Impacts of climate change on Turkey's water resources

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WATER: a natural but limited source

- social health,
- well-being,
- preservation of ecosystem,
- economic development of a country
The 20th century has seen significant increases in population growth, industrialization, and urbanization, leading to an increase in water consumption.
Main adaptation steps to mitigate effects of climate change on water availability

- wastewater treatment,
- recycled water use,
- seawater/brackish water desalination,
- groundwater recharge,
- improved and efficient irrigation water management,
- correct crop selection,
- production of some crop seeds which are drought-tolerant,
- adoption of a stricter water use policies,
- more research for better understanding of hydrological climate change effects
The current population of Turkey is **82,023,223** as of Monday, August 6, 2018, based on the latest United Nations estimates.

- Turkey population is equivalent to **1.07%** of the total world population.
- Turkey ranks number **19** in the list of countries (and dependencies) by population.
- The population density in Turkey is 106 per Km² (276 people per mi²).
- The total **land** area is 769,630 Km² (297,156 sq. miles).
- **72.1 %** of the population is urban (59,060,906 people in 2018).
- The **median age** in Turkey is **30.2 years**.

**Turkey Population (LIVE)**

**82,035,344**
Transboundary water flow 7 km³

annual precipitation 501 km³

evaporation 274 km³

annual water flow 196 km³

aquifer leak 41 km³

gross water potential 234 km³

TOTAL usable water 112 km³

annual supply 14 km³

current consumption 54 km³ (48% of total)

water flow 193 km³

annual usable surface water 98 km³
2018
1350 m³/year

urbanization ↑

industrialization ↑

2030
Population ↑
Water Stress
AAP: 643 mm
SE: 250 mm
NE: 3000 mm

AT: 23°C (summer)
-2°C (winter)

NE: 23°C / 7°C

EA&SE: 17°C / -13°C
"When the sun goes down, the sun is undressed and washed in the blue lake."
BEYSEHIR LAKE NATIONAL PARK

868.550 m², second largest park

http://www.milliparklar.gov.tr/bolgeler/
SALDA LAKE
ARTVIN/MACAHEL LAKE

world biosphere reserve
UNESCO 2006
BURDUR LAKE

1990

2000

2010
VAN LAKE

Akkus, 2017
WATER RESOURCES MANAGEMENT

• Determination of existing and future qualitative and quantitative characteristics of surface and groundwater resources, evaluation of supply possibilities,
• Determination, planning and arrangement of community water demands,
• Formation of water balances, collection of factors that will provide continuity of these balances, and development of a long term strategy for rational use of water resources,
• Monitoring of water resources in order to protect them from pollution and exhaustion,
• Planning water resources systems,
• Modeling of management,
• Designation of processes in water systems and operational conditions,
• Increase of assurance of water from quality and quantity point of views,
• Improvement of rational water use,
• Provide sustainability of natural potential of water resources and protect them,
• Provide effective utilization of technical elements (e.g. reservoirs, treatment plants etc.) in order to protect communities from adverse effect of water resources,
The General Directorate of Water Management

Ministry of Forestry & Water Affairs (MoFWA)

Projects of Environment & Water Sciences Departments of all Universities

SKI General Directorates for Water and Wastewater Administration

Ministry of Environment and Urbanization (MoEU)
Main purposes:

**Sustainability & Integration**

* Determination, planning, modelling and arrangement of water demands
* Provide sustainability of natural potential of water resources and protect

1. Basin Management Plans
2. Integrated Water Management
3. Transboundary Water Management
Basins in Turkey (CESI-ScI)
River basins and climate change high risk zones in Turkey
Yılmaz & Imteaz; Climate change and water resources in Turkey: A review, International Journal of Water, 2014
GAP Project

Yesilnacar & Cetin, 2005
Location of planned irrigation schemes of GAP

GAP Project & Harran Plain
Spatiotemporal patterns of irrigated agricultural fields on Harran Plain within the mid to late summer times.
Changes in Harran Plain irrigated lands and water reserve with mid-to-late summer total total precipitations
Integrated water management in Turkey (CESI-ScI)
Transboundary Water Management

«water should be utilized among riparian states in an equitable, reasonable and optimal way»
holistic approach
technical and financial support
regional and international organizations
financial institutions