

ASIAN DEVELOPMENT BANK

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TECHNICAL ASSISTANCE
(Financed by the Government of Finland)

TO THE

CENTRAL ASIAN REPUBLICS

FOR

**CAPACITY BUILDING IN ENVIRONMENTAL INFORMATION MANAGEMENT
SYSTEMS IN CENTRAL ASIA**

December 2003

ABBREVIATIONS

ADB	–	Asian Development Bank
ASBP	–	Aral Sea Basin Program
CARs	–	Central Asian Republics
CSP	–	Country strategy and program
DMCs	–	developing member countries
EC-IFAS	–	Executive Committee – International Fund for Saving the Aral Sea
EIMS	–	Environmental Information Management System
ICSD	–	Interstate Committee for Sustainable Development
ICWC	–	Interstate Committee for Water Coordination
IEA	–	Integrated Environmental Action
NAP	–	National Action Plan (to combat desertification)
NBAP	–	National Biodiversity Action Plan
REAP	–	Regional Environmental Action Plan
SIC	–	Scientific Information Center
TACIS	–	Technical Assistance for Commonwealth of Independent States
UNCCD	–	United Nations Convention on Combating Desertification
UNDP	–	United Nations Development Programme
UNEP	–	United Nations Environment Programme

NOTE

In this report, "\$" refers to US dollars

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I. INTRODUCTION

1. The Regional technical assistance (TA) Screening Committee approved a Concept Paper for the TA on 10 November 2002. A Mission visited the Central Asian Republics (CARs) including Kazakhstan, Tajikistan, Uzbekistan, Turkmenistan, and Kyrgyz Republic from 24 March to 18 April to undertake fact-finding for the proposed TA. The Mission carried out an assessment of earlier ADB and other donors' interventions in support of environmental management and held discussions with concerned government agencies, NGOs, regional institutions, and donor representatives and agreed on the objectives, scope, cost estimates, implementation arrangements, and other details. See Appendix 1 for TA Framework.¹

II. ISSUES

2. Due to their common historical and cultural heritage, and biogeographic links, the CARs share many natural resources and associated environmental problems. The five republics are all part of the Aral Sea basin (ASB), and are thus affected by the flow of the region's two major rivers, the Amudarya and the Syrdarya. These rivers play a key role in the well being of the people and economic development, providing valuable water resources for drinking, agriculture, industry, and household use, and maintenance of the ecological balance. Mismanagement of the region's natural resources, especially land and water, had led to many of the collective environmental threats. Early in the 1960s, the rapid development of irrigated agriculture led to a significant increase in withdrawals from the Amudarya and Syrdarya rivers. As a result, the Aral Sea has been shrinking at an alarming rate over the last thirty years, rendering the region one of the most severely damaged ecological zones in the world. See Appendix 2 for an overview.

3. Key environmental problems include water pollution, air pollution, land degradation and desertification, solid and hazardous waste disposal, mountain ecosystems degradation, and loss of biodiversity. Contamination of surface waters combined with poor access to drinking water supplies has led to high rates of water-related illnesses. Areas with high levels of radioactive contamination have revealed extremely high rates of psychological disorders, malignant tumors, and other morphological abnormalities. Environmental degradation also affects economic development by reducing worker productivity, and productivity of natural resources, in particular agriculture. Moreover, given the transboundary roots and human health implications of these problems, the consequences of continued environmental mismanagement is a potential source of tension and conflict among the countries of the region.

4. During the pre-independence Soviet-era, the system of environmental monitoring and the associated institutional set up was dictated by Soviet policies, which required measurements of indicators focused on irrigated agriculture, mainly cotton (hydrology – salinity, pH, silt levels in drainage systems, and related meteorological parameters), and to a limited extent on sanitation. Moreover, as the Russian technicians left the region, institutions were left in limbo and even hydrological monitoring was compromised and limited to sporadic measurements due to severe budgetary constraints and limitations of expertise. Environmental monitoring labs were left with limited staff and technical resources that rendered comprehensive or regular measurements of all critical parameters difficult. In the changed context of economic development in the post-independence era, there is a need for indicators that are relevant to sustainability of development and have direct bearing on health and welfare of the people. Soviet era environmental indicators became redundant for measuring environmental impacts on human health and well being. Post independence, while some environmental management capacity

¹ The TA first appeared in *ADB Business Opportunities* (Internet edition) on 04 March 2003.

has been built with the support of donors, it is still limited and the monitoring laboratories continue to be drastically under-funded, lacking both modern equipment and such fundamental materials as reagents for water quality analysis. Due to capacity constraints, data collection and analysis have yet to be computerized and are compiled manually on paper. Furthermore, the regional institutions are still grappling with standardized procedures and harmonized indicators. All these shortcomings, and the resulting lack of relevant and comprehensive environmental indicators severely constrains effective environmental management and, as a consequence, intra-national and regional collaboration on addressing environmental issues and impacts.

5. Responding to these constraints to sustainable development, several donor organizations have assisted the CARs in developing the needed environmental management infrastructure. Key donors include the ADB, European Bank for Reconstruction and Development, European Union Technical Assistance for Commonwealth of Independent States (TACIS), global environmental facility (GEF), United Nations Development Programme (UNDP), the World Bank, and several bilateral agencies. In 1992, the Aral Sea Basin development program under the banner—the International Fund for Saving the Aral Sea (IFAS)—was established to address the potential disaster resulting from a shrinking Aral Sea with the assistance of the World Bank, UNDP, and United Nations Environment Programme (UNEP). An Executive Committee (EC-IFAS) was also established at the same time to coordinate regional and international donor efforts and related environmental issues. The Interstate Committee for Sustainable Development (ICSD) under IFAS was given the mandate to ensure integration of economic, social, and environmental factors. The recently developed ASBII Program recognizes that irrational economic activities have led to breakdown of ecosystems, and consequently, environmental degradation in the region. Aral Sea Basin (ASB) II Program also recognizes that monitoring is critical to effective environmental management, in itself handicapped as monitoring centers lack modern analytical and communication equipment.

