# Water Security in Iraq

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## Introduction:

Iraq is facing, for the first time in its long history, a serious water shortage problem. Aside from the seasonal variations in the flows of the Twin Rivers, the Euphrates and Tigris, ancient as well as contemporary Iraqis have never witnessed such a serious threat to water availability in the country. Most importantly, the causes of the recent water scarcity were not entirely natural. They were mostly man-made aggravated by natural occurrence of drought conditions. The most recent water shortage in Iraq in 2007-2009, is an example where water control structures, including dams and diversion schemes in neighboring countries, particularly in Turkey and Iran, have prolonged the drought conditions time, inflicting harm on Iraq's economy and environment and forcing the Iraqi Ministry of Water Resources to declare to the public that it may not be able to meet the water requirements for the summer season of 2010.

It is extremely difficult, if not impossible, for Iraq, which is the most downstream country, to plan, manage and allocate its water resources, if the discharge in nearly all its rivers and tributaries is controlled by neighboring countries. Furthermore, all riparian countries are pursuing their own water resources development projects individually in the absence of any binding water sharing agreement. In the case of Iraq, the current state of water management practices in neighboring countries is damaging to its water security and in many aspects it is destabilizing factor as Iraq's environment and rural economy continue losing their life support capacity.

## What is "Water Security"?

Unlike the term "Food Security" which is well defined by the UN Food and Agriculture Organization FAO, there is no accurate definition of the term "Water Security". As water has a range of usages for diverse purposes including for food production and agriculture, domestic or drinking and sanitation, commercial, industrial and recreational usages; the term "Water Security" may not have the same meaning per each usage.

Our understanding, of the term "Water Security" in this article is related to a few factors if all of them are completely or reasonably met then water security is said to be achieved.

1. ***Accessibility*** *to the water resources is ensured in time and space*. This is vital for irrigated agriculture, as is the case in Iraq, where water must be available for seasonal crops at certain times of the years. Availability of water outside the required time would be of less value for agriculture and farmers would not be able to cultivate their farms.

2. ***Utilization*** *of the water resources to achieve economic development is possible*. Water is a significant economic input to achieve development and prosperity and as such water security is directly linked to the capacity of utilizing water resources in achieving economic growth.

3. ***Ability to manage*** *the water resources sustainably and to ensure acceptable quality and quantity*. Unless the country is able to manage its water resources in a way that ensure its sustainable supply and use without compromising the quality or quantity of the resource; water security would be vulnerable.

4. ***Ability to balance the competing demands*** *for water such as for irrigation, domestic water supply and sanitation, hydropower, environmental requirement etc*. Increased demand on water by all sectors is a challenge that must be addressed by resorting to the principles of Integrated Water Resources Management through which fair and balanced water allocation, pricing and governance are utilized to meet the competing demands for water.

5. *Long term* ***Water Sharing Agreement*** *with full participation of all stakeholders is achieved*. This is critical to manage shared water resources in the area. The Euphrates River and the Tigris and most of its tributaries cross the borders of more than one country. Iraq is the most downstream riparian is vulnerable to the water resources management practices in the upstream countries. In the absence of a long term water sharing agreement among the riparian countries, Iraq is by far the most disadvantaged country. The lack of Water Sharing Agreement represents a direct threat to water security in Iraq.

6. ***The environment is protected*** *from pollution and degradation*. It is extremely important that Iraq is able to protect its environment and provides for the restoration of the southern marshlands that have been deliberately drained at the hand of the former regime. The maintenance of Iraq's wetlands and the protection of biodiversity in the country are preconditions for sound water management practices intending at ensuring water security.

## Water Resources in Iraq:

The Euphrates and the Tigris rivers hydrology is a snow melt hydrology and is largely linked to the precipitation on the highlands of Turkey (and Iran in the case of Tigris River's tributaries). High precipitation of snow during the winter times would result in peak flows in the Euphrates and Tigris during the spring times and vice versa when the highlands receive low precipitation it would result in drought and water shortages in Iraq.

The water year or annual flow In Iraqi rivers is generally classified as wet, average or dry. Accordingly, water management plans and the seasonal operation of Iraq's hydraulic infrastructure, including storing or releasing, are based mainly on these three scenarios. However, devastating flood events took place in Iraq as well as severe drought and water

shortages. The variation in the hydrological cycle manifested in the magnitude and sequence of floods or droughts is very critical. Generally, in the natural state of the rivers 70% of flows in the Iraqi rivers occur between March and June, 20% between October and February and 10% between July and September as shown in Fig.1

The maximum demand on water is during the summer time where minimum flow has been historically observed. As a consequence, Iraq developed its water control structures, much earlier than its neighbors, to allow for storing excess discharges in the wet season and utilization in the dry season. As a consequence, Iraq developed an elaborate water system over time.

