

IAMA World Food and Agribusiness Congress
Consumers, Technology & Environment: Creating Opportunity and Managing Risk
June 24-28, 2000, Chicago

**WTO and the European model of Agriculture:
Cost-benefit Analysis of the so-called Multifunctional Agriculture**

Tapani Yrjölä¹, University of Helsinki, Finland
Jukka Kola², University of Helsinki, Finland

¹ Researcher, teaching assistant in Agricultural Policy

² Professor in Agricultural Policy and supervisor of the research

Multifunctional Agriculture: Cost-Benefit Approach

1. Introduction

Agriculture is still highly dependent on public support, especially in the European Union (EU). A reform of the agricultural policy is needed due to both internal and external pressures. Within the EU such pressures are due to, among other things, budgetary discipline, negative externalities of agriculture, eastern enlargement and the negotiation round of the WTO. The reform of the agricultural policy is characterised by the wish to emphasize that, if supports are still being use, they may not distort the market or international trade. Consequently, price supports have to an increasing extent been replaced by direct payments, which should not lead to any increase in the production volumes (decoupled support). This means that, in addition to the traditional objective of increasing the production, there is a need to find new significance and content for agricultural support, preferably based on widely approved objectives. This is why the EU has introduced the new concept of multifunctional agriculture to the discussion on agricultural policy.

The multifunctionality of agriculture consists of non-market goods produced by agriculture. The most widely accepted aspects of the multifunctionality of agriculture are food security, environmental considerations and securing the viability of rural areas. In connection with multifunctional agriculture environmental issues are taken in a wide sense, including besides e.g. restricting nutrient emissions and issues such as the maintenance of rural landscapes. The EU has also included animal welfare and food safety in the discussion on multifunctional agriculture.

This paper identifies and describes at a general level the costs and benefits of multifunctional agriculture. The qualitative, let alone quantitative, analysis of these is a very challenging task, where the choice of an appropriate method is decisive for guaranteeing the reliability and robustness of the result. Cost-benefit analysis is a method that can be used to establish the effects of non-market goods produced by agriculture on the total welfare of society. In cost-benefit analysis efforts are made to value the costs and benefits due to different policy measures in monetary terms.

A policy should be profitable, i.e. the benefits produced by a policy should be higher or at least the same as the costs. The social profitability of a policy can be deduced from the difference between the benefits and costs, i.e. the so-called net present value. Cost-benefit analysis is usually applied to compare different policy options, and the results of the analysis give the decision-makers quantitative, economic grounds for the selection of new policies and policy means. This paper assesses the applicability of cost-benefit analysis to the different dimensions of multifunctional agriculture and the establishment of the effects of these.

2. Cost-benefit analysis

Cost-benefit analysis measures the economic changes due to changes in the use of resources. In connection with public finances, cost-benefit analysis is generally used to determine the changes in net social benefit due to a government measure (Broadway and Wildasin 1984, pp. 187-188). Thus cost-benefit analysis provides additional information to the political decision-makers in a situation where there is a choice of several alternative models of action. Cost-benefit analysis helps to find out which alternative is the best from the perspective of society, i.e. which alternative produces the highest benefit at the total level (Dasgupta and Pearce 1978, p. 20).

Pareto improvement occurs when the welfare of at least one individual improves without any deterioration in the welfare of others. Pareto optimum is reached when no more Pareto improvements can be made (Varian 1993, p. 15). The objective of cost-benefit analysis is to maximise the difference between the benefits and costs. This difference, called net benefit, indicates the efficiency of the measures applied. The greater the net benefit, the greater is the benefit produced by the measures (Brent 1996, pp. 6-7). Pareto improvement occurs if the benefits from a project are higher than the costs. Pareto optimum is reached when the net benefit of any possible measure is no longer positive. Society is continuously striving to achieve Pareto improvements and to reach a situation that is as close as possible to Pareto optimum. If Pareto optimum is reached, the public policy has been fully efficient. However, due to the continuously changing operating environment and the inability of the theory to capture the real world, reaching Pareto optimum is possible only in theory.

According to Mishan (1976, pp. 11-12), the use of cost-benefit analysis is justified because it provides a means for examining the impacts on the whole operating environment caused by a single actor. This is why cost-benefit analysis is particularly well suited for the study of the environmental effects of agriculture. The production of goods that have no price on the market requires support. Without any support the production quantities remain at the level reached in normal production activity, which is not always the optimal outcome from the perspective of society. If production remains at too low a level, public support is needed. The externalities may also be negative, and according to the theory the producers should pay for the production of negative externalities to society. One such negative externality of agriculture is water pollution. In practice society often tries to reduce the production of negative externalities. One example of a policy measure aimed at reducing the negative externalities of agriculture, such as nutrient leaching, is environmental support.

