Multifunctionality and the European Common Agricultural Policy: A Theoretical Problem

Karsten Kyed
e-mail: kaky@kvl.dk

Niels Kaergard
e-mail: nik@kvl.dk

Henrik Zobbe
e-mail: hz@kvl.dk

Paper prepared for presentation at the X^th EAAE Congress
'Exploring Diversity in the European Agri-Food System',
Zaragoza (Spain), 28-31 August 2002

Multifunctionality and the European Common Agricultural Policy: A Theoretical Problem

by

Karsten Kyed, Niels Kærgård & Henrik Zobbe[1]

Department of Economics and Natural Resources
The Royal Veterinary and Agricultural University
Rolighedsvej 23, DK-1958 Frederiksberg C (Copenhagen, Denmark)

Summary:
The multifunctional character of agriculture is used as a main argument for agricultural support. This argument is theoretical analyzed in a model with decreasing marginal utility and it is shown that such a support must depend on the size of the agricultural sector. Consequently the argument is not valid for a common policy for very different countries as the EU-countries.

Keyword: Multifunctionality, Agricultural support, CAP.

1. Introduction

Many economists have shown that a liberalization of the agricultural sector will give welfare economic net benefits, see Gardner (1988), Anderson & Tyers (1991), Frandsen et al. (1994) and many others. Nevertheless, the whole 20th century has been characterized by a high degree of support to and regulation of the agricultural sector in most OECD-countries; no decreasing trend is found. Measured as PSE EU's agricultural support was 46 per cent in 1986-88 and 49 per cent in 1999, USA's support was 26 per cent in 1986-88 and 24 per cent in 1999, Japan 65 per cent for both periods and the average for OECD has fallen from 41 per cent to 40 per cent, see OECD (1999 and 2000). This stable high degree of support has inspired the economists not only pointing out the irrationality in the support, but to analyse the economic arguments for support more profoundly.[2]

The classical argument for support is an income distribution argument. There are reasons to believe that farmers will have a rather low or at least decreasing income. The food demand

---

[1] Karsten Kyed (kaky@kvl.dk), Niels Kærgård (nik@kvl.dk) og Henrik Zobbe (hz@kvl.dk) .

[2] Non-economic arguments for the high degree of support is found in political science, e.g. in public choice theory. The different actors are differently organised and have different positions in society. These strongly relevant non-economic theories will not be dealt with in this paper.

is since Ernst Engel known to have an income elasticity below one and small price elasticities, too. The demand for food will consequently not grow substantially, even when incomes are growing and prices are falling (because of growing productivity). On the supply-side adjustments of the production factors are more difficult than in other sectors. The production factor land cannot be used outside agriculture and the mobility of the labour force is low because a considerable part of the force consists of farmers for whom the farm is not only their working place, but also the residence for their family. A farm problem, where the farmers are caught in a treadmill, has been the main foundation for the classical arguments for agricultural support, see among others Cochrane (1958), Brandow (1977) and Gardner (1992).

Two possible policy alternatives could be used against the income problem: Adjustment support or income support.

If the main reason for the problem is lacking mobility of the labour force, it seems reasonable to support the structural changes (support to fast retirement of older farmers, retraining of farmers and agricultural workers etc.), see Johnson (1947), Tweeten (1989) and Gardner (1996). Such a policy is, however, in many areas in contrast to other aims, e.g. for the regional policy, where the depopulation of the rural districts is seen as a main threat, see Fennell (1997) and European Commission (1999).

The other alternative is some form of income support – directly or through the prices. In many countries income political aims are explicitly formulated; the aim is in the Treaty of Rome, and in Norway the Parliament has decided to try to obtain income equity between industrial workers and farmers. The welfare economic theory tells us that this could be done without efficiency losses by lump sum transference from taxpayers to the farmers. Such transferences have been a main political recommendation from agricultural economists in the last decade; they have argued for a decoupling of the agricultural support from the variable cost and prices and consequently from the production decision, see European Commission (1994) and OECD (1995). Such a support will, however, be capitalized in the price on land and farms and will mostly be a support to the owners of the farms at the time when the support is introduced. Complete decoupling is furthermore easier in principle than in practice.

