People and Place
Curriculum Resources on Human-Environmental Interactions

Hemispheres is a joint project of:
Teresa Lozano Long Institute of Latin American Studies
Center for Middle Eastern Studies
Center for Russian, East European & Eurasian Studies
South Asia Institute

in the College of Liberal Arts
at The University of Texas at Austin
People and Place
Curriculum Resources on Human-Environmental Interactions

Primary Authors:

Natalie Arsenault, Outreach Coordinator
Teresa Lozano Long Institute of Latin American Studies

Christopher Rose, Outreach Coordinator
Center for Middle Eastern Studies

Allegra Azulay, Outreach Coordinator
Center for Russian, East European & Eurasian Studies

Jordan Phillips, Outreach Coordinator
South Asia Institute

Hemispheres
The International Outreach Consortium at The University of Texas at Austin
People and Place
Curriculum Resources on
Human-Environmental Interactions

Final Version
Original Compilation Date: June 2005
Final Publication Date: April 2007

Permission is granted to reproduce this unit for classroom use only.
Please do not redistribute this unit without prior permission.
For more information, please see:
http://www.utexas.edu/cola/orgs/hemispheres/

Permission to include copyrighted materials in this unit is indicated in citations.
TEACHER NOTES

GOALS
This case study was created to help students understand the complexities of large-scale construction and development projects. Such projects often inspire an optimistic outlook; students will get a better sense of the many different benefits that such projects can have and the ways in which quality of life can be dramatically improved. At the same time, students will learn that such projects have side effects, both positive and negative, that can extend across geo-political boundaries.

ASSESSMENT EVIDENCE
Take a Stand: Students will assume one of six roles and determine how the Southeastern Anatolia Project (GAP) would benefit or harm the person in that role. Using the information they have gained by completing the unit, students will discuss the various cause-and-effect factors that must be taken into consideration when planning and executing projects on such a massive scale.

LEARNING ACTIVITIES
• The Introduction to the Southeastern Anatolia Project (GAP) presents the GAP, its history, and the region of Turkey where the project is being implemented. Students will be asked to consider the potential positives and negatives of the project based solely on their first impressions.
• The Benefits of the GAP discusses many of the positive social, economic, and geographic changes that have come about as a result of the GAP.
• In Change Over Time, students will analyze two aerial photographs of the large-scale irrigation in the Harran Plains that has literally made the desert bloom. Students will be asked to identify changes and consider how the lives of the people who live in the area may have been altered due to the project.
• A follow-up Agricultural Production in the Harran Plain graph activity will provide insight into one specific benefit of the GAP by allowing students to track increased agricultural production in the GAP region.
• After getting a sense of the benefits, students will read about Potential Problems with the GAP to get a better sense of some of the negative side effects the project could have. Students will be able to chart the unrealistic expectations that three nations have for the Tigris and Euphrates Rivers and propose solutions.
Introduction to the Southeastern Anatolia Project (GAP)

The Southeastern Anatolia Project (in Turkish: Güneydoğu Anadolu Projesi, or GAP) is a development project created by the government of Turkey to build a series of dams and hydroelectric plants along the Tigris and Euphrates Rivers in the southeastern part of the country.

The GAP is envisioned as a project that will not only bring electricity and water for irrigation to one of Turkey’s poorest and least developed regions, but will also provide for improved roads, railways and airports, local factories, new schools, and new opportunities for women and children. The Turkish government is heavily betting on this project to ensure Turkey’s ability to grow for years to come.

Critics say that the project is going to drain too much water from the rivers and could cause problems between Turkey and its downstream neighbors, Syria and Iraq. They also say that the project will dislocate too many people, most of whom are Kurds, a minority group in Turkey that has often fought with the government.

Project Overview

The GAP is based in the southeastern part of Anatolia, the name for the part of Turkey that lies on the Asian continent. This region, about 10% of the total area of Turkey, consists of eight provinces that border Syria and Iraq. This part of Turkey is one of the poorest—in 1985, the average income in this area was about half of what it was in the rest of the country. Each year, seven of the eight GAP provinces experience a decline in population due to people migrating to other parts of the country.

The Tigris and Euphrates rivers both originate in the mountains of central Anatolia, and run through the southeastern section before entering Syria and Iraq.

