



**Agriculture, Trade
and the
Environment:**

The Dairy Sector

SUMMARY AND CONCLUSIONS

Overview

Milk production in OECD countries raises a number of policy challenges when viewed in terms of the economic, environmental and social dimensions of sustainable agriculture. While per capita milk consumption is relatively stable in most OECD countries, consumption is expected to increase strongly in non-OECD countries. OECD countries account for over 80% of world exports. The high level of support provided to milk production in most OECD countries suggests that significant adjustments may occur within OECD countries as a result of further trade liberalisation. At the same time, the environmental consequences of dairy farming are of increasing public concern.

Within this broad context, this study focuses primarily on the linkages between milk production, trade and the environment. In particular, two linkages have been explored: the impact of trade liberalisation on milk production and the environment; and the impact on competitiveness of policies introduced to reduce the harmful environmental effects of milk production. Animal welfare requirements can also have an impact on dairy farming, but a review of these policies is beyond the scope of this study. Eight main conclusions emerge from this study and are discussed in more detail in the following sections.

- In regions with a high concentration of milk production there is a larger risk of water pollution, mainly in certain regions of Europe and Japan, although the risk is increasing in Australia, Korea and New Zealand. There is evidence that some environmental pressures are becoming more “decoupled” from milk production in some countries. The impact on ecosystem biodiversity and landscape varies considerably.
- Although dairy cow numbers have fallen in some countries, there has been a significant increase in the number of cows per farm in all countries and evidence of greater intensity of production. Regional changes have sometimes led to a greater concentration of production. These potentially raise the environmental risks

associated with milk production. Technologies and management practices have been developed that reduce the risks, all requiring an investment in human-capital if environmental performance is to be improved.

- A review of comparative studies that analyse the environmental effects of both organic and conventional dairy farms reveals that organic farms perform better in terms of soil and water quality, and species biodiversity, but can perform worse in terms of methane emissions.
- The level of support for milk is high relative to other agricultural commodities, varies greatly between countries, and is mainly provided through the most distorting forms. Although high support levels are not a necessary condition for environmental pressure, those countries with the highest levels of milk support are also those with the greatest risk of nitrogen water pollution from dairy farming. However, linking changes in support (level or composition) with changes in environmental risk is much more difficult to substantiate.
- Further trade liberalisation will raise the risk of water pollution from dairy farming in Australia, New Zealand and in some central European countries where production is anticipated to expand. In others, particularly the high support countries, the risk is likely to reduce. The increase in greenhouse gas (GHG) emissions from dairy cows may become an important constraint on New Zealand meeting its Kyoto commitments.
- Environmental policies most relevant to milk production focus on water pollution and ammonia, and more recently on biodiversity and GHG emissions. Environmental policy measures are predominately regulatory, which are increasing in severity and complexity, while payments for grassland management are provided in many European countries. Research and advisory services have also formed a crucial part of most government's policy response.
- A range of policy instruments have been used to encourage organic farming, including organic dairy farming. Particularly in Europe, organic milk production is supported through area payments to offset income losses. Problems of over-supply have

emerged in some markets, leading to the adoption of a more co-ordinated approach to the policy mix. Organic regulations and payments have been influencing patterns of trade in the organic milk sector.

- Manure management regulations vary between countries reflecting to some extent variations in dairy production systems. Consequently, the cost of manure management regulations on a per cow basis varies by up to 40% between countries. But the cost is not significant in terms of overall production costs, and therefore is unlikely to be having an impact on trade competitiveness. Manure management costs per cow decrease with farm size, and have been offset in many countries with payments to assist in storing, transporting or applying manure.

Dairy farming and the environment

The main environmental issues associated with milk production concern water and air pollution, and biodiversity. Water pollution arises from the inappropriate disposal of manure and the application of fertilisers for forage production. Nutrients, principally nitrogen and phosphorous, are a significant component of pollution from agriculture to surface water, groundwater and marine waters, damaging ecosystems through eutrophication and degrading their recreational use. Water bodies can also be affected by organic effluents and pathogens contained in manure. Water pollution is mainly a local or regional concern, although cross-border pollution can occur.

It is difficult to quantify the specific contribution of dairy farming to water pollution but data contained in the OECD's soil nitrogen balance indicator – an indirect pressure indicator – reveals the potential risks. The OECD balance is only calculated at the national level so regional variations in nitrogen balances, which can be significant, are derived from other information sources. The actual level of pollution depends on factors such as the soil type, climate and management practices.

