

**CAP reform:
an evolution compatible with resource conservation and
extensive production of safe and diverse quality foods**

W. Dunne¹ and J. J. O'Connell²

¹Rural Economy Research Centre, Teagasc, 19 Sandymount Avenue, Dublin 4, Ireland. Corresponding author. Email: ldunne@hq.teagasc.ie

²Department of Agribusiness and Rural Development, Faculty of Agriculture, University College Dublin, Belfield, Dublin 4, Ireland. Email: john.oconnell@ucd.ie

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W. Dunne¹, & J. J. O'Connell²

*¹Rural Economy, Teagasc, 19 Sandymount Avenue, Dublin 4, Ireland,
email ldunne@hq.teagasc.ie*

*²Agribusiness and Rural Development, University College, Dublin 4, Ireland,
email john.oconnell@ucd.ie*

This paper explores how CAP reform has altered the economic balance between commodity and non-commodity outputs from farming within the EU. Thereby affecting resource use, farm production techniques, production costs, types of food produced and the future configuration of agricultural and rural society.

The EU has, for over four decades, used high product prices to achieve its primary aim of food security. This encouraged the application of new technology, more intensive production methods and increased specialisation and scale. These changes have added to the biological pressures on animals, plants, environment, general landscape and rural communities resulting in 'public costs'. Public costs do not affect the monetary costs of the individual farmer but they represent a deterioration, or even loss, of valued outputs e.g. unpolluted rivers, for society as a whole.

CAP reform, initiated in 1992 and culminating with the Luxembourg Agreement in 2003, resulted in lower product prices and the introduction of direct payments for farmers which are conditional on the provision of public goods. Consequently, the economic balance between commodity and non-commodity outputs from farming has shifted towards more extensive production and resource conservation. The most recent reforms should facilitate improved financial rewards from more integrated crop and livestock farming systems which conserve local resources, incorporate more eco-friendly production methods, and encourage a move towards local products and more diverse food markets.

The full implementation and economic exploitation of this policy shift will require further definitions and development of compliance criteria for farming systems and the formulation of marketing strategies for the more diverse foods which are likely to be produced within an enlarged EU.

Keywords: Quality and safe foods, local and regional foods, extensive production, public good payments, reference standards, resource conservation, polluter pays, provider gets.

Introduction

For over four decades the CAP has been the major factor influencing both food supply and production methods in Western Europe. For most of its existence the primary function of the CAP was to increase food supply, and farmers responded accordingly.

The economic and policy environment in the EU is now very different from that which prevailed in earlier decades of the CAP. Further change is anticipated as the economic, social, geographic and ethnic diversity of the EU continues to increase through periodic enlargements incorporating new Member States.

The CAP itself is now undergoing a rapid evolution to reflect these changes. Over the last decade the CAP has been reshaped, its objectives have been broadened, and policy has shifted to encourage more eco-friendly farming and food production methods. This noticeable shift in emphasis has provided added scope for differentiation of food products. As this paper demonstrates, these transformations greatly alter the provenance of food production including its overall safety, diversity and the scope for linkage with its means of production, resource use and geographic origin.

Food Security

When the CAP was conceived and developed in the post-war period, the primary objective was to increase food supply and thereby increase food security. The main policy instrument used to increase food supply was high product prices. High prices in turn encouraged scientific advances and the application of new technology to intensify production. This policy structure gave individual farmers a direct economic incentive to use this new technology and incorporate only costs that were directly related to profitability and the need to comply with regulatory standards.

For many years this policy did maintain and support farm incomes and it also increased food supply. However, the eventual outcome of the intensification and specialisation in EU agriculture was severe structural surpluses of most farm commodities. Because of structural surpluses, increasing volumes of the main farm products had to be removed from the market through intervention purchases to maintain producer prices. By the late 1980s, intervention purchases accounted for a significant proportion of farm output and also differentially affected product prices in individual Member States, (O'Connell et al., 1999).

Throughout this period farmers within the EU were, in essence, in a volume business producing for intervention and were becoming increasingly isolated from consumers demands. In such circumstances, the scope for linking markets with the methods of food production, resource use, food safety, product diversity and geographic origin were, at best limited.

Additional economic factors also favoured the shift to commodity agriculture and these were not unique to the EU. Competitive pressures in the US were forcing continuous emphasis on cost reductions (Hayes et al., 2003). At farm level, this has led to somewhat homogeneous products and an increase in the optimal size of farm operations. Post-farm gate it led to commingling to take advantage of the lower cost of bulk handling systems which in turn prevented price signals being sent from consumers to producers. As stated by Hayes *et al.*, (2003) "consumers might desire food products that are different from the commodity standard and they may be willing to pay a premium, but the farmer does not get this signal".

