

3 The spatial dimension of agricultural policies

3.1 Analytical assumptions

In order to facilitate the analysis of the impacts of agricultural and land-use policies on farmland-use management, a generic typology of three agricultural categories is developed: the urban fringe or peri-urban zone; the agricultural core zone; and the far, or extensive, margin zone.

In the *urban fringe or peri-urban zone*, which is found at the edge of a city, urban activity has a strong influence on land uses and on the nature of farming, even in those countries where there are strong restrictions on converting farmland to other uses.

The *agricultural core zone* comprises the majority of agricultural land in most countries. In this zone, farmland has very low opportunity costs and the chance of market forces causing significant changes in land use are low. Returns from farming are high enough to keep the land in agriculture and there is little pressure for urbanisation.

In the *far, or extensive, margin zone*, agriculture is a marginally profitable activity and declines in the return from farming cause production to cease. If the urban fringe faces pressure to convert farmland to a higher-value use, the issue at the far margin is whether agriculture can be sustained. If this is not the case, then land will revert to a less intensively managed use, such as forests or native round cover.

Given the typology, conversion of farmland is fundamentally a problem only at the urban fringe and the far margin. By definition, in the agricultural zone, while the particular use of land in terms of the agricultural commodity produced may change or the operator of the farm may change, the land itself will remain in farming. However, while the majority of farmland may, in most countries, fall into this category, there is great interest in what happens to farmland at both the urban fringe and at the far margin. Depending on the specific country, these two zones can account for a large number of farms and a considerable share of farmland; moreover, they produce a disproportionately large share of agriculture's environmental services.

In developing the analysis a number of assumptions are made to provide a stylised framework of farmland conversion that is generally applicable to the OECD countries. An inevitable consequence of this process is that the framework does not describe any given country with sufficient precision for it to be used directly for policy purposes. Instead, the framework describes the broad forces acting upon different types of farmland that influence the conversion process. In particular, the framework is presented as a set of three concentric rings of farmland surrounding an urban centre. Obviously, in any country there are multiple urban centres and not all of them will have a corresponding pattern of farmland. Moreover, the quality of farmland varies considerably in most countries and this, too, will alter the specific geography of farmland types. However, the point of the framework is to provide a way of identifying the specific types of farmland most at risk of conversion, and it does fulfil that function.

A second simplified assumption used to facilitate the analysis is that farmland situated at some distance from the urban fringe, in the core agricultural zone, has an arbitrarily small opportunity cost. Since all parcels of

land are immobile, it is common in land value analysis to conclude that any payment to land is a pure economic rent or should serve other objectives than keeping land in farming. If there are no alternatives to the current use and if farming is a profitable activity, land will remain in that use, even at a payment that is close to zero – for, by definition, it has little or no opportunity cost. This is a rough approximation of the condition facing large amounts of farmland, especially in countries with low population densities and high rates of urbanisation. In reality, there are small amounts of farmland outside the urban fringe that may be used for ex-urban residences, rural manufacturing locations, etc., but these uses are small compared to the total mass of farmland. Indeed, this assumption fundamentally underlies the common practice in agricultural policy analysis of assuming the stock of farmland is fixed (OECD, 2008b).

The analysis also largely overlooks the issue of shifts in land uses that are internal to any given farm. Because land has different qualities there will typically be price regimes that lead to some land on a farm being idled in the short to medium run. However, in the long run there is a good chance that these parcels will return to production as prices improve. The rationale for not focusing on these land-use adjustments, which can have significant consequences, is that there is no change in ownership. Just as a farmer chooses to plant some land with one crop and another parcel with another crop and use a third as pasture, so too is the decision to withhold land from production part of the internal farm management process. For the purposes of this study, farmland conversion will involve land leaving the sector and becoming unavailable for short-term re-use.

A significant part of the analysis concentrates on the role of environmental services from agriculture. For the purpose of simplicity, the analysis treats these non-commodities as local public goods. This means that their value is largely determined by the direct experience of those living in close proximity to the point of production.

The analysis is static, in so far as only the effects of the agricultural policy measure considered are taken into account, while other factors that could influence conversion of farmland are assumed to be constant. In addition, it is assumed that producers are risk-averse.

Finally, the last major assumption is that the farm household assesses the available returns from both farm and non-farm allocations of labour and capital. If agriculture pays a lower return than from off-farm work, then individual household members will shift more resources to off-farm activity, where it is available. Certainly, in some countries the returns to full-time farming are sufficiently high to prevent this becoming a common phenomenon. However, if returns from farming are low, some other mechanism is needed to allow farming to persist in urban fringe areas, where farmers face a combination of: small farm size – leading to low levels of farm income, high production costs leading to low unit returns, and competition for land for other uses – leading to pressure for conversion.

