WHAT POLICIES TO MANAGE GROUNDWATER USE IN AGRICULTURE?
Lessons from a study of OECD countries

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International organisation, established in 1961, comprising of 34 member countries
- Compares and analyses data, economic and policies to foster international policy discussion on a wide range of issues (all areas except culture and defence)

Outline of the presentation
1. Rapid overview of agricultural groundwater use and misuse in OECD countries
2. What policies exist and are employed to manage groundwater use in agriculture?
3. Towards sustainable groundwater use: a combination of management approaches

Tackling the challenges of agricultural groundwater use

Increasingly used in leading groundwater irrigating OECD countries

Intensive use leads to significant negative externalities at the regional level

The Organisation for Economic Co-operation and Development (OECD)

1. Agricultural groundwater use and misuse in OECD countries
Groundwater is a key asset for agriculture in semi-arid regions in OECD countries. Agricultural groundwater use: 123.5 km3 over 23m ha (2010)

Trends in agricultural groundwater use (km3/yr)

Trends in use for top 10 OECD groundwater irrigators (1990-2010)

Externalities reported in 20 OECD surveyed regions in 12 countries*

*20 Regions covered: Australia: Murray-Darling Basin; Denmark: Western Jutland; France: Nappe de la Beauce, Departement de la Vienne; Israel: Western Galilee; Italy: Campania Ufita; Japan: Kikuchi Heiya, Honguwa Seigo Noubiheiya Seigo; Korea: Jeju volcanic Island; Mexico: Region Laguna; Netherlands: Gelderland and Overijssel; Limburg, North Brabant; Portugal: Tejo e Ribeira do Oeiras; Spain: Mancha Occidental, USA: Mississippi Alluvial Aquifer, Mountain and Pacific West; Northern High Plains Aquifer; and Southern High Plains Aquifer.
2. A multiplicity of policy instruments to respond to these challenges

<table>
<thead>
<tr>
<th>Regulatory</th>
<th>Instruments</th>
<th>Advantages/drawbacks</th>
<th>Conditions for success</th>
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</thead>
<tbody>
<tr>
<td>Entitlements, quotas, zoning</td>
<td>(+) Control use</td>
<td>Design, expertise, flexibility</td>
<td></td>
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<td>Economic</td>
<td>Taxes, subsidies, markets, transfers, retirements</td>
<td>(+) Cost-effective &amp; flexible, (-) Acceptance (tax), results, costs (subsidies)</td>
<td>Expertise, transaction costs</td>
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<td>Collective action</td>
<td>Voluntary programs</td>
<td>(+) Local adapted and lower costs, (-) Adoption issues</td>
<td>Supported by regulations</td>
</tr>
</tbody>
</table>

**Instruments**

- **Regulatory**: Entitlements, quotas, zoning
- **Economic**: Taxes, subsidies, markets, transfers, retirements
- **Collective action**: Voluntary programs

**Advantages/drawbacks**

- (+) Cost-effective & flexible
- (-) Acceptance (tax), results, costs (subsidies)

**Conditions for success**

- Design, expertise, flexibility
- Expertise, transaction costs
- Supported by regulations

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A wide diversity of policy instruments in OECD countries

Policies are founded on different legal systems; they focus on the demand side, supply side or both, and use direct or indirect approaches to regulatory, economic or collective management.

**Standardised indices of groundwater management approaches**

Indices: freedom to operate, regulations, economic instruments, collective management, other controls, supply side approaches, instruments in favour of consumption.

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3. What should be done to move towards sustainable systems?

**ALL GROUNDWATER IRRIGATION SYSTEMS**

<table>
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<th>6 general conditions:</th>
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<tr>
<td>Robust information system</td>
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<td>Use groundwater conjunctively</td>
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<td>Favour use of direct approaches</td>
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**REGIONS WITH INTENSIVE GROUNDWATER USE**

A Tripod Approach

1. Entitlement systems and regulations
2. Economic instruments
3. Collective management

**REGIONS WITH HIGH STRESS**

A) Agronomic tools
B) Supply-side instruments

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Few surveyed countries apply these recommendations

- 65% of most groundwater stressed regions cannot report essential data
- 80% do not use the tripod approach

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Main take-outs

1. Groundwater is an increasingly important resource for irrigated agriculture in OECD countries
2. Intensive groundwater pumping for irrigation has a negative impact on farmers, other users, and the environment
3. Governments should improve information systems and apply a combination of management approaches to tackle these challenges

The stakes are rising: actions should be taken now to mitigate future problems.

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Source: OECD (2015)
Thank you for your attention

- Report:
  [http://dx.doi.org/10.1787/9789264238701-en](http://dx.doi.org/10.1787/9789264238701-en)

- Country profile: Groundwater management policies in 16 OECD countries:

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