United Nations
Educational, Scientific and
Cultural Organization

Regional Centre
on Urban Water Management
(under the auspices of UNESCO)

National Agriculture and Water strategic
research center (NAWSRC)

International Water Social Media Literacy Workshop

The role of social media in consumption management

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National Agriculture and Water strategic research center

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May 10, 2023

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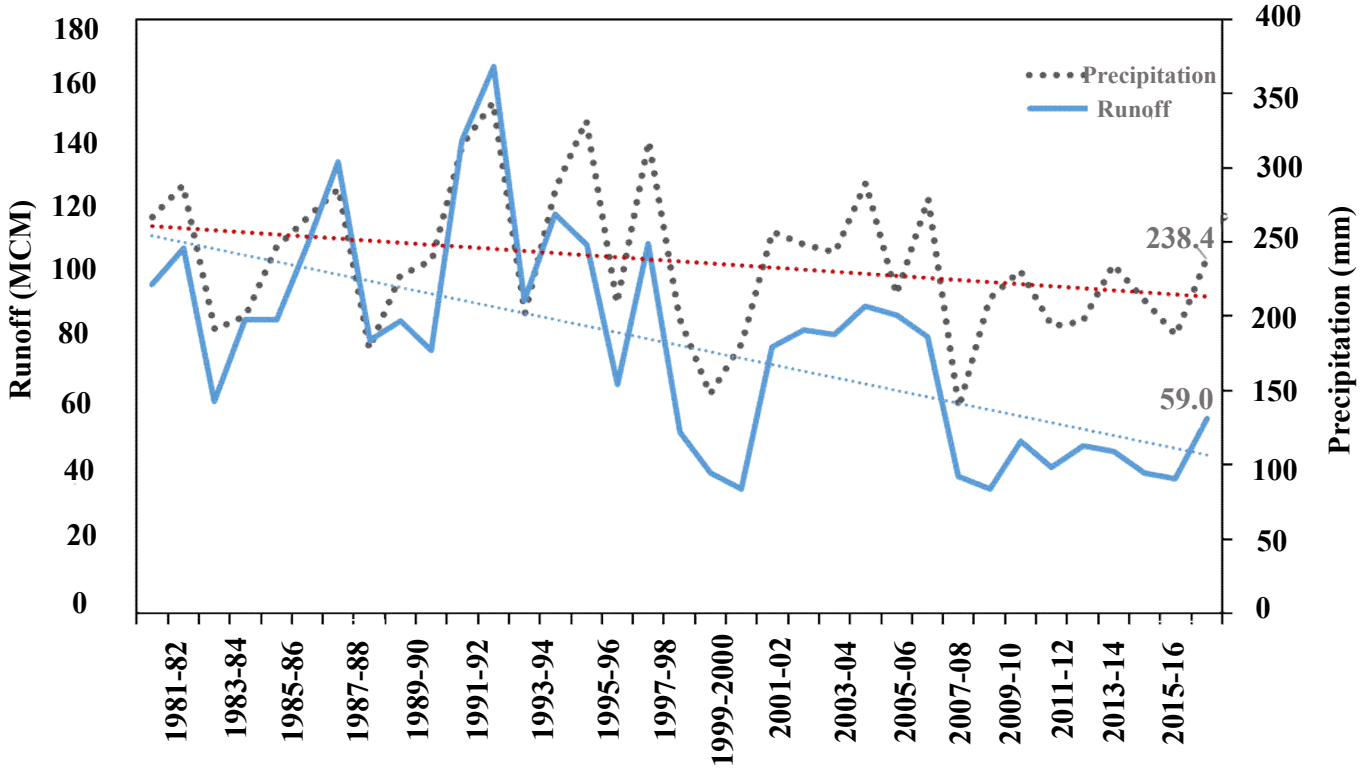
Water Crisis – Surface runoff change trends

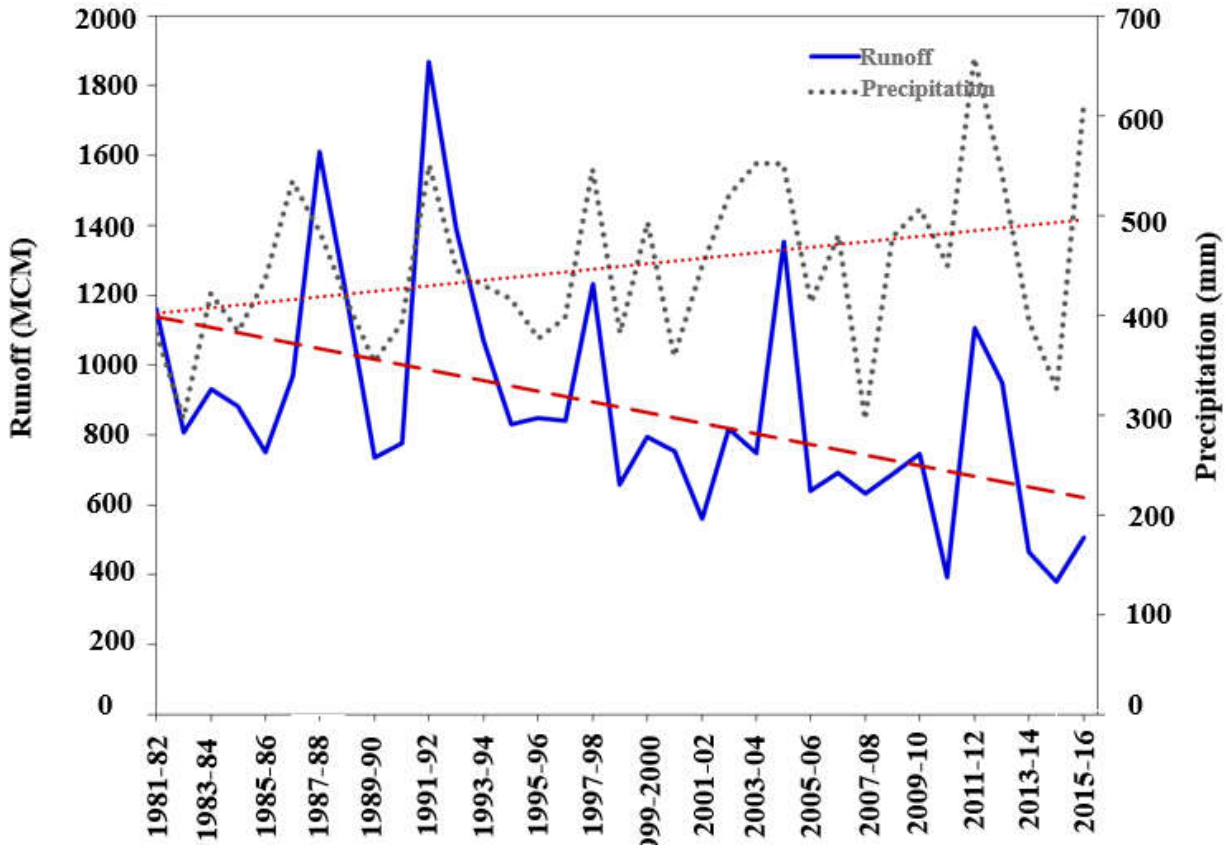
54.7% decrease in runoff in 2011-2015 compared to 1971-1975