The cost-benefit analysis has been used in agricultural economics to determine the profitability of environmental support in respect of the whole society (Vehkasalo 1999), to compare the efficiency of different measures for reducing nitrogen emissions (Hanley 1991). Accordingly cost-benefit analysis has been applied to examine the effects of the direct payments used in the agricultural policy on the national economy (Koester and Tangermann 1977).

3. Agricultural support in Finland

Finland became a member of the European Union in the beginning of 1995, and since then the common agricultural policy of the EU (CAP) has been applied also in Finland. As a result of the EU membership Finnish market prices of agricultural outputs fell by about 40% in the first year of membership (Kettunen 1996, p. 49). Prior to the EU membership price support constituted the most important form of agricultural support. According to CAP, price support is paid at the guaranteed so-called intervention price, which is the minimum price a farmer gets for the products. However, not all agricultural products have an intervention price, and the prices of these products are more clearly determined on the market. Within the EU most of the support to agriculture is paid as direct income support. The most important support measures in the CAP are income support based on the arable area or livestock units, agri-environmental support and compensatory allowances.

Income support from the EU is financed from the EU funds in full, while environmental support and compensatory allowances for less favoured areas (i.e. LFA scheme) are part-financed by the EU. In addition to the support financed fully or in part by the EU, during the EU membership Finland has applied national support, based on the authorisation from the EU Commission. National

support includes aid for northern regions, transitional aid, national subsidies for arable crops and a number of other types. Transitional aid was paid for a five-year period that ran out at the end of 1999 in the whole country for all of the main agricultural products (MMM 1999, p. 16-17).

4. Costs and benefits of reducing agricultural support

Cost-benefit analysis can be used to find out the impacts of changes in agricultural policy on social welfare. In most cases the analysis is concerned with the different kinds of effects of a policy change or reform on society as a whole and among the different interest groups in the country in question or internationally (e.g. agricultural producers, food industry, consumers and taxpayers). Instead of the absolute total welfare levels, more sensible and concrete results can be achieved in the study of the effects of a certain policy change.

Consequently, in order to illustrate the issues involved at a more concrete level, the example presented in this paper concentrates on the effect of the reduction in agricultural support on the production of the different aspects of multifunctional agriculture and the possible social welfare changes in Finland. If less money than earlier were used for agricultural support, the income level of farmers would fall, and the production of non-market goods, i.e. multifunctional agriculture, would also be affected. The production of certain aspects of multifunctionality might actually increase as a result of the reduction in the support, but as a whole the production of non-market goods would decline.

The reduction of agricultural support would have various kinds of repercussions in the welfare of society. The most obvious direct impact would be the decrease in the costs to society by the amount of the reduction in the support. This benefit can be considered to be fully directed at taxpayers, if it is assumed that the amount in question or part of it is not used to cover any other social costs. Correspondingly, the welfare of farmers would decline by the amount of the reduction in agricultural support. The increase in welfare achieved by taxpayers is the same as the welfare loss suffered by farmers, and thus the policy change can be regarded theoretically as socially acceptable.

The reduction in agricultural support would also lead to a considerable increase in the EU contribution to the financing of the support. As a result of this, public opinion might become more favourable to the agriculture, which could make it easier to reach agreement in Finland in agricultural policy issues in the future. This effect is, however, impossible to evaluate, and thus it may be taken into account as a qualitative variable only. In addition to the above-mentioned impacts, the reduction in agricultural support would have a number of repercussions, like (figure 1):

- Decrease in agricultural production
- Reduction in the number of farms
- Changes in rural environment
- Impacts of the above in the food chain
- Impacts on food safety, animal welfare and production ethics

which are described below in the following sub-chapters.