6. Donor assistance since independence, while strengthening capacity, resulted in (i) national environmental action plans (NEAPs); (ii) national biodiversity action plans (NBAPs), and Agenda 21s of the Earth Summit; (iii) ratification of most international conventions and protocols on environment; and (iv) national action plans (NAPs) to combat land degradation and desertification under United Nations Convention to Combat Desertification (UNCCD). Given the common objectives of these action plans, there is a need for their consolidation into a strategic program of implementation with a timeframe and budgetary commitments.

7. The ongoing water and environmental management project (WEMP), funded by GEF since 2002, was initiated for implementing a *Program of concrete actions for the improvement of the environmental situation in the ASB* approved on 11 January 1994 (Nukus). Its objectives are to develop national plans and regional strategy for rational use of water resources and salt control in the region, taking into account economic, ecological, and social tasks of the region's states. Such projects would benefit from linkage to national environmental monitoring systems.

8. ADB's TA in environmental management, initiated in 1994, primarily targeted capacity building in environmental monitoring and support to regional initiatives.² In collaboration with

² ADB. 1995. *Technical Assistance to Kyrgyz Republic for Strengthening Environmental Institutions and Improving Procedures for EIA*. Manila; ADB. 1997. *Technical Assistance to Uzbekistan for Strengthening of Institutions Engaged in Environmental Protection*. Manila; ADB. 1997. *Technical Assistance to Kyrgyz Republic for Environmental Monitoring and Management Capacity Building*. Manila; ADB. 1999. *Technical Assistance for Regional Cooperation for Sustainable Mountain Development*. Manila; ADB. 1999. *Technical Assistance to Kazakhstan for Strengthening Environmental Management*. Manila; ADB. 2000. *Technical Assistance to Kyrgyz Republic for Environmental Monitoring and Management Capacity Building II*. Manila; ADB. 2000. *Technical*

UNEP, ADB has made a significant contribution to the preparation of Regional Environmental Action Plan (REAP) and development of environmental information infrastructure at the regional Scientific Information Center (SIC) of ICSD at Ashgabat. Following up on REAP, UNEP is initiating establishment of a decision support system (DSS), using SICs as the focal points. This initiative would put in place the basic infrastructure for the DSS at the SICs with an operational phase that will support programs and projects for regional cooperation. The operational phase will include developing a set of common indicators for the Central Asian Republics to facilitate environmental monitoring across the region and harmonization of environmental standards.

9. Consequent to ADB's interventions in capacity building, the capacity of environmental management agencies has improved, as have environmental impact assessment procedures and guidelines. At the regional level, both UNEP and UNDP appear poised (with GEF resources) to follow through on many of the actions identified during the REAP process. There also has been good progress in creating the basic institutional framework for more systematic attention to the management of mountain ecosystems. The need for much more effective plans, policies, and programs to address water and land management is another important recurring theme in the region. Past experience has, however, revealed that for any interventions to be successful and yield desired results, there is a need for in-country ownership and commitment, demonstrated through provision of adequate budgetary support to ensure appropriate and effective level of environmental management. Future ADB assistance is programmed to build on this foundation and the partnerships established to help develop the region's full potential by ensuring protection of its environment and sustainability of its development.

10. Inadequacy of systematic and reliable environmental information due to national level capacity constraints, and an inadequate understanding of the implications of environmental mismanagement on economic development by stakeholders are primary barriers to sustainability of development. Given the agro-ecological linkages and socioeconomic dependencies among the countries in the region, the need for regional cooperation in environmental management as the means to sustainable development and social well being of their peoples is paramount. Success of regional environmental management needs an institutionalized system of environmental monitoring at the national level, encompassing environmental information management systems (EIMS) based on standard procedures, comparable standards and harmonized indicators across the region. Establishment of EIMS would provide a window for information exchange and an opportunity for dialogue on transboundary environmental issues, thereby providing a rationale for regional cooperation.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

11. The overall goal of the TA will be to help achieve sustainable development by mainstreaming environment into national development planning processes, and strengthening regional cooperation on transboundary environmental management. Building on past achievements and lessons learnt, and complementing the efforts of other donors such as UNEP and UNDP, the purpose of the TA is to enhance regional cooperation in addressing transboundary environmental issues by strengthening national environmental management capacities with specific reference to (i) environmental information and knowledge management; (ii) harmonized environmental standards across the region against the most critical environmental indicators (such as air, water, hazardous waste, land degradation); and (iii) a

nationally driven strategic program of implementation for existing environment related action plans with a timeframe and budgetary commitments.

12. The outputs include (i) a transparent and accessible EIMS in each participating CAR linked to SIC of ICSD to ensure systematic environmental monitoring; (ii) environmental standards, harmonized across CARs against the most critical environmental indicators; and (iii) a consolidated strategic program of implementation of all the existing environment-related action plans with national ownership and realistic budgetary commitments. The TA scope will extend to Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and to a limited extent to Uzbekistan.³

B. Methodology and Key Activities

13. The activities include (i) a needs assessment to scrutinize and sequence the elements for strengthening (a) the existing national EIMS (including hardware and software) and (b) the capacity of concerned institutions for effective environmental management; (ii) an evaluation of current practices, procedures and standards as a basis for (a) an agreement among the countries in the region on a set of environmental indicators, and (b) harmonization of environmental standards and procedures across CARs; (iii) consolidation of all environment-related action plans to develop an implementation program with realistic budgetary commitments, financing options and appropriate institutional arrangements (iv) strengthening regional cooperation through institutionalized links and synergies between national and regional programs and institutions; (v) providing a forum for regional seminars, workshops and summit meetings for discussion and resolution of transboundary environmental issues and a venue for dissemination; and (vi) providing modern facilities and equipment.

C. Cost and Financing

14. The TA is estimated to cost \$1,000,000 equivalent, consisting of \$800,000 in foreign exchange cost and \$200,000 in local currency cost. The Government of Finland will provide \$800,000 equivalent on a grant basis to be administered by ADB, to cover all of the foreign exchange costs through the channel financing agreement with ADB. The Governments of CARs will finance \$160,000 as direct budgetary support for procurement of materials and equipment and \$40,000 in-kind contribution covering such expenses as remuneration, domestic travel of counterpart staff, office space and other maintenance operations and activities. Cost estimates and financing plan are in Appendix 3.