Within the EU, further policy complications were developing. To sustain the internal producer prices, most surplus production had to be exported outside the EU to third

countries. Eventually, there were increasing requirement for export refunds, or subsidies, to promote exports and these raised the budgetary cost of the CAP. Also, the escalating scale of the exports created severe international trade difficulties for the EU. By the early 1990s, all these factors had combined to precipitate a major revamping of the CAP itself.

Resource use

The early CAP objective of food security was a rather traditional “productionist” view of the role of farming which was largely regulated through the medium of product price. Such a perception of farming takes into account only private costs to the farmer and the private gains or value that the consumer of the food ultimately derives from the natural resources used to produce that food. The unrelenting drive to improve technical and economic efficiency in food production in the EU did solve the food security objective, but it had a number of indirect impacts and costs.

The intensification of farming activities increased pressures on livestock, on the plants used to feed them, and on the overall biological diversity of the region where the production occurs (Dunne and O’Connell, 2000a; 2002). The exploitation of economies of scale has had both direct and indirect impacts on the environmental landscape, nutrient balances, and water quality of the region (Baldock et al., 2002). All these changes have significantly affected the rural population, and society in general, who also consume these public goods to varying degrees. Ethical issues also arise about the inputs and production techniques used in farming and their possible effects on product safety, animal welfare, and the environment. Included here are issues such as, the use of recycled animal products, feed additives, hormones and growth promoters, as well as livestock housing conditions (Dunne and O’Connell, 2000a; 2002a).

Production intensity

As outlined by Bonnieux and Rainelli; 2002, the intensive model of farming results in a number of significant problems, such as:

- human health effects of pesticides and fertiliser residues in soil, water bodies and the food chain
- human health consequences arising from bovine spongiform encephalopathy (BSE), which has been linked with the use of meat and bone meal in animal feeds
- a shift from managing biodiversity spatially to managing it over time and consequently important losses of cultivars and an increase of pests resisting one or more pesticides
- eutrophication of ground and surface waters leading to declines in the quality of aquatic resources, losses in recreational values and increased water supply costs
- losses in landscape amenities due to the emergence of monocultures, removal of hedges and the destruction of traditional farm buildings.

Bonnieux and Rainelli; 2002 are also of the view that the EU price support for grains has resulted in:

- a split between crop and livestock farming

- an important specialisation within farms and at regional level
- a gradual intensification of animal rearing in bigger herds
- a shift from traditional upland and grassland areas of the European Union to the coastal areas to benefit from the attractive price of imported material to produce compound feed
- the loss of integrated farming systems which preserve the genetic diversity and the particular aesthetic character of European landscapes.

Public Costs

These negative impacts on the environment, animal welfare, food safety and even ethical issues are normally referred to as “public costs,” since they do not directly affect the farmer. These costs accrue to society as a whole and arise from the deterioration or even loss of the “public value” placed on these goods by society. But while food supply remained the main EU priority, these external costs were undervalued, or even ignored. Resource use, methods of food production, food safety, product diversity and products of special geographic origin were essentially non-issues or had at best a very secondary role.

Most, if not all, farming results in the production of joint outputs or products, namely one or more food commodities and some public goods. The public goods can be negative, where harmful effects on society occurs, as with pollution and the various issues raised earlier. But, public goods can also be positive, where societal benefits arise, like an enhanced landscape and biodiversity (Dunford, 2002).

Changes in farming practices aimed at producing agricultural commodities also impact on the supply of public goods. A public good benefit could arise through reduction of the negative impacts or an enhancement of the positive impacts. Conversely, an additional societal loss can arise where there is an increase in the negative impacts or a reduction of the positive impacts. Because these damages and benefits are not taken into account in the farmers margins arising for commodity food production, the negative externalities tend to be over-supplied and the positive under-supplied (Cahill, 2001).

Public Goods

The inherent nature of public goods is that they are very diffuse and their costs and benefits are difficult to quantify. Hence they are difficult to control, regulate and convert into some type of market products. Their value depends on prevailing economic, social and cultural conditions, and consequently varies greatly with the circumstances of the individual and region. Socio-economic and cultural values vary greatly across the EU and additional diversity is introduced at each enlargement, which incorporates new and more ethnically diverse Member States.

Over the years, various societies have tended to define acceptable standards and practices for farming within a regulatory framework (Dunne and O’Connell, 2000a; 2002a). The framework is usually defined in technical terms with advice from a combination of animal, food, public health and environmental scientists. The standards may be derived from experiments that directly or indirectly measure the biological response of animals and plants to varying degrees of stress. They may measure the probability of loss of performance or death of the animal or, in the more extreme situation, the consumer of the

food product. Normally they are focused on the human as either the consumer or producer, but seldom on the welfare of the animal or the environment.