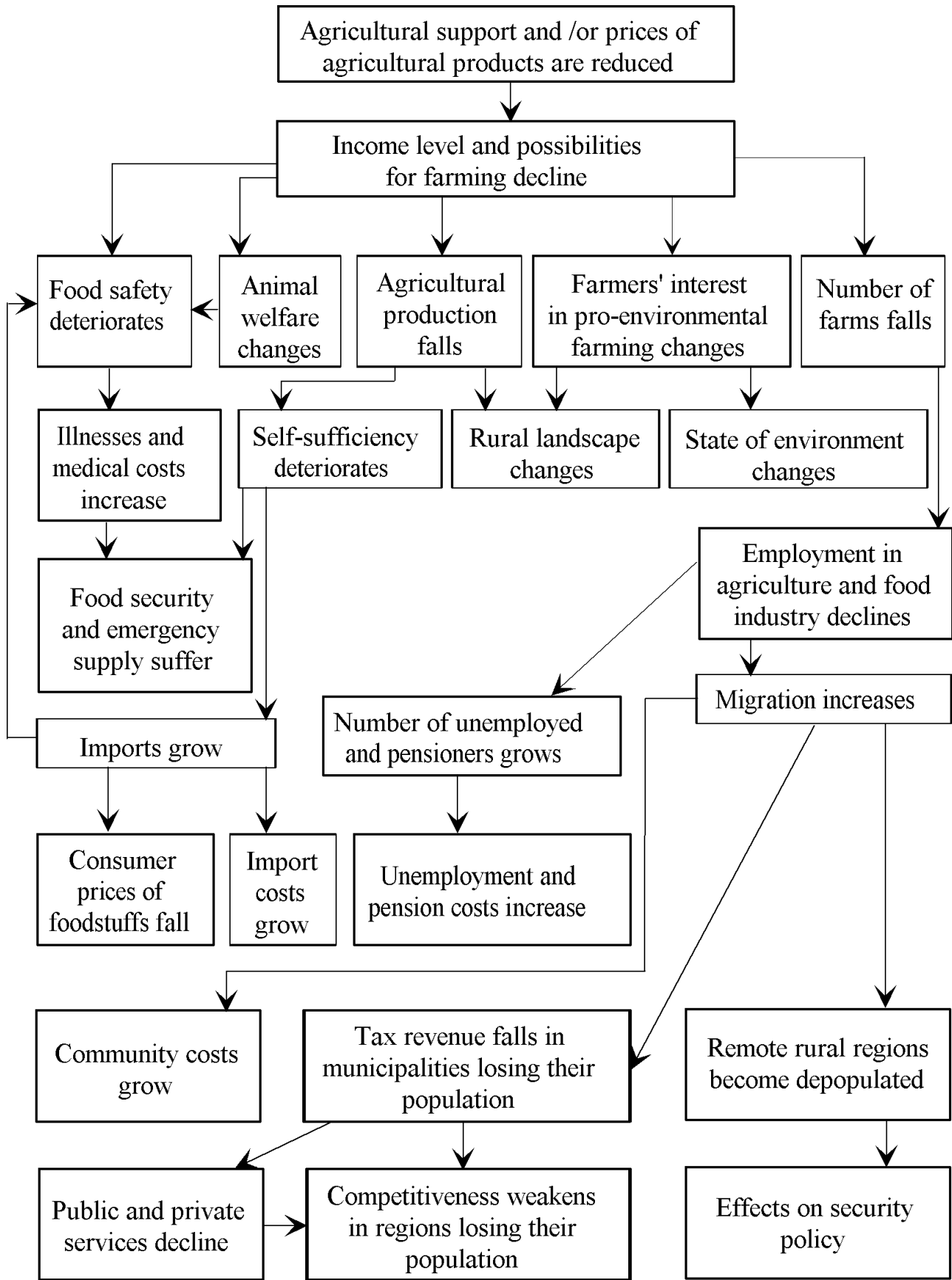


Figure 1. Welfare effects of the reduction in agricultural support and/or prices of agricultural products

4.1. Decrease in agricultural production

The weakening of the profitability of agriculture would lead to a reduction of the production. The increased efficiency and productivity would to some extent slow the reduction in the production down. The yields of both crops and animals per production unit are expected to continue to grow, which means that agricultural production would fall, but not as rapidly as the cultivated area. In the long run, however, a considerable reduction in support would also lead to a considerable reduction in the production, because the number of production factors would decline more rapidly than the efficiency increases. The structure of production might also change due to the changes in the relative profitability of the different production lines.

In terms of foreign trade it should be noted that even at present there is a need to import certain foodstuffs in order to satisfy the domestic demand. For example, the production of mutton and today also beef in Finland is far too small to meet the consumption. As a result of a decrease in the production, the domestic production of some of the products in which Finland is at present self-sufficient might fall to such a low level that it would no longer satisfy the domestic demand. Especially in the case of production lines with the lowest profitability, self-sufficiency might decline to a level that could be considered a risk to food security. Thus maintaining adequate food supply would require increasing imports from the current levels.

