

Reflections on Iran's Climate-Related Issues

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a) Remarks of Global Nature:

Scientists say that, in a warming climate, more energy and moisture enter the atmosphere. This upsets the general circulation system of the atmosphere, therefore, the precipitation scheme and the global water distribution. All indications point to the fact in the coming decades and centuries geographical and temporal distributions of rainfall and snowfall will change.

- Equatorial and northern latitudes will receive more precipitation. In these regions lands will be wetter, rivers will have more water, and floods will be severer and more frequent than what they are already today.
- On the other hand, mid latitudes will have less and untimely rains and snows, will have drier lands, lesser river flows, and longer and more intense droughts
- Snow packs in mountain areas will shrink, leading to lesser river flows in warm months of the year when water is most needed.

In face of such large scale uncertainties in the availability of fresh water, the world as a whole is likely to face a dilemma with no precedence and experience in its past history of civilization. For instance, fresh water, like fossil fuel of the present days, may become a commodity to be transported not only from one country to a neighboring one, but also across the globe.

To avoid crises and misunderstandings between the communities and population centers, governments, particularly those in dry latitudes, are advised to create an active "Water Diplomacy" in their foreign policies and have plans for possible unforeseen water related crises (this is an advice from M. H. PapoliYazdi, and F. Vossughi, Iran Water Diplomacy, Hydro-geopolitics, 2011, Meshed, [www://publisher.amayesh info. com](http://publisher.amayesh.info.com)).

To resolve potential future disputes between nations in peaceful a manner, international bodies, such as the United Nations and the International Monetary Fund, are advised to take initiatives and to draw up guidelines and legal measure for water related issues.

b) Remarks Pertaining to Iran:

Evaporation from Iran's lakes, wetlands, and exposed water reservoirs behind dams is of the order of 2000 – 3000 mm per annum. Developing and executing preventive measures to minimize evaporation are of immense help. Here are some suggestions:

- Underground reservoirs, wherever possible, would substantially reduce evaporation.
- Subsurface irrigation of trees and orchards would save 40 - 50% on water demand.
- Greenhouse growing of vegetables and fruits would cut the water consumption to one tenth of what is used in open air gardening and growing.
- Coating of open water surfaces, depending on how efficiently it is done, would reduce evaporation substantially. The technique is experimented in laboratory scales and on small pilot projects. There are, however, many technical problems to be solved before sizable and commercial scale practices are in place.

Implementation of any of these and similar provisions requires:

- Extensive Research and Development to arrive at appropriate technologies and optimized methods of practice.
- More often than not, traditions and old ways of life resist new ideas. A detail study of the social and economic structure of the rural food producing communities is essential before introducing any new measures.
- Extensive training, promotional initiatives, and social help are essential to persuade and enable farmers and growers to adopt the new technologies and practices.

The agriculture sector of Iran uses close to 90% of the fresh and brackish waters of the country. More often than not, this is done by the rural residents who might be least informed of the gravity and the consequences of global warming and climate change, and of the scarcity of water in the years and decades ahead of them. A nationwide education program to inform the public and, in particular, the food producers and crop growers should be created.

c) Dust in the Skies of Iran

In the first half of the 20th century the global dust band extended from the African Sahara, Arabian Peninsula, and Iraq to southern Iran and beyond. Northern Iraq and Iran seldom had dust storms. In the past few decades, however, the situation has changed. The whole Mesopotamia and the Iranian plateau are witnessing intense dust events. The source of some dusts of the northern and the central Iran are the dried up basins of the two historical Euphrates and Tigris rivers. And that itself is partially due to the global warming, but mainly to the water reservoirs built on the upstream of the two rivers before flowing into Syria and Iraq. The capacity of the reservoir behind the Ata

Turk dam alone is 4.9 billion cubic meter (bcm), exceeding the total volume of all reservoirs of Iran, 4.8-4.9 bcm.

There are other dust sources in Iran. All seasonal inland lakes of the country have dried up, and Lake Urumieh is continually shrinking.

The global dust band is a characteristics of the mid-latitudes countries. Countries, depending on their interests and means monitor and analysis their share of dust and collaborate in international forums by sharing their findings. Dust monitoring stations in the Middle East region are very few and not adequately equipped. In the greater Iran there are only two places, Zanzan and Tehran.

Our LIDAR studies combined with meteorological data indicate that they are originating from the dried up basins of the Euphrates and Tigris rivers. This in turn is mostly due to the large dams on the upstream of these rivers before entering Iraq.

As far as dust monitoring is concerned, the Middle East region is almost a vacuum. To have educated statements on dust issues and possible preventive measures, countries in the region, including Iran, are well advised to set up a monitoring grid and share their data and analyses with each other.