative quality of the relationship between farmers and non-agricultural villagers had a bad impact on farmers' attitude towards agri-environmental services. A major role in this context is played by local public actors such as mayors, whose opinions serve as a public reference system (Oppermann *et al.* 1997, pp. 38–39). Their positive or negative attitudes foster or hinder the project development and the efforts committed.

Another considerable part of social interaction around the decision about whether to co-operate with biodiversity-policies is the farmers' interaction with the representatives of those policies on the ground. The influence of official local agents (such as scheme advisors) is an important one in this respect. They are frequently mentioned as significant intermediary actors between farmer and policy enactment both in comparative as well as in regional studies (Drake *et al.* 1999; Schramek *et al.* 1999a; Deffuant 2001; in Germany: Mährlein 1993a, 1993b; Luz 1994; Nolten 1997; Mantau 1999; Weis *et al.* 2000; in the UK, Harrison *et al.* 1998; Juntti and Potter 2002; Fish *et al.* 2003). The literature tends to concentrate on important factors in establishing relationships between the farmer and the official policy actor in which the aim is for the later to exert influence over the former (Luz 1994; Nolten 1997; Oppermann *et al.* 1997; Lütz and Bastian 2000; Weis *et al.* 2000).

The public role that an advisor plays when disseminating information and knowledge and promoting biodiversity conservation programmes (Baumgärtner and Hartmann 2001) is also important to consider. However, similar tasks and roles can be taken on by farmers, environmental associations or others concerned with the provision of education and advice about AESs in the diffusion of environmental knowledge (e.g. Curry 1997; OECD 1998; Morris *et al.* 2000; Winter *et al.* 2000; Deffuant 2001; Juntti and Potter 2002). The existence of such a proactive link person is a question of policy design and seems to be highly relevant in terms of broad dissemination and a high acceptance rate. However, advisors do have a negative impact when farmers perceive paternalism to exits in communications (Mährlein

1993a, 1993b; Harrison *et al.* 1998). If new forms of rural governance, such as LEADER, increasingly offer a model of rural development in which the farmer is regarded as a reflexive actor in a re-imposed local context, then, by comparison, a centralised and top-down approach in agri-environment and biodiversity policy delivery approach does not create the conditions for farmer acceptance and co-operation. Several studies at the regional level show that a top-down approach to nature protection in the case of protected areas has become a focal point for resistance and protests among local people and land users (Stoll 1999; Siebert and Knierim 1999; Knierim 2001).

Similarly, understanding the farmer as culturally situated and tracing the values farmers attach to their farming behaviour may help explain why attempts to recruit farmers to biodiversity policies are not rejected simply on grounds of rational decision-making, but are actively resisted because they represent a potential erosion of identity associated with being a 'good' productivist farmer (Burton 2004a).

Professional working groups constitute a significant support structure for individual learning and problem solving. In The Netherlands and several other countries where this instrument has been applied in biodiversity conservation, these group approaches have proved to be effective. Unfortunately, there is no systematic and cross-country evaluation of the supportive interaction and processes of mutual influence that presumably go on in these groups. The fact that the effects of social interaction might go either way – either increasing or diminishing farmers' positive attitudes towards biodiversity conservation – can be shown, for example, using Dutch examples of environmental co-operatives (Polman and Slangen 2001; Brouwer *et al.* 2002).

In the introductory section it was explained that over the past few years biodiversity protection by agriculture has taken on much greater significance in politics and public debate. This has been manifested in changes made to legal arrangements at EU, national and state level and in the design of agricultural promotion programmes. The recent debate about the multi-functional nature of agriculture that has been going on nationally and internationally (Holm-Müller 2003; Wiggering *et al.* 2003) is aimed at broadening the range of functions fulfilled by agriculture, starting from food production and continuing through to the protection of nature and the environment as well as providing opportunities for recreation, among others. The obvious question here is to ask to what extent this debate is reflected in the views and behaviour of farmers.

In the German literature two contradictory observations can be made regarding farmers' self-perception as reported. On the one hand, farmers see themselves as being the best nature conservationists, protectors of the land and the best-qualified partners for biotope care (Luz 1994); on the other hand, they feel they are the scapegoats of public opinion because of the negative environmental impacts of agricultural land use (Oberbeck and Oppermann 1994). It was still the case at the end of the 1990s that farmers predominantly saw themselves as food producers. This is sometimes linked to a positive attitude towards the regional extensive land use reaffirmed by current policy (AEPs). However, this does not mean that farmers have a positive appreciation of nature conservation in general. Farmers perceive themselves as being in a defensive position, both because of their negative public image (a fact that makes them fear for their survival) and because of nature-conservation

policies usually being linked to restrictions, bans and limitations being placed on their agency (Retter *et al.* 2002). Several studies confirm farmers' self-perception that they are victims, a sense that has persisted over the last decade (Schur 1990; Pongratz 1992; Retter *et al.* 2002) and which results in their defensive attitude, which Oberbeck and Oppermann (1994, p. 265) describe as 'deeply-felt hurt, depression and bitterness', rather than in any proactive striving for greater social recognition.

