

HYDROLOGY & WATER RESOURCE MANAGEMENT

Human Impacts

Freshwater constitutes only ~2.5% of the total volume of water on earth, and two-thirds of it is trapped in glacial ice. Only 0.77% of freshwater is held in places more accessible to humans such as aquifers, lakes, rivers, and the atmosphere. River runoff is the most accessible source and accounts for much of the water used for irrigation agriculture, industry, and hydropower generation. New dam construction has the potential to increase accessible runoff by ~10% over the next 30 years, however population is projected to increase by more than 45% during that period. As a result humans will become increasingly sensitive to natural variations in precipitation and river runoff.

Perhaps the most sensitive of all regions is the Middle East, where usable freshwater is already scarce. With population increasing by 3.2% each year and irrigation practices consuming upwards of 80% of available water supply, water is a key variable affecting regional public health and political stability. Much of the current focus in Middle Eastern water policy has been the environmental and socio-economic impacts associated with increased damming along the Tigris-Euphrates River system.

Turkey, because it has the good fortune of being situated at the headwaters of the Tigris-Euphrates River system, can literally turn off the supply of water to its downstream neighbors and has threatened to do so on occasion. For example, when the Ataturk Dam was completed in 1990, Turkey stopped the flow of the Euphrates entirely for one month, leaving Iraq and Syria in considerable distress. However natural climate variability, which has no political alliances, can be attributed to variations

in Turkish precipitation and Euphrates River runoff and is linked to changes in the NAO. Even the recent trend in the NAO index can be seen in historical precipitation data; with droughts occurring in Turkey during the 1980s and the early 1990s and wet conditions generally occurring during the 1960s and the late 1970s.