3.2. The spatial implications of agricultural policy

Agricultural support policies have evolved over time. These changes, which range from limited re-instrumentation, to comprehensive reform, have had particular consequences for the spatial impacts of agricultural land use. In a number of OECD countries both the number and complexity of policy measures are increasing, as the centre of gravity of policy measures shifts gradually from traditional market price support and output-related measures towards sector-wide and non-commodity-specific policies, particularly those encompassing environmental and rural development concerns.

Reductions in the most distorting forms of support have been associated with increases in more decoupled payments, including the provision of payments with no requirement for the farmer to produce in order to be eligible for the support (Table 2). For the OECD as a whole, the use of payments based on area (current or non-current), although very diverse, has increased by more than 400% between 1986-88 and 2005-07.

Moreover, cross-compliance conditions, especially environmental, are increasingly being attached to payments.

Despite the steady evolution of agricultural policy in the OECD countries to include increasing support for environmental and rural development programmes, the majority of support for farmers is still delivered through programmes that influence the quantity or price of commodities. While rural policy and environmental policy both have a spatial dimension, in the sense that only specific areas qualify for this type of support, traditional commodity programmes are essentially spatial in nature.

Table 2. Composition of producer support in the OECD area

	Amount (USD million)		Shares (%)	
	1986-88	2005-07	1986-88	2005-07
A. Commodity production required	236 044	207 406	99	79
Support based on commodity output	196 715	144 902	82	55
Payments based on input use	20 219	29 813	8	11
Payments based on current A/An/R/I ¹	18 666	31 670	8	12
Payments based on non-current A/An/R/I	533	1 021	0	0
B. Commodity production not required	3 015	55 225	1	21
Payments based on non-current A/An/R/I	2 080	51 031	1	19
Payments based on non-commodity criteria	935	4 194	0	2
C. Miscellaneous payments	210	-99	0	0
Producer Support Estimate (PSE) (A+B+C)	239 269	262 533	100	100

Note: A (area planted) / An (animal numbers) / R (receipts) / I (income)

Source: OECD, PSE/CSE database (2008).

More significantly, traditional agricultural policy rarely focuses on the spatial distribution of agricultural commodities that will be produced in a country (Freshwater, 2008). Instead, it is assumed that farmers in each location will make appropriate production decisions based upon their price and output expectations and their cost of production. Thus, policy relies upon market forces to determine the specific locations where production occurs.

Agricultural policy has spatial implications, even though they may not be explicitly identified. Policies that alter the relative prices of commodities will alter the rates of return to farms in different locations and, hence, the spatial distribution of agriculture. Although traditional agricultural policies, do not, in general, focus on where these farmers are located, they may, in practice, provide higher or lower returns to farms of different size. But, if farm size is a function of location, then there are clear implicit spatial effects.

In the core agricultural zone, agricultural policy affects the particular type of farming carried out, but the land, by definition remains in farming irrespective of how policy changes. In this case, the opportunity cost of farmland is at such a low level that no other land use can be considered, even in the countries where the majority of agricultural land falls into this category. However, this does not mean that farmland is a single contiguous block of land. There may well be pockets of settlement or abandoned land interspersed with farming, but the general use of land is agriculture. From a national policy perspective this land is always part of the “single large national farm.”

This category encompasses the bulk of agricultural land and in this situation it is the land that leads to the common policy assumption that the stock of farmland is essentially fixed in the short to medium run. If a parcel of farmland has no opportunity cost, it will remain in its current use irrespective of the level of return. Thus, any payment to land can be thought of as a pure economic rent. A consequence of no opportunity cost is the limited influence of changes in agricultural policy or changes in agricultural prices on land use. To be sure, changes in agricultural prices or policy can alter ownership of this farmland. Individuals may be

forced out of business and lose their farms, but, given the lack of opportunity cost, the land will be operated as a farm by someone else.

At the far margin, where farming becomes unprofitable, agricultural policy has its largest effect on land use. The location of this margin is determined by the returns from production, net of transport costs. The policies in place are also crucial to define the location of the boundary. These returns have to cover the opportunity costs of the labour and capital employed on the farm and generate enough of a return for the land to just cover its value in its next-best use. Often this is a low-value per hectare use, such as forestry, but it may be a nature reserve or some other socially valued use, in which case the opportunity cost is higher. The central point about the extensive margin is that changes in agricultural policy can induce a relatively large shift in the location of this margin, with farmland going out of production if prices and returns fall, or new land being brought into agriculture if prices and returns rise. This reflects the relative ease of moving land from one use to another at the extensive margin.