Countries can be grouped into four distinct groups according to the *level* of risk as measured by the country soil nitrogen balance and the importance of dairy cow manure as a source of nitrogen. The risk is highest in Belgium, the Czech Republic, Denmark, Germany, Ireland, Japan, the Netherlands, Norway, Portugal, Switzerland and the United Kingdom. In Australia, Canada, Italy, New Zealand, Spain and the United States the risk of nitrogen pollution from dairy cow manure is low at the national level, although studies indicate that the risk at the regional level can be just as large as in the high-risk countries. In

Austria, Poland, Portugal and Sweden, the overall nutrient balance is low but the contribution of dairy cows to total nitrogen input is greater than 10%, while in Korea the overall nutrient balance is high but manure from dairy cows contributes less than 10%.

Changes in the nitrogen balance indicator between 1985-87 and 1995-97 reveal a number of different *trends* in the potential risk of water pollution from dairy farming. The risk has increased in Australia, Korea and New Zealand, with dairy cow manure nitrogen production increasing in response to higher levels of production. For all other countries, the risk has decreased with a fall in the nitrogen balance and in dairy cow nitrogen manure production, although dairy farming remains a significant threat in many.

Dairy farms are also a source of greenhouse gas (GHG) emissions, mainly from enteric fermentation (methane) and manure management (methane and nitrous oxide). The absolute level of GHG emissions from dairy farms in carbon dioxide equivalent terms is highest in the United States, France and Germany, reflecting both greater cow numbers and the relatively higher emission rates per cow. Only in New Zealand do dairy farms contribute significantly to the national level, contributing over 20% of total GHG emissions. In all other countries dairy cows contribute less than 6% of total emissions. Further, over the period 1990-92 to 1999-2001, total GHG emissions from dairy cows decreased in all countries except Australia and New Zealand.

In some countries, ammonia emissions from livestock housing facilities and from poorly managed storage and spreading of manure are of serious local concern. Livestock accounts for around 80% of total ammonia emissions in the OECD, with the importance of dairy cows as a source of emissions following a similar pattern to its contribution to livestock nitrogen manure production. The issue is particularly serious in regions of high dairy cow concentration in parts of northern Europe and Asia.

In most countries dairy nitrogen manure output and GHG emissions are becoming more “decoupled” from production in the sense that the output of these environmental risk indicators per unit of milk has fallen over time. While some care is required in interpreting these trends, improvements in productivity and the adoption of more environmentally friendly technologies and management techniques would suggest that such changes could be expected to occur.

Biodiversity issues relating to dairy farming include the genetic erosion of dairy breeds and the impact on ecosystem diversity. In terms of genetic diversity, there are globally 1 224 recorded breeds of cattle, of which 299 are at

risk of being lost. While OECD countries account for 191 of those at risk and the Holstein breed dominates milk production in many countries, the risk of further genetic loss does not appear to be a major issue due to the establishment of conservation programmes for most native breeds in OECD countries. The genetic conservation situation in non-OECD countries is not as positive.

The impact on ecosystem biodiversity is diverse. In general, a larger range of biodiversity, in terms of plant, insect and bird species, is found on more extensive dairy production systems. These can be lost when land is more intensively managed, resulting in “green deserts” of biodiversity, although in some areas these more intensively managed lands have become important for migrating wildfowl. They can also be lost when dairy production is abandoned. Whether this is an issue depends on the relative value of the biodiversity lost and those replacing them. This is a particularly important concern for mountain dairy systems.

Milk production also contributes to landscape when it is associated with farms producing amenities such as hedgerows, farm buildings and even through cows grazing on pasture. In some countries the open landscape of intensive production is desired, in others the existence of extensive systems with hedgerows and hay meadows is appreciated.

Developments in the structure and practice of dairy farming

To meet growing consumer demand, particularly in developing countries, world milk production increased by 20% between 1982 and 2001. In most OECD countries milk production has either remained stable or fallen slightly, reflecting in many cases the existence of output quotas. Growth has been the most rapid in Australia and New Zealand, moderate in Korea, Mexico and Portugal, and steady in the United States. Trade has grown at a faster rate than production, but less than 8% of milk is traded internationally in some form or other (14% if intra-EU trade is included).