There is still a need for a good argument for the agricultural support. It seems impossible to find completely valid arguments for long-run support in the income aim.

2. Multifunctionality

There is, however, an alternative foundation for the agricultural policy. It has been modern to talk about a “multifunctional” agricultural sector. The sector does not only produce food, but a series of less material goods such as landscape preservation, food security, animal welfare, rural development etc. There is a lot of social benefits from non-market goods, which society needs to pay for if they should be produced in a sufficient amount. Such immaterial goods have been discussed in economic theory as external effects at least since the 1920s, see Pigou (1920). It is a well-known part of economic theory that the private optimal in a free market does not need to be the same as the social optimal. Consequently, support and taxes must be used to adjust the free market in the direction of the social optimal – support for producers of social benefits such as landscape preservation and taxes for producers of e.g. pollution.

The production of the agricultural sector is made in the open air and spreads over big parts of the countries' area, and consequently the sector is without any doubt a big producer of external goods, both positive and negative. It follows that public regulations are necessary if the social optimum shall be realized. An early discussion of agricultural policy seen in the light of non-marked goods is found in Winters (1990) and the argument has since played a still greater part in the debate about agricultural policy. It is perhaps characteristic that the positive external effects have played a central part in the debate in areas where the agricultural support is considerable; it seems symptomatic that the Norwegians, e.g. Brunstad et al. (1995), have been very active in the debate, but also in the European Union the argumentation is common today, see among others European Commission (1999) and Blandford & Fulponi (1999). The concept of multiunctionality is used as argumentation for a special European agricultural "model", a European agricultural model which according to the Europeans is significantly different from other countries' model of agriculture:

> "The fundamental difference between the European model and that of our major competitors lies in the multifunctional nature of Europe's agriculture and the part it plays in the economy and the environment, in society and in preserving the landscape, whence the need to maintain farming throughout Europe and to safeguard farmers' incomes" (European Commission, 1998 cf. Swinbank, 1999 page 403-404).

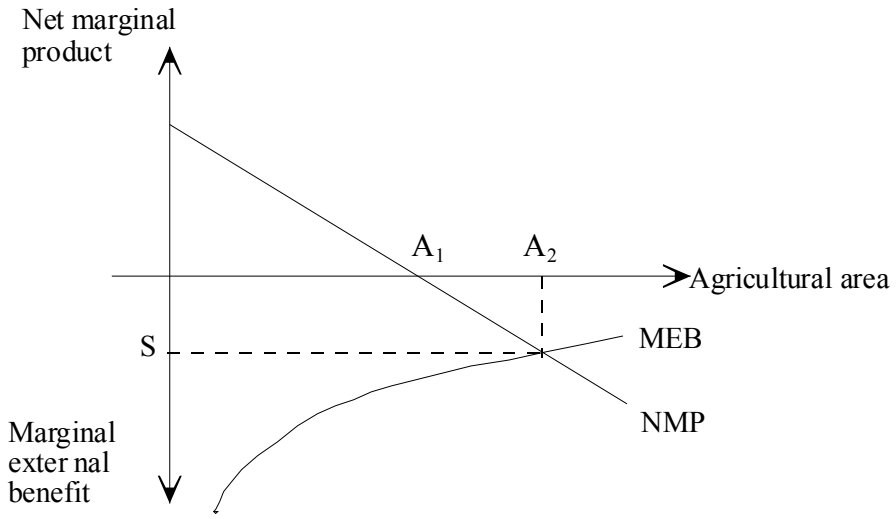
This argumentation has been used in relation to the negotiations around Agenda 2000 and is for the moment intensively used in the ongoing WTO-negotiations. The difference between the opinion of EU, Norway and Japan on the one side and of USA, Australia and New Zealand on the other is considerable. USA et al. consider multicollinearity only as a new make-up for protectionism, see Rabinowicz (1999) and Bohman et al. (1999).