The final situation is the urban fringe, where the transition between agriculture and urban settlement takes place. In general there is no precise boundary between urban and agriculture. Instead, there is a relatively broad transition zone where closer, to the urban core, there are fewer farms and more urban land uses, with the relative proportions switching, as distance from the city increases. A distinguishing feature of this transition zone is that it is influenced by both agricultural and urban policy.⁴ In general, agricultural policy is the weaker of the two and its greatest influence is at the far edge of the urban fringe.

Urban land uses almost always generate higher returns for landowners than does agriculture. However, the interest in converting farmland to an alternative use typically declines with distance from the edge of a city. In an ex-urban setting we would expect to find a relatively low premium for urban land over agricultural land near the far edge of the urban fringe. Thus, changes in agricultural policy can influence the far edge of the fringe by making farming more or less competitive with alternative land uses. Closer to the edge of the city – while there may be land remaining in agriculture – it mainly reflects a holding strategy, where the landowner waits for a more attractive purchase price. In this situation traditional agricultural policy can have little influence on land use.

This follows from the fact that traditional policy affects commodity prices everywhere, so to raise prices for farms in the fringe, and increase their returns to a point where farming becomes attractive, would require raising prices for all farms. This would include the majority of farms that are found in the infra-marginal area, as well as resulting in a pushing out of the extensive margin, because new land would now be profitable in agriculture. The effect of these changes would be a major increase in output that would tend to depress prices unless some additional policy measure was introduced to remove it from the market. This suggests that agricultural policy cannot be used to influence either the size of the urban fringe or the relative mix of farm and nonfarm land uses.

Urban policy can have, however, a major influence on the size and nature of the urban fringe. If we start from a situation where urban policy does not exist, then the size of the fringe will be largely determined by a combination of the following factors:

- Preferences for rural residential living
- Ease and cost of commuting from rural residence to urban employment
- Size of the price differential between urban and agricultural land.

If these factors are at levels that make it attractive to live in a rural setting, then the fringe will have a relatively large number of non-farm land uses and will extend a considerable distance from main urban centres. Conversely, strong preferences for urban living, high transport costs and high farmland prices would all tend to reduce the size of the urban fringe.

Now, if urban policy is introduced it will generally reduce the size and density of the fringe. For example, zoning can be used to limit land use changes, development rights can be withdrawn from farmland to block

its conversion, public services such as water, sewer and emergency services can be restricted to specific areas, development impact fees can be set at a high level to reduce the return from land conversion, and taxes can be used to increase the cost of commuting by car. All of these factors will tend to limit the extent of the fringe by making it less attractive for urban land uses to leave the primary urban settlement zones.

3.2.1. Agricultural policy effects on farmland types

The OECD has developed a typology of agricultural policies that is used to assess the relative ability of policy to alter the decisions of farmers. In its work on monitoring and evaluating agricultural policy developments, each year since the mid-1980s, the OECD measures the level and composition of monetary transfers (support) associated with agricultural policies in OECD countries (and increasingly for non-OECD countries), using a standard methodology. The classification of support into different categories is based on how policies are actually implemented and not on the objectives or impacts of those policies.⁵ Table 3 displays some selected examples of classification of policies into different categories for the European Union and the United States.

Table 3. Selected examples of classification of policies in the European Union and the United States

	European Union	United States
Support based on commodity output		
Market price support	Policies which create a gap between a country's domestic and border prices (e.g. tariffs, tariff quotas). Important for several commodities	Policies which create a gap between a country's domestic and border prices (e.g. tariffs, tariff quotas). Important for sugar and dairy
Payments based on output	Tobacco premium	Storage payments; commodity loan interest subsidy
Payments based on input use		
Based on variable input use	Insurance subsidies; fuel tax rebates	Energy subsidies
Based on fixed capital formation	Investment in agricultural holdings	Environmental Quality Incentives Program (EQIP); Farm ownership loans; Grassland Reserve Program (GRP)
Based on on-farm services	Pest and disease control; extension; technical assistance	Pest and disease control; extension; technical assistance
Payments based on current A/An/R/I, production required	Per hectare payments to crops; suckler cow premium; compensatory allowances/LFAs (after 2000)	Crop insurance; Income tax concessions
Payments based on non-current A/An/R/I, production required	Not important	None
Payments based on non-current A/An/R/I, production not required	Single Farm Payments Scheme	Counter-cyclical payments; direct payments; production flexibility payments (1996 Farm Bill)
Payments based on non-commodity criteria		
Based on long-term resource retirement	Long-term set-aside; afforestation	Conservation Reserve Program; Wetland Reserve Program
Based on a specific non-commodity output	National payments for landscapes, preservation of biodiversity and amenities (terraces, stone walls, hedges, shelter belts, buffer strips, etc.)	None
Based on other non-commodity criteria	Some payments in LFAs (after 2000)	Wildlife Habitat Incentives Program