The regulation can vary from outright prohibition to establishing minimum acceptable standards for a range of inputs and management practices. Examples are the conditions for use of inputs like land, feeds, feed additives and hormones. Increasingly this approach has been extended to management practices such as nutrient balances, stocking densities, housing and transport conditions, castration and slaughter.

Economic instruments have also been used to alter the balance between public costs and benefits. Government interventions through taxes or subsidies on either inputs or outputs could significantly affect the optimum intensity of crop and animal production. Such interventions affect the balance between the private and public costs and the overall benefits.

Institutional subsidisation of both inputs and outputs is quite common in agriculture, especially for livestock production in many countries. The primary aim of policy makers was usually some mix of protecting farm incomes, increasing food security, and encouraging exports. But the protection or provision of public goods has generally received low priority.

Joint production

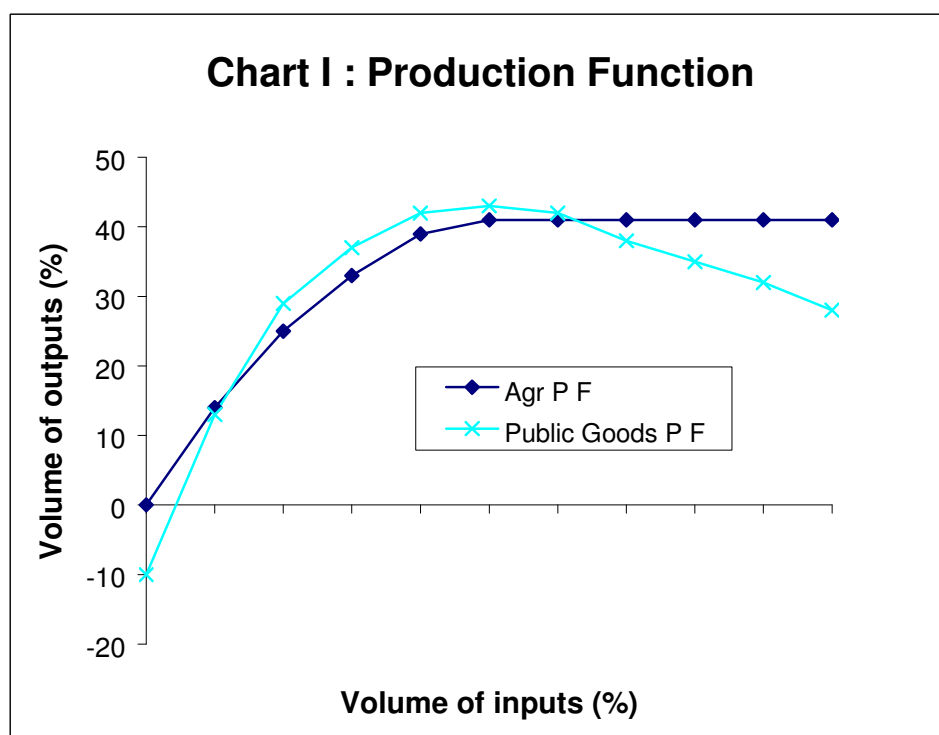
A hypothetical physical relationship between inputs and outputs for both commodity food production and a “bundle” of public goods is outlined schematically in Chart I. The profiles of these curves provide an interesting contrast. The curve for agricultural products conforms to the standard format with output initially increasing rapidly with each added input, followed by a slower rate of response as intensification increases and eventually reaching a plateau assuming maximum exploitation of existing technology and management skills.

The curve for the public goods bundle, in contrast, can be negative at zero or very low levels of inputs. For example, animals may die or starve due to insufficient winter-feed or due to diseases, public access to certain areas may be impossible or restricted by uncontrolled vegetation somewhat similar to the concerns often expressed in the EU in relation to marginalisation and possible abandonment of land. In these situations very small increases in inputs can result in a substantial increase in public goods. For example, the introduction of grazing animals could provide a beneficial level of vegetation control, physical access and a desired type of landscape (Dunford, 2002). Similarly, the provision of animal disease control and/or winter-feed could result in very significant increases in animal welfare and even public health benefits.

Overall the public goods curve is more like an inverted U, initially rising rapidly and then tapering off, followed by a small plateau and then entering a phase of fast decline. The latter phase representing the high public costs of resource depletion at high levels of farming intensity.