The diversity of attitudes shows that the refusal to participate in the implementation of an AEM does not necessarily entail a lack of interest in the environment; it can also find its origins in contradictory perceptions of the role of agriculture. Indeed, non-economic beliefs (e.g., moral commitment and conviction) as well as other reasons for non-participation (e.g., lack of confidence in the reliability of nature conservation policies, lack of personal conviction or the large amount of effort needed to collect information and handle administrative processes) seem to be more important than is generally recognised in policy analysis (Mährlein 1993b, pp. 311–315).

D. Policy design, content and results

In policy analysis we distinguish the way policy instruments are designed, their content and the results. We need to clarify what 'results' mean in this context. Studies about how farmers perceive and judge these three categories were relatively abundant for the first issue but much less so for the other two issues.

With regard to policy design, there are some distinctive tendencies. For example, farmers prefer voluntary measures, including direct payments for cost compensation. The importance of voluntary participation was especially emphasised by Finnish and German farmers (Lettmann 1995; Kröger 2002; Kaljonen 2002). One comparative study (Schramek *et al.* 1999b, pp. 57–59) equally confirms that farmers clearly favour direct payments (78 per cent) as the best way of achieving environmental conservation. Market solutions with higher prices for goods produced under environmentally friendly conditions, cross compliance and maximum stocking rates have still a fairly high rate of acceptance, in contrast to the taxation of inputs or legislative regulations (Schramek *et al.* 1999b, p. 94).⁴ Transaction costs seem to play the main role for farmers with a low eligibility (Falconer 2000) or when intermediary scheme agents favour larger farms against others because of economies of scale (Potter *et al.* 1993; Morris and Potter 1995; Walford 2002).

Sources from the UK and from The Netherlands show that one crucial scheme characteristic is flexibility, that is, whether the farmer is able to assess how the environmental characteristics of his/her farm matches with, or can be adjusted to, the schemes' requirements (Aarts and van Woerkum 1994). In the UK, scheme options that insufficiently take account of variation in farm environments often lead to disdain on the part of the farmer and, sooner or later, to non-participation (Morris *et al.* 2000, p. 249).

While the above quoted studies mainly deal with AEP, literature that specifically addresses biodiversity conservation policies (e.g., the Habitat Directive) mostly reports negative judgements of farmers such as their refusal of the top-down design and top-down implementation of the Natura 2000 network and similar nature conservation measures. Finnish studies make it very clear that the essential part of

farmers' opposition to these conservation measures is due to the procedure the government applies during policy design and implementation. In Oksanen's (2003) research on Finland's proposal for an EU NATURA 2000 protection network, the farmers interviewed mentioned several factors that prompted their resistance during preparation of the proposal. The farmers felt that they were not properly informed about the programme and its consequences. They felt that their own views were not listened to, and that areas to be protected were chosen in an arbitrary manner. Another reason why conservation programmes have aroused anger among farmers is the keenly held ideal of independence in relation to Finnish landownership. Top-down models of planning and implementing nature protection constitute a severe violation of this ideal and lead to opposition (Nieminen 1999; Silvasti 2001; Oksanen 2003).

The Netherlands have a good reputation for their co-operative policies in sustainable agriculture, which have created such an instrument as self-governing nature and landscape associations that manage natural resources (OECD 1998). Farmers' participation in the Nature Conservation Association in The Netherlands has shown a strong increase: 100–120 groups exist that cover an area estimated to be 22–32 per cent of the agricultural land in The Netherlands (Oerlemans *et al.* 2001; Silvis and Bruchem 2002). About half of the ANVs also include non-farmer members, the most prominent being provinces, municipalities, (regional) farmers' stakeholder organisations and (regional) landscape organisations.

Very little literature exists with respect to the content and the results of biodiversity-enhancing measures. As for the content, farmers in the UK are reported to view AES very critically for their goals and their effects on the land and the landscape (Fish *et al.* 2003). There is certainly greater scope for future studies into the way farmers view the results of conservation measures.

Conclusions

Most of the social scientific literature available about biodiversity protection by agriculture consists of qualitative studies carried out at the regional level; attempts of systematic up-scaling are lacking. Most of the analyses have a specific disciplinary view as opposed to a multidisciplinary perspective.

