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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. (Kritkausky)
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

Uzbekistan

Nancy Lubin

Executive Summary

The following paragraphs summarize the main contents and conclusions of a chapter on Uzbekistan, 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 Uzbekistan is briefly summarized, followed by a survey of its main economic resources and the most significant environmental constraints (climatic, seismologic, 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 Uzbekistan related to irrigated agriculture and the desiccation of the Aral Sea, including over-use of water, fertilizers, and pesticides, and the resultant deterioration of public health, especially in the Karakalpak republic. Local problems of air and water pollution are also discussed.

The main conclusion of the chapter is that the future of Uzbekistan is clouded by contradictions. It is resource-rich (especially in gold and natural gas), but past development of industry and agriculture has left a legacy of pollution and public health problems. Uzbekistan seeks outside aid, but problems of inefficiency and corruption limit the effectiveness of this approach. Rich in cultural and historic resources, major increases in tourism will also be dependent on an enhancement of environmental conditions. Thus, much investment in infrastructure improvements will be needed to raise Uzbekistan's standard of living and move it along the road of economic progress.

Philip R. Pryde, June 6, 1994
The end of Soviet rule in Uzbekistan has left a dual legacy. Certainly Uzbekistan today is more developed than some of its immediate neighbors. It enjoys a comparatively high level of literacy and industrial production, and basic education and health care are relatively widespread. But the human and environmental costs of Soviet development in Uzbekistan have been enormous, and in many respects Uzbekistan remains more impoverished and less democratic than many of its lesser developed counterparts in other parts of the world. Uzbekistan possesses more resources than some of its neighbors that it can utilize in dealing with these problems. But effective national development will require concerted political will to ensure that these resources are in fact used to benefit all segments of society in the new country.

Ethnicity, History, Political Geography

Before the collapse of the USSR, Uzbekistan was the third largest Soviet republic in population, and the fifth largest in territory. Today, with a population and level of industrial and agricultural production roughly 3 to 4 times that of Kyrgyzstan, Tajikistan, or Turkmenistan, many believe Uzbekistan is likely to emerge as one of the dominant, if not the dominant republic in the Central Asian region. With a 1994 population of over 20 million people, it is the largest in population, comprising more than 40% of the population of the five new Central Asian states that emerged from the former USSR.

But the importance of Uzbekistan as a single entity is relatively new. Before Russian conquest in the 1860s and the 1917 Russian Revolution, there was little sense of an Uzbek nation as such. Instead, life was organized around the tribe or clan, and traditional occupations centered on sedentary pursuits of the oasis — agriculture, commerce, artisan trades — or nomadic pastoralism. The population of what is today Uzbekistan was ruled by various khans who had conquered the region in the 16th century, the most powerful of whom were based in Bukhoro (Bukhara), Khiva, and Quqon (Kokand).

All of this changed with the onset of Soviet rule. Resistance was strong to the establishment of Russian rule in 1917, and opposition by "Basmachi", or guerilla fighters lasted well into the mid-1920s. Soviet power, nonetheless, slowly prevailed. In 1918, the new Russian government in Moscow formed a Turkestan Autonomous Republic that combined most
of Central Asia into one administrative unit. In October, 1924, this territory was divided into smaller units, and the republic of Uzbekistan was born.

The new borders of "Uzbekistan" ultimately not only created a new kind of Uzbek identity, but by deliberately cutting across existing ethnic and linguistic lines in the region, they also served to sow tension and strife among the different Central Asian groups. In particular, the territory of Uzbekistan was drawn to include two of the main Tajik cultural centers, Bukhoro (Bukhara) and Samarqand (Samarkand), as well as parts of the Fergana Valley to which other ethnic groups could lay claim. These borders have caused animosity and territorial claims between Uzbeks, Tajiks, Kyrgyz, and others for many years, but especially since the collapse of central Soviet rule (Rotar, 1992).

Indeed, even before the collapse of the USSR, Uzbekistan began to witness increased displays of tension among its different peoples and ethnic groups. In June of 1989, for example, ethnic conflict erupted between Uzbeks and Meskhetian Turks in the Fergana Valley, claiming about 100 lives. These were followed by other outbreaks of violence in other parts of the Fergana Valley and elsewhere as tensions also increased among Uzbeks, Kyrgyz, Tajiks and Kazakhs, and other national groups living on Uzbekistan's territory (Table 18.1). Many in Uzbekistan today fear the potential spillover of the conflict in Tajikistan into Uzbekistan, and many fear further unrest among ethnic groups within Uzbekistan itself. Thousands of Uzbeks living in Tajikistan have fled the civil war there and migrated back to Uzbekistan, just as tens of thousands of Russians and other Slavs have left Uzbekistan for northern Kazakhstan or Russia. Crimean Tatars, deported to Uzbekistan at the end of World War II, are migrating out of Uzbekistan to return to the Crimea.

During the 1980s, Uzbekistan gained notoriety through wide ranging corruption scandals. These centered primarily around the embezzlement of funds by falsifying figures on the production and distribution of cotton, and several high ranking Uzbek officials were prosecuted and imprisoned by the Soviet central government. Despite the fact that Uzbekistan initially wavered in its opposition to the August 19, 1991 coup in Moscow, on August 31, 1991, the Supreme Soviet of Uzbekistan declared the republic independent, and recognized the sovereignty and right to secession of the Karakalpak Republic. In December, 1991, an independence referendum was passed with 98.2 percent of the popular vote, and Islam Karimov, then Communist Party Secretary of Uzbekistan, was elected its first President.