Note: A (area planted) / An (animal numbers) / R (receipts) / I (income)

Source: OECD, PSE/CSE database (2008).

The main focus of the OECD analysis used in monitoring and evaluating agricultural policies in OECD countries is the aggregate effect of these policies on prices and outputs at the national level. However, it is useful to consider how the various types of policy might affect farmers' decisions depending upon their spatial location. Table 6 provides a summary of the spatial influence of different forms of agricultural policy on three types of location – the urban fringe, the agricultural core zone and the extensive margin.

In general, the conclusion is that agricultural policy has the greatest impact on farm income and the level of output of farms in the infra-margin or agricultural core zone. As this is where the largest number of farms are to be found, it would be surprising if farms in this location were not strongly influenced by agricultural policy. However, agricultural policy has little effect on land use in this zone, because farmland in the infra-margin has virtually no opportunity cost (i.e. there is no alternative use that can generate as high a positive return to land as agriculture).

By contrast, agricultural policy at the two margins has markedly different effects on farmland conversion. In the urban fringe, the returns from agriculture are low relative to the returns from conversion, even with high levels of support. At the extensive margin, the incremental income from agricultural support can: maintain land in farming; cause land to enter agriculture if support is increased; or cause land to enter an alternative use if support is reduced.

Table 4. Ability of agricultural policy to influence farmland conversion

	Urban fringe	Agricultural zone	Far, or extensive, margin
Support based on commodity output	Generally minor, but in those places where farms produce large output, benefits are large	small effects on the total stock of farmland, but a large influence on types of output and farm welfare	Generally small because farms are small and intensity is low
Payments based on input use	Generally minor, but in those places where farms are large, benefits are large	Small effects on the total stock of farmland, but a large influence on types of output and farm welfare	Generally small because farms are small and intensity is low, so input use is low
Payments based on current A/AN/R/I commodity, production required	Generally minor, but in those places where farms produce large output, benefits may be large	Small effects on the total stock of farmland, but a large influence on types of output and farm welfare	Generally small because farms are small and intensity is low, but if payments are designed to promote low intensity farming then the effects can be large
Payments based on non-current A/An/R/I commodity production required	For the majority of farms that historically had low A/AN/I/R benefits are small, but can be large in the case of large farms	Small effects on the total stock of farmland, but a large influence on types of output and farm welfare	Generally small because farms are small and intensity is low
Payments based on non-current A/An/R/I commodity production not required	Generally small, but if the landowner expects continued increases in land values, the payments provide an incentive to delay conversion	Small effects on the total stock of farmland, but a large influence on types of output and farm welfare	Generally small because farms are small and intensity is low
Payments based on non-commodity criteria	Can be large if criteria tend to reward farms with large amenity value	Generally small, because main focus of farm is to produce commodities	Can be large if criteria tend to reward farms with large amenity value

Note: For detailed information, see OECD (2007a and OECD (2008f).

A (area planted) / An (animal numbers) / R (receipts) / I (income)

Support based on commodity output

This form of support has historically been one of the main forms of agricultural policy in OECD countries (e.g. market price support and payments based on output). It provides payments to farmers based on the level of output. As a result, those farms with higher levels of output receive higher total payments. There is a general recognition that these payments provide an incentive for farms to increase efficiency by specialising in a smaller number of commodities. They are able to do this because support reduces the risk

associated with production and there is less need for diversification (OECD, 1998). A parallel effect of the support is an increase in farm size. Specialisation provides an opportunity to increase output and this is most easily accomplished by increasing the amount and intensity of land operated. Available evidence suggests that, while such policies may economise on administration and transaction costs, they fail to promote improvements in land management practices, such as hedge management or buffer strips (Hodge, 2008).