The theoretical deficits behind this latter observation are important: assumptions about neo-classical or rational choice behaviour dominate, while broader concepts that combine behavioural theories based on individual perceptions and interests with influencing social norms and expectations are not present (see Burton 2004b). Hence, not only representative empirical studies but also more fundamental research on integrative theory for biodiversity conservation is necessary.

The results presented above suggest that the empirical bases for the leading assumption of EU's agri-environmental policies have limitations: economic interests are an important, but not the only, determining factor for farmers' decision-making. For example, particular differences between public and in-group perception exist with respect to the role farmers assume in biodiversity conservation. While in a German survey nearly all experts from the agricultural sector adopt a market-based view and agree that biodiversity conservation is a relevant task and a possible future source of

income for farmers (Knierim and Siebert 2005), farmers themselves tend to opt for a defensive attitude and do not consider themselves as proactive resource managers.

Summarising the findings of the literature study with respect to policy implementation and evaluation, it becomes obvious that support for practices oriented towards biodiversity protection should not be viewed in a static sense – as a situation determined by one or several influencing factors – but, rather, as a process marked by interaction. Financial compensation and incentives function as a necessary, though clearly not sufficient, condition in this process. Policy examples of this sort of multifactorial, interactive understanding of motivation being put into practice include the Blümlswiesenprogramm (meadow flowers programme) (Briemle and Oppermann 2003) in Baden-Württemberg in Germany and the biodiversity protection programme in the canton of Graubünden in Switzerland (Baumgärtner and Hartmann 2001). Both policy approaches explicitly link an economic incentive with an advisory component and an expectation that the farmer will actively assume responsibility at the level of the business. Other examples are largely limited to the local or regional level (Luz 1994; Mantau 1992, 1999; Oppermann *et al.* 1997; Brendle 1999).

The literature analysis showed that co-operative approaches are very promising for biodiversity conservation in agriculture in general. However, these examples come mainly from non-EU countries, such as Australia, Canada and Switzerland. In the EU, only The Netherlands has long-term and wide-ranging experiences in the application of co-operative concepts, with a high level of participation among farmers as well as satisfactory assessments. It appears that the EU is questioning this initiative by demanding that payments go directly to the farmers, not indirectly by means of the nature conservation bodies. Yet active acceptance of biodiversity protection can only be achieved through a process of dialogue. Indeed, one of the key parts of the literature emphasises that policy needs to be sensitised to local conditions. This means not only the local ecology and economy but also the connections policy has to farmers' lived worlds; to the invisible work they do; and to their own knowledge. Many biodiversity measures tend to rely on unreflexive assumptions about farming: that the measures can be accomplished regardless of a difference in social milieu. Those policies implicitly standardise behaviour and keep it as a constant within measures and schemes, thereby oversimplifying the complex social/natural network in which the farmer exists (Kaljonen 2006). In contrast, our findings emphasise that the capacity of farmers to act represents a key direction for future research and the task of influencing and changing behaviour needs to be conceived of as a medium- to long-term process.

Notes

* Corresponding author.

¹ BIOFACT, assessing factors that affect farmers' willingness and ability to co-operate with biodiversity policies, is a collaborative research project between institutions from Finland, Germany, Hungary, The Netherlands, Spain and the UK. We gratefully acknowledge the support of the European Commission in funding the project as part of the Fifth Framework programme (Research grant no. QLK5-CT-2002-30241).

² 1973 – First EU Environmental Action Programme; 1975 – less favoured Areas Directive (75/268); 1979 – Birds Directive (79/409/EEC); 1980 Drinking Water Directive (80/778/EEC); 1985 Commission's Green Paper; 1991 Nitrates Directives (91/676/EEC), 1992

Habitats Directive (92/43/EEC); 1992 Agri-environmental regulation (2078/92); 1992 Fifth Environmental Action programme; 1999 Agenda 2000 (1257/99); 2000 – Sixth EU Environmental Action programme.

- ³ The components are (1) knowledge of ecological problems and issues; (2) subjective assessment of one's own capabilities; (3) attitudinal variables; (4) external influencing factors (both incentives and obstacles); (5) 'habits' (taken-for-granted routines etc.).
- ⁴ These results show no significant difference between participants and non-participants of AEMs.

