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**TITLE: ENVIRONMENTAL RESOURCES AND CONSTRAINTS  
IN THE FORMER SOVIET REPUBLICS:**

**Chapter 20: TAJIKISTAN**

**AUTHOR: SHARON EICHER**

**THE NATIONAL COUNCIL  
FOR SOVIET AND EAST EUROPEAN RESEARCH**

***TITLE VIII PROGRAM***

1755 Massachusetts Avenue, N.W.  
Washington, D.C. 20036

PROJECT INFORMATION:\*

CONTRACTOR: San Diego State University  
PRINCIPAL INVESTIGATOR: Philip R. Pryde  
COUNCIL CONTRACT NUMBER: 807-04  
DATE: September, 5, 1994

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\* *The work leading to this report was supported in part by contract funds provided by the National Council for Soviet and East European Research, made available by the U. S. Department of State under Title VIII (the Soviet-Eastern European Research and Training Act of 1983). The analysis and interpretations contained in the report are those of the author.*

## NCSEER NOTE

*This report is part of a Council-funded research project entitled Environmental Resources and Constraints in the Former Soviet Republics. Twenty one reports, listed below, resulting from this project will be distributed seriatim by the Council, and will collectively become the chapters of a book to be published in 1994 by Westview Press. Eighteen of the 21 (written by other authors) deal with the fifteen former republics, and three (written by Dr. Philip R. Pryde, the Principal Investigator) are summarizing reports.*

