The sustainable management of water in agriculture - an OECD perspective

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Australian National University, Canberra, 25 August 2009
The Organisation for Economic Cooperation and Development is an inter-governmental organisation financed by its 30 member countries with increasing outreach to other countries.

Aim is to foster global economic growth, sustainable development and prosperity and act as a hub for globalisation.

Addresses common policy issues through dialogue among countries, based on analysis and comparative statistics.
OECD value-added....

- Comparative and consistent data and projections
- Bridge between academic research and policy communities
- Objective policy analysis and advice using economic tools
- Cross-cutting research (horizontal projects involving several departments in OECD – including one on water)
- Interactive dialogue and sharing experiences among Member countries and with civil society stakeholders
- Engagement of non-OECD countries in work
- Public dissemination and communication of results
OECD work on sustainable agriculture

Provides economic analysis and policy advice on the linkages between agriculture and the environment to help governments design and implement effective and efficient domestic and international policies that can contribute to sustainability.
• By 2030 global **food demand** projected to rise by 50%

• Land for agriculture (currently 40% of total) will have to increase by 10% - not including bioenergy

• **Yields** (output/land) will need to grow by 40%

• Global emissions of **greenhouse gases** will rise by 2% due to land use changes

• Greater pressure on **water** (global agriculture uses 70% of global supplies) and **energy**

• Farming will need to adjust to **climate change**
Markets do not always function **efficiently** – policy distortions, externalities, public goods

Markets do not necessarily deliver the **distribution** of food and other goods that society desires

Incomplete **information**, poor property rights and uncertainty can mean markets give weak signals for the allocation of resources to meet future needs

**Markets and trade** necessary to ensure efficient provision of commodities, but need **policies** for public goods and address negative externalities
Is the concern for food, water and energy security and climate change an opportunity or an impediment to achieve sustainable agriculture (green growth)?

Which policy mixes can help promote a low carbon agriculture, meet increasing food, feed, fibre and fuel needs, and achieve greater trade liberalisation?

Which structure of incentives and institutions will best ensure global food security, sustainable resource use, provision of public goods from agriculture, and help agriculture adjust to climate change?
OECD Water Program 2007-08: Outputs

- Managing Water for All – An OECD Perspective on Pricing and Financing
- Managing Water for All – Key Messages for Policy Makers
- Strategic Financial Planning for Water Supply and Sanitation
- Alternative Ways of Providing Water and Sanitation: Emerging Options and their Policy Implications
- Private Sector Participation in Water Infrastructure: OECD Checklist for Public Action
- Sustainable Management of Water Resources in Agriculture
OECD Water Program 2009-10

- **Synthesis report** on implementing effective policies for water supply and sanitation (WSS)
  - Benefits
  - Private sector participation (PSP)
  - Aid for water
  - Eastern Europe, Caucasus and Central Asia (financing strategies, economies of scale, benchmarking, performance-based contracts)

- **Integrated water resources management**
  - Information (policy needs, incl. agriculture, workshop early 2010)
  - Governance (improving multi-level governance, incl agriculture)
  - Financing (reference framework, country-level work, PSP and CC)
  - Policy Coherence (energy, agriculture, horizontal coordination)
Possible options for further work in 2011-12

• Improving basic information
  – establishing comparative statistics (particularly economic aspects)
  – updating work on ODA flows

• Improving governance
  – governance of WSS (sub-national level)
  – links between water management and land use policies
  – integrated responses to water-related risks

• Managing competition for water resources
  – links between water policies, cost-effectiveness, competitiveness and economic growth
  – financing ecosystem services / nature protection within IWRM
  – mechanisms for allocating water among competing uses, enforcement issues
  – links between water management and rural development objectives

• Improving access to water and sanitation services
  – analyses on cost recovery policies and practices, pricing
  – toolbox to support policy dialogues
  – facilitating policy dialogues in developing countries

• Climate change and water management process
Key sustainable water policy issues

- Experience in countries in **policies** for the sustainable management of water for agriculture
- Measurement of **support** provided by agricultural water policies and extent of **cost recovery** by the sector
- **Impediments and opportunities** for greater water cost recovery by agriculture
- Checklist of **good policy practices**
Global challenges

Agriculture water drivers

- Population up 2 billion by 2050 and higher incomes:
  - 50% more food by 2030
  - 100% more food by 2050
- Changing diets towards more meat and dairy products
- Expanding biofuel/bioenergy production from agri-forestry
- Increasing need for environment uses e.g. wetlands

World water withdrawal projections by sector to 2050
Water demand in selected regions to 2050

- **OECD Total**
- **OECD Agriculture**
- **India & South Asia Total**
- **India & South Asia Agriculture**
- **China Total**
- **China Agriculture**

Index 2000=100

- **Total water demand**
- **Agricultural water demand**

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<thead>
<tr>
<th>Year</th>
<th>OECD Total</th>
<th>OECD Agriculture</th>
<th>India &amp; South Asia Total</th>
<th>India &amp; South Asia Agriculture</th>
<th>China Total</th>
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Global warming and agricultural prices (IPCC 2007)

Global mean annual temperature change relative to the 1980-1999 baseline °C

Cereal imports of developing countries to increase by +10% to +40%
Water use productivity in agriculture

