

Environmental Management in Independent Central Asia

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On achieving independence from the Soviet Union, the five Central Asian Republics (CARs) faced a daunting legacy of problems derived from nearly categorical neglect of environmental management in their previously planned economies. While simultaneously coping with the creation of new nation-states and the transition to market-oriented economies, the CARs have struggled to establish new environmental management systems consistent with their economic and social development goals.

Efforts to improve environmental management in the CARs since their independence have ranged from the restructuring of national and regional institutions to enhancing environmental planning and programming at both the country and regional levels. In the initial stages of their transition, emphasis was given to stabilizing and defining a new set of environmental and resources management institutions—still primarily based on those inherited from the Soviet period. Former agencies of the five Soviet Socialist Republics were upgraded to ministries and departments within the newly formed national governments.¹ As in other spheres, balance was sought between central and local government roles in environmental management, though such determinations and adjustments are far from complete. Following the path of other economies in transition, each of the five countries developed National Environmental Action Plans (NEAPs) with international assistance, each varying significantly in their quality and practicality.²

Efforts also have been made to develop new ways to handle environmental and natural resources management concerns at the regional level.³ Building on the NEAPs, a Regional Environmental Action Plan (REAP) has been produced covering high priority transboundary environmental challenges in the region as well as some problems common to several or

all of the countries.⁴ In 2003, the CARs also presented a common environmental and natural resources management vision for the region⁵ at both the United Nations (UN) World Summit on Sustainable Development in Johannesburg and the UN Economic Commission for Europe conference on Environment for Europe held in Kiev.⁶ Since the five former Soviet countries previously had been under the same governmental system and planned economy, their efforts to develop new regional mechanisms for the allocation and trade of water, energy, and other resources had a common starting point. However, such regional issues remain contentious and in need of careful analysis and resolution emphasizing mutual interests. Externally introduced institutional distortions which relate to regional versus national environmental management are also present. For convenience, regional international assistance programs often have grouped together issues that are truly regional (such as transboundary water management or air pollution) with national or even local topics that happen to be of common concern in the region.

Nevertheless, the international donor community has played a vital role in helping the CARs emerge from their isolation and come to terms with inherited environmental problems as well as new challenges. Donor programs continue to assist these countries in developing new ways to better incorporate environmental considerations into their transitions to market-based economic development. Whether at the national or regional levels, the primary target of and counterpart for this assistance has been the national environmental ministries or state committees, but institutions responsible for agriculture,⁷ energy and natural disasters management also have received important support.

This chapter begins with an overview of key environmental and natural resources management issues in Central Asia. This is followed by a review of environmentally-related policy and program developments at the country and regional levels. Some brief conclusions also are offered concerning common directions observed.

Environmental Challenges Facing the Region

Geographical Characteristics and Determinants

From the days of Amir Timu, or Tamerlane, Central Asia has served as a crossroads for cultures, trade and ideas. It is emerging from the isolation of its colonial period and still holds the promise of becoming a dynamic region of growth and prosperity in the heart of Asia. Bounded by the Russian Federation to the north, the Caspian Sea and Iran to the west,

Pakistan to the southeast, and the People's Republic of China to the east, the five former Soviet countries of Central Asia span an area larger than the Indian subcontinent.

Aside from a densely populated strip across the north of Kazakhstan bordering Russia, most of Central Asia's more than 55 million people reside within the area drained by the two great rivers flowing to the Aral Sea: the Syr Darya and the Amu Darya. The upstream states of Kyrgyzstan and Tajikistan are mountainous and largely dependent upon their agricultural economies, whereas the downstream states of Kazakhstan, Turkmenistan and Uzbekistan show a greater balance between agriculture and industry. Northern Afghanistan also is hydrologically and ethnically linked to the Central Asian states.⁸ The downstream countries of Central Asia possess fossil fuel resources—especially oil and gas in the Caspian Sea region of Kazakhstan and Turkmenistan, gas in Uzbekistan, and coal in Kazakhstan—that place them among the most energy rich countries in the world.⁹

The major natural resource and environmental management questions facing the region can be grouped into six areas: water resources management, urban and industrial pollution, land and natural systems degradation, mountain ecosystems management, and environmental management policies and institutions. Central Asian efforts to shape national responses to global environmental challenges also have influenced domestic policies and programs. The remainder of this section briefly reviews current developments relating to each of these topics. Additional detail on country and regional responses in the context of international assistance programs follows.

Water Resources Management

Water and environmental management problems in Central Asia first gained international notoriety in response to the ecological crisis brought on by the shrinking Aral Sea. From 1960 to 1990, the area of this inland sea was halved as inflows were diverted to support cotton, wheat and rice production in the deserts of the downstream states. The results included destruction of a vibrant fishery (including the likely loss of 24 indigenous species of fish), devastation of surrounding ecosystems, and an undermining of the livelihoods and/or health of more than three million people.

The challenge of regional water management for these semi-arid lands is no less acute today. The mountains of Kyrgyzstan, Tajikistan and Afghanistan serve as the principal sources of water for the region (see Chapter 9 by Daene McKinney for full details). If it were not for the

mountain relief capturing and redistributing moisture from precipitation (mostly through snowmelt into rivers), the arid downstream states would not be able to support their current populations. The three downstream CARs receive only about 13 percent of the Aral Sea Basin's rainfall but have 86 percent of its irrigated area.

The mountains also hold tremendous hydropower potential, which Kyrgyzstan and Tajikistan are eager to develop. Attention has turned in recent years from a focus on the downstream problems in the immediate Aral Sea region to the need for a stable balance between upstream hydropower and downstream irrigation interests and to wide-ranging issues of land degradation due to water mismanagement. Nevertheless, some steps continue to be taken to address the economic and social hardships facing those living around the Aral Sea. All five CARs have a mutual stake in the establishment of a stable post-independence regional water and energy management regime, and this has become a principal interest of the International Fund to Save the Aral Sea (IFAS) and its affiliate body, the Interstate Commission for Water Coordination (ICWC). Agreements were made in 1992 and 1995 establishing the mandates of these organizations. A landmark interstate agreement on irrigation and hydropower for the Syr Darya River also was signed in 1998 (outside of IFAS), but much remains to be done if long-term stability is to be achieved in these matters. Preliminary interstate agreements also have been reached between Kazakhstan and Kyrgyzstan, covering the Chui and Talas Rivers, and between Kazakhstan and China, covering the Ili-Balkash and Irtys Rivers.

In addition to water allocation issues, water quality concerns were reiterated as a key issue during development of the REAP. Pollution from industrial point sources as well as municipal and agricultural wastes are causing serious health problems in some locations, especially where communities face shortages of potable water.¹⁰ The heavy silt load of the region's rivers caused by soil eroded from upstream states creates costly downstream problems through sedimentation of reservoirs and irrigation canals. There also are close and confounding interactions between water quantity and quality problems.¹¹ Chemical, biological and sediment pollution discharged into the Amu Darya and Syr Darya Rivers eventually finds its way to the Aral Sea—aggravating other environmental and social problems from low water flows and further threatening delta ecosystems.