D. Implementation Arrangements

15. ADB will be the Executing Agency. Within ADB, the Agriculture, Environment, and Natural Resources Division of ECRD will administer and supervise the TA. Implementation of various components will be undertaken concurrently in each participating country, and will be led by national environment management agencies or ministries, as implementing agencies (IAs), with the head of the agency as the focal point. The IAs will be responsible for day-to-day operations to ensure smooth implementation, close coordination of activities with national finance and economic planning agencies, regional institutions such as EC-IFAS, ICSD, and various development partners, in particular UNEP, UNDP, and TACIS.

³ Uzbekistan's involvement would be limited to participation in regional seminars, workshops, and meetings to discuss transboundary environmental issues. Since Uzbekistan is developing a unified environmental monitoring network (across sectors) on its own under the State Committee for Nature Protection, sharing of information and experience would benefit all participating countries.

16. Implementation of the TA will require 15 person-months of international and 192 person-months of domestic consultants. Three international experts will be recruited with expertise in (i) environmental management for 9 person-months (team leader); (ii) EIMS and geographic information systems for 3 person-months; and (iii) environmental analysis and monitoring for 3 person-months. Preference will be given to candidates for international consultants who have prior experience in any of the participating countries and/or Russian language capability. Team Leader's services will be staggered over a 24 month period during which implementation will be completed. A domestic Environmental Management expert, also acting as Deputy Team Leader, will lead domestic expert teams in each participating country. He/she will be assisted by an EIMS and Information technology (hardware and software) expert, and an Analytical Laboratories' Development and Operations expert, each for a period of 12 person-months, in each CAR. The domestic team leader, in addition to his technical responsibilities, will be responsible for liaison with the national focal points, government agencies, regional institutions such as ICSD, and donor organizations, and submit regular monthly reports on project progress, problems, and constraints to the international team leader (and ADB in the absence of Team Leader).

17. Given the specialized nature of services required, including prior CARs experience and Russian language capability, international consultants will be recruited in accordance with *ADB Guidelines on the Use of Consultants* and other arrangements for the selection of domestic consultants, using simplified technical proposals and quality based selection procedures. Individual domestic consultants will be engaged by ADB in consultation with the team leader. Detailed terms of reference for consultants are in Appendix 4.

18. A regional workshop will be held at Dushanbe, with participation of all national focal points, national economic planning and finance ministries, EC-IFAS and ICSD, concerned donors, regional and national NGO representatives to deliberate and agree on an Inception Report (IR) and a work program. Four months, 12 months, and 18 months after commencement, second, third (first mid-term) and fourth (second mid-term) reports, respectively, will be presented at regional workshops that will be held at agreed locations within the region. The reports will provide an update on progress and achievements, a work program for the remaining period of implementation, and an updated framework. The draft final report will detail outcome of the TA and demonstrate how the outcome responds to achievement of objectives. Exact timing for the submission of first mid-term, second midterm, and draft final reports, as well as various seminars and workshops, would be indicated in the work program presented in the IR. Additional regional workshops and/or Ministerial level meetings will be held in consultation with EC-IFAS and ICSD at Almaty, Ashagabat, Dushanbe, or other agreed locations, where case studies and other issues of regional significance would be discussed and conclusions and recommendations adopted. Options will be explored to hold a regional summit and sign agreements to address transboundary environmental issues. The final report will be submitted two weeks after its presentation, incorporating comments made by various stakeholders.

IV. THE PRESIDENT'S DECISION

19. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$800,000 to the Governments of Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan to be financed on a grant basis by the Government of Finland for Capacity Building in Environmental Information Management Systems in Central Asia, and hereby reports this action to the Board.

REGIONAL TECHNICAL ASSISTANCE FRAMEWORK CAPACITY BUILDING IN ENVIRONMENTAL INFORMATION MANAGEMENT SYSTEMS IN CENTRAL ASIA

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
Goal:			
<ul style="list-style-type: none"> To help achieve sustainable development by integrating environment into national development planning processes and facilitating regional cooperation on transboundary environmental management 	<p>By the year 2020:</p> <ul style="list-style-type: none"> Participating countries have uniform standards across Central Asian Republics (CARs) for the most critical environmental parameters, using appropriate indicators for water, air, hazardous waste, and land degradation, harmonized across the region Levels of air pollutants (CO₂, particulates (PM₁₀, PM_{2.5}, SPM), SO₂, NO₂, O₃ and lead and BOD, COD and heavy metals in the main rivers (Syrdaria and its main tributaries Naryn and Karadaria rivers; and Amudarya and its main tributaries Vakhsh and Pandj) rivers reduced and brought at par with the World Health Organization standards, using appropriate indicators; 	<ul style="list-style-type: none"> Regular monitoring of environmental information at strategic locations by national institutions, using international standards and an acceptable set of indicators harmonized across the region National Development Strategies and Plans (include environmental management as a part of the development process) Information exchange and dialogue at the regional level under the auspices of Interstate Sustainable Development Commission (ISDC) in Central Asia Regular CARs Environmental Ministers' Meetings National State of the Environment Reports Press Releases 	<ul style="list-style-type: none"> Policy makers and development planners' willingness to mainstream environmental management in the development planning processes Policy makers and planners are aware of the implications of environment on the development processes. Capacity of national environmental management institutions improved and brought to international standards.
Purpose:			
<ul style="list-style-type: none"> Enhance information management capacity in the participating CARs (Kazakhstan, Kyrgyz Republic, Tajikistan and 	<p>By the end of the Project:</p> <ul style="list-style-type: none"> Participating CARs have an adequate hardware and software for Environmental Information Management System (EIMS) and capacity to generate and disseminate information through regular reports and information and make it 	<ul style="list-style-type: none"> State of the Environment Reports published by the concerned Ministries of Environment. Updated and Agreed Standardized 	<ul style="list-style-type: none"> Commitment by policy makers and development planners and their willingness to mainstream environmental management in the development

