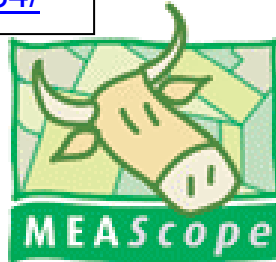




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Case Study on Regional Differences in Social Demand for Commodity and Non-Commodity Concerns Deliverable 6.3

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Abbreviations

CV	Contingent Valuation
CVM	Contingent Valuation Method
DE	Germany
DK	Denmark
EMA	European Model of Agriculture
EV	Equivalent Variation
EVM	Expert Valuation Method
GDP	Gross Domestic Product
IT	Italy
MCA	Multi-Criteria Analysis
MS	Market Stalls
NCO	Non-Commodity Output
NUTS	Nomenclature des unités territoriales statistiques
OECD	Organisation for Economic Co-operation and Development
OPR	Ostprignitz-Ruppin
PL	Poland
PPS	Purchasing Power Standards
RP	Revealed Preference
SDA	Stakeholder Delphi Approach
SMEs	Small and medium enterprises
SP	Stated Preferences
UAA	Utilised Agricultural Area
TEV	Total Economic Value
WTP	Willingness to pay

Executive summary

In order to foster a multifunctional agriculture that is adapted to the societal demand, the preferences of the regional population for functions provided by agriculture have to be identified. This demand, however, is difficult to measure economically, since multifunctionality is partly concerned with public goods.

Our study aimed at identifying the societal demand for economic, ecological and socio-cultural functions of agriculture and the underlying reasons within the framework of multifunctionality. Therefore, methods which can measure several functions at the same time and which include also qualitative information in addition to revealing Willingness-to-pay (WTP) values were regarded as most appropriate.

For our research question, we opted for an indirect method, based on stated, collective preferences of regional representatives and experts for rural development (e.g. mayors from towns located in the case studies, representative from tourist or environmental organisations, experts from agricultural or regional administrative bodies, coordinators of Leader projects and researchers). We applied Stakeholder Delphi Approach: The first step aimed at seizing the whole range of relevant views on the issue by individual face-to-face interviews, while the second step condensed this information to a prioritisation of functions using a budget game approach. The results of the interviews were analysed by means of qualitative content analysis. Prioritisations and budget allocations were interpreted with descriptive statistics.

Assuming that there are regional differences concerning the societal demand, this study was implemented in four case studies: River Gudenå (Denmark), Ostprignitz-Ruppin (OPR) (Germany), Mugello, (Italy), and Kościan (Poland). First, each case study was analysed separately, then a cross-country comparison was carried out.

The results of this research indicate that there is a considerable societal demand for multifunctional agriculture in all cases studied. However, the roles the stakeholders attributed to regional agriculture varied between the case studies. In most of the case studies, the stakeholders opted for a relatively balanced demand allocation in terms of economic, ecological, and socio-cultural functions, whereas the stakeholders in OPR put a slight emphasis on economic functions.

While the stakeholders of the OPR case study gave absolute priority to the provision of jobs, the stakeholders in the Danish case study were strongly concerned about the elimination of negative effects of agriculture such as smells and nitrate in drinking water. In both cases a significant share of the demand was allocated towards para-agricultural activities, such as agri-tourism and the provision of renewable energies, whereas functions directly related to food production attained a relatively small proportion of the demand.

The case study “Kościan” in Poland suggests, in contrast, a strong societal demand for food-production related functions, such as regional food supply and quality food production, while an improvement of the rural infrastructure was also highly prioritised.

In the case of Mugello (Italy) two clusters of agricultural functions were identified: A high societal demand was stated both for the functions related to food production and landscape related functions, including the maintenance of a hydro-ecological equilibrium.

We conclude that despite the regional differences concerning the importance of multifunctional services of agriculture, there is a strong demand for multifunctional agriculture as a whole.

These results have to be interpreted with care, given the explorative character of the study. We faced a variety of methodological challenges. Particularly, the relatively small sample per case study and the limited information flow to the involved stakeholders needs to be addressed in future studies. Nevertheless, our results give valuable insights into the demand structure and its underlying reasons for the complex matter of multifunctionality.

Thus, on the basis of our results we are able to provide policy recommendations for a future Model of European Agriculture backed by the preferences prevailing in society. Furthermore, we give suggestions for further research concerning the societal demand for the functions of agriculture.

1. Introduction and aims of the study

Different frameworks have been established to assess the multifunctionality of agriculture, while the framework of the Organisation for Economic Co-operation and Development (OECD) has become the most influential on international level (Le Cotty et al., 2005). According to the analytical framework for multifunctionality of the OECD, commodity outputs and (multiple) non-commodity outputs (NCOs) are jointly produced by agriculture. As some of these NCOs can be regarded as public goods or externalities, markets for these NCOs do not exist or function poorly (OECD, 2001).

Contrary to the positive, supply oriented frameworks of the OECD and the WTO, the European Commission applies a normative, demand-orientated approach (Casini et al., 2004; European Commission, 2003). This approach is based on the view that the property rights of land are with the society as a whole rather than with the owners of land. Hence, the society is legitimised to decide on land use and landscape design. The European Model of Agriculture (EMA) is thus multifunctional by integrating the interrelated objectives of farmers and society on the production, territorial and social level. From the researchers' point of view, this approach requires that the societal demand for NCOs is analysed on regional level (Yrjölä & Kola, 2004).

However, due to the absence of functioning markets, the demand for NCOs cannot be determined as straightforwardly as for commodities. Resource economics offer a wide range of methods for such a valuation of public goods and externalities, albeit all of these methods have their specific disadvantages which still make a valuation of non-commodity outputs problematic (Bateman, 1994).

In this study we employ the demand-orientated approach of multifunctionality using a Delphi technique with regional stakeholders and experts. This study aims to:

- clarify the role that agriculture plays in the regions,
- identify the regional demand for the multifunctionality of agriculture,
- explore reasons for the regional demand for multifunctionality of agriculture,
- reveal the regional differences in the societal demand for the functions of agriculture.

Following this introduction, the existing literature on socio-economic approaches which can help to identify the societal demand for the multifunctionality of agriculture is reviewed (Section 2). Against this theoretical background, we will classify and describe the approach selected for this project (Section 3). The results section (Section 4) will firstly point out the results from each case study and then compare them across the case studies (Section 5). The study concludes with a review of the methodology and implications of the research results for policy (Section 6).

2. Measuring the demand for multifunctionality

The normative approach of welfare economics is concerned with the problem of finding the optimal condition for a modelled society, taking into account the central assumptions of neo-classical theory. Within this theory, money is the unit, which determines the welfare of individuals. As individuals act in order to maximise their welfare, the individuals' willingness to pay (WTP) reflects the strength of their preferences (Faucheux & Noël, 1995; Marggraf & Streb, 1997).

Economists have been developing various techniques to value non-commodity outputs (NCOs), public goods and cultural amenities consistent with the microeconomic valuation of marketed goods; i.e. based on individual preferences. These techniques are based upon either observed behaviour (revealed preferences; RP) or stated preferences (SP) in surveys with respect to the public good. Furthermore, we distinguish between direct and indirect approaches. While direct methods straightforwardly deal with the concerned non-commodity, indirect methods derive values for the concerned non-commodity by investigating related aspects or commodities (see Table 1, Methods based on individual preferences).

Table 1 Classification of approaches to measure the Willingness-To-Pay (WTP)

	Indirect	Direct
Methods based on individual preferences		
Revealed preferences	Household Production Function Approach: - Travel Cost method - Averting Cost method Hedonic Price analysis	Simulated markets Market prices Replacement cost
Stated preferences	Contingent Ranking Choice Experiments/ Conjoint Analysis	Contingent Valuation Method
Methods based on collective preferences		
Revealed preferences	Implicit Valuation	
Stated preferences	Citizens' Juries Delphi Method Market stall Valuation workshop Expert Valuation Method Budget game	Multi-Criteria Analysis

Source: modified from Navrud (2000)

2.1 Approaches based on individual preferences

The **Household Production Function** approach aims to analyse changes in the consumption of commodities that are substitutes or complements for the public good in question. It comprises the **Travel Cost** method and the **Averting Cost** method. The **Travel Cost** method is often used to measure the demand for recreation. The travel costs to get to the site, entrance fees together with information about participation rates, visitor attributes and substitute sites are used to derive a measure for the use value of the recreational site. Therefore, the assumption has to be made that only use values are relevant for the concerned problem (Henseleit, 2006). However, non-use values often influence the decisions when public goods are concerned. Therefore, although based on revealed preferences, the explanatory power of the travel cost method is often limited (Ahlheim & Frör, 2003).

The **Averting Cost** method is based on the thought that a rational consumer will buy averting inputs up to the point where the marginal rate of substitution between purchased inputs and the collective environment equals the price ratio. The WTP for a change in the environment is derived by the rate of substitution and the price paid for the substitute to make the personal environment different from the collective environment (Navrud, 2000). In the context of our study this means, we can avoid to express the benefits directly in monetary terms by theorising that the benefit for society is at least as high as the costs of a policy or action that is undertaken to prevent or ameliorate an environmental or social problem or deficiency, because obviously society is willing to pay these costs (Bateman, 1994).

Both the Travel Cost method and the Averting Cost method have the major disadvantage that they can measure only the use value of a public good, whereas non-use values¹ are not considered. They share this characteristic with another indirect RP method: the **Hedonic Price** technique. Some environmental goods and services can be considered to be attributes of a market commodity. In Hedonic Pricing, particularly real properties are often used as market commodities. The economic value of negative effects from noisy streets or airports can be measured by comparing the rental fees with rental fees of similar houses or flats in other areas, where the examined effect (e.g. noisy street or airport) is missing. However, Hedonic Pricing studies are often difficult to conduct due to the lack of reliable data (Endres & Holm-Müller, 1998). On the other hand, Vanslembroeck & van Huylenbroeck (2003) used Hedonic Pricing and the Travel Cost Method in a multifunctionality-related context and found both methods providing evidence that "agriculture causes significant marginal benefits in terms of landscape".

¹ The Total Economic Value (TEV) is defined as the sum of use values and non-use values. While use values can be taken into account in most indirect techniques, non-use values cannot (Pearce, D. (1993), *Economic values and the natural world*, London.)

The direct RP methods comprise **Simulated Market** exercises, **Market Prices** and **Replacement Costs**. The simulation of a market means to create a real market for a public good (Navrud, 2000). Some impacts on the environment can be estimated by multiplying the market price difference of the public good before and after the researched factor was changed, multiplied by the amount of the gain or loss of this good.

According to Navrud (2000), the Replacement Costs method was implemented in the case of soil erosion. The value of the lost soil was calculated via the market prices for soil and fertilisers. As for the market price method, these prices, however, may not be related to the WTP, that the society attaches to the NCO.

The indirect stated preference techniques **Contingent Ranking** and **Choice Experiments** have gained popularity in environmental and resource economics (Ahrens & Harth, 2005; Alpizar et al., 2001; Bennett et al., 2004; Henseleit, 2006). Originally developed within psychology, Choice Experiments and Contingent Ranking studies consist of a set of questions with more than two alternatives posed to the respondent. While in Contingent Ranking studies, interviewees have to set up a ranking of the alternatives according to their WTP, interviewees in Choice Experiments choose between alternative products or conditions, usually according to their WTP (Hanley et al., 2001). Multivariate statistical calculations allow for a subsequent estimation of the preferences (Backhaus et al., 2006). Schmitz et al. (2003) used Choice Experiments to derive valuations of landscape functions. They argued that multi-attribute techniques are most suitable for multi-dimensional problems such as landscape and multifunctionality of agriculture because it is necessary to look at the problem as a whole, rather than concentrating on single aspects only. Simultaneously, it is possible to examine the importance of single aspects, e.g. environmental goods. Hanley (1998) stresses that of the Choice Modelling techniques only Choice Experiments are able to come up with welfare-consistent values in the strictly economic sense (Hanley et al., 1998).

The **Contingent Valuation Method (CVM)**, is a direct, stated preference method. After a preferably concrete and realistic situation has been described respondents directly state their WTP directly (Pearce, 1999), contrary to the abovementioned techniques. During the last decades, the use of the CVM for the valuation of environmental goods has widely spread and the results have received significant attention from the scientific community (Ahlheim & Frör, 2003; Colombo et al., 2003; Culinova et al., 2004; Hartl, Fox, J.S.; Pruckner, 2001; Roschewitz, 1999; Yriöla & Kola, 2004). The CVM received further recognition when the United States Department of the Interior launched an act to use CVM results for juridical estimations of economic damages to natural resources (Henseleit, 2006). Common guidelines (e.g. regarding survey design, formulation of questions) how to conduct a good CVM study were established (Arrow et al., 1993). In Europe, however, the CVM has never attained a similar level of popularity as a political decision-making tool as in the United States.

A CVM interview covers three steps: Firstly, the concerned good must be exactly described to the respondent; secondly, the hypothetical market must be explained to the respondent; and in the last step the interviewer will ask for the respondents' WTP (Ahlheim & Frör, 2003). Despite its general ability to produce reliable WTP estimations, there is a number of biases (information bias, hypothetical bias, embedding effect, etc.) which can negatively affect the results of CVM studies (Bateman, 1994; Fischer et al., 2003; Hampicke, 2003; Hanley et al., 1995; Henseleit, 2006; Mann, 2004; Randall, 2002).

2.2 Approaches based on collective preferences

Besides the above mentioned RP and SP techniques which are based on individual preferences and rooted in welfare economics, other methods for economic valuation of public goods based on collective preferences have been proposed (Mann, 2004). These methods are based on the preferences of policy makers, scientific experts or specific interest groups (see Table 1, Methods based collective preferences) and may be suitable to bypass the problems discussed above.

In the following paragraphs, common methods to assess the WTP from decision-makers', experts' or interest groups', namely **Implicit Valuation**, the **Multi Criteria Analysis**, the **Delphi Method**, **Citizen Juries**, the **Expert Valuation Method**, **Market Stalls**, and **Budget Games** are discussed.

The revealed-preferences method of **Implicit Valuation** reveals values that are implicitly present within policy decisions. Implicit Valuation assumes that the policy makers had complete information about the impacts on the non-commodity output, and that researchers are able to sort out these values from other considerations that are implicit in the decision (Carlsen et al., 1993). This technique can be regarded as an indirect, revealed preference method, unveiling policy makers' preferences rather than individual preferences.

Navrud (2000) proposes two possible applications for Implicit Valuation:

- In spite of the potential biases of Implicit Valuation, the method could serve as a corrective to policy makers by making them aware of the economic values they implicitly assign to environmental and cultural goods through the decisions they have made.
- The method can also be used to make policy makers aware of implicit values from decisions they are about to make, e.g., by pointing out the values they would tacitly attach to unvalued environmental impacts in a Cost Benefit Analysis dependent upon the project alternative they choose.

Stated, collective-preference approaches (participatory and expert-knowledge based) have gained importance as methods for the valuation of public goods in the latest years (Ananda & Herath, 2003). These studies often show surprisingly rich results, capable of complementing purely quantitative studies with a large sample, based on individual preferences (Fischer et al., 2003;

Kenyon & Nevin, 2001). Macmillan et al. (2002) argue that *"this type of group-based approach to environmental valuation offers important advantages over individual approaches, especially for unfamiliar and/or complex environmental goods"*.

As a direct, stated preference method the **Multi Criteria Analysis (MCA)** encompasses to identify decision criteria, a scale for each criterion, and different alternatives that score differently for the various criteria (European Commission, 1999). Usually, the criteria are aggregated to a single value in order to facilitate to judge the options. The aggregation may include a weighing of the criteria. There are different ways to weigh the criteria. It is possible to calculate the implicit trade-offs between units of each criterion in terms of the units of a specified criterion. If, for example, the cost to preserve the agricultural landscape is one of the criteria, this procedure can be used to calculate the WTP for changes in the aesthetic beauty of agricultural landscape, assuming that marginal changes in this public good could be identified and measured in a meaningful way (Navrud, 2000). An MCA can be conducted with experts, decision-makers, stakeholders and/or citizens (Kontoleon et al., 2001).

The concept of **Citizens' Juries** can be classified as an indirect stated preference technique although it does not primarily aim to elicit the WTP of the respondents. Citizens' Juries have been employed for making policy recommendations and setting priorities for public issues (Kenyon et al., 2003). Grounded in the theory of deliberative democracy (Smith & Wales, 1999), Citizens' Juries are built on the notion that citizens have no influence on the nature and substance of policy decisions. A citizens' jury is a small group of citizens that have been randomly selected to represent the general public rather than any interest group or sector (Brown et al., 1995). Citizens' Juries aim to overcome the information bias through conveying all necessary information to the jury members before they have to draw their decision (Kontoleon et al., 2001). So, the practical legitimisation of the Citizens' Jury approach lies in the assumption that the benefits of the higher degree of information of the respondents outweighs the disadvantage of a smaller sample.

Contrary to the Citizens' Juries the **Delphi method** is mostly based on expert panels. Originally developed as a forecasting instrument, it solicits the opinions of experts on a certain problem or issue (Turoff & Linstone, 1975). Delphi exercises administer more than one questionnaire with attached information to a group of experts. So, the experts are polled more than on time; and between the polls, information on the opinions of the group of experts as a whole is disseminated among the members of the group. Within the standard Delphi approach there is no direct interaction among the anonymous experts on the panel. This avoids common unintended group dynamics. The aim of such a standard Delphi panel is to reach consensus (within a range of tolerance) regarding the subject in question (Ziglio, 1996).

Although the Delphi method is frequently proposed for the valuation of environmental or other public goods (Kahn et al., 2001; Navrud & Pruckner, 1997), rather few examples of the use of the standard

Delphi method for environmental valuations have been found in literature. As one example Carson et. al. (1997) asked 30 experts for the valuation of a global public good, the Fes Medina in Morocco.

An economic and democratic legitimisation for such a selection of individual experts is derived from the concept of merit goods (Musgrave, 1959). Economic theory says that merit goods are less consumed if provided by the market mechanism because individuals typically consider how the specific good benefits them as individuals rather than the benefits that consumption generates for others in society. Therefore, the state is legitimated to decide as a principal for its citizens on the optimal provision of the merit good because, contrarily to individuals, the state has a high degree of information, decision-making power, and non-competing preferences (Erlei, 1992). Therefore, it can be argued that many of the NCOs of agriculture (biodiversity, soil quality, rural amenities, animal welfare, etc.) have merit good characteristics. This justifies looking at the entire complex of multifunctionality of agriculture from the merit good perspective using collective preference techniques.

With Market Stalls, Valuation Workshops, the Expert Valuation Method, and the Budget game four concepts were found which combine methods based on collective preferences with quantitative valuation exercises:

Based on the concept of citizens' juries, **Market Stalls (MS)** consist of usually around 12 persons who hear witnesses presenting evidence on the issue and decide on the issue. In order to achieve a larger sample, it is possible to conduct several parallel MS. Market Stalls are an attempt to combine the Citizens' juries approach with economic valuation. Similar to a Delphi approach, MS follows an iterative procedure with two workshops (Macmillan et al., 2002):

- The first workshop aims to inform the participants about the approach and discuss relevant questions. At the end of it a WTP question is posed to the respondents, which they have to answer confidentially.
- The second meeting is organised about one week after the first one, leaving time for the participants to reflect their thoughts on the specific topic. In this meeting, remaining questions regarding the approach can be posed and then the WTP question is re-administered to the participants.