Issues of river pollution crossing international boundaries are commonplace. The salinity of the Syr Darya River is significantly heightened in Uzbekistan before it passes into Kazakhstan. Industrial pollutants flow from Russia to Kazakhstan through the Ural River and from Kazakhstan to

Russia through the Irtysh River.¹² The Chui and Talas Rivers flow from Kyrgyzstan into Kazakhstan, with the former carrying effluents from a paper mill in the capital city of Bishkek and the latter having its salinity increased from agricultural drainage waters. Similarly, the Surkhandarya River is heavily polluted by the large Tursunzade Aluminum Works in Tajikistan before flowing into Uzbekistan.¹³ The uranium tailings of Kyrgyzstan have raised considerable international concern because of the risks they pose to downstream river contamination in both Kyrgyzstan and Uzbekistan should poorly constructed containment structures be compromised.

Urban and Industrial Pollution

Pollution problems are not limited to waterways but also extend to the air and to solid wastes. Soviet-period environmental neglect established patterns of urban and industrial development that, even today, pay scant attention to environmental considerations. The exposure of Central Asian industry to market forces has caused many of the worst polluters to shut down, but concern remains high in many communities over urban and industrial pollution. As is often the case, the poorest segments of society generally pay the greatest price for environmental mismanagement in terms of their sacrificed health and quality of life. Industrial pollution in northern Kazakhstan and in Uzbekistan's portion of the Ferghana Valley are of particular concern.

Poorly-contained stockpiles of potentially dangerous wastes, including uranium and heavy metals, have accumulated across the region. Efforts are underway to locate toxic and hazardous waste depositories and to arrange for their safe disposition—mostly through containment, stabilization and isolation, since clean-up tends to be prohibitively expensive. Such pollution continues, especially from the mining and industrial sectors. Mining results in 25 billion tons of waste annually that often is improperly disposed. Current and previous mine tailing dumps occupy vast areas.

A considerable proportion of the region's pollution is associated with energy production and consumption. Significant negative environmental impacts from past oil and gas exploitation—and associated urban and industrial development—are found in the coastal region of the Caspian Sea within Kazakhstan, concentrated around the city of Atyrau, as well as in Turkmenistan. Pressure has been placed on oil companies operating in and around the Caspian to follow internationally accepted environmental management practices for new exploration and exploitation as well as for pipeline construction. While hydropower meets an appreciable amount of the region's peak energy needs, reliance on inefficient fossil fuel-based

power plants mostly burning coal and natural gas contributes significantly to urban air pollution and drives Central Asian carbon dioxide (greenhouse gas) emissions per unit of gross domestic product (GDP) to among the highest in the world. This is threatening the region's industrial competitiveness and thus is of both local and global concern.

Land and Natural Systems Degradation

The region faces a host of pressures on the productivity and even viability of its natural systems, especially from inappropriate land management practices. Soviet-period agricultural policies sought to open so-called "virgin lands" in defiance of sustainability principles, and surrounding deserts are now encroaching on many of these areas. Marginal lands face desertification driven by wind and water erosion and exacerbated by the cultivation of inappropriate lands or overly intensive tilling practices, deforestation, overgrazing and windborne salinization especially neighboring the bed of the former Aral Sea. The pollution of otherwise productive arable lands with high concentrations of pesticides and herbicides also is a widespread problem.¹⁴ Radioactive contaminants remain around the former nuclear test site of Semipalatinsk in Kazakhstan and there are other troubling military wastes as well, including those at former biological weapons development sites in Uzbekistan.

Decades of stresses placed on fragile natural systems—deserts, wetlands, riparian zones and mountain ecosystems—have severely damaged, sometimes irreversibly, their natural regenerative capacities and reduced the region's biological diversity. According to the REAP, the area of forest in Central Asia has fallen by 75 to 80 percent since the beginning of the twentieth century. Large areas of *saksaul* and riparian forests (*tugai* and juniper) have been converted to arable land. The area of this vegetation in the Amu Darya River basin has been reduced from around 150,000 hectares in 1928 to 22,000 hectares in 1993, and the trend continues. Extinction threatens a growing number and range of indigenous species, with several having been moved from "rare" to "disappearing" status due to various habitat pressures since the collapse of the Soviet Union. Linking biodiversity loss to land degradation processes will be important, as it is likely to constitute a crucial element of future efforts to generate international support for programs to address these problems.

Mountain Ecosystems Management

The sustainable management of mountain ecosystems is of such special concern in the region that it warrants separate mention and ac-

tion. This is particularly so in the upstream states of Kyrgyzstan and Tajikistan—which straddle the westernmost expanse of the Tien Shan and Pamir Mountain Ranges—though Kazakhstan, Uzbekistan and Turkmenistan each have mountainous areas as well. The predominantly downstream states have a heavy stake in the wise management of mountain areas, given their dependency on these water sources.

Mountain ecosystems provide habitats for a diverse range of flora and fauna and are under a variety of threats, including: overgrazing; cultivation on steep slopes; non-sustainable fuelwood and timber harvesting; introduction of alien and sometimes invasive species; illegal wildlife poaching; and poorly planned development in the transport, tourism, housing and other sectors. The most significant physical impacts are increased erosion and sedimentation of rivers and reservoirs, deforestation, decreased pasture productivity, altered patterns of water flow and loss of biodiversity. In turn, these changes are adversely affecting the livelihoods of mountain communities, who already have the lowest incomes in the region and face a disproportionate degree of threat from natural disasters such as earthquakes, landslides, avalanches, mud flows and floods.

Environmental Management Institutions

While education levels in the region are among the highest in Asia, the environmental management institutions inherited from the Soviet period were rigid and top-heavy. Though well trained, most officials and scientists had virtually no exposure to the development of international advances and thinking in environmental fields over the crucial decades of the 1970s and 1980s when most of the analytical tools and management practices prevalent in the West were devised. Post-independence restructuring in Central Asia also has created uncertainties regarding the roles and responsibilities of various central and local government entities. This has left the region with weak human and organizational resources with which to tackle its wide array of environmental challenges.

All of the Central Asian countries have some form of national environmental management ministry or state committee represented at the cabinet level. These bodies incorporate pollution control functions, and in most cases they also include oversight of the protected areas system and broader environmental planning roles (though generally only a portion of environmental monitoring responsibilities). Except where combined with line functions controlling natural resources management, these environment agencies remain relatively weak. Powerful departments, such as those covering finance, energy, agriculture and industry, have thus far given only

limited attention to environmental considerations in development activities despite environmental protection laws meant to be enforced by the environment agencies. The lack of good data and analysis translating the consequences of environmental mismanagement into economic costs also contributes to a weak appreciation for their significance. This indicates that a long road remains ahead for efforts to “mainstream” environmental considerations into economic development plans, policies and programs, and it also helps to explain why Central Asian environment ministries are so keen to assert themselves internationally and tap into newly available aid to address global issues.