One region that today holds an ambiguous position in Uzbekistan is Karakalpakstan. In 1936, as part of Stalin's nationality policy, the Karakalpaks (a Turkic Muslim group, related to the Kazakhs, whose name literally means "black hat") were given their own territory in western Uzbekistan and the administrative delineation of an "autonomous Soviet socialist
<table>
<thead>
<tr>
<th>Nationality</th>
<th>Number of given nationality (thousands)</th>
<th>Nationality as Percentage of Total</th>
<th>1970 as percentage of 1959</th>
<th>1979 as percentage of 1970</th>
<th>1989 as percentage of 1979</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uzbeks</td>
<td>5038 7724 10569 14142</td>
<td>62.1 65.5 68.7 71.4</td>
<td>153</td>
<td>131</td>
<td>134</td>
</tr>
<tr>
<td>Karakalpaks</td>
<td>168 230 298 412</td>
<td>2.1 2.0 1.9 2.1</td>
<td>137</td>
<td>130</td>
<td>138</td>
</tr>
<tr>
<td>Russians</td>
<td>1092 1473 1666 1653</td>
<td>13.5 12.5 10.8 8.3</td>
<td>135</td>
<td>113</td>
<td>99</td>
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<tr>
<td>Tatars</td>
<td>398 438 531 468</td>
<td>4.9 3.7 3.5 2.4</td>
<td>110</td>
<td>121</td>
<td>88</td>
</tr>
<tr>
<td>Kazakhs</td>
<td>343 476 620 808</td>
<td>4.2 4.0 4.0 4.1</td>
<td>139</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>Tajiks</td>
<td>311 449 595 934</td>
<td>3.8 3.8 3.9 4.7</td>
<td>144</td>
<td>133</td>
<td>157</td>
</tr>
<tr>
<td>Koreans</td>
<td>138 148 163 183</td>
<td>1.7 1.3 1.1 0.9</td>
<td>107</td>
<td>110</td>
<td>112</td>
</tr>
<tr>
<td>Ukrainians</td>
<td>88 112 114 153</td>
<td>1.1 0.9 0.7 0.8</td>
<td>127</td>
<td>102</td>
<td>135</td>
</tr>
<tr>
<td>Kyrgyz</td>
<td>93 111 142 175</td>
<td>1.1 0.9 0.9 0.9</td>
<td>120</td>
<td>128</td>
<td>123</td>
</tr>
<tr>
<td>Jews</td>
<td>73 93 74 65</td>
<td>0.9 0.8 0.5 0.3</td>
<td>128</td>
<td>79</td>
<td>89</td>
</tr>
<tr>
<td>Turkmen</td>
<td>55 71 92 122</td>
<td>0.7 0.6 0.6 0.6</td>
<td>130</td>
<td>130</td>
<td>132</td>
</tr>
<tr>
<td>Other*</td>
<td>254 328 381 513</td>
<td>3.0 2.7 2.6 3.0</td>
<td>129</td>
<td>116</td>
<td>135</td>
</tr>
</tbody>
</table>

* Other nationalities include Belarusians, Azerbaijanis, Armenians, Georgians, Bashkirs, Uighurs, Moldovans, Chuvash, Ossetians, peoples of Dagestan, and gypsies.

republic" (ASSR), an administrative division highlighting differences from the rest of Uzbekistan but still located within that Republic’s borders. It was given continued republic status in 1992, but pressure from Tashkent and continued ties with the Uzbek government have kept it from exerting full independence. Today, the population of Karakalpakstan is about 1.3 million people.

The capital of Uzbekistan is Tashkent, with a population of 2.1 million people. Other major cities include: Samarqand, Namangan, Andijon (Andizhan), Bukhoro, Farghona (Fergana) and Quqon (Kokand) (Table 18.2). As of 1989, roughly 72% of Uzbekistan’s population was Uzbek, with the remainder largely Tajik (almost 5%), Kazakh (about 4%), Tatar (2.5%), Karakalpak (a little over 2%), and about 8% who are ethnically Russian (see Table 18.1). Some would contend that the Tajik/Persian ethnic population is almost certainly understated in these figures. Today, Uzbekistan is becoming increasingly homogeneous as Russians and others continue to out-migrate in increasing numbers, and as Uzbeks return to Uzbekistan from other parts of the former USSR. With a per capita income estimated at 2,714 rubles in 1991, it ranks as among the poorest of the former Soviet republics.

Physical Environment and Constraints to Development

With a territory of approximately 447 thousand square kilometers (roughly the size of Sweden), Uzbekistan is one of the larger Central Asian states. Bordering on Turkmenistan to the southwest, Afghanistan to the south, Kazakhstan to the west and north, and Tajikistan and Kyrgyzstan to the east, the physical environment of Uzbekistan is quite diverse. The southeast portion of Uzbekistan is characterized by the western-most extensions of the Tien Shan mountains; the highest peak is 4643 meters. The vast Qizilkum (Kyzyl Kum desert) dominates the northcentral portion of Uzbekistan (Figure 18.1).