The increase in imports would raise the import expenditures and weaken the trade balance. The reduction in the production of agriculture and food industry would also have significant multiplier effects on the national economy, e.g. the employment and tax income. The increase in food imports might lead to a slight reduction in the consumer prices of foodstuffs, which would increase the welfare of consumers. According to the Swedish Competition Authority (KKV 2000), increased food imports may also reduce the food prices due to the increase in competition. However, growth in food imports would also have considerable negative impacts on the national economy.

4.2. Reduction in the number of farms

The decrease in the farm income resulting from the fall in the levels of support would also lead to a reduction in the number of farms. This, together with the decrease in the production, would result in a decrease in agricultural labour. Part of the people employed in food processing and agricultural input industries as well as in transportation might also be left unemployed as a result of the reduction in agricultural support.

Labour released from agriculture and food industry might retire, remain unemployed, or migrate to population centres to find employment opportunities. All of these alternatives would cause costs to society. Society pays unemployment benefits to those who are out of work, and an increase in the number of unemployed would lead to an increase in the compensations to be paid. Similarly, the growing number of pensioners results in increasing costs to the society. Both unemployment and pension payments are made at the cost of taxpayers.

The concentration causes direct so-called community costs to the municipalities. Houses and traffic networks have to be constructed for the people moving to the area, and public and private services and their production capacity have to be expanded. Costs are also due to the corresponding infrastructure that remains unused in municipalities suffering from population loss. Despite their temporary nature the community costs may be considerable (Kangasharju et al. 1999, p. 3).

Loss of population in rural, farming-dominated areas leads to considerable reductions in both the public and private services due to unprofitability of the services. The decrease in the tax revenues of municipalities as a result of the population loss may also cause pressures to terminate or cut some public services.

The difficulties caused by the population loss, and problems faced by the defence policy because of it, are very difficult to value in monetary terms. However, these cannot be completely ignored in the discussion on the role of agriculture in the socio-economic development of the rural areas.

4.3. Rural environment

The decrease in the profitability of agriculture may also be reflected in the attitudes of farmers to environmental issues. Environmental support, which is partly financed by the EU, would stay at the present level despite a reduction in the national agricultural support. However, due to the decrease in the profitability of agriculture the willingness of farmers to influence their environment might be restricted to the measures necessary to meet the eligibility criteria for environmental support. If economic benefit could be achieved by evading the terms for environmental support, the willingness to comply with the terms might also suffer. This could be called a moral hazard.

The rural environment produced by agriculture consists of a number of different aspects, such as the rural landscape, bio-chemical processes maintaining the life of ecosystems, as well as economic, socio-cultural and ecological factors (Aakkula 1999). Aspects of multifunctional agriculture produced by pro-environmental agriculture include at least the rural landscape, maintaining biodiversity as well as, at least partly, socio-economic factors in rural areas. The decline in the production of these as a result of the weakening of the profitability of agriculture and change in the environmental attitudes of farmers would also be reflected in the state of the rural environment.

Reduction in agricultural support would lead to significant changes in rural landscape. Due to the decline and increased efficiency in agricultural production, the cultivated arable area would decrease, and in general the cultivated landscape is considered more attractive than one that is completely in its natural state. Thus the benefit from rural landscape experienced by consumers would be smaller if agricultural support were reduced from the current levels.

4.4. Food safety, animal welfare and production ethics

The fall in the income level of farmers might weaken their interest in the production of high-quality, pure and safe foodstuffs. This could result in an increase in various kinds of residues and pathogens in foodstuffs, which would be reflected as an increase in the diseases caused by foodstuffs in Finland. Growth in the number and cases of diseases caused by food would increase the medical costs.

The medical expenses due to the increase in the diseases that can be traced back to foodstuffs would largely be borne by society and, through this, by taxpayers. Thus the welfare of taxpayers can be considered to decrease by the amount of the increase in the medical expenses.

Animal welfare might also suffer and the production ethics in general might develop in a more negative direction as a result of a decrease in the income level in agriculture. The weakening of

animal welfare may also be reflected in lower food safety. However, it is very difficult to estimate the welfare effects of the changes in the welfare of production animals.