A range of regional organizations have evolved to help these countries deal with environmental and natural resources issues. The principal mandate of IFAS—with membership of all five former Soviet states—should be obvious from its name.¹⁵ IFAS recently has undertaken a wider range of environmental and social development objectives in the Basin.¹⁶ Under IFAS, the ICWC serves an important function in managing the seasonal allocation of water for irrigation within the complex array of water management systems and uses in the Aral Sea Basin. Also technically under IFAS, the Interstate Commission for Sustainable Development (ICSD) operates as a standing committee of the finance and environment ministers, though it and IFAS itself suffer from a lack of core professional staff.¹⁷ Partly for this reason, both European Commission (EC)-IFAS and ICSD have drawn upon the recently created Central Asia Regional Environment Center (CA-REC) for analytical and organizational functions on several occasions. However, CA-REC’s primary mandate is to facilitate public participation in decision making for improved environmental management, and it is playing an increasingly proactive role in the region, despite the severe challenges posed by civil society restrictions, corruption, and legal weaknesses in most countries of the region. In the past, regional economic integration bodies, particularly the Central Asia Cooperation Organization, have played important roles in helping to broker interstate agreements on environmental and natural resources subjects—covering water and energy management, environmental information sharing and transboundary protected areas management. Today, however, none of the several regional organizations devoted to improving regional economic cooperation and security is much concerned with or able to tackle these issues.¹⁸ The Central Asia Mountain Information Network (CAMIN) was created with much fanfare when Kyrgyzstan hosted the Global Mountain Summit as a culmination of the International Year of the Mountains

(2002). But CAMIN's post-summit goal of serving as a focal point for mountain ecosystem management in the region has yet to be realized.

Global Environmental Concerns

Many of the environmental issues facing the region are large enough in geographic or physical scale to be of concern at the global level. A good deal of attention has been paid to global environmental concerns by the countries of the region—especially their environmental authorities—due primarily to the availability of assistance from international donor agencies on these topics. Certainly the transboundary water management issues of the Aral Sea Basin have attracted strong international attention and financing. As noted, Central Asia also has some of the least energy efficient countries in the world, with associated implications for greenhouse gas emissions and corresponding global interest. The region is now waking to the long-term threats from periodic droughts, desertification, and land degradation, while both its desert and mountain ecosystems represent important repositories of often unique—and threatened—biological diversity. The aftermath of and response to Soviet-period use of ozone-depleting substances and persistent organic pollutants also are of global interest. The participation of Central Asian Republics in the major multilateral environmental agreements is summarized in Table 13-1.

Because of the scale of the water management challenges in the Aral Sea Basin, the international community has supported a wide range of grant- and loan-financed investments under the framework of the IFAS-led Aral Sea Basin Program (ASBP-1). This phase of capacity-building and planning assistance—combined with selected water and environmental management investments—has now concluded. With a mandate from the heads of state of its five member countries, IFAS has prepared a new set of program plans under the Second Aral Sea Basin Program (ASBP-2), meant to serve as a blueprint for further international support to the region's improved water and environmental management.¹⁹ However, neither the Central Asian governments nor their international donors now speak of "saving" the Aral Sea. The new goal is its division—by means of a levee financed by the World Bank—and stabilization to protect what is left of the two delta ecosystems and some measure of fisheries restoration, at least in the northern "Little Aral Sea." Disappointments over IFAS' handling of ASBP-1 and a weak strategic framework underlying the proposals of ASBP-2 suggest that the next phase of regional water and environmental management efforts is unlikely to attract the same degree of international

Table 13–1. Central Asian Participation in Multilateral Environmental Agreements

Agreement	Kazakhstan	Kyrgyzstan	Uzbekistan	Tajikistan	Turkmenistan
Climate Change (GCC)	X	X	X	X	X
Ozone Depletion (Montreal)	X	X	X	X	X
Hazardous Wastes (Basel)		X	X		X
Bio- Diversity (CBD)	X	X	X	X	X
Endangered Species (CITES)	X		X		
Wetlands (Ramsar)			X	X	
Environmental Information (Aarhus)	X	X		X	X
Trans-boundary Waters (Geneva)	X				
Persistent Organic Pollutants (Stockholm)	X	X		X	
Land Degradation (CCD)	X	X	X	X	X

Source: Convention Websites

X denotes ratification and/or signature.

interest seen during the 1990s. Thus far, the REAP also has failed to galvanize the attention of international environmental aid donors.

Central Asia's part in addressing the issue of global climate change also has received considerable international notice. Table 13–2 shows that the region has some of the highest per capita CO₂ emissions levels in the world, and its economies are also among the most energy intensive. According to the Pew Center on Global Climate Change,²⁰ Kazakhstan is ranked second and Uzbekistan sixth in energy use per GDP. The other countries of the region are ranked only slightly better: Turkmenistan—eleventh; Tajikistan—thirteenth; and Kyrgyzstan—twenty-sixth. The energy inefficiencies of the region's economies, however, also have created opportunities for them to engage with developed countries as a global market for greenhouse gas emissions credits emerges. Kazakhstan already has completed a transaction with the Gov-

Table 13–2. Economic, Demographic and Environmental Statistics for Central Asia

Country	Population (millions)	Population in poverty (percent)	2001 GNP per capita (US\$)	Total land area (1000 km ²)	Land in protected area status (percent)	Annual CO ₂ emissions per capita (MT)
Kazakhstan	14.70	34.6	1,230	2,717.3	2.7	10.9
Kyrgyzstan	4.97	55.3	300	198.5	3.6	1.3
Uzbekistan	24.78	22.0	720	447.4	2.1	4.1
Tajikistan	6.29	83.0	290	143.1	4.2	1.0
Turkmenistan	5.28	n/a	660	416.0	n/a	7.4
Total or Average	56.02	36.5	763	3,922.3	2.7	5.6

Source: ADB Developing Member Countries Statistical Summary, 2002 (based on published Government data).

ernment of Japan involving the annual creation of 62,000 tons of CO₂ reduction credits, and more deals are likely to follow. Projects for improved efficiency of district heating systems, thermal power generation, industrial production, increased use of renewable energy sources and reduced energy loss from fossil fuel extraction are but a few of those likely to seek funding through either the Clean Development Mechanism or the Joint Implementation window under the Framework Convention on Climate Change and its Kyoto Protocol (assuming it enters into force).

The arid to semi-arid region of Central Asia is defined, in part, by its two great deserts: the Karakum and Kyzylkum. Concern is increasing over the advance of these deserts brought on by periodic drought coupled with unsustainable land management practices. As noted, this process of land degradation is driven especially by mismanagement of irrigation waters, unsustainable pasture lands management, and weak protection of mountainous watersheds. In response, a regional strategic partnership has been formed to prepare and implement national and regional strategies under the UN Convention to Combat Desertification and Drought (UNCCD). This is receiving organizational support from the UNCCD Global Mechanism (GM), the Asian Development Bank (ADB), and the Canadian and German governments, while the Global Environment Facility (GEF) is expected to provide project funding at the country level in the years to come.

Biological diversity losses also are gaining increased attention in the region. The main targets of natural systems protection are mountain and desert ecosystems, the aquatic ecosystems of the Aral Sea deltas and other marshlands, as well as the flora and fauna of the Caspian Sea and its shoreline. Activities are underway with support from the World Bank and GEF to conserve the deltas of the Amu Darya and Syr Darya Rivers. Several transboundary park projects in mountainous areas also have been proposed or are underway. Further efforts of this kind certainly are warranted, particularly in the fragile mountain ecosystems of the upstream states and in Uzbekistan.

While production of ozone-depleting substances has been phased out, concern still lingers over the control of persistent organic pollutants (POPs)—particularly residual pesticides dating from the Soviet period. This topic has only recently begun to receive systematic attention under the initiative of the UN Environment Program (UNEP), and additional effort will be needed to define the POP problems facing the region and to identify and implement appropriate remedies.