The most fertile part of Uzbekistan is the Fergana Valley, an area of roughly 20,000 square kilometers lying between two high mountain ranges. The eastern end of the valley abuts against the Tien Shan mountains in Kyrgyzstan; the western end opens up along the course of the Syr Darya into the Kyzyl Kum desert. The valley has very low rainfall, roughly 200--300 millimeters (8--12 inches) per year; but only small patches of unirrigated desert remain in the center of the area and along ridges on the periphery. It has a very high density of population.

Uzbekistan's climate is "continental", with hot summers and cool winters. In July, the mean temperature is 25°C in Tashkent and 30°C in the desert (77-86°F), while the January average is around minus 2°C but may fall in places to as low as minus 20°C. It is also quite arid, with average annual rainfall in most parts of the country between 100--400 millimeters (4--16 inches), falling mostly in winter and spring.
<table>
<thead>
<tr>
<th>City (Russian spelling)</th>
<th>Population (1000s)</th>
<th>1970-89</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tashkent (same)</td>
<td>1,385</td>
<td>2,073</td>
<td>49.7</td>
</tr>
<tr>
<td>Samargand (Samarkand)</td>
<td>267</td>
<td>366</td>
<td>37.1</td>
</tr>
<tr>
<td>Namangan (same)</td>
<td>175</td>
<td>308</td>
<td>76.0</td>
</tr>
<tr>
<td>Andijon (Andizhan)</td>
<td>188</td>
<td>294</td>
<td>56.6</td>
</tr>
<tr>
<td>Bukhoro (Bukhara)</td>
<td>112</td>
<td>224</td>
<td>100.0</td>
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<tr>
<td>Farghona (Fergana)</td>
<td>148</td>
<td>200</td>
<td>35.1</td>
</tr>
<tr>
<td>Quqon (Kokand)</td>
<td>133</td>
<td>182</td>
<td>36.8</td>
</tr>
<tr>
<td>Nukus (same)</td>
<td>74</td>
<td>169</td>
<td>128.4</td>
</tr>
<tr>
<td>Chirchiq (Chirchik)</td>
<td>107</td>
<td>156</td>
<td>45.8</td>
</tr>
<tr>
<td>Qarshi (Karshi)</td>
<td>71</td>
<td>156</td>
<td>119.7</td>
</tr>
</tbody>
</table>


Placename changes: Office of the Geographer, U.S. Dept. of State
Karakalpakstan, the only autonomous republic in Central Asia under the Soviet system, contains 165,600 square kilometers, or over a third of the entire Uzbek republic. Located in the lower reaches of the Amu Darya river, it contains part of the Aral Sea and the Kyzyl Kum desert. Karakalpakstan’s economy has always been centered in the very fertile Amu Darya delta, and it has a long history of irrigated agriculture. Today, however, the drying up of the Aral Sea has made Karakalpakstan one of the poorest and most environmentally devastated parts of Uzbekistan, if not the entire former USSR.

The exceedingly arid climate and general scarcity of water in Uzbekistan would be constraints to development anywhere in the world. In Uzbekistan, it has only been exacerbated by decades of relentless pursuit of irrigated agriculture, especially cotton, without regard to wastage of water or other natural resources. The cotton monoculture that has destroyed the fertility of much of the soil; the high losses of water due to poorly planned expansion of irrigated lands; the waterlogged soils; the large scale erosion of soil; the vast amounts of secondary salinization of Uzbekistan’s soils—all these have had not only a negative environmental impact, but have had serious public health and economic consequences as well. After rapid expansion of acreage under irrigation between 1965 and 1986, by 1988 poor water management had actually taken more than 3.4 million hectares out of production in the Aral Sea Basin (Feshbach and Friendly, p. 76). Other reports suggest that more than 400,000 ha. of irrigated land were taken out of production in Uzbekistan alone between 1976 and 1985, and almost half (44 percent) of all irrigated land in Uzbekistan today is strongly salinized. The regions of Uzbekistan most seriously affected by salinization are Syr Darya, Dzhizak, Bukhoro, and Khorazm oblasts and the Karakalpak region. Throughout the 1980s, officials were pumping more investment into farms in Uzbekistan, and sustaining greater losses.

Seismic activity is also a potential physical constraint to development. Indeed, much of Uzbekistan’s capital city, Tashkent, was destroyed in a major earthquake in 1966. Other earthquakes on a significant scale have occurred both before and since; for example, a very strong earthquake resulted in heavy damage to the Gazli area in 1984. The mountain areas and adjacent foothills are especially prone to earthquakes.

A third major constraint on economic growth is Uzbekistan’s exceedingly high rate of population growth. According to estimates by Uzbek demographers, Uzbekistan’s population, growing at almost 3 percent per year, is projected to increase by roughly 600,000 people annually through the year 2000. By the year 2005, it is projected that roughly 30 million people will live in Uzbekistan alone, more than the combined populations of Uzbekistan, Tajikistan, Kyrgyzstan and Turkmenistan today. Population density likewise will have almost doubled, to roughly 74 people per square kilometer. "A very great ecological burden will be
created on irrigated land in the republic, where already today there are only .15 hectares per inhabitant" (Ata-Mirzaev, 1989).

