Water Budgets in Mesopotamia

Background

Rivers can unite or divide people – they can be the topic of cooperation or conflict.

Neighboring countries can cooperate in using the water.

Conflicts can arise when people cannot agree about the use of water.

This activity focuses on Southwest Asia, where Turkey, Syria and Iraq depend on the Tigris and Euphrates rivers. Because this is an arid (dry) region, these rivers are important sources of water. And because populations in all three countries are growing rapidly, they demand more and more water. Could this situation cause conflict, or will these countries cooperate in the use of available water?

The geographic setting of the Tigris-Euphrates region

The Euphrates River is the longest river in Southwest Asia. It is about 1800 miles long. The Tigris, at 1,000 miles, is the second longest. Imagine that you are riding a raft downstream from the headwaters of the Tigris or Euphrates River. You will want a life jacket for running rapids and a motor to cross lakes behind huge dams.

At first, you will see snow on mountaintops. Later, you will get sun-burned in hot deserts. In many places along the river, small towns and green fields of irrigated crops will hug the river's edges.

Both rivers begin in eastern Turkey.

- The Euphrates flows out of Turkey through Syria and then into Iraq.
- The Tigris also starts in Turkey. It forms a short portion (20 miles) of the border between Turkey and Syria before it flows into Iraq. There, it is joined by tributaries flowing out of the mountains of western Iran.

The two rivers come together in southern Iraq to form the Shatt al-Arab, a short and very slow-moving river that empties into the Persian Gulf.

Thousands of years ago, some of the world's first farmers settled in the Tigris-Euphrates river basin. Ancient empires such as Sumer, Assyria, Babylon, and Persia had their capitals in this area.

In modern times, Iraq, Syria and Turkey have all built dams and irrigation systems to use river water. Turkey recently started a huge water-storage and distribution project, known as GAP (Guneydogu Anadulo Projesti), in its southeastern region. Iraq and Syria are concerned that GAP will reduce both the quantity and the quality of water flowing downstream. This creates the potential for conflict in the region.

Water Budget Worksheet

In examining the water budget of a river, geographers use four key terms:

Inflow: water flowing in a river at the point where it enters a country
Rain & snow: water added to a river (by precipitation) within a country
Withdrawal: water that people take from a river for use within a country
Outflow: water flowing in a river at the point where it leaves a country

Inside a country, these four terms are related in the following way:

Start with inflow. *Add rain and snow.* *Subtract what you use.* *The result is outflow.*

INFLOW + RAIN & SNOW - WITHDRAWAL = OUTFLOW

This simple formula can be used for an individual river, but we can also talk about inflow, addition, withdrawal, and outflow for several rivers combined. Using the water-budget equation, figure the appropriate numbers and put them on the blanks in this summary table:

	Situation Before the Large Dams			**Predicted flow**
	Euphrates River	Tigris River	Combined Rivers	(combined rivers) in 2040
Turkey				
Inflow	0	0	0	0
Rain & snow	+23	+15	+38	+36
Withdrawal	-2	-2	-4	-26
Outflow	21	___	34	10
Syria				
Inflow	21	___	___	___
Rain & snow	+2	+0	+2	+1
Withdrawal	-5	-2	___	-18
Outflow	18	___	___	___
Iraq				
Inflow	18	___	___	___
Rain & snow	+0	+32	___	+30
Withdrawal	-12	-26	-38	-48
Outflow	6	___	___	___

Data source: Adapted from Kliot 1994.

If you came up with a negative number for the predicted outflow from Syria or Iraq in 2040, you can see why people in this region are worried. It looks like none of these countries will be able to do all of the projects they have planned, because there is not enough rain or water in the rivers to satisfy all the demands.

Here is the big question: What do you think people should do about this?