*Iran Water Resources Company (2018)

Water Crisis – Surface runoff change trends in the Qarasu watershed of Gorganroud

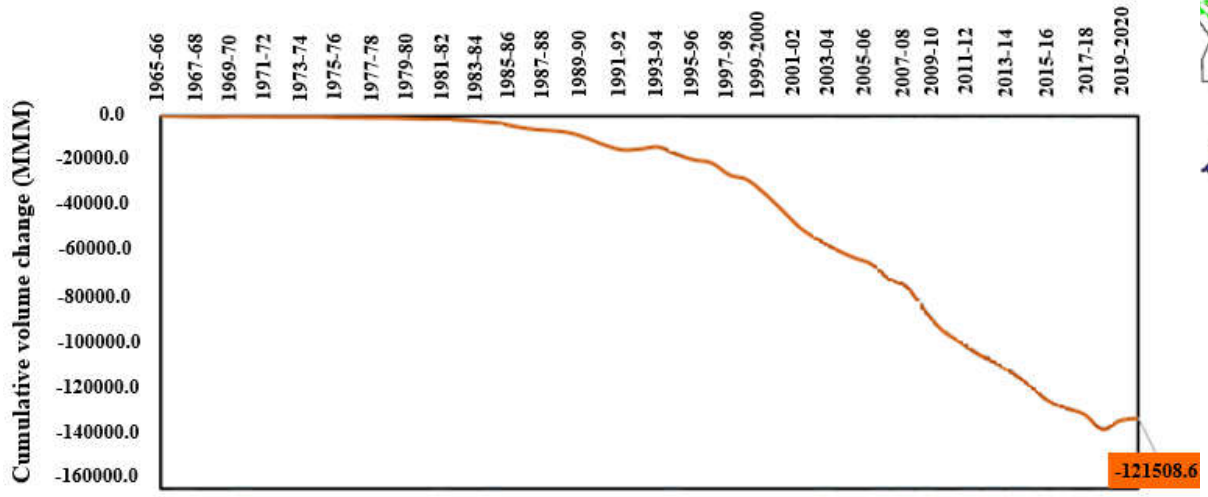
- 24% decrease in runoff in 2001-2015 compared to long-term
- 12% increase in precipitation in 2001-2015 compared to long-term

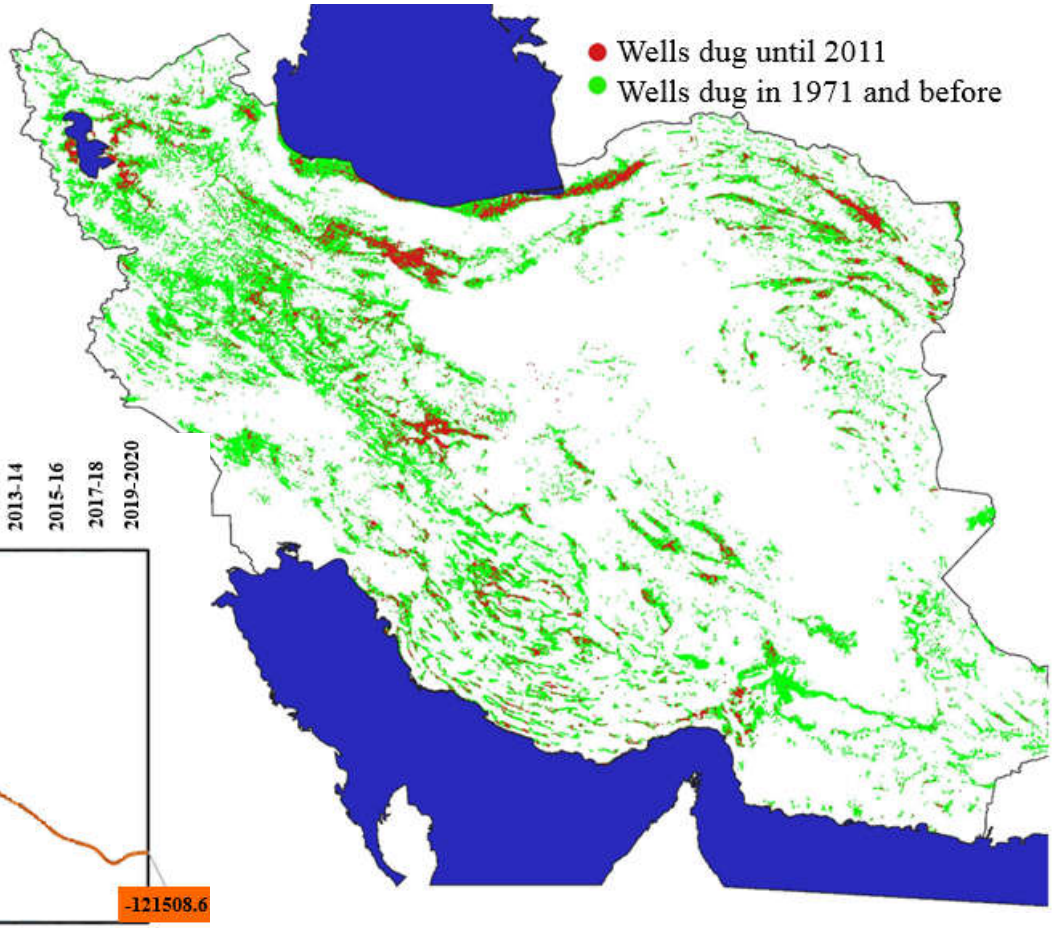


*Iran Water Resources Company (2018)