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Turkmenistan);</p> <ul style="list-style-type: none"> • Harmonize environmental standards across CARs against the most critical environmental indicators (such as air, water, hazardous waste, land degradation) • Facilitate consolidation of all environmentally related action plans and initiatives and preparation of a phased implementation program and firm national budgetary commitments. 	<p>available on the websites for use by various stakeholders across the region.</p> <ul style="list-style-type: none"> • National level environmental monitoring mechanisms and standards across the 5 CARs follow an agreed norm against the most critical indicators • All the environmentally related plans are consolidated and a workable timetable for their implementation, reflective of national priorities, supported by realistic budgetary commitments, and endorsed by competent national authorities, is agreed in each CAR 	<p>Guidelines for Environmental Management for use by all participating DMCs</p> <ul style="list-style-type: none"> • Proceedings of regional workshops, seminars and summits held under the auspices of ISDC, with the participation of key stakeholders and decision makers • Press Releases of Summit Meetings • ISDCs Annual Reports • Quarterly Reports, Annual Reports, Special Papers, and Websites by national environmental management agencies 	<p>planning processes</p> <ul style="list-style-type: none"> • Agreement by participating CARs on the means to enhance regional cooperation in minimizing transboundary pollution
<p>Outputs</p> <ul style="list-style-type: none"> • A unified, institutionalized, transparent, and accessible EIMS in each participating CAR to ensure systematic monitoring is linked to the SIC set up under the ICSD • Environmental standards, harmonized across CARs against the most critical environmental indicators (such as air, water, hazardous waste, land degradation) • A nationally acceptable implementation program for environment-related action 	<p>By end of the Project:</p> <ul style="list-style-type: none"> • A state-of-the-art EIMS in each participating CAR with a website to disseminate the results of environmental monitoring with information available for use in the design • A regularly updated and computerized database set up in each participating CAR, with regular reports on state of the environment published • Non-sensitive Information placed on the national website and the website of ISDC • A report on harmonized standards published and on the website • Implementation Program with a 20-year time-frame 	<ul style="list-style-type: none"> • State of the Environment Reports • Newsletters published by ISDC • Website access to State of the Environment Reports and regularly updated reports on regional cooperation • Newsletters published by ISDC • Publications on harmonized standards and indicators for critical environmental parameters • Agreement of the Implementation Program by key decision makers and stakeholders including the 	<ul style="list-style-type: none"> • Continued Commitment by national and regional institutions and policy planners. • Continued Commitment by national and regional institutions and policy planners. • Continued Commitment by national and regional institutions and budgetary commitments for continued operations

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
plans, with firm national budgetary commitments		ministries of finance, economic planning, and environment, confirming budgetary commitments and ownership	
V. Inputs Consultants – <ul style="list-style-type: none"> • International 15 person months • Domestic (192 person-months) • Conferences/ workshops, and Training Seminars (including case studies and reports) • Materials, Laboratory, EIMS and Equipment – • Translation and Interpretation services • Contingency/Others Participating CARs (each)- <ul style="list-style-type: none"> • Office accommodation and local transport services • Remuneration, domestic travel and per diem of counterpart staff • Materials, equipment, operations and maintenance 	Total cost (incl. travel) \$588,000 \$300,000 \$288,000 \$32,000 \$100,000 \$5,000 \$75,000 \$50,000 (In-kind \$10,000, budgetary support \$40,000) Total Contribution : \$200,000 Budgetary support: \$160,000 In-kind Contribution: \$40,000	Company invoices Receipts, invoices of travel Receipts, invoices for vehicles and equipment Receipts, invoices of travel, accommodation	

AN OVERVIEW OF THE CURRENT STATE OF THE ENVIRONMENT

A. Introduction

1. The extent of environmental degradation in Central Asia is substantial. Key environmental problems include water pollution, air pollution, land degradation and desertification, solid and hazardous waste disposal, mountain ecosystems degradation, and loss of biodiversity. These problems are closely inter-related.

2. Water pollution—from chemical, biological, physical and radioactive pollutants—is perhaps the most common and widely addressed environmental concern throughout the region. Chemical pollution includes high concentrations of sulfates, chlorides, sodium ions, pesticides, nitrogen compounds and phosphates; primarily due to the excessive use of pesticides and fertilizers in agriculture. The main sources of water pollution and contamination are untreated agricultural, industrial and municipal wastewaters. Other sources include soil erosion (due to deforestation and inappropriate agricultural/irrigation practices), mining operations, weapons production and testing, and toxic/radioactive dumping. The inefficient use of water resources for agriculture has also contributed significantly to water scarcity and contamination.

3. Land degradation and desertification are a growing problem across the region. Because of water shortages resulting from the arid climate and excessive water use, lands are becoming drier and less able to support plant and animal communities. There are four major components of land degradation: soil erosion and nutrient depletion; soil contamination and salinization; deforestation; and desertification. Soil erosion impacts majority of agricultural land in each of the Central Asian Republics (CARs), and intense salinization affects about half of irrigated croplands in both Turkmenistan and Uzbekistan. Deforestation, driven primarily by fuelwood harvesting among rural populations, has major impacts on soil erosion too, especially in the mountainous areas of the upper Aral Sea Watershed (i.e., Tajikistan and the Kyrgyz Republic), which have lost nearly half of their original forest cover. Desert and riparian forests have also been reduced drastically. Extreme soil degradation has led to desertification, rendering more land unsuitable for agriculture. Human activities exacerbate natural land degradation processes.