*Chapter 1: The Environmental Implications of Republic Sovereignty. (Pryde)*

*Chapter 2: Russia - An Overview of the Federation. (Pryde)*

*Chapter 3: European Russia. (Kochurov)*

*Chapter 4: The Urals and Siberia. (Scherbakova & Monroe)*

*Chapter 5: The Russian Far East. (Strand)*

*Chapter 6: Estonia. (Soot)*

*Chapter 7: Latvia. (Dreifelds)*

*Chapter 8: Lithuania. (Kritkauskys)*

*Chapter 9: Ukraine. (Stebelsky)*

*Chapter 10: Environmental Management in Ukraine. (Freeman)*

*Chapter 11: Belarus. (Cherp & Kovaleva)*

*Chapter 12: Moldova. (Dinu & Rowntree)*

*Chapter 13: Georgia. (Richards)*

*Chapter 14: Armenia. (Valesyan)*

*Chapter 15: Azerbaijan. (Wolfson & Daniell)*

*Chapter 16: Kazakhstan. (Smith) [Distributed February 3, 1994]*

*Chapter 17: Turkmenistan. (Micklin)*

*Chapter 18: Uzbekistan. (Lubin)*

*Chapter 19: Kyrgyzstan. (Braden)*

*Chapter 20: Tajikistan. (Eicher)*

*Chapter 21: The View to the Future. (Pryde)*

Environmental Resources and Constraints  
in the Former Soviet Republics

**TAJIKISTAN**

**SHARON EICHER**

Executive Summary

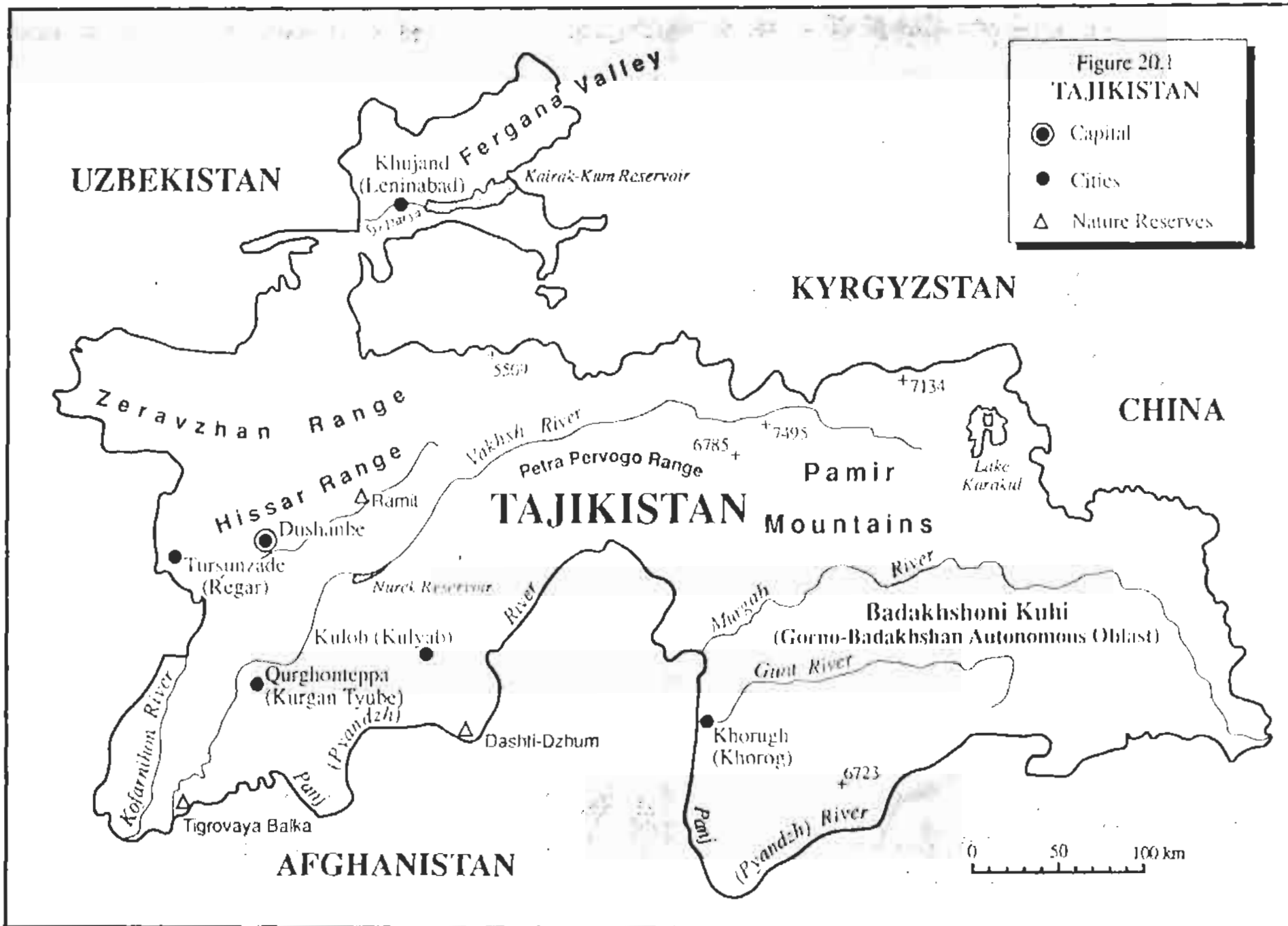
The following paragraphs summarize the main contents and conclusions of a chapter on Tajikistan, which has been prepared as part of a larger work on the environmental and economic-geographic situation in each of the former Soviet republics. The full study, edited by Philip R. Pryde, will be published by Westview Press under the title "Environmental Resources and Constraints in the Former Soviet Republics. Funding assistance from the National Council for Soviet and East European Research is acknowledged with appreciation.

In this chapter, the history, physical geography and ethnography of Tajikistan is briefly summarized, followed by a survey of its main economic resources and any significant environmental constraints (climatic, geomorphologic, etc.) that affect the country's development. The contemporary state of the development of industry and agriculture within the republic is reviewed, with a focus on the environmental disruption that has resulted from this development. The current situation with regard to biotic preservation is also reviewed, including the establishment of nature reserves and parks, and the potential for tourism. The administrative structure for environmental management within the country is also briefly examined, as are non-governmental environmental efforts.

Particular discussion is directed to the problems that currently exist within Tajikistan regarding land and water pollution from agricultural chemicals and industrial operations, and resultant adverse effects on human health. The complicating factors of Tajikistan's complex geopolitical situation and the ongoing civil war are also examined.

The main conclusions of the chapter is that improvements to Tajikistan's unfavorable economic, environmental, and public health problems are largely dependent upon peace and political stability within the republic being achieved. Foreign aid is difficult to solicit under the current adverse conditions, and Tajikistan's needed improvements must wait for the internal situation to improve.

Philip R. Pryde, June 6, 1994



## Chapter 20. TAJIKISTAN

SHARON EICHER

Tajikistan is a small, underdeveloped, but resource-rich country of 5.1 million persons and 143,100 square kilometers. It is mostly mountainous, with developed irrigation and agriculture in the inter-montane valleys. Environmental problems in the country are legacies of poor Soviet management of the natural world and the USSR's compulsion to transform nature. The Soviet government established a conservation ministry, but was unsupportive of local requests to close down polluting industries. Today, problems of air and water pollution are directly impacting the human population and illnesses are increasing. Overuse of agricultural chemicals, and secondary salinization is making the land unfit for crops.

