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ABSTRACT

This article approaches the Aral Sea's demise as an extreme example of how human development has the potential to destroy the environment. The discussion focuses on two lessons provided by the Aral Sea story: (1) the interdependence between humanity and nature, and the consequences of disregarding the environment in pursuit of progress; and (2) the trans-national nature of environmental problems, and the need to cooperate across borders to prevent and reduce the impact of environmental disasters. The article gives a brief history of the Aral Sea problem and discusses its effects on climate, health, development, and international efforts. Includes teaching suggestions. References. (BB)

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The Aral Sea: A Lesson in Environmental Degradation by Eric D. Boyle

Considered “perhaps the most notorious ecological catastrophe of human making,” the Aral Sea’s demise is an extreme example of how human development has the potential to destroy the environment. Sandwiched between Kazakhstan and Uzbekistan, two newly independent republics of the former Soviet Union, the Aral Sea was once the fourth largest inland lake in the world. At one time, the sea covered over 26,000 square miles (slightly bigger than Lake Huron). Now this land-locked body of saltwater has shrunk to 12,000 square miles, leaving a 14,000 square mile wasteland of salt and sand once covered by water. Most specialists on this problem assert that the single greatest factor contributing to the decline of the Aral Sea has been the diversion of the Sea’s tributaries for agricultural purposes. In Soviet times, engineers diverted water from the Amu-darya and the Syr-darya, the Sea’s main sources, to irrigate the surrounding desert. Since 1960, the mismanaged irrigation efforts have reduced the Aral Sea’s volume by over 80%. Restoring the Aral Sea to its former volume seems impossible now. Even efforts to stop the shrinking are very difficult, hampered by problems left in the wake of the Soviet Union’s collapse.

Significance of the Aral Sea Disaster

The Aral Sea’s story provides two valuable lessons. First, it shows the interdependence between humanity and nature. It is perhaps the most dramatic example of what can happen when we have little regard for the environment in our pursuit of progress. Second, the Aral Sea shows the trans-national nature of environmental problems. The Soviet leadership’s decisions have had negative effects beyond their borders. Although constrained by ongoing political and economic upheavals, the Central Asian states are working with international organizations and with each other to resolve the numerous issues caused by the shrinking sea. In this age of globalization, the case of the Aral Sea demonstrates why developing countries and the international community need to cooperate with each other to prevent and reduce the impact of environmental disasters.

History of the Aral Sea Problem

The Aral Sea is located in an area of the world that has only recently become accessible to the American classroom: Central Asia. Located in the heart of the Eurasian landmass and crisscrossed by ancient land trade routes between Europe and China, the peoples who inhabited the territory of Central Asia worked primarily as agrarian settlers and pastoral nomads for centuries. After

several decades of contacts, trade, and eventual tutelage under Tsarist Russia, Central Asia became one of the first non-Russian territories to fall under Soviet control after the Bolshevik revolution. Although Central Asia was a part of the Soviet Union, the native inhabitants are not Russian. The major ethnic groups are historically, linguistically, and culturally related to the Turks and Persians. The Soviet leaders carved the lands of Central Asia into new political units – Kazakh S.S.R., Kirgiz S.S.R., Tajik S.S.R., Turkmen S.S.R., and Uzbek S.S.R. These units represented five of the fifteen republics that made up the Union of Soviet Socialist Republics (USSR).

The logic behind draining the Aral Sea was simple. Water was considered to have greater value if used for irrigation rather than flowing into the sea unused. During Soviet times, the five Central Asian republics were part of the overarching Soviet economic structure. The Soviet Union was a *planned economy*, directed according to the principle that all the elements of production (raw materials, inputs, finished products, consumer products, etc.) could be coordinated by a group of decision makers able to predict and dictate what everybody would need. In other words, planners in Moscow made decisions that affected the entire USSR, often ignoring the interests of populations in the affected territories. Moscow planners decided that the Central Asian republics, especially Uzbekistan and Turkmenistan, were to be the main producers of cotton for the entire Soviet Union. The needs of the entire Soviet Union to obtain agricultural products from the Central Asian republics was considered more important than the environmental drawbacks.