Responses to Environmental Challenges

Country Level Trends and Responses

This review would not be complete without a stock-taking of current national and regional efforts to address these environmental and natural resources management problems. Environmental management at the country level is strongly influenced by and correlated with each republic's economic development strategy. There remains almost the same degree of variation in approaches to and progress with environmental governance in the region as is seen in broader political and economic spheres. The country summaries which follow begin with the two upstream states of Kyrgyzstan and Tajikistan and then move to the downstream republics—providing a snapshot of the key environmental issues as well as policy and institutional responses playing out at the national level.

Kyrgyzstan²¹

The basic environmental policies of Kyrgyzstan are embodied in the Law on Environmental Protection of 1999 (as amended in 2003), which includes environmental standards, the establishment of protected areas as well as rules regarding the management of natural resources and disasters. Interpreting the provisions of the constitution, this law emphasizes individual rights to environmental protection, provides for respecting the

sustainable development principle, and establishes the structure of regulatory and economic incentives governing environmental policy and the involvement of civil society in environmental management. A list of key environmental laws as an example of how this Central Asian Republic is addressing these concerns is given in Table 13–3.

As in the other CARs, the NEAP adopted in 1995 represents the best overall statement of Kyrgyzstan's environmental policies and objectives. Taking economic growth and poverty reduction as its starting point, the Kyrgyz NEAP lays out a range of environmental management activities meant to contribute to these goals and is particularly commendable in its attempt to develop an environmental policy framework grounded on the use of market-based incentives. Although seminal in its review of

Table 13–3. Major Environmental Legislation of the Kyrgyz Republic

Legislation	Main Subject or Resource Protected	Year Passed (Amended)
Law on Specially Protected Areas	Parks and reserves	1994
Law on Waters	Water and floods	1994 (1995)
Law on Fisheries	Fish habitats	1997 (1998)
Law on the Subsoil	Mining rehabilitation	1997 (1999)
Law on Biosphere Territories	Biosphere reserves	1999
Law on Drinking Water	Water quality	1999 (2003)
Law on Protection of Ambient Air	Air quality	1999 (2003)
Forest Code	Forest management	1999 (2003)
Law on Radioactive Safety of the Population	Radioactive hazards	1999 (2003)
Law on Ecological Expertise	Projects and EIAs	1999 (2003)
Law on Wildlife/Fauna	Endangered species	1999 (2003)
Law on Environmental Protection	Basic protections	1999 (2003)
Land Code	Land management	1999 (2003)
Law on Chemicalization and Plant Protection	Pesticides/agrochemicals	1999 (2003)
Law on Protection of Historic & Cultural Heritage	Cultural preservation	1999
Law on Protection and Use of Flora	Biodiversity conservation	2001
Law on Tailings Ponds and Dumps	Tailings management	2001
Law on Waste Production and Consumption	Waste management	2001

Sources: UNECE, 2000 and www.law.gov.kg.

environmental management priorities and pragmatic in tone, the now-dated NEAP has served as only a very broad guidance document for environmental policy development in the country. Nevertheless, many of its overall recommendations have been implemented or otherwise have helped to shape the strong evolution of the country's environmental laws and regulations.

The Ministry of Environment and Emergency Situations (MEES) is the lead executive branch agency for the environment subject, with its minister serving as the principal environmental advocate within the cabinet. MEES is directly responsible for implementing provisions of the Law on Environmental Protection, as well as environmental standards and regulations associated with most other environmental legislation that is not specifically tied to a line ministry or delegated to the President's Office, including environmental monitoring and impact assessment. Committees on Environmental Protection at the oblast and city levels complement these national institutions, and the country continues to undergo a decentralization process that is encouraging ever greater self-governance at the regional and local levels. Several other government agencies and ministries also play crucial roles in environmental and natural resources management—most notably the Ministry of Agriculture, Water Resources, and Processing Industry and the State Forestry Service.

Both the legislative and judicial branches of government also are awakening to new roles in environmental governance in Kyrgyzstan. As demonstrated by the proliferation of new environmental laws, it is clear that these subjects are receiving a high degree of attention from the national parliament. The Parliamentary Commission on Agriculture and Environment serves as the lead body for the legislative branch. Attention to environmental subjects has been less prevalent in the judicial branch, though this too is growing. Thus far an environmental/green bench within the judiciary has had only limited development, though several successful environmental cases have been brought to court in recent years. This represents a significant institutional challenge, however, because of more generic shortcomings of the Kyrgyz legal system.

Though considerable challenges remain, the Kyrgyz Republic is the most open to civil society participation in decision making—including environmental—within Central Asia. There are many non-governmental organizations (NGOs) with environmental and/or natural resources management interests, ranging from scientific and educational groups to those exercising advocacy functions. Though there is room for even further government transparency and collaboration, environmental NGOs have

participated in the debate on environmental policy since the 1995 NEAP exercise and have helped to shape the many environmental laws passed since 1998.

Despite the country's impressive array of environmental laws and regulations, weak enforcement remains a serious constraint to the protection and sound management of natural resources and protection of environmental quality. Some existing regulations and incentive structures are inherently difficult to enforce, but capacity constraints among responsible government institutions—coupled with severe funding shortages and corruption—lie at the core of this problem. Despite attempts to improve data collection and management, shortages of accurate, timely and appropriate environmental information to assist decision making continue.

While a range of programs are financed as a part of government agencies' routine activities, the most visible responses to environmental protection and management needs are those involving international cooperation. Many of these have been linked with the country's fairly active participation in global affairs associated with multilateral environmental agreements. In particular, several capacity-building activities have been funded by the Global Environment Facility (mostly through UNDP). These are meant to strengthen the institutions responsible for overseeing the country's participation in global conventions, such as those covering climate change, land degradation and biodiversity conservation. The country consistently has called for international aid to help it address the high national and regional risks associated with poorly contained uranium tailings inherited from the Soviet period, and the World Bank and the Organization for Security and Cooperation in Europe (OSCE) now are leading a coordinated donor response. Kyrgyzstan has been something of a trend-setter in the region with regard to market-oriented land reform and restructuring of water management at the local level, with World Bank and ADB projects serving as the principal vehicles for developing demonstration activities and replicating them at the oblast and national levels.

*Tajikistan*²²

Though Tajikistan's policies and institutions have deviated somewhat from those of Kyrgyzstan since independence, these mountainous neighbors share many of the same environmental and natural resources management problems. Unfortunately, Tajikistan's post-independence political struggles have diverted attention and resources away from natural systems and resources management. There also has been a significant inflow of international aid coupled with better communications since the

end of the civil conflict, and these have strongly affected the country's ability to respond to environmental management challenges. Civil society's participation is relatively high, and this includes involvement in both the debate over and actions to address environmental concerns.

The country still lacks a clear set of environmental policies and programs to guide government and private interventions. Though considerable analysis and dialogue has been devoted to determining environmental action priorities, little consensus has emerged. More important, the fundamental land and water resources underpinnings of the economy are only weakly recognized. The prevailing policy view seems to be that environmental management can be adequately handled by the Ministry of Nature Protection. Though this Ministry is doing its best with limited staff and funds, it has only weak influence over the more powerful interests governing urban and rural development in the country. The State Environment Program (1998-2008) deals with general principles and goals but does not offer an implementable strategy for improving environmental and natural resources management in the context of efforts to promote economic growth and alleviate poverty. While the development of a NEAP could potentially help, this ongoing exercise again has been concentrated largely within the network of the Ministry of Nature Protection and delayed by differences over its scope and structure.