Tajikistan inherits a situation in which it is financially burdened and must choose between keeping industries open that pollute heavily, or losing much needed income. Resolving this problem, however, was not even under discussion in 1993, as political stability had not yet been achieved.

### **Ethnicity and History**

Tajikistan's total population is 5.1 million, of which 3.2 million are ethnically Tajik. Its population is ethnically mixed, consisting of 62% Tajik, 24% Uzbek, 8% Russian, and 6% other nationalities (Table 20.1). It is bordered by the former Uzbek and Kyrgyz republics, and by China and Afghanistan.

The ethnonym, Tojik, identifies descendants of Indo-European Iranian tribes who settled throughout Middle Asian regions of Turkestan, Afghanistan, and India. The Iranian tribes first came to this region from 2000-1000 BC. Pre-Tajik human habitation dates back as far as the Lower Paleolithic Period, 200,000 to 400,000 years BC (Bolshaya..., 1983).

Alexander the Great, known as Iskander in Central Asia, conquered this area in 329 BC. His wife Roxanne was reputedly a Bactrian and is claimed by the Tajiks. One of the most significant events for Central Asia was its conversion to Islam, which was introduced in the 8th century. Sunni Islam of the Hanifi School was officially adopted, replacing Zoroastrianism, Buddhism, Manicheism, and Nestorian Christianity. A minority of the Islamic population today practices Shiism. Later came the Mongol-Tatar invasion of 1219-21. The Tajik-populated cities of Bukhoro, Samarqand and Khujand fell to Chingiz Khan (Ghengiz Khan) in 1220.

The reign of Timur, or Tamerlane, (1336-1405) was a prosperous period based on wealth acquired from commerce along the Silk Route. Tamerlane's empire was centered in

Table 20.1. Ethnic diversity of Tajikistan

Ethnic group	Population (1000s)		% change, 1959-89	% of total in 1989
	1959	1989		
Tajiks	1,051	3,172	201.8	62.3
Uzbeks	454	1,198	163.9	23.5
Russians	263	388	47.5	7.6
Tatars	57	72	26.3	1.4
Kyrgyz	26	64	146.1	1.3
Ukrainians	27	41	51.9	.8
Germans	33	33	.1	.6
Others	70	125	78.6	2.5

Source: Data adapted from Schwartz, 1991, p. 246.

Samarqand, and his court was served by Persian, or Tajik, scribes. Both Alexander and Timur became ancestral heroes of the Tajiks.

Russia became interested in expansion into this region in the 18th century, but the real conquest of Turkestan began after 1847. Territorial disputes made the khanates vulnerable to colonialism, and Russia was able to quickly subjugate the small Central Asian states. In 1868 Samarqand and Bukhoro became vassal states; Khiva followed in 1873, and Quqon (Kokand) fell in 1876 (Holdsworth, 1959).

In 1875 Russia and Britain established borders between Turkestan, as a colony of Russia, and "Afghanistan", which was controlled by the British. This artificial border drawn by imperial Britain and Russia left Tajik-speaking people in both countries. The territory of the future Tajikistan in the 1880s was subdivided; parts lay in the Eastern Bokharan Khanate and in what are now Syr Darya and Farghona (Fergana) Oblasts.

Following the Russian Revolution, Turkestan became nominally Soviet. By late 1918, Tajikistan was included in the Turkestan Autonomous Republic (ASSR). The small village of Dushanbe became the political center.

Central Asian armed resistance to the Soviet takeover took place through the Basmachi Revolt. Much of the rebellion was located in southern and central Tajikistan, and the area was not fully brought under Soviet control until 1926.

The Law on National Demarcation of Central Asia was passed by the Executive Central Committee of the USSR on October 27, 1924. The existence of the Tadzhik Soviet Socialist Republic was ratified in February, 1931. Unfortunately, its boundaries did not have a close correlation to where most Tajiks actually lived. At the time, 52% of all Tajiks in Turkestan lived in the Bukhoro area, which became part of Uzbekistan (Great Soviet Encyclopedia). Similarly, a great many Uzbeks lived within the Tajik SSR boundaries.