References

- EEC (1999) Council Regulation 1257/99 Available online at http://ec.europa.eu/agriculture/rur/leg/1257_en.pdf#search=%22EEC%20%22regulation%201257%2F99%22%22 Accessed 19 September 2006
- EU (2003) Regulation 1782/03
- EEC (1992) Habitats Directive 43/92 Available online at http://ec.europa.eu/environment/nature/nature_conservation/eu_nature_legislation/habitats_directive/index_en.htm Accessed 19 September 2006
- Aarts, N. and C. v. Woerkum (1994) *Wat heet natuur? De Communicatie tussen overheid en boeren over natuur en natuurbeleid* (Wageningen: Landbouwwuniversiteit)
- Aarts, N. and C. v. Woerkum (1999) Communication and nature policies: the need for an integral approach to policy design. Pp. 33–49 in C. Leuwis *Innovation in agriculture and resource management* (Wageningen: Mansholt Institute)
- Aarts, N. and C. v. Woerkum (2000) *Communication in nature management policy making. communicating nature conservation – a manual on using communication in support of nature conservation policy and action* (Tilburg: European Centre for Nature Conservation)
- Ajzen, I. (1991) The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes* 50, pp. 179–211
- Battershill, M. and A. Gilg (1997) Socio-economic constraints and environmentally friendly farming in the southwest of England. *Journal of Rural Studies* 13 (2) pp. 213–228
- Baumgärtner, J. and J. Hartmann (2001) The design and implementation of sustainable plant diversity conservation program for alpine meadows and pastures. *Journal of Agricultural & Environmental Ethics* 14 (1) pp. 67–83
- Borrini-Feyerabend, G., M. Taghi-Farvar, J.C. Nguinguiri and V. Ndongang (2000) *Co-management of natural resources: organising, negotiating and learning-by-doing* GTZ and IUCN (Heidelberg: Kasperek-Verlag)
- Brendle, U. (1999) *Musterlösungen im Naturschutz – Politische Bausteine für erfolgreiches Handeln*. Bundesamt für Naturschutz, Bonn
- Briemle, G. and R. Oppermann (2003) *Von der Idee zum Programm – die Förderung des artenreichen Grünlandes in MEKA II*. Pp. 26–32 in R. Oppermann und H.U. Gujer eds, *Artenreiches Grünland bewerten und fördern – MEKA und ÖQV in der Praxis* (Stuttgart: Eugen Ulmer)
- Brouwer, F. and J. v.d. Straaten (2002) Agriculture and nature in conflict? in F. Brouwer and J. v.d. Straaten eds, *Nature and agriculture in the European Union: new perspectives on policies that shape the European countryside* (Cheltenham, UK and Northampton MA, USA: Edward Elgar)
- Brouwer, F., C.J.A.M. de Bont and C. van Bruchem eds (2002) *Landbouw, Milieu, Natuur en Economie*. Editie 2001/2002 (Den Haag: Landbouw Economisch Instituut)
- Buller, H. (2000) Regulation 2078: patterns of implementation. Pp 219–253 in H. Buller, G.A. Wilson and A. Höll eds, *Agri-environmental policy in the European Union* (Aldershot: Ashgate)
- Buller, H. and C. Morris (2003) Farm animal welfare: a new repertoire of nature-society relations or modernism re-embedded? *Sociologia Ruralis* 43 (3), pp. 216–237

