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International Food and Agribusiness Management Review
Volume 7, Issue 1, 2004

Consumer Preferences Regarding Multifunctional Agriculture

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Abstract

Multifunctionality is one of the key issues and concepts in European agriculture and in the common agricultural policy. Its importance is further emphasized in the context of the WTO negotiations. Stronger emphasis on multifunctionality will also have significant impacts on the food and agribusiness sector. Yet, so far consumers' views on multifunctionality have mostly been neglected in both policy planning and research. This paper presents one of the first major surveys on consumers' attitudes towards and willingness to pay for multifunctional agriculture. The study is based on a modern computer aided interviewing system and the contingent valuation method was employed to find out the WTP.

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Introduction

Multifunctional agriculture is concerned with the fact that agricultural production processes produce not only food and fiber but also various kinds of non-market, non-commodity outputs, which include, in the broadest sense, the impacts of agriculture on the state of the environment in rural areas, rural landscape, biodiversity on and close to farmland, contribution of agriculture to the socio-economic viability of the countryside, food safety, national food security, welfare of production animals, and cultural and historical heritage. These elements of multifunctional agriculture are externalities and, in most cases, public goods that are produced jointly with food or fiber in an agricultural production process (OECD 2001). Therefore, these effects do not have a monetary value and no compensation is paid for producing them. Nevertheless, at least some of them have significant impacts on the overall social welfare. This means that there should be some kind of compensation, one way or the other, for the production of at least the most important elements of multifunctional agriculture in order to ensure their supply also in the future.

Some of the most recent definitions of multifunctionality are quite strict. According to the OECD (2001, 2003), it is controversial whether rural employment and food security should be considered as elements of multifunctional agriculture. Similarly, Lankoski (2003) mainly focuses on the environmental and biodiversity aspects of multifunctionality. On the other hand, the CAP reform of June 2003 presents quite a wide range of multifunctional elements as key ingredients of the future direction of agricultural policy in Europe. The new single payment scheme introduced in the CAP reform is linked to the respect of environmental, food safety, animal and plant health, and animal welfare standards. Rural development aspects are also given strong emphasis in the reform. In the WTO context the so-called non-trade concerns (NTCs) contain elements similar to multifunctionality. It was agreed in the WTO Uruguay Round Agreement on Agriculture that NTCs would be taken into account in the forthcoming negotiations on liberalizing the agricultural trade. The WTO Ministerial Conference in Doha, Qatar in November 2001 focused on three main concerns: rural development, food security and protection of the environment. It was emphasized that NTCs are public goods and, hence, are not fulfilled through market mechanisms (WTO 2001). Therefore, domestic agricultural support is needed to maintain production of the NTCs on adequate level (LD 2001). Because of the failure of the Ministerial Conference in Cancún in September 2003, these issues also remain now open in the WTO negotiations.

Even though the entitlement for supporting multifunctional agriculture and the role of its different elements are somewhat controversial, it is important to study consumers' attitudes towards multifunctional agriculture and its different elements and their willingness to pay for the production of multifunctionality. Consumers' attitudes also reflect possible changes in the demand for food products. Increased emphasis on the multifunctionality of agriculture may also alter farmers'

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production practices, for example, the level of production intensity in terms of the use of chemical inputs. These issues are highly important to food and agribusiness managers, as well as to policy makers.

The aim of this study is to elicit the Finnish consumers' willingness to pay (WTP) for multifunctional agriculture as a whole. The study also shows which elements of multifunctional agriculture the Finnish citizens consider the most important ones and what are the most important tasks and most serious problems in Finnish agriculture in general. In the conclusions we also reflect on the implications of multifunctionality for the food and agribusiness sectors and policy makers.