- Irrigated area not likely to increase very much
- No major new irrigation infrastructure (financial and physical limits)
- Potential for agriculture to use recycled and desalinated water marginal and costly
- Priority to improve productivity of existing irrigation system, and raise the water productivity of rain-fed agricultural systems, but performance is variable
Support to farmers

(Producer Support Estimates as a percent of gross farm receipts)
Composition of Producer Support Estimate 1986-2007 (% share in PSE)

- Support based on commodity output
- Payments, production required
- Payments, production not required
Farm producer support as a % share of Gross Farm Receipts (€ billion, average 2004-06, for Brazil & China 2005)

- Norway €2.4
- EU25 €113
- USA €31
- OECD €225
- Australia €1.0
- China €28
- Brazil €3.4

- Reduction of overall support has reduced pressure on water use:
  - Less production support
  - Decrease in input support (energy and water)
- Shift in support to water efficient technologies, farmer education and advisory services
- Quantifying effects of farm support on water use (production, environmental effects) is difficult and further analysis is required (possible use of SAPIM method?)
OECD experience with cost recovery for agricultural water:

- Significant variations in farm water charges in and across countries
- Rates of cost recovery have been increasing for most countries
- Full recovery of operation and maintenance costs is common, but rates of recovery for capital costs are poor
- A few countries are recovering some of the environmental and resource costs associated with water use in agriculture
- Major obstacles in collecting reliable cost recovery data

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<th>Volume of irrigation water supplied km³</th>
<th>% Share of cost recovery</th>
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<tr>
<td>New South Wales</td>
<td>4.8</td>
<td>88</td>
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<td>Queensland</td>
<td>1.2</td>
<td>97</td>
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<td>Victoria</td>
<td>1.2</td>
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<td>Total of above States</td>
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Many OECD countries have started **water reforms** to use water pricing.

Significant variations in farm **water charges** within and across countries.

Rates of **cost recovery** have been increasing for most countries.

Full recovery of **operation and maintenance costs** is common, but rates of recovery for capital costs are poor.

Where countries have increased water charges to farmers, available evidence indicates this has not led to reduced output.

A few countries are recovering some **environmental and resource costs in agriculture**, but mainly use other policy instruments.

**Groundwater policies** usually involve licences and other regulatory instruments but water pricing has rarely been applied.
100% recovery of Operation and Maintenance (O&M) and Capital (CC):
Austria; Denmark; Finland; New Zealand; Sweden; United Kingdom

100% recovery of O&M Costs, but less than 100% recovery of CC:
Australia, Canada, France, Japan, United States

Less than 100% recovery of O&M and CC:
Greece; Hungary; Ireland; Italy; Mexico; Netherlands; Poland; Portugal; Spain; Switzerland; Turkey

Less than 100% recovery of O&M Costs but no CC: Korea

Recovery of other costs through water charges or water pricing, opportunity costs, economic and environmental externality costs
Australia (some environmental costs already recovered); United Kingdom (currently recovering share of environmental costs).
Recovery rates for O&M irrigation costs: Mexico

Average irrigation O&M charges: Turkey

Turkish Lira (TRY) and US Dollars (USD) per hectare irrigated

- TRY/ha, 2003=1
- USD/ha

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Impediments to developing water markets

- Gaps in understanding water resource and ecosystem linkages
- Lack of physical networks between water delivery systems supplying agriculture, urban, industrial and other water users
- Poorly defined property rights, including land-water entitlements
- Problems of defining, securing and agreeing among water basin stakeholders allocation of water for the environment
- Concern with high transaction costs in creating water markets
- Issues of equity and social concerns that are perceived to be overlooked by the ‘economic’ focus of water markets
- Frequently legal, administrative and institutional barriers
Increase cost recovery rates for irrigation water, recognising the complexity and diversity of water resource management in agriculture and involving:

- reform of institutional water management systems
- enhancement of agriculture’s resilience to climate change and variability impacts
- greater coherence among agriculture, water, energy and environment policies – and better governance
- Attention to knowledge and information deficiencies to better guide water resource management
Issue of agriculture and water quality high on the policy agenda of virtually all OECD countries, and economic costs also high

Water management in agriculture is not only about quantity but also quality

Focus on policy measures used in OECD countries including water quality trading and adoption of polluter pays principle

Synergies and trade-offs with policy developments related to climate change and agricultural policy

Although there are differences across countries in situations and policy approaches, policy diversity is less than for water quantity

Aim is to provide policy advice
Questions for discussion

- Does the Australian experience provide useful lessons for other countries in tackling water allocation issues?
- Where are the major knowledge gaps in improving water allocation to agriculture (science, methodology, data, analysis, modelling,...)?
- Can we identify the optimum balance between market signals, economic policy instruments, regulations, voluntary and collective approaches to address water allocation issues in agriculture?
- What are the institutional, policy formation, process issues (incl. stakeholders) that need to be addressed?
OECD publications and websites

- Sustainable Management of Water Resources in Agriculture (late 2009)
- Environmental Performance of Agriculture in OECD Countries since 1990 (2008)
- Water and Agriculture: Sustainability, Markets and Policies (2006 - Proceedings of an OECD workshop held in Adelaide)

www.oecd.org/tad/env
www.oecd.org/water

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OECD Work on Sustainable Agriculture

Trade and Agriculture Directorate

Visit our website – Sustainable Agriculture link:

www.oecd.org/agr/env

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