Even at present, five of the eight most densely populated oblasts of the former USSR -- Andijon, Farghona (Fergana), Tashkent, Namangan, and Khorazm -- are in Uzbekistan, and their populations continue to grow rapidly. Average population density for Uzbekistan is roughly 118 inhabitants per square mile, compared to 16 inhabitants per square mile in Kazakhstan.

Finally, despite the high population growth, the shortage of skilled personnel in Uzbekistan is also a major constraint to future development. Russians and other non-indigenous personnel have long concentrated for a variety of reasons in the industrial sectors of the economy, which include mining and most factory production. With the disintegration of the USSR and the outbreak of violence in Central Asia, many of these skilled personnel have begun to leave.

According to unofficial data, between 1985–1991, the number of "non-natives" in Uzbekistan declined from 2.4 to 1.6 million people, and the number of out-migrants continued to escalate throughout 1992. In the energy sector, half of the power generating units of the Syr Darya electric power station have been shut down because of Russian out-migration, and there is no trained personnel to operate the recently constructed Novoangrenskii power station. In Tashkent, one individual lamented ominously, "Europeans make up more than 90 percent of the personnel of the electric power station and now they are leaving" (Sabov and Cherniak, 1992, p.2). Efforts are being made to train indigenous cadres, but the shortfall is making itself sorely felt.

**Natural Resource Advantages and Existing Industry**

Uzbekistan is exceedingly rich in a wide array of natural resources that provide enormous opportunity for future development. These include important mineral and energy resources, cotton and other agricultural crops, and a relatively well-developed industrial processing capacity in these sectors.

Perhaps the most valuable of Uzbekistan’s mineral resources is gold. Uzbekistan accounted for about one third of Soviet gold production before the breakup of the USSR. Today, the Muruntau gold mine, located about 250 miles northwest of Tashkent in the Kyzyl Kum Desert near the town of Zarafshan, is estimated to be the largest gold mine in the world (Consolidated Goldfields, 1979; Sagers, 1992). Other gold reserves have reportedly been located at Oriklisoy and elsewhere. In 1992, a reported 80 tons of gold was mined in
Uzbekistan, making it the eighth largest producer of gold in the world. Other metals include significant copper deposits, iron ore, lead, zinc, and silver. Some uranium mining also occurs.

Uzbekistan is also quite rich in energy resources. It was the third largest producer of natural gas in the former Soviet Union after Russia and Turkmenistan, producing over 10 percent of the natural gas in the former USSR. Gas reserves are tentatively estimated at more than one trillion cubic meters, concentrated mainly in Kashkadarya Oblast, at Gazli, Urtabulak, Dengizkul, Shurtan, and other locations. The biggest gas deposit, Boyangora-Gadzhak, was discovered in Surkhandarya Oblast in the 1970s.

Uzbekistan also has small coal reserves, mainly from Angren, and a small but increasing production of oil. The recent discovery of the Mingbulak (or "Thousand Springs") oil field in Namangan oblast may ultimately dwarf these other energy resources. Some experts suggest this may prove to be one of the world's best oil fields. The field is on an unfaulted anticline covering more than 20,000 acres in the central basin of the Fergana Valley (Oil and Gas Journal, 1992). Local sources suggest that Namangan Oblast could soon produce the equivalent of hundreds of millions of dollars worth of oil (Kolbasiuk and Svartsevich, 1992). Western Uzbekistan is also reportedly rich in oil, with reserves in one deposit, Kokdumalak, reportedly exceeding hundreds of millions of tons.

Uzbekistan's main agricultural resource has long been its "white gold", meaning the vast amounts of cotton growing on its territory. Uzbekistan was long the chief cotton growing region of the former USSR, accounting for 61 percent of total Soviet production, and today it reportedly ranks third in the world. In 1991, Uzbekistan's cotton yield was more than 4.6 million tons, of which over 80% was of the first and second grades. In 1987, roughly 40% of Uzbekistan's workforce, and more than half of all irrigated land in Uzbekistan (over 2 million hectares) were devoted to cotton.

In light of increasing water shortages in Central Asia, and the declines in food imports to feed an increasingly impoverished population, government leaders have stated that they would like to reduce the acreage under cotton cultivation in favor of growing food. But Uzbekistan's short-term needs for hard currency make dramatic declines in cotton cultivation unrealistic. Likewise, the entire existing agricultural infrastructure (the irrigation system, layout of the fields, farm machinery, etc.) is geared towards cotton production; shifting to other crops would require a massive overhaul of the agricultural system that leaders do not appear to be prepared to risk. The continued commitment to cotton, therefore, is also seen as providing a good base for further development.

Despite some efforts to diversify its industrial base, Uzbekistan's economy remains dominated by raw materials extraction and processing, mostly connected with cotton production.
and mineral extraction. These include extraction of oil and natural gas and oil refining; mining and mineral processing; machine building, especially of equipment for cotton cultivation and the textile industry; cotton ginning, and other light and food industries; and to a lesser extent the iron and steel, chemical, power and coal industries (Table 18.3). Uzbekistan is also home to several major defense industries, including aviation factories, from the Soviet era.

The capital city of Tashkent accounts for about one third of all industrial output in Uzbekistan, largely in textiles and agricultural machinery. Electricity for these industries comes from small hydroelectric stations along the Chirchik River and from a gas-fired thermal power station. Two refineries in Uzbekistan, in Farghona (Fergana) and Amtiari, have a combined capacity of over 173 thousand barrels per day. Other centers of processing industries include Angren (for coal), Bekabad (steel), Olmaliq (Almalyk) (copper, zinc, and molybdenum), Zarafshan (gold), and Yangiabad (uranium).