Methodology of the Survey

Several methods have been developed to value non-market amenities in monetary terms consistent with the values of marketed goods. These methods are based on individual preferences, which means that they are assumed to reflect the preferences of individual consumers. These preferences are aggregated with other consumer preferences. Thus, the demand for non-market amenities is derived. Valuation techniques derived from individual preferences can be based either on revealed preferences (*RP*) or stated preferences (*SP*). RP methods are based on observed behavior towards some marketed good connected to the examined non-market goods. Similarly, SP methods rest on surveys regarding the non-market goods. (Navrud 2000, 15.) Both RP and SP methods are divided into direct and indirect methods (Table 1).

Table 1: Classification of Environmental Valuation Techniques Based on Individual Preferences (Navrud 2000, 16).

	Indirect	Direct
RP	Household Production Function (HPF) Approach: Travel Cost (TC) method Averting Costs (AC) Hedonic Price (HP) analysis	Simulated markets Market prices Replacement Costs (RC)
SP	Contingent Ranking (CR) Choice Experiments (CE): Conjoint Analysis	Contingent Valuation (CV)

In this paper the contingent valuation method is used to reveal the Finnish consumers' WTP for multifunctional agriculture as a whole. Therefore, the contingent valuation method is presented in more detail in the following chapter.

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Contingent Valuation Method

Contingent valuation is probably the most widely used method for placing monetary values on public goods. Contingent valuation (*CV*) method is based on consumer surveys whose questions elicit the consumer preferences for public goods by constructing a hypothetical market for the public goods. This market is created based on either a private goods market or a political market. The aim of a CV study is to estimate consumers' WTP for public goods by asking them how much they would pay for certain government actions. (Carson 2000.)

In a CV study a detailed description of the good(s) valued and the hypothetical circumstance under which the valuation should be made are presented to the respondents. After the presentation of the valuing problem, the CV questions to elicit the respondents' willingness to pay for the good(s) being valued are asked. In addition to the actual willingness to pay questions also queries about respondents' characteristics (age, income, etc.), their preferences relevant to the good(s) being valued, and their use of the good(s) are made. (Mitchell and Carson 1989.)

These responses are then used to approximate the economic value of the good(s) being valued. Economic value is derived from choices observed in the hypothetical market created in the survey in the same way as the value would be estimated from the choices made by consumers in a real market. (Carson 2000; Mitchell and Carson 1989.)

CV questions can be asked in several different formats. The simplest question format is binary choice in which respondents are asked to choose between two alternatives. One of the alternatives is present policy and the other is policy involving more costs than the status quo policy. (Navrud 2000.) In dichotomous choice (*DC*) questions the respondents are asked whether or not they are willing to pay certain costs for the new policy. DC questions can be double or even triple bounded. This means that the respondents are asked another discrete choice question based on the first response. Those who answered yes to the previous question are asked whether they are willing to pay an even greater amount and those who answered no are asked if they would be willing to pay lower costs. (Siikamäki 2001.) Different factors, like respondents' weariness of guilt and indignation, seem to alter the responses in further bound responses. (Bateman et al. 2001.)

Another method to elicit the WTP is open-ended questions. In open-ended questions the respondents are directly asked what is the maximum amount they would be willing to pay for a certain change in present policy. Nevertheless, open-ended questions have not been widely used, even though they give detailed information on WTP, because people find it hard to name an exact WTP sum. (Navrud 2000, Siikamäki 2001.)

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The payment card method is a kind of expansion of open-ended questions. In the payment card method the respondents are provided with a large array (from 0 to some large amount) of potential WTP amounts. In this method the need to provide a single starting point, like in DC questions, can be avoided and it also gives the respondents a wider framework than open-ended questions. (Mitchell and Carson 1989.)

Obviously there are also problems in CV. According to Aakkula (1999), the hypothetical scenario created by CV study differs in many respects from the real life decision-making, choice or valuation situations. Most often the CV critics argue that getting moral satisfaction by reflecting a rather high WTP, which is higher than the WTP in real market situation, is misrepresenting the true social value (Navrud 2000). Especially in the case of open-ended questions a large number of so-called protest zeros and a small number of enormously high responses are given. Even a small fraction of the population with extremely high values for a good can influence the mean WTP considerably. (Carson 2000.)

