



Adaptation to climate change in semi-arid mountainous area in Iran

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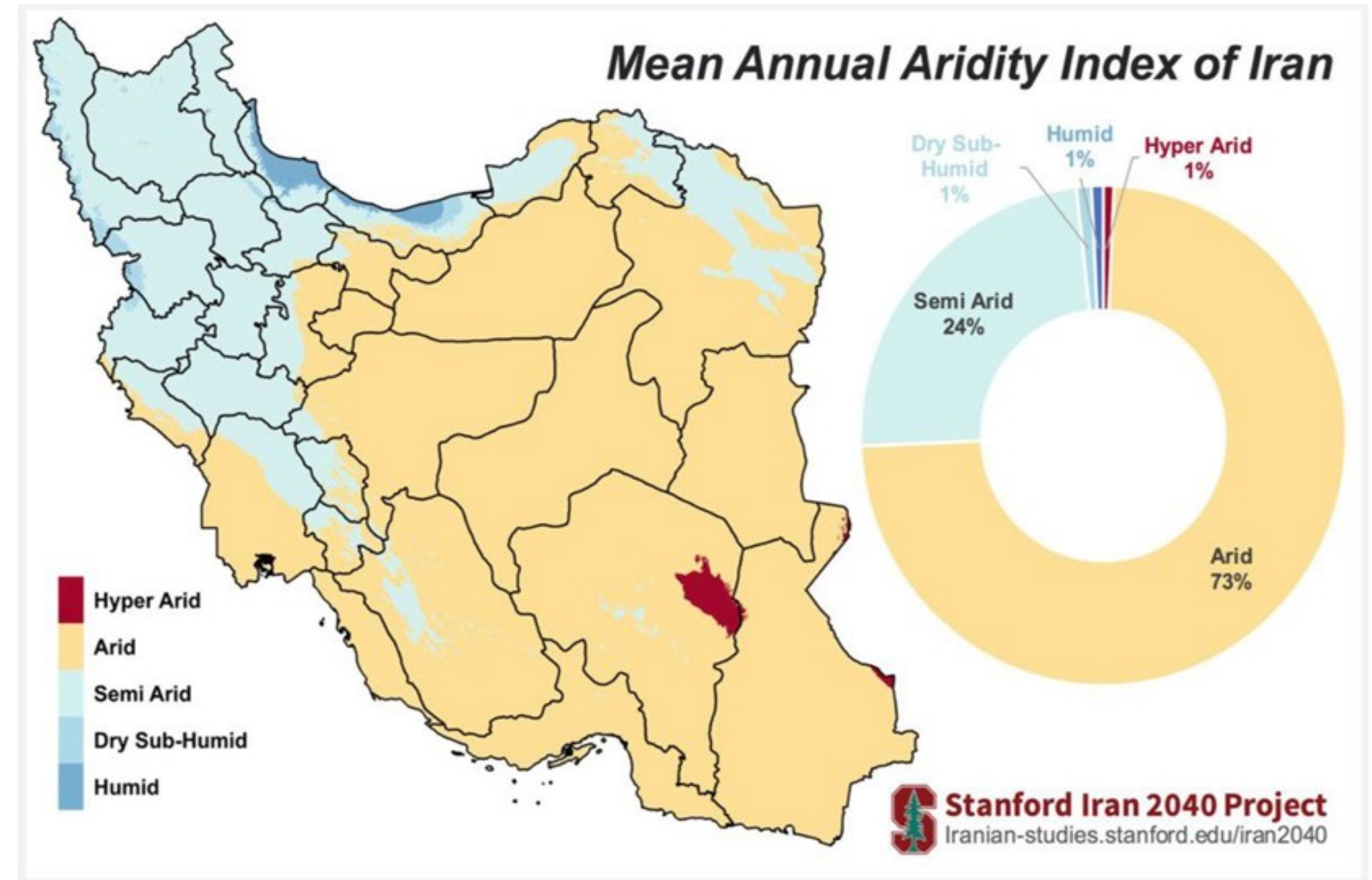
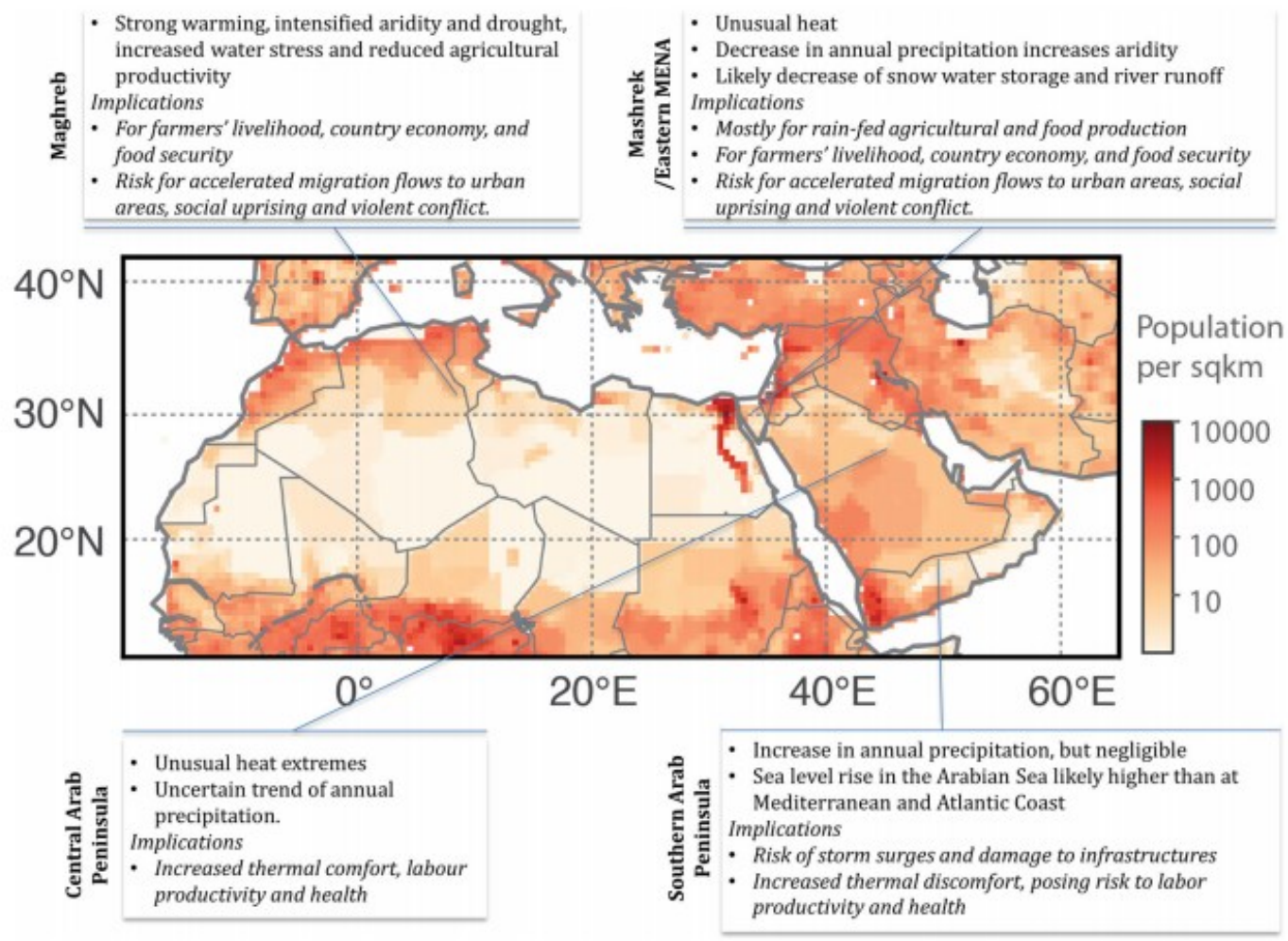
It is well documented that the Middle East region has experienced climate shifts, water shortages, and disruptions to agriculture and human settlement for millennia. The Middle East and North Africa (MENA) is the most water scarce region in the world. With combined effects of a predominantly arid climate, rapid population increases, increased demand for water, climate change, and transboundary water management issues Iran, along with other MENA countries, is faced with a growing water crisis situation. Based on an analysis of the economic impacts of climate change induced water scarcity the MENA region is expected to experience the greatest economic losses, estimated at 6-14 percent of GDP by 2050.

