

Changes in the Use of Rangelands, Forests and Water Resources Beyond Their Recycling Capacity: As the Most Important Environmental Challenges in Iran

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Geographical Location of Iran

Iran is located in Western Asia and covers an area of 1,648,198 square kilometers. Iran borders Armenia, Azerbaijan, and Turkmenistan and the Caspian Sea in the north, Afghanistan and Pakistan in the east, and Iraq and Turkey in the west. In addition, Iran has a water border in the Persian Gulf and the Sea of Oman with Kuwait, Iraq, Saudi Arabia, Bahrain, Oman, Qatar, and the United Arab Emirates. Iran is located between 25 degrees and three minutes to 39 degrees and 47 minutes north latitude and 44 degrees and five minutes to 63 degrees and 18 minutes east longitude. The territory of Iran is located in the arid and semi-arid belt of the earth, and the country's only water resources are annual atmospheric precipitation that flows or accumulates in the form of surface water in rivers and streams, groundwater in alluvial aquifers or reservoirs of hard formations, and part of the water resources comes from neighbouring countries.

Iran's Most Important Environmental Challenges

Caspian Sea Basin, Persian Gulf, Lake Urmia, Hamun, and Hor-al-Azim Wetland

The Caspian Sea in northern Iran is at risk of severe environmental pollution. All countries bordering the sea are engaged in extracting resources, including oil, with advanced technology. Due to political reasons and tensions with the West, Iran's only share is pollution related to drilling and crude oil spills, the clots of which are occasionally seen on the coasts of Iran. The lake's wildlife is also suffering from widespread mortality

and population decline. Every year, carcasses of Caspian seals are found on its shores. On the other hand, the high population density in the north and the arrival of tourists with high frequency have caused pollution of the rivers, so much so that the former head of the Department of Environment stated that there were no longer any living organisms in the river. Because the leachate of waste has entered the rivers and destroyed the living creature.

Persian Gulf

In the south of Iran, the Persian Gulf has been exposed to severe pollution from oil. This waterway supplies about 40% of the world's oil needs. The ecosystem of this waterway is in serious danger due to oil pollution. Under normal conditions, 120,000 tons of oil enter the waterway annually, and many species of its inhabitants are at risk of extinction. Another threat is the introduction of invasive species from other parts of the world due to the discharge of ballast water from giant oil tankers. Trawling or dredging and the reduction of biodiversity by the Chinese is another major threat that has endangered the lives of local fishermen in the Persian Gulf. Installing desalination plants for drinking water in this area in a limited and shallow waterway will cause more salinity and destroy its rich fauna and flora. The Persian Gulf, like the Caspian Sea, is flooded with pollutants through water currents. A major war is currently underway in the Persian Gulf, which has caused various pollutions, including crude oil spills, disrupting the region's ecosystem, and causing irreparable losses to its inhabitants. Mangrove forests on the shores of the Sea of

Oman are at serious risk. In the Persian Gulf, as in the Caspian Sea, Iran is unable to use the oil and gas resources shared with the countries of the region due to its lack of technology and tensions with the West.

Lake Urmia

The drying up of Lake Urmia is a phenomenon that has occurred over the past 3 to 4 decades with the construction of numerous dams. The number of unauthorized wells drilled to supply agricultural water in this basin is much higher than in any other province in Iran. More than 50,000 unauthorized wells have been drilled around Lake Urmia, the area of irrigated agricultural land in the basin increased from 230,000 hectares before 1979 to approximately 700,000 hectares today, making the lake unstable and dry.

Lake Hamun

In eastern Iran, the bed of Lake Hamun has dried up due to the lack of water rights from Afghanistan, which has caused sandstorms and driven native animals away. The main way to control fine dust in the north of this province is to restore the Hamun wetland and allow the Helmand River to flow. The death of animals and the destruction of vegetation are one of the main factors in creating dust centers in the country. Even the application of oil mulch has contributed to the death of animals and the drying of plants, so that thousands of native species have perished.

Hor al-Azim Wetland

The Hor al-Azim Wetland in southwestern Iran has been drained for oil extraction and has been turned into a salt marsh that has become a source of dust. The wetland requires at least 5 billion cubic meters of water annually, 2 billion of which must be supplied through the Karkheh River and 3 billion must be supplied from Iraq, namely the Tigris and Euphrates rivers. Drought and the failure to reach the Hor al-Azim have caused the death of fish and buffaloes. Rice cultivation is another reason for the consumption of water in the region beyond its natural replenishment. One third of the Hor al-Azim wetland is located in Iran and two thirds in Iraq, and it is the livelihood of many villagers in the region. Turkey has blocked the flow of water from these two rivers into the wetland by building a dam. This region is the cradle of the ancient Mesopotamian civilization, where the agricultural revolution took place. The Gavkhoni wetland in central Iran has dried up due to the lack of water from the Zayandeh River.