From an economic-theoretical point of view it is, however, undoubtedly relevant to consider external effects. The problematic is not the existence of external effects, but what these effects can be used for in relation to the common agricultural policy and in relation to the conflict between USA and EU.

3. Multifunctionality: Some theoretical considerations

In the scientific literature Brunstad et al. (1995 and 1999) have argued for agricultural support using figure 1, where the marginal production of land is shown as the decreasing curve. In the simplest case one can have two factors of production, land and corn, and one product, corn. The net marginal product is then the harvest of corn minus the seed corn, and the marginal external benefit is measured as the kg of corn the people are willing to pay for the external effects (the view of wavy corn fields). In a more complicated and realistic situation with more than one type of goods and more than two factors of production, e.g. land, corn and labour, the measurements will be more mixed and must be measured in monetary units, but the argumentation will be the same.

Figure 1. Social economic equilibrium for agricultural production



Source: Brunstad et al., 1999

Note: Marginal production and marginal external benefit shall of course be measured in the same units. It could be money or in a single-commodity model, e.g. kg of corn.

An unsupported agriculture will in figure 1 produce until the net marginal product will be zero, it is at the area A_1. But if there is a net external benefit of food security and landscape protection of agricultural production the social optimum will be A_2 and this point could only be realized with the agricultural support of S per unit of land. [3]

From the point of view of a typical agricultural country like Denmark it is not obvious that landscape protection is positively correlated with the agricultural production. Opposite Norway Denmark has very little "nature" and very much arable land – the biodiversity will consequently increase in Norway with increasing cultivated areas, but be falling in Denmark. In Norway they are delighted at the sight of a corn field between all the mountains and forests, while we in Denmark are delighted at the sight of a small forest between all the corn fields.

One could consequently generalize the argumentation of Brunstad et al. by looking at the social utility function

$$U = U(C, L, N) \qquad (1)$$

where the social welfare U depends on material consumption C, arable land L and nature areas N. It is assumed that both landscapes with agriculture and with nature have positive effect on the utility, but that the marginal utility of the different types of landscapes are decreasing.

[3] For the sake of simplicity, the external effects are things like landscape protection and food security, which are dependent on the area of land in cultivation. Other externalities such as animal welfare will not necessarily be dependent on the cultivated area.

The maximization must respect the side conditions

$$L + M = A \qquad (2)$$

where A is the total area in the country, and the production function

$$C = C(L) \qquad (3)$$

Non-food consumption is constant and could be included as a constant term in the C (..) function. Again the simplest model will be a pure corn model; a full specified 2-sector-model with an urban sector and labour will be more complicated, but not change the argument.

The optimality condition will be

$$U_N = U_L + U_C C_L \qquad (4)$$

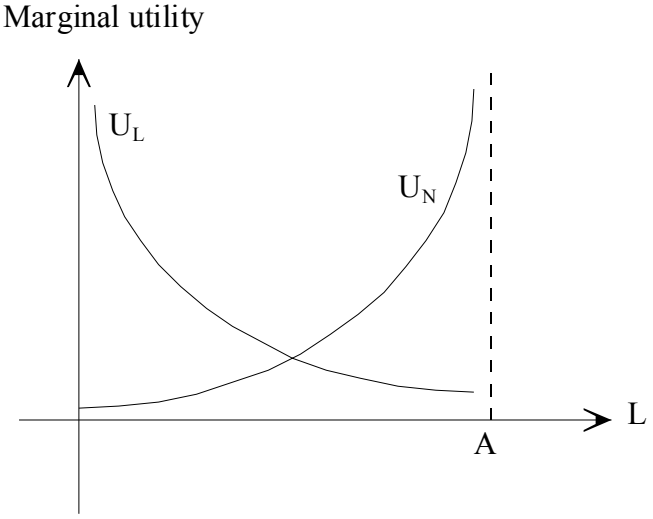
where U_N and U_L is the marginal utility of nature areas and agricultural areas and U_C the marginal utility of consumption. C_L is the marginal productivity of agricultural land. What (4) tells us is that the marginal utility of a ha of nature in the optimal situation shall be equal to the marginal utility of a ha of arable land plus the marginal utility of the production of consumer goods (food) on the last ha of arable land.