Since the profile of the two curves differ, as intensification of farming occurs, there are a number of points of intersection. At low levels of farming intensity the two curves are highly complementary and the public gains in resource conservation and development could even exceed the private agricultural gains. After the first point of intersection the

curves still remain complementary but with largely similar rates of increase, extra inputs still provide added private gains for the farmer but also some extra public goods. As intensification increases, the gains in public good begin to falter before entering a relatively rapid decline arising from added public costs (serious pollution problems). Here, the private gains to farmers may also have reached a plateau. When this level of intensification is reached an antagonistic relationship exists between the private gains of the farmer and the public loss to society. While policy interventions in agriculture have existed for decades irrespective of the level of intensity of farming, those of an environmental nature can be more readily justified once farming intensity reaches the antagonistic stage outlined here.



Private gains and public costs

“In traditional agriculture, adequate supply of environmental outputs was assumed: there was no market failure and no need for intervention. Waste and pollutants were still jointly produced as were positive externalities, but all within limits acceptable to society” (Harte and O’Connell, 2003). However, as affluence increases, society becomes more aware of the external costs involved in food production, but it also can afford to place a higher value on public goods like food safety, animal welfare, and environmental and ethical issues. This intensifies the potential conflict between the degradation of such public goods that are of increasing value, and the technical objective of increasing efficiency and productivity in farming and the lowering of unit costs which were the main pursuits of the CAP for decades (Dunne and O’Connell, 2000a; 2002a; 2002b).

As food surpluses in the EU began to accumulate, this potential conflict became a reality, and in conjunction with international trade difficulties and escalating budgetary costs, it was responsible for a significant change in EU policy in 1992. By the turn of the century, EU food production policy had shifted to placing a declining value on extra units of food production, but an increasing value on any public goods consumed in the production process (Dunne and O'Connell, 2000a; 2002a; 2002b).

Fischler, in a contemporary view of agriculture, states “throughout Europe, agriculture is having to face changes in what society expects of it ...safeguarding the landscape-shaping functions of farming, environmental goals, ethical issues surrounding animal welfare, not to mention quality assurance and questions of social balance are coming to the fore” (Fischler, 2001). A similar perspective has been expressed and elaborated on in a number of official EU policy proposals in recent years (CEC, 1997; 2002 and 2003).

The cost-benefit mix had finally progressed to the stage where it was probable that the sum of the private and public costs was greater than the sum of the private and public gains. It is scarcely surprising that this occurred in an affluent region of the world where both the human and the animal population densities are relatively high.

Policy interventions

The major changes in the CAP over the last decade have been primarily driven by the combination of budgetary, enlargement and world trade (WTO) issues. Nevertheless, the EU in an attempt to address local and/or national issues has evolved CAP mechanisms to delegate powers to Member States to develop and agree with the Commission appropriate programmes to meet local and national needs. For example, special funds were made available under the MacSharry reforms for agri-environmental programmes to be developed primarily by Member States. Similarly, under the Agenda 2000 agreement, a series of commodity based financial envelopes of revenue were identified and designated by which Member States could disburse to address local needs provided this did not interfere with the single market principle.

Some of the policy initiatives in relation to public goods were the introduction of:

- additional payments to farmers in Less Favoured Areas (LFA,s) in the 1970s
- payments for conserving natural habitats in the 1980's
- extensification payments as part of the 1992 MacSharry and the Agenda 2000 reforms for beef
- agri-environmental programmes under the accompanying measures as part of the 1992 CAP reform. The aim was to remove negative externalities and promote positive protection and enhancement of the environment and countryside. These included compensation for input reduction, grassland maintenance, landscape and nature protection, aid to organic farming, protection of products of designated geographic origin.
- Premiums for land conversion to forestry or organic farming
- cross compliance as part of the general DP system under Agenda 2000

- decoupling of the commodity based direct payments in 2004 to a single farm payment with a range of compliance conditions
- prohibition of slurry spreading in certain time periods and maximum nitrogen application limits under the nitrates directive.

In the Agenda 2000 proposals, published by the EU Commission, a number of non-price issues in relation to general competitiveness, the multi-functional nature of EU agriculture, and the CAP were outlined (CEC, 1997). The most important issues affecting the future CAP objectives that were discussed and outlined in the Agenda 2000 proposals were summarised by Dunne and O'Connell, 2000a; 2002. These were:

- food safety and product quality, which consumers often link to specific production methods or geographic regions
- animal welfare considerations
- environmental friendliness of production methods
- integration of environmental goals into the CAP
- further developing the role of farmers in the management of natural resources and landscape conservation
- preservation of sustainable farming and social cohesion
- maintaining a fair standard of living for the agricultural community and stability of farm incomes
- creation of complementary or alternative income and employment opportunities in rural areas for farmers and their families.

While most of these multi-functional aspects were not explicitly incorporated into the final Agenda 2000 agreement, they will shape the future role of EU farming as they were subsequently incorporated into the 2003 Luxembourg agreement.