In the agricultural sector, there has been little conversion to private enterprise as yet. Uzbekistan has been reluctant to begin the process of breaking up the collective farms and privatizing agricultural land for fear of the political ramifications and destabilizing impact it might have on Uzbekistan's power structure.

**Major Environmental Problems**

The major environmental problem facing Uzbekistan is the tragedy of the Aral Sea, which has been reduced to about a third of its normal size. Some of the impacts of this disaster include serious salinization of the land under crops; salt and dust storms; increased desertification and consequent loss of plant and animal life as well as arable land; change in climate conditions of the region; lower cotton yields; destruction of historical and cultural monuments; and decreases in public health indices. Irrigation diversions have reduced flow in the lower Amu Darya to almost zero in some years, yet about half the diverted water is not beneficially used on crops (Micklin, 1988, 1991).

The newly exposed bed of the Aral Sea is creating serious down-wind problems. Each year up to 150 million tons of salts are reportedly carried distances of as much as 800 kilometers; Karakalpak Ministry of Health experts assert that salt and dust storms from the Aral Sea have raised the level of particulate matter in the earth’s atmosphere by more than 5%. Likewise, the continental climate in the Aral region has become more severe: the number of frost-free days has diminished; summers are on average 2--3 degrees hotter, and winters two degrees colder, than they were two decades ago.

The human problem is particularly acute in Karakalpakstan, where public health has deteriorated significantly in recent years. Drinking water is contaminated, and diseases such as
Table 18.3. Industrial Production by Sector of Industry in Uzbekistan (as percent of whole)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Total Industry</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Heavy Industry</td>
<td>42.3</td>
<td>44.1</td>
<td>44.4</td>
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<tr>
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<td>8.5</td>
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<tr>
<td>metallurgy</td>
<td>5.2</td>
<td>4.6</td>
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<td>10.4</td>
</tr>
<tr>
<td>machine building</td>
<td>14.7</td>
<td>16.0</td>
<td>16.0</td>
<td>11.1</td>
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<tr>
<td>chemical-timber</td>
<td>6.4</td>
<td>7.3</td>
<td>7.6</td>
<td>5.7</td>
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<tr>
<td>construction materials</td>
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<td>5.9</td>
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<tr>
<td>Light Industry</td>
<td>40.2</td>
<td>38.5</td>
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<tr>
<td>Food Industry</td>
<td>14.3</td>
<td>13.9</td>
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</tbody>
</table>

typhoid, cancer, and hepatitis are rampant (Feshbach and Friendly, 1992, pp. 73-75). Muynaq (Muynak), once a thriving Aral Sea port, is now many kilometers from the sea, and must process imported fish. Other problems in this minority region are noted elsewhere in this chapter, and the nature of the Aral Sea tragedy is discussed further in Chapter 16 on Kazakhstan.

But the Aral Sea disaster is only the tip of the iceberg. Decades of poor water management and a lack of water or sewage treatment facilities; inordinately heavy use of pesticides, herbicides, defoliants and fertilizers in the fields; and construction of industrial enterprises without regard to human or environmental impact have led to massive environmental challenges throughout the territory of Uzbekistan.

As but one example of the magnitude of these problems, throughout Central Asia an average of 20--25 kg of various toxic chemicals are applied per hectare, as against a former Soviet average of 3 kg. In some parts of Uzbekistan, upwards of 20 times the Soviet average of fertilizer is applied per acre; that is, upwards of 230 kilograms of fertilizer per acre, as opposed to a Soviet average of 11 to 12 kg. Pesticide usage per hectare of arable land in places exceeds the safe level of 1.3 kilograms per hectare by 40--50 fold, and the USSR average by 26 times (Yablokov, 1992). According to some reports, the concentration of chemical poisons in the atmosphere of population centers during the period of crop cultivation exceeds the maximum permissible concentration by 30--50 times (Torianikova and Karaseva, 1991).

In the words of one local environmental specialist: "Unfortunately, the gratis extensive use of the important natural resources of the republic, and the spontaneous distribution of productive forces undertaken without any consideration of the recommendations of scientific and authoritative specialists, has led to the brink of ecological catastrophe of the natural resources of our republic" (Alikhanov, 1990). Uzbekistan’s water, air and land are polluted to dramatic proportions. These various environmental assaults are also adversely affecting wildlife and the nation’s network of nature reserves (Table 18.4).