When these effects are put into a spatial context, the following conclusions can be drawn. The largest effect of output-based support is found in the agricultural core zone. Here, farmland quality is generally good and land is still relatively cheap (because it can command only a quality differential, or Ricardian rent). Higher levels of support have the effect of increasing the relative share of the supported commodities produced on this type of farmland. Smaller farms in the agricultural core zone benefit less from these payments than large farms because, by definition, they have a lower output and less ability to capture the scale economies that reduce unit costs of production. While farms in the agricultural core zone will receive the bulk of the benefit from this support it does not alter the stock of farmland because it does not alter opportunity costs.

One possible effect of this type of support is to encourage the intensity of production. If farmers are able to increase output per unit of land and if this increase is larger on larger farms (i.e. returns to scale), then a greater share of production may occur in the agricultural core zone. That is, support may lead to smaller amounts of farmland in both the urban fringe and the far margin.

At the far margin, the effect of high levels of this type of support is to preserve production on land that is close to being unprofitable in agriculture. Land at the far margin typically suffers from two disadvantages. The first is higher transportation costs and the second is lower production capacity. The first deficiency results in lower realised prices for output, once shipping has been paid for. The second deficiency leads to lower yields and/or higher unit costs of production. The cumulative effect is lower margins per hectare, and hence low returns for land and labour. If support is increased, there may be some expansion of land in production in the medium term, as land that was previously unprofitable in agriculture is converted to farmland, and vice versa.

The magnitude of the conversion process will vary by farm size at the far margin. Where farms are small the effect is likely to be small, given the relatively modest amount of money that flows to any particular farm. Each farm receives limited support because the farms in these areas are typically smaller and less productive than in the agricultural core zone. However, in some OECD countries farms at the far margin are large, and in these cases the effect of policy will also be large, with significant conversion implications.

In the urban fringe, output-based farm payments typically provide only a modest incentive to alter land-use decisions. Farms in this zone tend to be relatively small and the households operating them are likely to generate most of their income from non-farm employment. Further, farmland in this zone has high opportunity costs, associated with conversion to urban use. The combination of a low level of commodity output, a small share of household income coming from farming and high opportunity costs for farmland, suggests that output-based payments provide a limited incentive to maintain land in farming. The main exception to this would be those commodities that are highly valuable and can be produced on a small land base. In this instance it may be possible to maintain land in farming, but, by definition, only a small amount of land will be preserved.

Environmental effects of land-use change associated with reduction in output-related support

There is general consensus that producers would respond to reductions in output-related support by reducing their supply of commodity outputs. This can be achieved through: lowering the demand for variable inputs, such as mechanical and chemical-inputs; taking land out of agricultural production; or through using land less intensively.

Reduction in output-related support could strengthen the incentive for farmers to reduce the intensity of production and to facilitate reallocation of land to non-agricultural purposes such as forestry, leisure or nature

preservation. The choice of whether to continue farming or to use land for which farming under market conditions has become unattractive for non-agricultural uses will depend on local circumstances. Moreover, farmland adjustment may be hindered by various structural and institutional impediments, such as the inability of the farm operator to exit farming – or by laws and regulations regarding the use, zoning, transfer, or inheritance.

Although it is difficult to postulate what the precise outcome would be, the expectation of the farmland-use impacts of agricultural policy reform is for an accelerated restructuring of agriculture. There is a likelihood – except where land has alternative more profitable uses – that agricultural land will remain in production, becoming amalgamated into larger farms. However, marginal land, often found in remote rural areas, would be under strong pressure to become derelict, particularly where the land had been used to produce highly subsidised products and was of no, or only limited, alternative use. In some remote rural regions, traditional systems of farming which have created particular landscapes, could be threatened. In the more economically integrated rural areas, agricultural production on marginal land could be discontinued and more land would thus become available for non-agricultural purposes, including outdoor recreation.

Removal of output-related support is expected to lead to a decline in the value of the assets of in the sector in countries and regions with relatively high assistance, at least in the short run. A fall in the relative price of land implies that relatively more land could be used in the production process, but substitution possibilities among factors of production could differ across regions and countries. In some cases, agricultural policy reform may result in the substitution of land for other inputs, and farmers may regard expansion of area as a desirable adjustment. Land could remain in agricultural production, but labour and human capital might leave the sector, triggering structural change involving farm amalgamations (the technology effect). Larger structures would permit new technological and farming-practice options for exploiting the land that were not previously feasible.

In other cases, reforms may result in the removal of land, as well as labour, from production (resource effect) and lead to downward pressure on land prices. Price effects will also differ according to the possibility of alternative uses for farmland, and the likelihood of a different mix of farm enterprises (which is limited in some rural areas and significant in others).