Despite differences in production growth, there have been some similar structural changes in the dairy sector. In all OECD countries, the scale of production has increased, shown by an increase in the average number of animals kept per holding, even in countries when overall cow numbers have decreased. This has led to an increase in the number of larger, more capital-intensive operations. Milk production has also become more intensive, as measured by the volume of milk produced per cow and per hectare of forage area. There have also been some changes in the regional pattern of production. The change has been more noticeable in countries that do not operate production quotas. Major factors driving these structural changes include capital

intensive technologies (*e.g.* technologically advanced milking parlours), management intensive technologies (*e.g.* record keeping and rotational grazing) and attempts to reduce on-farm production costs.

These structural changes potentially raise the environmental risks associated with milk production. A greater number of animals per farm results in a larger volume of manure that must be disposed of. If there is less land available per cow, the quantity of nutrients supplied to the soil will increase, with potential harm to water quality. In some cases, changes in the regional distribution of production may be reducing the environmental pressure from dairy farming as production moves out of more marginal production areas (*e.g.* following deregulation in Australia). In others, the risk may be increasing as the average herd size in the expanding regions can be significantly higher than in traditional regions (*e.g.* in New Zealand and the United States).

The environmental performance of dairy farming is also being affected by technological developments (*e.g.* in regard to housing (holding) facilities, manure storage and treatment systems including wetlands, and alternative energy production units) and management practices (*e.g.* altering feed composition and manure spreading practices). Some of the developments are not scale-neutral (*e.g.* methane converters), nor lead to increases in production (*e.g.* fencing off native bush or waterways). Consequently, operations of a larger-scale have a greater potential to introduce such technologies because the cost can be spread over a larger volume of production. Other changes, such as in feed composition can provide win-win situations for all farmers, lowering both production costs and the environmental risks. In all cases, along with production technologies, developments have led to a significant increase in the human-capital requirement of milk production.

Environmental impacts of organic dairy systems

At present there is little empirical work to assess the environmental impact of different dairy systems and scales of production. Results from the few comparative studies indicate that larger, more intensive operations appear to have a higher risk of environmental damage. This study has examined in particular differences between organic and conventional dairy production systems. Although there are wide variations with the spectrum of organic and conventional production, both within and between countries, a number of key findings emerge.

Organic dairy farms generally display a greater balance between the level of inputs, such as nutrients, pesticides and energy, and what is required for production. Consequently, organic dairy farms are found to perform better in

relation to agri-environmental indicators of soil quality (*e.g.* soil organic matter, biological activity and soil structure), water quality (*e.g.* nitrate, phosphate and pesticide leaching), and species biodiversity. On the other hand, organic systems do tend to have a higher level of methane emissions. For other indicators, either no clear difference between the systems has been found or yet studied. A final assessment of the comparative environmental performance of organic dairy farming, and organic farming in general, should consider its broad impact on a wide range of variables rather than its impact on any specific indicator. Appropriate farm management is crucial in ensuring that the potential benefits actually occur, particularly in relation to nutrient leaching, carbon dioxide emissions, and animal health concerns. Another consistent result was that while the environmental pressure from organic farming was less on a per hectare basis, the difference between systems reduced substantially when measured on a per unit of output basis.

Agricultural policies supporting dairy production

Milk production is very highly supported in most OECD countries but there are exceptions. OECD countries can be grouped in terms of their support levels for milk. The first group (Iceland, Japan, Norway and Switzerland) has relatively high tariffs and consequently higher overall levels of support, averaging over 70% of gross farm receipts. A second group have slightly lower tariffs, with support in the range of 40-55%. These include Canada, the European Union, Hungary, Korea and the United States. These countries also use export subsidies, along with Norway and Switzerland. At the other extreme, support for dairy farmers in New Zealand is about 1%. In countries where support is provided to milk producers, policy measures that are more output- (*e.g.* measures such as tariffs and export subsidies) or input-linked make up a significant proportion. In comparison to other commodities, support levels for milk are generally higher even in countries where commodity support is low.

This pattern of support for milk, in terms of the level and composition, influences production patterns and consequently changes the pressure on the environment. While it is difficult to separate out the effects of support policy, the high level of output- and input-linked support for milk in many countries has encouraged greater volumes of more intensive production and this is likely to have exerted greater pressure on the environment than if producers were responding to market signals, all other things being equal. The countries where the potential risk of nitrogen water pollution is the highest are also those with the highest level of support to milk producers *i.e.* northern Europe and Japan. However, high support levels are not the only factor causing environmental pressure. Harmful environmental impacts of milk production are also evident in

countries with low levels of support, particularly where production is becoming more intensive.