Following the USSR's dissolution in 1991, the Central Asian republics retained the territories assigned to them in the 1930s by the Nationalities Commissariat. The former Tajik republic joined the Commonwealth of Independent States (CIS) on December 30, 1991. For the first time, this was an independent country with an emerging national identity. In seeking recognition as an autonomous state, Tajikistan emphasized its membership in the CIS, adherence to international law, loyalty to the UN Charter, Helsinki Act, the Paris Charter, and the inviolability of its borders.

Tajikistan is the only non-Turkic Central Asian state. All the others are more closely tied to the Turkic and Mongolian tribes which entered the region after the Indo-European, Iranian (Persian) steppe tribes. Tajiks are the only Persian speakers in the Commonwealth of Independent States. Dari, spoken in North Afghanistan, Farsi, spoken in Iran, and Pashto,



along with Tajik, make up the Iranian family of languages spoken in central and south Asia. While sharing the same linguistic family with the Iranians, Tajiks are religiously more closely tied to their Turkic neighbors, who are also Sunni; most Iranians are Shiite.

### **Geographical Characteristics**

The dominant geographic characteristics of Tajikistan are aridity, mountainous topography, great diversity of landscapes, and remoteness. The country is subdivided into five oblasts or provinces. These are Badakhshoni Kuhi (Gorno-Badakhshan) in the east, Khujand(Leninabad) to the north, Qurghonteppa (Kurgan Tyube) and Kulob (Kulyab) to the Southwest, and the Karotegin region in Central Tajikistan around the capital city of Dushanbe. Much of the country is drained by the Vakhsh and Panj (Pyandzh) Rivers, which become the Amu-Darya in Uzbekistan (Figure 20.1).

The Khujand Region extends deep into Uzbekistan and comprises part of the Fergana Valley. Khujand (formerly Leninabad), is the administrative center, and predates Alexander the Great's visit in the 4th c. BC. It lies due north of Dushanbe, but the two cities are separated by the Zeravshan Mountains. It is the country's second largest city with a 1989 population of 160,000. The upper portion of the Syr Darya runs through Kujand Province, providing irrigation water. The largest Uzbek population in Tajikistan lives in Khujand and the surrounding lowlands.

Below Khujand is the central Karotegin province. Dushanbe, the national capital, lies in the western part of this region in a mountain rift between the Zeravshan Mountains and the foothills of the Peter the First (Petra Pervogo) Mountains. Dushanbe is situated in a valley drained by the Kofarnihon (Kafirnagan) River, at about 900 meters elevation. It had a population in 1989 of 595,000. Fifty kilometers away, the Hissar Mountains reach 4000 meters, and further to the east the Pamirs rise to over 7000 meters.

In the southwestern portion of Tajikistan is Qurghonteppa (Kurgan Tyube) Province. The Vakhsh River lowland extends from the Nurek reservoir southward to Qurghonteppa, and is heavily irrigated. Much of the water pollution in Tajikistan flows to this area, delivered by the Panj (Pyandzh) and Vakhsh rivers. Qurghonteppa's proximity to Afghanistan has made it a convenient crossing point for smugglers, and much of the unrest in the early 1990s has occurred in this part of the country.

Kulob (Kulyab) is a small oblast to the east of Qurghonteppa. Kulob, its capital, is Tajikistan's third largest city with about 77,000 persons. The oblast's southern border is also the Panj River, and it lies within steppe and mountain-steppe regions. It is one of the

economically least developed and poorest provinces of Tajikistan, and is where in the early 1990s local warlords were opposing the pro-Communist leadership.

The autonomous republic of Badakhshoni Kuhi (Gorno-Badakhshan) accounts for almost half of the territory of Tajikistan. This region is little developed. Its mountains are home to various different populations, collectively referred to as "Pamiris", or Mountain Tajiks. The groups live isolated from western Tajiks, and may speak unrelated languages. The former USSR's highest peak, which rises to 7495 meters (24,590 feet) is on its western border. The easternmost portion is mainly a high, arid plateau, containing many lakes.

Tajikistan is arid with a continental climate that produces extreme temperature variations. The warmest areas are in the western temperate zone, specifically near Khujand, Qurghonteppa, and Kulob. Average daily temperatures here reach a summer high of 30°C, and they receive on average 230 to 240 frost-free days a year. The coldest region is in the southeast Pamirs, where winter temperatures can drop to -25°C (Mamadjonova, 1968).

Other climatic features are hot, desiccating winds and glaciation. Glaciers cover 8470 km<sup>2</sup> of the land. The occasional hot, dry winds blow in the Fergana Valley and in southwestern Tajikistan, and in extreme cases can cause dust storms and damage crops.