Evaluation of underground water resources

The trend of average discharge changes from each well





*Iran Water Resources Company (2022)

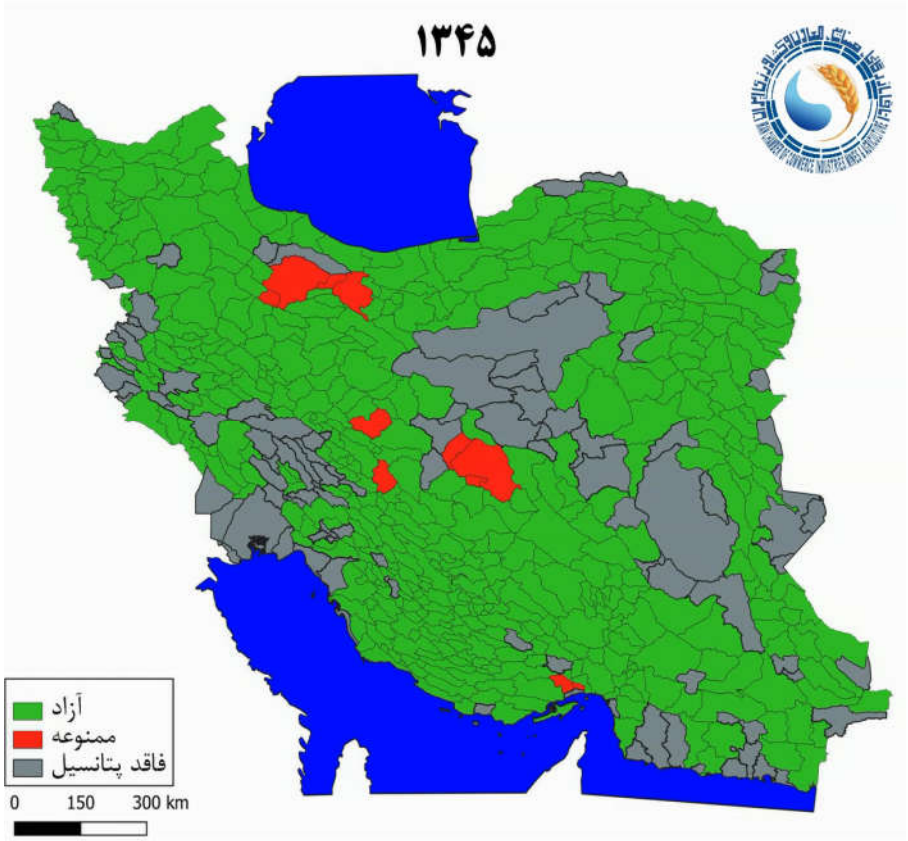
Number of critical plains

The highest number of forbidden plains:

Fars

Kerman

Khorasan Razavi

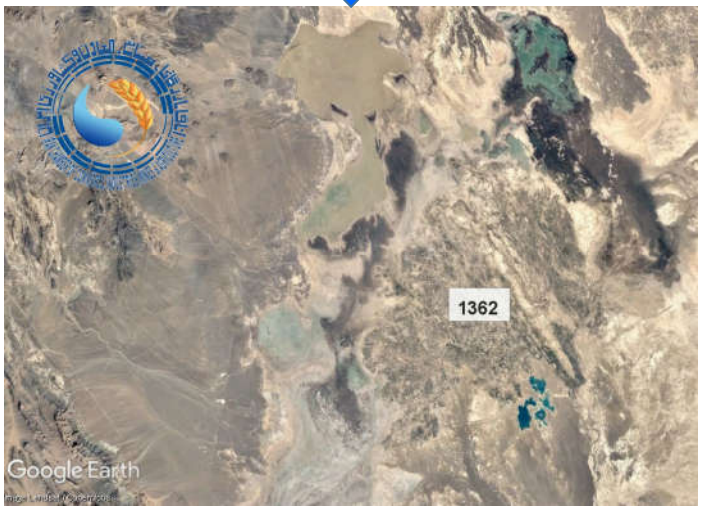


*Data provided by Iran Water Resources Management Company

Water Crisis – Status of lakes and wetlands

**Urmia lake, Van lake (Turkey),
Suvan lake (Armenia)**

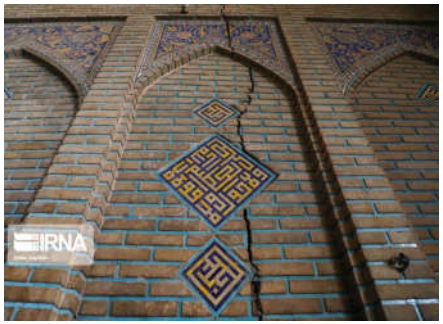
**Hamoon lake
(Iran and Afghanistan)**

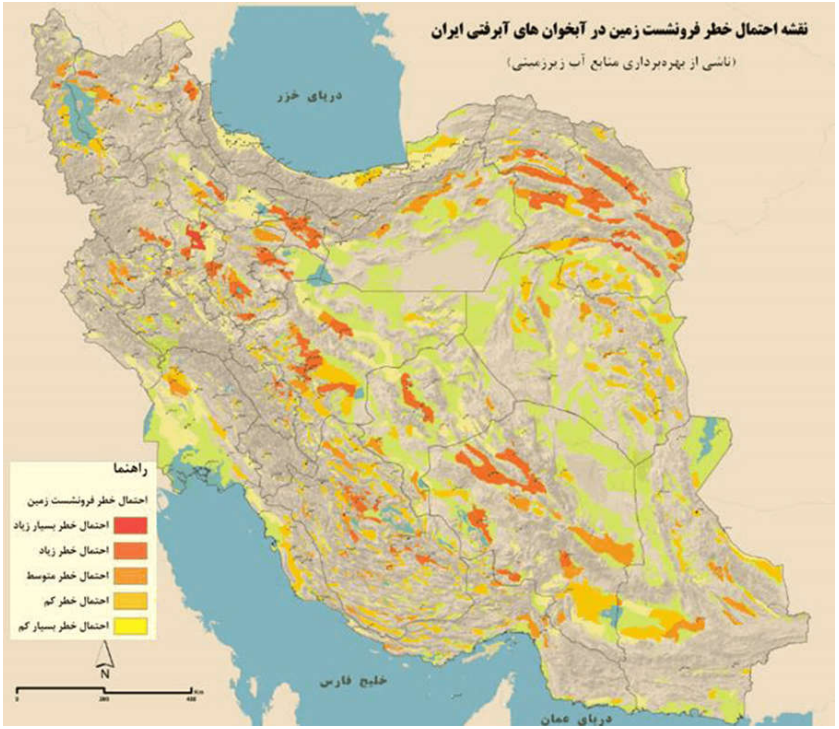


**Tashak and Bakhtegan lakes
(Fars province)**

* Google Earth

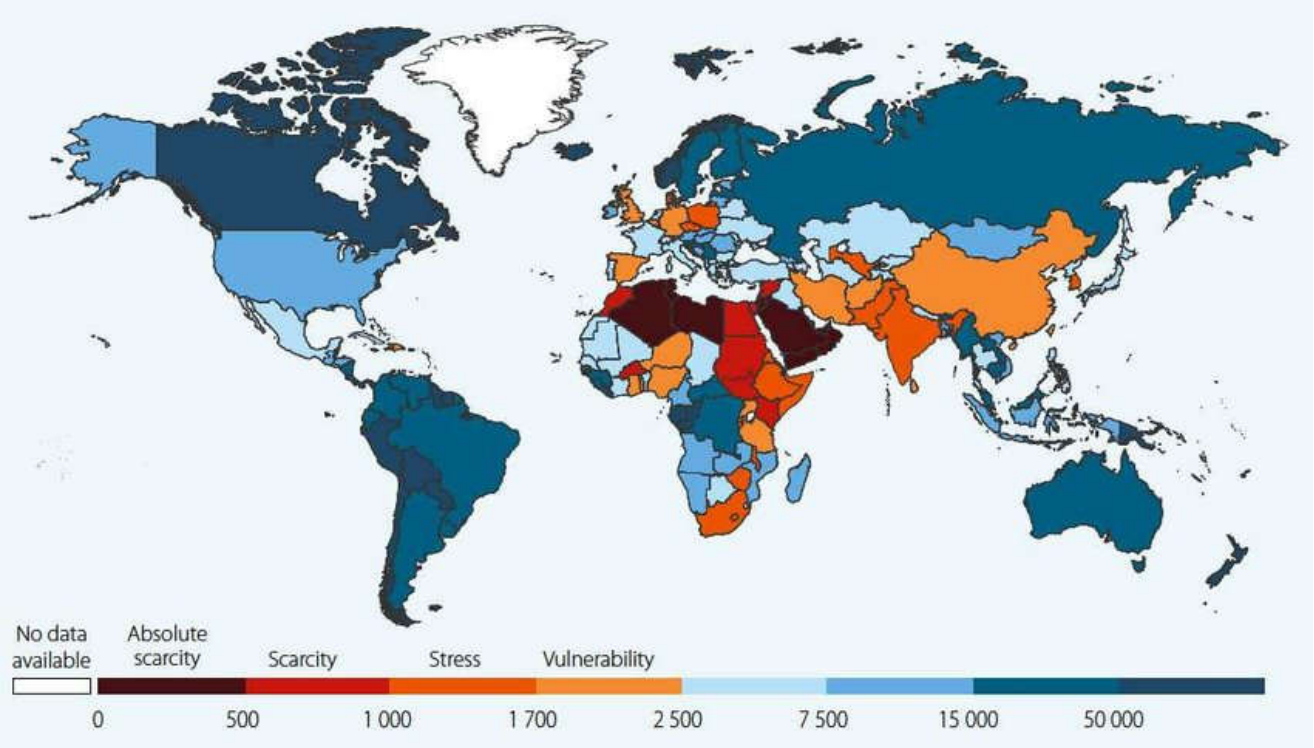
Land subsidence caused by over exploitation of ground water resources





Global renewable water resources

Global renewable internal freshwater resources flows refer to internal renewable resources (internal river flows and groundwater from rainfall) in the country.

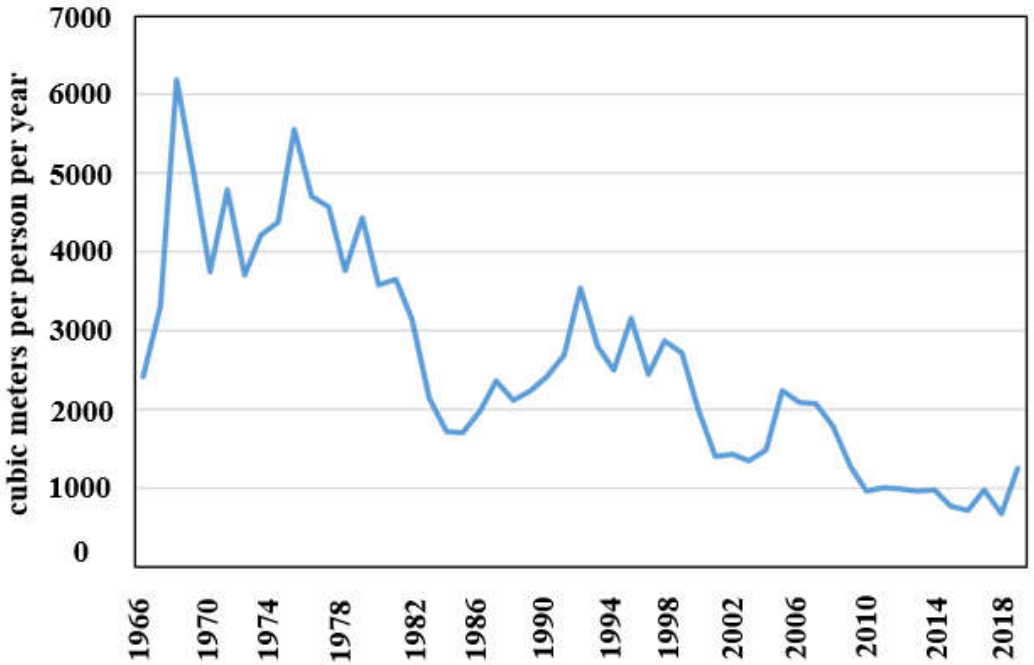


*WWAP 1 , with data from the FAO AQUASTAT database (2015)