- Burton, R.J.F. (2004a) Seeing through the 'good farmer's' eyes: towards developing an understanding of the social symbolic value of 'productivist' behaviour. *Sociologia Ruralis* 44 (2) pp. 195–215
- Burton, R.J.F. (2004b) Reconceptualising the 'behavioural approach' in agricultural studies: a socio-psychological perspective. *Journal of Rural Studies* 20 (3) pp. 359–371
- Curry, N. (1997) Providing new environmental skills for British farmers. *Journal of Environmental Management* 50 (2) pp. 211–222
- Deffuant, G. (2001) Improving agri-environmental policies: a simulation approach to the cognitive properties of farmers and institutions. Final report of the FAIR3 CT 2092 project. Available online at <http://www.lisc.clermont.cemagref.fr/images/project/FinalReport/final%20report%20V2last.pdf> Accessed 19 September 2006
- Drake, L., P. Bergström and H. Svedsäter (1999) Farmers' attitude and uptake. Pp. 89–111 in G. v. Huylenbroeck and M. Whitby eds, *Countryside stewardship: farmers, policies and markets* (Oxford: Elsevier Science)
- Ellen, R. and K. Fukui eds (1996) *Redefining nature: ecology, culture and domestication*. (Oxford: Berg)
- Falconer, K. (2000) Farm-level constraints on agri-environmental scheme participation: a transactional perspective. *Journal of Rural Studies* 16 (3) pp. 379–394
- Fay, F. (1999) Impact of agri-environment measures (PDF-file). Available online at http://ec.europa.eu/agriculture/envir/report/en/2078_en/report.htm Accessed 19 September 2006
- Fish, R., S. Seymour and C. Watkins (2003) Conserving English landscapes: land managers and agri-environmental policy. *Environment and Planning A* 35 (1) pp. 19–41
- Gravsholt Busck, A. (2002) Farmers' landscape decisions: relationships between farmers' values and landscape practices. *Sociologia Ruralis* 42 (3) pp. 233–249
- Halfacree, K. (1999) Contrasting roles for the post-productivist countryside. Pp. 70–93 in P. Cloke and J. Little eds, *Contested countryside cultures* (London: Routledge)
- Ham, A. v. d. (1998) Farmers with nature: how do we perceive outside? *Publicatie Landbouw Economisch Instituut* 3.167, pp. 45. Available online at <http://opc4.kb.nl/DB=1/SET=6730/TTL=1\CLK?IKT=1004&TRM=ham,aart+van+den> Accessed 19 September 2006
- Harrison, C.M., J. Burgess and J. Clark (1998) Discounted knowledge: farmers' and residents' understandings of nature conservation goals and policies. *Journal of Environmental Management* 54 (4) pp. 305–320
- Holm-Müller, K. (2003) *Bewertung nicht-marktfähiger Leistungen der Landwirtschaft – eine Herausforderung für die Forschung*. *Agrarwirtschaft* 52 (8) pp. 353–355
- Hunecke, M. (2002) *Beiträge der Umweltpsychologie zur sozial-ökologischen Forschung*. Pp. 499–515 in Bundesministerium für Bildung und Forschung ed, *Sozial-ökologische Forschung – Ergebnisse der Sondierungsprojekte aus dem BMBF-Förderschwerpunkt* (Munich: ökom verlag)
- Juntti, M. and C. Potter (2002) Interpreting and reinterpreting agri-environmental policy: communication, trust and knowledge in the implementation process. *Sociologia Ruralis* 42 (3) pp. 215–232
- Kaljonen, M. (2002) *Maatalouden ympäristötuen paikallisia sovellutuksia* (Local dynamics of agri-environmental policy) (Vaasa: West Finland Regional Environment Centre)
- Kaljonen, M. (2006) Co-construction of agency and environmental management. The case of agri-environmental policy implementation at Finnish farms. *Journal of Rural Studies* 22 (2) pp. 205–216
- Kazenwadel, G., B. van der Ploeg, P. Badoux and G. Häring (1998) Sociological and economic factors influencing farmers' participation in agri-environmental schemes. Pp. 187–203 in S. Dabbert, A. Dubgaard, L. Slangen and M. Whitby *The economics of landscape and wildlife conservation* (Wallingford: CAB International)

