Policies to Manage Agricultural Groundwater Use

NETHERLANDS

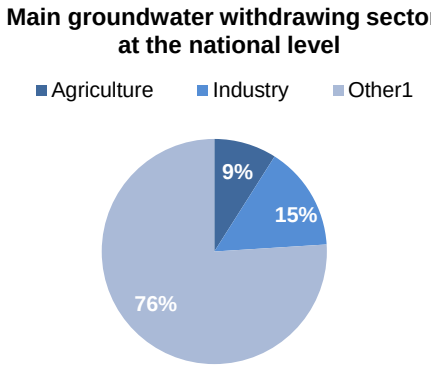
Agricultural groundwater use is limited in the Netherlands. It is used in conjunction with surface water in certain regions. Its management is lead at the provincial level in co-ordination with surface water. The examples of the North-Brabant, Limburg, and Gelderland and Overijssel regions show that provinces use mostly regulatory instruments to manage groundwater use. National agriculture policy and programs on conservation, land, climate change, and electricity may also manage groundwater use.

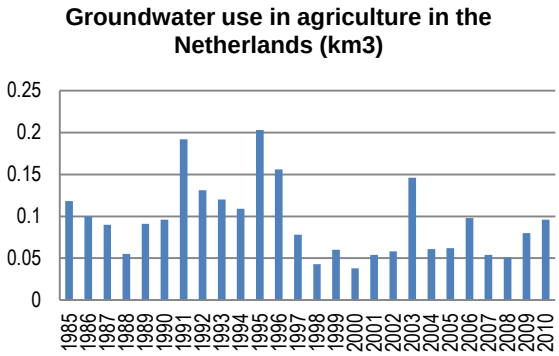
1. Main national governmental agency responsible for quantitative management of groundwater

Institution	Role
Ministry of Infrastructure and the Environment	Coordinating ministry and responsible for national water policy.
Ministry of Economic Affairs	Has a derivative liability which applies to groundwater quality (through the implementation of the Nitrates Directive and the Plant Protection Directive and related Regulations).
Provinces (12 in total)	Groundwater policy and management.
Regional water boards (24)	Operationalization of groundwater policy.

2. Status and use of groundwater resources

- Annual groundwater use was estimated to be 0.992 km^3 in 2011.
- Groundwater irrigation area: 36 089 ha in 2010.
- Groundwater withdrawals for irrigation: 0.060 km^3 in 2011.
- Total irrigation volume: 0.079 km^3 in 2011.
- Total irrigation area: 156 174 ha in 2011.
- Groundwater use in agriculture: 0.096 km^3 (1990), 0.038 km^3 (2000) and 0.089 km^3 (2011).





Note: 1. Drinking water

Source: Statistic Netherlands (2013), Environmental account of the Netherlands 2012

3. Inventory of national policies affecting agricultural groundwater use

Recent groundwater management reforms

Reforms	Year	Scope and objective	Degree of implementation
Groundwater Act	1983	The 1983 Groundwater Act prescribes that provinces have to draw up groundwater management plans and rules for issuing permits and levying charges on the amount of groundwater extracted (Blumenthal and Visée 1988, as cited in Hellegers 2001). This Act was implemented in 1985.	Complete
Water Authorities Act	1992	The 1992 Water Authorities Act introduced two new interest groups: residents and tenants, in addition to the already three existing interest groups, i.e., landowners, property owners and the owners of company premises. All these groups may propose candidates for the governing body. Provinces determine the number of seats to be held by various interest groups. As a result of this Act, environmental and nature organisations, which belong to the residents group, are better represented within the governing body of water boards than they were before 1992 (Hellegers 2001).	Complete
GGOR (Desired Ground and surface Water Regime)	1998	The Desired Ground and Surface Water Regime (in Dutch: Gewenst Grond- en Oppervlaktewater Regime, GGOR) is a policy instrument to show whether the water status is appropriate for various functions in rural and urban areas and whether these functions are in line with the water system. If this is not the case, GGOR helps to choose relevant measures, both on the field of water management and spatial planning (CIW 2003). This regime is implemented on the regional level (via provinces and water boards) during the period 1998-2010.	Complete
Water Act	2010	On December 22, 2009, the Water Act was implemented in the Netherlands. The Water Act combines 8 water related Acts, such as the 1983 Ground Water Act. Provinces are still responsible for large groundwater abstractions from industries, drinking water companies and soil-energy systems. Small abstractions such as agricultural abstractions are the responsibility of the regional water boards. There is still a permit system for groundwater abstractions. For very small abstractions (<10 m3/hr), there is no permit needed, but reporting is mandatory.	Complete