According to Carson (2000), serious consideration should be given to the choice of the parameter used to describe the WTP. When we are concerned with environmental goods there are plenty of respondents who are not willing to pay anything for the production of the good. When WTP distribution is asymmetric, as in most cases of CV data concerning environmental goods, and some of the respondents are moderately indifferent to the environmental issues, the mean WTP may differ significantly from the median WTP. When choosing between mean and median, the purpose to which the measure will be used is of great importance. It is often useful for policy makers to see the whole WTP distribution in addition to the mean and/or median WTP. The sample size and survey design have a substantial effect on the accuracy of the WTP estimates. The need for accuracy should be taken into account when considering the sample size and the effort put into the survey design.

Previous Research

One of the first CV studies of agricultural non-market outputs was Drake (1992), which approximated the monetary value of Swedish landscape. Based on the results, the Swedes are willing to pay for maintaining the existing agricultural landscape. The mean WTP figures vary between SEK 860 and 2100 with respect to the form of land use and from SEK 700 to 1300 due to location. It is also suggested that subsidies based on acreage may be a suitable policy instrument to maintain the agricultural landscape.

Pruckner (1995) evaluated the economic value of environmental benefits produced by agriculture. The environmental benefits are considered amenities of the tourist

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services in Austria. Tourists visiting Austria answered a survey of their WTP for agricultural landscape. The study indicated mean and median amounts of 9.20 and 3.50 Austrian shillings a day per person. Hence, the aggregate WTP is considerable, but it may not be enough to maintain agriculture in mountainous regions. Direct compensation to farmers for the provision of rural landscape was seen as a suitable policy option.

Spash (2000) investigated consumers' WTP for wetland creation with benefits for endangered bird species in Great Britain. The study indicates that some WTP for wetland creation exists (mean WTP is £16 and median WTP is £10). Furthermore, the study gives support to previous work (for example Arrow et al. 1993, Lockwood 1998) in providing evidence that ethics and non-compensatory choice rules[1] play a major role in choices with respect to endangered species and ecosystems.

Kotchen and Reiling (2000) examined the attitudes towards non-use values with respect to environmental thoughts by contingent valuation method in a case study of endangered species in the USA. The results show that a significant relationship can be seen between environmental attitudes and motivation to maintain nonuse values. Pro-environmental attitudes are related especially to stronger eagerness for species protection. According to Kotchen and Reiling (2000), CV study is a useful tool for estimating monetary values for non-commodity goods output. Nevertheless, the attitude towards the environment seems to affect the results of such studies. Therefore, pro-environmental attitudes should be used in interpreting responses to valuation questions (see also Arrow et al. 1993).

Scarpa et al. (2000) performed a CV study of Irish forests to estimate the effects of forest attributes in the WTP for recreation. They found that forest attributes, like the presence of water bodies, the length of trails and the amount of open space, affect the results significantly. They concluded that the CV method produces valid estimates on the WTP of the consumers for recreation.

Kontogianni et al. (2001) mixed CV with a rating exercise of four possible development scenarios in a study valuing a wetland surrounding a bay on a Greek island. The questionnaire also included questions concerning the respondents' attitudes to local environment. It is believed that this kind of mixed methodology helps in drawing conclusion of greater relevance to policy makers compared to using either methodology alone.

Data Collection

A survey was carried out to reveal the Finnish consumers' attitudes towards multifunctional agriculture and agriculture in general and their willingness to pay

[1] Non-compensatory choice rule means that as an environmental progress occurs an individual is forced to sacrifice some consumption of other commodities.

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for them. A relatively new method was utilized in collecting the data. The respondents answered the questionnaire in a computer aided interviewing system. The commercial research company which carried out the field survey for the study has installed a computer aided interviewing system to 1,300 Finnish households. These households have been selected on the basis of demographic information and they constitute a representative sample of all Finnish citizens between 18 and 75 years of age.

