



Policies to Manage Agricultural Groundwater Use

JAPAN

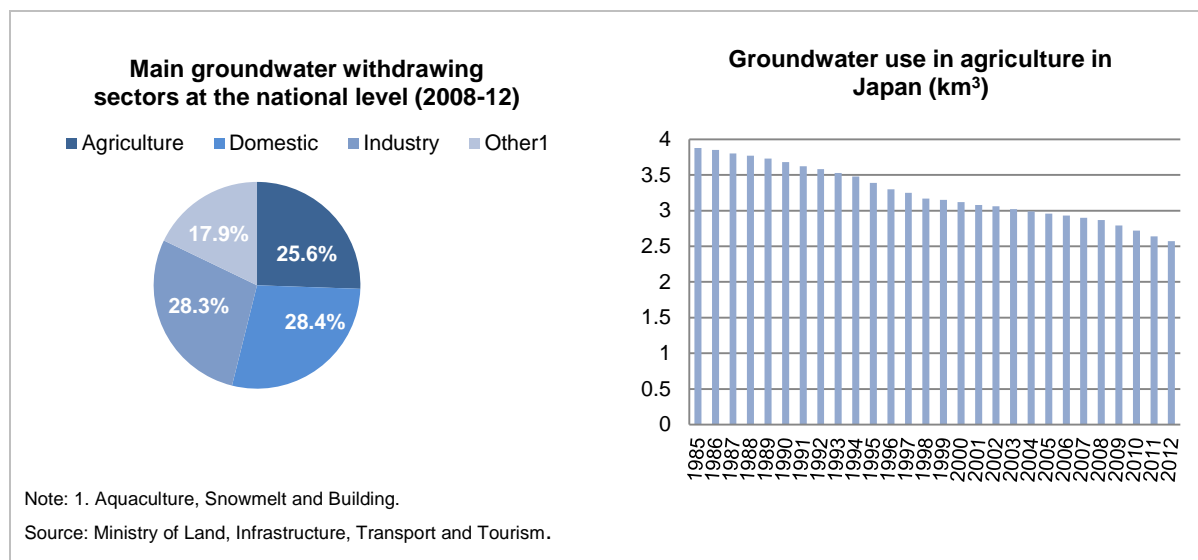
If groundwater remains a significant source of freshwater in Japan, agricultural groundwater use has been decreasing significantly since 1990. Partially as a result of land subsidence, saline intrusion and excessive lowering of the water table, groundwater use has been restricted to a safe yield via the use of regulations and ordinances to critical areas. The regions Kinugawa Seibu, Noubiheiya Seibu and Kumamoto and Kikuchi Heiya present different aquifer systems but employ similar regulatory schemes to manage groundwater use.

1. Main national governmental agency responsible for quantitative management of groundwater

Institution	Role
Ministry of Health, Labour and Welfare.	Water supply business.
Ministry of Agriculture, Forestry and Fisheries.	Reservation of land, water and other resources for agricultural use irrigation business. Agricultural land improvement business.
Ministry of Economy, Trade and Industry.	Aid and supervision of industrial water supply business.
Ministry of the Environment.	Regulations and measures on preventing groundwater pollution and land subsidence.
Ministry of Land, Infrastructure, Transport and Tourism.	Development of rivers, watercourses and water surfaces, use, maintenance and other management Planning, implementation and promotion of a master plan for water resources development and other comprehensive and fundamental policies on the supply and demand of water.

2. Status and use of groundwater resources

- The annual groundwater use is estimated to 11.2 km³ (2008-2012).
- Groundwater irrigation area: 232 143 ha in 2010.
- Groundwater withdrawals for irrigation: 2.6 km³ in 2010.
- Groundwater use in agriculture decreased 30% from 3.68km³ in 1990 to 2.57km³ in 2012.



3. Inventory of national policies affecting agricultural groundwater use

Recent groundwater management reforms

Reforms	Year	Scope and objective	Degree of implementation
Groundwater intake control ► Industrial Water Act	1956	Aimed for the sound development of industry and prevention of ground subsidence by ensuring rational supply of industrial water and conserving groundwater sources in a specified area	Partial
Groundwater intake control ► Act for Regulation of Pumping-up of Ground Water for Use in Building	1962	Aimed for the protection of people's lives and property and contribution to public welfare by applying required regulations for taking up groundwater for buildings to prevent ground subsidence in a specified area	Partial
Groundwater intake control ► Guideline on Measures for Prevention of Ground Subsidence	1985, 1991	Aimed for the conservation of groundwater by, for instance, regulating excessive intake of groundwater, ensuring alternative water sources, and supplying alternative water, as well as taking comprehensive measures according to the local circumstances including the prevention and recovery of disaster caused by ground subsidence	Partial

Core groundwater management approaches at national level

Groundwater ownership	► Private
Groundwater entitlement characteristics	► Linked to land rights
Beneficiaries of entitlement	► Individuals
Groundwater entitlement allocation doctrine	► Managed by the ordinance (by region)

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches

Coordination with surface water management

- ▶ Partial co-ordination (irrigation and drainage project area)

Regulations on wells

- ▶ Managed by the ordinance by region

Mandated metering or monitoring system for groundwater

- ▶ Managed by the ordinance by region

4. Agricultural groundwater use at the regional level

4.1 Kinugawa Seibu

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Temperate, Humid	Wetter, hotter, more frequent floods	no	Surface water is available and used for irrigation is used conjunctively and mainly sourced on-farm and off-farm

Characteristics of the main aquifers in the regional unit

The main aquifers consist of sand and gravel in Quaternary strata.