A more complete description and discussion of the multifunctional role of farming, including the EU model of agriculture and its significance in rural development, can be obtained elsewhere (Blandford, 2001; Cahill, 2001; Harvey, 2001; Latacz-Lohmann and Hodge, 2001; Laurila, 2000; Mahe, 2001; OECD, 2001; Tarditi, 2001; Thomson, 2001). A contrast between the US and the EU perspective on multi-functionality has been outlined by Freshwater (2002). Daily and Ellison (2002) discuss an even wider vision of the role of farming in the economy and in nature conservation.

CAP Reform to date

Translating the EU vision into reality is a long and complex process. The following outline illustrates the scale of the EU policy shift and the administrative mechanisms used for agriculture over the last decade. In 1992, the MacSharry reforms introduced substantial support price reductions for cereals and beef to enable beef to better compete with other meats and to facilitate exports of cereals and meats to third countries. To compensate producers for the lower product support prices, cereal and beef farmers received direct payments (DPs) or "cheques in the post" to maintain their incomes. But

for supply control purposes, these payments were restricted to area-based quotas for cereals and specific animal-based quotas for beef.

Several “accompanying measures” were also implemented under the Rural Development programme. The main measures provided direct financial aid for:

- land conversion to forestry and alternative enterprises, including organic farming
- protecting the agricultural environment
- a farm retirement scheme for older farmers.

Under the more recent Agenda 2000 agreement, the CAP reform was further deepened for beef and cereals and tentatively extended to include milk. As in 1992, this involved lower product prices and increases in the value for DPs. Also under the Agenda 2000 agreement, the existing less-favoured area (LFA) or “headage” payments were decoupled from animals and linked to land management to prevent environmental degradation. The new land-based payments were also linked via a minimum stocking density requirement to continued use of the land for agricultural production, although at a very low level. Even as the Agenda 2000 agreement was being implemented, additional reform seemed inevitable.

From a land use and food supply perspective the policy shifts, up to and including Agenda 2000, had several interesting economic implications. The main implications were:

1. the lowering of product prices, alone, would inevitably shift the optimum economic production towards lower levels of intensity
2. the DPs for cattle farmers were and are based on the possession of certain types of animals rather than their performance, and the animals had to be “farmed” within specified stocking density limits, less than 2.0 livestock units per hectare (Lu/ha)
3. additional payments or extensification premiums were made available for more extensive cattle systems, an extra €40 and €80 per eligible animal was paid where the stocking density was lower than 1.8 and 1.4 Lu/ha respectively
4. additional area based payments were made for organic farming production systems
5. possibly the most important of all, the concept of “cross compliance” was introduced whereby the DPs were made conditional on farming methods conforming to various other EU measures and regulations, for example animal welfare and animal traceability
6. production was further constrained by a combination of quotas for products and quotas for DPs for specific products.

These policy shifts greatly increased the economic incentive for cattle farmers to extensify their production systems. The scale of the beef price reductions arising from both the MacSharry and the Agenda 2000 policy shifts resulted in a substantial incentive to extensify production. The economic effects were similar to those noted earlier in relation to, use of taxes or subsidies on either inputs or outputs to significantly alter the optimum production intensity and the balance between the private and public costs and the overall benefits. Not surprisingly, a study of the trends in the economic efficiency of

Irish agriculture showed that total factor productivity in Irish agriculture declined sharply post 1992, (Matthews, (2000), O'Connell, (2004).

Dunne et al., (2001) evaluated likely response by cattle farmers in Ireland to the EU extensification payment system and suggested the possible emergence of three separate stocking rate groups based on the farmer's initial stocking densities. These were farms:

- “at 1.5 and possibly some up to 1.6 will likely opt for €80 extensification and will achieve this by either shedding animals or renting-in land to reach the 1.4 limit
- over 1.6 but under 1.8 range may in the short term opt for the €40 payment and they could also slightly increase their number of animals or rent-out some land but they must remain below the 1.8 limit. Should market based margins¹ decline as costs rise or beef prices decline, the farms in this segment may eventually be attracted to the higher extensification premium at the 1.4 limit
- at 1.9 or higher may remain outside the extensification while the market based margin remains significantly positive. But, direct payments are a more predictable source of income than market based margins. Therefore, some of the farms operating at 1.9 and even 2.0 may aim for the €40 payment, especially if :
 - beef prices and market based margins decline further, or if
 - the “surplus” animals on these farms are either low value or no value for direct payments.

If, in time, the market based margins become seriously negative² then all of the farms will be attracted to the higher value extensification payments at the 1.4 stocking density limit.”

The evidence now emerging from the number of Irish farms and animals availing of these two different extensification options would support these conclusions.

Overall, the impact was that the DPs are unlikely to fully compensate the very intensive producers who have the greatest impact on the degradation of the value of public goods. However, when the price and the DP effects are combined, there is likely to be an overall gain in the public cost-benefit balance, but the extent of this is difficult to quantify.