4. Air pollution levels in the CARs are on the rise again, after an initial drop in early 1990s, due to the re-opening of manufacturing facilities and the increase in emissions from non-stationary sources. Kazakhstan accounts for nearly half of total airborne pollutants in the region (43.7%), with 75% from stationary sources (mainly industries and energy production facilities). Uzbekistan and Turkmenistan follow, emitting 31.4% and 19.9% of airborne pollutants, respectively. The combined contribution of Tajikistan and the Kyrgyz Republic is only about 5%. Main pollutants are sulfur dioxide, suspended solids, carbonic oxide and hydrocarbons. In 1999, ten cities in Kazakhstan, and one in Uzbekistan, registered high levels of air pollution (i.e., atmospheric pollution index > 7) with significant transboundary implications. In 2001, the proportion of fallout of sulfur dioxides and nitrogen oxides from Kazakhstan and the Kyrgyz Republic on their neighboring CARs were 7% and 58%, respectively.

5. Solid and hazardous waste disposal is a burgeoning problem in the region. The amount of municipal solid waste continues to grow annually, with 13 million tons accumulated during 1999 alone. Excess quantities of solid waste combined with insufficient municipal waste management and recycling programs create an environmental health risk for populations living near waste dumps. Industrial waste consists of both solid and hazardous materials. However, a majority is comprised of toxic and radioactive substances. During 1999, The CARs produced over 168 million tons of industrial waste; over ten times the amount of municipal waste

(Kazakhstan and the Kyrgyz Republic accounted for 83%). Principal sources of hazardous waste include the mining, military and energy sectors.

6. Mountain ecosystems degradation in the region is the result of several of the environmental problems discussed above, including water and air pollution, land degradation, and hazardous waste disposal. Major threats include deforestation and degradation of pasture areas. These impacts, along with unsustainable agricultural practices, contribute to soil erosion on steep hillsides. Mining devastates mountain landscapes and pollutes rivers with toxic chemicals used for processing ores. Mountain ecosystems are also impacted by road construction, hydropower development, industrialization, uncontrolled tourism, and illegal hunting and foraging.

7. The region encompassing the CARs, with its wide variety of ecosystems—from alpine snows to temperate forests, arid deserts, riparian wetlands, and marine environments—supports a substantial diversity of plant and animal species. However, pervasive environmental degradation (in the form of those environmental problems mentioned above) threatens species in nearly all of these ecosystems.

B. Implications of Environmental Problems for Human Health, Poverty, Economic Development, Peace and Security

8. The environmental issues described above have significant adverse impacts on human health, poverty, economic development, peace and security throughout the region. Health impacts result from water and air pollution, toxic and radioactive wastes, and soil degradation. Respiratory diseases are common in a few heavily polluted industrial zones, and around the Aral Sea where contaminated dusts blow. The contamination of surface waters combined with poor access to drinking water supplies have led to high incidences of water-borne diseases including anemia and intestinal diseases. Overall, contaminated water is the source of about 80% of diseases in the region, including typhoid, dysentery, diphtheria and viral hepatitis. Areas with high levels of radioactive contamination have revealed elevated rates of psychological disorders, malignant tumors, and morphological abnormalities. Environmental degradation also has negative implications for poverty and economic development. The poor typically live closer to contaminated air and water, leading to a higher incidence of illnesses and unemployment. Degradation of natural resources also impacts the rural poor whose livelihood depends directly on them. Environmental degradation affects economic development by reducing labor availability and worker productivity (due to poorer health), creating environmental mitigation costs, reducing agricultural productivity, and decreasing tourism. It is estimated that soil salinization and land degradation have decreased agricultural yields by 20–30 percent regionally, reducing GNP by about five percent. The annual fish catch has also declined by nearly 60% in the last decade. Furthermore, competition over water resources, transboundary chemical and radioactive pollution (via water and air), decaying water management infrastructure and natural disasters (such as the potential for the bursting of the natural dam holding Lake Sarez in Tajikistan), and unguarded and poorly contained hazardous waste materials pose a real threat to peace and security in the region.

C. Capacity of the CARs for addressing Environmental Issues

9. The national capacities of the CARs to deal with the environmental problems outlined above varies considerably, depending on their legal/policy framework, institutional effectiveness, engagement of civil society, equipment and expertise, and financial commitments, as discussed below:

1. Legal/Policy Base and Enforcement

10. With the assistance of various donors, each of the CARs has developed legislation to address environmental problems in their country; signed agreements with their neighboring countries to concur on specific transboundary environmental issues; and joined international environmental conventions and protocols under the United Nations Framework. According to a majority of the stakeholders in the region, the commitments inherent in these laws, agreements and conventions are adequate to ensure the protection and rational management of environmental and natural resources. The problem, they say, is in their implementation. In addition to legal mechanisms, the CARs have each developed a set of environmental strategies: National Environmental Action Plans (NEAPs), National Action Plans to Combat Desertification, National Strategies and Action Plans for Sustainable Mountain Area Development, national biodiversity strategies, and Agenda 21 (i.e., sustainable development) implementation plans. This patchwork of policy mandates complicates implementation of each by simultaneously supporting parallel and competing institutions and processes. Moreover, development of these strategies was driven largely by donor organizations, so it does not necessarily reflect true national priorities or enjoy the full political support of their governments. Other policy initiatives, such as the extension of protected areas or decisions to unify national monitoring systems, represent positive steps, but also suffer from implementation issues. National policies and processes for mainstreaming environment in economic development planning also require strengthening.

2. National and Regional Institutions

11. Implementation of the legal and policy commitments mentioned above depends on national and regional institutional capacities. The key institutions for environmental policy formulation at the national level are the Ministries/State Committees of Environmental/Nature Protection, charged with regulation of pollution, management of protected areas, and other responsibilities. Despite their cabinet-level status, these organizations are situated rather low in the government pecking order, lacking both political weight and financial resources. Thus, they are not equipped with adequate resources or authority to fully carry out their various responsibilities. There are other national-level organizations responsible for different aspects of environmental management, including the hydrometeorological services (Hydromet), land management committees, forest services, and various research institutions. Coordination among these agencies is compromised by competition over mandates and meager budgets.