Iran, with an area of 1,648,195 square kilometres, is mostly a mountainous and semi-arid land. The climate is mainly influenced by a sub-tropical high pressure belt, with three climate types according to the Koppen climate classification; arid and semi-arid; temperate-mesothermal; continental-microclimate. Approximately 97 percent of the country is arid or semi-arid with an average annual rainfall of 240mm, less than a third of the world's average precipitation. Annual rainfall in the inland dry deserts of Iran can be as low as only 10mm. Rainfall is very the central, southern and eastern areas of the country. Average annual rainfall over most of the country is about 200mm. Temperatures vary from -6°C to 21°C in January and 19-39°C in July. Iran's population has grown rapidly over the last sixty years, from approximately 19 million people in 1956 to approximately 80 million in 2016.

The Bakhtegan Basin is located in the northeast of Fars Province in the south of Iran and is home to 854,093 people. It is one to the most important natural habitats in Iran covering an area of 2,724,592 hectares. It is the heart of Persian civilization and culture, with the ruins of Persepolis and other important archaeological sites located within the basin. Persian civilization undoubtedly thrived there because of water. The most important meteorological systems in the region are the Sudanese low pressure system, the low pressure of the Mediterranean, the cold north high pressure, the low thermal pressure of India and the low pressure of Saudi Arabia. Local climate data have been gathered and analyzed from 43 meteorological stations.

A recent study shows of the impacts of climate change on the Bakhtegan wetland is somewhat inconclusive. Using 1998-2012 as a baseline period changes out to 2050 were determined using 28 different climate change scenarios. The results demonstrated that "The Bakhtegan wetland is predicted to have an area of 238–690 km² in 2050. 16 climate scenarios estimate an increase of 0.4–72 % and 12 scenarios estimate a decrease of 3.8–41 % in the area of this wetland for 2050 in compared to its mean area". All scenarios predicted a decrease of 17–69.5 % in the maximum area (i.e. the maximum extent identified from the baseline period) of the Bakhtegan wetland.

A study commissioned by the Ministry of Energy developed a climatic zoning for the Bakhtegan Basin using the Trewartha - Koppen classification method because of high precision in determining the boundaries of temperature and precipitation. The analysis used network data from CCAFS-Climate Data Center with five-minute spatial resolution under the A2, B2 and A1B scenarios of HadCM3 model for the base time period of 1982 to 2012 the projected periods 2030s, 2050s, and 2080s.



Climate Type	Current Period	Based on A1B scenario		
		2030s	2050s	2080s
Warm semi-arid	21.7	49.9	33.3	35.7
Cold semi-arid	8.3	31.7	17.7	11.3
Arid hot	-	1.9	40.4	49.4
Arid cold	-	-	8.0	3.1
Subtropical with dry summer	18.7	6.1	-	-
Hot dry moderate	8.5	6.1	-	-
Cold dry moderate	0.2	-	-	-
Arid-hot moderate with winter precipitation	12.5	-	-	-
Humid moderate	30	4.3	0.5	0.5

Project Main Objective

The objective of the project is increase the resilience of communities and the natural environment of the Bakhtegan Basin to climate variability and change through integrated landscape management

Project Main Components

- Knowledge of climate risk, climate change and the environmental situation is strengthened to support development of long-term climate resilience in the Bakhtegan Basin using a decision support system
- The resilience of communities in the Bakhtegan Basin is strengthened through community empowerment and implementation of climate smart agriculture and alternative livelihoods
- The resilience of the natural environment of the Bakhtegan Basin is strengthened through targeted interventions in key locations
- Capacity at the local, regional and national level is strengthened for improved governance and decision making in relation to climate risk management and effective implementation of adaptation measures