The people who have a computer owned by the research company in their home are supposed to answer questionnaires relating to different studies weekly. In June 2002 the questions concerning multifunctional agriculture were included in a round of the computer aided interviewing system. 1,375 respondents answered the questionnaire, which means that every single respondent participated in the survey. The number of respondents is greater than the number of households included in the sample, because more than one person per household may answer the questionnaire.

Results

First the respondents were first asked what increases the social welfare most. The factor they considered to increase the social welfare most is a well-organized public health care system. Those with lower annual income consider public health care even more important than those who earn more. Maintaining and improving the state of the environment state in Finland is considered the second most important factor in terms of the social welfare most. Education, low unemployment and small income disparities are also considered more important with respect to social welfare than domestic food production. Only than 8% of the citizens consider domestic food production as the factor that increases the social welfare most. (Figure 1.)

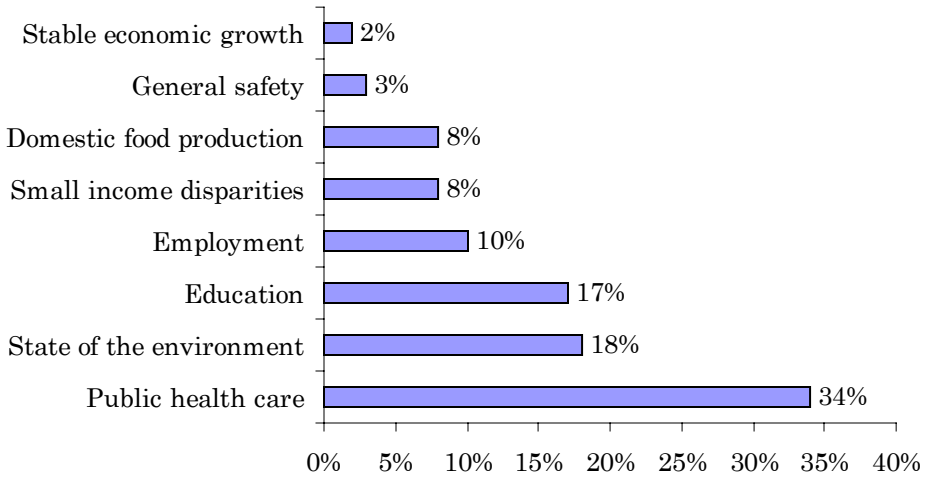

Figure 1: What Increases the Social Welfare in Finland Most?

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When the respondents were asked what is the most important function of agriculture in Finland the majority, 28% of the respondents, answered that ensuring and maintaining the viability of the rural areas is the most important task of Finnish agriculture. Producing high quality food was the second most important function, and only slightly fewer respondents considered it the most important function of Finnish agriculture than in the case of the viability of the countryside. Producing food of high quality is extremely important for those whose annual income is the highest among the respondents. According to this survey, the third most important function of Finnish agriculture is maintaining self-sufficiency in food production. It should also be mentioned that ensuring the livelihood of farmers was clearly more often the most important function of Finnish agriculture according to those whose annual income is either the lowest or the highest. Only few of the respondents consider maintaining rural heritage, landscape or state of the environment in rural areas, which are included in "Other" in Figure 2, the most important task of Finnish agriculture.