Dust

Dust pollution is another environmental pollutant in Iran. Out of 31 provinces in Iran, more than 25 provinces are affected by dust. This is a regional problem that, in addition to Iran, is related to Turkey, Afghanistan, Iraq, Saudi Arabia and Syria, and a suitable solution must be implemented with the help of these countries. The most important reasons for this problem are the lack of proper water management in the countries involved, the loss of vegetation and forests, more than 80 percent of the dust

that affects Iran comes from its western neighbors. Sometimes the concentration of pollution in the city of Ahvaz has reached 23 times the permissible limit, which has made normal life difficult for people. According to the Minister of Health, 50,000 deaths occur in Iran every year due to air pollution. Domestically generated dust resulting from the destruction and pollution of the country's wetlands, including Shadegan and the destruction of the Gavkhoni, the drying up of the montane forests due to the extraction of groundwater from deep underground for agriculture and pistachio cultivation, the excessive transfer of water from the Karun and Karkheh springs, and the drying up of Lake Urmia are some of the issues that have shaped the current situation.

Forest cover

With 5 forest habitat areas including the Arasbaran, Hyrcanian, Zagros, Iran-Turanian, and Omani Sea forests, Iran ranks 56th globally in terms of forest area. These habitats are home to many valuable species. Among them, the Zagros forests with 6 million hectares and the Hyrcanian forests with 2 million hectares have suffered the most from human encroachment and climate change. Estimates show that Iran loses between 14,000 and 20,000 hectares of its forests every year. In the past five decades, about 43 percent of Iran's forests have been destroyed. Since 1979, Iran's forests have fallen victim to increasing destruction, and about one million hectares of the ecologically rich Zagros forests have been lost due to climate change.

Central plateau basin

The Central Plateau Basin of Iran is facing a severe water crisis due to climate change and declining water availability, on the one hand, and population growth and increasing water demand, on the other. In the central parts of the country, groundwater has been extracted more, and many cities in the provinces of Iran have suffered very large subsidences. The main reasons are the increase in population and cultivated area. The area of irrigated agriculture in Isfahan before the revolution increased from 70 thousand hectares to 360 thousand, and large subsidences are swallowing Isfahan. The largest land subsidence in Iran has occurred around Kashan. This large gap starts from Kashan and continues to the city of Qom. Its length is about 76 kilometers. Agriculture and excessive extraction of water from groundwater tables are the main reasons for this subsidence. In the past 3 decades, the water table in the Aran and Bidgol deserts has risen from about 2 to 3 meters to more than 100 meters. So that a large number of *Haloxylon aphyllum* trees have dried up. Groundwater that is hundreds of thousands of years old is pumped out using powerful pumps for pistachio trees or agricultural products, which has severely damaged the ecosystem of the region, including animals and natural cover. The result is an increase in dust and the occurrence of respiratory and eye diseases. This environmental destruction in the region. With human interference in Iranian nature over the past half century, 70 percent of animal species in Iran have been destroyed and many species are at risk of extinction.

Apart from the excessive harvesting of Iran's ecosystem, the type of environmental protection management is ineffective. So much so that in Iran, 150 park ranger have been killed by hunters in a forty-year period.

Food security

Excessive extraction of surface water and groundwater has put the food security of the Iranian people at serious risk, which will have dire social and economic consequences. Currently, more than half of the food needed by the Iranian people and a very a substantial proportion of livestock inputs are imported from abroad. Large parts of Iran have been affected by drought. In human history, climate change, especially drought, due to its lasting effects, has caused great migrations, wars, victories and defeats, including the Arab invasion in the 7th century, including the Mongols and the French Revolution, the fall of the Roman, Han, Mauryan and Gupta kingdoms, and the collapse of advanced Mesopotamian civilization and kingdoms. Continuous droughts and deadly and long-term climate changes have led to war, famine and tribal strife, and then the invasion of wealthy northern and western countries, which were the main reasons for the Arab invasion in the 7th century AD. The most important factors affecting the process of the collapse of these civilizations are population, climate and environmental conditions, water, agriculture and energy resources. In the case of a combination of over-exploitation of natural resources and the division of society

into a wealthy minority and a poor mass, ground is laid for the collapse of civilizations. Iran is in tension in terms of food supply, this issue can challenge Iran's national, cultural and historical security.

It is predicted that with this process of extraction of water resources, with an increase in population and agricultural activities, it will lead to large-scale migrations of Iranians. It is impossible to assess environmental crises without considering the effects of widespread human interventions and inefficient political, economic and social management. Ignoring the role of human activities and the current type of management of resources, especially in agricultural activities, in national environmental crises will cause imbalance in the environment and ultimately the destruction of Iran's fragile ecosystem.

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