Macmillan et al. (2002) stress the benefits of MS compared to a conventional contingent valuation study especially regarding the higher degree of information of the respondents and more time each participant has to answer the question.

In an analogous manner the **Valuation Workshop** aims to combine the quantitative outputs of CV with the participatory, deliberative preference construction aspects of the Citizens Juries (Kenyon & Hanley, 2000). A three-step workshop procedure is proposed:

- After an introduction, the respondents are asked to individually fill-in a contingent valuation questionnaire.

- In the second step, the participants discuss different aspects of the concerned issue. In Kenyon & Hanley's (2000) concrete case, they discussed good aspects and problems of a certain project, resulting in a ranked list of good aspects of the project and suggestions how to solve the problems, ranked according to their relative importance.
- In a final questionnaire, the participants are asked whether they would change their WTP after the discussion and why.

Also having in mind the constraints of the CVM, Mann (2004) developed the **Expert Valuation Method (EVM)**, which is closely related to the above approach. Mann used this method to monetarily assess the environmental benefits of the Swiss agri-environmental schemes according to the values that the population attaches to the benefits delivered by the scheme. Similar to the Delphi approach the EVM method is an iterative process. Contrary to a standard Delphi approach, however, in Mann's EVM study the experts were not anonymous and did not participate via letter or e-mail communication but came together to group discussions. In order to solicit the population's WTP through the EVM, Mann suggested to open the panel to practitioners instead of asking purely theoretical experts such as scientists (Mann, 2003).

Budget games have been used several times in the 1970s and 1980s to determine the absolute WTP for public goods (De Groot & Pommer, 1989). Von Ziehlberg (1999) used this method to find out the preferences and the WTP from a group of local level decision makers regarding agriculture and nature conservation. After elicitation of the relative importance of several issues in the context of agriculture and nature conservation in two workshops, these relative values were set in relation to the real regional budget spending in order to derive values for the potentially desired budget spending (assuming that there was no question whether to raise or lower the total budget size).

2.3 Comparison of the approaches

Comparing experts' and individuals' WTPs for biodiversity, Henseleit (2006) observes very similar values. She concludes that both studies with individuals and with experts can lead to realistic answers. Wenstop & Carlsen (1998) using CVM and Carlsen et al. (1993) using an expert-based MCA found very similar WTP values for avoiding the negative impacts on recreation, ecosystems and cultural heritage of a hydropower development project. The MCA study produced 14% lower values than the aggregated individual WTP in the CVM (Navrud, 2000) study. Apart from the above studies also other authors report an only small difference between individual preferences on the one hand and the preferences of interest groups/decision makers and experts on the other hand (Jung, 1996; Kenyon & Edwards-Jones, 1998; Van den Berg et al., 2005).

In general, identical values from both experts and individuals are considered the optimal case (WBGU, 1999). If collective-preference studies and studies based on individual preferences come to the same results, it could be argued in terms of efficiency of research to apply the quicker and

cheaper expert-knowledge based studies. Therefore, Ascher & Steelman (2006) argue *“to apply expert valuation more broadly to take advantages of public choices and that valuation does not presuppose formal benefit-cost analysis to be useful in environmental policy deliberations”*.

The seven exposed techniques, which reveal preferences of decision makers, experts and interest groups rather than the preferences of a random sample of the affected individuals, are often considered to be a reasonable and cost-extensive alternative to the techniques measuring individual preferences (Faucheux & Noël, 1995; Henseleit, 2006; Marggraf, 2003; Navrud, 2001). Moreover, it is assumed that by referring to expert knowledge, the information bias that is inherent to SP techniques based on individual preferences are minimised (Mann, 2004).

There are, however, general objections against the use of WTP techniques to derive economic values for environmental goods, regardless whether individuals or experts are consulted. Potential problems and biases that can occur are (Bateman, 1994; Fischer et al., 2003; Hampicke, 2003; Hanley et al., 1995; Henseleit, 2006; Mann, 2004; Randall, 2002):

- **Information bias:** Individuals may not have enough information to state their WTP. This applies especially to very complex questions in relation to multifunctional outputs of agriculture or rural development.
- **Strategic bias:** Respondents may purposely give incorrect answers because they hope to achieve other aims (e.g. free-rider behaviour).
- **Interviewer bias, starting point bias:** Like in any other method of empirical social research the interviewer or the formulation of the questionnaire might influence the respondent.
- **Hypothetical bias:** A hypothetical market is not comparable to a real one. Respondents are not used to value non-commodities or public goods. Some even might refuse to do so. Others might simply state a meaningless amount of money as their WTP.
- **Embedding effect:** As a special case of a hypothetical bias, the embedding effect leads to the fact that the respondents value only the quality but not the quantity of a good. In the case of biodiversity, some studies report that the same respondents stated a higher WTP for the conservation of a single species than for a set of species.
- **Warm glow effect:** When asked for issues with a moral value, which might be the case for a number of NCOs in our study, the interviewees state sums which they personally are willing to pay for charity purposes. This results in a valuation, which is not according to the micro-economic theory, where individuals only think of personal welfare maximisation.

As a further problem in the context of public goods, Hampicke (2003) emphasises the non-microeconomic thinking of the respondents (which also causes the warm glow effect). It is the exception rather than the rule that respondents are able to state their exact demand for a public

good and even if they could, public goods are often indivisible (Ahlheim & Frör, 2003). For instance, if a respondent was able to state the exact amount of fresh air he or she demands, it is most likely impossible to provide this exact amount just as it is unlikely to exactly satisfy the demand for, say, 0.89 l of milk, because milk is mostly rationed in 0.5 and 1 l packages. Therefore, the microeconomic idea of a marginal WTP differs significantly from reality in this concern. Furthermore, ethical values and normative conceptions are attached to public goods, making a valuation in a strictly microeconomic sense difficult. This critique is shared by Bateman (1994), who questions the appropriateness of individual preferences as a basis for judging the environmental and other values associated with a particular site or environmental benefit. He argues that the assumption that values can be measured on the basis of current income distributions may be wrong (Bateman, 1994).

This list of potential biases of stated preference studies reveals that these studies have to be conducted very accurately and results have to be interpreted with particular care, although many researchers stress that if SP studies are conducted correctly these biases could be avoided (Hampicke, 2003; Hanemann, 1994; Henseleit, 2006; Kontoleon et al., 2002).

Some scientists, however, express serious doubts whether the attempt of monetarisation of external costs and benefits should be undertaken at all (Macmillan et al., 1998; Nunes & van den Bergh, 2001). The fact that even selected experts who have a good overview of the subject in question refuse to attach monetary values to non-commodity goods, questions even more the answers of randomly chosen individuals. Mann (2003) experienced this whilst conducting an expert-knowledge based evaluation of benefits of agri-environmental programmes. While the experts agreed to score different policy options for their effects on environmental indicators, they refused to attach an absolute monetary value to them (Mann, 2003).

Alternatively to an absolute measurement, which is necessary to directly express the WTP, rating scales may be used in economic and sociological surveys. For these purposes, ordinal or interval scales, like Likert or Thorstone scales, have been introduced for the dependent variables. For practical reasons often an interval or ratio scaling level is assumed in order to allow for a quantitative statistical analysis (Stier, 1998; Tacq, 1997). A major disadvantage of this alternative procedure is, however, the lower information content, which leads to the fact that it is impossible to deduce absolute monetary values. While the interval scales lack only the information of an absolute zero point, in ordinal scaling even the distances between the values are not defined. On the other hand, the main advantage of using rating scales in the context of WTP studies is that the interviewees show a higher willingness to respond to certain abstract answers. For example, it is easier to answer whether the WTP is in a certain range than to determine an absolute value for oneself. Interviewees often get the impression that the determination of an exact value may pretend an exactness that is not given. This impression may let the interviewee refuse to answer (Hampicke, 2003; Stier, 1998). WTP values cannot be interpreted as ultimate absolute values, anyway, because as Ahlheim & Frör (2003) theorised, the CV approaches correspond to only one single transformation



of the utility function, while for example Equivalent Variation (EV) function corresponds to another transformation of the same economic utility function.

Particularly indirect methods are capable to cover both quantitative and qualitative aspects, because the subject in question is not directly asked for. In regard to complex questions, qualitative information can be used to supplement and interpret the quantitative data (Culinova et al., 2004). Especially the methods which are based on decision-makers', experts', and interest groups' preferences can be combined with qualitative questions because these surveys have the character of qualitative studies in terms of sample size and structure (Bitsch, 2001; Flick, 2002; Lewis, 2003/2004).

Summing up, we found several approaches to measure the demand for public goods which can be distinguished according to the kind of preferences studied (individual – collective, stated – revealed) and the type of questions (direct – indirect). Apart from methods that measure merely the WTP, particularly qualitative approaches were found to identify societal demands. As all approaches show strengths and weaknesses in specific research design, the choice of method has to be done and with respect to the specific aims of a study.

3. Methods

3.1 Selection of the approach

As outlined in chapter 1, this study aims to determine the societal demand for the multifunctionality of agriculture in relative values, to identify the reasons behind this demand and to clarify the role that agriculture plays in the case study regions. Considering the findings of the literature review in chapter 2, we opted for a mixed **panel of decision makers, stakeholders, and experts**, instead of polling individuals because of the following reasons:

- The primary reason to consult a group of decision makers, stakeholders, and experts is the information bias, which has been observed in many studies (see chapter 2). In the case of multifunctionality, this information bias has two distinct facets:
 - Multifunctionality of agriculture is a very complex case, and ordinary citizen might not have sufficient knowledge of the underlying processes. Regional representatives, such as majors or members of regional parliaments are more likely to have the necessary overview of regional contexts. Furthermore, they have been democratically legitimised to represent the regional population..
 - Besides a general overview (provided by regional representatives), it is necessary to have detailed expert knowledge of distinct topics. Biodiversity is a good example because the average citizen may not be aware of the direct impact of agriculture on the local flora and fauna. Experts, on the other hand, do have a high knowledge in their specific fields.
- It could be argued that multifunctionality is concerned with merit goods to a large degree (Erlei, 1992; OECD, 2001) because its value is higher than perceived by ordinary citizens. Thus, the consultation of representatives and experts may be democratically legitimate because citizens may want delegate their votes to principals who can draw decisions for them (see Fig. 1).
- Against the background of the limited resources that were available for this task and the case study approach in the project, we opted for a collective preference method, rather than on individual preferences. As delineated, this choice is justified by WTP studies that show a small difference between individual and expert-based studies.

As a **stated preference** technique our approach does rely on statements rather than behaviour. Since multifunctionality of agriculture is concerned with many different public goods, it can be assumed that non-use values make up a considerable share of the total economic value. It is therefore advisable to opt for a stated preference technique, which takes into account non-use values. Implicit valuation, which is the only expert based technique working with revealed

preferences, would need a lot of data on budget spending, which may often not directly be allocated towards specific functions of agriculture.

In order to fulfil the above mentioned aims we used an **indirect method**. As there were too many dimensions of a rural society affected by agriculture, we did not ask for the WTP directly but used a set of indirect questions in order to explore the demand for multifunctional agriculture. Taking into account the objections against monetarisation of NCOs, we assumed that it was too difficult to set absolute values for the interviewees. Furthermore, indirect questions may be able to reveal the underlying reasons behind the societal demand.

Thus, our approach may be classified as a blend of a standard Delphi approach, Mann's Expert Valuation Method (EVM) and a Budget Game (Budget exercise) as conducted by von Ziehlberg (1999). It will be called hereafter **Stakeholder Delphi Approach**. Since such a method has not been used before to determine the demand for multifunctionality of agriculture, the study had an exploratory character. The implementation of the approach is specified in section 3.2 and shown in Figure 1 below.

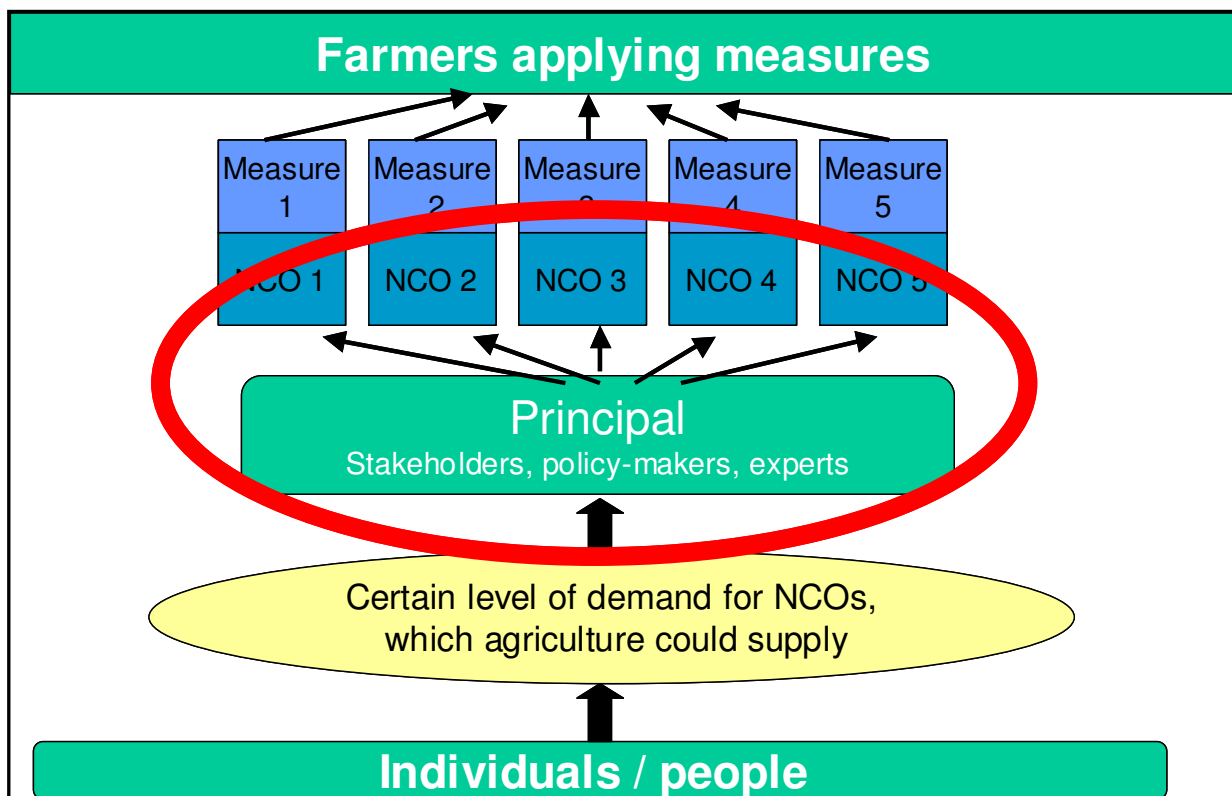


Fig. 1 Theoretical framework of the Stakeholder Delphi, modified from Mann (2003)

3.2 The Stakeholder Delphi Approach

In this study we consulted a set of principals, which had either the role of a representatives or experts. Representatives, on the one hand, are persons from democratically legitimised institutions, such as representatives of regional parliaments, district councils, mayors, representatives of farmers' unions, environment conservation organisations, tourism organisations, regional economy, regionally active movements, consumer associations, health organisations. Experts, on the other hand, are not democratically legitimised, but have close regional ties and are able to provide professional input through their knowledge (e.g. administrative staff from agricultural or environmental institutions, coordinators of LEADER projects, researchers, etc.) (see Box 1).

Group 1: Democratically legitimised institutions, organisations, regional representatives:

- a) **political representatives:** representatives of regional parliament, regional government, district council, mayor
- b) **representatives from societal groups:** farmers' union, environmental organisations, consumer associations, health organisations, regional economy, further regional movements, etc.

Group 2: Experts with close regional ties:

- a) administration: agriculture, environment, job agencies, etc.
- b) coordinators of EU-funded and other regional projects for rural development
- c) researchers
- d) other experts as journalists, consultants etc., if relevant

Box 1 Composition of regional expert groups

The Stakeholder Delphi Approach we used for this study consisted of two iterative steps: For the first step face-to-face interviews in each case study were conducted with representatives and experts. For the second step a structured group discussion with the same persons was organised. Box 2 shows the specific aims of the two steps.



Step 1: Individual face-to-face interviews

- Identify positive and negative factors determining the living in rural areas
- Clarify the role of agriculture for rural areas (positive and normative)
- Determine the importance of non-commodity outputs in the case-study regions

Step 2: Structured group discussion in each region with budget exercise

- Condensate and discuss results of interviews
- Set up and agree upon a regional importance for NCOs
- Discuss reasons for the demand for specific NCOs

Box 2 Overview of the objectives and methods for the two steps of the Stakeholder Delphi

Step 1: Face-to-face interviews

The first step consisted of structured qualitative face-to-face interviews with open and closed-ended questions, which aimed to seize the whole range of relevant views on the issue. The interviewees represented a particular societal group relevant for rural development in the region. Accordingly, the interviewees were always addressed in their role as a representative or an expert.

The questionnaire was subdivided in the following parts (see Annex 1):

- factors determining living conditions, not restricted to agriculture (Question Q1 and Q2)
- the role of agriculture for living conditions (Question Q3 and Q4)
- Importance of effects of agriculture for the regional population (Question Q5 and Q6)
- Alternatives to agriculture to achieve the positive effects (Question Q7)
- Future demand for the functions of agriculture (Question Q8)

For the three closed-ended questions (Q5, Q6, Q8), a list of 16 positive and 9 negative effects, or functions, respectively, was developed in collaboration with the other partners of the project. This list was based on the MEA-Scope NCO² list for the indicators (Balázs et al., 2005) and adapted to the demand-oriented context.

² the usage of the notion "non-commodity outputs NCOs" within WP6 was considered not appropriate because, the list of functions covers a wider range of issues, whereas some have the character of an NCO and some not. Furthermore, the "NCO" is a highly technical term, which is not necessarily understandable for the stakeholders in its economic sense. Therefore, we used the more colloquial terminology "functions and effects of agriculture".

Each interviewee appraised the positive and negative effects of agriculture according to their estimation of importance of the effect for the regional population (see Annex 1: Questionnaire for face-to-face interviews). The interviewees were asked to add further important positive and negative effects of agriculture to these lists. Thus, a more comprehensive coverage of the effects of agriculture in the different regions was achieved.

Step 2: Structured group discussion with budget exercise

The second step consisted of a structured focus group discussion with the interviewed persons. The aims were to condensate the results of the interviews and to reach consensus on an order of magnitude for the various functions and effects of agriculture in the region.

The workshop started with informing the participants about the results from the interviews in both their region and the other case studies. The lists of functions and effects of agriculture were complemented according to the results from the interviews in each case study (see Annex 3). After a discussion the participants were asked to allocate a budget for prioritising the list of functions and effects of agriculture (von Ziehlberg, 1999).