The considerable international assistance rendered to the country also has not made a substantial contribution to improving the coherence of either environmental policies or programs. Though some local-level initiatives have produced promising results, these have been poorly documented and seldom replicated. National-level assistance has been highly fragmented, and much of it has centered on Tajikistan's role in addressing regional or global concerns with only weak attention to national or local priorities. This includes such topics as biodiversity conservation, land degradation, climate change and waste management.²³ Reliance on donor support for environmental analysis and programming also has undermined nascent efforts to establish routine government funding channels for environmental and natural resources management topics through line ministries or the legislature.

The key to progress in Tajikistan—as elsewhere in the region—will be incorporating an understanding of and concern for sound environmental and natural resources management into the mainstream of economic development planning, policy-making and programming. This principle is gradually coming to be understood, though it requires a departure from the traditional patterns of designing “environmental” projects and

the conduct of environmental analysis in isolation from economic planning and programming of development resources for key sectors such as agriculture and energy. The Ministry of Nature Protection appreciates the importance of its reaching out to the government bodies—executive or legislative—which govern such economic interests and using its links to civil society to advocate for expanding attention to the environmental underpinnings of the country's development path.

Kazakhstan²⁴

Kazakhstan is set apart from the other CARs on the basis of several characteristics. Its sheer size and oil-based economic growth are perhaps the most important distinguishing factors. Along with Kyrgyzstan, it also has embraced open-market policies to a much greater extent than its neighbors. Despite its geographic scope, population densities remain low—further affecting its special circumstances.

The country's natural resource base remains degraded from unsustainable practices dating from the Soviet period. The “virgin lands” policy opened many semi-arid steppe regions to agricultural production beyond their long-term potential.²⁵ Mining wastes in the East, industrial pollution in the Northeast, oil industry pollution in the West along the Caspian, and land degradation in the South present a diverse and far-flung set of environmental challenges.

Isolated rural populations cut off from Soviet-era subsidies are struggling to survive, and agricultural production has fallen substantially since independence. Efforts such as the World Bank/GEF-funded Drylands Management Project are testing the environmental, social and economic viability of shifting from currently unsustainable cereal-based agricultural production systems back to traditional livestock-based systems.²⁶ Decentralized and renewable energy systems also are receiving increased attention as potential means for overcoming rural productivity losses and the high cost of keeping distant communities linked to the national electricity grid.

Kazakhstan enjoys by far the highest level of foreign investment among the CARs, and—though environmental regulation of industry remains a contentious issue—interactions with multinational firms are leading to a gradual adoption of internationally-accepted environmental management norms. This is most clear in the oil and gas industry located along the Caspian Sea, though international firms are balking at being asked to clean up pollution problems left over from Soviet times.

After a period in which the government mixed responsibilities for both resource extraction and environmental regulation under a large umbrella ministry, these functions now have been divided. Regulatory authorities under the Ministry of Environmental Protection are gradually gaining some ability to enforce compliance with environmental laws despite continuing and widespread corruption. As elsewhere in the region, environmental considerations are only weakly incorporated into—or even acknowledged by—development plans and programs of key sectors such as energy, transport or agriculture. The formation of a National Sustainable Development Council to coordinate such mainstreaming efforts holds some promise. Some indications show progress being made in some areas, since both the intensity of pollution and energy use per unit of GDP have begun to fall.

At the regional level, Kazakhstan continues a strong policy of political engagement and economic integration with its neighbors (though not limited to the CARs). Consistent with this stance, it has been perhaps the most solid member of IFAS from the start and is taking direct measures to address the ecological crisis in its territory surrounding the former boundaries of the Aral Sea, particularly with assistance from the World Bank. It also is working with neighboring China and Kyrgyzstan on bilateral river basin management issues—having concluded agreements governing the Ili-Balkash and Chui-Talas Basins, respectively. Kazakhstan also actively participates in the Caspian Environmental Program.

The country is an often vocal participant in meetings of the major multilateral environmental agreements, and, as noted in Table 13-3, is a signatory to most. This stance has attracted considerable international assistance to develop national assessments and action plans for national compliance with agreement provisions—sometimes distracting from higher priority domestic concerns.

Turkmenistan

Like Kazakhstan, Turkmenistan is well endowed with oil and especially gas resources, but continued reliance on a planned economy and rigid political and social controls have limited foreign trade and investment. The country's political and economic isolation places it at something of a disadvantage within the region with respect to its access to international expertise and assistance to improve environmental and natural resources management. While a few NGOs have begun to address environmental issues, the scope of their influence is limited by the closed attitudes of the government toward the participation of civil society in public policy de-

bate. Government agencies—including those managing natural resources and meant to protect the environment—are often tentative in their decision making due to rigidities in the authoritative structure.

Most of the country is uninhabitable desert, and the population is largely concentrated along the courses of the Amu Darya River and the Karikkum Canal which supports the capital, Ashgabad. Turkmenistan is almost completely dependent upon water flowing from its upstream neighbors, so it has an enormous stake in efforts to improve regional water cooperation. Nevertheless, it has been a reluctant partner within IFAS and other regional mechanisms promoting regional cooperation on resources management.²⁷ It also inherited significant land degradation challenges from the Soviet period. These comprise waterlogging and especially salinization in agricultural areas due to over-irrigation and severe drainage problems—with half of the country's irrigated lands considered to be in an unsatisfactory state.²⁸ The rapidly growing urbanized population also is posing increasing challenges for adequate provision of water supply and wastewater management. The country is still prone to grand construction schemes, and the proposed creation of an enormous “Golden Lake”—as a collector of agricultural drainage water just upstream of the Aral Sea and for uncertain additional uses—has been met with skepticism in the region and beyond.

A NEAP was completed in 2002, and it has begun to shape thinking about priorities for incorporating environmental considerations into national economic development plans. An ecological information network also is expanding. Much of the NEAP centers on addressing the severe land degradation problems. Though the NEAP is an important forward step, much remains to be done if it is to receive broader ownership among key government and civil society stakeholders as a necessary basis for its implementation.

Uzbekistan

Uzbekistan is able to support the largest population in the region in large measure because of the fertility of the irrigated Ferghana Valley and, more generally, due to the abundance of water resources flowing through its predominantly arid landscape. Its territory straddles the courses of the Amu Darya and Syr Darya Rivers. Yet its ability to maintain land and water management systems is increasingly threatened by severe resource degradation—due largely to mismanagement of irrigated agriculture for cotton and wheat production—coupled with intensifying regional competition over shared water resources. The most extreme problems are in

the Autonomous Region of Karakalpakstan, where the Amu Darya meets the Aral Sea. Here drought and desertification have combined with the dislocations associated with the Sea's desiccation to impoverish most of the population.²⁹

Beyond the constraints on rural development imposed by land degradation, the country also faces a range of environmental problems affecting the health and productivity of urban populations. These include air pollution, industrial water pollution, deteriorating infrastructure for wastewater collection and treatment, weak systems of solid waste management, and energy-related environmental issues. Although both air and water pollution from industrial sources has declined since independence (with the fall in heavy industry's output), there remain localized pockets of air pollution that can have wide-ranging impacts when atmospheric inversions trap pollution for days on end. Likewise, some areas immediately downstream of operating industries suffer from poor water quality. Problems from industrial air pollution are exacerbated by weakly controlled and gradually expanding vehicular pollution sources. Uzbekistan's air pollution problems would be far worse were it not abundantly endowed with natural gas which is widely utilized as the principal energy source—except for vehicles—throughout the country.³⁰ Though Uzbekistan had one of the most developed urban water supply and wastewater collection and treatment systems in the former Soviet Union, maintenance and management have suffered in recent years with a corresponding decline in service. A similar pattern may be seen with respect to solid waste management.