According to one report, practically all of the large underground fresh water supplies in Uzbekistan today are polluted by industrial and chemical wastes (Koniukhov, 1990). Currently, Koniukhov estimates, roughly 6 million people live in regions where the level of water pollution is merely "dangerous", and more than 3.5 million live in areas where the level of water pollution is deemed "critical" (ibid.). In other words, about half the population lives in regions where the water is severely polluted. Only 60% of the farms have a piped water system, and in many rural regions of Karakalpakstan, as well as in Khorazm, Bukhoro, and other oblasts, the population is forced to drink water directly from polluted reservoirs, rivers, and canals (ibid.).
Table 18.4: Preserved Areas in Uzbekistan

<table>
<thead>
<tr>
<th>Type of Preserve (a)</th>
<th>Number</th>
<th>Total area (b)</th>
<th>Average area (b)</th>
<th>% of Re-size (b)</th>
<th>% of Republic (c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zapovednik (Nature Reserves)</td>
<td>10</td>
<td>2162.69</td>
<td>216.27</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>Above that are Biosphere Reserves</td>
<td>1</td>
<td>356.86</td>
<td></td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>National Parks</td>
<td>1</td>
<td>315.03</td>
<td>315.03</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Zakazniki (nature preserves)</td>
<td>5</td>
<td>786.00</td>
<td>157.20</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>3263.72</strong></td>
<td><strong>203.98</strong></td>
<td><strong>0.73</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zapovedniki (date created)</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aral-Paigambar (1971; 1960)</td>
<td>3094</td>
</tr>
<tr>
<td>Badai-Tugai (1971)</td>
<td>5929</td>
</tr>
<tr>
<td>Chatkal (1947)</td>
<td>35686</td>
</tr>
<tr>
<td>Gissar (1983; 1975)</td>
<td>87538</td>
</tr>
<tr>
<td>Kitabskiy (1979)</td>
<td>5378</td>
</tr>
<tr>
<td>Kyzylkum (1971)</td>
<td>10141</td>
</tr>
<tr>
<td>Nuratinsk (1973)</td>
<td>22537</td>
</tr>
<tr>
<td>Suzkhansk (1986)</td>
<td>28014</td>
</tr>
<tr>
<td>Zaamin (1959)</td>
<td>15600</td>
</tr>
<tr>
<td>Zeravshan (1975)</td>
<td>2352</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>216269</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>National parks</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uzbek People's Park (1978)</td>
<td>31503</td>
</tr>
</tbody>
</table>

(a) For the definition of each type of preserve, see Appendix 2 to Chapter 1.
(b) In square kilometers.
(c) Area of Uzbekistan equals 447,400 square kilometers.

According to Koniukhov, out of 124 cities and villages in Uzbekistan, Tashkent has the best quality drinking water, but even here, heavy pollution of the Chirchiq River and other industrial pollution has made Tashkent's drinking water unacceptable. According to an investigation by the Uzbekgidrogeologia Association, much of the surface waters and ground water in Tashkent is saturated with heavy metals, phenols, and petroleum products along with other pollutants, giving enormous "cause for alarm" ("They investigated...", 1992).

Air pollution presents just as bleak a picture. Uzbekistan may account for 60% of industrial production among the four Central Asian states, but it also accounts for 60 percent of air pollutants in Central Asia (Zav'ialova and Agafonova, 1991). In 1988, emissions of pollutants into the republic's atmosphere reached 4.1 million tons per year, including 336 thousand tons of nitric oxide. High levels of heavy metals (lead, nickel, zinc, copper, mercury, manganese, and the like) have been found in Uzbekistan's atmosphere, mainly from the burning of fossil fuels, utilization of wastes, and ferrous and non-ferrous metallurgy (Zav'ialova, et al., 1991). Especially high concentrations of heavy metals are reportedly found in the southern part of Tashkent oblast near the Olmaliq (Almalyk) metallurgical combine.

Combined with the soil pollution described above, the environmental situation of Uzbekistan has already had serious health effects. Although it is always difficult to prove a direct cause and effect, the cumulative impact of these problems appears to have been devastating. Frequently cited in the press are increasing occurrences of typhoid, paratyphoid, and hepatitis due to contaminated drinking water; rising rates of intestinal disease and cancers; and increased frequency of anemia, dystrophy, cholera, dysentery, and a host of other illnesses, including, according to one Russian specialist, a "lag in physical development" especially among children (Volkhov, 1988). According to one estimate, 69 out of every 100 adults in the Aral Sea region are deemed to be "incurably ill" (ibid.). The average life span in some villages in Karakalpakstan is roughly 38 years.

Infant mortality—perhaps the best measure of the health of a population—has increased dramatically over the past twenty years, by as much as 49 percent in Uzbekistan between 1970 and 1986, or from 31 deaths before the age of one per 1000 births, to 46.2 deaths (TsSU, 1987). Today, official data put the level of infant mortality in parts of Karakalpakstan at roughly 110 per 1000 children born, meaning that more than one out of every ten children born do not live until their first birthday (Bohr, 1989). Unofficial estimates put the level at twice that figure.

**Governmental Structure**

President Karimov, and the government of Uzbekistan, have acknowledged the extent of these environmental problems and have stated a commitment to address them. But the
governmental structures to deal with these problems remain confused and ill defined. Old agencies and organizations have been expanded to address these questions, and new ones created, resulting in a range of agencies caught in a bureaucratic web with seemingly no real commitment to attack environmental problems head on.

The key institution for addressing environmental problems in Uzbekistan is the State Committee for Environmental Protection, an outgrowth of the former branch of the all-Union State Committee for Environmental Protection in Moscow, which is currently under Minister Askhad Khabibulaev. It shares overlapping responsibilities with the State Committee on Hydrometeorology, and a host of other institutions that play a key role in environmental protection, such as the Ministry of Land Reclamation and Water Resources; the State Committee for Water Resources Construction; the Institute of Irrigation; a new Institute for Nature Protection; and others. These institutions also work with a plethora of other sectoral ministries and committees. In the energy sector, for example, "Uzbekneftegaz", a new Uzbek State Oil and Gas Industry concern, was formed in May of 1992, to develop more effectively and comprehensively Uzbekistan's oil and gas deposits and energy production capabilities ("Ukase...," 1992). Its responsibilities directly overlap those of the Sredazgasprom Production Association, the State Committee on Geology, and others.