Table 7 summarises the different scenarios involving the withdrawal of agricultural land and/or labour from agriculture following the removal of output-related agricultural support. For countries/regions whose agricultural sectors are already characterised by large-scale structures and low labour-land ratios, and where unused land can revert easily to an ecologically sound, pre-agricultural state, both scenarios in the bottom line may seem inevitable and desirable (Burrell, 2001). However, in countries/regions whose current provision of agricultural land-based environmental amenities is based on smaller-scale, more labour-intensive agriculture, and where high population density creates heavy demand for them from agriculture, these developments would be viewed with more concern.

Payments based on input use

These payments reduce the cost of production for the commodities that use these inputs. Lower unit costs lead to higher levels of output and higher profits for farms receiving this benefit. The larger the support provided and the more important the input is in the total cost of production, the larger the effect on output. To the extent that the input is either a substitute for or a complement to farmland there may be either an increase in the amount of farmland used per unit of production, or a decrease. Thus, there is a degree of ambiguity in the impact of input subsidies on farmland. However, if the support triggers a large increase in production, a greater amount of farmland may be allocated to commodities that use the input, even if farmland is a substitute for other inputs.

In the agricultural core zone, the influence of input support will be significant, supposing the input is commonly used in various types of agriculture. To the extent that larger farms use more of the input, they will gain more of the benefit. If this increases the competitive position of large farms, an increase in average

farm size could result. Once again, while the economic conditions of some farmers may decline and others improve as a result of the subsidy, and while a change in the mix of commodities produced could take place, there should be no material change in the amount of farmland in the agricultural zone.

Table 5 Summary of impacts on environmental services of changes in agricultural land use following a fall in output-related support

Labour	Land	
	Remains	Withdrawn
Remains	Farm incomes fall, rural poverty increases. Deterioration in farming practices possible Consequences for environmental services from agriculture difficult to predict	Not realistic
Withdrawn	Farm amalgamation, restructuring → new technology Greatest threat to landscape preservation, biodiversity and rural employment	Land abandonment or conversion, out-migration. Reduction in the total provision of landscape, biodiversity; loss of flood and disaster prevention, food security and rural employment (where relevant)

Source: Adapted from Burrell (2001).

Similar to the output-based support case, the effects of an input-based support on individual farm welfare should be modest at both margins, for small farms, when compared to the effect in the agricultural core zone. Similar results should also prevail for farmland conversion effects. At the urban fringe, input subsidies are likely to have a very limited effect on the decision to convert farmland to alternative uses. At the far margin, changes in the level of input subsidy may alter the location of the boundary between agriculture and lower-value uses, if the change in input subsidies is significant. This is most likely to be the case for those countries where farms at the far margin are large in size.

It should be pointed out that the payments based on the inputs-use category of support to producers also includes programmes which provide payments on condition that farmers respect certain production practices considered environmentally or animal-welfare friendly, or which address food safety or other societal concerns.⁶ Agri-environmental programmes designed to prevent or decelerate the conversion of farmland to other uses, such as urban development, are classified under this category. The *Farm and Ranchland Protection Programme* (FRPP) in the United States is one such example. The FRPP provides funds to state and local governments or non-profit groups to help purchase development rights that keep productive farmland in agricultural use. Funds can be used to purchase conservation easements or to purchase easements to protect historical resources.

Payments based on current area, animal units, revenue or income with commodity production required

These payments provide revenue to farms on the basis of some current measure of farm size. There are two types of such schemes. The first provides a flat rate per unit of measure (e.g. a farm may receive a fixed payment per hectare planted to a given crop). In the case of revenue and income payments, there may be a cap on payments or a trigger value for a decline in income or revenue. In each case, though, it is the current level of the measure that triggers the level of payment. The other type of scheme provides higher values for initial levels of the measure, and reduced support as hectares, animal units, revenue or income rise. This type of scheme aims to protect small farms. The second version is most commonly used in LFAs as a strategy to slow the rate of farm abandonment at the extensive margin.

In the agricultural core zone, the effects of this payment stream are the same as in the previous cases. If payments are constant per unit of measure, then larger farms receive larger benefits, and these benefits

may be used to enhance their competitive position within the zone. The same conclusion also applies to the impact of these policies on the stock of farmland, with some effect on the mix of commodities produced, but little effect on the total quantity of farmland. In the urban fringe, these payments would typically have little effect because they offer most farms small benefits relative to the returns from conversion. In a limited number of cases, if payment levels are high and can be generated on a small land base, farms may have an incentive to remain in production for a longer period of time than would otherwise be the case.