5. Summary

This paper is concerned with the impact of the reduction in agricultural support on the effects of multifunctional agriculture, i.e. the production of non-market goods in connection with agriculture. Through this, efforts were also made to assess whose welfare is affected and to what extent.

Fall in agricultural support can be expected to accelerate the reduction in both agricultural production and the number of farms. The self-sufficiency in food and, thus, food security in Finland would suffer considerably from a decrease in agricultural production. Increased imports of foodstuffs and agricultural products from abroad would be needed to meet the domestic demand.

The number of people employed in agriculture would decrease as a result of the reduction in the production and number of farms, and the increased import of foodstuffs and agricultural products would also leave a large number of people unemployed in food industry. Unemployment and pension costs would grow more rapidly than in the case of the current support policy and the migration directed at the growing population centres would accelerate. This would lead to an increase in the community costs.

A reduction in agricultural support would have various kinds of impacts on the state of the rural environment. First of all, the decrease in the cultivated area would increase the share of natural, often less attractive landscapes in the rural areas. Second, a decrease in the income level would reduce the possibilities and willingness of farmers to take care of their buildings. And third, the lower income level might lead to the deterioration of the state of the environment as it would not be possible for farmers to take environmental considerations into account in farming.

Decrease in the support level would also be reflected in food safety, animal welfare and production ethics. The welfare of the production animals might not be considered as important as today if the incomes were reduced. This, together with the increased food imports, could lead to an increase in the number of diseases caused by foodstuffs in Finland.

Cost-benefit analysis that takes all the possible effects into account becomes very complicated and it will necessarily include several assumptions and estimates concerning the valuation of the benefits and disadvantages. It is very likely that all effects cannot be valued in a cost-benefit analysis. These effects are not directly reflected in the results, but still they have to be taken into account in the interpretation of the results. The results will obviously be open to various interpretations in respect of the single values in monetary terms. However, the results are indicative for agricultural policy-making and provide a basis for further quantitative analyses. The quantitative analysis is finished in late March and all in detail results will be available during the IAMA Congress in June 2000.

References:

Aakkula, J. J. 1999. Economic Value of Pro-Environmental Farming - A Critical and Decision-Making Oriented Application of the Contingent Valuation Method. Agricultural Economics Research Institute. Publications 92. 210 p. + appendices 17 p. Helsinki.

- Boadway, W. B. & Wildasin, D. E. 1984. Public Sector Economics. 571 p. Boston.
- Brent, R.J. 1996. Applied Cost-Benefit Analysis. 336 p. Cheltenham, UK.
- Dasgupta, A. K. & Pearce, D.W. 1978. Cost-Benefit Analysis: Theory and Practice. 270 p. London.
- Hanley, N. 1991. The Economics of Nitrate Pollution Control in the UK. In: Hanley, N. (ed.). Farming and the Countryside. An Economic Analysis of External Costs and Benefits. C.A.B. International. 328 p. Oxon.
- Kangasharju, A., Kataja, J-P. & Vihriälä, V. Tarvitaanko aluepolitiikkaa? Pellervon taloudellisen tutkimuslaitoksen työpapereita 18:1999. 41 p. with English abstract. Helsinki.
- Kettunen, L. 1996. Finnish Agriculture in 1995. Agricultural Economics Research Institute, Finland. Research Publications 79a. 61p. Helsinki.
- KKV 2000. Konkurrencen i Sverige under 90-talet - problem och förslag. Konkurrensverket (The Swedish Competition Authority). 425 p + bilagor. Stockholm.
- Koester, U. & Tangermann, S. 1977. Supplementing farm price policy by direct income payments: Cost-benefit-analysis of alternative farm policies with a special application to German agriculture. European Review of Agricultural Economics 4(1): 7-31.
- Mishan, E. J. 1976. Elements of Cost-Benefit Analysis. 2nd ed. 151 p. London.
- MMM 1999. Agriculture in Finland. . Ministry of Agriculture and Forestry. 36 p. Helsinki.
- Varian, H. R. 1993. Intermediate Microeconomics. A Modern Approach. 3rd ed. 623 p. + appendices 36 p. New York.
- Vehkasalo, V. 1999. Ympäristötuen yhteiskunnallinen kannattavuus. Teoksessa: Maatalouden ympäristöohjelma 1995-1999:n taloudellinen analyysi. Ympäristötukijärjestelmä ja tulevaisuus – tutkimuksen loppuraportti. Maatalouden taloudellinen tutkimuslaitos. Julkaisu 90 with English abstract. 157 p. Helsinki.