The idea for the GAP has been around for nearly a century, having been first proposed in 1936. Originally, two commissions were set up: one to deal with the Tigris River and one with the Euphrates. In 1980, the two were merged into the GAP and a unified plan was established. The project is scheduled to take 30 years to complete, at a cost of $32 billion. The GAP will eventually include 22 dams and 19 hydroelectric stations that will allow for irrigation of an area of 1.7 million hectares, roughly the size of Belgium. Once the project is completed, 55 billion kWh of electricity will be generated each year.

The first major structure built as part of the GAP is the Atatürk Dam, which was completed in 1992 and is located near the town of Sanlıurfa. Its completion was such an important event that the dam appears on the back of the Turkish 1 lira note.

In addition to the construction of dams and power plants, the GAP also includes other improvement projects, such as the building of new roads, industrial plants, schools, and hospitals. The Turkish government hopes that this will convince people to stay and work in the GAP region and so that they do not have move to bigger cities elsewhere in Turkey to try to make a better life for themselves.
Introduction to the Southeastern Anatolia Project (GAP)

Comprehension Exercises

(1) What is the GAP?

(2) How long will it take to complete?

(3) Why is this region of Turkey important?

(4) What does the government hope that the GAP will do for the people who live there?

(5) Why do you think the Turkish government considered the opening of the Atatürk Dam to be such an important event?

(6) Can you think of similar events in your city, state, or country that have been considered so important?

(7) What do you think some of the benefits from the GAP might be?

(8) What do you think some of the negative effects of the GAP might be?
Benefits of the GAP

Agriculture
The GAP region is an active agricultural region, producing crops ranging from olives and pistachios to citrus fruit. The area is also responsible for about one-third of Turkey’s cotton production. Irrigation as a result of the massive building projects will allow more land to be used for agriculture.

The Harran Plain area, near the Atatürk Dam, has experienced tremendous growth in its ability to produce year-round due to irrigation (see Change Over Time).

The GAP administration estimates that when the project is completed, production will increase as follows:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>90%</td>
</tr>
<tr>
<td>Barley</td>
<td>43%</td>
</tr>
<tr>
<td>Cotton</td>
<td>600%</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>700%</td>
</tr>
<tr>
<td>Lentils</td>
<td>250%</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>167%</td>
</tr>
</tbody>
</table>

Industry
With the expected increase in agricultural production, the Turkish government is investing in factories and processing plants for agricultural produce, so that it can be processed locally instead of being shipped across the country to factories elsewhere. The government is encouraging local business owners to invest in these factories and to hire local employees. The government is hoping that this partnership will convince potential workers to stay in the area instead of moving to Turkey’s largest cities (Istanbul, Ankara, and Izmir), where there are high unemployment rates. The GAP administration expects at least 60,000 new jobs to be created through this program.

New plants built through the GAP:

<table>
<thead>
<tr>
<th>Province</th>
<th>Existing</th>
<th>1995-98</th>
<th>1998-2000</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diyarbakır</td>
<td>42</td>
<td>36</td>
<td>9</td>
<td>87</td>
</tr>
<tr>
<td>Adıyaman</td>
<td>72</td>
<td>58</td>
<td>43</td>
<td>173</td>
</tr>
<tr>
<td>Batman</td>
<td>35</td>
<td>12</td>
<td>33</td>
<td>80</td>
</tr>
<tr>
<td>Sanlıurfa</td>
<td>78</td>
<td>84</td>
<td>23</td>
<td>185</td>
</tr>
</tbody>
</table>

Between the new jobs in industry, agriculture, and construction of the dams, roads, and other facilities, the GAP expects to be able to employ 3.8 million people.
Local Services
The GAP has resulted in a dramatic increase in the local infrastructure (physical parts of city services, such as the lines needed to run telephone service and electricity to homes, and the pipes needed to run water into homes and other buildings):

<table>
<thead>
<tr>
<th>Percentage of ...</th>
<th>1985</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural homes with running water</td>
<td>57%</td>
<td>67%</td>
</tr>
<tr>
<td>Urban homes with running water</td>
<td>15%</td>
<td>57%</td>
</tr>
<tr>
<td>Urban homes with electricity</td>
<td>66%</td>
<td>99%</td>
</tr>
<tr>
<td>Villages with paved access to the national highway system</td>
<td>71%</td>
<td>98%</td>
</tr>
</tbody>
</table>

Social Benefits
The GAP administration has created a number of projects aimed at helping local citizens in the region improve their living conditions through educational, cultural, income-generating opportunities.

