



Policies to Manage Agricultural Groundwater Use

MEXICO

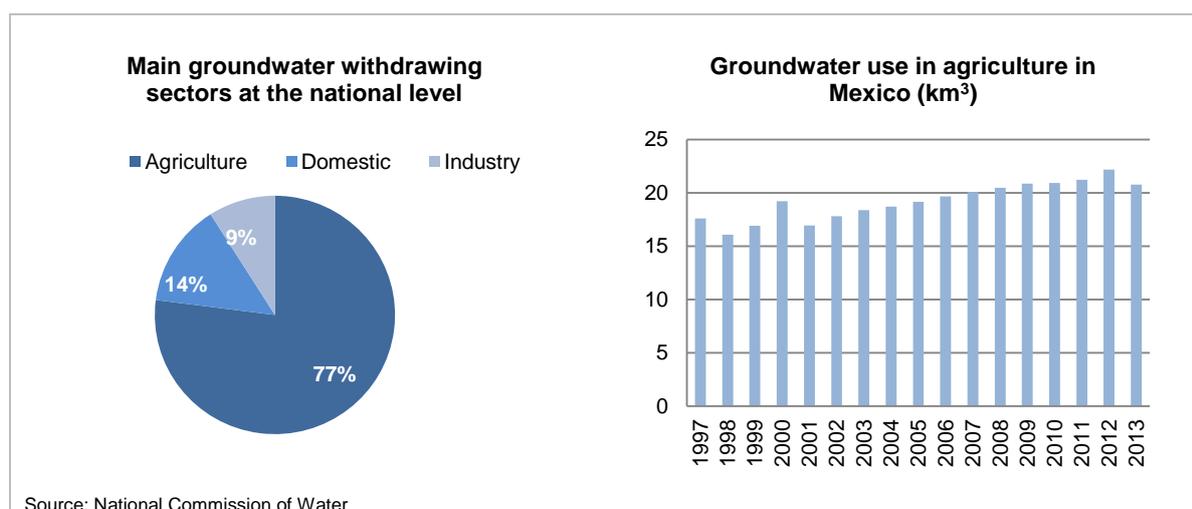
Mexico is the second largest OECD user of groundwater in agriculture, with groundwater-based irrigation sustaining multiple crops. Agriculture represents over three-fourth of total groundwater withdrawals at the national level. Trends indicate that such use is increasing from year to year. As observed in the case of the Lagunera region, intensive groundwater pumping generates major and in some case increasing externalities. Multiple instruments are employed to manage groundwater use, from regulatory to economic and collective-action based. Supply side approaches are also applied to recharge groundwater or develop alternative water supplies.

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

Institution	Role
National Commission of Water	Principal Federal.

2. Status and use of groundwater resources

- Total groundwater resource 458.1 km³ in 2013 and 378.873 km³ in 2014.
- Annual groundwater recharge is 306.9 km³ in 2013 and 92.62 km³ in 2014.
- Estimated groundwater use for irrigation 20.92 km³ in 2010 and 20.78 km³ in 2014.
- Groundwater irrigation area is 3 000 000 ha in 2010 and 2014.



3. Inventory of national policies affecting agricultural groundwater use

Recent groundwater management reforms

Reforms	Year	Scope and objective	Degree of implementation
National Water Law	2006	Management and use of water by basins	Complete
Manual for National Water Law	2012	Reform the National Commission of Water	Partial

Core groundwater management approaches at national level

Groundwater ownership	▶ Public and private
Groundwater entitlement characteristics	▶ Temporary and transferable
Beneficiaries of entitlement	▶ Individuals, collective bodies and companies
Groundwater entitlement allocation system	▶ Reasonable use

Main types of instruments used to manage groundwater use in agriculture

Regulatory approaches	Economic instruments	Collective management approaches
Groundwater management plans ▶ Mandated	Economic instruments to regulate quantity: pricing ▶ There are charges on pumped water in agriculture and they based on cost recovery. ▶ They account for environmental externalities ▶ They account for the scarcity value of water	Collective management schemes ▶ Mandated by states ▶ Water user associations ▶ District or community based
Coordination with surface water management ▶ Systematic		
Regulations on wells ▶ Groundwater withdrawal restriction		
Regulations on irrigated land: ▶ Regulation on the expansion of irrigated areas	Groundwater markets ▶ Temporary entitlement are marketable ▶ Pumped water is marketable among users	
Mandated metering or monitoring system for groundwater ▶ Mandated metering for agricultural and other users	Irrigation programs ▶ Irrigation subsidies focusing on efficiency	

Other policies and programs affecting agricultural groundwater use

Agriculture water conservation programs

- ▶ Subsidies
- ▶ Conditional payments

Land policies with implications on groundwater use

- ▶ Zoning with restriction on groundwater use

Watershed conservation programs

- ▶ Exclusion zone for conservation area
- ▶ Acquired groundwater entitlements for water conservation

Supply side management approaches

Aquifer recharge programs

- ▶ Aquifer storage and recovery programs
- ▶ Groundwater banking
- ▶ Infiltration ponds

Programs supporting the development alternative water supplies

- ▶ Surface water reservoir expansion
- ▶ Desalination
- ▶ Recycled water

Energy program

- ▶ Electricity tax

Multiple sources also report the use of electricity subsidy programs in rural areas with effect on groundwater irrigation (OECD, 2013).

4. Agricultural groundwater use at the regional level

Region Lagunera

Agro-climatic zone	Climate change prospective (2030-2050)	Is groundwater expected to be significantly affected by climate change in 2030-2050?	Surface Irrigation
Semi -arid	Drier, hotter, more frequent droughts	yes	Surface water is available and used for irrigation. It is dominant source of water and mainly sourced on-farm and off-farm.

Characteristics of the main aquifers in the regional unit

It is a former lagoon originated by precipitation at an inner basin, without an outlet, that formed the aquifer. At the beginning it was a rich aquifer, but now is overused. We now that there is pollution in it, by heavy metals and cyanure.

Type of aquifer	Geological type	Groundwater quality concerns
Confined	Sand and gravel	Important The main type: we presume pollution

	Area
Groundwater irrigation Trends	72 143 ha (2013) Diminishing

	Total number	Increase in the past 10 years	Average	Range	Variance
Estimated number of agricultural wells	n.a.	n.a.			
Evolution of the depth of the water table(trend in the past 10 years)			Lowering	Lowering	Steady

Period of intense groundwater development

► 1970s

Other uses of groundwater

	Minor	Major	Diminishing	Steady	Increasing
Domestic		✓			✓
Industry	✓				✓

Pumping related external effects

	Minor	Major	Growing	Steady	Reducing
Pumping lift/cost increase		✓	✓		
Well yield reduction		✓	✓		
Vegetative stress		✓	✓		
Ingress of polluted water		✓	✓		
Salinity		✓	✓		
Aquifer compaction		✓	✓		
Land subsidence	✓			✓	

5. Bibliography

Institutional websites

- www.conagua.gob.mx
- www.conagua.gob.mx/CONAGUA07/Publicaciones/Publicaciones/EAM2014.pdf

Official reports

- Estadísticas del Agua en México- 2013- Water Statistics about Water at Mexico
- Estadísticas del Agua en México- 2014- Water Statistics about Water at Mexico

Additional sources

- www.conagua.gob.mx
- www.imta.mx
- OECD (2013), Making Water Reform Happen in Mexico, OECD Studies on Water, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264202405>

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