Various non-governmental environmental organizations and grassroots organizations have also begun to form, some closely tied to the current government, and others assuming more of an opposition stance. Environmental issues were among the first points in the original platform of "Birlik", the first major opposition movement to emerge in Uzbekistan. They are a key concern of all opposition groups today, and the cause of growing concern if not discontent among the population as a whole. The Committee to Save the Aral Sea, formed by Permat Shermukhamedov, held its first congress as a "Green Party" in June, 1992. In November, 1992, a new group was formed, the Foundation for Ecology and Health, headed by Shadimetov; the foundation is touted as being "completely autonomous", although Shadimetov himself is a major government figure, heading the Department of Social Issues of Uzbekistan's Council of Ministers. Other groups, such as smaller Committees to Save the Aral Sea and the Union to Defend the Aral and the Amu Darya, remain more grassroots activist, very much created and supported from below.

To be sure, a wide array of measures have been endorsed to address some of these problems. Plans to introduce payments for resources, especially water; to collect fines from heavy polluters; and to address the Aral Sea crisis have been discussed for some time. But the multitude of government agencies has created administrative confusion. A lack of law enforcement in these areas, a kind of capriciousness in government economic and
environmental planning, and heavy centralization in the hands of the Uzbek President with little tolerance of grass roots groups has greatly hindered addressing these problems. "Basically there are a lot of organizations doing the same tasks and having the same goals and orientation," says one Uzbek geologist, hindering an effective response to Uzbekistan's problem (Polatov, 1992).

And all of this has been exacerbated by a high degree of corruption throughout the Uzbek system. A spate of accusations have appeared in the local press concerning misuse of funds, including allegations of squandering and embezzlement of several million rubles from the "Aral Fund" created under Shermukhamedov's Committee to Save the Aral Sea. In this case, funds allegedly were used illegally to fund private businesses and a commercial center, for the construction of a bath house, for the production of a documentary film previously vetoed by the Committee as a whole, and for direct personal gain (Mirzaev and Kovalev, 1992). Other alleged cases of widespread "abuse, waste, theft, embezzlement, and sabotage" have been attacked in the sale of Uzbekistan's petroleum products and other sectors ("On measures...", 1992).

Uzbekistan is rich in resources and potential. The country's environmental problems are at heart a result of abuse and mismanagement of Uzbekistan's natural resources, economic wealth, and political power. Until the political will emerges to regard environmental problems as a threat not only to the existing government in power but to the very survival of Uzbekistan, little will be done by way of effectively addressing these increasingly serious challenges.

In addressing environmental questions of such immediate importance, perhaps one of the biggest challenges for Uzbekistan will be to establish a greater degree of cooperation with its neighbors. Few of the environmental challenges facing Uzbekistan today, and hence few of the major constraints on their own future development, can be addressed in isolation from the other former Central Asian republics. Water management, air and soil pollution, climate change, the Aral Sea catastrophe, and the like can only be handled effectively if addressed multinationally.

For some time, conferences and declarations by leaders in Central Asia have called for more cooperation and collaboration among the five new Central Asian states to resolve the problem of the Aral Sea and regional use of water resources. In December, 1992, President Karimov took the lead in proposing the creation of a "strong, unified interstate organization to resolve the problems of the Aral Sea". But so far, these new countries have acted far more competitively than cooperatively in their economic policies, and the prospect of interstate cooperation to resolve environmental problems remains a glimmer of hope for the future.
External Ties and Economic Potential

Having had independence thrust upon them in 1991, Uzbekistan and the other Central Asian states pressed to become “founding members” of the Commonwealth of Independent States (CIS) on December 21, 1991. Economically unstable and politically shaky, Uzbekistan has found perpetuating existing links with the former Soviet republics its best hope for the short term. Economic and trade treaties have been signed with Russia, Ukraine, Moldova, Azerbaijan, Kyrgyzstan, and Kazakhstan, and collective security and/or military agreements have been signed with Russia, Armenia, and other Central Asian states. In the environmental area, a protocol among most of the CIS governments was signed in January, 1992, that emphasized the Aral Sea problem as a priority for CIS cooperation.

In general, however, little has come of direct CIS cooperation in addressing Uzbekistan’s environmental ills. As the other CIS states have focused mainly on their own problems at home, Uzbekistan has begun to look in other directions for cooperation and assistance.

One natural direction for Uzbekistan to look is to its immediate neighbors to the south—Iran, Pakistan, Turkey—and to the wider Middle Eastern and Asian worlds. Uzbekistan’s relations with its southern neighbors have greatly increased: Turkey and Iran have been especially active in pursuing economic projects and social, cultural, and diplomatic initiatives in Uzbekistan. For example, Uzbekistan has been the recipient of most of the $700 million (US) in credits that Turkey has given the new Central Asian states; Pakistan has followed suit, with particular commercial interest in hydroelectric power, gas pipelines, and other projects. Although initially nervous about the spread of Iranian fundamentalism in Central Asia, Uzbekistan has found mutual economic interests with Iran, and the two have pursued overland links and other joint ventures. During 1992, trade and cooperation agreements were signed with China, Saudi Arabia, Jordan, Pakistan, Iran, and others.