In the beginning of the budget exercise, the participants were asked to sort out those effects and functions with the lowest relevance and thus to reduce the number of effects of agriculture to 20. Subsequently, every participant had to allocate 100 hypothetical budget points towards the twenty functions, and the mean budget allocation of the group was calculated. This allocation was then presented to the participants to start a group discussion in order to reach a group consensus on the budget allocation.

Finally, a session on the implication of the exercise for the region was conducted in order to apply the abstract results of the budget exercise to the real situation in the case study region.

The study was implemented in four different case studies: Ostprignitz-Ruppin (OPR) (Germany), River Gudenå (Denmark), Kościan (Poland), and Mugello (Italy). Therefore, a practical division of competences among the project partners was developed.

In order to ensure a uniform implementation of the study in all case studies detailed guidelines were developed for both the interviews and the group discussions. They were translated into the case study language as the interviews and workshops were conducted in the local language. The documentation of the interviews and group discussions was translated back into English for the analysis of the results.

3.2.1. Data analysis

The analysis of the results of both steps was carried out per case-study region, and afterwards a cross-country comparison was conducted.

For analysing the data from the interviews (Step 1), a summarising qualitative content analysis (Mayring, 2002) was applied to analyse the open-ended questions (Q1, Q2, Q3, Q4, Q7). The answers to the closed-ended questions (Q5, Q6, Q8) were analysed by comparing the cumulative values of the interviewees on Likert-type ranking scales with homogeneous distance between the 3-4 answers, whereas ratio or interval level, respectively, was assumed as described in Stier (1998). Scores were assigned for each answer and added up, divided by the sample size (number of interviewees) (see Box 3).

$$Q_5 = \frac{(n_{very_important} * 3) + (n_{less_important} * 2) + (n_{not_important} * 1) + (n_{not_existing} * 0)}{N}$$

$$Q_6 = \frac{(n_{very_important} * 3) + (n_{less_important} * 2) + (n_{not_important} * 1) + (n_{not_existing} * 0)}{N}$$

$$Q_8 = \frac{(n_{more_engagement} * 1) + (n_{same_engagement} * 0) + (n_{less_engagement} * (-1))}{N}$$

with: N= sample size; n= number of answers

Box 3 Formulas for calculating ranking values for Q5, Q6, and Q8

For a better illustration, the answers to Q5 (Current importance of the positive effects of agriculture) and Q8 (Demanded future commitment of agriculture) are plotted into a two dimensional graph, which is divided in four quadrants (see Fig. 2). Fig. 2 can be interpreted as follows: The more to the right an effect is located, the higher is the current importance of regional agriculture for this effect, (according to the interviewed stakeholders). The higher an effect is located in the chart, the higher is the demand for a future commitment of agriculture to this function/effect estimated by the interviewed experts in general.

Hence, positive effects of agriculture located in the upper right quadrant are both highly important at present and agriculture's future commitment is requested to increase. In contrast, the lower left quadrant contains those effects which have been classified as effects with a low current importance and a decreasing requested agricultural commitment in future. Contrarily, the upper left quadrant contains effects which combine a low current importance with an increasing requested agricultural commitment in future, while the effects located in the lower right quadrant have a high current importance but are expected to need a lower future commitment of agriculture.

As we did not measure the societal demand directly, we interpreted the societal demand for a certain effect of agriculture, whether this effect has the character of a public good or not, as a function of its current importance and the expected future demand.

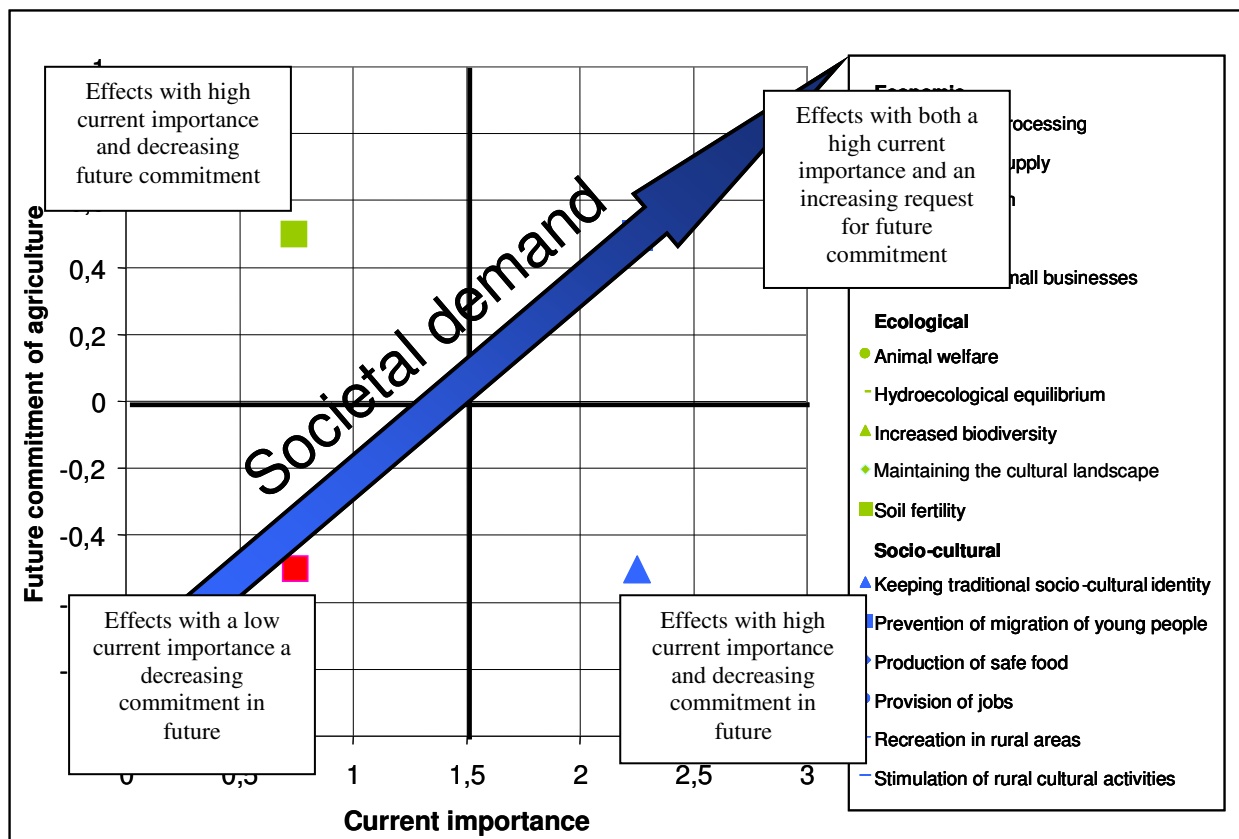


Fig. 2 Allocation of positive effects of agriculture on a two-dimensional ordinal chart with four quadrants

Larger quantitative deviations in budget allocations for the functions were taken as an indicator for differences that may exist in the societal demand in the case study. The plausibility of these deviations was cross-checked with the available qualitative data. Due to the small sample, however, we did not conduct a statistical analysis of the results.

4. Case study results

This section is structured by case study. In each case study section, firstly, a short description of the case study region is given, then the role of agriculture for the general living conditions is described according to the stakeholders³ answers to the questions Q1, Q2, Q3, Q4 and Q7 of the face-to-face interviews. Finally, the functions are prioritised according to the respective societal demand, considering the answers to Q5, Q6, Q8, and the budget exercise.

We aimed at having in both steps an identical composition of the interviewees, however, the groups of representatives and experts were not the same due to the fact that not all interviewed persons were able to participate at the workshops. Although, in these cases qualified substitutes were asked to participate, the number of workshop participants was lower than the number of interviewees (see Table 2).

Table 2 Number of stakeholders per case study and Delphi step

Case study	Number of interviewees Step 1	Number of participants Step 2
Ostprignitz-Ruppin (Germany)	13	7
River Gudenå (Denmark)	10	7
Kościan (Poland)	11	11
Mugello (Italy)	11	7
Total	45	32

The second part of each subsection first specifies the prioritizations done during the interviews in the questions Q5, Q6, and Q8 and then describes the prioritisation in the budget exercise, the arguments exchanged and finally describes the course of the discussion.

Despite a clear grouping of effects is difficult due to the multiple interactions between them, they were clustered into predominantly economic, ecological and socio-cultural effects as illustrated in Table 3.

³ The experts and representatives, which have been interviewed and participated in the group discussions are henceforth referred to as "stakeholders". If stakeholders as a specific group are addressed, it will be elucidated in the text.

Table 3 Grouping of the generic positive effects of agriculture into economic, ecological and socio-cultural sets according to their predominant nature

Economic	Ecological	Socio-cultural
Regional food processing	Animal welfare	Keeping the social-cultural identity
Regional food supply	Hydro-ecological equilibrium	Prevention of migration of young people
Regional tourism	Increased biodiversity	Production of safe food (healthy)
Rural livelihood	Keeping the rural landscape	Provision of jobs
Stimulation of small businesses	Soil fertility	Recreation in rural areas
		Stimulation of rural cultural activities

4.1 River Gudenå, Denmark

The Danish case study “River valleys of Gudenå and Norea” is located in the centre of Jutland between the cities of Aarhus, Viborg and Randers. The case study is about 600 km² wide, placed in two counties (NUTS 3 regions), and covers seven municipalities. 1,871 farms manage 72,089 ha of arable land and 5,089 ha of permanent grassland. The average farm size is 41 ha and most of the farms focus on crop production. The main animal production branch is pig fattening with 3.03 pigs per ha of Utilised Agricultural Area (UAA). The landscape is considerably flat with the highest nearby elevation of 100 m above sea level. Both high and low quality soils can be found in the case study area (Balázs et al., 2005). The average gross domestic product (GDP)⁴ per inhabitant in Denmark is with 35,184 Euros, 21 % higher than the EU25 average (EUROSTAT, 2006a).

Role of agriculture for the general living conditions in the River Gudenå region

The Danish stakeholders polarised between three different types of farming: The “big landowners”, the smallholders and the alternative or organic farmers. While the “big landowners” affect the society mainly in a negative way, smallholders and alternative/organic farmers potentially provide more NCOs to the society. The stakeholders saw only a small contribution of agriculture to the rural economy, currently. However, this might change in future, because the societal demand for economic services is expected to rise, particularly for the provision of jobs and tourism activities. The stakeholders moreover demanded further innovation and diversification on farms (especially concerning renewable energies).

⁴ in Purchasing Power Standards (PPS), EU25=100; no regional GDP data for the case study available

The Danish stakeholders particularly pointed to negative effects of agricultural practice in the River Gudenå region. Nonetheless, they emphasised that this should not be understood as a negative view on agriculture in general. However, agriculture, as it is widely practiced nowadays in the region, does not provide sufficient NCOs to satisfy the societal demand in the region.

The regional agriculture is perceived as particularly deteriorating for the environment. This accounts for annoyances for the population like bad smells from animal husbandry or fertilisers as well as for other effects such as a negatively influenced biodiversity, non-sustainability, and unethical animal husbandry. Moreover, the Danish stakeholders are ambiguous about the effect of agriculture on landscape design; agriculture shapes of the rural landscape while the provided rural infrastructure to access agricultural landscapes is not sufficient.

These negative effects of agriculture limit tourism opportunities in the region. In order to minimise the negative effects on the environment, alternative styles of agriculture, such as smallholder farms, organic or alternative farm management were proposed by some stakeholders.

As an important social role of agriculture in rural areas, social cohesion was referred to by the stakeholders.

Prioritisation of functions

During the prioritisation in the interviews, the stakeholders tended to attach a high current value to the ecological effects of agriculture, compared to the economic and socio-cultural effects. By contrast, the requested future commitment of agriculture for the ecological effects tended to be lower than for the economic effects. Out of the ecological functions, the future demand for landscape and biodiversity was considered highest (Fig. 3).

The prevention of migration of young people and the hydro-ecological equilibrium were valued lowest for both criteria because the stakeholders linked these effects only indirectly with agricultural activities.

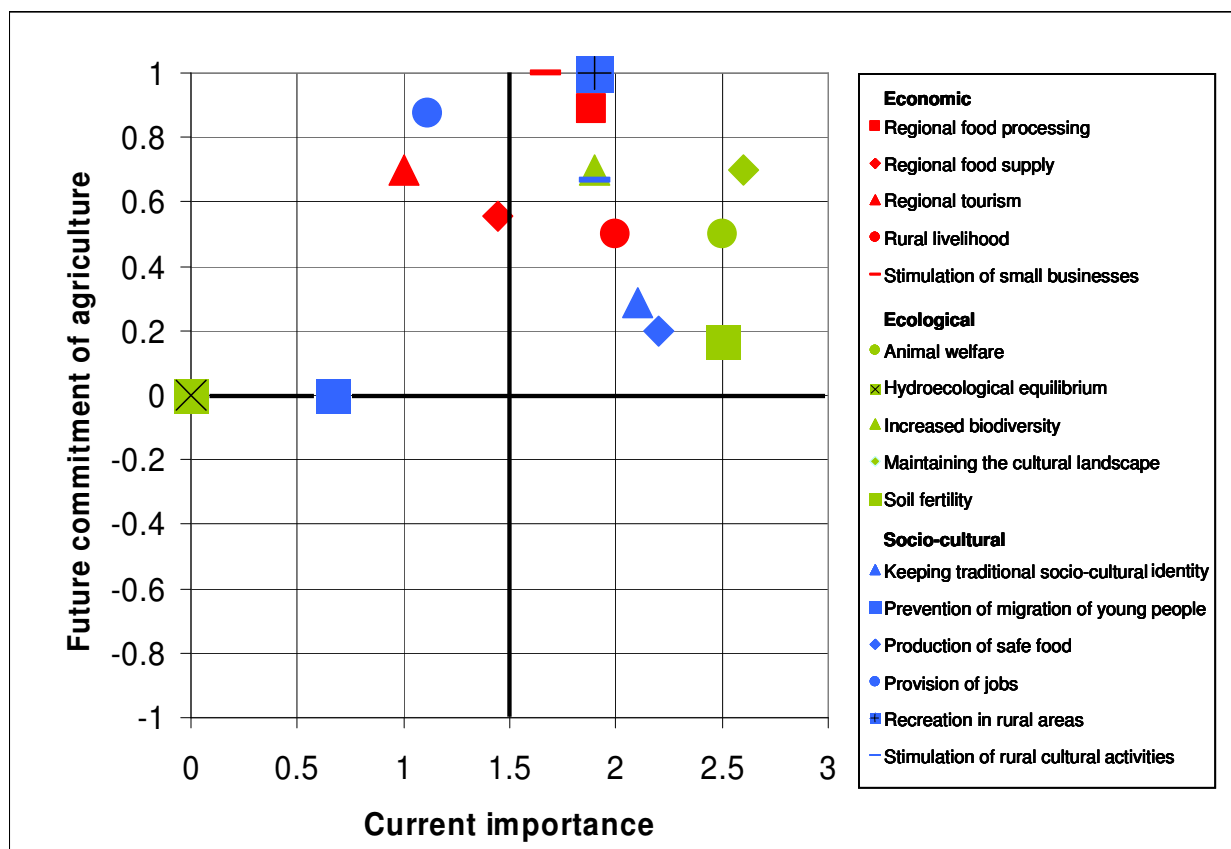


Fig. 3 Current and future importance of positive effects of agriculture on case study region River Gudenå (DK)

Smells from agriculture was classified as the most important negative effect whereas the influence of agriculture to the problem of water scarcity was not seen as important at all. This prioritisation is explained by the high abundance of large pig fattening farms in the region, the emissions of which influence the attitude of the local population.

As a result of the budget exercise five issues are of particular importance from the point of view of the stakeholders involved in this study: Provision of renewable energies, minimisation of smells from agriculture, stimulation of small businesses, keeping/making landscape accessible, minimisation of nitrate in drinking water.

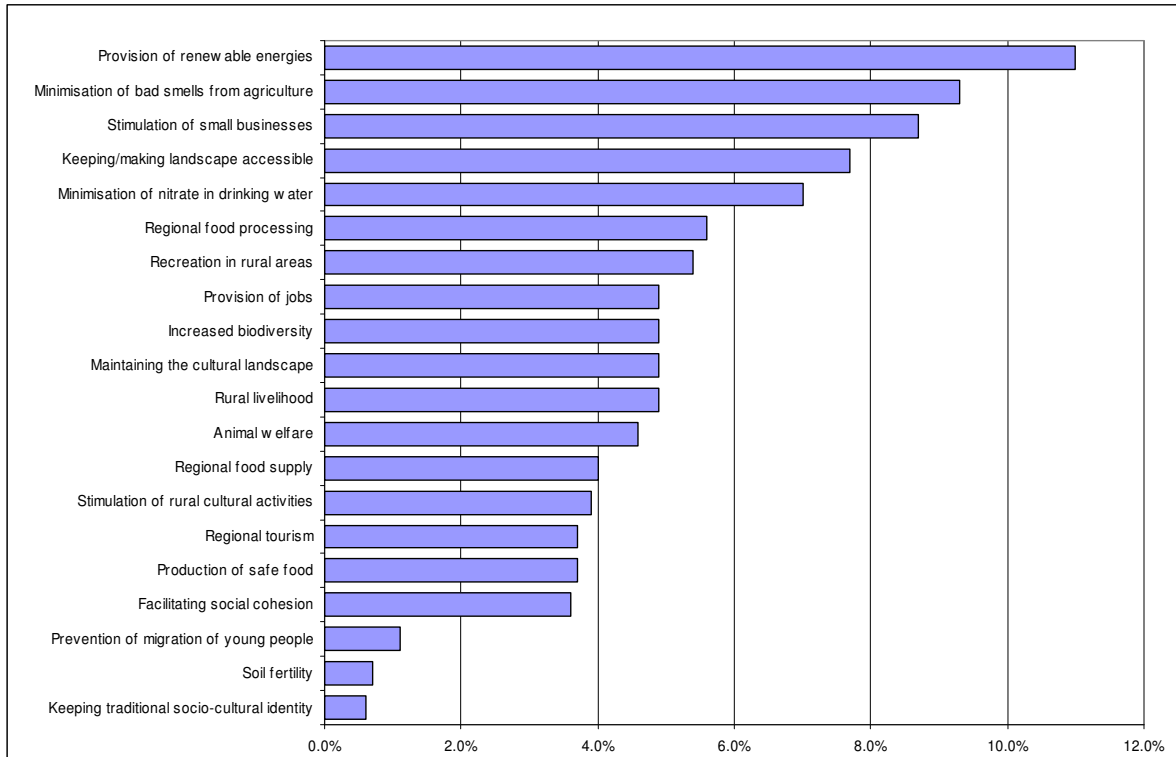


Fig. 4 Budget allocation to agricultural functions in the case study River Gudenå (DK)

Firstly, **provision of renewable energy** was attached the highest importance to by the stakeholders (11 % of the budget). While the stakeholders argued on the one hand that there is a global need to foster these technologies, on the other hand, renewable energies can bring mutual benefits for both agriculture and the energy sector also at regional scale.