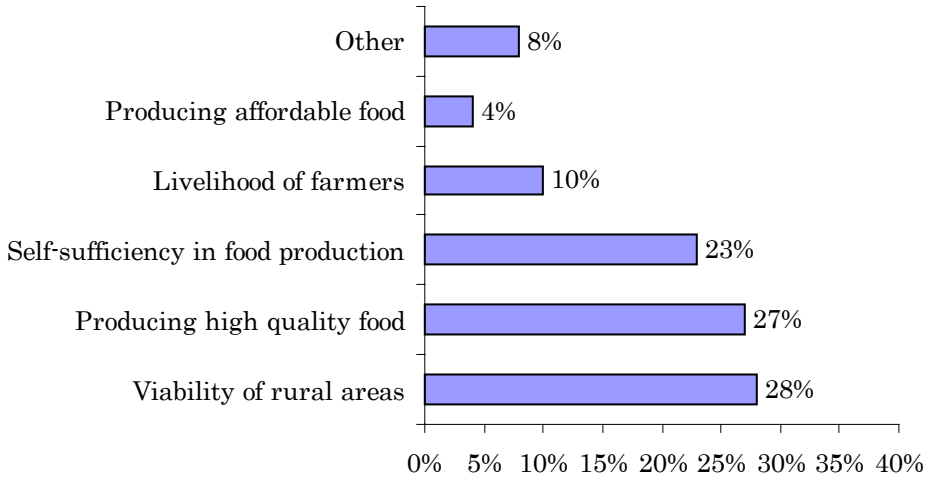

Figure 2: What is the Most Important Function of Finnish Agriculture?

Somewhat controversially, considering the fact that issues relating to the environment are very seldom considered the most important function of Finnish agriculture, almost half of the respondents regard nutrient leakages to waters as the most serious problem in Finnish agriculture (Figure 3). Effects of agricultural production on biodiversity together with the tax burden due to agricultural subsidies are the next most serious problems of Finnish agriculture, as roughly 15% of the respondents consider each of them the most serious problem in Finnish agriculture. It is interesting that the tax burden due to agricultural subsidies is clearly more often considered the main problem of Finnish agriculture among those with the highest annual income. In contrast, those whose annual income is the lowest among the respondents consider the state of animal welfare the most serious problem in Finnish agriculture more often than an average respondent.

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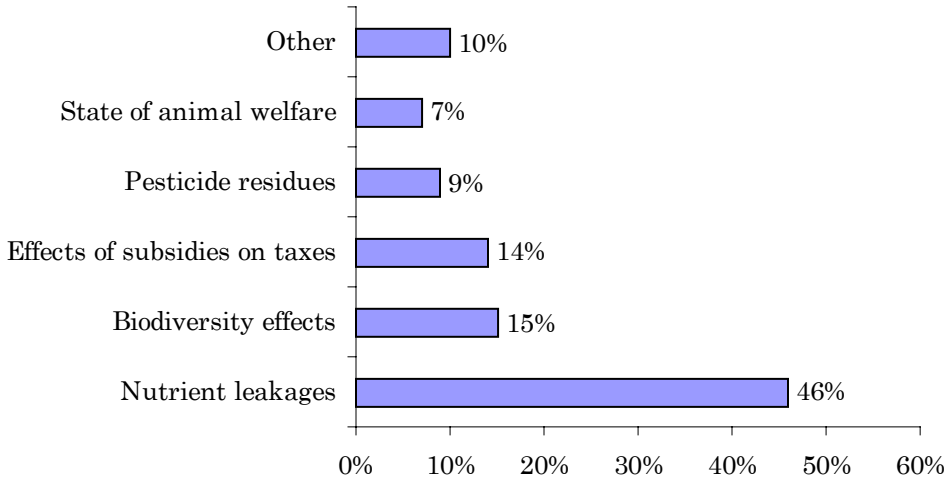

Figure 3: What is the Most Severe Problem Involved in the Finnish Agriculture?

Food safety is considered the most important element of multifunctional agriculture in Finland, as roughly 70% of respondents consider food safety very important and none of the respondents consider it not at all important. This result is in line with Latvala and Kola (2003). The second most important element of multifunctionality in Finland is animal welfare (Figure 4). Almost 60% consider animal welfare very important and only 10% consider it somewhat or not at all important. An interesting, although not necessarily surprising, observation is that those who have higher annual income tend to appreciate food safety more than those with a lower income level. On the other hand, those with lower annual income find animal welfare more important than those whose annual income is higher. Instead, there