### **Natural Resources and Constraints to Development**

There are 81 species of mammals in Tajikistan, including unique animals such as the Tibetan wolf, Eurasian otter, stone marten, lynx, jungle cat, snow leopard, Bokharan deer, Asiatic sheep, Argali sheep, Siberian ibex, and many small rodent species, such as Turkestan rat, jerboa, pika, and the Pamir vole (Mamadjonova, 1968). The republic also has 365 types of birds, 49 species of reptiles, and 40 species of fish. Its plant species exceed 5000, although only 0.8 percent of the republic is forested. In order to help protect this biotic diversity, Tajikistan has created 16 nature preserves (Table 20.2).

Good agricultural land is a limited asset, but has been turned into a liability in Tajikistan through poor management. Although irrigated farming has been extensively developed, much of Tajikistan's land is not arable and cannot be put into crops, leaving the country with a deficit of fertile lands. What little land is arable lies in the river valleys or intermontane basins, and is subject to erosion and pollution.

Irrigated lands total about 945 thousand hectares. These produce cotton, grapes, and silk, or are in orchards. Cereals are grown on non-irrigated land. The irrigated land in Tajikistan, as elsewhere in Central Asia, is subject to salinization.

Table 20.2: Preserved Areas in Tajikistan

Type of Preserve (a)	Number	Total area(b)	Average size (b)	% of Re-public (c)
Nature reserves (zapovedniki)	3	855.68	285.23	0.60
Biosphere Reserves, non-zapovedniki	0	0.00	0.00	0.00
National Parks	0	0.00	0.00	0.00
Natural preserves (zakazniki)	13	8006.00	615.85	5.59
Total:	16	8861.68	553.86	6.19

Nature reserves (date created)	Hectares
Dashti-Dzhum (1983)	19700
Ramit (1959)	16168
Tigrovaya Balka (1938)	49700
Total:	85568

(a) For the definition of each type of preserve, see Appendix 2 to Chapter 1.

(b) In square kilometers.

(c) The total area of Tajikistan is 143,100sq. km.

Source: Pryde (1991).

Tajikistan has a variety of mineral resources, which include lead, zinc, silver, and tungsten in the north; antimony, gold, salt, and fluorspar in the west; and gold in the east (Shabad, 1969). Much of its economy is based on mining these minerals.

The republic has a mixture of energy resources, including small amounts of coal, gas, oil and uranium, and considerable hydroelectricity. The three fossil fuels are extracted only in small (and declining) amounts, production in all three being only about a third of what it was in 1970. Tajikistan extracts uranium, but does not have the technology to enrich it. It is now considering joint-ventures for uranium enrichment with Middle East states (FBIS, 1/2/92).

Sixty percent of Soviet Central Asia's hydroelectric resources came from Tajikistan. Its energy production in 1990 totalled 18.1 billion kilowatt hours. The largest electricity producer at that time was the Nurek dam, which generated 80% of Tajikistan's electrical power. This power is used, in part, to refine aluminum. The Soviet Union had planned to expand hydropower by constructing twenty-one additional hydroelectric stations on the Vakhsh and Panj Rivers, but these plans now appear optimistic. Tajikistan's hydroelectric potential, which might be as high as 85 billion kWh, may be one of its major assets.

The republic sits in a seismically active area. The Nurek and other dams often experience tremors. Pressure from the weight of the dam and water places additional stress on what may be sensitive areas, making them more unstable. Tajikistan's worst recent earthquakes occurred in 1949 and 1989. The 1989 quake, in which 274 people died, registered as "6" on the Richter Scale. The earthquake apparently undermined the integrity of a mountainside and loosened a landslide upon a village that was only 20 miles from Dushanbe (Washington Post, January 24 and 26, 1989). The 1949 earthquake was much worse; in that disaster, 12,000 persons died.

Population size will influence the effectiveness of Tajikistan's economic development, and may become a burden upon the country's natural and economic resources. Population in Tajikistan has increased by one-third in the ten year period from 1979 to 1989. Because of the high birthrate, the dependency ratio is very high, meaning that the working age population must support an unusually high number of dependents. Family size averaged 6.5 persons, and the country must create jobs for today's children. Tajikistan has high unemployment now; if this situation doesn't change, then the forecast for the future is a further decrease in the standard of living.