Secondly, to avert **negative effects**, namely **smells and nitrate in drinking water**, is a major priority in the Danish case study. Both effects can be attributed to the intensive animal production in the region, while the bad smells (Rank 2, 9 %) was assessed by the stakeholders to be slightly more detrimental for the population than nitrate in drinking water (Rank 5, 8 %). Furthermore, it was argued that selling houses in areas next to big farms becomes difficult and the social cohesion in the neighbourhood decreases due to the unpleasant smells. The fundamental right for clean and healthy drinking water was regarded as jeopardised.

The **stimulation of small businesses** was ranked on third position, with 9 % of the budget. According to the stakeholders, this function can be associated with both job provision and rural livelihood (both rank 8, 5 %). As reasons for the high scoring, the participants stated the importance for newcomers to the rural area and, with regard to farming businesses, the increasing importance of part-time farming instead of full-time agriculture.

As an issue of specific importance in the Danish case study, **keeping/making landscape accessible** to the population was also among the five most important concerns (rank 4, 8 %). Related to the function of keeping the rural landscape, this issue emphasises that landscape is not

only attractive from the visual point of view but should be/is open to the whole population and not restricted to the farmers' use, only (*"It is unacceptable that a large part of the country is not accessible"*). In this regard it is interesting that the stakeholders were not explicitly mentioning the importance of landscape for tourist purposes, but emphasised its role for the regional population. In fact, the function of **regional tourism** received less than 4 percent of the budget allocation and was considered as one of the most important functions only when the view was limited to the Gudenå river valley and not the surrounding area.

It is worth to note that among the five most important issues there was no function directly related to food production. It may be concluded that the stakeholders from the Danish case study are in favour of a significant change of the primary roles of agriculture, as it has been discussed for years: Food production, as the formerly primary task of agriculture, becomes one issue among many in a multifunctional agricultural sector.

The group discussed without raising any major points of conflict. It was easy to come to a consensus for the budget allocation. In the discussion the question of the spatial scale of this case study was raised. The region in question also contains three medium sized cities with varying priorities. As a consequence, the stakeholders developed a second budget allocation only for the area immediately next to the river basin. For this limited perspective, only six functions were allocated more than 3 % of the budget: Keeping/making landscape accessible (10%), increased biodiversity (10%), maintaining the cultural landscape (10%), Provision of renewable energies (10%), recreation in rural areas (9%), regional tourism (8%) and regional food supply (8%).

In Denmark, the regional partners in charge of conducting the case study were facing exceptional difficulties in bringing together the stakeholders from Step 1 to the group discussion (Step 2). Therefore, as an intermediate step, a mailing survey was conducted in order to grasp the individual budget allocations and associated reasons. Finally, a shortened group discussion was conducted with only three stakeholders participating from the original eight of the first step, omitting the discussion on the political implications of the budget exercise results.

The stakeholders did not feel as representatives for their region and did not accept the theoretical assumptions underlying this approach. Nevertheless, the stakeholders came to consensus for a budget allocation of the case study region.

4.2 Ostprignitz-Ruppin, Germany

Ostprignitz-Ruppin (OPR) is a separate administrative district located nearby Berlin in the county of Brandenburg. The region of OPR is 2,511 km² wide and covers 23 municipalities. 109,500 inhabitants live in this district which results in a low population density of 43,6 inhabitants per km². Brandenburg has a considerably high unemployment rate of 18.4 %, compared to an EU25 average of 9.2 % (EUROSTAT, 2006b). Brandenburg has a gross domestic product (GDP)⁵ per inhabitant of 18,334 Euros, which is 75.8 % of the EU25 average (EUROSTAT, 2006a).

An average annual rainfall of 520 mm per year and sandy soils provide disadvantageous conditions for crop production. The total Utilised Agricultural Area (UAA) in OPR in 2003 was 126,378 ha with 561 farms of an average farm size of 225 ha (71 % arable land and 29 % permanent grassland in average). Nature-orientated, recreational tourism plays a considerable strong role for the local economy (Balázs et al., 2005).

Role of agriculture for the general living conditions in Ostprignitz-Ruppin

In the region of Ostprignitz-Ruppin the stakeholders regarded the high unemployment rate as the dominant problem. However, they had different opinions on the ability of the agricultural sector to supply jobs. While some stakeholders were sceptic, most of the stakeholders argued that agricultural sector already plays this role taking into account the related trading and processing industries.

Equally important is the role that agriculture plays for rural tourism. The stakeholders expect agri-tourism, as well as general tourism (supported by external effects of agriculture), to become even more important in Ostprignitz-Ruppin. They furthermore considered landscape conservation as an important ecological and socio-cultural function of agriculture in Ostprignitz-Ruppin.

The stakeholders saw farm diversification strategies as a way to both survive on the market and to supply functions that society demands, in particular renewable energies (such as wind energy, biomass, or biogas).

Alternative management practices, e.g. agri-environmental measures taken up by farmers, have the potential to provide higher rates of ecological NCOs compared to conventional agriculture. According to some stakeholders, organic farms may therefore provide a higher benefit for society than conventional farms.

In this context the supply of regional food was seen as an important function of agriculture. Not only production but also processing and marketing of agricultural produce is important, because it keeps the added value in the region and creates positive side effects. For instance, direct marketing on farms or farmers' markets contributes to good living conditions and stimulate regional tourism.

⁵ Expressed in Purchasing Power Standards (PPS), EU25 = 100

According to some stakeholders, in particular quality products from the region have a good chance to be marketed locally.

The stakeholders had no uniform opinion on the question whether the regional agriculture can be replaced or not in fulfilling these societal roles. Some stakeholders argued that the economic and socio-cultural roles could be fulfilled by industry, small and medium enterprises (SMEs) and tourism; the ecological functions need to be addressed by nature conservation services and voluntary associations. Contrarily, other stakeholders argued that there is no effective way how agriculture could be replaced by other actors fulfilling the multiple functions.

Prioritisation of functions

The stakeholders feel that most of the functions of agriculture are both important at present and should also be provided by agriculture in future with an increased commitment. Accordingly, these effects are clustered in the upper right quadrant of Fig. 5.

The functions of 'soil fertility' and 'maintaining the cultural landscape', which both were assessed as currently important, attained a lower future importance than the rest of the functions. The 'prevention of migration of young people', which was rather seen as a by-product of the other positive effects of agriculture, was assigned a low importance as a single effect.

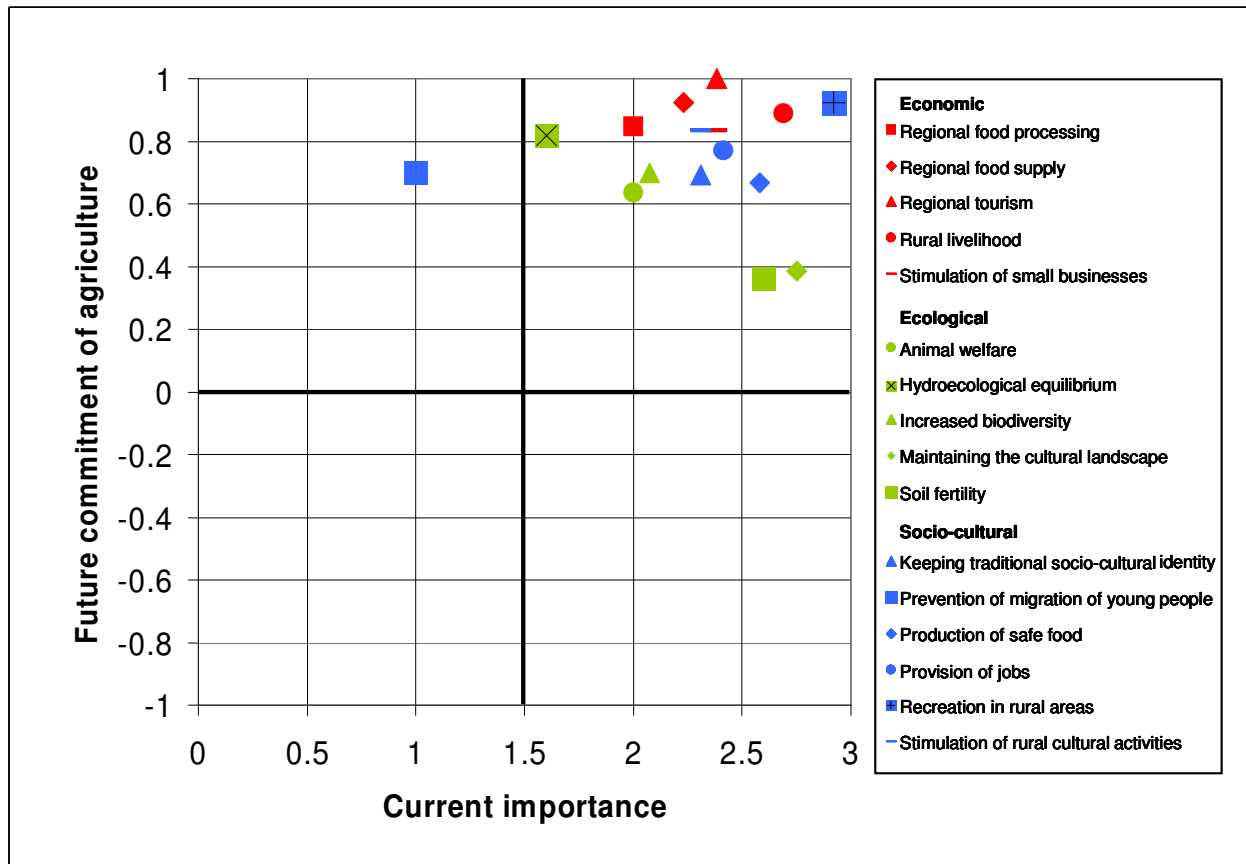


Fig. 5 Current and future importance of positive effects of agriculture on case study region OPR (DE)

Confirming the results from the interviews, the participants of the group discussion classified the **provision of jobs** as the most important effect of agriculture to the population of Ostprignitz-Ruppin. About 20 % of the budget was allocated to this function (see Fig. 6). This extraordinary importance of the provision of jobs as a function of agriculture was even more emphasised through the reasoning that the importance of most of the other functions of agriculture are related to their ability to create jobs in the region (Table 8). A discussant put this into words arguing: *"All functions with a reasonable budget allocation should foster the provision of jobs."*

There were seven other effects of agriculture, which had an importance as single issues, according to the results of the budget exercise. These functions may be clustered into two groups: **Functions in relation to food and energy production** and **functions related to landscape**. As a cross-sectional function, the function of securing **rural livelihood** can be interpreted as the economic component within the provision of jobs and is linked to both clusters of functions, which all act as a precondition for a rural livelihood. Rural livelihood received about 7 % of the budget.

28% of the budget was spent on functions with relation to food and energy production (Regional food processing, regional food supply, provision of renewable energy). Regional food processing (3rd rank) was strongly related to the provision of jobs in the region.

But the participants emphasised also relations to many other of the listed functions (see Table 8). These strong linkages illustrate the need not to look at the effects isolated but to take into account the decision process as a whole. The high importance of this function corresponds with the idea of short, regional supply chains, which was considered with the function of **regional food supply** (4th rank). Through this original function, agriculture is binding work force, which is another reason for the high budget score of nearly 10 % for this function.

As the sixth most important function of agriculture in the region of Ostprignitz-Ruppin, the **provision of renewable energy** received nearly 9 % of the total budget. By launching the *Renewable Energy Sources Act* (BMU, 2000), the German Federal Government triggered investments to renewable energies, fostering the spread of techniques such as biomass, photovoltaics and wind energy. As farmers were one of the primary beneficiaries of this policy, the participants argued on the one hand with economic and socio-cultural reasons, such as the resulting job provision and alternative source of income for farmers. On the other hand, the participants acknowledged the global ecological importance of renewable energies.

Functions in relation to landscape (regional tourism, maintaining the cultural landscape, hydro-ecological equilibrium) received about 26 % of the total budget allocation. Landscape management is one important way through which agriculture affects **regional tourism**, which received the second rank of functions with about 12 % of the budget allocated. The participants argued that tourism can be important for farmers who are not able to sustain economically by merely producing food. The regional population also benefits from efforts to improve the infrastructure for the tourists. Furthermore, tourism feeds back on the **preservation of the cultural landscape** (5th rank) (and thus the recreational value of the region) which are also very important and basic task of agriculture. It supports tourism and prevents people from migrating to the cities. One participant regarded the fulfilment of this function as a requirement for the other functions.

Very much related to the preservation of the landscape is agriculture's function to maintain the **hydro-ecological equilibrium** (rank 8). With an annual rainfall of less than 520 mm, the importance of a hydro-ecological equilibrium in Brandenburg becomes obvious. Furthermore, the devastating floods in nearby districts during recent years have raised the importance of this issue for the population in OPR. However, there was no consensus among the participants whether to maintain the hydro-ecological equilibrium is a primary issue for the population or not.

While the stakeholders allocated 81 % of the budget to the eight above mentioned functions, the twelve functions in the end of the list received only 0-5 % of the budget each. Most of these functions were not seen as relevant for the population. Some participants argued that some of the listed effects were not functions but requirements for a good farm management (cooperation among farmers and with other sectors, diversification of farms and hence should not be taken into account. The list of reasons for the budget assignment is presented in Table 8).

All effects were perceived as interrelated with each other, thus it was difficult for the stakeholders in OPR to value the isolated effects. High quality, regional origin and safety of agricultural products were in particular closely related, since one important quality parameter is the safety of food. Furthermore regional products are often perceived as safer than anonymous products from elsewhere.

While the farmers' representative saw agriculture in the primary role of production (food and renewable energies), the majority of participants considered the contribution to a diversified rural economy as the main role. Therefore, rural development policy was regarded as too much focussed on agriculture, which is only one rural actor out of many. Especially looking at the supply chain shows the complex interrelations between agriculture and the rest of the economy.

The participants agreed in general with the established order of magnitude that was derived from the individual scorings in the first part of the workshop as a good compromise between the different opinions in the group. Functions which were emphasised during this discussion as being more important than in the average results were hydro-ecological equilibrium and the image of the region. However, for none of these points the majority of participants wanted to change the order of magnitude, because they acknowledged the arithmetic means of the individual scorings as some sort of democratic vote, which should not be modified afterwards in order to maintain its legitimacy.

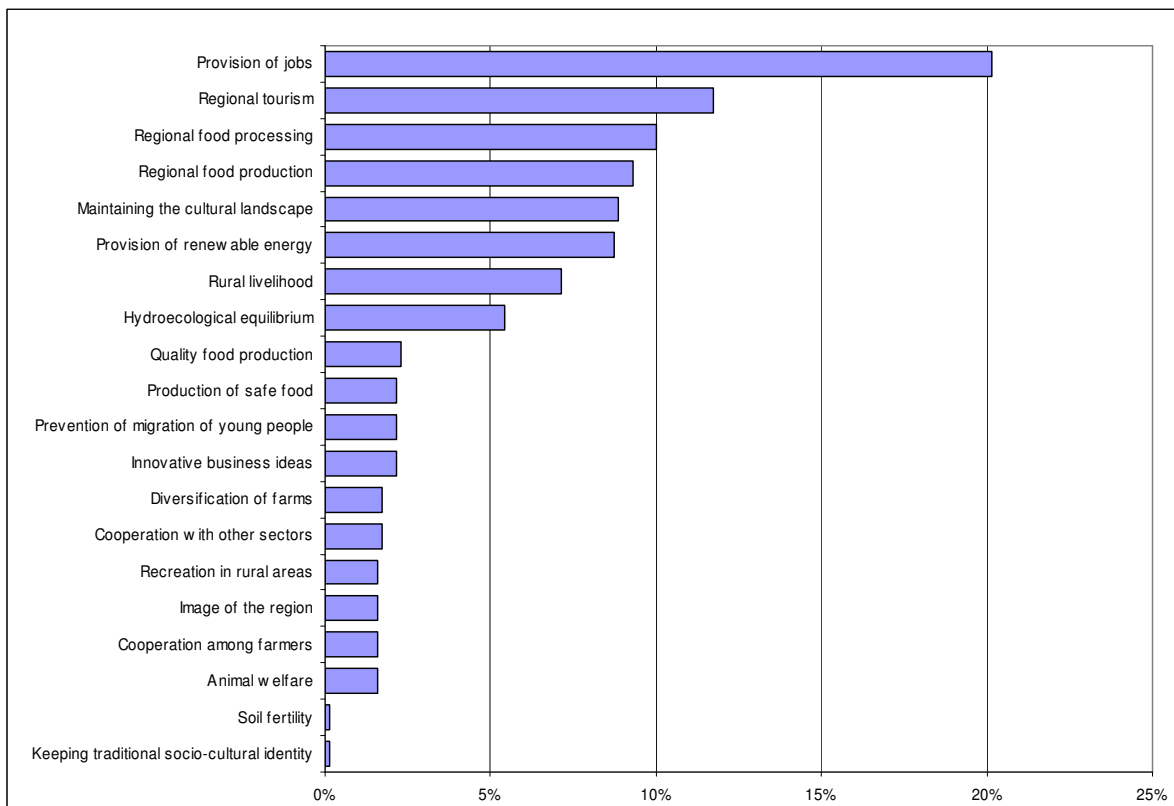


Fig. 6 Budget allocation to agricultural functions in the case study OPR (DE)

4.3 Mugello, Italy

The Mugello case study is 1,127 km² in size and stretches from 160 m to 1,241 m above sea level with slopes of up to 20 %. The average farm size is 18 ha, thus much lower than in the German or Danish case study (49 % of the farms are smaller than 5 ha). Arable land and permanent grassland are equally distributed in the region, and permanent crops, mostly olive tree plantations, have a noteworthy importance (Balázs et al., 2005). Tuscany in which the NUTS 2 region Mugello is located has a population density of 158.1 inhabitants per km² and an unemployment rate of 5.2 %. Rural tourism is a considerable economic factor in the region. The purchasing power in Tuscany is of 25,358 Euros GDP per inhabitant, making 118.5 % of the EU25 average (EUROSTAT, 2006a).

Role of agriculture for the general living conditions in Mugello

The stakeholders interviewed emphasised the ecological role that agriculture plays in rural society. Besides general ecological effects, the function to manage and shape the landscape and to provide hydro-ecological effects is considered relevant. Such hydro-ecological assets are interpreted as farm management practices that aim at averting soil erosion, such as terraces or planting vegetation at slopes.

According to the stakeholders in Mugello, agriculture does not fulfil economic functions, such as the provision of jobs, in the first place. To facilitate tourism was also not considered by the stakeholders to be a primary role of agriculture, although agri-tourism plays an important part in this region when looking at the statistics: 232 registered camping grounds, 3000 hotels, 3000 holiday flats (EUROSTAT, 2006b). The Italian stakeholders may have only seen an indirect effect of agriculture through the provision of ecological assets which favour the tourism services in the region. Agriculture also played an indirect role for the prevention of migration of young people.

Just like the environmental effects, the provision of typical regional products is linked to the tourism function partly, because it also shapes the image of the region. Besides, the stakeholders also linked direct marketing of agricultural produce to healthy and high quality food.