The trend of renewable water resources per capita in Iran

The trend of changes in national renewable water:

- It has reached to 1000 and low since the middle of 2007.
- According to the revised Falcon Mark index, the country has entered into chronic water stress conditions since 2007.
- Some watersheds are under absolute water stress conditions in the country.

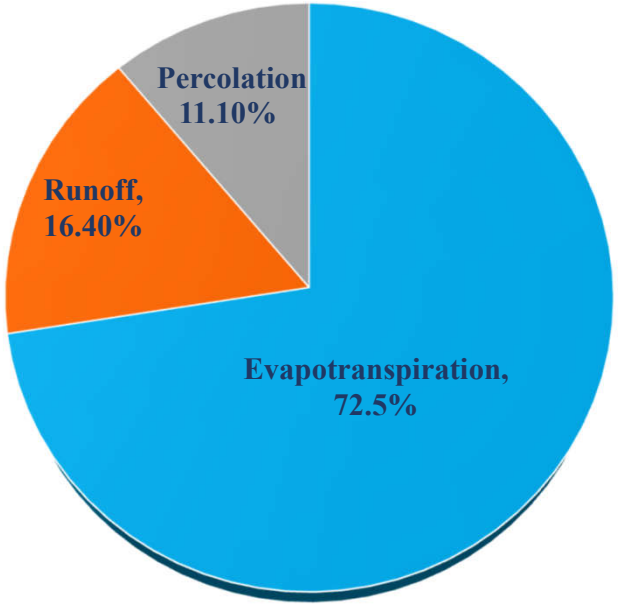


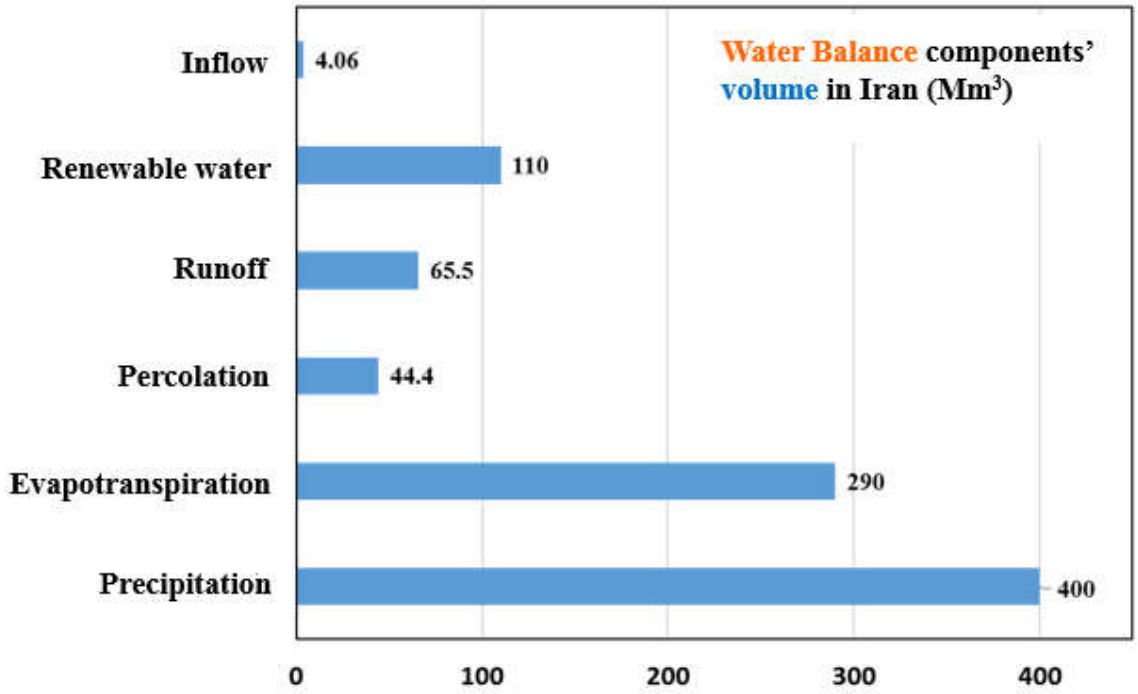
*National Agriculture and Water Strategic Research Center

Water Balance

The last official water balance report of the Ministry of Energy leading to 2010-2011