Russians make up a significant portion of Tajikistan's professionals, skilled laborers, and doctors, even though they are only about 8% of the population. In the 1970s they began emigrating to other parts of Central Russia and Siberia, fleeing from perceived prejudice against non-Tajiks, social unrest, and implementation of the 1989 Tajik Language Law.

Likewise, some better educated Tajiks have also fled from the political unrest of the early 1990s.

The employment situation in Tajikistan is unusual in that, while it is losing its specialists, it has an overabundance of labor. According to Soviet Sociology, (n.4, 1991), only 13% of the working-age population is fully employed. Tajikistan must create an indigenous workforce, both to create jobs for the current and future unemployed masses, and to fill the void left by the specialized workers who have left the country.

### **The Environmental Situation**

Tajikistan's environmental problems include: salinized and overcultivated farmland, erosion, water supplies that are over-consumed or wasted through evaporation, inadequate purification of effluents, air pollution, and endangered wildlife species. The effects of many of these problems are not only damaging to natural communities, they are directly harming the human population.

Water resources. Tajikistan is in the headwaters of the Syr Darya and Amu Darya rivers, which flow to the Aral Sea. Tajikistan's runoff is 51.7 km<sup>3</sup>, or 44% of the runoff of Tajikistan, Uzbekistan, Kyrgyzstan, and Turkmenistan combined (Mnatsakanian, 1992). Other chapters (16 and 18) have reported on the problem of the drying up of the Aral Sea. This problem doesn't affect Tajikistan directly, although the Tajiks contribute to the causes of the problem.

Water consumption in Tajikistan is 90.81% agricultural, 4.67% evaporation, 4.33% industry, and .14% residential and other uses. Most water goes to irrigating crops, but this agricultural usage harms water quality, as salts are leached out of fields. These flow into downstream water supplies or into newly created lakes that store used irrigation water.

The most significant chemical contamination of water in Tajikistan comes from industry. Reputedly, up to 50% of industrial purification systems are malfunctioning. This affects populations in Dushanbe, Khujand, Qurghonteppa, and Tursunzade; that is, almost all the major cities. An example given by Goskompriroda is the Vakhsh Nitrogen Fertilizer Plant, which is 13 miles north of Qurghonteppa. There are no safeguards against pollution from this plant and canal collectors do not work properly. As a result, sewage, chlorine, and nitrogen pollutants are absorbed into the subsoil, and enter the underground drinking water supply. Among the other primary polluters in Tajikistan are the Kolkhozabad Cotton Combine, Tajik Aluminum Factory, and Dushanbe Cement Factory (Goskompriroda, 1989).

The Land. In addition to water pollution, cotton production has promoted weed infestation, the wilt virus, and cotton parasites and insects. Much of Tajikistan's available

agricultural land is in cotton; it is second in production only to Uzbekistan. Although of great economic value, the present cotton monoculture has weakened the land. It has robbed it of microorganisms and nitrogen, and left it salinized and laden with chemical pesticides. One report indicated that 123.7 thousand hectares in Tajikistan were salinized (13% of all irrigated land). Of these, 113.8 thousand hectares were plowed fields; the rest was not in use as it was too salinized for agriculture (Goskompriroda, 1989).

Among the defoliant (agricultural herbicides) used, Butifos was the most popular. It was likened to Agent Orange in its effect by nationalist environmentalists. Butifos was banned in 1987, after being applied for 23 years, but some may still be used (Pryde 1991, p. 104). The total amount of pesticides used in Tajikistan in 1987 was 17,359 metric tons. This averaged to 3.4 kg per person, but among the rural (agricultural) population, 6.3 kg per person (Goskompriroda, 1989). In terms of kilograms of pesticides per hectare used in 1986, Tajikistan, at 19.8, was the highest ranked Republic, and was many times higher than the USSR average of 2.1 (Yablokov, p. 15).

Pasture lands are overgrazed. Traditional herding was semi-nomadic, but when herding became collectivized, animal husbandry became a much larger-scale operation. Landslides and erosion are two results of the land being overworked. There are 3.1 million hectares liable to erosion in the country, which is equal to 70% of agricultural lands (Goskompriroda, 1989).

Air Quality. The most serious forms of air pollution in Tajikistan consist of particulates, fluoride compounds, and motor vehicle emissions. Particulates originating from stationary sources in 1988 and 1989 equalled 53.3 and 42.7 thousand tons, respectively (Mnatsakanian, 1992). On average, the concentrations of polluting substances are 1.2--1.9 times maximum health norms (Goskompriroda, 1989), and Dushanbe was on the list of the "most polluted Soviet cities" in 1989. There has been a small reduction in the amount of air pollutants in recent years, possibly resulting in part from the economic slowdown.