The "ecological safety" of the young and rapidly growing population³¹ is guaranteed by the Constitution, and environmental legislation since independence has emphasized this notion along with generally accepted principles of environmental protection and rational natural resources use. The State Committee for Nature Protection serves as the lead government body in implementing environmental laws and regulations, but it is weak relative to, for example, the powerful ministries governing agriculture/water, industry, and energy. It also shares responsibilities for monitoring and managing air and water quality with other agencies such as the hydrometeorological service—often competing for budgetary and project resources. The strong scientific base in the country has led to perhaps the most rigorous analysis of environmental problems and processes in the region. However, environmental policy-making remains fragmented and outside of the mainstream of economic planning structures, which have changed only marginally since the Soviet period. Further, the high degree of state control has limited the participation of NGOs and other

elements of civil society, including the media, in environmental planning and decision making.³²

The country has been a sometimes reluctant partner with its neighbors in addressing regional environmental and natural resources challenges. A core member of IFAS, Uzbekistan has not lent strong support to its efforts since the EC-IFAS secretariat moved from Tashkent in the late 1990s. It became a signatory to the 1998 Framework Agreement on the Syr Darya River's management, but it subsequently ceased participating in the associated energy-for-water swaps. In 2003, it hosted discussions on land degradation in the region under the auspices of the Strategic Partnership for UNCCD Implementation in Central Asia, and efforts are underway to lay the groundwork for a tougher domestic policy stance on addressing severe land and water management problems. It has taken part in discussions under the framework of the REAP, but has made little commitment to implement projects emanating from the planning exercise. A recently created regional environmental planning integration and information networking activity supported by ADB achieved buy-in from all CARs except Uzbekistan. While the country hosted the ADB-organized Second Ministerial Conference on Central Asian Regional Economic Cooperation held in late 2003, it vetoed inclusion of reference to the obvious connections between water and energy in the Ministerial Statement. More than any of its neighbors (save Turkmenistan), it has viewed regional cooperation from a position of very narrow national self-interest.

Its highly scientific approach to problem analysis can be seen in the country's responses to its obligations under the key multilateral environmental agreements to which it is party. A National Strategy and Action Plan for Biodiversity Conservation was produced in 1998. A National Action Plan for implementation of the UNCCD was finalized in 1999, and an Initial National Communication under the Framework Convention on Climate Change was completed in 2001. All three of these documents place a strong emphasis on documenting the environmental problems in technical terms and scientifically identifying the underlying ecological or bio-physical processes. Conversely, they are weak in their analysis of poverty-environment linkages and the root causes of environmental problems lying in past and current government policies. These documents—and the planning exercises that led to them—are similarly lacking in strategic thinking concerning appropriate policy and institutional responses. Such weaknesses pervade the environmental governance atmosphere and need to be directly addressed if Uzbekistan is to incorporate environmental considerations into its economic development and poverty alleviation

planning—taking full advantage of its scientific skills and relatively strong information base to address the wide range of environmental and natural resources management problems it faces.

International Assistance

Improving land and water resources management in the region remains the highest priority for international environmental assistance to Central Asia. The World Bank has been perhaps the most active multilateral aid agency, having served as the lead donor for ASBP-1. In addition to the analyses under ASBP-1, the World Bank's land and water management programming has included country-level investments in the irrigation sector as well as a project to divide the remainder of the Aral Sea into two parts.³³ It also has produced an insightful review of agricultural water use and needed reform measures in the CARs.³⁴ The ADB is playing an active role in encouraging greater regional economic integration, and it also has provided considerable environmentally-related technical assistance to the CARs—including for improved water management.³⁵ The ADB sponsored Central Asia's participation in the third World Water Forum of 2003 and co-sponsored the 2003 Forum on Strategic Partnership for UNCCD Implementation in Central Asia. It remains actively engaged in various efforts to address water, land and environmental management problems at the local, national and regional levels. UNDP has made regional water management one of three focal areas in its environmental program for Central Asia—centering efforts on strengthening the institutional, programming and legal framework for water resources management by assisting EC-IFAS with completion of the ASBP-1 problem analysis and helping to formulate a coherent ASBP-2.³⁶ The EU³⁷ has begun a third phase of regional water assistance focusing on demonstrating principles of integrated water management in pilot sub-catchments.³⁸ The OSCE is leading an activity supporting creation of a Joint Commission for the Chu and Talas Rivers, and also is involved in an Environment and Security Initiative dealing with regional water issues.³⁹ The Global Water Partnership's Caucasus and Central Asia program is also building regional relations to support improved integrated water management.

Several bilateral aid agencies also are assisting at the regional level. Among others, the U.S. Agency for International Development (USAID) provided the aid that led to the initial brokering of the 1998 Syr Darya Framework Agreement as well as much of the core international environmental assistance to the region in the immediate post-independence period. USAID no longer supports environmental management programs

and most of its water management activities—other than a modest regional effort on the upper Syr Darya Basin—have now shifted to field-level demonstrations of irrigation systems and hydrological monitoring. The Swiss Agency for Development Cooperation is supporting a multi-year pilot-level effort on integrated management of internationally shared canals in the Ferghana Valley, involving the Kyrgyz Republic, Uzbekistan, and Tajikistan, and the German development aid agency (GTZ) has a region-wide program to address land degradation problems dealing extensively with salinization and waterlogging. The Canadian International Development Agency also has been active, though its programs are now almost exclusively focused on alleviating poverty in Tajikistan as the poorest Central Asian country.

The Central Asian REAP represents another effort to identify and organize responses to high priority environmental problems of regional significance. The REAP was initiated in 2000 with financial and institutional support from UNEP, ADB, and UNDP. It began by identifying “regional” problems in five areas: air pollution; water pollution; land degradation; waste management; and mountain ecosystem degradation. Project concepts were developed in each of these five areas, and regional work groups were to have prepared and overseen the funding and implementation of corresponding projects or programs. A number of the project ideas generated under the REAP framework also are not necessarily “regional” in nature (requiring interstate cooperation for their solution), but rather constitute problems common to two or more countries. The lack of emphasis on truly regional environmental issues, such as those of an obvious transboundary nature, has interfered with efforts to appropriately focus institutional attentions and resources. Progress with funding and implementing these projects has lagged, while considerable attention has been expended in further discussion and planning at the national and regional levels. This is partly due to the Interstate Commission for Sustainable Development (ICSD) having been entrusted with guiding REAP implementation; during this period ICSD has been struggling to get itself fully operational. In response to the institutional constraints encountered, the focus of Central Asian REAP teams as well as the key donors (UNEP and UNDP) has shifted to establishing the enabling conditions for REAP implementation through: creating a mechanism to support regional environmental cooperation in Central Asia; developing a REAP decision support system; encouraging stronger public awareness of and participation in REAP-related activities; and building capacities for REAP implementa-

tion. Despite these constraints, a proposal has been submitted by UNEP to the GEF for the financing of further REAP organizational activities.