Equation (4) is easiest illustrated if the variables are replaced a bit:

$$U_N - U_L = U_C C_L \qquad (5)$$

If the part of the total area which is arable land is very small the marginal utility U_L is extremely high (the marginal utility of seeing a corn field or a cow in Norway is high). But in the opposite case where the part of the total area which is arable land is very big the marginal utility U_N will be high (the marginal utility of seeing a place with wild nature in Denmark is high). U_L and U_N are shown in figure 2.

Figure 2. Marginal utility of the external effects of arable and nature areas

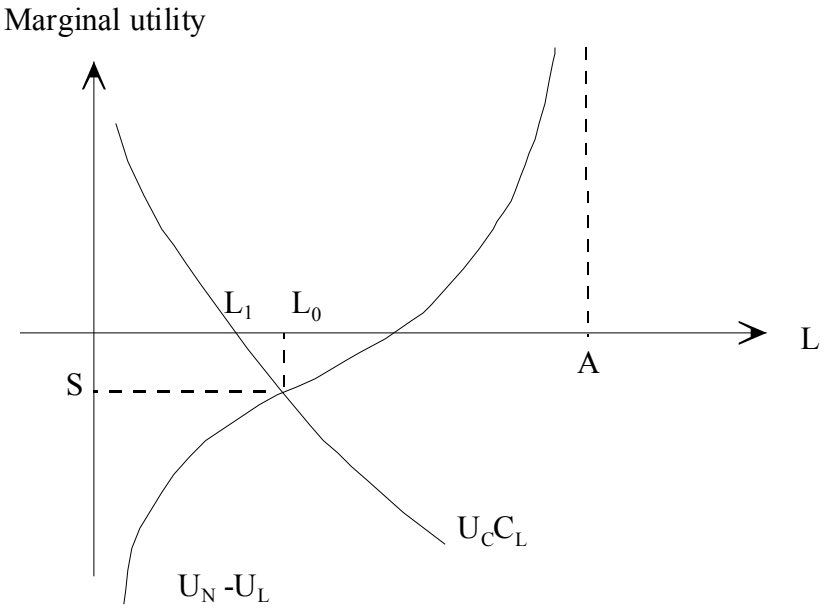


The left side in equation (5) is the difference between the two curves in figure 2. It will be numerically big and negative if the part of arable land is small and numerically big and positive if almost the whole area is arable land. $U_N - U_L$ are shown in figure 3.

The right side in equation (5) is the marginal utility of the material production of food. The marginal productivity C_L will diminish with increasing arable areas [4] and U_C will diminish with growing consumption C. As shown in figure 3 U_C C_L consequently will be falling when one is moving from left to right. The farmers' unsupported private optimum will be with the arable area L_1 (where the net marginal product is zero), but the social optimum will be in L_0 (where the negative net marginal product is negative and equal to the marginal net external benefit). The social optimal point will be realized with the agricultural support S per ha.

But whether the social optimum is realized with support to or Pigou-taxes on agriculture depends strongly on the curves. L_1 could as well be to the right of L_0 , and then taxes will be needed.

Figure 3. Social economic optimal distribution of arable and nature areas



The placing of the curves depends on the fertility of the area. Fertile areas will give high values of C_L and consequently a high-placed U_C C_L-curve and ceteris paribus a high L/A value; a stony, infertile ground the opposite. This means other things equal lower (or negative) support to agriculture in countries with fertile areas and a high L/A ratio. The marginal utility of food U_C must be assumed to be low in rich countries with a sufficient supply of food [5]. This means that other things equal rich countries will have higher agricultural support than poor countries.