It is at the far margin that the version of the payment scheme in place has a major bearing on the degree of impact, particularly for small farms. If flat-rate payments are in place, then there will not be a significant effect because the amount of money transferred is likely to be too low to alter the economic condition of farms facing low revenue and high costs.

However, if the payment scheme is structured so that farms with low values of the performance measure receive a high level of support and its level is reduced for higher values, the effect on farms in the far margin can be substantial. Where farms in this spatial zone tend to be small and have limited opportunity to increase output, a scheme that front-loads support on initial quantities of hectares, animal units, revenue or income, adds a large increment to income.

For farms with no potential to achieve higher levels of the specific performance measure, this approach maximises benefits. Consequently, a higher rate of farm survival and even an expansion of agriculture onto marginal land with high levels of support could be expected.

Payments based on non-current area, animal units, revenue or income with commodity production required

This form of support provides lump-sum payments based on some historical condition, with current production of any commodity required. This type of support is used by only a few OECD countries (e.g. Norway, Canada and Mexico) and, on average, accounted for less than 1% of total support to farmers in the OECD area in 2005-07. Its impacts are similar to those described in the previous case.

Payments based on non-current area, animal units, revenue or income with no commodity production required

These payments provide the same sort of benefits as described in the two previous cases, but do not require current production. Essentially, this form of support provides lump sum benefits based on some historical condition, which effectively decouples support from production decisions. This type of support is particularly important in the European Union and the United States, where it makes up around 25% of support to producers. It is now also important in Switzerland, Mexico, Canada, and Turkey.

Typically, these programmes require the farmer to maintain land in a condition suitable for agriculture, even if no production takes place. Thus, it is unlikely that a farmer would be able to convert land to an alternative use and also maintain programme support. Unlike the previous case, there is generally only one version of these programmes, as there is little interest in providing high rates of support on the initial levels of the measure used to determine payments. This means that payments tend to be a constant amount per unit of hectares, animal unit, revenue or income up to a specified maximum. However, payments can be provided at fixed rates (i.e. the SFP in the European Union) or at variable rates, where the level of payment is triggered by a change in price, yield, net revenue or income, or change in production cost (e.g. the Countercyclical payments of the 2002 Farm Bill in the United States).

In the agricultural core zone, the effect of this type of support will mainly be seen in a shift in the mix of outputs as farmers adapt to market signals given by changes in relative prices. Lump-sum payments clearly provide more resources to the enterprise, and farmers receiving large payments may choose to use them to support expansion of the farm through land acquisition or capital improvements. This may affect the distribution of land holdings, but it should not alter the total stock of farmland.

In the urban fringe, the main effect of these payments may be an incentive to delay development. Owners of farmland would no longer incur the expense of production, and the combination of current income from subsidies and potentially higher land values in the future may lead to a slower pace of land conversion in the short to medium term. However, if the farmland owner has a short planning horizon, it is unlikely that payments will block conversion when the opportunity to realise large capital gains from conversion is available.

At the far margin, the effects of lump-sum payments are more nuanced. Payments may be sufficient to keep land in farming, in the sense that it could eventually be brought back into production. However, this level of maintenance may not be enough to provide the full amount of environmental services that are associated with agriculture. For the farm owner, the net return from payments leaving land idle may be roughly the same as exceed the net return from production with lump-sum payments. In this case, land will be maintained in almost an intermediate status between out-of – and in-production. Alternatively, the payments may be adequate to keep land in production.

The study on the effects of the 2003 CAP reform in England (discussed in the next section) suggests that, due to limited opportunities for diversification, policy reform will tend to shift the relative spatial intensity of farming by concentrating production on the best and most accessible land, as defined at local level, and/or induce agricultural land to leave agricultural management.

Payments based on non-commodity criteria

These payments to farmers refer to transfers provided for agri-environmental reasons or for the production of visual and open space amenities of value to society. Although these payments are becoming more common as the broader functions of agriculture are explicitly recognised in the policy process across OECD countries, they still account for only 2% of total support to producers. They are most important in the United States, followed by Switzerland (7% and 3% of the total support to producers in 2005-07, respectively). In terms of the level of payments, the Conservation Reserve Program (CRP) in the United States is the largest single measure in this category.

Two main types can be distinguished: those payments which entail transfers for the long-term retirement of factors of productions from commodity production (e.g. the CRP States and in the EU the long-term set-aside); and those which provide transfers for the use of farm resources to produce environmental services, which are not required by regulations (e.g. payments for hedges and payments for floral fallow in Switzerland).