Mountain ecosystems management is another environmental problem area that has attracted considerable regional as well as international attention. As noted, Kyrgyzstan played host in 2002 to the Bishkek Global Mountain Summit, which capped a series of events around the world marking 2002 as the International Year of Mountains.⁴⁰ A detailed strategy and action plan for sustainable mountain areas development was developed for Kyrgyzstan that was meant to serve as a model for similar national plans covering all five CARs,⁴¹ and several papers at the Mountain Summit outlined the threats to fragile mountain ecosystems in the region—including the proposition that the region's glaciers are receding rapidly and contributing to a troubling over-estimation of available freshwater resources in the Aral Sea Basin. Though global in scope, the Bishkek Mountain Platform that resulted from the meeting was significantly shaped by the Central Asian experience and venue of the Summit.⁴² Unfortunately, meaningful follow-up has not occurred at the national or regional levels, and international attention to the subject has waned somewhat after the conclusion of the Year of Mountains. Effectual responses also have been inhibited by land tenure conflicts, security concerns and a confusing array of government jurisdictions in the region's mountainous areas.

The international community, including particularly the World Bank, EU and UNDP, already has invested heavily in regional institutions for natural resources and environmental management. EC-IFAS has received considerable support through the ASBP-1, though questions within the donor community about the likely effectiveness of the ASBP-2's strategic framework have thus far limited further substantial international support. The ICWC under IFAS has continued to function as a committee of the region's water ministers while its Scientific Information Committee (SIC-ICWC) has cobbled together assistance from a variety of sources to support ICWC decision making and the training of water professionals in the region. The network of national REAP working groups represents yet another effort to establish institutional capacity for improved environmental management at the regional level, but the REAP's progress is being constrained by continuing concerns over ICSD's ability to oversee project implementation. There are corresponding networks of national focal points covering each of the global environmental agreements to which all CARs are party (climate change, land degradation, biodiversity, and ozone depletion). Another recent innovation at the regional level has been the creation of the CA-REC in Almaty, chartered by agreement of the five

states at the Aarhus Ministerial in 1998. CA-REC, working with EC-IFAS and ICSD, has conducted analyses of regional issues and helped to catalyze preparations for international environmental meetings such as the WSSD and the UNECE Environment for Europe ministerial conference. Some regional stakeholders believe this may have detracted somewhat from CA-REC's mandated responsibility to facilitate public participation in environmental decision making.

Finally, although only Kazakhstan and Turkmenistan—among the CARs—are littoral states of the Caspian Sea, their active participation in the Caspian Environmental Program (CEP) should be noted.⁴³ The CEP was established to coordinate the resource management actions of the five countries bordering the Caspian Sea, interact with efforts under the Ramsar Convention on the protection of wetlands and, more generally, “to halt the deterioration of environmental conditions of the Caspian Sea and to promote sustainable development in the area.”⁴⁴ The CEP inter-governmental process is primarily supported by the GEF, UNDP, World Bank, UNEP and the EU, but it also includes cooperation with the private sector—particularly the oil and gas industry. CEP has developed and adopted a Strategic Action Program for the protection and rehabilitation of the Caspian environment covering high priority environmental concern areas as well as helping each littoral state develop its own National Caspian Action Plan. This has proven to be quite positive for Kazakhstan and Turkmenistan, as participation in CEP has led both nations to adopt enhanced pollution control measures in their oblasts bordering the Sea.

Conclusion

Since achieving their independence, all Central Asian countries have sought to improve their understanding of environmental and natural resources constraints on their economic development. Varying efforts also have been made to strengthen policy and institutional responses to these challenges. The need for much more effective plans, policies and programs to address land degradation and water mismanagement is an important recurring theme in the region, while environmental dimensions of urban and industrial restructuring also are receiving increased attention. The capacity of most environmental agencies has been improved, and it is becoming more widely accepted that environmental considerations must be built into all aspects of economic and social reform. Broader results will require further outreach to government agencies directly charged with resource management, such as those managing the agriculture and energy sectors.

At the regional level, institutions have been formed and initiatives undertaken to address problems of common concern to the region. Most prominent among these are efforts to address the Aral Sea crisis through IFAS. More recently the REAP process has sought to identify other trans-boundary or common environmental problems for action through the IFAS subsidiary ICSD. The Strategic Partnership for Implementation of the UNCCD in Central Asia is becoming an important mechanism for coordinating efforts to address land degradation in the region. Institutions such as CA-REC have much to offer as resource bodies to encourage more active dialogue between government and civil society, though the rigid political atmosphere pervasive in the region continues to inhibit a participatory approach to developing and implementing environmental policies.

After quickly joining most of the key multilateral environmental agreements, Central Asian countries have taken advantage of available funding to prepare associated national strategies. Some of this analysis—such as air pollution assessments tied to the climate change treaty—have had positive cross-over benefits of improved understanding of the domestic costs of pollution and inefficient resource management. Others have had weaker links to national environmental issues, and some even have distracted attention from higher priorities at home. Few of the efforts addressing global environmental issues have engaged those policymakers most responsible for managing the resources or allocating funds to improve their management, though more recent initiatives have sought to rectify this shortcoming.

Each of the Central Asian countries faces its own set of social, economic and environmental challenges, but they also share a common heritage and many mutual development goals. Socio-political development varies greatly among the countries, and the degree of market orientation and transparency exhibited in environmental management efforts tends to mirror broader country-level trends. This suggests that environmental management gains should result from broader governance improvements, and that environmental considerations need to be woven into the very fabric of economic development policies and programs. This must go beyond mere pronouncements, the publishing of national action plans or even legislative reform to encompass fresh political will and the accompanying resources needed to realize real change. With proper attention to the strengthening of key environmental management institutions, to using renewable natural resources only within their sustainable limits, to avoiding adverse environmental impacts from other forms of development, to reducing waste while improving economic efficiency and to encouraging

public engagement in decision making regarding these matters, the page can be turned on the old story of environmental neglect and a new chapter opened to wise environmental and natural resources management forming the basis for healthy and prosperous societies in the lands that straddle the Great Silk Road.

Notes

¹ The State Committee structure was retained in Uzbekistan, and Tajikistan has recently reverted to this structure.

² See: <http://www.grida.no/ara/main_e.html> for both the NEAPs available and national State of the Environment Reports prepared in cooperation with UNEP in anticipation of the Johannesburg Earth Summit. The NEAP for Tajikistan is scheduled to be completed by early 2004. Environmental Performance Reviews (EPR) conducted by the UN Economic Commission for Europe (UNECE) supplement the NEAPs as do Country Environmental Analyses (CEAs) prepared by the Asian Development Bank. See: UNECE, 1999. *Environmental Performance Review: Kyrgyzstan* (United Nations: Geneva; UNECE 2000); *Environmental Performance Review: Kazakhstan* (United Nations: Geneva; and UNECE 2001), *Environmental Performance Review: Uzbekistan* (United Nations: Geneva). Also see: Asian Development Bank (ADB), 2003. *Country Environmental Assessment: Kazakhstan*, ADB: Manila; ADB, 2003; *Country Environmental Assessment: Kyrgyzstan*, ADB: Manila; and ADB, 2003; *Country Environmental Assessment: Tajikistan*, ADB: Manila (an EPR for Tajikistan and CEA for Uzbekistan are planned for 2004).

