Water and farms

Towards **sustainable** use

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Both consumption and pollution of water by agriculture are becoming serious concerns. Yet, water resources can be used much more efficiently in producing food and fibre, while minimising pollution and supporting ecosystems. How to achieve this depends on mindsets and societal goals, as well as institutional systems and structures. And that means government.

A widely held view is that developed countries are water-abundant and farmers need pay little attention to issues like water management or quality. If only that image were true. Rising production of thirsty crops and livestock have brought severe strains on water resources everywhere, including the richest countries.

Consider the US, which is one of the world's largest agricultural producers. There, irrigated agriculture has been depleting groundwater resources beyond natural recharge rates for several years in some regions. For example, in the High Plains (Ogallala) aquifer, which irrigates more than 20% of US cropland, the water level has fallen, and is close to depletion in parts of Kansas. In the Texas Panhandle, water depletion now poses a serious threat to the sustainability of the agricultural and rural economy.

The US is by no means the only developed economy faced with such a problem. In France, also one of the world's leading agricultural exporters, farming's share in groundwater use rose from 10% in the mid-1980s to 17% by mid-1990s. In fact, OECD agricultural water use has increased more rapidly than for other uses over the past decade, accounting for 45% of total water use. This reflects a 6% expansion in the irrigated area in agriculture, in particular for cereals, horticultural crops like vines, and improved pasture.

Projections over the next decade suggest that demand for water from irrigators will continue to rise, notably in countries where irrigated farming provides the major share of agricultural production, such as Australia, Mexico, Spain and the US. This means stiffer competition for water among other users, too. Moreover, the growing incidence and severity of droughts over the past decade, perhaps related to the impact of climate change, is raising the pressure on irrigated farming in many drier and semi-arid areas.

Agriculture's share in total groundwater utilisation is above 30% in some OECD countries, and farming now draws an increasing share of its supplies from deeper underground aquifers. Use of groundwater by irrigators is well above recharge rates in some regions, which is threatening the economic viability of farming in those areas.

While farms can act as guardians of the environment, in too many cases the opposite is happening.

The dilemma is that farming can be a boon and a bane for the environment. Over-exploitation of water resources by agriculture has damaged some aquatic ecosystems, and has harmed recreational and commercial fishing. On the other hand, farming systems can bring environmental benefits to water catchments by providing habitats, replenishing groundwater reserves and helping to control flooding through provision of

riparian buffer strips, tree planting, terracing and good management.

But while farms can act as guardians of the environment, in too many cases the opposite is happening. In some countries the low uptake of water-efficient irrigation technologies, such as drip emitters, and the poor maintenance of irrigation infrastructure has led to inefficiencies in water use. This results in water losses, as well as higher water application rates for every hectare irrigated. But there are encouraging signs that in other countries like Australia, per hectare water application rates have fallen with improvements in water management practices. In short, with proper techniques and incentives to take up the right technology, the stress on groundwater resources can be relieved.

Pollution on the cheap

But use is only part of the challenge. Farming is also a major source of groundwater pollution in many countries. Over a fifth of groundwater monitoring sites in agricultural areas of Denmark, the Netherlands and the US record nitrate levels that exceed drinking water standards. This is a particular concern where groundwater provides the main source of drinking water supplies for both people and livestock. Moreover, the situation is likely to deteriorate, since phosphates put into the soil even a few years ago will, because of particular physical properties, take many years to seep into the groundwater.

The impact of agriculture on water quality has improved slightly over the past decade, reflecting reductions in livestock waste, fertiliser, and pesticide run-off and leaching in response to public concerns and policies. But despite the improvement, *absolute* levels of agricultural pollution remain high in many regions. Nitrogen and phosphorus sources of water pollution are relatively more important, too, as industrial and urban sources of pollution have decreased.

The question is how to tackle these issues. The financial costs of agricultural pollutants, such as nutrients and pesticides in rivers and lakes, are high.

Who pays?

Water prices per cubic metre, selected countries, late 1990s

Water prices (US$/m³)	Agriculture	Industry	Households
Netherlands	1.44	1.075	3.16
Austria	1.005	..	1.05
France	0.0813	0.95	3.11
Greece	0.0515	..	1.14
Spain	0.0485	1.075	1.07
US	0.0459	0.505	1.25
Hungary	0.029	1.535	0.45
UK	0.0205	1.675	2.28
Australia	0.0195	..	1.64
Portugal	0.0175	1.255	1.0
Turkey	0.005	1.675	1.51
Canada	0.00185	1.59	0.7

Note: Some caution is needed in comparing these figures, because water for agriculture is generally of lesser quality than for households, while infrastructural and conveyance costs may be lower.

Source: OECD

Farmers often pay very low prices for water delivered and used compared to households or industry.

According to the UK Environment Agency, agricultural water pollution costs around €345 million per year, affecting drinking water and aquatic ecosystems. This accounts for about 40% of total water pollution costs in the UK.