Not surprisingly, once the degradation of the Aral Sea had become apparent, government officials were reluctant to admit that they had made a mistake. After all, these same officials had to maintain the image that they knew what was best for the country. Even if the local population did not agree with the decisions, there were no channels available to express disagreement with policies, let alone to protest. Another aspect of the Soviet planned economy was that the state (or government) had control or influence over every aspect of life. Because the government controlled the press, there were no opportunities for those who opposed government policies to inform people of the disaster. The regime did not provide any forums for independent

expression or allow any independent environmental watchdog groups.

In the 1980s, the problems of the Aral Sea and the rest of the Soviet Union became so acute that they became impossible to ignore. Despite the Soviet government's efforts, production started to slow down to the level at which the country could not survive without some kind of change. In the mid-1980s, Mikhail Gorbachev introduced reforms under the policies of *glasnost* and *perestroika*, which allowed for more open dialogue about the Soviet Union's more pressing issues. The Aral Sea disaster was quickly exposed and became a prominent symbol for Moscow's disregard for the environment and people's well-being. Spokesmen for Central Asia's diverse peoples mustered support for a single cause: the Aral Sea.

In 1991, the Soviet Union collapsed, leaving the five republics of Central Asia with an unexpected independence. The Soviet Republics became the independent states of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. With independence came new responsibilities. Formerly a small part of the Soviet hierarchy, the Central Asian republics were each left with a shattered portion of the Soviet Union's legacies: a population unaccustomed to popular participation, an insulated political elite, an economy unprepared to function without central direction, and the hitherto hidden legacy of environmental degradation.

Robbed of both the central coordination and resources of the rest of the Soviet Union, the governments of the new states had to grapple with all the difficulties of learning to run independent countries while trying to address the problems of the political and economic turmoil of the collapsed Soviet Union. The newly independent states have experienced many difficulties in their first years of freedom, including falling industrial output, dramatic increases in crime and unemployment, gaping holes in the social safety net, and undercurrents of friction among the different ethnic groups of the region. Against this backdrop, the problems related to the continued shrinkage of the Aral Sea have not been the top priority for the countries of Central Asia, despite the numerous and dangerous consequences.

Current Issues

Most experts agree that there is no way to reverse the Sea's shrinkage. It is difficult for the five fledgling states even to halt the process at its current stage. In addition, they must deal with the serious climate, health, and economic problems that have been produced by the changes in the sea. There are no easy answers to this perplexing situation. The more we learn, the more complicated the issues appear.

Climate Issues: As the sea shrank, the salt from the water accumulated on the ground. The 14,000 square miles of dry seabed is said to contain over 10 billion metric tons of salt. Pesticides from the irrigated fields have also

accumulated in the dried seabed. Continental winds have been reported to pick up the salt and chemicals and deposit them as far away as 1000 miles. Karakalpakstan, an autonomous republic in the northwest corner of Uzbekistan, has borne the brunt of the dust storms and their consequences. Less water from the sea is able to evaporate into the atmosphere so that the rest of already-arid Central Asia has experienced decreased rainfall, affecting crops well beyond the basin.

Health Issues: As the sea continues to shrink, health problems in the area continue to grow. The people living in the Aral Sea basin have reduced access to safe drinking water. Some experts estimate that over 3 million people are chronically ill due to Aral Sea complications. The death rate from respiratory illnesses in Karakalpakstan – 167 per 100,000 people in 1993 – is among the world's highest. The rate of anemia in the region is also dangerously high. A report by the Monterey Institute of International Studies in California claims that Soviet scientists routinely released the deadly agent anthrax over the air of Vozrozhdeniye, an island in the middle of the sea. Scientists are concerned that the surrounding areas may become exposed to residual toxins on the island.

Developmental Issues: The area around the Aral Sea is practically uninhabitable, yet many people are too poor to move. There are no more fish to catch because all 24 native species of fish have died out. In the Soviet times, people living in the two fishing and canning villages – Aral'sk and Muynak – were kept employed by expensive shipments of fish from Russian Siberia. Now, when such shipments have ceased, these cities lie 40 miles away from the coast of the sea and see few signs of relief.

Reducing the amount of water drawn from the river and tributaries flowing to the Aral Sea is very difficult. The Central Asian republics' economies are still very dependent on agricultural production. To continue to produce enough to support their families and their countries, farmers are forced to continue irrigating with water that otherwise might reach the Aral Sea. However, scientists estimate that even if no more water were diverted from the rivers, it would still take over 50 years for the Aral Sea to fill to its original volume.