12. Among the regional institutions concerned with environmental issues, the most prominent is the Interstate Fund for Saving the Aral Sea (IFAS). IFAS was founded by the five CAR Presidents in 1992 to coordinate regional and international donor efforts for addressing the Aral Sea crisis and related environmental issues. IFAS' mandate has since grown to include setting regional policy and promoting intersectoral coordination for sustainable development. There has also been a proposal to create a new UN Commission on the Aral Sea Basin (ASB). IFAS comprises an Executive Committee (EC-IFAS), an Interstate Commission for Water Coordination (ICWC) Ministers of Water Resources Management, an Interstate Commission on Sustainable Development (ICSD) and Chairs/Ministers of Nature Protection/Environment and Ministers of Finance/Economy. IFAS has lost much of its former eminence, due to political infighting among member countries and frequent relocation of its offices. ICWC has retained its importance due to its foundation on well-established regional water management institutions in Tashkent, and the fact that transboundary water allocation remains a salient issue for all of the CARs. The ICSD does not enjoy the same level of political or financial support from IFAS or the national governments. ICWC and ICSD both have subordinate Scientific Information Centers

(SICs). ICWC-SIC (located in Tashkent) enjoys strong coordination among national branch offices, is provided with ample support from IFAS and the CAR governments, and serves as the secretariat for ICWC. In contrast, ICSD-SIC, which is charged with coordinating regional information exchange, lacks cooperation among its country branch offices, and plays a limited role in the affairs of ICSD. Other organizations involved in regional environmental issues include the Central Asian Mountain Information Network, the Central Asian Regional Environmental Center, and the Central Asian Hydrometeorological Scientific Research Institute. Despite its limitations, most donors are of the opinion that EC-IFAS is the only organization that has the mandate and the only forum for the concerned countries to debate, discuss, and in many instances resolve regional issues.

3. Awareness and Engagement of Civil Society

13. Environmental NGOs play an integral role in influencing environmental policy and management in the region by: (i) participating in decision-making processes, and holding governments, industries, and donor organizations accountable for their decisions and actions; (ii) educating and informing the public about environmental issues and transgressions; and (iii) coordinating local-level projects for the prevention and/or mitigation of environmental problems. NGOs have begun to participate in the policy dialogue with increasing frequency and status, enjoying membership on governmental and inter-governmental committees. They are also building strong coalitions and conducting effective advocacy campaigns around specific environmental causes, while working to involve the public more directly in environmental decision-making by pressing for public hearings on government decisions or economic development plans. Direct relationship with local communities also makes NGOs more efficient and effective in carrying out specific environmental protection, management, and mitigation projects. Despite their proven record in addressing environmental problems, lack of government support and acknowledgement of NGOs remains a significant barrier to increasing the magnitude and scope of their impacts.

4. Technical Assets and Capacity

14. Throughout the region, environmental management agencies lack adequate equipment and expertise for collecting, archiving, analyzing, and dispersing environmental data. Environmental monitoring labs (for measuring water and air pollution and soil contamination) are spread across multiple institutions with little collaboration among them. None of them have sufficient staff or technical resources to make comprehensive or regular measurements of all critical parameters, precluding the development of reliable environmental indicators necessary for effective environmental management. The present situation with national environmental information networks (which rely largely on monitoring data) is similar, with databases spread throughout various institutions and infrequent information sharing. Uzbekistan has initiated efforts to consolidate its monitoring and information systems within their main environmental agencies, with direct institutional links to other relevant institutions. Current efforts to promote regional information exchange will not be effective without standardized indicators and strong national information management systems for them to draw upon.

5. Financial Resources

15. Inadequacy of financial resources is one of the most frequently cited reasons for the inability of governments and civil society organizations to effectively address urgent environmental issues. While it is true that current national budget allocations for environmental programs and activities are inadequate to address the magnitude of the problems, it is also

apparent that the lack of funding has as much to do with misplaced priorities as with meager financial resources. Moreover, the CARs rarely include budgetary considerations in their national environmental initiatives and programs. Consequently, national environmental agencies must seek donor support to implement them. The CAR governments have contributed very little funding to regional environmental initiatives and institutions like Regional Environmental Action Plan, Aral Sea Basin Program II, or IFAS.

D. Donor Assistance for Enhancing and Mainstreaming Environmental Management

16. International donor organizations have funded environmental management, economic development and social sector projects in the CARs since the early 1990s. Key donors include the Asian Development Bank, World Bank, European Bank for Reconstruction Development, European Union, global environmental facility (GEF), UNDP, and several bilateral agencies. The World Bank environmental program emphasizes irrigation drainage improvement, water supply and sanitation as well as related institutional and policy supports. Its nonlending services provide support for studies on river basin management and fisheries. EBRD's program focuses on industrial pollution control and municipal waste management. The EU is involved in Aral Sea program. GEF provides supports in wetland and biodiversity protection of Aral Sea and Caspian Sea as well as in water and environmental management. Overall, the focus of international development assistance has been the problems of the water management issues of the Aral Sea region, emphasizing technical solutions to water allocation and conservation.

17. Asian Development Bank's technical assistance (TA) in environmental management, initiated in 1994, has targeted capacity building, selected environmental or natural resources management problems and regional cooperation.¹ Regionally, ADB has made significant contributions to the development of a Regional Environmental Action Plan (REAP) under implementation in collaboration with UNEP. The Project has resulted in a regional environmental action plan and development of environmental information infrastructure at the regional SIC at Ashgabat. The lessons learned from implementing these TAs point to the fact that while some headway has been made in providing the basic infrastructure and capacity of environmental monitoring, the magnitude of problem and its complexity demands concerted efforts and significant level of investments, both through TAs and as parts of investment projects to bring the concerned institutions to a level of effective environmental management. Experience has also revealed that there is a need for in-country ownership and commitment, not only from the concerned institutions but also from the resource rich ministries (planning and finance) to ensure compliance with environmental policies and regulations. Adequate budgetary support would be a prerequisite to ensure appropriate and effective level of environmental management.