DPs for Public Goods

A direct policy link between the use of DPs and the provision of public goods was proposed by Dunne (1996). This proposal suggested that switching a significant proportion of farm income support from product prices to DPs would provide an ideal

¹ The market based margin used in this context refers to the gross margin excluding the value of all direct payments.

² The normal farm management interpretation of a negative (market based) gross margin would be to quit production. Under the CAP rules for animal based direct payments, the cattle farmer would still have to continue farming as the possession of eligible animals is a compliance requirement for access to the direct payment. For a more detailed explanation and consequences see Dunne and O'Connell, 2002.

opportunity to influence private behaviour to voluntarily incorporate the external costs of public goods into production technology. Under this proposal, the societal value of the DPs could be enhanced significantly if the payments were made conditional on supplying public goods. This would have the added advantages of increasing the justification for the large expenditure on the DPs themselves, the acceptability of the DPs to EU taxpayers, and the justification for the DPs under WTO rules.

Dunne (1996) also suggested that decoupling the DPs from eligible animals and land would have several added benefits. The production costs for cattle farmers could then be reduced to reflect the declining value of the carcass, cattle numbers could reflect market balance for beef independent of their ability to collect DPs, and the DPs themselves could be used to provide a more targeted method of income support. A more generalized form and further refinement of this proposal for all land-using farming activities was developed and published by Dunne and O'Connell (1998; 2000a; 2000b; 2002a) and Dunne et al., (1999).

In July 2002, the EU Commission published a report entitled a "Mid-Term Review of the Common Agricultural Policy", CEC, 2002. Against expectations, this report proposed decoupling direct payments from animals and a shift to a single income payment per farm for all the relevant land-using enterprises. According to the proposals:

"Farms under this scheme will have complete farming flexibility increasing market orientation, but payments will be conditional on compliance with statutory environmental, food safety, and animal health and welfare standards (Cross compliance)",

The stated ultimate aim is to include all crop and animal regimes within this type of framework. It proposed that farm audits be introduced to ensure that the compliance criteria are met. In contrast to the earlier DP system, this mechanism would also be much more compatible with the EU vision of agriculture and rural areas outlined in the earlier Agenda 2000 proposals (CEC, 1997). The Mid Term Review proposals also identify funds for financial support for voluntary schemes, which will include:

"Encouraging farmers to participate in quality assurance and certification schemes recognised by Member States or the EU including geographic indications and designation of origin and organic farming", (CEC, 2002).

Although the future direction of EU agricultural policy is now becoming clearer, several serious operational aspects of the policy have yet to be resolved. Probably the most important in relation to the future shape of EU farming is the degree to which the DPs are linked to land use and its stewardship versus land ownership.

The justification and the compliance criteria for the DPs contained in the Mid-Term Review are very similar to the policy framework developed and published by Dunne and O'Connell, (1998; 2000a; 2000b; 2002a). The major difference between the two proposals is in the details on how the DPs will be administered to the farmers. The Commission's proposal relies exclusively on an area-based payment on historical land use as against our preference for a combination of a payment per farmer/household and a reduced payment per hectare on current land use. The farmer/household component was suggested to reduce the capitalisation of DPs into assets, especially land values and rents.

Once this capitalisation occurs, these become additional costs for new entrants thereby increasing future production costs. Our proposal would also provide for a stronger public good and social dimension to meet local needs, especially in the poorer regions of the Union.

Chart II summarises the likely impact of each payment option on the future structure of farms, farm enterprises and the general rural area.

Chart II: The impact of the structure of the DP mix on farming and rural areas

A straight area payment would:	A payment with a high farmer/household component would:
<ul style="list-style-type: none"> • favour the larger farmers • encourage restructuring of holdings • facilitate the exploitation of economies of scale • reduce the unit costs of production • be quickly capitalised into land values • encourage out-migration of people 	<ul style="list-style-type: none"> • favour smaller farms • transfer almost directly into a farmer and/or household income • reduce the mobility of land use and ownership • increase the likelihood of part-time farming • increase the incentive to engage in farm enterprises and production practices that are compatible with part-time farming

Source: Dunne and O’Connell, (2002a)

Some implications of decoupling DPs

A more comprehensive review of the likely implications of these changes for farmers, farm structures, administrative requirements, farm inputs, outputs and product markets is given in Dunne and O’Connell, (2002a), O’Connell, (2004). Decoupling of the current DPs would introduce a whole new dynamic into the entire EU policy, farming systems, product outputs and market interface.