- Knierim, A. (2001) *Konflikte erkennen und bearbeiten. Aktionsorientierte Forschung zwischen Landwirtschaft und Naturschutz in Brandenburg. Sozialwissenschaftliche Schriften zur Landnutzung und ländlichen Entwicklung* 45 (Weikersheim: Margraf Verlag)
- Knierim, A. and R. Siebert (2005) *Förderung des Biodiversitätsschutzes durch Landwirte – eine Analyse des aktuellen Wissensstands*. Pp. 489–500 in K. Hagedorn, U.J. Nagel and M. Odening eds, *Umwelt- und Produktqualität im Agrarbereich. Schriften der Gesellschaft für Wirtschafts- und Sozialwissenschaften des Landbaus e.V.* 40 (Berlin: GeWiSoLa)
- Kornfeld, B. and H.K. Wytzens (2003) *Zielgruppen für den Vertragsnaturschutz – Strukturanalyse der Teilnehmer an Naturschutzprogrammen in Niederösterreich*. Pp. 269–276 in M. Penker and S. Pfusterschmid eds, *Wie steuerbar ist die Landwirtschaft?* (Wien: Facultas)
- Kröger, L. (2002) *Osallistuva suunnittelu maatalouden ympäristöpolitiikassa. Viljelijöiden näkemyksiä osallistumisesta, vaikuttamismahdollisuuksista ja ympäristönhoidosta*. (Participatory planning and decision-making in agri-environmental policy. Farmers' views on participation and production of environmental goods) (Helsinki: MTT Economic Research, Agrifood Research Finland)
- Kumpulainen, M. (1999) *Maan ja talouden välissä. Viisi kertomusta suomalaisen maatilan luontosuhteiden muutoksesta* (Land versus agrobusiness. Five narrations on the changes in the nature relations of Finnish Farms) (Joensuu: University of Joensuu, Dept. of Geography)
- Latour, B. (1999) *Pandora's hope: essays on the reality of science studies*, Cambridge, MA: Harvard University Press
- Law, J. (2004) *After method* (London: Routledge)
- Lettmann, A. (1995) *Akzeptanz von Extensivierungsstrategien in Nordrhein-Westfalen. Forschungsberichte Heft 20* (Witterschlick/Bonn: Verlag M. Wehle)
- Lind, A.E. and T.R. Tyler (1988) *The social psychology of procedural justice* (New York and London: Plenum Press)
- Little, J. and R. Panelli (2003) Gender research in rural geography gender, place and culture. *A Journal of Feminist Geography* 10 (3) pp. 281–289
- Lobley, M. and C. Potter (1998) Environmental stewardship in UK agriculture: a comparison of the ESA programme and the Countryside Stewardship Scheme in south east England. *Geoforum* 29 (4) pp. 413–432
- Lütz, M. and O. Bastian (2000) *Vom Landschaftsplan zum Bewirtschaftungsentwurf. Zeitschrift für Kulturtechnik und Landentwicklung* 41 (6) pp. 259–266
- Luz, F. (1994) *Zur Akzeptanz landschaftsplanerischer Projekte – Determinanten lokaler Akzeptanz und Umsetzbarkeit von landschaftsplanerischen Projekten zur Extensivierung, Biotopvernetzung und anderen Maßnahmen des Natur- und Umweltschutzes* (Frankfurt/Main, Berlin, Bern, New York, Paris, Vienna: Lang)
- Mährlein, A. (1993a) *Einzelwirtschaftliche Auswirkungen von Naturschutzaufgaben: eine theoretische und empirische Analyse unter besonderer Berücksichtigung Niedersachsens. Schriften zur Umweltökonomik* 5, 2. Auflage (Kiel: Wissenschaftsverlag Vauk)
- Mährlein, A. (1993b) *Grünlandschutzprogramme aus Sicht der Landwirtschaft. Zeitschrift für Kulturtechnik und Landentwicklung* 34, pp. 311–318
- Mantau, R. (1992) *Konfliktmanagement als Aufgabe der Beratung – dargestellt am Zielkonflikt Landwirtschaft/Wasserwirtschaft. Berichte über Landwirtschaft* 70, pp. 30–39
- Mantau, R. (1999) *Kooperation statt Konfrontation. Berichte über Landwirtschaft* 77 (2) pp. 201–213
- Morris, C. and C. Potter (1995) Recruiting the new conservationists: farmers' adoption of agri-environmental schemes in the UK. *Journal of Rural Studies* 11 (1) pp. 51–63
- Morris, J., J. Mills and I.M. Crawford (2000) Promoting farmer uptake of agri-environment schemes: the Countryside Stewardship Arable Options Scheme. *Land Use Policy* 17 (3) pp. 241–254
- Murdoch, J. and J. Clark (1994) Sustainable knowledge. *Geoforum* 25 (2) pp. 115–132
- Nagel, U.J. (1979) Knowledge flows in agriculture. linking research, extension and the farmer. *Zeitschrift für ausländische Landwirtschaft* 18 (2) pp. 135–150