The source of the hydrogen fluoride emission is the Tajik aluminum smelter at Tursunzade, one of the largest stationary sources of pollution in the republic. Near the plant, congenital development defects were reportedly eight times as high as in a cleaner nearby region (Feshbach and Friendly, p. 109).

Health effects on the human population. Other harmful effects of pollutants on humans in Tajikistan have been documented. Illnesses, infant mortality, and unsuccessful pregnancies are all believed to be linked to pollution, primarily to agricultural chemicals. "Results of the analyses of the sickness rate testify to the direct correlation between pesticide use and the sickness rates of bronchial asthma among adults, nervous disorders and psychoses among conscription age youth and congenital anomalies of children." (Goskompriroda, 1989).



Infant mortality in the 1989 census was strikingly high, especially when compared with Soviet averages and neighboring republics. The infant mortality rate per 1000 births was, for the USSR, 22.7; for Tajikistan, 43.2; for Uzbekistan, 32.0; and for Kyrgyzstan, 25.9 (Demograficheskii..., 1990). Infant mortality in Tajikistan ranged locally from 26.1 to 60.8 per 1000 births. The highest risk areas are in the Panj River region.

Studies in the 1970s and 1980s pertaining to female cotton production workers showed increased occurrences of respiratory illnesses, gastro-intestinal disease, miscarriage and stillbirth, interuterine pregnancy and birth defects (*Ogonyok*, no. 13, 1988). In addition, the studies found traces of pesticides in the women's blood and milk. Other studies on pregnancy risks demonstrated that working in cotton production increases one's chances of miscarriage by 51%, of spontaneous abortion by 24.5 % and of premature delivery by 18.9% (*Zdravookhranenie Tadzhikistana*, v.4, no. 229, 1990). Through chemical exposure to pesticides and defoliants used in growing cotton, this work was often found to suppress immune systems and alter normal oxidation processes in workers.

Significantly higher numbers of deaths due to respiratory illness occur in the country. Rates of tuberculosis, pneumonia, and bronchial asthma in Tajikistan are high. The occurrence of typhoid, viral hepatitis and malaria is either highest, or second highest, in Tajikistan among all fifteen of the former Soviet republics (Feshbach and Friendly, pp. 279-280).

### **Environmental Activities**

In 1988 the USSR Goskompriroda was created to act as an environmental protection agency. Its aims were primarily utilitarian: to maximize uses of air, water, land, timber and other resources; to include costs for resources into production; and to fine polluting industries. It had a semi-autonomous regional affiliate in each of the fifteen Union Republics.

At that time, Tajik Goskompriroda was confused on how to organize itself and develop policy. It was, however, aggressively determined to stop industrial pollution of air and water. Industries it publicly criticized and fined were the Vakhsh Fertilizer Plant, the Tursunzade Tajik Aluminum Plant, the Dushanbe Cement Factory, and the Yavan Union & Vakhsh Factory.

At the time of independence, there were at least 31 non-governmental environmental protection committees: 3 at the Oblast (province) level, 23 at the district level, and 5 special inspection groups. Since independence in 1991, the environmental movement has not made any apparent progress. The most visible organization has been the Socio-Ecological Union. It is the largest nongovernmental, environmentally-active organization in the country, and in 1992 had a staff of about 300 persons throughout the former Soviet Union. Goals for the Socio-Ecological

Union in Tajikistan for the 1990s are to create a national park system; block further construction of the Ragun Hydroelectric Station; promote eco-tourism, traditional agricultural methods, and ecologically-clean small businesses; promote population control; and conduct educational programming.

Tajikistan's future environmental goals require both a monetary and a political commitment. An effective governmental agency, whose function is solely to set norms, preserve natural resources, and coordinate conservation efforts is necessary. Research to improve methods of agriculture must be carried out. All this requires funding and a public commitment to work towards long-term environmental and social improvements regardless of short-term costs.

Environmental law must be developed further, but more importantly, the Tajik state needs to support it in a way that the Soviet government did not. Remnants of Soviet orthodoxy in the legal system and in its departmentalist control over resource consumption must be eradicated. State agencies need more than just the ability to levy fines; they must have the power to halt the construction, or output, of industries when environmental standards are not met. Tajikistan needs a means of enforcing conservation and industrial norms other than by fining polluters; fines do not halt the pollution.