18. The main focus of UNDP's activities in CARs is capacity building in environmental management with a view to strengthen environment governance and promote sustainable development. Support for environmental activities includes institutional strengthening for better environmental administration, capacity building within government and civil society institutions,

¹ ADB. 1995. *Technical Assistance to Kyrgyz Republic for Strengthening Environmental Institutions and Improving Procedures for EIA*. Manila; ADB. 1997. *Technical Assistance to Uzbekistan for Strengthening of Institutions Engaged in Environmental Protection*. Manila; ADB. 1997. *Technical Assistance to Kyrgyz Republic for Environmental Monitoring and Management Capacity Building*. Manila; ADB. 1999. *Technical Assistance for Regional Cooperation for Sustainable Mountain Development*. Manila; ADB. 1999. *Technical Assistance to Kazakhstan for Strengthening Environmental Management*. Manila; ADB. 2000. *Technical Assistance to Kyrgyz Republic for Environmental Monitoring and Management Capacity Building II*. Manila; ADB. 2000. *Technical Assistance to Tajikistan for Capacity Building for Environmental Assessment and Monitoring*. Manila; and ADB. 2000. *Technical Assistance for Regional Environmental Action Plan in Central Asia*. Manila.

addressing land degradation, preparation and implementation of the priorities of NEAPs. With GEF support, UNDP assists in areas that include biodiversity conservation, climate change, ozone-depleting substances, and persistent organic pollutants. The GEF Small Grants Program in Kazakhstan and Kyrgyz Republic provides assistance to NGOs at the grassroots level to tackle environmental issues relating to GEF focal areas. On the regional and sub-regional front, UNDP assists governments to participate in regional initiatives with the aim of promoting cooperation to address transboundary environmental issues.

19. The UNDP Regional ASB Capacity Building project has played a key role in the establishment and promotion of regional cooperation under the IFAS/ICSD umbrella. Despite the support from this project, a review made by UNDP at end of the project pointed to a lack of coordination of donor activities, making it difficult to ensure consistency from a regional perspective by intergovernmental bodies in the Aral Sea region. The review emphasized that technical work completed under the donor-financed initiatives does not reach decision-makers.

20. Following up on REAP and possible funding from GEF, UNEP is contemplating an initiative to establish a decision support system (DSS) with the Scientific Information Centers (SICs) as the main focus. The objective would be to establish a DSS for the CARs to support programs and activities of regional cooperation on environment protection and sustainable development. This initiative would put in place the basic infrastructure for the DSS and would be completed in a year. An operation phase for actual implementation of the database to support the programs and projects on the regional cooperation is proposed after the establishment phase. UNEP's initiative would complement the national level EIMS proposed under the RETA.

21. The Aral Sea Basin II Program recognizes that irrational economic activity in the ASB has led to extensive breakdown of ecosystems, and consequently, the extent of environmental degradation in the region is substantial. ASBII Program has also recognized that environmental monitoring is critical to effective environmental management and it is handicapped on account of ill-equipped hydro-meteorological centers and outdated analytical and communication equipment. There has also been a reduction in the number of hydrometeorological stations and posts as well as the number of observations. The Dushanbe's meeting of State Leaders, while discussing the ASBII Program, provided the main directions and approved concrete actions on improvement of environment for the period of 2003–2010. These actions, among other things, include improvement of environment monitoring systems for more complete data collection and effective use of such data in addressing water-related environmental problems.

22. The water and environmental management project (WEMP) also funded by GEF was initiated in 2002 for purposes of implementing program of concrete actions for the improvement of the environmental situation in the ASB as approved by Heads of the CARs on 11 January 1994 (Nukus). The objectives of the project are to develop national plans and regional strategy for rational use of water resources and salt control in the region, taking into account economic, ecological, and social tasks of the region's states given its limited water resources. Obviously, the project focuses on addressing issues related to quantitative aspects of water in the region as the means to address potential environmental problems, primarily related to salt. Given the significance of WEMP in addressing the long-term environmental management issues resulting from irrational water abstraction, water quality related environmental information would help draw the attention of concerned regional (such as EC-IFAS, ICWC, ICSD) and national institutions (concerned ministries of water, environment, nature protection) in prioritizing actions aimed at addressing such issues. Given its link to the dams in the region, which require urgent measures to increase their safety, EC-IFAS in its ASBII Program has reiterated the need for pilot projects on restoration and modernization of dams within the framework of WEMP.

23. The success of donor efforts can be seen in their contributions (at the national and regional levels) to legal and policy milestones for addressing environmental problems, institutional capacity building or environmental management institutions, increasing involvement of civil society in the environmental policy process, improving the technical base of environmental agencies, and securing government funding of important environmental initiatives. Stakeholders from across the CARs have, however, noted some shortcomings of international donor assistance: a lack of national ownership and institutional and financial sustainability of environmental programs; poor donor collaboration leading to duplication and competition among programs; ineffectiveness of regional cooperation initiatives that emphasize donors priorities over common national priorities; a lack of transparency, accountability and effectiveness among donor supported programs; and a narrow sectoral focus.

24. Experience from past interventions indicates that “ownership” is key to the success of assistance and that success of projects addressing environmental and natural resources management requires a program-based approach, not a project-based one. For technical assistance to have a lasting effect, identification of priorities and design must be guided by a program framework and a strategic vision and be supported by a genuine sense of partnership. A reorientation of ADB’s approaches for environmental assistance is therefore required to respond to the needs of mainstreaming sustainable development with a program-based approach. This may involve addressing both capacity and policy constraints in mainstreaming environment in development planning, and enhancing awareness of the civil society through enhanced access to environmental information may be key to ensuring greater government commitment to such policies and strategies.