Type of aquifer	Geological type	Area	Maximum Thickness	Groundwater quality concerns
Mixed	Sand and gravel	1 400 km ²	300m	Limited The main type: The fall of groundwater level.
		Volume	Area	
Groundwater irrigation		0.442 km ³ (2008)	16 859 ha (2008)	
Trends		Diminishing	Diminishing	

Groundwater supported agricultural activities in recent years

- ▶ Paddy rice

	Total number	Increase in the past 10 years
Estimated number of agricultural wells	17 653 wells (1996)	Steady

Period of intense groundwater development

- ▶ 1950s

Other uses of groundwater

	Minor	Major	Diminishing	Steady	Increasing
Domestic		✓	✓		
Industry		✓	✓		

Pumping related external effects

	Minor	Major	Growing	Steady	Reducing
Well yield reduction	✓			✓	
Salinity	✓			✓	

Core groundwater management approaches

Groundwater entitlement allocation doctrine ► Reasonable use

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches

Regulations on wells

- Approval of new well
- Groundwater withdrawal restrictions

Mandated metering or monitoring system for groundwater

- Mandated metering for agricultural and other users

4.2 Noubiheiya Seibu

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Temperate, Humid	Wetter, hotter, more frequent floods	no	Surface water is available and used for irrigation is used conjunctively and mainly sourced on-farm and off-farm

Characteristics of the main aquifers in the regional unit

The main aquifers consist of sand and gravel in Quaternary strata.

Type of aquifer	Geological type	Area	Maximum Thickness	Groundwater quality concerns
Mixed	Sand and gravel	600 km ²	300m	Limited The main type: The fall of groundwater level.

	Volume	Area
Groundwater irrigation	0.103 km ³ (2008)	4896 ha (2008)
Trends	Diminishing	Diminishing

Groundwater supported agricultural activities in recent years

- Paddy rice

	Total number	Increase in the past 10 years
Estimated number of agricultural wells	1160 wells (1996)	Steady

Period of intense groundwater development

- 1950s

Other uses of groundwater

	Minor	Major	Diminishing	Steady	Increasing
Domestic		✓	✓		
Industry		✓	✓		

Pumping related external effects

	Minor	Major	Growing	Steady	Reducing
Well yield reduction	✓			✓	

Core groundwater management approaches

Groundwater entitlement allocation doctrine ► Reasonable use

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches

Regulations on wells

- Approval of new well
- Groundwater withdrawal restrictions

Mandated metering or monitoring system for groundwater

- Mandated metering for agricultural and other users.

4.3 Kumamoto and Kikuchi Heiya

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Temperate, Humid	Wetter, hotter, more frequent floods	no	Surface water is available and used for irrigation is used conjunctively and mainly sourced on-farm and off-farm

Characteristics of the main aquifers in the regional unit

The main aquifers consist of porous lava, pyroclastic flow deposits, sand and gravel.

Type of aquifer	Geological type	Area	Maximum Thickness	Groundwater quality concerns
Mixed	Volcanic	1300 km ²	200m	Limited The main type: groundwater acidified.
Groundwater irrigation		Volume		Area
		0.205 km ³ (2008)		9 937 ha (2008)
Trends		Diminishing		Diminishing

Groundwater supported agricultural activities in recent years

- Paddy rice

	Total number	Increase in the past 10 years
Estimated number of agricultural wells	3801 wells (1996)	Steady

Period of intense groundwater development

- ▶ 1950s

Other uses of groundwater

	Minor	Major	Diminishing	Steady	Increasing
Domestic		✓	✓		
Industry		✓	✓		

Pumping related external effects

	Minor	Major	Growing	Steady	Reducing
Well yield reduction	✓			✓	
Ingress of polluted water	✓			✓	
Land subsidence	✓				✓

Core groundwater management approaches

Groundwater entitlement allocation doctrine ▶ Reasonable use

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches

Regulations on wells

- ▶ Approval of new well
- ▶ Groundwater withdrawal restrictions

Mandated metering or monitoring system for groundwater

- ▶ Mandated metering for other users

Sectoral policies with effects on agricultural groundwater use

Aquifer recharge programs

- ▶ Aquifer storage and recovery program, largely from paddy fields.

5. Bibliography

Institutional websites

- www.maff.go.jp

Official reports

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- The 4th survey of groundwater use of agriculture, Ministry of agriculture, forestry and fisheries
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- Influence by climate change in Japan (2012) Ministry of Education, Culture, Sport, Science and Technology, and Ministry of the Environment and Japan Meteorological Agency

This country profile was compiled by the OECD Secretariat and reflects information obtained in a 2014 OECD questionnaire on groundwater use in agriculture. Further information and analysis can be found in OECD (2015), [Drying Wells, Rising Stakes: Towards Sustainable Agricultural Groundwater Use](#), OECD Studies on Water, OECD Publishing. The countries profiles for 16 countries of OECD are available for download at: www.oecd.org/tad/sustainable-agriculture/groundwater-use.htm