Among these programs is the ÇATOM program, which established a series of community-based centers in urban, poor areas. These centers were created as a way for local citizens, especially women, to have access to education and health services. A number of these ÇATOMs have established programs where women can work at home creating traditional handicrafts in their spare time, and then sell them through the ÇATOM to earn extra money.

Since being established in 1995, the ÇATOM program has helped 3,200 women learn to read and write, 480 women find jobs, 34,000 people get access to health services, and has helped about 800 women earn a total of $75,000 each year.

The GAP program has also established Youth and Culture centers offering after-school and weekend cultural and educational programs. Since 2002, nearly 6,000 young people have taken part in programs offered by four centers in the largest cities of the GAP district.

Another important effort has been the Diyarbakır Rehabilitation Project for Children Working in the Street. The city of Diyarbakır is the largest in the GAP region and is home to many unskilled urban migrants who come in search of work. In many cases, children are hired to work in factories or do unskilled labor in the streets because they don’t have to be paid as much as adults. The project is designed to help these children get an education, and it provides health services and social services that the families often cannot afford. Over 4,000 children have been reached through this program, which was so successful that a similar program was established in the town of Adıyaman in 2002.
Benefits of the GAP

Comprehension Exercises

(1) What does the Turkish government hope that the primary benefit of the GAP will be?

(2) What are other benefits of the GAP?

(3) What areas of Turkey will be affected by the GAP? How will people in other parts of the country benefit from the project?

(4) Why do you think it would be important to include social and education programs in a project of this scale?

(5) Can you think of any projects in your city or state that combine physical, social, and educational aspects?
Change Over Time

Divide the class into groups of three or four students. Distribute a copy of Handout 1 (The Atatürk Dam and surrounding area, 1993) and Handout 2 (The Atatürk Dam and surrounding area, 2002) to each group. Ask some groups to look for similarities between the two photos. Ask the other groups to look for differences. Discuss as a class and write the similarities and differences on the chalkboard.

Have students speculate as to why there have been changes in the vegetation. Ask students to identify other features that have changed (cities, roads, airports, etc.) and speculate about those changes. Students should defend their speculations. List students’ suggestions on the board.

Conclusion:
Have students list the features they can identify in the two aerial photographs. Ask: How much has the landscape changed in the last ten years? Do you think these changes have been beneficial? Why or why not? Who has benefited from the changes? When would you most like to have lived in this area? Why?
Handout 1:
The Atatürk Dam and surrounding area, 1993

Photo by NASA.
Handout 2:
The Atatürk Dam and surrounding area, 2002

Photo by NASA.
Agricultural Production in the Harran Plain

Graph Activity

(1) Since the Atatürk Dam was completed and the irrigation project on the Harran Plain began, the amount of crops produced in the Harran Plain has increased every year. Create a bar graph from the following data that shows the increases in crop values from 1994-2003 (the amounts listed below are not the total value of the crops, but rather the increases: crops in 2001 were worth $114 million more than those in 2000, for example).

<table>
<thead>
<tr>
<th>Year</th>
<th>Increase (in millions of U.S. dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>$18 million</td>
</tr>
<tr>
<td>1995</td>
<td>$50 million</td>
</tr>
<tr>
<td>1996</td>
<td>$67 million</td>
</tr>
<tr>
<td>1997</td>
<td>$101 million</td>
</tr>
<tr>
<td>1998</td>
<td>$149 million</td>
</tr>
<tr>
<td>1999</td>
<td>$160 million</td>
</tr>
<tr>
<td>2000</td>
<td>$172 million</td>
</tr>
<tr>
<td>2001</td>
<td>$114 million</td>
</tr>
<tr>
<td>2002</td>
<td>$125 million</td>
</tr>
<tr>
<td>2003</td>
<td>$121 million</td>
</tr>
</tbody>
</table>

Value Increases of Crops, 1994-2003 (in millions of U.S. dollars)

(2) Calculate the cumulative value of crop increases and create a bar graph below. (Hint: 1996= add the increases from 1994, 1995, and 1996; add the increase, from the list above, to the sum from the previous year).