From a natural resource use and food marketing perspective, a policy of this type clearly facilitates diverse production methods and more eco-friendly farming. With appropriate controls and labelling, localised products could then be differentially marketed to ensure the maximum economic exploitation of their inherent attributes. This should encourage greater efforts at development of alternative enterprises and products and in relation to exploiting unique factors and facilitate farmer branding by reference to specific locality or region as suggested by Hayes, (2003).

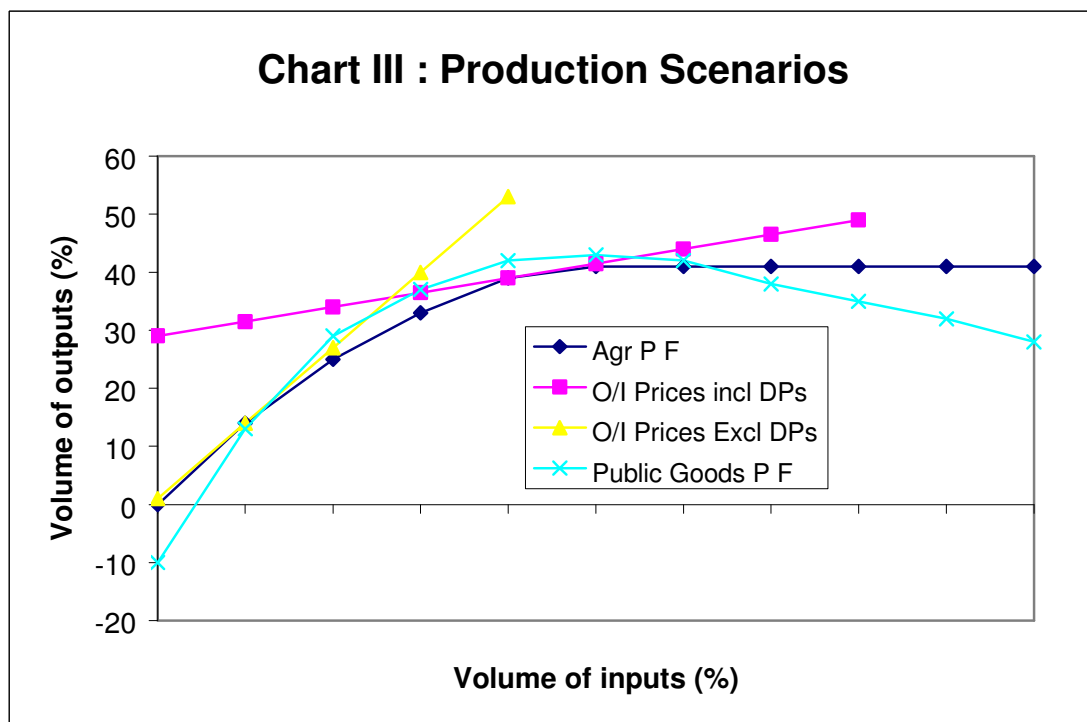
As the centre of gravity of mainstream EU agriculture moves closer to eco-friendly farming, the contrast between mainstream farming and organic farming is reduced. This may narrow the market scope and share for organic products, thus reinforcing its niche market status, (Dunne and O’Connell, 2002b). In addition, since the DP system will no longer be tying down specific types of commodity production, as in the past, it is likely that a greater diversity of activity will emerge at farm level which may well be financed, at least in part, by the revenue from the DPs.

The re-orientation of the DPs towards a payment system for public goods will impact on both the supply of and demand for food within the EU. This will affect the overall market balance and the need for subsidised food exports. Once DPs are decoupled from the animals, it is difficult to predict the actual scale of the decline in animal numbers, prices and the knock-on effects on the farm enterprise mix. But the expenditure on concentrate feed and fertilisers will decrease to reflect the decline in animal and crop prices, animal numbers and the changes in the farm enterprise mix.

Preliminary estimates for Ireland would suggest that compared to 1999, the expenditure reductions on purchased feeds and fertilisers could be of the order of 20 per cent, valued at approximately 190 and 65 million euro respectively, (Dunne and O’Connell, 2000b). A more comprehensive discussion of some of the direct and indirect implications of decoupling the DPs from individual animals can be obtained in Dunne and O’Connell, (2002a).

Production scenarios

Refocusing on the production functions for agriculture and public goods, discussed earlier in relation to Chart I, it is possible to gain some insights on the impact of decoupling DPs from product output in relation to future resource use and the supply response for agricultural products and public goods. These production functions are reproduced in Chart III, but also included in the diagram are the input to output price ratios before and after decoupling of the DPs from the agricultural output.



As demonstrated in Chart III, when the value of the DPs is excluded from the price of the agricultural output, the input to output price ratio deteriorates sharply. In response, the optimum economic level of agricultural output declines significantly. This in turn results

in a change in the farmers' indirect incentive to supply public goods as demonstrated by the corresponding point on the public good production function. The mix of agricultural commodities and public goods supplied at the farmers' new economic optimum will be very different than that which prevailed before the DPs were decoupled.