Milk production quotas are an important component of dairy policy in many countries that provide high support to dairy farmers. By controlling the expansion of milk production generated by high support prices they have limited the environmental impact that would have otherwise occurred. But they have effectively “locked-in” the regional distribution of production so that changes in geographic patterns of production are less obvious in quota countries than those that do not have them. The environmental impact of this is not obvious. While they have contributed to the maintenance of dairy farms in marginal areas considered to be of high environmental value, it seems very unlikely that the geographic distribution of dairy farms at the time quotas were imposed was optimal from an environmental point of view, particularly since quotas were imposed for production and not environmental related reasons. Quotas may also have contributed to increasing the intensity of production on some farms, by providing greater incentives to increase production per cow rather than to expand the number of cows and area involved in milk production. However, increases in intensity of production have also been driven by other policy changes, such as the reform of the European Union cereal market.

There have been moves to reduce output- and input-linked support in most countries, although the rate of decrease varies considerably. In a few, such as the Czech Republic and Switzerland, reductions have been compensated by increases in payments based on animal numbers or historical entitlements. It is difficult to connect changes in support for milk with changes in environmental pressure. A number of other variables can contribute including changes in support provided to other commodities, agri-environmental measures, and market induced changes. Changes in environmental impact need to be analysed on a case-by-case basis, and appear to vary according to the environmental concern. However, it seems clear that for those negative environmental impacts that are directly related to production, such as air and water pollution, these risks have decreased in countries where production has fallen. To the extent to which support changes have driven the fall in production, policy reform have contributed to an improved environmental performance from dairy production. In some countries, reform has resulted in an expansion of milk production, either in the country as a whole or in certain regions, and this has raised some environmental concerns.

The impact of further agricultural trade liberalisation on nitrogen manure output and greenhouse gas emissions from the dairy sector

While the WTO Uruguay Round Agreement on Agriculture (URAA) made some progress in reducing and limiting the import barriers and export subsidies provided to milk producers in OECD countries, significant trade impacting policies remain in place. Consequently, when the current WTO Doha Development round of negotiations is finally concluded, these should be further reduced. The present study considered the impact of two general agricultural trade liberalisation scenarios on two agri-environmental indicators relevant to the dairy sector: nitrogen manure output and the greenhouse gas emissions from cows. The first scenario considered reductions very similar to that negotiated under the URAA and the second, the elimination of export subsidies and trade distorting support, and substantial tariff cuts.

Under both further trade liberalisation scenarios, the global level of milk production increases by less than 1%. What is more significant is the projected change in the regional distribution of production. Milk output is estimated to fall by around 20% in the most highly supported countries, Iceland, Japan, Norway and Switzerland, and increase by around 20% in New Zealand and Australia, with some increase also likely in central European countries. As the indicators under review are closely related to production, the study predicts increases in dairy nitrogen manure output and GHG emissions in Australia and New Zealand, and decreases in the other OECD countries. Overall, there is a very small net increase in global emissions.

Production is expected to change little in Korea and the United States. As a consequence of changing production patterns, global trade in dairy products will rise, by 14% in the most liberating scenario. The increase in GHG emissions associated with expanded dairy product trade is insignificant in comparison with current levels of direct emissions from milk production.

An important qualifier to these results concerns the assumption regarding the value of the producer rents associated with milk production quotas. In both scenarios there is no change in production in the European Union and Canada. This is because the fall in milk prices is not enough to lower production as quotas remain binding *i.e.* the quota rents still exist despite further liberalisation.

Policy measures addressing environmental issues in the dairy sector

Reducing the harmful environmental impacts of milk production, particularly in relation to water pollution and ammonia emissions, is a major

objective of agri-environmental policy measures affecting the dairy sector. In recent years, measures have been introduced in some countries to deal with concerns such as the impact of dairy on biodiversity and to a lesser extent GHG emissions. There are relatively few measures that specifically relate to dairy, with milk producers affected by wider policies aimed at the livestock sector or the agricultural sector as a whole. Some policy measures, such as those relating to ammonia or GHG emissions have been introduced in response to international environmental agreements and this trend is likely to continue. Others, such as those relating to water quality and biodiversity have been largely motivated by local or regional concerns, and are very often designed and implemented at that level.