Cumulative Value of Crop Increases, 1994-2003 (in millions of U.S. dollars)

Data Source: Türkiye Cumhuriyeti Başkanlığı, Güneydoğu Anadolu Projesi, Kalkınma İdaresi Başkanlığı.
Teacher’s Answer Key for Cumulative Value of Crop Increases, 1994-2003

1994: $18 million
1995: $68 million
1996: $135 million
1997: $236 million
1998: $385 million
1999: $545 million
2000: $717 million
2001: $831 million
2002: $956 million
2003 $1,077 million ($1.07 billion)
Potential Problems with the GAP

With many positive aspects to the GAP, it may seem that there are not many ways that this project could go wrong. However, there are a number of questions that have been raised both inside and outside of Turkey concerning the GAP and its short- and long-term effects.

Can the GAP region produce as much agriculturally as expected? Many of the Turkish government’s plans for the GAP region involve using the area as the agricultural breadbasket for the rest of the country. However, as seen in Egypt’s experience with the Aswan High Dam, it takes more than a steady supply of water to make agriculture grow. Increasing production often requires the use of artificial fertilizers that can pollute the groundwater—assuming that the soil is of a high enough quality to use in the first place.

Who will do all the work? The GAP region has a slightly higher birth rate than the rest of Turkey, but despite all the improvements, the region is still losing people to the cities in western Turkey. The new factories in the area are intended to employ men—raising the question of who will be left to do the agricultural work that will increase as a result of the GAP. Studies indicate that women and children are responsible for a higher percentage of agricultural work than they were 20 years ago, meaning that they are shouldering responsibility for the increased workload, at the expense of school and other opportunities.

The Kurdish Question. For the last 50 years, the Turkish government has been at odds with the Kurds, an ethnic minority with its own language and customs separate from those of the Turks. In the mid-1980s, the struggle turned into an armed conflict, with an estimated 34,000 people killed between 1984 and 1999 and many thousands more having fled the region. The GAP region is the only part of Turkey where Kurds form the majority (65%), with Arabs forming another 15% of the population.

The construction of so many dams means that many villages will be flooded. While constructing the Ilisu Dam on the Tigris River, 78,000 people had to be relocated, most of whom were Kurds. The rising waters of the dam’s reservoir covered the entire city of Hasankyef, almost entirely populated by Kurds.

Critics charge that many of the social programs created by the GAP are really aimed at bringing the minority population more in line with the rest of Turkey—something that the Kurds in particular have always resisted. For example, education in the Kurdish language is against the law in Turkey, so the community and youth education programs are conducted in Turkish. When rural Kurdish and Arab women are taught to read and write, they are taught to read and write Turkish, not their own languages.

In addition, the opening of new factories and new employment opportunities may attract people from other parts of Turkey to the GAP region, making the Kurds a minority.

Health. The addition of many new lakes to the geography of southeastern Turkey may have a significant impact on health. While many of the social programs associated with the GAP are directed at providing health services to poor and rural people, there are some costs. For example, this part of Turkey is home
to mosquitoes that carry the malaria virus. Malaria is a tropical disease carried by mosquitoes that is a serious problem in many parts of the world, and can be fatal. Since mosquitoes breed in water, many people are concerned that adding so many reservoirs to the region will increase the spread of malaria. In addition, mosquitoes can fly across borders, meaning that the problem is not limited to Turkey, but could affect its neighbors as well.

**Who owns the water?** Like the Nile River in Egypt, the Tigris and Euphrates rivers are vital to more than one country. The Tigris and Euphrates are the two rivers that were so important to ancient Mesopotamia (Ancient Greek meaning “between the two rivers”) that they form part of its name. Even today, Iraqi and Syrian Christians use the Arabic version of this name for the region: *Bayn al-Nahrain*.

The three nations through which these rivers flow each contribute and use different amounts of water.