The ratio of water balance components to total precipitation

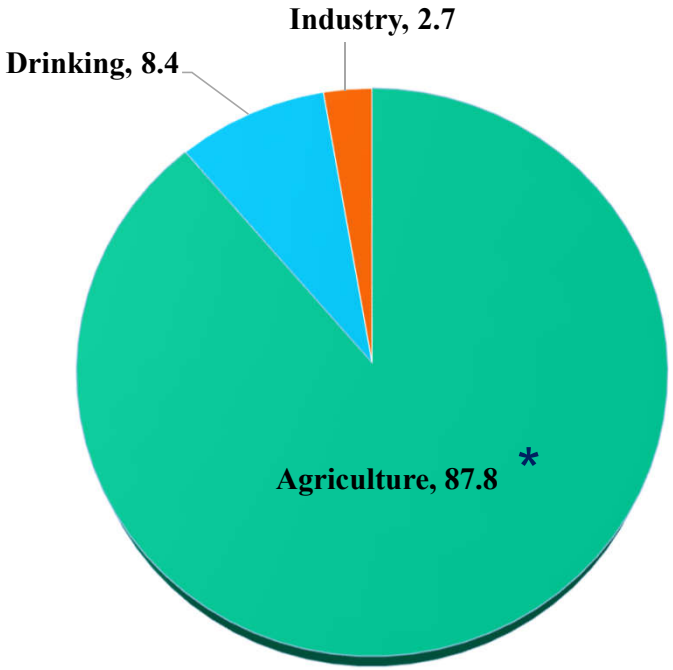




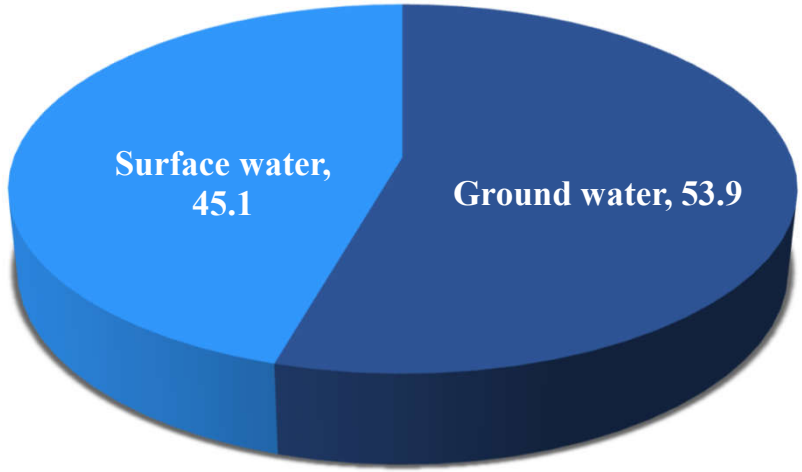
*Ministry of Energy leading to 2010-2011

Water consumption in different sectors

Water withdrawal in different sectors (Mm^3)



Water withdrawal from different resources (Mm^3)



* In the national food security document (National Agriculture and Water Strategic Research Center), withdrawal for agriculture is evaluated to be 77 (Mm^{-3}).

The trend of changes in agricultural area and yield in Iran

The trend of the total agricultural cultivated area (ha.10^6)

	Irrigated permanent crops	Irrigated field crops	Total
Four-year average (2000-2003)	1.91	5.79	7.70
Four-year average (2018-2021)	2.52	5.97	8.49
The average annual growth (%)	1.27	0.14	0.44

The trend of crop yield (tons per hectare) over a period of 20 years

	Irrigated permanent crops	Irrigated field crops	Total
Four-year average (2000-2003)	7.50	8.11	7.98
Four-year average (2018-2021)	8.51	12.48	12.23
The average annual growth (%)	0.58	1.98	1.96

*National Agriculture and Water Strategic Research Center

Main water challenges and threats in Iran

- Low physical and economic productivity of water in all sectors of consumption
- The over exploitation of supply and demand (resources and consumption), especially in the ground water sector (not paying attention to the balancing of ground water) and not paying attention to the allocation of environmental rights
- Population growth and demand imbalance with ecosystem capacity (increasing demand pressure due to population growth and worsening conditions)
- Lack of view to water as an input between economic, social and environmental sectors
- Lack of coordination between different sectors related to water and the existence of conflict of interests between governance and executive affairs
- Inadequacy in the participation of the private sector and stakeholders in the water management system
- Lack of attention to accurate and up-to-date monitoring of water resources

Suggested strategies and programs

- Accurate determination of water ecological capacity and clarification of policies and development plans, compatible with water capacity
- The absolute priority to the balance the supply and demand of water resources, reallocation water, reducing the economic water consumption in agricultural sector to allocate the water demand for drinking, balance of ground water, provision of environmental rights and national economic growth
- Focusing on increasing the productivity in water consumption in all sectors with priority in the agricultural sector
- Establishing a proper water governance system based on the comprehensive participation of people, stakeholders, non-governmental sectors and social capital from the stage of water policy, implementation and exploitation, taking the equal rights of stakeholders and decision makers

Suggested strategies and programs

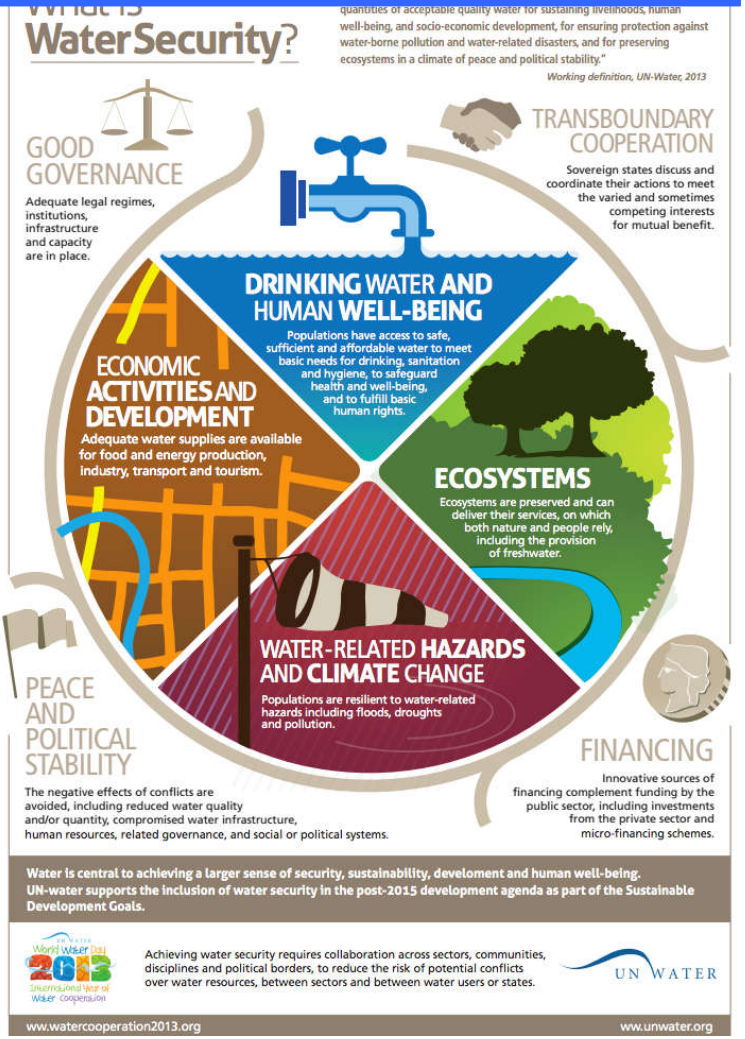
- Creating and organizing a powerful and independent trans-sectoral dimension (preferably non-governmental) to develop policies, propose bills and regulations and monitor the water management path
- Supporting the privatization of the water industry and focusing on water governance
- For years, water has been recognized as an economic, social, environmental and political factor, But unfortunately, only its economic dimension is considered and other dimensions are almost forgotten. While water applicants are people in all sectors.