---

[4] In an open economy the U_C will be equal to the world market price on corn.

[5] This argument is strictly speaking outside our pure corn model. But one can imagine a high urban production which gives the possibility of an import of corn. In an open economy U_C will be equal to the world market price, see footnote 2, and the marginal utility of the fixed world market price will diminish with the falling marginal utility of income.

The Norwegian arguments for agricultural support are doubtful in Denmark. The scare factor in Norway is arable land, in Denmark wild nature areas. Norway needs to support agriculture, Denmark to support nature.

These theoretical indications of the sign of the determined factors for agricultural support are found in the real world.

4. The European Common Agricultural Policy and Multifunctionality

A main problem by using the multifunctionality as the foundation for a CAP with a considerable support to agriculture is that the EU-countries are so different. As seen in table 1 the part of the countries' area used for arable land is varying inside EU between 6.2 per cent for Sweden and 59.1 per cent for Denmark.

If the external social benefits are national, this means that some countries (e.g. Denmark) want to use Pigou-taxes to restrict agriculture and protect nature, while others (e.g. Sweden) want to use agricultural support.

Table 1. The arable area as part of the total area

	Arable area	Total area	Arable area as part of the total area, pct.
Denmark	2.545	4.309	59,1 pct.
Norway	883	32.390	2,7 pct.
Sweden	2.768	44.996	6,2 pct.
Germany	11.467	35.691	32,1 pct.
Holland	894	3.733	24,0 pct.
UK	6.544	24.448	26,8 pct.
Spain	15.207	50.478	30,1 pct.
Belgium	767	3.310	23,2 pct.

Source: Danish Statistical Yearbook, 1995. In the table permanent grass fields are not included. If they were included e.g. UK's number would have been considerably higher.

It is important to observe that such a multifunctional based support is not a decoupled neutral support. Countries like Sweden want to see agricultural fields with corn production and it will from a national point of view be optimal to support this. But such a support will be in contrast to the EU rules of competition.

The only possible reason for a common policy is a common European feeling for nature and arable area. The Danes should be satisfied by working in the Swedish nature, and the Swedes by watching the Danish wavy corn fields. But this is in contrast with the normal evaluation of external benefits, see e.g. Pearce & Moran (1994) and Freeman (1993). These benefits are of different sources: There are existing values (the value for the consumer of knowing that grey bears exist) and value of using nature, e.g. as a recreational area. It is difficult to say anything precise about existing values, but it seems reasonable that a country's

inhabitants stress the existence of the typical national animals and nature. The value of using nature is much easier. A method used for evaluation has been the travelling expenses (the travelling expenses people are willing to pay for visiting an area is a possible quantification of the utility of the non-marked value of the area). This means that if people are willing to pay X euro for visiting a special type of area, only areas inside a border where they can go for X euro in travelling expenses are of interest in the utility function. This means that the optimisation in figure 3 shall be made inside one's own area. Big attractions (e.g. the volcano of Vesuvius) could be of relevance to all Europeans, but small attractions such as arable landscapes will only be of interest to the "local" people willing to pay what it costs to go there. A European common agricultural policy could not be based on multifunctionality and external effects. The support based on external effect must depend on the local scarcities.

A real good economic argument for the high degree of support to European agriculture in EU is still not found.

References

Anderson, Kym & Rodney Tyers (1991). *Global Effects of Liberalizing Trade in Farm Products*. Harvester Wheatsheaf. New York

Blandford, David & Linda Fulponi. (1999). Emerging public concerns in agriculture: Domestic policies and international trade commitments, *European Review of Agricultural Economics*, vol. 26, pp. 409-424.

Bohman, M. & J. Cooper, D. Mullarkey, M. A. Normile, D. Skully, S. Vogel, E. Young. (1999). The Use and Abuse of Multifunctionality, Economic Research Service, USDA, November, Washington D.C.

Brandow, G. E. (1977). Policy for Commercial Agriculture, 1945-71. I L.R. Martin (red), A Survey of Agricultural Economics Literature, Vol. 1, University of Minnesota Press, Minneapolis.