The magnitude of the changes in the balance of private and public gains and losses will depend on the scale of the shifts that occur on the respective production functions. If the economic optimum shifts from the very intensive agriculture and public good antagonistic farming, to very extensive low input farming the public gain may be substantial. Yet, the farmers private gain may not have altered when the income value of the output-decoupled DP is taken into account. However, the method by which the DP is delivered in the new situation could influence the farmers' costs and hence the supply of public goods. The supply of public goods may be curtailed if the farmer has to incur compliance costs to gain access to the DPs such as, for example, maintaining a prescribed level of production.

On very extensive farms the economics of commodity food production may be marginal or even unprofitable without the revenue from DPs and thereby result in land abandonment. However, within the future EU single farm payment the possibility of land abandonment is greatly reduced since access to the payment is dependent the continued use of the land and its related compliance criteria of maintaining land in good agricultural and environmental condition. Such farming situations could be classified as primarily public good farming with food output assuming a very subsidiary role.

Guiding Principles

The goals of farming in a modern economy often extend beyond food production and include issues such as a reduction in soil erosion, water pollution, flood protection, preservation of wildlife habitats and landscapes. The creation and preservation of wildlife habitats and landscapes can support a number of recreational activities such as walking, green tourism, hunting, fishing and related activities and services. The supply of some of these desired outcomes depends upon the maintenance of specific farming practices (Dunford, 2002).

Some of these are easily marketed but some are not. For those which cannot be marketed, and in the absence of government intervention, the farmer has no incentive to take into account the negative externalities arising from farming activities. The 'optimal level of degradation' for a profit maximising farmer will always be more than for society in general. The gap between the private optimum and the societal optimum illustrates the extent of the failure of the market in relation to public goods.

A prerequisite to establishing an economic optimum level of private reward or payment for the supply of public goods is the establishment of appropriate reference levels for public goods. Thus, water purity in rivers and lakes may, *inter alia*, be defined in technical and scientific terms by reference to levels of chemicals per litre of water which in turn may be linked to levels of such chemicals per kilogram of soil on farms. Farmers could incorporate such parameters into their enterprise decision making. Those farmers

meeting the reference levels might be rewarded at a certain level while those doing better might get extra reward.

This would be in line with the Provider Gets Principle (PGP), (Bonnieux and Rainelli, 2002). On the other hand, farmers failing to reach the reference levels would be penalised under the Polluter Pays Principle. All of this would require:

- the definition of standards
- the development of scientific methodologies for the measurement of the standards
- the appraisal of performance relative to those standards, and
- operational procedures for overall implementation of the system.

Government policy is already impacting in this process through:

- zoning of land for particular use
- agri-environmental schemes such as the Rural Environmental Protection Scheme (Republic of Ireland)
- cross-compliance requirements for receipt of the existing EU direct payments, and especially the future single farm payment once full decoupling is implemented.

Government efforts in the future will become more highly focused and specific. Reference levels which will be defined and measured scientifically, will refer to more specific regions, localities and perhaps even farms and will be incorporated into farmer decision making. Underlying the farmer's decisions in relation to reference levels will be the principles of the Polluter Pays and the Provider Gets.

Summary and conclusions

In the past, agricultural policy in the EU was primarily driven by the need for a secure food supply and by the objective of sustaining the economic and social well-being of farmers. This policy brought with it problems of excess supply, trade tensions, mounting and unsustainable cost, environmental difficulties and others.

In the affluent EU society of the 21st century with an abundance of food, agriculture and food policy will be mainly driven by the economic and social goals of this new society. In this society, the value placed on an extra unit of surplus food production is declining and possibly negative but the value placed on any public good consumed in food production is increasing. As a consequence, the mix of agricultural and public goods that this society is prepared to support financially is changing rapidly.

The level and component of farm incomes in the EU in the 21st century will reflect these value changes. Farm revenue will consist of a mix of payments for conventional agricultural commodities and public goods. The public good payments will be conditional on the level and type of inputs used, farming practices, types of products and conformance to a societal vision of the role of farming.

There will be further developments in the definition of public goods, in defining reference levels for these and in the techniques for measurement of attainment of

reference levels. Policy in this area will become more precise and localised. Farmers will incorporate such policy into their farming decision making. Underlying their decisions will be the principles of Polluter Pays, Provider Gets.

Finally, it is likely that the greater freedom afforded to farmers by virtue of decoupling the DPs will result in a greater diversity of activity and output at farm level with the emergence of products and brands which seek to capitalise on unique geographic and traditional factors.

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