Water security

Security in various human sectors including social, economical and environmental is directly and indirectly influenced by water security.

Water security is the extent to which every person has reliable access to sufficient water at a reasonable and affordable rate in order to have a healthy and useful life in such a way that the environment is protected.

Explaining the components of water security under the four dimensions of "objective, social, political, trans-sectoral" can prevent the entry of personal matters into policy-making forums.

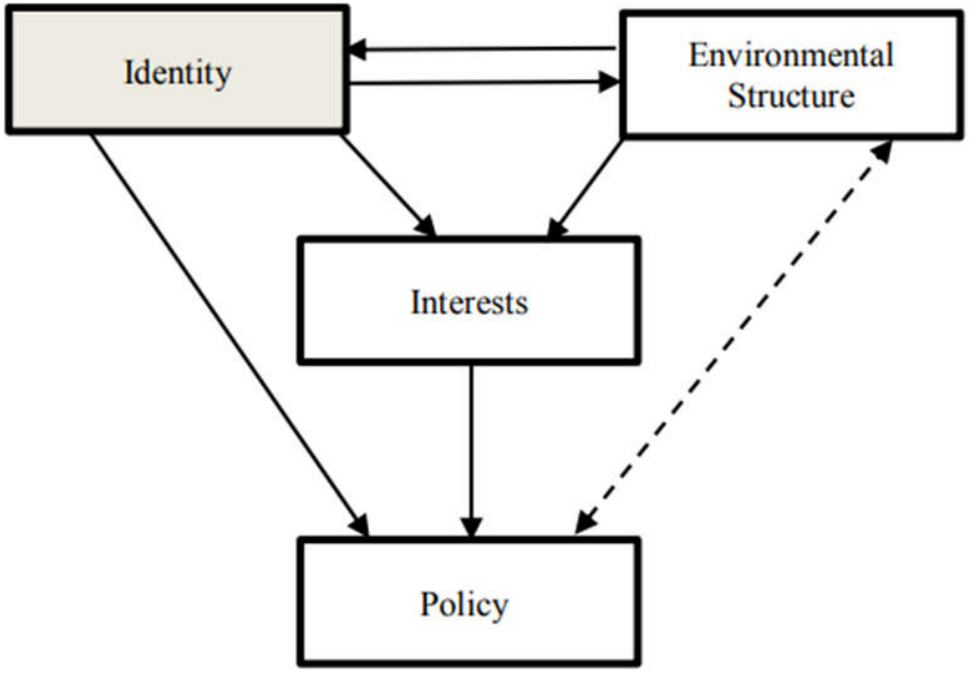


Water security

The social dimension shows that the indicators obtained from the objective dimension should be explained in connection with the ideology, values and identities of societies.

- Neglecting this dimension can lead to social changes and have economic, political and environmental consequences.

The interaction of Structure, Identity, Interests and Policy (Jepperson et al., 1996)



Water security

The trans-sectoral dimension also shows that the intertwining of water issues with economic, social, environmental issues has caused that the governance of water issues is not limited to the water sector.
For example, water resources are affected by agricultural activities, food security, energy security, climate change, infrastructure and technology.

- The reason for not evaluating issues related to water and environment security in our country is that these issues have been analyzed mainly in the objective dimension with a quantitative and numerical engineering perspective, and the human, social and political aspects of water and environment issues have been seriously neglected by society experts and policy makers.

Virtual water

The water used in the production process of an agricultural or industrial product is called the 'virtual water' contained in the product (Hoekstra, 2003).

- the water consumed during the production process does not physically exist in the final product and a small part of the consumed water will remain as real water in the texture of the product at the end.