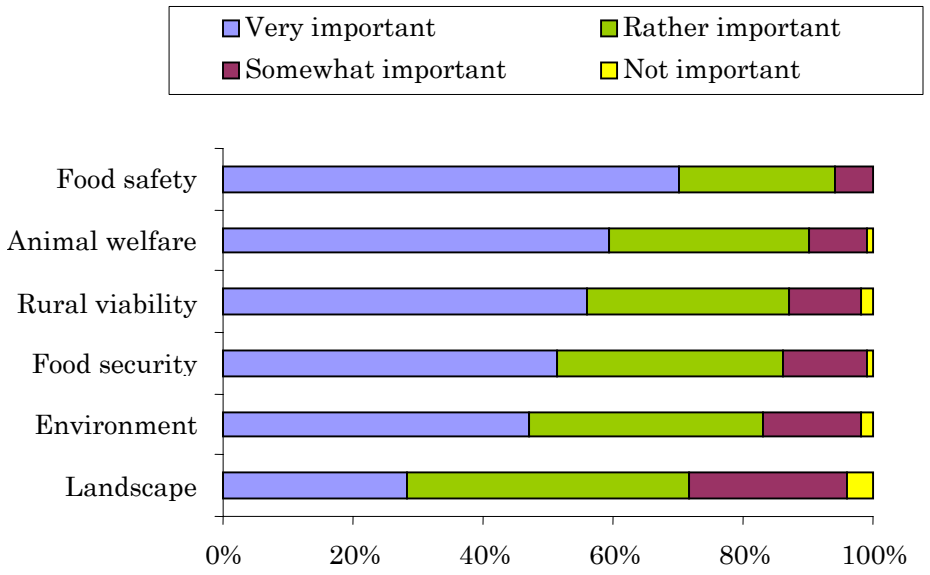

Figure 4: What is the Most Important Element of Multifunctional Agriculture in Finland?

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are no significant differences between different age groups and regions in terms of the importance of food safety and animal welfare.

Food security, or producing a sufficient amount of domestic food, and preserving or increasing the viability of rural areas are more often considered either very important or rather important than maintaining and developing the rural environment or, especially, landscape. The share of those who consider maintaining and developing the rural landscape only somewhat or not at all important is as high as 28%, whereas more than half of the respondents consider both food security and viability of rural areas very important elements of multifunctional agriculture in Finland.

The consumers' willingness to pay was approximated by an open-ended contingent valuation question. Open-ended question was used instead of the more sophisticated alternatives because it will be used as a benchmark for the valuation results of a choice experiment carried out in the same survey. If a more complicated CV question type, like dichotomous choice, had been used the questionnaire would have been too demanding for the respondents to answer.

The results of the contingent valuation are presented in Figure 5. The results show that 80% of Finnish citizens are willing to pay something for producing at least some elements of multifunctional agriculture. However, about every fourth Finnish citizen is willing to pay no more than € 10 annually. The median annual willingness to pay for multifunctional agriculture is € 50. The mean annual WTP for the production of an optimal amount of the different elements of multifunctional agriculture is € 93.81 and the mode of the answers is 100 €/year. However, according to this survey only less than every fifth Finnish citizen is willing to pay