Furthermore, they related the conservation of traditions and culture to agricultural activities. Agriculture is important from the societal point of view: enhancing social relationships, preserving the local cultural heritage and the agricultural know-how linked to traditional breeding techniques and cultivations. The local society seems also to be more attentive about elderly people and children.

Agriculture is irreplaceable for its environmental and landscape characteristics and affects society less negative than other economic sectors. Non-agricultural activities may enhance some positive effects of agriculture but agriculture itself cannot be replaced, according to most of the interviewed stakeholders, because many of the listed functions and effects are directly linked to agricultural activities.

Prioritisation of functions

According to the stakeholders' answers during the interviews, all investigated positive effects of agriculture are located in the upper right quarter of the two dimensional demand diagram. This means that all of the effects of agriculture currently have a high importance and agriculture's commitment is requested to increase (Fig. 7).

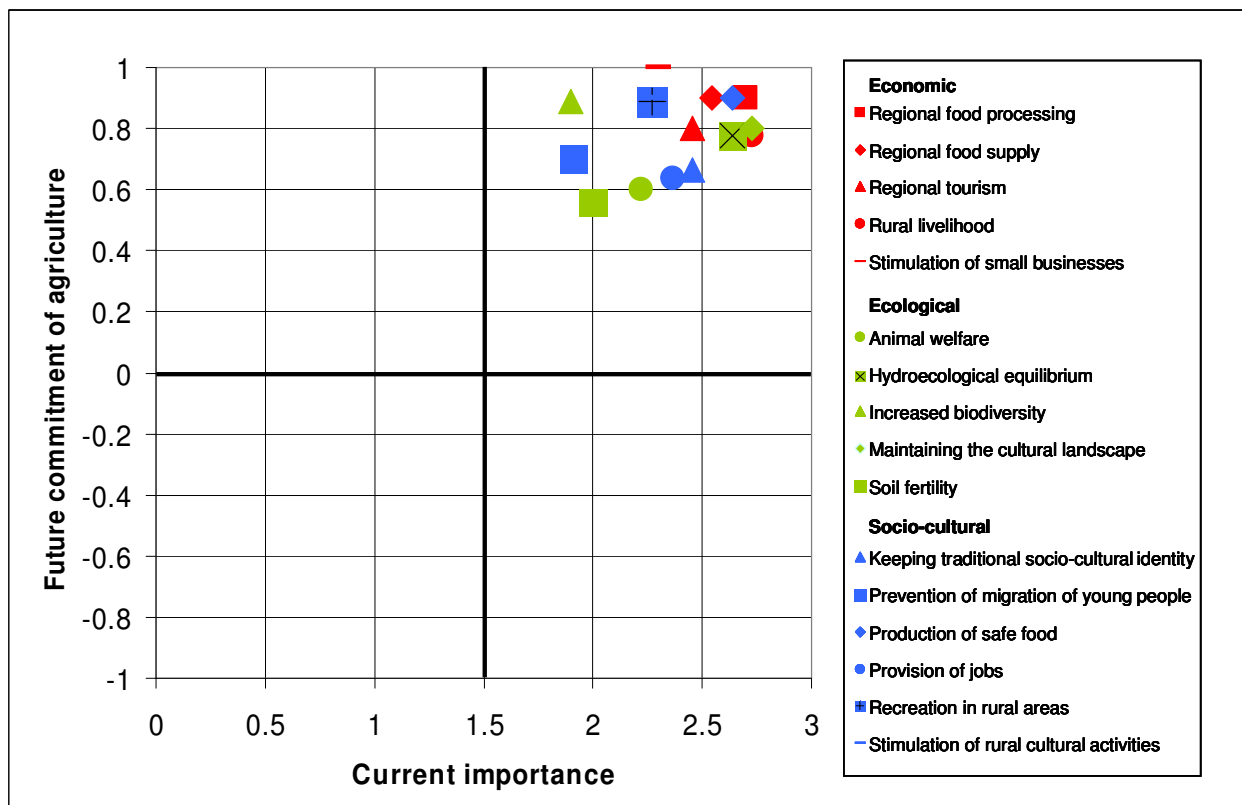


Fig. 7 Current and future importance of positive effects of agriculture on case study region Mugello (IT)

The stakeholders distinguished clearly the various negative effects of agriculture. Water scarcity, pesticide residues in food, nitrate in drinking water and a decreasing biodiversity were assessed as the most important negative effects of agriculture, whereas smells and noise from agricultural activities are not relevant. In general, the negative effects of regional agriculture in Mugello were regarded as less important than the positive ones.

The group discussion widely confirmed, but also further specified the main findings of the interviews regarding the demanded functions for agriculture in Mugello. Two main priority issues were delineated: on the one hand the landscape-related functions and on the other hand a set of functions related to the local production and processing of quality food.

The first set encompasses mainly the functions **hydro-ecological equilibrium** and **maintaining the cultural landscape**, which were ranked as first and third most demanded functions in the budget exercise. In recent years, the problem of erosion and landslides gained public interest due to

natural disasters which were related to landscape and hydrologic questions in Mugello and other regions in Italy. In addition, rural migration left some fields abandoned while others were subsequently farmed in a way that risks soil erosion instead of using traditional soil conservation practices. Furthermore, agriculture is a crucial component of the pleasant historical landscape in Mugello. Hence, more than 20 % of the societal demand was allocated towards these two functions.

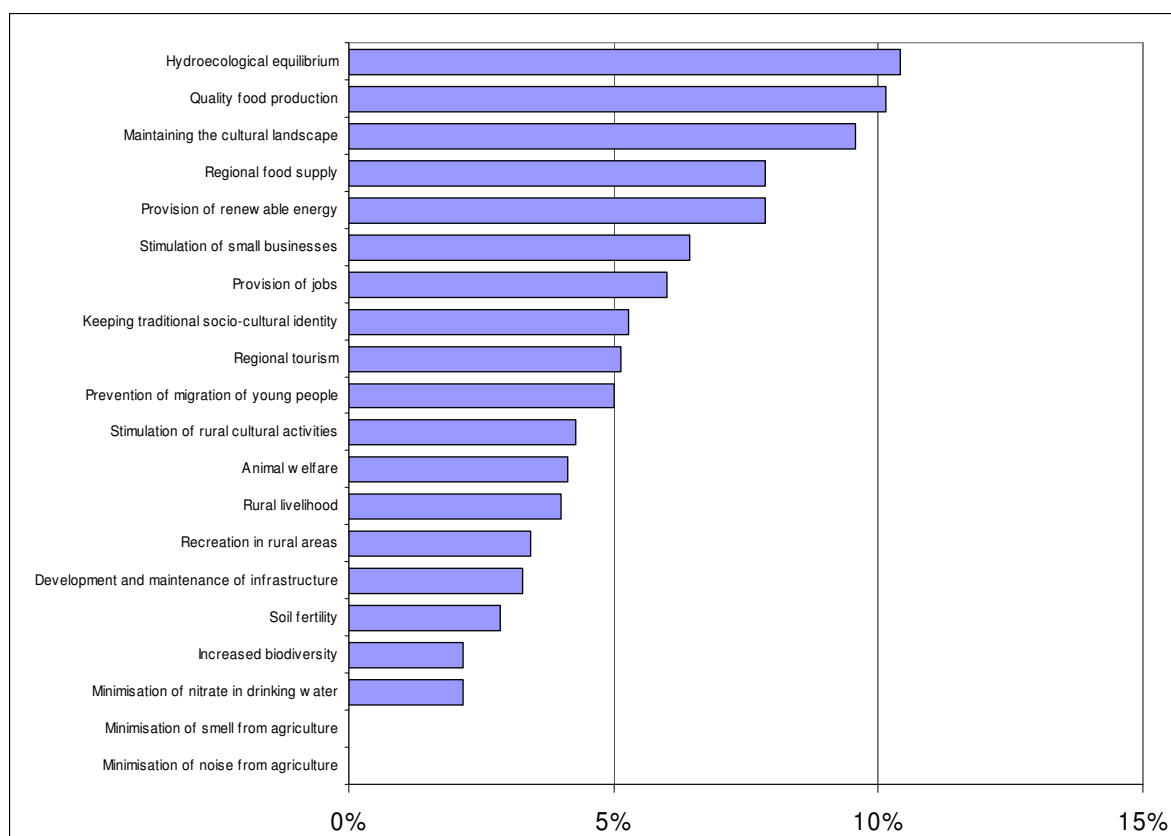


Fig. 8 Budget allocation to agricultural functions in the case study Mugello (IT)

The second most important point for the stakeholders was **quality food production**, which was merged with **production of safe food** due to the significant overlap of these two points. Agricultural products from Mugello meet high quality standards in terms of safety, flavour, smells and appearance. **Regional food supply** (4th rank) is related with the upper two issues and received a high score, too, because regional food also communicates values, history and customs from the region.

As another economic function of agriculture, the **provision of renewable energy** was ranked on the 4th place, jointly with regional food supply. For farmers the forestry sector and biomass cultivation for energy production play an important role for an economically sustainable development, environmental protection and the diversification of productions. In the views of the stakeholders the provision of renewable energy is not a public good but an alternative production branch.



Five other economic and socio-cultural functions have received more than 5 % of the budget allocation. The positive effect of agriculture on the **stimulation of SMEs, job provision, keeping traditional socio-economic identity, regional tourism** and the **prevention of migration of young people** has been affirmed and regarded as important for the regional population. However, these effects have only a secondary relevance according to the stakeholders.

The reasons for allocating only less than 5% of the budget to ten of the functions and effects of agriculture were only poorly explained (see Annex 4, Table 9).

While **animal welfare** received a very low value after the individual scoring, the participants agreed to upgrade the budget for animal welfare slightly, arguing that to respect for animal welfare is a component of food quality.

The participants allocated only a very small share of the budget to **soil fertility** and **increased biodiversity** arguing that these issues cannot be improved by agricultural practices in the case study Mugello.

The Italian stakeholders did not allocate significant budgets to the **minimisation of nitrate in drinking water**, the **minimisation of smells from agriculture** and the **minimisation of noise from agriculture** because these effects were considered not relevant for the region Mugello. Nevertheless, the group discussion ended with a full consensus among the participants. This accounts especially for the functions with a high budget assignment.

4.4 Kościan, Poland

The case study Kościan is located in the Voivodship of Wielkopolska in the West Polish Lowlands with 3.36 Mio. inhabitants and 30,000 km² of land. The Kościan district covers 723 km² and includes about 3,076 farms on 53,467 ha Utilised Agricultural Area (UAA) with an average farm size of 17 ha. In Wielkopolska, 75 % of the farms are small-scale farms (< 20 ha) with an average size of 11 ha. They coexist with very large agricultural co-operatives of an average farm size of about 298 ha. The share of arable land is 84 %. Wielkopolska's economy is dominated by agriculture, therefore, the region is known as the "granary" of Poland (Balázs et al., 2005).

Compared to the average EU purchase power, Wielkopolska is rated rather poor with a GDP⁶ of 11,728 Euros per inhabitant (54.5 % of EU25 average) and an unemployment rate of 17.1 % (in 2005). In comparison with other regions in Poland Wielkopolska's purchasing power is above average (EUROSTAT, 2006a).

Role of agriculture for the general living conditions in Kościan, Wielkopolska

According to the stakeholders, agriculture is the key economic branch in the rural Kościan district. It provides important economic, environmental and socio-cultural NCOs. The importance of agriculture, however, is expected to decrease since the hope for an establishment of industry prevails. Economic benefits from an agriculture-based tourism were not expected by the stakeholders.

The Kościan stakeholders acknowledged the important role of agriculture for the environment in general. While there are some important positive effects, the deteriorating ecological effects of agriculture were also relevant to the stakeholders. In accordance with the minor importance of tourism, the landscape function was not considered important.

However, agriculture plays a dominating role in conserving the socio-cultural identity in rural areas. According to the interviewed stakeholders it contributes to the conservation of traditional values, customs, and events. Another important function of agriculture in the Polish case study is the provision of cheap local food for poorer people who cannot afford to purchase food from supermarkets. Providing food is therefore an important function of agriculture in the region. Agriculture is considered to remain the most important rural agent for rural development in future, since many functions that agriculture fulfils cannot be executed by other branches of the economy.

⁶ in Purchasing Power Standards (PPS), EU25=100

Prioritisation of functions

While the Polish stakeholders did not distinguish much for the current importance of these effects in the interviews, they differentiated strongly regarding the demanded future commitment of agriculture for the different positive effects.

A high demand for a future commitment of agriculture is expected for the recreation in rural areas, stimulation of small businesses, regional food processing and hydro-ecological equilibrium. Regional food supply, prevention of migration of young people, and the effect on rural livelihood were rated low.

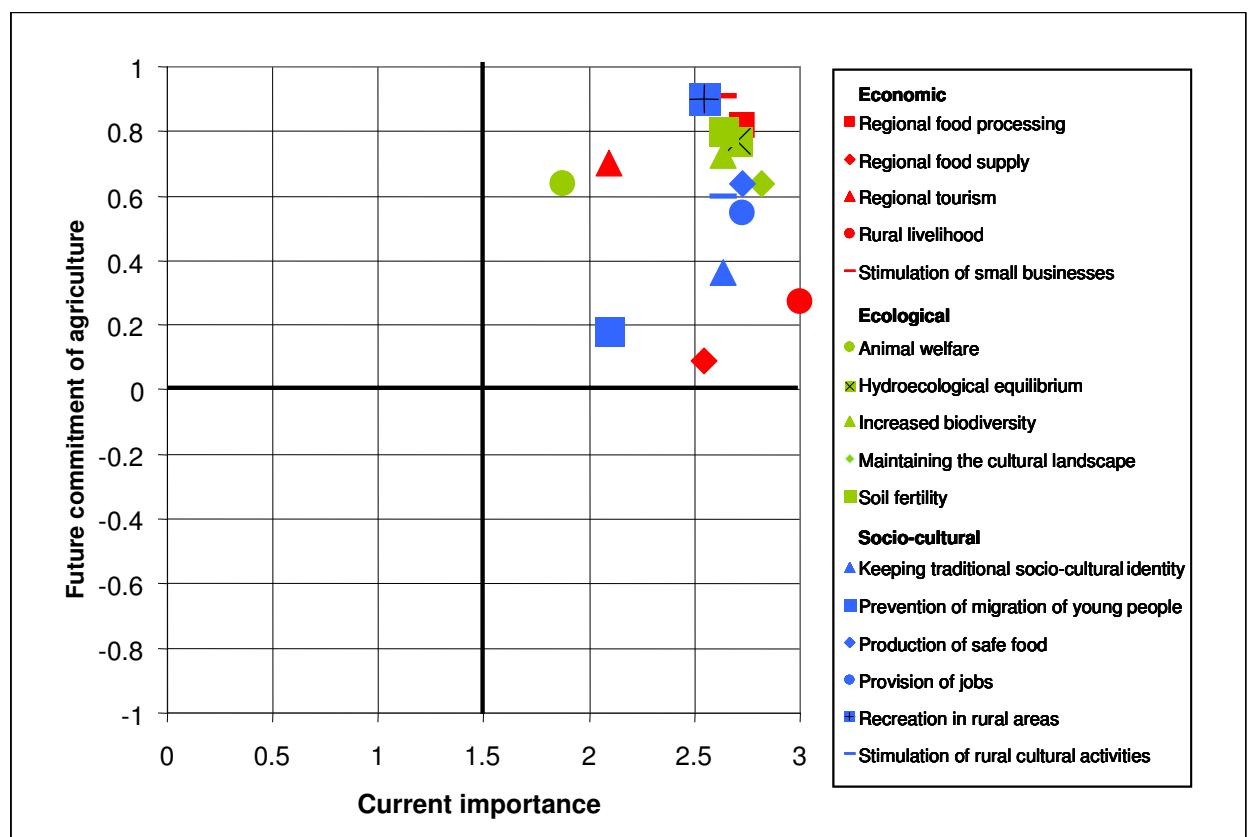


Fig. 9 Current and future importance of positive effects of agriculture on case study Kościan district (PL)

There was no major variance in the importance of the negative effects of agriculture; almost all of them were rated as very important in the interviews.

The budget exercise confirmed the importance of food production in the Polish case study ranking three effects related to the function of food production (quality food production, production of safe food and regional food supply) among the four highest ones. Hence, almost 30 % of the total demand was attached to these functions. Many stakeholders argued that **quality food production** is highly related to **safe food production**. It is a basic obligation for food producers to supply safe

food and food of high quality, which can be exported and thus improves the income of farmers. One stakeholder indicated also that this function improves the competitiveness on markets.

Although it seemed obvious to some stakeholders that food needs to be safe, the group did not agree on whether Polish food is safer than imported products. On the one hand it was argued that Polish farmers apply much less chemicals than farmers from West Europe. On the other hand many subsistence-orientated farmers still produce food that doesn't meet quality and safety standards.

Regional food supply was very important to many stakeholders especially for economic reasons: It stimulates regional food processing and provides jobs. Regional food is less expensive and it can improve competitiveness of the region. It is to note in this regard that there are two differing kinds of agriculture prevailing in the case study region: i) export-orientated agriculture which sticks to quality and safety standards and ii) subsistence-orientated agriculture that plays a dominant role for local food security and regional food supply.

The **development and maintenance of infrastructure** was added to the original list and received about 10 % of the budget, which indicates its importance in the Kościan case study for regional and rural development in the view of the stakeholders.

As shown in Fig. 10, there are five more functions which received a budget allocation higher than 5 %.

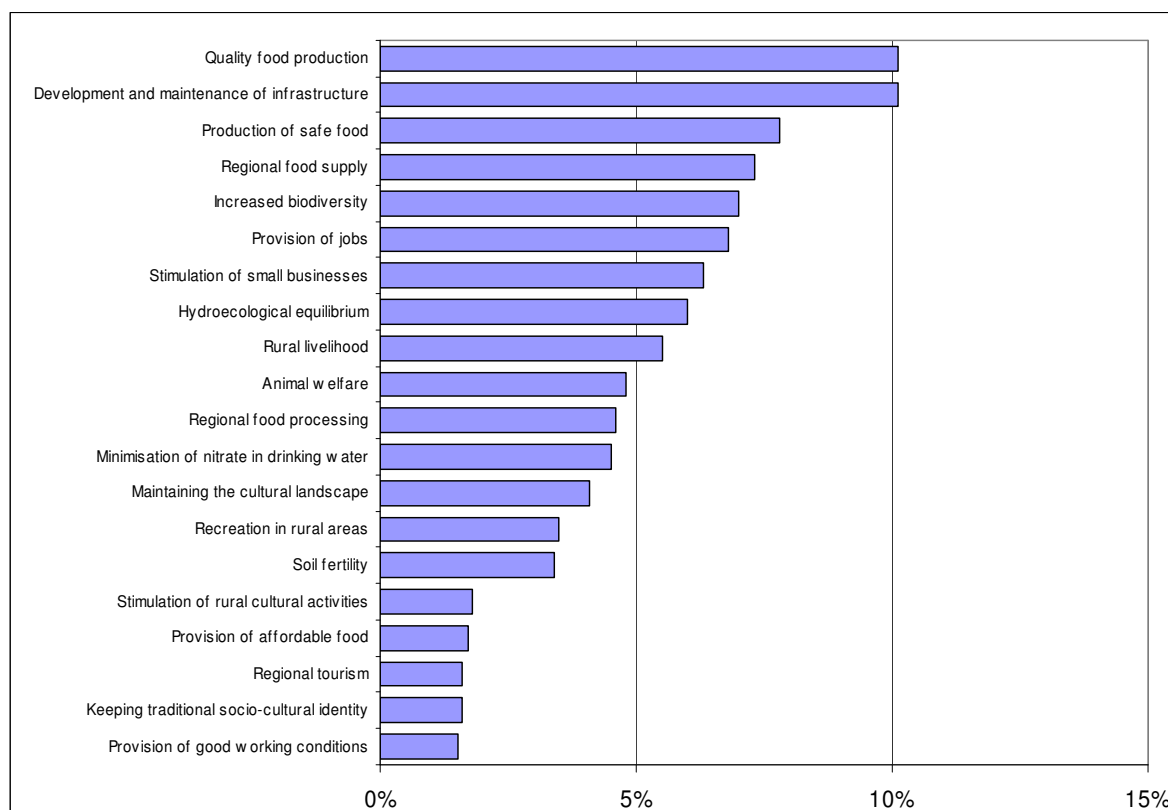


Fig. 10 Budget allocation to agricultural functions in the case study Kościan (PL)

Three are related to the difficult economic situation in the Polish case study. Some stakeholders emphasised the importance of agriculture for **job provision**, arguing that especially in rural areas agricultural activity is still one of the few possibilities to become employed. This major drawback is reflected by the high unemployment rate of 17.1 % all over Wielkopolska. The **Stimulation of small businesses** is very much related to job provision, according to the Polish stakeholders, as they provide jobs and livelihood for rural community and stimulate general development.