International Efforts: Even before the Soviet Union's collapse in 1991, international organizations were providing assistance to stop the draining of the sea. International efforts, however, are constrained by multiple factors, including the residue of secrecy and mistrust from the Soviet era, lack of international interest in such an isolated part of the world, and administrative difficulties in effective

coordination of international efforts effectively. Two separate arms of the United Nations – the United Nations Development Programme and the United Nations Environmental Programme – undertake efforts to relieve poverty and health complications among the local population. The World Bank, the leading multilateral lending institution facilitating sustainable development, is initiating a program to clean the drinking water, sustain biodiversity and improve irrigation methods. Doctors Without Borders, an international organization of volunteer physicians, has built a dispensary for distributing emergency medical supplies. The World Health Organization has held conferences for government officials, scientists, and concerned citizens. In total, it is estimated that relief efforts will cost more than \$600 million over the next three years.

Teaching Suggestions

Learning about the Aral Sea is a vehicle for bringing closer to home the problems and issues that other people of the world face. The Aral Sea is an ideal case study for classes examining effects of human activity on the environment. It provides a different perspective for students who take progress for granted without realizing the consequences. The materials written about the Aral Sea show how our link to the environment affects a variety of different aspects of our daily lives: community and personal health, employment and economic well-being, and the role of cooperation in solving difficult issues.

Scientifically, the Aral Sea's story is an important case study for pointing out fundamentals such as erosion, pollution, and the link between geography and weather. In addition, it is an excellent tool to expose students to the proactive role that Americans play outside their own borders, either by their own efforts or through international organizations.

To understand the depth of the Aral Sea's problems, it is also necessary to understand the people most affected. The 50 million people of Central Asia are inheritors of a rich and complicated history who only recently began to enjoy opportunities for contact with the Western world. The Aral Sea's legacy is a vivid introduction to the issues that influence the people of Central Asia.

References

The following list of resources includes references used to prepare this Digest and sources for additional information.

For all ages

Bangs, R., "Rapid Changes," *Sierra*, vol. 75, issue 3, page 56, May/June 1990.

Ellis, William S., "A Soviet Sea Lies Dying," *National Geographic*, vol. 177, issue 2, page 73, February 1990.

For younger readers (Grades 1 – 8)

Stuckey, Scott, "Vanishing Sea," *National Geographic World*, issue 270, page 5, February 1998.

For older readers (Grades 9 – 12)

Stone, Richard, "Coming to Grips With the Aral Sea's Grim Legacy," *Science*, vol. 284, issue 5411, page 30, April 2, 1999.

"Uzbeks Manage to Endure Amid Ruins of the Aral Sea," *Wall Street Journal*, vol. 231, issue. 25, page A18, February 5, 1998.

"Only Water, Maybe, But It Was a People's Lifeblood," *New York Times*, vol. 147, issue 50959, page A4, October 28, 1997.

Kasperson, Jeanne and Roger Kasperson, "Regions at Risk," *Environment*, vol. 38, issue 10, page 4, December 1996.

"Asian Republics Agree on Joint Rescue Plan to Save the Aral Sea," *Nature*, vol. 367, issue 6469, page 206, January 20, 1994.

Micklin, P.P., "Desiccation of the Aral Sea," *Science*, vol. 241, page 1170, September 2, 1988.

Audio/Video materials

The Aral Sea: Environment Under Siege, videocassette (16 minutes), distributed by Encyclopedia Britannica Educational Corporation, 1994.

NOTE: Comes with teacher's tip sheet.

International Organizations

The United Nations Development Programme, One United Nations Plaza, New York, NY, 10017. Internet: <http://www.undp.org>

The United Nations Environmental Programme, One United Nations Plaza, New York, NY, 10017. Internet: <http://www.unep.org>

Doctors Without Borders (also known by its French name, *Médecins Sans Frontières*) 6 East 39th Street, 8th Floor, New York, NY 10016, phone: (212) 679-6800, fax: (212) 679-7016. Internet: <http://www.dwb.org>

The World Bank, 1818 H Street, N.W., Washington, DC
20433, phone: (202) 477-1234. Internet:
<http://www.worldbank.org/html/schools/>

The World Health Organization (WHO) 2 United Nations
Plaza, New York, NY, phone: (212) 963-4388. Internet:
<http://www.who.org>



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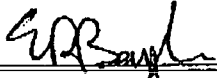
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