- Nieminen, M. (1999) What land, what nature, what threat? Pp. 180–196 in E. Konttinen, T. Litmanen, M. Nieminen and M. Ylönen eds, *All shades of green. The environmentalization of Finnish society* (Jyväskylä: SoPhi)
- Nieminen, M. (2003) *Globaalin ja paikallisen kohtaaminen luonnonsuojelussa* (Encounters of global and local in nature conservation). Pp. 145–162 in L. Suopajärvi and J. Valkonen eds, *Pohjoinen luontosuhde. Elämäntapa ja luonnon politisoituminen* (Rovaniemi: University of Rovaniemi)
- Nolten, R. (1997) *Implementation von Naturschutzsonderprogrammen. Eine empirische Untersuchung in Nordrhein-Westfalen. Bonner Studien zur Wirtschaftssoziologie* 8 (Witterschlick/Bonn: Verlag M. Wehle)
- Oberbeck, H. and R. Oppermann (1994) *Agrarwirtschaft und Dörfer am Scheideweg. Erfahrungen von Landwirten mit dem Wandel gesellschaftlicher Akzeptanz der landwirtschaftlichen Intensivproduktion. Soziale Welt* 45 (3) pp. 259–278
- OECD (Organisation for economic co-operation and development) (1998) *Co-operative approaches to sustainable agriculture* (Paris: OECD)
- OECD (Organisation for economic co-operation and development) (2000). *Agricultural knowledge systems addressing food safety and environmental issues. Second Conference of Directors and Representatives of Agricultural Knowledge Systems (AKS)*. 10–13 January 2000 (Paris: OECD)
- Oerlemans, N., J.A. Guldmond and E. van Well (2001) *Agrarische natuurverenigingen in opkomst. Een eerste verkenning naar natuurbeheeractiviteiten van agrarische natuurverenigingen. Centrum voor Landbouw en Milieu* 29 (Utrecht: CLM [Centrum voor Landbouw en Milieu])
- Oksanen, A. (2003) *Paikallisen ja kansainvälisen kohtaaminen luonnonsuojelussa* (Confrontation between local and international interests in nature conservation) (Turku: University of Turku)
- Oppermann, B., F. Luz and G. Kaule (1997) *Der 'Runde Tisch' als Mittel zur Umsetzung der Landschaftsplanung. Angewandte Landschaftsökologie* 11 (Bonn-Bad Godesberg: Bundesamt für Naturschutz)
- Osterburg, B. (2001) *Umsetzung der VO (EWG 2078/92) in Deutschland – Wirkungen auf Umwelt, landwirtschaftliche Produktion und Einkommen*. Pp. 13–24 in B. Osterburg and H. Nieberg eds, *Agrarumweltprogramme – Konzepte, Entwicklungen, künftige Ausgestaltung, Sonderheft* 231 (Braunschweig: Landbauforschung Völkenrode)
- Palviainen, S. (1996) *Maanviljelijä ja ympäristödiskurssi* (Farmer and environmental discourse) Publications of Karelian Institute 113 (Joensuu: University of Joensuu)
- Paniagua, M.A. (2001) Agri-environmental policy in Spain. The agenda of social-political developments at the national, regional and local levels. *Journal of Rural Studies* 17 (1) pp. 81–79
- Petersen, J.-E. (1998) The implementation of Regulation 2078/92/EEC in Spain. A case study of the cereal steppes ESA in Castilla y León. Submitted to the University of East Anglia for the degree of Doctor of Philosophy
- Plankl, R. (2001) *Entwicklung der Agrarumweltprogramme in Deutschland und der EU – ein Überblick*. Pp. 1–11 B. Osterburg and H. Nieberg eds, *Agrarumweltprogramme – Konzepte, Entwicklungen, künftige Ausgestaltung, Sonderheft* 231 (Braunschweig: Landbauforschung Völkenrode (FAL))
- Polman, N.B.P. and L.H.G. Slangen (2001) 'Ecoöperatie, natuurlijk!' *Economisch-statistische berichten: algemeen weekblad voor handel, nijverheid, financiën en verkeer* 86 (4317) pp. 561–563
- Pongratz, H. (1992) *Die Bauern und der ökologische Diskurs*. (Munich, Vienna: Profil Verlag)
- Potter, C. and M. Lobley (1992) Ageing and succession on family farms. *Sociologia Ruralis* 32 (2/3) pp. 317–334
- Potter, C., H. Cook and C. Norman (1993) The targeting of rural environmental policies: an assessment of agri-environment schemes in the UK. *Journal of Environmental Planning and Management* 36 (2) pp. 199–216