The function of agriculture to provide a **rural livelihood** was seen controversial in the group. Whereas many stakeholders indicated that this function of agriculture was very important in rural areas because it prevents migration of people, one stakeholder regarded this function as unimportant because Polish agriculture cannot provide a sufficient livelihood, since most farms are very small and farmers need to have an additional job.

Also two ecological functions of agriculture received more than 5 %. The term hydro-ecological equilibrium was basically connected to the problem of water scarcity in the Wielkopolska region. The demand for a stabilised **hydro-ecological equilibrium** through agriculture was neglected in past. The stakeholders find it necessary to protect this equilibrium, because the amount of precipitation and the level of ground water decreased in the region. For the high assessment of societal demand for an **increased biodiversity** no particular reasons were exchanged during the group discussion.

There were eleven functions with less than 5 % of allocated budget:

All participants agreed that **animal welfare** is quite important and livestock needs to be bred in adequate conditions but it isn't prior problem of agriculture. Thus, the demand was only moderate.

Regional food processing was important for some stakeholders because regional food processing provides jobs and generates an added value in the region through exports. The low priority that was attached to this function indicates the considerably low importance of processed foods in the Polish case study.

Nitrate in drinking water was regarded as the most important negative effect of agriculture in the Polish case study. Many stakeholders emphasised the negative effect of nitrate on human health and indicated that agriculture was the source of nitrate in drinking water; however in the context of the whole exercise the budget rating for this effect was relatively low.

Rather important for tradition and social cohesion is **maintaining the rural landscape**.

Recreation in rural areas was not seen as a primary function of agriculture. Two stakeholders stated that this function can provide additional profits in rural areas and will receive an increasing public attention. But to care for the recreational value of rural areas can also be seen as the task of the local administration rather than of agriculture.

While some people indicated that **soil fertility** is important in times of increasing soil degradation, it seemed unimportant to others. The overall score for the function to provide a fertile soil was fairly low.

The **stimulation of rural cultural activities** was also demanded very low. Only two people saw it as an important social effect of agriculture because it improves the relationships between people and gives them chances for self-realization.

How demanded the function of agriculture **to provide of affordable food** was disputed. Two stakeholders wanted to exclude this function, others argued about the actual importance and how cheap the regional food really is.

Regional tourism support is a function that was not highly demanded in the Polish case study. One stakeholder wanted to exclude this function. While the current number of tourism facilities is very small (only 138 hotels, 43 registered camping grounds and 40 holiday flats (EUROSTAT, 2006b)), some stakeholders expect an increasing importance of the facilitation of farmers to rural tourism.

The function of **keeping the traditional socio-cultural identity** was completely unimportant for three stakeholders. They indicated that many old, traditional agricultural activities produce many threats for the environment. Habits and ceremonies have much less and only symbolic meaning nowadays and that change is a natural process.

The **provision of good working conditions** is an important issue but in the opinion of participants it is the duty of each employer rather than function of agriculture, therefore it received a poor score in the budget exercise.

Table 10 (see Annex 4) summarises the arguments that were mentioned by the stakeholders during the Polish group discussion. All participants accepted the arithmetic mean of the individual scorings as a proper consensus for the budget allocation according to the societal demand in the Kościan district.

5. Cross-country comparison

The demand structure, i.e. the portfolio of functions, was different in each case study. Only the stakeholders in the OPR case study allocated much more than 10 % towards a single function (provision of jobs; 20 %). In the other case studies the distributions were more even, with a maximum value for a single function of 10-12 %.

The stakeholders attached a noteworthy importance towards 7 (DK), 8 (DE), 10 (IT), and 9 (PL) of the functions. The group discussion participants declared that the other functions are not irrelevant, however, they clearly stated that they have less priority in their specific case study.

Many reasons for a societal demand for different functions could be identified by the approximately 50 stakeholders over all case study regions. The reasoning behind this demand for certain functions of agriculture showed that the linkages between the different functions are often strong, thus, it is eminent that these functions cannot be looked at as isolated issues but in the context of the region and the other functions that are related.

Firstly, this section will give an overview of the roles that agriculture fulfils currently in the different case study regions and then discuss the most important issues regarding the prioritisation of the functions (importance of food production, para-agricultural activities, ecological and socio-cultural public goods as well as reasoning and allocation patterns). At the end, this section will discuss the strengths and weaknesses of the general approach and its implementation.

5.1 Role of agriculture for the general living conditions in the case study regions

The stakeholder groups were composed heterogeneously, with most of the stakeholders taking a societal perspective rather than a narrow productivist perspective on agriculture. The current multifunctional character of agriculture was affirmed in all four case study regions. Although most of the stakeholders argued that the way agriculture is practiced nowadays has several very important positive effects on ecological, economic, socio-cultural functions, the population of the case study regions demands a stronger commitment regarding most of the functions. According to the stakeholders the functions cannot realistically be supplied by an alternative another way than agriculture.

Different portfolios of roles of agriculture were identified for each case study region. While in the River Gudenå case study agriculture was characterised by a strong focus on providing public goods rather than agricultural produce, in Ostprignitz-Ruppin the stakeholders emphasised alternative roles of agriculture so-called para-agricultural activities (ART et al., 2006), such as on-farm tourism and the provision of renewable energies by agriculture. The roles that were attached to regional

agriculture were strongly linked to the overarching societal problem of the region: the high unemployment rate.

In Mugello, the interviewed stakeholders thought of two distinct roles (or sets of roles) of agriculture: On the one hand as a supplier of high quality, special foods and on the other hand as the preserver of a sound landscape in the region.

In contrast, in Kościan district, the stakeholders revealed the still dominant role of agriculture as a provider of food, with an increasing importance of broader rural issues, such as the establishment of a good rural infrastructure.

Corresponding to the stakeholders' answers, a clear demand structure of multifunctional agriculture could be formed for each case study region. However, as these models fit to the different situations in the case study region, it implies that a uniform European Model of Agriculture (EMA) that is applicable for all of Europe's different regions is difficult to attain or needs to encompass all different regional ideas in one model, respectively.

5.2 General prioritisation of the functions of agriculture

In addition to the qualitative description of the roles of agriculture in the case studies, we aimed to determine demand priorities of the society in order to obtain a clear, comparable picture of the roles that agriculture plays in each case study. Table 4 sorts the functions and effects of agriculture according to the hypothetical mean of all case studies. The top ten functions are mainly of economical nature, while two socio-cultural functions (both with strong economic facets) and two ecological functions (both related to landscape) were also among these most demanded functions. Furthermore, it shows the deviations of scores in the different case studies from a hypothetical mean of all case studies, whereby deviations higher than 4 % are highlighted in green (for positive deviations) and red (for negative deviations). Table 11 (Annex 4) illustrates the orders of magnitude of the functions and effects of agriculture in each case study. The stakeholders identified distinct budget allocations, particularly for the first 5 to 10 functions, which fit to the specific situations in the case studies.

Table 4 Overview of budget allocations in the case study regions, functions sorted by their mean budget share across all case studies

Function/effect	Category	DK ¹	DE ¹	IT ¹	PL ¹	Mean	Max	Min	Range
Provision of jobs	Socio-cultural	5%	20%	6%	7%	10%	20%	5%	15%
Regional food supply	Economic	4%	9%	8%	7%	7%	9%	4%	5%
Maintaining the cultural landscape	Ecological	5%	9%	10%	4%	7%	10%	4%	6%
Provision of renewable energy	Economic	11%	9%	8%		7%	11%	8%	3%
Quality food production	Socio-cultural		2%	10%	10%	6%	10%	2%	8%
Regional tourism	Economic	4%	12%	5%	2%	6%	12%	2%	10%
Rural livelihood	Economic	5%	7%	4%	6%	5%	7%	4%	3%
Hydro-ecological equilibrium	Ecological		5%	10%	6%	5%	10%	5%	4%
Stimulation of small businesses	Economic	9%		6%	6%	5%	9%	6%	3%
Regional food processing	Economic	6%	10%		5%	5%	10%	5%	5%
Recreation in rural areas	Socio-cultural	5%	2%	4%	4%	4%	5%	2%	4%
Animal welfare	Ecological	5%	2%	3%	5%	4%	5%	2%	3%
Increased biodiversity	Ecological	5%		2%	7%	4%	7%	2%	5%
Minimisation of nitrate in drinking water	Ecological	7%		2%	5%	3%	7%	2%	5%
Production of safe food	Socio-cultural	4%	2%		8%	3%	8%	2%	6%
Development / maintenance of infrastructure	Socio-cultural			3%	10%	3%	10%	3%	7%
Stimulation of rural cultural activities	Socio-cultural	4%		4%	2%	2%	4%	2%	2%
Min. of smells from agriculture	Ecological	9%		0%		2%	9%	0%	9%
Prevention of migration of young people	Socio-cultural	1%	2%	5%		2%	5%	1%	4%
Keeping/ making the landscape accessible	Socio-cultural	8%				2%	8%	8%	0%
Keeping traditional socio-cultural identity	Socio-cultural	1%	0%	5%	2%	2%	5%	0%	5%
Soil fertility	Ecological	1%	0%	3%	3%	2%	3%	0%	3%
Facilitating social cohesion	Socio-cultural	4%				1%	4%	4%	0%
Innovative business ideas	Economic		2%			1%	2%	2%	0%
Cooperation with other sectors	Economic		2%			0%	2%	2%	0%
Diversification of farms	Economic		2%			0%	2%	2%	0%
Provision of affordable food	Economic				2%	0%	2%	2%	0%
Cooperation among farmers	Socio-cultural		2%			0%	2%	2%	0%
Image of the region	Socio-cultural		2%			0%	2%	2%	0%
Provision of good working conditions	Socio-cultural				2%	0%	2%	2%	0%
Minimisation of noise from agriculture	Ecological			0%		0%	0%	0%	0%

² Green cells indicate a positive deviation from the mean of > 4, red cells indicate a negative deviation from the mean of > 4

In Denmark, the functions on the five highest ranks are to point out as primarily important: Provision of renewable energies, minimisation of smells from agriculture and nitrate in drinking water, stimulation of small businesses, and keeping/making landscape accessible. With two issues regarding the minimisation of negative effects of agriculture, the Danish stakeholders were the only group that did the prioritisation against the backdrop of negative effects of current agricultural practice. On the one side, they emphasised para-agricultural activities, on the other side they attached a high importance to post-productivist activities of agriculture. Attaching such a high importance to adverse societal effects of agriculture by prioritising the function of keeping/making

landscape accessible so much, the stakeholders emphasised another shortcoming of current agricultural practice. With the high scorings for the provision of renewable energies and the stimulation of small businesses, the Danish stakeholders expressed the need for more para-agricultural activities and a structural change to more part-time farms. It is important to note that in the Danish case study region the functions related to food production were not among the most important ones.

Contrarily to the other regions, in the case study region Ostprignitz-Ruppin (DE), the participants of the group discussion classified the provision of jobs as the most important function of agriculture to the population. An exceptional demand of 20 % was attached to this function. There were two other important clusters of functions: Functions in relation to food and energy production (Regional food processing, regional food supply, provision of renewable energy) and functions related to landscape (regional tourism, preservation of the cultural landscape, hydro-ecological equilibrium). As a cross-sectional function, the function of securing rural livelihood can be interpreted as the economic facet of the provision of jobs and is likewise linked to both clusters of functions, which all act as a precondition for a rural livelihood.

The demand in the Italian case study Mugello was allocated towards two main issues: on the one hand the landscape-related functions and on the other hand a set of functions related to local production and processing of quality food. The first set encompasses mainly the functions to maintain the hydro-ecological equilibrium and to preserve the cultural landscape, which have gained public interest due to natural catastrophes related to the problem of erosion and hydro-geological hazards. The second most important point for the stakeholders was quality food production, which was merged with production of safe food due to the high level intersection between these two points. Agricultural products from Mugello meet high quality standards in terms of safety, flavour, smells and appearance. Regional food supply (4th rank) is therefore related with the upper two issues and received a high score, too, because regional food also communicates values, history and customs from the region. Provision of renewable energy was ranked on the 4th place, jointly with regional food supply, as another economic function of agriculture. For farmers the forestry sector and biomass cultivation for energy production have an important role for a sustainable development, environmental protection and the necessity of a diversification of productions in future. This indicated a post-productivist agriculture in Mugello, supplying services important services to the rural region, besides producing local food.

The importance of food production in the Kościan case study is reflected by the fact that three of the four highest ranked effects were related to the generic function of food production (quality food production, production of safe food and regional food supply). Hence, almost 30 % of the total demand was attached to these functions, much more than in any other case study region.

Apart from the functions related to food production, the high scoring of the development and maintenance of infrastructure reveals a demand for an issue that might not be primarily improved by the agricultural sector but is important as a societal issue for the rural population.

5.3 Importance of economic, ecological and socio-cultural functions

The 31 different functions and effects can be clustered into predominantly economic, ecological and socio-cultural issues as shown in Table 4. Fig. 11 compares the budget allocated to these clusters in each case. In most of them, the functions obtained 28-40% of budget. Only in the Ostprignitz-Ruppin case study, the importance of the economic functions was considered to be much higher (52,4 %) than the other clusters, while only 18 % of the budget was allocated to predominantly ecological functions. An important reason for this imbalance may be the slightly biased composition of the stakeholder group, with no full representative of environmental groups. On the other hand, also the interviews showed an emphasis on the economic functions in Ostprignitz-Ruppin which illustrates the dominant political discourse and public concern about unemployment.

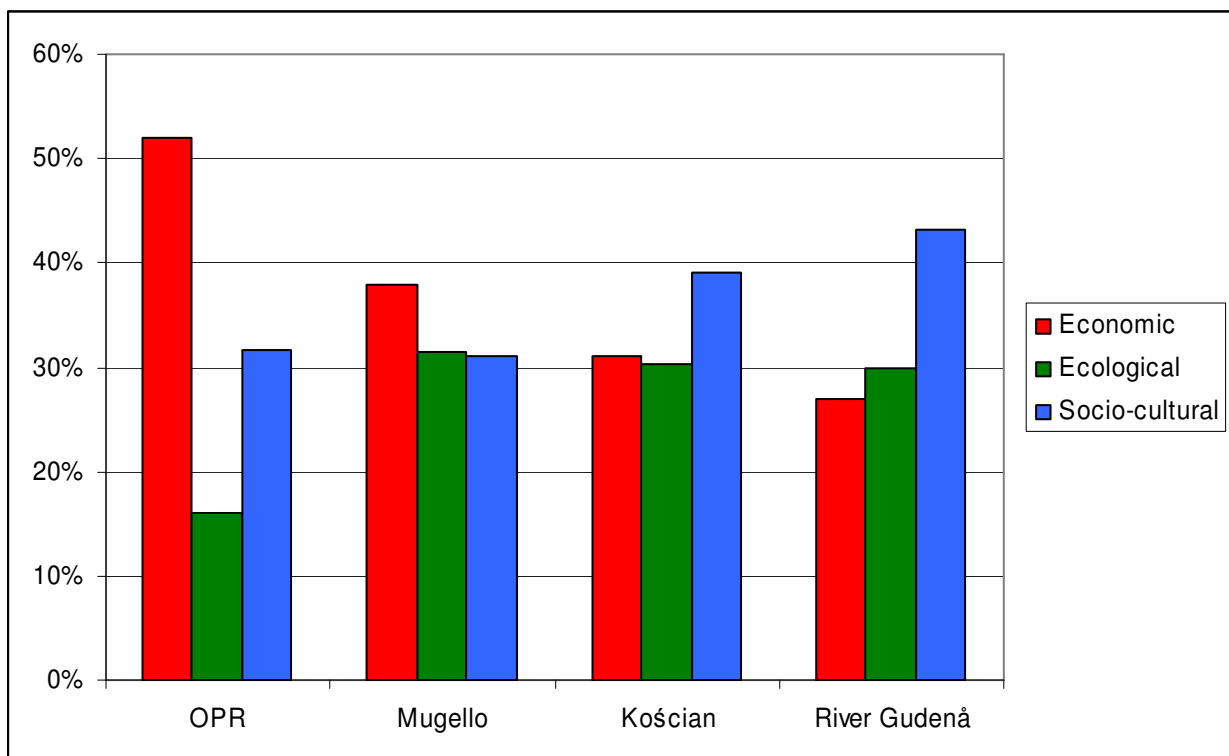


Fig. 11 Comparison of importance of economic, ecological and socio-cultural functions and effects of agriculture in the case studies

However, the different scorings of the single functions in all case study regions reveal notable deviations, which will be interpreted below.

Difference in the demand for food production functions

Food production, as the basic function of agriculture, was subdivided into several aspects (regional, safe, quality, and affordable food). This formerly primary function of agriculture had different degrees of importance for the consulted stakeholders in the case studies. In the Polish case study region, the results indicate a still very important role of food production. In the budget allocation this importance is reflected by the high value for quality foods and the additional function of affordable food production. In River Gudenå and OPR, in contrast, the stakeholders did not allocate significant budget shares towards food production related functions. All the functions related to food production put together (regional food supply, quality food production, production of safe food and regional food processing) received only 13-14 % of the budget in both the German and Danish case study, while allocating 18% of the budget in Mugello and 30 % in Kościan, respectively.

Differences in the demand for para-agricultural activities

The ten highest ranked functions and effects included two important para-agricultural activities: the provision of renewable energies and regional tourism. A German farmers' organisation representative pointed out that production of food is less important nowadays, but at the same time para-agricultural activities gained importance which means an equally weighty role of the agricultural sector within the rural economy.