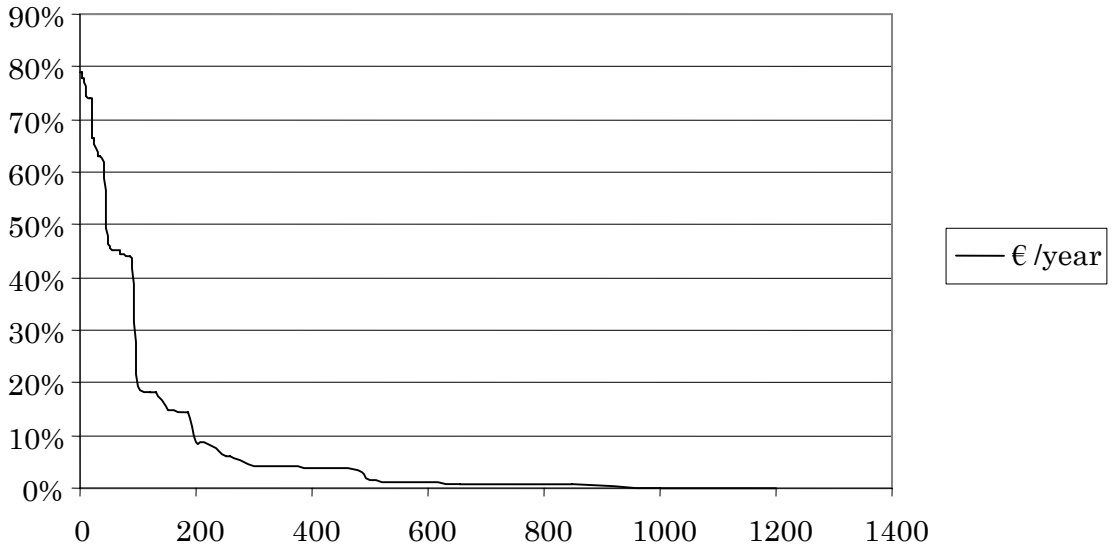

Figure 5: Finnish Consumers' Willingness to Pay for Multifunctional Agriculture as a Whole

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more than 100 €/year for producing the non-commodity outputs of the agricultural production process.

In the end of 2002 the Finnish population aged between 18 and 75 year was 3,770,652. If we assume that the average annual WTP derived in this survey (€ 93.81) represents the WTP of every single 18 to 75 year-old Finnish citizen the aggregate WTP is € 354 million. If the median annual WTP (€ 50) is used the aggregate WTP is € 189 million, while the mode annual WTP (€ 100) would yield an aggregate WTP of € 377 million.

Conclusions and Implications for Business and Policy

When the Finnish consumers, or citizens, were asked about the relative importance of the different elements of multifunctional agriculture, food safety and welfare of production animals were the most often considered as very important issues. Somewhat surprisingly, considering that Finland is a very rural country with strong long-term emphasis on environmental issues, the state of the rural environment is the element of multifunctional agriculture which was the second least often regarded as very important, and maintaining rural landscape is the least important element of multifunctional agriculture.

When consumers/citizens were asked about the key roles of agriculture in the society at large, ensuring the viability and permanent settlement in rural areas and sufficient production of wholesome and high quality food products were regarded as the most important tasks of Finnish agriculture in general. The aim to produce inexpensive food is regarded as very insignificant in Finland.

The average willingness to pay for multifunctional agriculture is 94 €/year/citizen. The aggregate WTP for an optimal bunch of the elements of multifunctional agriculture varies between € 189 and 377 million. Compared to the annual amount of agricultural support in Finland (€ 1.79 billion in 2003) the WTP of consumers/citizens for multifunctional agriculture can be considered remarkable.

These results also indicate that the EU's CAP reform of 2003 at least partially meets the requirements and preferences of Finnish citizens in terms of the multifunctional role of agriculture. Yet, when comparing our survey results and the current multifunctionality elements of the CAP, it becomes evident that the policy planning and decision-making process should more comprehensively and efficiently take into account consumers' and citizens' attitudes and preferences towards multifunctionality, i.e. what elements of multifunctionality are regarded as the most important ones and how they can be incorporated into the pursued policy. Moreover, in terms of policy, we have to bear in mind that the multifunctionality of agriculture is a concept that has to be assessed via national, regional, and sometimes even local dimensions and characteristics.

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In the long run the increased emphasis on multifunctionality in agricultural policies may have considerable impacts on consumers' demand for food products and farmers' demand for production inputs. Quality, safety and environmental sustainability will have bigger roles than low prices and high volumes of bulk production. Farmers will need different types of production inputs as the intensity of production, e.g. the use of chemical inputs, changes due to reforms of farm policies. On the other hand, in the worst scenario, the quantity and quality of raw materials supplied by agriculture to food processing industries may decrease as incentives to high yields may diminish as a result of the decoupling of farm support in the policy reforms that emphasize the multifunctional role of agriculture. Finally, citizens' approval rate of agricultural policy could rise, if they consider that the multifunctional, quality-orientated policy generates more public goods and social welfare than typical, quantity-orientated agricultural policies.

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