Long-term diversion programmes, although achieving rural development objectives is not their specific aim, can affect rural communities in a variety of ways. For example, by improving the rural landscape and fostering a cleaner environment, they can contribute to the quality of rural life; be of benefit to outdoor activities and recreation in many communities; and act as a significant stimulus to rural economies. Moreover, by increasing the revenue of farm households, they can boost consumer demand, including recreational spending.

On the other hand, retiring productive farmland can have the effect of reducing the demand for farm inputs and agricultural marketing services. Thus, if alternative economic activities (such as hunting, fishing and other forms of outdoor recreation) do not develop in tandem with the withdrawal of farmland from agricultural production, rural communities with high proportions of farmland enrolled in such programmes can be adversely affected. Decreased farming activity could also result in decreased demand for non-farm goods – and the consequential job losses could contribute to out-migration from such areas. Pronounced shifts in a community's economy can also affect its desirability as a place to live and work, and, ultimately, its population level.⁷

The intent of the payments to provide environmental services is often to preserve farmland. These payments are of particular importance in urban regions where open space is scarce. Thus, if society wishes to maintain

the production of amenity outputs, it may be prepared to provide additional income to farmers to reduce the incentive to sell off farmland for other uses. Of course, there is the possibility that some other use will also provide similar amenities (e.g. a golf course). However, most other uses are not likely to provide the same level of visual amenities.

By increasing farm income, the opportunity cost of keeping land in farming decreases. Whether non-commodity payments are effective in maintaining farmland depends upon the size of the increase in income and the capital gain from selling the land. There is likely to be a positive relationship between the value of open space and the alternative use-value of land, as congestion should increase both, albeit not at the same rate.

Payments for environmental services can have very different impacts depending on the type of farm and its location in space. In some instances non-commodity payments may reinforce production decisions – for example, a visual amenity payment associated with an extensive grass-fed cattle enterprise. In other cases they may be ineffective. For example, payments to maintain hedgerows are generally ineffective in cereal crop areas, where the benefits from field consolidation that allows the use of larger machinery are high.

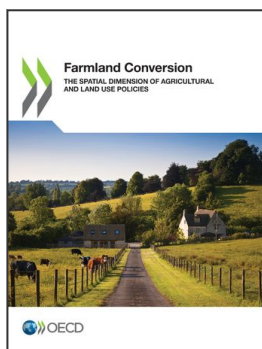
In the agricultural core zone, non-commodity payments may influence farmers to alter production decisions for some portion of their land. This could include putting low-productivity fields into conservation uses or not cultivating wet areas. However, in times of low commodity prices, with or without support, these lands are likely not to be used, and, in times of high commodity prices, farmers seek to remove this land from conservation uses and bring it into production. This could suggest that in the agricultural core zone, non-commodity payments act as lump sum transfers in periods when commodity prices are low, but may, to a limited extent, influence the supply of farmland when commodity prices are high, if the policy effectively prevents the farmer from using the land.

Many of the environmental services of agriculture are local public goods. This means their value is determined within a relatively small geographic area by local supply and local demand. In the agricultural core zone, the supply of local non-commodities is typically high relative to demand, which results in a relatively low implicit or shadow price. This mainly reflects a large stock of farmland and a relatively small local population. By contrast, the demand for commodities is established at the international level, which leads to commodity production generating a higher value than non-commodity production. As a result, the use of farmland in the agricultural core zone is largely driven by commodity policy. If non-commodity payments are to be used for farmland preservation they will have to be targeted to those farms most subject to an alternative use.

In the urban fringe, environmental services from agriculture may be more valuable to society than the actual commodities produced. However, it is rare that the level of payments for non-commodity output is high enough to overcome the opportunity cost of farmland. In many cases the farmer receives very limited direct remuneration for environmental services, in comparison with the level of support which is based on commodity criteria.

In this zone, there are greater off-farm employment opportunities and incomes of farm households are usually more diversified than in other zones (Heimlich and Anderson, 2001).⁸ Many of these farm households derive considerable non-pecuniary benefit from their farms, so its non-commodity value is an important component for operating the enterprise. If non-commodity payments reinforce the life-style benefits already received by such pluriactive farmers, then they will be more likely to continue in farming.

The level of environmental services from agriculture is also typically high at the far margin. Farms at this margin are often found in areas of high visual amenity and, whilst distant from major urban centres, they may attract large numbers of tourists or be of value for wildlife preservation. By their nature, farms in this zone provide a relatively small share of national agricultural production, which suggests that policy to maintain farming in the far margin zone will be more easily justified and implemented through support for environmental services targeted to such areas.



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