- Retter, C., K. Stahr and H. Boland (2002) *Zur Rolle von Landwirten in dörflichen Kommunikationsnetzwerken. Berichte über Landwirtschaft* 80 (3) pp. 446–467
- Ribbe, L. (2002) *Anmerkungen über die Umweltverträglichkeit des EU-Agrarhaushalts. Projektstudie im Rahmen des Projektes 'Landwirtschaft und Umwelt – Agenda 2007' (Rheinbach/Hamm/Singen: Stiftung Europäisches Naturerbe [EURONATUR]/Arbeitsgemeinschaft bäuerliche Landwirtschaft [AbL]/Institut für Landschaftsökologie und Naturschutz [ILN])*
- Röling, N.G. (1988) *Extension science: information systems in agricultural development* (Cambridge: University Press)
- Röling, N.G. and A.E. Wagemakers eds (1998) *Facilitating sustainable agriculture* (Cambridge: University Press)
- Rost, J. (1996) Theorien menschlichen Handelns. In G. Michelsen ed., *Handbuch zur umweltberatung* (Bonn: Economica)
- Saaristo, K. (2000) *Avoim Asiantuntijuus. Ympäristökysymys ja monimuotoinen ekspertiisi* (Open expertise. The environmental question and diversified expertise) (Jyväskylä: Research Centre for Contemporary Culture)
- Schramek, J., D. Biehl, H. Buller and G.A. Wilson eds (1999a) *Implementation and effectiveness of agri-environmental schemes established under Regulation 2078/92. Volume 1. Main Report* (Frankfurt/Main: Institut für ländliche Strukturforchung)
- Schramek, J., D. Biehl, H. Buller and G.A. Wilson eds (1999b) *Implementation and effectiveness of agri-environmental schemes established under Regulation 2078/92. Volume 2. Annexes* (Frankfurt/Main: Institut für ländliche Strukturforchung)
- Schur, G. (1990) *Umweltverhalten von Landwirten. Campus Forschung* 652 (Frankfurt/Main and New York: Campus-Verlag)
- Siebert, R. and A. Knierim (1999) *Divergierende Nutzungsinteressen in Schutzgebieten – Konflikte und Lösungsansätze in Brandenburg. Zeitschrift für Kulturtechnik und Landentwicklung* Vol. 40 (4) pp. 181–186
- Silvasti, T. (2001) *Talonpojan elämä. Tutkimus elämäntapaa jäsentävistä kulttuurisista malleista* (The peasant's life. Research on the way cultural models shape lifestyles) (Helsinki: Suomalaisen Kirjallisuuden Seura)
- Silvis, H.J. and C. v. Bruchem ed. (2002) *Landbouw Economisch Bericht* (Agricultural economic report of The Netherlands 2002). Landbouw Economisch Instituut 204 (Den Haag: Landbouw Economisch Instituut)
- Simon, H. (1955) A behavioral model of rational choice. *The Quarterly Journal of Economics*, vol. 69, Feb. 1955: 99–118
- Stoll, S. (1999) *Akzeptanzprobleme bei der Ausweisung von Großschutzgebieten. Ursachenanalyse und Ansätze zu Handlungsstrategien* (Frankfurt/Main, Berlin, Bern, Brussels, New York, Vienna: Lang)
- Vehkala, M. and A. Vainio (2000) *Luonnonsojelen yhteiskunnallinen ulottuvuus* (The social dimension of nature conservation) (Vaasa: Research Institute at the University of Vaasa)
- Velde, H., N. Aarts and C. v. Woerkum (2002) Dealing with ambivalence: farmers and consumers perception of animal welfare in livestock breeding. *Journal of Agricultural and Environmental Ethics* 15 (2) pp. 203–219
- Walford, N. (2002) Agricultural adjustment: adoption of and adaptation to policy reform measures by large-scale commercial farmer's. *Land Use Policy* 19 (3) pp. 243–257
- Weis, J., T. Muchow and W. Schumacher (2000) *Akzeptanz von Programmen zur Honorierung ökologischer Leistungen der Landwirtschaft*. Pp. 107–120 in B. Schweppe-Kraft ed, *Innovativer Naturschutz – partizipative und marktwirtschaftliche Instrumente. Angewandte Landschaftsökologie* 34 (Bonn-Bad Godesberg: Bundesamt für Naturschutz)
- Wiggering, H. and K. Helming eds (2003) *Sustainable development of multifunctional landscapes* (Berlin: Springer)
- Wilson, G. (1996) Farmer environmental attitudes and ESA participation. *Geoforum* 27 (2) pp. 115–131

- Wilson, G. (1997a) Factors influencing farmer participation in the Environmentally Sensitive Areas scheme. *Journal of Environmental Management* 50 (1) pp. 67–93
- Wilson, G. (1997b) Assessing the environmental impact of the Environmentally Sensitive Areas scheme: a case for using farmers' environmental knowledge? *Landscape Research* 22 (3) pp. 303–326
- Wilson, G. and K. Hart (2000) Financial imperative or conservation concern? EU farmers' motivations for participation in voluntary agri-environmental schemes. *Environment and Planning A* 32 (12) pp. 2161–2185
- Wilson, G. and K. Hart (2001) Farmer participation in agri-environmental schemes: towards conservation-orientated thinking? *Sociologia Ruralis* 41 (2) pp. 254–274
- Winter, M., J. Mills and A. Wragg (2000) (with contributions from P. Selman, C. Potter and D. Shepherd) Practical delivery of farm conservation management in England. *English Nature Research Report* 393 (Peterborough: English Nature)

Rosemarie Siebert

Leibniz-Zentrum fuer Agrarlandschaftsforschung (ZALF)
Institute of Socio-Economics
Eberswalder Str. 84
D – 15374 Muencheberg, Germany
e-mail: rsiebert@zalf.de

Mark Toogood

School of Natural Resources
University of Central Lancashire
Preston, PR1 2HE, UK
e-mail: mtoogood@uclan.ac.uk

Andrea Knierim

Leibniz-Zentrum fuer Agrarlandschaftsforschung (ZALF)
Institute of Socio-Economics
Eberswalder Str. 84
D – 15374 Muencheberg, Germany
e-mail: aknierim@zalf.de