One forum that has emerged as a potentially important structure for cooperation with these countries in environmental issues, as well as other areas, has been the Economic Cooperation Organization (ECO). Although during its almost two decades of existence ECO has achieved very little in the way of economic cooperation, with the inclusion in November, 1992, of the five former Soviet Central Asian states plus Afghanistan and Azerbaijan, there have been significant efforts to reinvigorate the organization. At a meeting in February, 1993, an ambitious plan was announced to create a new interlinked regional economic bloc among ECO’s members by the year 2000. The plan calls for expanding ties in all economic sectors, including tourism; setting up an effective transportation infrastructure to do so; and ultimately abolishing restrictions on the free flow of people and commodities. Energy trade is also to be expanded through the building of oil and gas pipelines and power transmission lines throughout
the entire region. Given ECO's track record, it is unclear the extent to which these goals may be reached.

With Uzbekistan now a member of the United Nations, the World Bank, the IMF, the CSCE, the North Atlantic Cooperation Council, and other Western and international organizations, Uzbekistan has also begun to look beyond its immediate neighbors or the Islamic world for cooperation and assistance. The World Bank, for example, has scheduled a preparation mission for a $150 million Cotton Sub-Sector Development program to increase on-farm productivity and individual farmer's income and improve the international marketing of cotton. On a smaller scale, the European Bank for Reconstruction and Development has approved $155,000 ECU dollars to investigate the economic and technical feasibility of setting up a waste lubricants re-refining plant in Uzbekistan (Environmental Cooperation Bulletin, 1993).

The role of the United States has not been negligible. The U.S. recognized Uzbekistan as an independent state on December 25, 1991; diplomatic relations were established in February, 1992 following a visit by Secretary of State James Baker to the republic, and an embassy was opened in March. Negotiations on a U.S.-Uzbek trade agreement took place in November, 1992, but in early 1993, it awaited signature by the Uzbeks. Other initiatives, however, have gotten underway: the Peace Corps sent a group of about 50 volunteers to Uzbekistan in December, 1992; an agreement with the Overseas Private Investment Corporation (OPIC) has been put into force; and humanitarian and technical assistance was provided to Uzbekistan during 1992 and 1993.

On the commercial side, U.S. companies have also been making inroads to help exploit Uzbekistan's rich natural resources. The U.S. firm Stan Cornelius Enterprises, for example, helped cap the oil well blowout at Mingbulak in March, 1992, and has subsequently established a joint venture with Uzbekneft to develop the oil field and explore and develop other oil reserves in the country. The joint venture expects Mingbulak field to produce for 12--20 years ("CIS Petroleum. . .," 1992).

Likewise, the Colorado based Newmont Mining Company has established a roughly $75 million joint venture with the Navoi Mining and Metallurgical Combine and the State Committee for Geology and Mineral Resources of Uzbekistan to produce gold at the Muruntau mine near Zarafshan. The venture is expected to cost $100 million in start-up costs, start producing in 1994, and yield an output of about 270,000 ounces of gold per year (Sagers, 1992). The European Bank for Reconstruction and Development is considering allocating funds to implement the project, along with investing in the development of such sectors as power generation, the agrarian industrial complex, transportation, communications, tourism and
ecology, as well as the financial sector. Other U.S. and Western firms are signing joint ventures in cotton and woolen cloth production, tourism, and other sectors, and a range of U.S. environmental NGOs are exploring joint projects throughout Uzbekistan.

In July, 1992, President Karimov issued a decree establishing a national company called "Uzbektourism" to build a viable tourist industry; i.e., to develop the infrastructure, educational and organizational basis for development of all types of tourism and to construct modern tourist facilities with the help of foreign investment. Turkish firms have become involved in building hotels, motels and camping facilities, and several Western firms are exploring possibilities as well.

All of these efforts, however, remain in their infancy, and problems and complications abound. Despite new laws regarding tax holidays, repatriation of profits, and tax incentives to reinvest profits in scientific research, the investment climate for foreign companies remains poor. Political instability, highly bureaucratic and centralized control, lack of infrastructure, corruption, and other problems remain major impediments, inhibiting many joint ventures from getting off the ground.

These are the kinds of challenges that face Uzbekistan in its new period of independence, as it strives to reverse a legacy of unbalanced economic development and environmental devastation from roughly seventy years of Soviet rule. One indication of Uzbekistan's desire to show its independence from Moscow was its decision in 1993 to change its native written language from the Cyrillic to the Latin alphabet, so as to more easily interact with the non-Russian world. If Uzbekistan chooses to institute democratic domestic reforms, work effectively with its direct neighbors, and judiciously attract foreign investment, it may be able to move along the path to political pluralism, environmental cleanup, and an improved economic infrastructure. Alternatively, if it becomes mired in conflicts, authoritarianism, and local rivalries that leave it caught in a web of infighting, indifference and despair, it may be unable to address adequately an environmental crisis that could ultimately threaten its very survival. Thus, the 1990s will be a defining decade in the history of the Uzbek people.

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