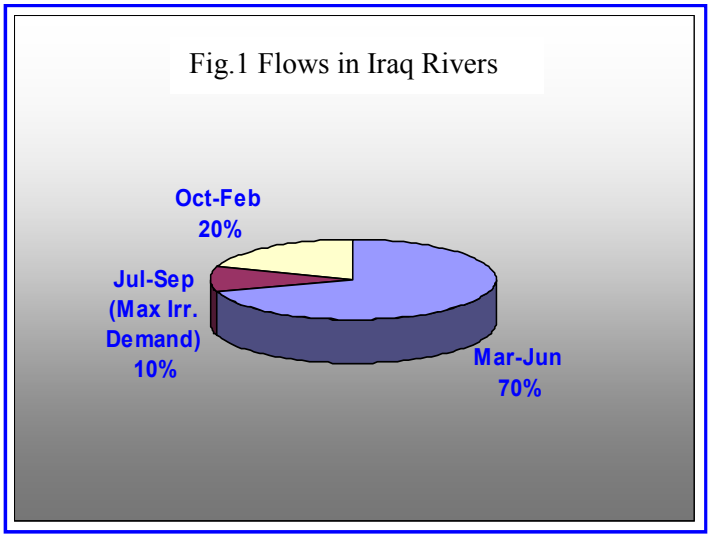

Fig.1 Flows in Iraq Rivers

Although the first attempts to manage water resources in Iraq, both in terms of codification, as in the Code of Hammurabi, or construction of canals, dykes and control structures, took place in the ancient times; the real development in water resources management took place in the second half of the twentieth century. However, critical diversion structures like Hindya Barrage on the Euphrates and Kut Barrage on the Tigris were constructed in 1918 and 1939 respectively. They have played a major role in Iraqi agricultural production.

Currently, Iraq possesses a highly controlled and fairly flexible water system. However, one of the main features of Iraq's water system, at least in most its infrastructures, is the assumption that historical discharges in Iraqi rivers and tributaries would remain unchanged. As Iraq is the most downstream country, this assumption is now shaky. In the last three to four decades riparian countries resorted to unprecedented programs of dams building, resulting in significant changes in the natural cycle of water in the Euphrates river and in the lower reaches of the Tigris River ( as a result of construction of dams and diversion schemes in Iran). This variation is evident in the Euphrates River recorded discharges at the Iraqi-Syrian border, as well as the substantially elevated salinity level and the encroachment of the Gulf water into Shatt Al-Arab.

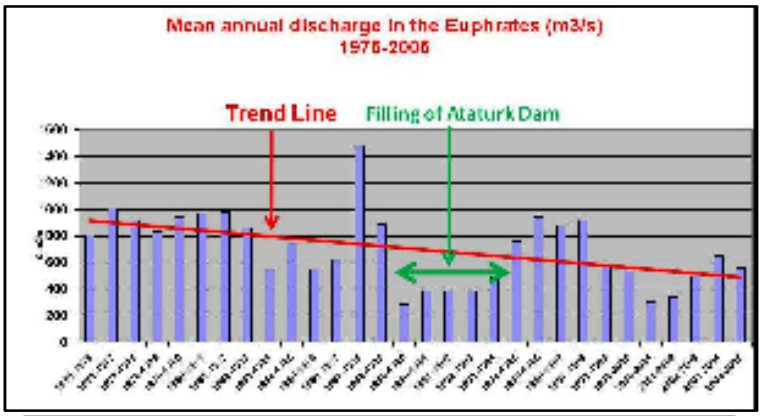

**Fig.2 Mean Annual Discharge in the Euphrates R.**

The flow of the Euphrates at the border point has been declining since mid 1970's as shown in Fig.2., with the construction and filling of a series of dams in Turkey (Keban, Karakaya, Ataturk, Birecik and Karkamis) and in Syria (the Baath, Tabqa and Tishreen)

The reduction in inflows at the Iraqi border with Syria is estimated at about 10 BCM per annum and the trend line for the last 30 years is very alarming. If the trend continues, Iraq will face deadly water shortage.

Fig.2 also shows that Dam construction, of the scale observed in Turkey, is a serious intervention in, and alteration of, the natural hydrologic cycle. The most devastating period on the Euphrates River was the period of the filling of the dam. The decline observed in the discharges of the Euphrates River between 1990 and 1994 is a consequence of the filling of the Ataturk Dam.