Planning and policy problems include a lack of environmental philosophy (including a land ethic, population control, and environmental ethics); insufficient legislation and conservation norms; lack of regional planning among Central Asian states and cooperative environmental compacts; the existence in 1993 of civil unrest; and a lack of adequate funding for environmental goals.

### **Future Prospects**

Tajikistan is in a period of crisis, politically and environmentally. It has made one of the least tranquil transitions following the dissolution of the USSR, resulting in civil war throughout 1992, and repression of democratic leadership in 1993. It lacks the resources to pursue economic goals, as well as the political stability, democratic traditions, and national unity needed to enact effective environmental policies.

Before his forced resignation, President Nabiyeu in 1992 lifted most foreign trade and investment obstacles in order to encourage joint-ventures. Fortunately, Central Asian states have had long experience with market systems. Cities have always had bazaars, artisan shops, and small factories, and these people did not lose all of their market and entrepreneurial skills during the Soviet period. Unfortunately, Tajikistan, like the rest of the former Soviet Union, lacks institutions to manage a private economy and will have to develop its own. This is not



only a matter of currency and banking; insurance firms, legal structure, land reform mechanisms, transfers of technology, and commercial structures are also lacking.

Tajikistan has serious economic problems. Its gross domestic product (GDP) was the lowest in the former USSR. The budget deficit has approached 40% of the GDP by some calculations (The Economist, 8/1/92). The country is now a debtor nation. These factors, together with a lack of political stability, ineffectual guidance of the economy, and desire to reduce cotton production, will make being a new country with old debt even more difficult.

Ties appear to be quickly developing between Tajikistan and its nearby Soviet successor-states, as well as with Iran, Pakistan, India, Turkey, and the United States. The first foreign embassy to open in Dushanbe was Iran's. Linguistically related to Iran and Afghanistan, Tajiks historically had close cultural ties with these two countries. An "Islamic Common Market" has been created, of which Tajikistan is a member. Called the Economic Cooperative Organization, its members include the four Central Asian republics, Iran, Azerbaijan, Turkey, and Pakistan. Bilateral trade agreements are also being made; Turkey is setting up banks in Tajikistan, and Iran has sponsored trade exhibits. Cuba also signed a five-year trade agreement to develop health care and a sugar trade. Developing trade between Central and south Asian states may help to foster stability in Tajikistan, and a Central Asian consortium might be able to produce efficacious environmental compacts and agreements.

The development of environmental agreements between Tajikistan and its neighbors is essential. These countries must apply uniform conservation strategies; for example, each country along the Amu Darya and the Syr Darya should adopt uniform pollution norms, water consumption procedures, etc. These will be difficult to plan and implement, especially since Tajikistan is economically poorer.

Unless new export industries can be quickly developed, Tajikistan may have to acquire hard currencies by selling raw materials. There may also be a market for surplus hydroelectricity in neighboring republics, although it should again be noted that the Ragon Dam is being opposed by environmentalists. If foreign investors can be enticed to come to Tajikistan, its lead, zinc, silver, gold, tungsten, antimony, fluorspar, and uranium reserves could be developed. It especially needs technology in refining these raw materials. An obvious danger in this approach is that, given the present political realities, foreign firms may be able to avoid sound environmental practices in order to quickly recoup their investment.

Tajik farmers were producing 900,000 tons of cotton in the late 1980s, a third of which was valuable long fiber Egyptian cotton. Although more could theoretically be grown, many believe that an excessive amount of Tajikistan's agricultural land is currently sown in cotton. It would be possible to decrease the overall scale of cotton growing, while maintaining the more

valuable Egyptian cotton. A goal might be to gradually revert farming back to earlier practices, growing one part lucerne alfalfa to two parts cotton, soy, corn, fruit and vegetables, and rotating fields.

A critical issue is the dynamics of the Tajik population. How will it provide work for its youth, particularly in rural areas, who will soon be entering the labor force? How will a rapidly increasing population impact the land? A related question involves whether large state-run farms will be retained. If not, a transition must be planned for reducing large state farms to efficient sizes, or, if desired, to convert them back to family farm operations.

Tajikistan in the early 1990s finds itself in a crisis situation. It cannot be blamed for the situation of the environment which it inherited as a Soviet successor-state. It is, however, now saddled with the problems that Soviet industrial and agricultural planning have caused. In order to resolve these, the development of a coordinated economic and environmental improvement program, within a context of political stability, is essential.

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