In terms of policy measures, the initial response by most governments to address environmental issues in the dairy sector is to develop research programmes and provide on-farm technical assistance and extension services to farmers. The aim being to try and achieve the environmental result at least cost to each individual farmer. This has often been supported or followed quickly by regulations. Such policy measures remain an integral part of the overall environmental strategy in most countries. For example, this process of first undertaking research and advice is being carried out in relation to GHG emissions from dairy cows in countries such as Australia and New Zealand where this is an emerging issue.

There is an array of regulations impacting on dairy farming practice in all OECD countries. Regulations were first introduced to limit point source pollution, for example by prohibiting or limiting the direct discharge of dairy cow manure into waterways. Regulations have been steadily introduced to limit non-point source pollution, for example by regulating the quantity of manure that can be produced, the quantity that can be spread and the way in which it is spread. Over time there has been a clear trend for the number of regulations to be increasing and to be imposing more stringent conditions on dairy farmers. A greater number of measures and generally of a more restrictive nature have been applied to producers in northern European countries. Only in Norway and Switzerland are environmental cross-compliance requirements imposed as a condition on the receipt of budgetary support payments to milk producers.

In many countries, payments have been provided to assist dairy farmers in meeting the costs imposed by new regulations, particularly those associated with manure management such as the storage, transport and application of manure. Such payments have mainly taken the form of grants, and interest or tax concessions, and have generally been made available for a limited time only following the introduction of the regulation. Support has also been provided to encourage alternative uses for dairy manure, such as an energy source, in both

on-farm and off-farm operations. Payments to support the use of breeds at risk, offset the cost of input restrictions and, most importantly, the management of grasslands are also provided. While dairy farmers are subject to general pesticide and fertiliser taxes in a limited number of countries/states, taxes specifically relating to livestock pollution have only been used in Belgium, Denmark, France and the Netherlands. These taxes are levied on the volume of nutrients above a certain level measured at the total farm level.

Organic dairy production – policy measures and market developments

Within the range of agri-environmental policy measures potentially impacting on dairy producers, a large number have been introduced to encourage and support the development of organic farming. All OECD countries have either in place, or are in the process of finalising, regulations defining national organic standards, including those for organic milk and dairy products. In many countries, the inspection and certification of growers and processors according to these standards is being carried out by government agencies; in others private sector parties have been contracted to do so. In addition, OECD countries in Europe provide financial support in the form of annual per-hectare payments for both the conversion and maintenance of organic milk production. In North America, producers are provided with some assistance to offset the cost of certification. On the demand side, governments have supported organic production through information campaigns, supply-chain co-ordination, and institutional procurement policies favouring organic produce. In a growing number of countries, greater attention is being paid to the coherence of organic policies through “Action Plans”, to ensure that the market is not disrupted by large swings in supply and demand, which impact on price premiums.

There has been a significant increase in the number of organic dairy farmers in most countries since the mid 1990s, often as a consequence of support policy developments, although organic production remains a very small share of total milk production in all but a few countries. In some European countries such as Austria and Denmark, milk is the most important organic product. Price premiums for organic dairy products are higher at the retail level than the farm level due to comparatively higher per unit costs of processing a smaller volume of milk. It is also common for organically produced milk to be sold as, and processed with, conventional milk, *i.e.* the milk producer does not receive a price premium. In some countries, the price premium for organic milk collapsed following a large increase in the number of suppliers.

Concerns have been raised about the impact of agri-environmental measures on trade competitiveness, and the resulting impact on the pattern of

trade and location of production. At present there is little international trade in organic milk and dairy products, with the exception of intra-EU trade. While there may be economic and environmental justifications for policy intervention in the organic milk market, there are a number of trade implications arising from such measures. While the creation of a national standard may remove confusion from the consumer market, it may place obstacles in the path of trading organic milk and milk products. There are a few examples that suggest that some regulations and certification requirements have created trade barriers to entry in the organic milk and milk product markets. The move to equivalence will help facilitate trade. It appears that payments for organic milk production have also influenced trade patterns. Those countries that first supported the development of organic milk production are some of the most important traders, exporting to other countries where organic milk production did not exist or was in small supply. Policies to stimulate demand for organic products, including milk, may also have a trade distorting effect to the extent that they specifically encourage the consumption of local product.