Delta Plan Freshwater's Deltaprogram-ma	2016	This program support effort to help governmental and private better anticipate changes in freshwater availability due to climate change. More specifically, the objectives of the action program are: a more economical use of freshwater (including groundwater) and the identification of regional freshwater provisioning programs. The program stands within the framework on strategic management of groundwater resources.	Forthcoming

Core groundwater management approaches at national level

Groundwater ownership

►Groundwater is publicly owned. Groundwater resource management is in the hands of provinces

Groundwater entitlement characteristics

►Abstraction of groundwater or recharge of water without a permit from the Provincial Executive is prohibited:

a) for industrial purposes, if the quantity of water to be abstracted exceeds 150,000 m^3 per year;

b) for the public drinking water supply, and

c) for geothermal energy storage.

For smaller abstractions, the permits are granted by the regional water board. This includes agricultural groundwater abstractions. For abstractions smaller than $10m^3$ per hour, there is no permit needed: there is an obligation to report groundwater abstraction.

Beneficiaries of entitlement

►This applies to all users that have permission to extract groundwater.

Groundwater entitlement allocation system

► In exchange for a fee, permits can be obtained from provincial authorities.

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches

Groundwater management plans

►No specific groundwater management plans are in order. However, national government, provinces and water boards are responsible for water resource management plans that include both surface and groundwater management.

Coordination with surface water management

►Systematic. National government, provinces and water boards are responsible for water resource management plans, that include both surface and groundwater management.

Economic instruments

Economic instruments to regulate quantity: pricing

► In 1995, a national groundwater tax was implemented, but it was abandoned in 2012.

Other policies and programs affecting agricultural groundwater use

Land policies with implications on groundwater use

►Zoning with restriction on groundwater use

Climate change adaptation programs

►Investment in agriculture R&D

Watershed conservation programs

►Exclusion zone for conservation area
►Limits of groundwater use close to protected areas

Energy programs

►Electricity tax
►Electricity subsidies
►Other energy supporting programs (diesel, natural gas)

Other sectorial or broader policies

Agricultural income support policies

►Biofuel production support
►Since most payments are decoupled on account of the Common Agricultural Policy reform, crop-linked payments and livestock specific programs are currently rare in the Netherlands.

Drought insurance programs

►Private insurance only

4. Agricultural groundwater use at the regional level

4.1 Meuse River Basin (North-Brabant)

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Temperate	More frequent floods and more frequent droughts	yes	Surface water is available but rarely used for irrigation It is sourced on-farm as well as off-farm

Characteristics of the main aquifers in the regional unit

This groundwater body covers the middle and northern part of the provinces Limburg, North-Brabant and a relatively small southern part of the province of Gelderland. The total surface area of the groundwater body covers 6277 km^2 and is the main fresh groundwater resource in the Dutch part of the river basin Meuse. The total volume of the aquifers is about 500 km^3. The body is at some places separated in 2 aquifers.

Other uses of groundwater

	Minor	Major	Diminishing	Steady	Increasing
Industry		✓			
Energy		✓			
Other		✓			

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches

Groundwater management plans

►There is no policy about groundwater management plans. No specific groundwater management plans are in order. However, national government, provinces and water boards are responsible for water resource management plans that include both surface and groundwater management.