The Provision of renewable energies was an important matter for the stakeholders in DK, DE, and IT, since it was added to the list of positive function after the interviews and received a high scoring in the budget exercise. The Danish stakeholders gave this function the highest priority. The Polish stakeholders on the other hand, did not signal any potential for a societal demand for the provision of renewable energies through agriculture.

The fact that regional tourism scored a higher budget in OPR than in the other case studies corresponds with its already current high importance in the regional context. It is remarkable that also for this para-agricultural activity there is much less demand in Poland than in the other case studies.

The function of regional food processing can also be considered to be a para-agricultural activity as far as on-farm activities rather than SMEs are concerned. Many agricultural entrepreneurs have already nowadays on-farm processing capacities (bakeries, mills, cheese dairies), but the demand for locally processed food seems to be high, particularly in the OPR case study.

Differences in the demand for environmental public goods

A significant number of ecological public goods were discussed in the course of the fieldwork for this study. It is important to note that most participants acknowledged the importance of the contribution of agriculture to nearly all of them (Fig. 3, Fig. 5, Fig. 7, Fig. 9). Maintaining the cultural landscape may be regarded as the most important ecological function of agriculture from a cross-



country perspective. Stakeholders in all case studies attached a high importance to this function. Maintaining the cultural landscape was regarded as the most important ecological function in OPR and Mugello.

Contrarily, for some ecological functions the regional differences were high, which may be attributed to the specific ecological and geographical conditions.

While the negative effects of agriculture did not play a role in the German, Italian, and Polish case study, the Danish stakeholders allocated significant shares of the budget towards two of them: Minimisation of smells and of nitrate in drinking water are serious societal matters in the Danish case study, according to the interviewed stakeholders.

Water scarcity received high values in the Polish, Italian, German case study while the Danish stakeholders did not regard this issue as important. Hence, hydro-ecological equilibrium was interpreted differently in the case studies, according to the specific geological and hydrological conditions. Both in OPR and Kościan case studies, hydro-ecological equilibrium was viewed in the context of lack of water for agricultural activities, the disastrous floods of river Elbe in the latest years may also have influenced the understanding of this function in OPR. From the stakeholders' understanding, the influence of agriculture on the hydro-ecological equilibrium is that agriculture consumes a lot of drinking water on the one hand and that agriculture is an important factor for minimising the future risk of floods. In Mugello, on the other hand, hydro-ecological equilibrium was linked to the heavy erosions on the slopes. Through management practices, particularly production on terraces, agriculture can prevent erosion in the region. Contrarily, in Denmark the hydro-ecological equilibrium was not considered as important by the stakeholders, because neither droughts nor erosion are a severe problem.

Differences in the demand for socio-cultural and rural amenities

By far the most important rural amenity provided by agricultural production is the provision of rural jobs. Agriculture is highly important for the provision of jobs in the region. 20 % of the budget allocation of the German case study was allocated towards this function and also the stakeholders in the other case studies ranked this function high.

Regarding the socio-cultural quality food production, the results of the budget exercises also show large differences. While in Mugello and Kościan, the quality food production is highly demanded concentrating more than 10 % of the budget, both in the Danish and the German case study this issue has not been identified as a major societal demand in the region. We assume, however, that there was a different understanding of the term quality food production in the Kościan and the Mugello case study region. While the stakeholders in the Polish case study interpreted quality food production more in the sense of meeting quality standards, the stakeholders in Mugello attached a cultural value to products with specific quality characteristics.

Closely linked to the provision of jobs, enabling a rural livelihood and the stimulation of small businesses were valued by the population. In contrast, both the stimulation of cultural activities and the keeping of the traditional socio-cultural identity are not demanded by the population in the case study regions in a large amount, according to the interviewed stakeholders. Nevertheless, these issues cannot be left aside as being irrelevant; the stakeholders rather confirmed that they are also part of the multifunctionality of agriculture.

6. Conclusions

6.1 Societal demand for multifunctional agriculture

The aims of this study, as outlined in section 1, could be achieved by applying the Stakeholder Delphi Approach. Our conclusions regarding the single aims are delineated below.

As a result of our survey, we assume that society attaches a fundamentally important **role of agriculture** for the living conditions in the rural area. In each case study the role of agriculture for the living conditions is shaped by the natural, societal, and political framework conditions. Both positive and negative roles of agriculture were taken into account, while the positive roles were seen as far more relevant, except for in the Danish case study. From the societal perspective, the impact on agriculture ranges from economic effects like the production related functions, over ecological effects like the maintenance of a cultural landscape or biodiversity, to different socio-cultural effects.

Our research has confirmed that society demands various functions from agriculture. While the stakeholders of the case study region OPR gave absolute priority to the provision of jobs, the Danish stakeholders attached a high level of demand to the elimination of negative effects of agriculture such as bad smells and nitrate in drinking water. In both of these case studies a significant share of the demand was attached to para-agricultural activities, such as agri-tourism and the provision of renewable energies, whereas functions directly related to food production received a relatively small proportion of the demand.

The Polish case study suggests, in contrast, a strong societal demand for food-production related functions, such as regional food supply and quality food production, while an improvement of the rural infrastructure was also highly prioritised.

In the Italian case study region the demand structure has two sides: Firstly, the functions related to food production received high budget shares, which indicate a significant societal demand, secondly, landscape related functions, including the maintenance of a hydro-ecological equilibrium, were equally important.

Capturing **the reasons behind the demand** for certain functions of agriculture allows us to conclude that there are strong linkages between the functions. As these interrelations between functions are important for the structure of the demand in a region, it is eminent that functions are not looked at as isolated issues but in the regional context and in relation to the other functions. By definition, multifunctional agriculture links food production and external effects of food production. This study confirmed the high degree of jointness and interrelation between agricultural production, para-agricultural activities and public goods provision. For example, the provision of jobs in rural areas through agricultural production is perceived as highly related to earning one's livelihood in the region. Furthermore, it contributes to the survival of other small businesses in rural areas, be it suppliers of agricultural inputs or purchasers of agricultural goods (e.g. mills, supermarkets, traders,

food processing plants). Similar linkages exist between rural tourism, landscape design, hydro-ecological equilibrium, the provision of jobs and recreation in rural areas.

Our results in the different case study regions imply that there are significant **regional differences in the societal demand for the functions of multifunctionality**. Outstanding is the strong difference with regard to production related functions. We found food production related issues to be very important in the Kościan case study region, while agriculture has a fairly post-productivist characteristic in the other case studies. In the River Gudenå case study the production function received the lowest importance, being only a minor issue among many others. The intensive pig farms with their negative environmental effects do not correspond to the demand pattern expressed by the stakeholders in the River Gudenå case study.

Correspondingly, para-agricultural activities, i.e. on-farm processing, agri-tourism, production of alternative energy, and farm shops are important in the case studies OPR and River Gudenå. While in OPR regional tourism is the most demanded para-agricultural activity, the provision of renewable energies is dominant in River Gudenå.

Maintaining the landscape was found to be the most important ecological function fulfilled by agriculture across all case study regions, particularly in OPR and Mugello case study regions. In the River Gudenå case study the demand for mitigating negative ecological effects for agriculture is high. This high demand can be attributed to the high abundance of specialised pig production farms which affect the regional ecology. In the other case studies the negative effects played a negligible minor role.

There were many differences in terms of socio-cultural effects and rural amenities provided by agriculture in the case studies. Most important was the strong demand for provision of jobs in OPR, which could not be identified in other regions in this magnitude. In the Kościan case study region the development and maintenance of infrastructure received the highest demand share. This reveals a strong demand for a function that cannot primarily be fulfilled by agriculture. Quality food production was classified as a socio-cultural function in Mugello, where it received a high share of the societal demand. Also in Kościan quality food production was among the most important functions, however, the understanding of this function is here more an economic one, meaning that the produced food must comply with international quality standards which allows for an export of the products.

This shows that not only the demand for agricultural functions is different in each case study but also the reasons underlying the demand and hence the interrelations between them.

6.2 Methodological conclusions

To conduct the present study posed a methodological challenge because of the wide thematic scope and its simultaneous implementation in four case study regions.

In general the Stakeholder Delphi approach proved to be capable to identify preferences of the participating representatives and experts. However, further research is needed to refine the method. In the following section our conclusions in terms of strengths and weaknesses of the approach and then give implications for further research.

Strengths of the approach

The Stakeholder Delphi Approach has shown the following strengths during the application in this project:

- Employing the Stakeholder Delphi Approach, we could successfully establish a prioritisation of functions for each region, identify the underlying reasons for this demand, and clarify the differences for each region.
- It was possible to produce valid and plausible results with the Stakeholder Delphi Approach because: i) both of the two steps indicate societal preferences in the same direction, therefore an arbitrariness of the valuation is limited ii) the preferences we measured with our Stakeholder Delphi are not contradictory with the common understanding of societal demand structures, measured in representative surveys with a more limited thematic scope (IPSOS, 2006).
- It showed that by taking into consideration qualitative aspects, both in the interviews and the workshop the purely quantitative prioritisation data could be enriched and put into context.
- The broad approach, taking into account all possible aspects of multifunctionality, allows for a comprehensive coverage of the notion multifunctionality. The strong linkages illustrate the need not to look at the effects in an isolated manner but to take into account the decision process as a whole.
- As an expert and stakeholder-based approach the Stakeholder Delphi is particularly useful for complex research questions, because, through the open discussion process, the information bias can be reduced significantly compared to methods based of individual preferences.
- The approach is feasible and can be implemented with reasonable financial and human resources.
- The Stakeholder Delphi is not a purely economic approach only measuring the demand by WTP. Since we cannot assume that the stakeholders set the priorities purely according to the paradigms of welfare maximisation, considerations of non-use values and charity-related valuations have been explicitly taken into account.

- As stakeholders and experts rather than randomly selected individuals are chosen, the Stakeholder Delphi Approach is potentially able to take into account merit good considerations.
- As a participatory approach with a two-step procedure, Stakeholder Delphi allows for adoptions according to the interviewee statements of the concepts after the first step (reflexibility, openness, flexibility of the research process).
- The prioritisation budget exercise is a good method to develop a consensus among a group of experts and stakeholders. The participants accepted the arithmetic means of the individual scorings as a valid end result and did not see a necessity to change the budget.

Weaknesses of the approach

On the other hand, we could identify some difficulties with the Stakeholder Delphi Approach:

- In our study the Stakeholder Delphi approach made high demands on the interviewees because
 - the topic of multifunctionality is a complex topic, covering very different aspects,
 - the stakeholders had to answer as representatives of a certain societal group,
 - they had to distinguish between 20 different aspects at the same time,
 - the budget exercise was on an abstract level, not according to real budgets but according to the societal demand in the region.
- As other stakeholder or expert based methods, the Stakeholder Delphi Approach can produce biased results if the interviewees have not been selected appropriately according to the situation in the case study region, or single interviewees strongly push into a specific direction without being interested in a group consensus.
- The small sample size is a major disadvantage of the Stakeholder Delphi Approach. Because the number of participants for running an effective workshop is limited to 12-15, it is difficult to increase the sample size.
- In similar studies (see e.g. (Hug-Sutter, 2007)) differences have been observed between the demand of a population in a rural region and the visitors coming to a region. The external often urban people had often stronger demand regarding the maintenance of a cultural landscape or animal welfare, than the regional population. However, the study did only take into account the societal demand of the regional population.
- The participating stakeholders have to be given much information, which needs efforts from the research team on the one hand and bears the risk for biased results on the other hand.

6.3 Implications for further research

Since we think that combining collective stakeholder preferences with quantitative methods is a worthwhile approach to follow we suggest fostering research activities in this direction. We are convinced that with further know-how, more precise demand estimations can be achieved. These approaches based on collective preferences have manifold advantages. Apart from the Stakeholder Delphi Approach, which we used for this study and the other related approaches that were identified in section 2 of this report, we can think of other promising approaches to employ. For such a complex topic we propose to use conjoint measurements in connection with collective preferences. Conjoint measurements promise to deliver exact demand values and are able to fully cover multi-facet topics. Due to the high requirements to the know-how of the project partners, however, it seems useful to test new approaches in a single region first and then build on the knowledge gained from unpredictable obstacles that emerged.

Parallel to these research activities we recommend using similar approaches for the valuation of socio-cultural functions alone because we think that these functions of agriculture are least understood and need further attention from researchers. Furthermore, the other methodological results should be taken into consideration by succeeding researchers.

We suggest fostering both theoretical and empirical research on the relation of merit goods in relation to multifunctionality. While merit goods can be referred to as legitimising not to take into account individual preferences on the one hand, on the other hand one could argue that there is no need to take into account the societal demand at all. In our study it is difficult to say to what extent multifunctionality is concerned with merit goods.

6.4 Implications for policy

It is difficult to derive direct implications for policy from the results of our study. However, the results imply that a reallocation of CAP expenses among the two pillars should be considered. One might conclude that 1st pillar policies should be reduced for the benefit of second pillar policies, if the societal demand of the population is taken into account. But the problem is more complex because at least before 2007, there have been different European funds involved in satisfying the societal demand for some of the functions. Particularly the results of the Polish case study region imply that CAP may not be a sufficient policy tool to meet the societal demand for non-commodities (see Deliverable 6.1 and 6.2 (Schader & Stolze, 2005a; Schader & Stolze, 2005b) for more information on relevant policy instruments in the context of rural development and multifunctionality).

The three axes of the second pillar of the CAP can be compared to the economic, ecological, socio-cultural clusters that we have developed. While the first axis "competitiveness" corresponds with the economic activities, predominantly food production-related functions, the second axis on "environment and countryside" matches our ecological functions. Finally, the "quality of life and

diversification" axis, corresponds to the socio-cultural issues, as well as to the para-agricultural activities, which aim for an integrated rural development.

As delineated in Deliverable 6.1 and 6.2 (Schader & Stolze, 2005a; Schader & Stolze, 2005b), however, multifunctionality is not an issue to address on EU level only. Particularly, looking at the regional differences in the demand structure, we conclude that the EU level can and should only provide a very rough framework leaving space for region-specific implementation.

The formulation of a demand-orientated Model of European Agriculture is therefore a different undertaking, given the varying emphasis for different functions (e.g. the production function in the Kościan district).

On the other hand a look on the aggregated clusters of the demand allocations on the economic, ecological, and socio-cultural clusters of functions shows that there are not so large regional differences to expect in this regard. Therefore tighter restrictions regarding the allocation of funds on the various axes could be justified, in order to foster a multifunctional character of agriculture which is based on all dimensions of sustainability (ecological, economical, and social).

Especially for food production-related functions these results indicate a regionally varying societal demand. Production related support policies seem to be less legitimised if only such low shares of the demand can be attached to this function, especially, if this demand is attributed to added-value food production activities (i.e. regional origin, high quality).

How the funds are allocated within a single axis, however, has to be decided on national or regional level, respectively. Therefore, we think that the latest reforms within the 2nd pillar of the CAP are in line with the requirements from the demand side, whereas the total allocation of funds to the second pillar is too low, compared to the funds for the first pillar, given a societal demand of 30 % at maximum for production related functions. Looking at the real budget distribution within the CAP, however, there is a strong focus on first pillar policies with about 90 % of the total budget. In the current programming period of 2007-2013, the budget share of second pillar policies even decreased.

To include food safety and animal welfare as separate policy issues within the mid-term review reforms in 2003 was backed by the stakeholders in our survey. Particularly, food quality and safety is demanded strongly, while animal welfare was a secondary matter.

In summary, we conclude that despite the regional differences concerning the importance of multifunctional services of agriculture, there is a strong demand for multifunctional agriculture as a whole. We recommend adjusting the agricultural policy in order to directly link policy instruments to the provision of the identified multifunctional services of agriculture.

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Annex 1: Questionnaire for face-to-face interviews

- Q1** In your opinion as a representative/expert, what are the **current positive factors determining the living conditions** (including economic, social, and environmental aspects) in your rural area, currently?
- Q2** Which factors, do you think as a representative/expert, **currently deteriorate the living conditions** (including economic, social, and environmental aspects) in your rural area?
- Q3** Which role **does** agriculture play currently for the living conditions (including economic, social, and environmental aspects) in your region from your representative/expert point of view as a...? Think especially of other things than food that are produced or provided indirectly.
- Q4** Which role **should** agriculture play for the living conditions (including economic, social, and environmental aspects) in your region according to the wish of the local people from your representative/expert point of view as a...? Think especially of other things than food that are produced or provided indirectly.)
- Q5** There are many positive effects on rural areas affiliated to the agricultural sector. Besides the aspects you have just mentioned, could you value how important following positive effects of agriculture are for local people in your region? Please note that you should answer as a representative/expert
- Q6** Actually, what are the main negative effects of agriculture in your region for the inhabitants, from your point of view as a representative/expert?
- Q7** Could the following positive effects of agriculture be reached in another way than agricultural production in your region? Imagine alternative ways.
- Q8** From your point of view as a representative/expert, in your region, how should the commitment of agriculture develop in future with respect to following aspects?