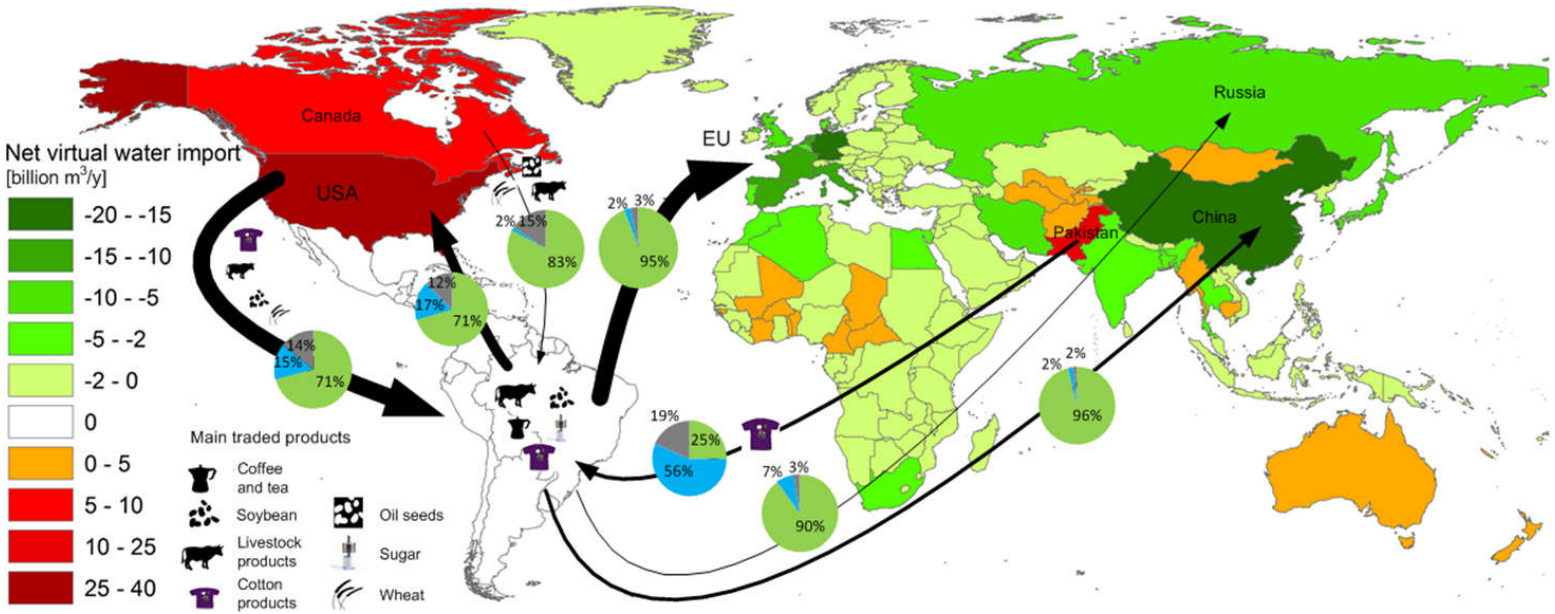
Virtual water

To clarify this concept, for example, how to calculate the virtual water of milk production in Australia is presented in the table below. Based on calculations, virtual water required for one liter of milk produced is 915 liters (Hoekstra and Chapagin, 2007).

Virtual Water Source	Volume of virtual water used (Liters of water per Liters of Milk)
Direct use	
Precipitation on pastures	**400**
Irrigation on pastures	**300**
Water for livestock	**12**
Indirect use	
Precipitation/Irrigation water used in forage production	**200**
Total	**915**

Virtual water trade

Globally, America, India, Brazil, Argentina, Canada, Australia, Indonesia, France and Germany are the main exporters of virtual water and Japan, Germany, China, Italy, Mexico, France, England, Netherlands and Iran are the main importers of virtual water.



Legend: Global map showing countries with net virtual water import related to import of agricultural and industrial products from Latin American countries (green) and countries with net virtual water export due to agricultural and industrial exports to Latin American countries (red) over the period 1996-2005. Only the biggest gross virtual water flows (over 10 billion cubic meters per year) are shown. Source: Mekonnen, M.M., Pahlow, M., Aldaya, M.M., Zarate, E. and Hoekstra, A.Y. (2015)

Water footprint

The water footprint is a multi-dimensional indicator, showing water consumption volumes by source and polluted volumes by type of pollution; all components of a total water footprint are specified geographically and temporally.

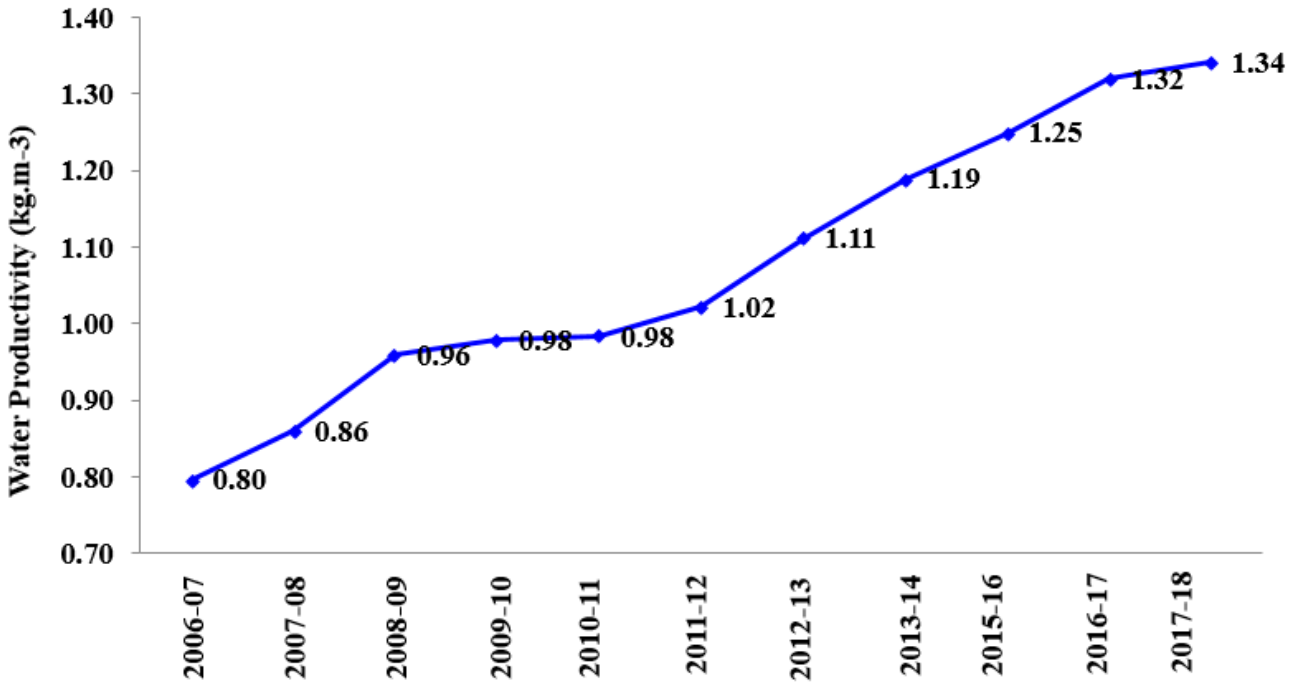
- Virtual water only refers to the volume of water used in the production of the product, while the footprint clearly states where the water footprint is estimated, what water resources were used, when the water was consumed, etc.

Water productivity

The highest consumption of water is in the agricultural sector in worldwide (the global average is 70% and the national average is about 85%), therefore, increasing water efficiency in the agricultural sector should be at the top of the work and other programs should be carried out based on water productivity.

Water productivity is the ratio of various quantitative concepts like product performance, net income, production energy, calories produced, added value to applied water (blue and green water).

The trends of water productivity in Iran



Thank you for your attention

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