Coordination with surface water management

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Regulations on wells

► Approval of new well
- ✓ Accounting for well space restriction
- ✓ With environmental impact assessment

► Groundwater withdrawal restrictions

Mandated metering or monitoring system for groundwater

►Mandated metering for agricultural and other users (these measures are enforced)

4.2 Sand Meuse River Basin (Limburg)

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Temperate	More frequent floods and more frequent droughts	yes	Surface water is available but rarely used for irrigation.

Characteristics of the main aquifers in the regional unit

Refer to the description of characteristics of the river basin in the North-Brabant section.

Type of aquifer	Geological type	Area	Maximum Thickness	Groundwater recharge rate	Groundwater quality concerns
Confined and unconfined	Sand and gravel	6277 km^2 (2014)	80 m (average) (2014)	502 km^2 (2014)	Important The main type: Nutrient loads to surface water bodies and some pesticides in drinking water wells.

Area and volume of groundwater irrigation

Since 2009, groundwater abstractions are no longer regulated and registered by the provinces but by the waterboards. Most provinces registered information about abstractions for irrigation and/or executed specific inventories to obtain realistic estimates of abstracted volumes and trends. Unlike the provinces, the waterboards do not register the abstractions for irrigation. So since 2009, in most regions adequate information about volumes and trends has been lacking.

	Average	Range	Variance
Evolution of the depth of the water table (trend in the past 10 years)	Steady	Steady	Steady

Other uses of groundwater

	Minor	Major	Diminishing	Steady	Increasing
Industry	✓				
Other		✓			

In the province of Limburg, the main usages are the abstractions for the public drinking water supply (38 Mm^3/y). Industrial usage is about 4 Mm^3/y, Energy 0.1 – 0.3 Mm^3/y and other usages than the ones mentioned before are about 4 – 5 Mm^3/y.

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4.3 Rhine East River Basin (Gelderland and Overijssel)

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Temperate	More frequent floods and more frequent droughts	yes	Surface water is available but rarely used for irrigation.

Characteristics of the main aquifers in the regional unit

This shallow groundwater body covers the eastern regions of the provinces Drenthe (1527 km^2), Achterhoek (1808 km^2) and Twente (2792 km^2). The highest point (ground level) is NAP + 70 m, the lowest point NAP-5, 5 m. The aquifer consists of a thin sand layer, in the main part no more than a few meters. In the former glacial valleys, the thickness of the aquifer is larger. Here groundwater withdrawal for drinking water and other usage is possible and allowed. The aquifer is partly covered by a thin layer of loam / fine sand or clay. At the bottom there is a thick layer of tertiary clay (tens of meters). The main recharge of the aquifer is rain. Groundwater exfiltrates in the lower parts and supplies the local streams.

Type of aquifer	Geological type	Area	Maximum Thickness	Groundwater reserve	Groundwater recharge rate	Groundwater quality concerns
Unconfined	Sand and gravel	6141 km^2 (2014)	150 m (2014)	921 km^2 (2014)	822 Mm^3/j (2014)	Important. The main type: Nutrient loads to surface water bodies and some pesticides in drinking water wells.

The groundwater recharge rate is in accordance with the WFD article 2-27 interpreted as the total recharge reduced with the flow-rate that is necessary to achieve the ecological objectives of the connected surface water bodies.

Area and volume of groundwater irrigation

	Volume	Area
Groundwater Irrigation	15 Mm^3/y (2003)	4050 km^2 (2003)

Groundwater abstraction for irrigation varies between 0 and 30Mm^3/year. This information is derived from the Dutch National Groundwater Register ("Landelijk Grondwater Register"), supplemented by detailed data from an inventory of the province of Overijssel (sprinkling in Overijssel 2002, Provincie of Overijssel 2003). The estimated volume (0-30 Mm^3/y) accounts for the total agricultural land use area of the groundwater body (66 % of 6141 km^2).

Note: Since 2009, groundwater abstractions are no longer regulated and registered by the provinces but by the waterboards. Most provinces registered information about abstractions for irrigation and/or executed specific inventories to obtain realistic estimates of abstracted volumes and trends. Unlike the provinces, the waterboards do not register the abstractions for irrigation. So since 2009, in most regions adequate information about volumes and trends has been lacking.

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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*