The costs of bringing water quality in agricultural areas up to standard for environmental and recreational uses would obviously be higher than for drinking water in many OECD countries, given the widespread eutrophication of rivers and lakes in farming regions, and the damage to aquatic organisms from pesticides. Agricultural nutrient pollution of estuaries and coasts is also becoming a more pressing issue, as this causes algal blooms that damage marine life.

Regulations can limit water pollution, but they are not enough. Policies that provide subsidies linked to production misalign farmers' incentives, aggravating overuse and pollution of water in most OECD countries. Although the quality of farm water is usually inferior, farmers often pay very low prices for water delivered and used compared to households or industry. In the US, for instance, farmers pay on average around $0.05/m³, compared with $0.50/m³ paid by industry; in France the respective figures are $0.08/m³ and $0.95/m³; and for Spain $0.05/m³ for farms and 1.08/m³ for industry. At least on price, farmers have little if any incentive to become more efficient in their use of water.

Even if the incentives were created, there is a question of who pays. Property rights to water are often ill-defined in agriculture–a well on a farmer's land might belong to a village, for instance. This makes the polluter pays principle hard to enforce.

In short, for many OECD countries, agriculture's impact on water resources is not sustainable. Policies and actions are beginning to place a high priority on new management approaches, using better regulation as well as instruments like market-based water trading. There is wide recognition of the need for better pricing structures that reflect the costs and benefits of water in agriculture. And there is a need for all countries to reinforce the monitoring and evaluation of their reform initiatives to ensure that they are moving in the right direction.

Non-OECD countries face similar concerns, even if there is the difficulty in more arid economies of providing even a very basic supply of water to cultivate crops and rear livestock to feed their growing (richer) populations. In general, however, countries are at different stages in reforming their water policies.

An OECD workshop on agriculture and water held in Australia in November 2005 under the banner of "Sustainability, Markets and Policies", recommended a number of actions for consideration by policymakers. First, they should use a mix of cost-effective and coherent measures, ranging from

watershed to national levels, to improve the management of water both for farming and to support aquatic ecosystems. Second, they should turn to scientific research, water-use accounts and water-quality indicators to underpin their policymaking. A third recommendation is to identify the precise property rights attached to water withdrawals, water pollution and ecosystem provisions.

Also, clear lines of responsibility in water management should be established, with a commitment from governments to resource the necessary actions properly, especially given the challenges related to climate change and climate variability. Policymakers should strengthen reforms with instruments like water pricing and trading, water service competition or benchmarking performance where competition is limited. And they should enhance the capacity for farmers, industry and community groups to participate in the design and delivery of policies for water management.

Developed countries are at last waking up to the realisation that, far from being abundant, water is a fragile resource and that the right market and policy signals must be put in place. They are starting to address the issues, but for many countries there is still a long way to go. ■

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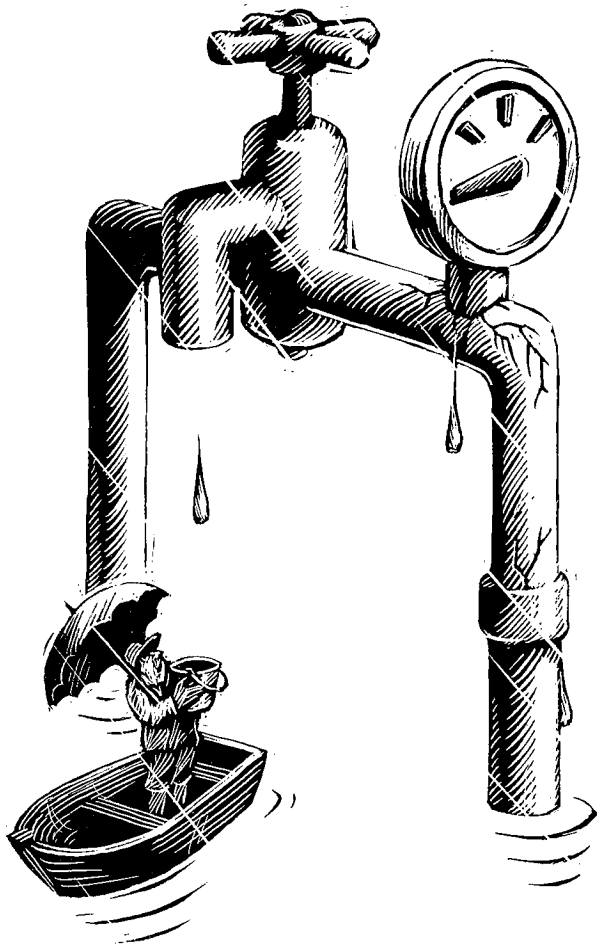

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water

A quality conundrum

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Achieving the Millennium Development Goal on water should not only require extension of access, but proper maintenance of existing infrastructure, too. It is a long-term challenge.