The monthly average flow for the periods 1925-1973 (before the construction of dams in Turkey and Syria) and after the construction in 1975-2005 is shown in Fig.3. The peak flows in the months of March, April, May and June observed in Iraq during the pre-dams period has been significantly reduced compared to the post dams period. However, more discharges have been recorded in the months from July to February in the post-dams period and this mainly due to the controlled releases from upstream dams in Turkey and Syria. Unfortunately the volumes of releases in the summer months are much less than the volumes retained during the wet seasons.

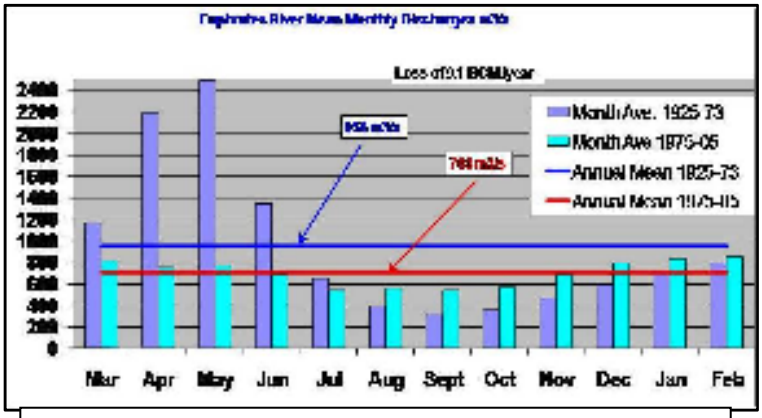


**Fig.3 Mean Monthly Discharge in the Euphrates R.**

The series of Turkish dams provide full control on the flow of the river both in terms of quantity as well as the timing of releases. In the absence of water sharing agreement or coordination of the operating procedures I the three countries, this could be damaging to the economy, particularly the agricultural economy, and a threat to the ecosystem and biodiversity particularly for the season-sensitive species.

In fact Turkey continues to be the most active country in the world in the field of dam building. In the last 30-40 years Turkey constructed more than 650 dams of which more than 20 dams in the Euphrates and Tigris River basins where Turkey has, in the Euphrates River only, a storage capacity of 92 Billion Cubic Meters (BCM). This is more than three times the average flow of the Euphrates Rivers. Turkey is also pushing for the construction of Ilisu Dam on the Tigris River despite the pulling out of the European countries (Germany, Austria and Switzerland) from financing the project. The Ilisu dam, if constructed will be a major blow to Iraq by reducing the Tigris discharges at the border with Iraq by nearly 50% of its annual average.

## **Iraq's new realities and the push for water security**:

Throughout their long history, Iraqis always found water to be readily available and safe to drink and utilize. In southern Iraq, there was plenty of it everywhere in the Mesopotamian marshes all year round and ancient Sumerian civilization flourished on water. The abundant water provided everything that sustains human life in the area for thousands of years. The Sumerian way of life continued for five thousand years uninterruptedly up to the modern times. The new reality of water resources in Iraq is somewhat different. There is less water flowing in the Iraqi rivers. Water management and operations in the neighboring countries are based on their needs only and they are unwilling, except in the case of Syria, to respond to the Iraqi demand to reach a fair and long term water-sharing agreement. Climate change and variability impact are reflected in less rainfall, elevated average temperature, shrinkage of vegetation cover and desertification, increased stresses on the vulnerable and newly restored Iraqi Marshes and extended drought. For instance, the last drought 2007-09 has been unprecedented in its severity and length. Haditha Dam power generation capacity was interrupted for extended period and no diversion has taken place to the Habaniya Lake and a major reduction in the areas of cultivated land in winter and summer seasons

However, the Iraqi Ministry of Water Resources succeeded in establishing good relationships with neighboring countries resulting in regular high level meetings and increased cooperation. The capacity of the Ministry of Water resources to ensure water security for Iraq must be supported including in terms of financial support and various other forms of support to be able to join forces and lead all national stakeholders, including the Ministry of Municipalities and Public Works, The Ministry of Environment, Baghdad Amanat and provincial authorities water-related departments. This is essential to implement its long term strategy and to introduce water reforms at the national level and influence the regional approach of water management.

To meet the six factors, listed above as indicators for water security in the country, Iraq requires adequately empowered and well resourced Iraqi water-related ministries and institutions to carry on with intensive efforts at national, regional as well as international levels.