The effect of manure management regulations on competitiveness

In addition to the possible trade effects associated with organic policies, another important issue for the dairy sector is the extent to which variations in environmental regulations impact on trade patterns by imposing significantly different costs on milk producers. To answer this question, a comparative analysis of the manure management costs associated with the storage, disposal and application of manure in six countries/regions was undertaken. These costs are determined by the requirements of national/regional regulations, and are not net of the costs that farmers would have incurred if regulations had not been in place. While other environmental regulations exist, manure management regulations are seen as the most comprehensive and costly for dairy farmers.

The analysis shows that manure management costs, when measured on a per cow basis, were highest in Denmark and the Netherlands. They were approximately 10% higher than the cost of the new regulations in Ontario (Canada), and around 40% higher than those in Japan, Switzerland and Waikato (New Zealand). However, in terms of overall production costs, differences in manure management costs are not of a scale (2-4% of costs per cow) that explains differences in competitiveness between the six countries/regions. When measured on a per tonne of fat corrected milk basis, the country order changes with New Zealand manure management costs being the highest.

Two main points of divergence arise when these results are compared to those from the similar analysis done for the pig sector. First, manure management costs in the dairy sector are generally lower, possibly reflecting the

less intensive nature of milk production on a per hectare basis. Second, there is less diversity in manure management costs between countries/regions in the dairy sector, reflecting the more stringent regulations that are place on pig producers in some countries.

Differences in production costs imposed by regulations should be expected to the extent that these are associated with variations in the environmental cost of milk production and are in conformity with the polluter-pays-principle. This is particularly true for those environmental effects that are of a local nature. The environmental costs of milk production are likely to vary between countries just as labour, land and capital costs vary between countries. In most countries, support has been provided to offset the increased costs imposed by regulations, limiting the extent to which the true cost of pollution is being internalised by dairy producers.

Another result of the analysis was the relationship between farm size and the costs imposed by manure management regulations. The costs of manure management regulations, as measured in relation to total production costs per cow were greatest for the smallest farm size examined (40 cows). This is due to economies of scale in the construction of storage facilities, and the lower quantity of production across which costs are spread. As a general rule, manure management costs per cow decrease with farm size. In the analysis, costs for the largest farm (160 cows) are higher than for the middle-sized farm, but this is because of the assumption that the larger farm is required to transport and apply manure off their farm in order to meet the regulatory requirements. If the largest farm did not have this requirement, then its manure management cost per cow would be the lowest. A similar finding was observed in the pig sector.

Policy implications

A number of policy implications can be drawn from this study, including the following.

- Flows of environmentally damaging materials into water (*e.g.* nutrients) and emissions into the air (*e.g.* GHG and ammonia) are a common consequence of dairy production. Reducing the flows of these materials and emissions to an acceptable level of risk in terms of human and environmental health is a priority for policy.
- All countries will need to respond to increases in pollution risks associated with the further intensification of production driven by market and technological developments.

- Technologies and management techniques do offer the possibility of reducing the environmental risks, with evidence of some “decoupling” of environmental risk from milk production taking place. These may require significant investment in human-capital.
- Further trade liberalisation is likely to increase livestock environmental pressure in countries where production would increase such as Australia and New Zealand, requiring careful attention to the effectiveness of policies.
- Further trade liberalisation may also reduce the environmental pressure in some of the countries where it is currently the highest, but for European Union countries, including some where dairy production carries a large environmental risk, milk quotas remain binding, limiting any beneficial adjustment.
- Progress in a few countries in developing policies that tax farmers for the potential pollution resulting from milk production demonstrate that the difficulties in taxing “non-point” source pollution may be able to be overcome to a certain extent.
- Experience has shown that government policies to support organic milk production can impede market signals. Governments need to work with and not against the market.
- While maintaining the integrity of organic standards, attention needs to be given to minimising their potential trade distorting effect.
- Providing support payments to farmers for environmental benefits/services requires *inter alia* investment in research to ensure that the benefit being paid for is actually being provided.
- The multiple and sometimes conflicting impacts with biodiversity and the variation in public value indicate that a targeted approach is very necessary to achieve objectives in this area.
- Policy makers need to recognise the cost impact of agri-environmental policies, especially regulations, on different sized producers and consider this in relation to the resulting environmental benefit. A one-size-fits-all approach, particularly

when focused on a specific farming practice, may be neither environmentally effective nor economically efficient.

- Differences in regulations do exist, but these appear to reflect differences in the environmental risk, and are not large enough to impact on the trade competitiveness of producers. Payments to offset the cost of regulations will reduce the extent to which farmers understand the cost they impose on the environment and limit the appropriate implementation of the polluter-pays-principle.