Annex 2: Exemplary agenda and objectives of the group discussion

Table 5 Overview of group discussion and the session objectives

Time	Session	Objectives
45 min	Introduction to the workshop Presentation of interview results: national and international	<ul style="list-style-type: none"> • Explain the context of the workshop • Explain the workshop procedure and concept • Inform the participants about the results of the interviews in the case study and reference to other case studies • Bring all participants on the same level of information
35 min	Discussion of presented interview results	<ul style="list-style-type: none"> • Clarify the terms • Hear participants' feedback on the presented group's opinion • Limit the list of functions to 20
30 min	Budget allocation I: Individual	<ul style="list-style-type: none"> • Develop a starting point for a group discussion • Collection of reasons for allocation
90 min	Budget allocation II: Plenum Presentation of results of individual budget allocations Introduction statements Agreement on final order of magnitude	<ul style="list-style-type: none"> • Introduce results of the individual budget allocation to the entire group • Give everyone the opportunity to share the individually developed reasons with the entire group • Reach consensus on an order of magnitude of functions • Identify issues where no consensus can be reached
30 min	Implications of the results for the real situation in the region	<ul style="list-style-type: none"> • Putting the results of the budget exercise into the context of the situation in the region
15 min	Feedback on group discussion	<ul style="list-style-type: none"> • Getting to know how the participants think about the group discussion

Annex 3: Definition of the functions and effects according to the guidelines for conducting the group discussions

Table 6 Description of functions and effects

Case study	Function/effect	Description/ comments
All	Provision of jobs	Only jobs on farms are meant here
All	Stimulation of small businesses	Both, small businesses selling inputs or services to the farm holdings and small businesses purchasing, trading, or processing agricultural products
All	Regional food supply	The food that is consumed in the region was also produced in the region
All	Regional food processing	The regionally produced food was also processed in the region
All	Increased biodiversity	How certain agricultural practices increase biodiversity or minimise negative effects of agriculture on biodiversity
All	Production of safe food	Safe food means here: Food, which does not cause any negative health effects and does not bear the risk to do so (for children and adults) (think of pesticide residues, nitrate, GMOs, mad cow disease, etc.)
All	Animal welfare	Farm animals are treated appropriately to their species. This aspect is explicitly limited to livestock
All	Stimulation of rural cultural activities	Cultural activities like fairs or festivals (both traditional and non-traditional) in rural areas initiated or supported by farmers
All	Maintaining the cultural landscape	The farming practices significantly shape the landscape
All	Rural livelihood	The chance to economically survive in the rural area
All	Recreation in rural areas	The contribution of agriculture to generate recreative rural areas
All	Keeping traditional socio-cultural identity	Knowledge and traditions from former generations may be passed on and kept alive by farmers and their families
All	Regional tourism	Both agri-tourism and the contribution of agriculture to attract tourists
All	Prevention of migration of young people	The fact that agriculture is practiced in the region may prevent young people from migrating to the city
All	Soil fertility	Different farming practices may significantly influence the soil fertility (e.g. favouring or preventing all kinds of erosion)
All	Hydro-ecological equilibrium	To keep the water flow and the ground water at a ecologically sound level
All	Minimisation of smells from agriculture	Agriculture may be a source of annoyance due to various smells (e.g. slurry, pesticides, mineral fertilisers)



All	Minimisation of noise from agriculture	Agriculture may be a source annoyance due to noise (e.g. through machinery or cattle)
All	Minimisation of nitrate in drinking water	Inappropriate fertilisation of agricultural fields may result in nitrate in drinking water, which is harmful for consumers and/or costly to purify
DE	Farm diversification	The diverseness of farming practices on single farms may influence the rural areas, e.g. through influencing landscape, economic performance of the farm
DE, IT, DK	Provision of renewable energy	The provision of renewable energies (e.g. biomass, wind energy) on farms may cause several ecological and economical effects (higher added value in the region) for the rural area
DE, IT, PL	Quality food production	There are different criteria for quality food such as: taste, nutritional quality, ecological quality, etc.
IT, PL	Development and maintenance of infrastructure	The agricultural sector may contribute to the development and maintenance of infrastructure in rural areas (e.g. streets, public transport services, telecommunication)
DE	Innovative business ideas	Innovative business ideas of farmers (e.g. tourist attractions, clever marketing of own products) may have positive effects on region
DE	Co-operation among farmers	Co-operation among farms mainly has economic advantages for the farmers and may contribute to social cohesion
DE	Co-operation with other sectors	A stronger co-operation of the agricultural sector with other sectors may induce a more economic management of farms or have other positive effects on the region (like social cohesion)
DE	Non-industrial agricultural production	Family farms and traditional farming practices are often perceived as more valuable than a highly rationalised agricultural production
DK	Education of non-farmers	The population, even in rural areas, increasingly loses the contact to agriculture. A population with a good knowledge about agriculture may be desirable from a societal viewpoint
DK	Keeping/ making landscape accessible (paths)	Farmers and agricultural practices make the rural landscape accessible by building and maintaining paths. On the other hand, agricultural practices sometimes make the landscape inaccessible (e.g. fences)
DK	Facilitating social cohesion	The up-keeping of farming may have a beneficial effect on the social cohesion of the population in the region (e.g. between farmers and residents)
DE	Image of the region	What inhabitants and non-inhabitants of the region associate with the region
PL	Provision of good working conditions	Agriculture may improve the working conditions (e.g. salary, insurances, working hours) in the region
PL	Provision of affordable food	For poorer people regionally produced food may be an affordable alternative to other foodstuffs

Annex 4: Final orders of magnitude of functions and effects and reasons for assignment and non-assignment of budget

Table 7 Final list of functions and effects for Denmark with reasons

Rank	Functions/ effects	Budget allocated	Reasons for assignment and non-assignment
1	Provision of renewable energies	11%	<ul style="list-style-type: none"> • Research and development essential for future development • reducing use of fossil fuels important • mutual benefit for both energy sector and agriculture • there is an urgent need for bio energy and the river valley could make an important contribution
2	Minimisation of smells from agriculture	9%	<ul style="list-style-type: none"> • Smell indicates surplus nitrogen to the atmosphere, which leads to high fertilization levels • important for neighbours – it is hard to sell houses in smelly villages • improves understanding among neighbours
3	Stimulation of small businesses	9%	<ul style="list-style-type: none"> • Important for attracting newcomers and provision of rural jobs • stimulation and support of part-time farming instead of supporting full-time agriculture
4	Keeping/making landscape accessible	8%	<ul style="list-style-type: none"> • It is unacceptable that a large part of the country is not accessible • has little importance for local residents' use of the landscape • for the time being, access to the river and surroundings is limited
5	Minimisation of nitrate in drinking water	7%	<ul style="list-style-type: none"> • Important because pollution of ground water is irreversible • an important basic value or right
6	Regional food processing	6%	<ul style="list-style-type: none"> • Mostly a question of reducing transport costs, economically and ecologically
7	Recreation in rural areas	5%	<ul style="list-style-type: none"> • The River Gudenå valley attracts many rural residents from the whole region, thus making it an important area
8	Rural livelihood	5%	<ul style="list-style-type: none"> • Provision of jobs essential • other functions than just housing should be provided in rural areas
8	Maintaining the cultural landscape	5%	<ul style="list-style-type: none"> • It is more important to conserve nature • has an important function in relation to the image of agriculture • high risk that Gudenå River will get blocked by plant



			growth, which is not cut back as it was earlier
8	Increased biodiversity	5%	<ul style="list-style-type: none"> The greater diversity – the more healthy ecosystems has an important function in relation to the image of agriculture
8	Provision of jobs	5%	<ul style="list-style-type: none"> Creation of jobs will attract new residents farming is not an end in itself – important to include non-agricultural jobs in development most important in rural areas distant from growth centres important to maintain rural employment important objective for rural development schemes in general, but not a pressing issue in the River Gudenå Valley
12	Animal welfare	5%	<ul style="list-style-type: none"> a basic value, which is valued highly by Danish consumers
13	Regional food supply	4%	<ul style="list-style-type: none"> A larger local/regional supply saves energy for transporting food
14	Stimulation of rural cultural activities	4%	<ul style="list-style-type: none"> No reasons expressed
15	Production of safe food	4%	<ul style="list-style-type: none"> Important for securing future jobs and for attracting new rural residents Danish food is already secure a basic value, which is valued highly by Danish consumers
15	Regional tourism	4%	<ul style="list-style-type: none"> Provides alternative livelihoods
17	Facilitating social cohesion	4%	<ul style="list-style-type: none"> Important to avoid commuter villages (where commuters only come to sleep) local social cohesion is important
18	Prevention of migration of young people	1%	<ul style="list-style-type: none"> Important for securing future rural settlement
19	Soil fertility	1%	<ul style="list-style-type: none"> No reasons expressed by the participants
20	Keeping traditional socio-cultural identity	1%	<ul style="list-style-type: none"> No reasons expressed by the participants

Table 8 Final list of functions and effects for OPR (DE) with reasons

Rank	Functions/ effects	Budget allocated	Reasons for assignment and non-assignment
1	Provision of jobs	20%	<ul style="list-style-type: none"> • The primary aim for OPR is to provide enough jobs. • All other functions are only prerequisites for the provision of jobs
2	Regional tourism	12%	<ul style="list-style-type: none"> • Very important for the regional economy • Provides better infrastructure for the local population • Induces a better livelihood and the provision of jobs • Potential second pillar for farmers besides pure production of food • Prevents migration of people to the cities • Helps to keep the socio-cultural identity and the cultural landscape and supports the recreational value of the region
3	Regional food processing	10%	<ul style="list-style-type: none"> • Strong relation to the provision of jobs in the region • Has positive effects on job provision, rural livelihoods, regional food supply, prevention of migration of young people, food safety, food quality, innovative business ideas and co-operation with other sectors • Should be supported in connection to regional food supply (supply chain approach)
4	Regional food supply	9%	<ul style="list-style-type: none"> • Binds labour force and thus provides jobs • Should be supported in connection with regional distribution (supply chain approach) • Basic task of agriculture
5	Maintaining the cultural landscape	9%	<ul style="list-style-type: none"> • Basic task of agriculture, which is fulfilled by appropriate farm management • Has positive effects on tourism and the prevention of migration • Cost intensive, because of yield reductions • Important prerequisite of all other functions
6	Provision of renewable energy	9%	<ul style="list-style-type: none"> • Connected to other functions: Innovation, provision of jobs, rural livelihood and prevention of migration • New source of income, makes farms competitive • Supports nature conservation, necessary to solve global problems • Important future source of income for farmers • Way of diversification of farms • Good alternative to food production • Creates new jobs in rural areas



7	Rural livelihood	7%	<ul style="list-style-type: none"> • Closely related to provision of jobs • If a rural livelihood is warranted other areas will benefit
8	Hydro-ecological equilibrium	5%	<ul style="list-style-type: none"> • Bias with current agricultural practices • Important for food production and maintaining the cultural landscape • Important for the rural area • Not important for the population
9	Quality food production	2%	<ul style="list-style-type: none"> • Quality food is safe food • Strongly connected to regional food supply
10	Innovative business ideas	2%	<ul style="list-style-type: none"> • Effects on provision of jobs, rural livelihood, prevention of migration, regional production (safe food, food processing) • Not a function of agriculture, but a prerequisite for good management • To stand out from the crowd is important
11	Prevention of migration of young people	2%	<ul style="list-style-type: none"> • Factor for future of agriculture and the rural area • Result of other effects and functions
12	Production of safe food	2%	<ul style="list-style-type: none"> • Requirement for the social acceptance of agriculture • Connected to the provision of jobs
13	Cooperation with other sectors	2%	<ul style="list-style-type: none"> • No function of agriculture but prerequisite • Cooperation with tourism sector, gastronomy and science can be beneficial
13	Diversification of farms	2%	<ul style="list-style-type: none"> • Necessary for rural tourism, renewable energies, innovations and cooperation with other sectors • Basis for a provision of jobs through agriculture
15	Animal welfare	2%	<ul style="list-style-type: none"> • Prerequisite for production and sales
15	Cooperation among farmers	2%	<ul style="list-style-type: none"> • No function but prerequisite • Promotes job provision
15	Image of the region	2%	<ul style="list-style-type: none"> • Supported through transparency of production on farms • Important for sales and rural tourism • Result of other effects
15	Recreation in rural areas	2%	<ul style="list-style-type: none"> • Promotes tourism • Promotes job provision • Result of maintaining the cultural landscape
19	Keeping traditional socio-cultural identity	0%	<ul style="list-style-type: none"> • Not important for population • No function of agriculture • Positive effect on tourism and prevention of migration

19	Soil fertility	0%	<ul style="list-style-type: none"> • Not important/relevant for the population
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Table 9 Final list of functions and effects for Mugello with reasons

Rank	Functions/ effects	Budget allocated	Reasons for assignment and non-assignment
1	Hydro-ecological equilibrium	12%	<ul style="list-style-type: none"> • The problem of erosion and hydro-geological hazards is highly important because of some well visible catastrophic consequences; • The maintenance of an optimum hydro-geological equilibrium is important for preserving the landscape and soil fertility especially in the mountain and hill areas.
2	Quality food production	10%	<ul style="list-style-type: none"> • Mugello's products are normally characterised by high quality standards in terms of safety, flavour, smells and appearance; • Mugello's local products have an added value because they are produced in this particular region or by a traditional method or because their production methods pay special attention to the environment and animal welfare (e.g. organic farming).
3	Maintaining the cultural landscape	10%	<ul style="list-style-type: none"> • The agriculture in Mugello is a crucial component for maintaining the pleasant landscape inherited from an ancient history.
4	Regional food supply	8%	<ul style="list-style-type: none"> • Local products are expressions of the specific territory and manifest particular characteristics that communicate values that are deeply-rooted in local history and custom.
4	Provision of renewable energy	8%	<ul style="list-style-type: none"> • This item has been considered a "new" function, important for diversification. Innovative plans designed to increase the use of energy from forestry, agriculture and waste materials may be an interesting option for future agriculture of the area.
6	Stimulation of small businesses	6%	<ul style="list-style-type: none"> • Several small businesses appear being strictly linked to the agriculture sector.
7	Provision of jobs	6%	<ul style="list-style-type: none"> • The unemployment rate is quite high and the agriculture is an important activity for maintaining occupation.
8	Keeping traditional socio-cultural identity	5%	<ul style="list-style-type: none"> • Agriculture activities influence maintaining traditional socio-cultural identity which is essential also for the social cohesion in the area;

9	Regional tourism	5%	<ul style="list-style-type: none"> The agriculture activities influence the creation of a pleasant landscape and wholesome environment which attract tourism; tourism on farms is regarded as farm diversification and an important source of income;
10	Prevention of migration of young people	5%	<ul style="list-style-type: none"> Young people tends to migrate in the urban areas looking for better job opportunities in term of income and stability;
11	Stimulation of rural cultural activities	4%	<ul style="list-style-type: none"> A lively rural area is more enthusiastic towards rural cultural activities;
12	Animal welfare	4%	<ul style="list-style-type: none"> The respect of animal welfare standards is considered a fundamental principle strictly linked to food quality productions.
13	Rural livelihood	4%	<ul style="list-style-type: none"> The agriculture is a crucial activity in order to maintain livelihood in rural areas;
14	Recreation in rural areas	4%	<ul style="list-style-type: none"> A lively and pleasant rural area provides recreation which is an important component for the quality of life of the inhabitants and for attracting tourists;
15	Development and maintenance of infrastructure	3%	<ul style="list-style-type: none"> Keeping the agriculture activity in remote areas pushes the maintenance of infrastructures; A lively rural area pushes to the creation of new infrastructures;
16	Soil fertility	3%	<ul style="list-style-type: none"> The agriculture techniques used In Mugello do not improve very much soil fertility.
17	Increased biodiversity	2%	<ul style="list-style-type: none"> Agriculture influences just moderately agro-biodiversity and not very much the natural biodiversity;
18	Minimisation of nitrate in drinking water	0%	<ul style="list-style-type: none"> The reason for not assignment is the fact that this negative effect of agriculture is considered by the participants "not relevant" for the region.
19	Minimisation of smells from agriculture	0%	<ul style="list-style-type: none"> The reason for not assignment is the fact that the agriculture in Mugello does not produce bad smells. This negative effect of agriculture is considered by the participants as "not relevant" for the region
20	Minimisation of noise from agriculture	0%	<ul style="list-style-type: none"> The reason for not assignment is the fact that the agriculture in Mugello does not produce considerable noises. This negative effect of agriculture is considered by the participants "not relevant" for the region.

Table 10 Final list of functions and effects for Kościan with reasons

Rank	Functions/ effects	Budget allocated	Reasons for assignment and non-assignment
1	Development and maintenance of infrastructure	10%	<ul style="list-style-type: none"> Improvement of living standards and development of region.
1	Quality food production	10%	<ul style="list-style-type: none"> Improvement of living standards and development of region
3	Production of safe food	8%	<ul style="list-style-type: none"> This is the most important imperative of agriculture.
4	Regional food supply	7%	<ul style="list-style-type: none"> Cheaper food and easy available
5	Increased biodiversity	7%	<ul style="list-style-type: none"> Very diversified opinions, administration considers it important.
6	Provision of jobs	7%	<ul style="list-style-type: none"> Importance of agriculture in job provision and that due to high unemployment (especially in rural areas) agricultural activity is still only one way to take up employment
7	Stimulation of small businesses	6%	<ul style="list-style-type: none"> Necessity for stimulation of small business and services related to agriculture in rural areas because they provide jobs and livelihood for rural community and stimulate general development which results in a higher standard of living
8	Hydro-ecological equilibrium	6%	<ul style="list-style-type: none"> Because of frequent shortages – important.
9	Rural livelihood	6%	<ul style="list-style-type: none"> Great discrepancy in opinions, important for administration and do not observed by farmers.
10	Animal welfare	5%	<ul style="list-style-type: none"> Humanitarian and ethical reasons.
11	Regional food processing	5%	<ul style="list-style-type: none"> Provide jobs and opportunity for food export.
12	Minimisation of nitrate in drinking water	5%	<ul style="list-style-type: none"> Majority of respondents consider pollution as problem.
13	Maintaining the cultural landscape	4%	<ul style="list-style-type: none"> Keeping tradition.
14	Recreation in rural areas	4%	<ul style="list-style-type: none"> Some source of income.
15	Soil fertility	3%	<ul style="list-style-type: none"> Noted by not the first rank of importance.
16	Stimulation of rural cultural activities	2%	<ul style="list-style-type: none"> Poorly recognised by farmers.
17	Provision of affordable food	2%	<ul style="list-style-type: none"> No problem in region.



18	Keeping traditional socio-cultural identity	2%	<ul style="list-style-type: none">• General trend for unification of society at the country level.
18	Regional tourism	2%	<ul style="list-style-type: none">• Rather unimportant.
20	Provision of good working conditions	2%	<ul style="list-style-type: none">• Observed by administration.

Table 11 The orders of magnitude of the functions of agriculture in the case studies

Rank	River Gudenå	OPR	Mugello	Kościan
1	Provision of renewable energies	Provision of jobs	Hydroecological equilibrium	Development and maintenance of infrastructure
2	Minimisation of smells from agriculture	Regional tourism	Quality food production	Quality food production
3	Stimulation of small businesses	Regional food processing	Maintaining the cultural landscape	Production of safe food
4	Keeping/making landscape accessible	Regional food supply	Regional food supply	Regional food supply
5	Minimisation of nitrate in drinking water	Maintaining the cultural landscape	Provision of renewable energy	Increased biodiversity
6	Regional food processing	Provision of renewable energy	Stimulation of small businesses	Provision of jobs
7	Recreation in rural areas	Rural livelihood	Provision of jobs	Stimulation of small businesses
8	Rural livelihood	Hydro-ecological equilibrium	Keeping traditional socio-cultural identity	Hydroecological equilibrium
9	Maintaining the cultural landscape	Quality food production	Regional tourism	Rural livelihood
10	Increased biodiversity	Innovative business ideas	Prevention of migration of young people	Animal welfare
11	Provision of jobs	Prevention of migration of young people	Stimulation of rural cultural activities	Regional food processing
12	Animal welfare	Production of safe food	Animal welfare	Minimisation of nitrate in drinking water
13	Regional food supply	Cooperation with other sectors	Rural livelihood	Maintaining the cultural landscape
14	Stimulation of rural cultural activities	Diversification of farms	Recreation in rural areas	Recreation in rural areas
15	Production of safe food	Animal welfare	Development and maintenance of infrastructure	Soil fertility
16	Regional tourism	Cooperation among farmers	Soil fertility	Stimulation of rural cultural activities
17	Facilitating social cohesion	Image of the region	Increased biodiversity	Provision of affordable food
18	Prevention of migration of young people	Recreation in rural areas	Minimisation of nitrate in drinking water	Keeping traditional socio-cultural identity
19	Soil fertility	Keeping traditional socio-cultural identity	Minimisation of smells from agriculture	Regional tourism
20	Keeping traditional socio-cultural identity	Soil fertility	Minimisation of noise from agriculture	Provision of good working conditions

Colours indicate the affiliation of a function to a cluster (■ economic, ■ ecological, ■ socio-cultural)