Brunstad, R.J., I. Gaasland og E. Vårdal. (1995). Agriculture as a Provider of Public Goods: A case study for Norway, Agricultural Economics, Vol. 13, pp. 39-49.

Brunstad, R.J., I. Gaasland og E. Vårdal. (1999). Agricultural Production and the Optimal Level of Landscape Preservation, Land Economics, Vol. 75, pp. 538-546.

Cochrane, W.W. (1958). Farm Prices, Myth and Reality, University of Minnesota Press.

European Commission (1999). The CAP Reform - A Policy for the future. Bruxelles.

European Commission. (1998). Explanatory Memorandum. The future for European Agriculture, Bruxelles.

European Commission. (1994). EC Agricultural Policy for the 21st Century, European Economy, No. 4, Bruxelles.

Fennell, Rosemary. (1997). The Common Agricultural Policy - Continuity and Change. Clarendon Press, Oxford.

Frandsen, Søren E., Jan V. Hansen & Peter Trier. (1994). A General Equillibrium model for Denmark with two Applications, Economic & Financial Modelling, pp. 1-34.

Freeman III, A.M. (1993), The Measurement of Envoronmental and Ressource Values Theory and Methods, Ressources for the Future, Washington D.C.

Gardner, Bruce L. (1988). Recent Studies of Agricultural Trade Liberalization, Proceedings of the Twentieth International Conference of Agricultural Economics, Dartmouth. Aldershot

Gardner, Bruce L. (1992). Changing Economic Perspectives on the Farm Problem, Journal of Economic Litterature, Vol.XXX, pp. 62-101.

Gardner, Bruce L. (1996). Why Experts on the Economics of Agriculture Have Changed Their Policy Tune. In Antle & Sumner (red.) Papers in Honor of D. Gale Johnson. The University of Chicago Press. Chicago.

Johnson, D.G. (1947). Forward Prices for Agriculture, The University of Chicago Press 1947, Chicago.

OECD (1993). Trade Liberalization: Global Economic Implications, OECD, Paris

OECD (1995). Adjustment in OECD Agriculture - Issures and Policy Responses, Paris.

OECD (1999). Agricultural Policies in OECD Countries - Monitoring and Evaluation, Paris.

OECD (2000). Agricultural Policies in OECD Countries - Monitoring and Evaluation, Paris.

Pearce, D. and D. Moran (1994), The economic Value of Biodiversity, Earthscan, London.

Pigou, Arthur C. (1920). The Economics of Welfare, London.

Rabinowicz, Ewa. (1999). Redesigning the CAP: What can agricultural economic research contribute? European Review of Agricultural Economics, vol. 26, side 265-281.

Swinbank, A. (1999). CAP Reform and the WTO Compatibility and Development. European Review of Agricultural Economics, Vol. 26 No. 3, side 389-407.

Tweeten, Luther (1989). Farm Policy Analysis, Westview Press, Boulder.

Winters, L.A. (1990). The so-called “non-economic” objectives af agricultural support, OECD Economic Studies, nr. 13, pp. 237-266.

Nom du document : 289-karsten kyed-kaergard-zobbe-
Dossier : C:\Documents and Settings\gilles\Bureau\EAAE
Modèle : C:\Documents and Settings\gilles\Application Data\Microsoft\Modèles\Normal.dot
Titre : Multi Functionality and the Common European Agricultural Policy:
Sujet :
Auteur : Tove Mark Jensen
Mots clés :
Commentaires :
Date de création : 07/03/2002 17:35
N° de révision : 2
Dernier enregistr. le : 07/03/2002 17:35
Dernier enregistrement par : GILLE
Temps total d'édition :3 Minutes
Dernière impression sur : 07/03/2002 17:35
Tel qu'à la dernière impression
Nombre de pages : 9
Nombre de mots : 3 044 (approx.)
Nombre de caractères : 17 353 (approx.)