For example:

<table>
<thead>
<tr>
<th>Euphrates River</th>
<th>Turkey</th>
<th>Syria</th>
<th>Iraq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution</td>
<td>89%</td>
<td>11%</td>
<td>0</td>
</tr>
<tr>
<td>Planned use</td>
<td>52%</td>
<td>32%</td>
<td>65%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tigris River</th>
<th>Turkey</th>
<th>Syria</th>
<th>Iraq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution</td>
<td>52%</td>
<td>0</td>
<td>38%</td>
</tr>
<tr>
<td>Planned use</td>
<td>14%</td>
<td>5%</td>
<td>92%</td>
</tr>
</tbody>
</table>

In 1987, Turkey, Syria, and Iraq signed an agreement regarding how much water needed to be allowed to flow through the Euphrates River over its course. In 1990, when Turkey began filling the Atatürk Dam reservoir, it completely blocked the water flow of the river for one month. Iraq and Syria both reacted strongly. Iraq even threatened to bomb the dam.

The construction of the Ilisu Dam in Turkey has caused more problems between the neighbors. Both Syria and Iraq claim that the dam will restrict the water flow available to them. As the chart above illustrates, the three nations are already planning to use more of the river’s water than is actually available. The question of how the water will be divided among them is one that will take a long time to resolve.

Sources:
Potential Problems with the GAP

Comprehension Exercises

(1) What are the concerns about how much agriculture can take place in the GAP region? What are some other issues that might be related to agricultural production that haven't been mentioned?

(2) Who are the Kurds? How will the GAP project affect them?

(3) Create pie graphs showing each country’s contribution to and intended usage of the water of the Tigris and Euphrates rivers.

<table>
<thead>
<tr>
<th>Euphrates River</th>
<th>Turkey</th>
<th>Syria</th>
<th>Iraq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution</td>
<td>89%</td>
<td>11%</td>
<td>0</td>
</tr>
<tr>
<td>Planned use</td>
<td>52%</td>
<td>32%</td>
<td>65%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tigris River</th>
<th>Turkey</th>
<th>Syria</th>
<th>Iraq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution</td>
<td>52%</td>
<td>0</td>
<td>38%</td>
</tr>
<tr>
<td>Planned use</td>
<td>14%</td>
<td>5%</td>
<td>92%</td>
</tr>
</tbody>
</table>

(4) What is wrong with these graphs? How would you suggest that the water be distributed fairly?
Take a Stand

Divide the class into six groups and give each group one of the following cards. Using what they have learned over the course of this case study, they should make a decision on the question asked and have a representative explain their position to the class.

Afterwards, have students discuss how the GAP will affect different people in different ways. Who will benefit the most? Who stands to lose the most?

**Question: Will the GAP benefit or hurt you?**

| You are an unemployed factory worker in Istanbul. | You are a farmer living near Adiyaman in the GAP region. |
| Migrant workers from the GAP region are willing to work for less and are usually hired first for available jobs. | Your farm has experienced low output for several years because of drought. |

| You are an archaeologist working at a site on the banks of the Tigris River. | You are a Kurdish woman who cannot read or write. |
| The site will be underwater if all of the GAP dams are built. | A new community education program for women has opened in your town, but they are only teaching how to read and write Turkish. |

| You are a child who works in a factory during the day. | You are a farmer in Iraq. |
| A new education program for factory children will allow you to attend school in the evening. | You have heard that the water flow in the Euphrates River will be significantly reduced if the GAP is completed. |
About Hemispheres

Created in 1996, Hemispheres is the international outreach consortium at the University of Texas at Austin. Hemispheres utilizes University resources to promote and assist with world studies education for K-12 and postsecondary schools, businesses, civic and non-profit organizations, the media, governmental agencies, and the general public.

Comprised of UT’s four federally funded National Resource Centers (NRCs) dedicated to the study and teaching of Latin America; the Middle East; Russia, East Europe & Eurasia; and South Asia, Hemispheres offers a variety of free and low-cost services to these groups and more. Each center coordinates its own outreach programming, including management of its lending library, speakers bureau, public lectures, and conferences, all of which are reinforced by collaborative promotion of our resources to an ever-widening audience in the educational community and beyond.

Hemispheres fulfills its mission through: coordination of pre-service and in-service training and resource workshops for educators; promotion of outreach resources and activities via exhibits and presentations at appropriate state- and nation-wide educator conferences; participation in public outreach events as organized by the consortium as well as by other organizations; and consultation on appropriate methods for implementing world studies content in school, business, and community initiatives.

For more information, visit the Hemispheres Web site at:
http://www.utexas.edu/cola/orgs/hemispheres/
or e-mail: hemispheres@austin.utexas.edu