³ Afghanistan often is excluded from such activities due to its very different relationship with the former Soviet Union and because many international assistance agencies treat it as part of "South Asia" rather than "Central Asia."

⁴ UNEP 2001. *Regional Environmental Action Plan for Central Asia*. UNEP/RRR: Bangkok.

⁵ Or at least concurrence with analysis and positions put forward by CA-REC.

⁶ UNECE 2003. *Report of the Fifth Ministerial Conference on Environment for Europe*, UNECE Secretariat: Geneva, and UNECE 2003. *Invitation to Partnership on Implementation of the Central Asian Sustainable Development Initiative*, Fifth Ministerial Conference Environment for Europe, Kiev, May 21-23, 2003, UNECE: Geneva.

⁷ Generally including the agencies responsible for water resources management.

⁸ Though not covered in this review, Afghanistan lies in the upstream watershed of the Amu Darya River, and it is ethnically linked with Tajikistan, Uzbekistan and Turkmenistan with which it shares a common border. For a summary assessment of its contemporary environmental issues, see: McCauley, 2003.

⁹ For further detail on environmental and natural resources conditions and issues in the region, see: ADB, 1997. *Central Asian Environments in Transition*. ADB: Manila (covering Kazakhstan, Kyrgyzstan and Uzbekistan); ADB, 2000. *Environmental Profile of Tajikistan*. ADB: Manila; McCauley, D. 2001. *Central Asia: Summary Assessment of ADB Environmental Assistance*, ADB: Manila; as well as the EPRs and CEAs footnoted above.

¹⁰ Pollution levels were considerably higher in the CARs during the Soviet period and declined thereafter with the demise of many high-polluting industries.

¹¹ Mismanagement of irrigation water is resulting in widespread waterlogging of soils and salinization, both from poor drainage and through a process whereby soil salts are brought to the surface on waterlogged lands. In addition to the section of the REAP on this subject, see also: IFAS, 2002. *Water and Environmental Management Project Sub-Component A1: National and Regional Water and Salt Management Plan Phase III Report – Regional Needs and Constraints*. GEF Agency of the IFAS Aral Sea Basin Program: Tashkent.

¹² The impending diversions by the People's Republic of China of waters from the Irtysh and Ili Rivers upstream of Kazakhstan also are of concern due both to the potential impacts on the rivers' pollution flushing capacities as well to their overall water volumes.

¹³ Tursunzade also is a major source of air pollution.

¹⁴ The consequences of over-irrigation, including waterlogging and salinization, have already been mentioned, as have the unstable uranium tailings of Kyrgyzstan.

¹⁵ IFAS's role and history are discussed at length in Daene McKinney's chapter.

¹⁶ This is under the Aral Sea Basin Program-2 (ASBP-2) described in further detail below.

¹⁷ ICWC is slightly better off in this regard, as it is able to draw upon its Scientific Information Committee (SIC-ICWC), which serves as an analytical secretariat. ICSC also has an SIC, though it is more weakly staffed and recognized.

¹⁸ In addition to CACO (with Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan as members and Turkmenistan as an observer), other leading regional groupings include: the Eurasian Economic Community (EurAsEc; with Belarus, Kazakhstan, Kyrgyzstan, Russia and Tajikistan as members); Shanghai Cooperation Organization (SCO; with China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan and Uzbekistan as members); and less formal groupings such as that organized by the Asian Development Bank (CAREC; with Azerbaijan, China, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan and Uzbekistan as members and Afghanistan, Iran, Pakistan, Russia, Turkey and Turkmenistan as observers).

¹⁹ IFAS, 2003. *Program of Concrete Actions on Improvement of the Environmental and Socio-Economic Situation in the Aral Sea Basin for the Period of 2003-2010*, EC-IFAS: Dushanbe.

²⁰ 1995 data, see: Eileen Claussen and Lisa McNeilly. 1998. *Equity and Global Climate Change: The Complex Elements of Global Fairness*, Annex 1. Pew Center on Global Climate Change: Washington, DC.

²¹ This country is given slightly greater coverage as an introduction to national-level institutional and program trends common in the region; additional details may be found in ADB, 2003b, prepared by this author.

²² This section draws particularly from ADB, 2003c, and further background information may be found in ADB, 1999.

²³ An initiative funded by the GEF and UNDP to coordinate and integrate national action plans in response to the Biodiversity, Land Degradation and Climate Change conventions represents a promising counter-trend. As far as I know, National Capacity Needs Self-Assessment deals with analyzing the capacity needed to implement national actions plans and strategies on biodiversity, climate change and desertification.

²⁴ This section draws upon ADB, 2003a, and further detail may be found therein.

²⁵ An indication of the remaining constraints to official perceptions in this regard may be found in the early 2004 "celebration" of the 50th Anniversary of the Virgin Lands Policy in Kazakhstan.

²⁶ World Bank-GEF, 2003. *Project Appraisal Document on a Proposed Global Environment Facility Grant to the Government of Kazakhstan for Drylands Management Project*, World Bank Environmentally and Socially Sustainable Development Unit, Europe and Central Asia Region: Washington, DC.

²⁷ The country's more active participation in the Caspian Environment Program represents something of an exception to this trend.

²⁸ Ministry of Nature Protection, 1999. *State of the Environment of Turkmenistan*, Ministry of Nature Protection and UNEP: Ashgabat and Saigal, S., 2003. *Issues and Approaches to Combat Desertification: Turkmenistan*, Report of ADB RETA 5941: Manila.

²⁹ The consequently high rate of out-migration threatens to undermine the very Karakalpakstani identity.

³⁰ Rising domestic and export demand for Uzbekistan's natural gas against an essentially fixed supply is expected to alter the status quo over the next decade, requiring both economic and environmental adjustments.

³¹ Almost one-half are 16 years of age or younger.

³² Uzbekistan is the only Central Asian country which has not acceded to the Aarhus convention on environmental information transparency.

³³ As noted, a levee is being constructed just south of the Syr Darya River's delta to preserve aquatic ecosystems and partially restore fisheries but also effectively splitting the Aral Sea into two separate lakes.

³⁴ Bucknall, et al., *Irrigation in Central Asia: Social, Economic and Environmental Considerations* (Washington: World Bank, 2003).

³⁵ See McCauley, 2002.

³⁶ The former analysis is co-financed by the United States State Department.

³⁷ European Union Technical Assistance for Commonwealth of Independent States (EU/TACIS).

³⁸ Covering the Chui-Talas and Vakhsh River Basins.

³⁹ For the work to establish the Chui-Talas Rivers Commission, OSCE is partnered with the UN Economic Commission for Europe (UNECE) and the UN Economic and Social Commission for Asia and the Pacific (ESCAP); for the Environmental Security Initiative, it is partnered with UNDP and the United Nations Environment Program (UNEP). The United Nations Educational and Scientific Cooperation Organization (UNESCO) also is supporting research on sustainable water management in the region.

⁴⁰ See the Summit materials given at: <http://mountains.unep.ch/mtn/home_page.html>.

⁴¹ See: Kyrgyz CAMIN Working Group 2001. *National Strategy and Action Plan for Sustainable Mountain Development in the Kyrgyz Republic*, CAMIN: Bishkek.

⁴² See: <<http://mountains.unep.ch/mtn/papers/BMPlatform.doc>>.

⁴³ The others are Iran, Russia and Azerbaijan.

⁴⁴ <www.caspianenvironment.org>.