E. Constraints and Opportunities in Effective Environmental Management

25. The preceding review of capacities and efforts to address the region’s most pressing environmental issues has revealed constraints to effective environmental management and opportunities to address them, as discussed below:

- (i) **Legislative and Policy Constraints** include (a) lack of integration among national environmental strategies, (b) insufficient legal mandate and policy mechanisms for mainstreaming environment in economic development planning, (c) lack of common membership by all CARs in international conventions on important transboundary environmental issues, (d) vague and repetitive action plans and initiatives without mutual coordination; and (e) lack of a legal mandate for information-sharing at the regional level.
- (ii) **Institutional Constraints** are (a) lack of understanding and information about the severity and impacts of environmental problems, (b) weak political will and influence of environmental agencies in the national policy arena; lack of incentives to enforce environmental laws and implement agreements; (c) inadequate collaboration and duplication among national ministries and agencies; (d) lack of involvement and empowerment of civil society in the environmental policy process; (e) poor collaboration among NGOs at national and regional levels; (f) failure of the CAR governments to support regional environmental initiatives and institutions; duplication and lack of coordination among national and regional information management initiatives; and (g) frequent rotation of regional organizations and turnover of environmental officials.
- (iii) **Technical Constraints** include (a) outdated and scattered environmental monitoring systems and equipment, (b) lack of unified information management

- systems at the national level, (c) poor electronic communications infrastructure, and (d) lack of common environmental indicators and standards.
- (iv) **Financial Constraints** include (a) inadequate budgets for implementing national environmental programs, (b) excessive reliance on donor funding and lack of efforts to build financial-sufficiency, and (c) lack of government funding for regional institutions and initiatives.
- (v) **Donor-Related Constraints** are (a) top-down programming and lack of ownership of environmental agenda by the CAR governments and civil society, (b) inflexible donor regulations and procedures, (c) excessive reliance on international experts and government officials, (d) lack of transparency and monitoring of donor projects, (e) insufficient funding for water quality and non-water-related environmental issues, and (f) lack of donor coordination.

26. Opportunities to address the aforementioned constraints include:

- (i) **Building national monitoring and information management capacities** through (a) consolidating national environmental monitoring systems, (b) building national monitoring capacity, (c) consolidating national information management systems, (d) building national capacities for environmental information management and distribution, (e) supporting NGOs efforts to provide information on environmental laws, agreements, and conventions, (f) enhancing public access via the internet to environmental information, (g) enhancing coordination between national and regional information management centers, and (h) encouraging development of a regional agreement on information sharing.
- (ii) **Mainstreaming environment in development among the CARs** through (a) mandatory requirements and mechanisms for mainstreaming environment in ADB loan projects, (b) integrating environmentally sound technologies into ADB's economic development programs, and (c) promoting national and regional mechanisms and forums for mainstreaming environment.
- (iii) **Facilitating consolidation of national action plans related to the environment** through concerted efforts to develop a time table for implementation with time-bound actions supported by ownership, commitment and adequate internal financial resources, which are supplemented by donors.
- (iv) **Enhancing civil society involvement in environmental management** by (a) devolving environmental projects to local institutions and communities, and (b) increasing involvement of NGOs and citizens in environmental programs and decision-making.
- (v) **Promoting national and regional ownership of environmental management agenda** by (a) establishing co-financing requirements, (b) channeling environmental grant programs through ICSD or EC-IFAS to enhance their ownership and capacity for regional initiatives, and (c) increasing involvement of local experts in environmental management projects.
- (vi) **Facilitating regional cooperation through institutional partnerships and exchanges** by (a) supporting joint initiatives for addressing specific transboundary environmental issues, and (b) promoting collaboration and exchanges of experts among the CARs.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Government of Finland Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants (15 person-months)	270	0	270
ii. Domestic Consultants (192 person-months)	288	0	288
b. International and Local Travel	20	0	20
2. Equipment (laboratory, EIMS equipment, computers, etc.) ^b	100	0	100
3. Workshops, Training/Seminars, and Conferences (including case studies and preparations of reports)	32	0	32
4. Miscellaneous Administration and Support Costs	10	0	10
5. Translation and Publication	5	0	5
6. Contingencies	75	0	75
Subtotal (A)	800	0	800
B. Government Financing			
1. Office Accommodation and Local Transport Services	0	20	20
2. Remuneration, Domestic Travel, and Per Diem of Counterpart Staff	0	20	20
3. Materials, Equipment, Operations and Maintenance and Facilities including Internet, Telephone, Fax, etc (budgetary support) ^c	0	160	160
Subtotal (B)	0	200	200
Total	800	200	1,000

EIMS = Environmental Information Management System, RETA = regional technical assistance.

^a Administered by Asian Development Bank (ADB).

^b Equipment procured during implementation would be transferred to concerned government institutions upon completion of RETA.

^c Specifications of various items of expenditure would be determined at inception and expenditure will be carried out as parallel-cofinancing.

Source: ADB estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Background

1. Implementation of the technical assistance (TA) will require 15 person-months of international and 192 person-months of domestic consultants. Three international experts will be recruited with expertise in (i) environmental management for 9 person-months (team leader);¹ (ii) Environmental Information Management System (EIMS) and geographic information systems for 3 person-months; and (iii) environmental analysis and monitoring for 3 person-months. Preference will be given to candidates for international consultants who have prior experience in any of the participating countries and/or Russian language capability. A domestic Environmental Management expert, also acting as Deputy Team Leader, will lead domestic expert teams in each participating country. He/she will be assisted by a domestic EIMS and Information technology (hardware and software) expert, and a domestic Analytical Laboratories' Development and Operations expert, each for a period of 12 person-months, in each Central Asian Republics (CAR).

B. Detailed Terms of Reference

1. **Environmental Management** (9 person-months, international [project team leader]; and 24 person-months, domestic, in each country)²
2. In the area of Environmental Management:
 - (i) Review and document all relevant reports on the existing bilateral and multilateral agreements and protocols among the countries of the region and assistance programs of various donors;
 - (ii) Examine Asian Development Bank's long-term strategic framework, medium term strategy, poverty reduction strategy and other key ADB policies/ strategies in the context of the regional approaches to sustainable natural resources development and environmental management as a means to economic development, with specific reference to the developing member countries in the CARs;
 - (iii) Review and evaluate current practices and standards as a basis for (i) an agreement among the countries in the region on a set of environmental indicators; (ii) harmonization of environmental standards and procedures across CARs against the most critical environmental indicators (for air quality, water quality, hazardous waste, land degradation); and (iii) standardization of monitoring procedures; this work will be closely coordinated with United Nations Environment Programme (UNEP)'s ongoing initiative at the regional level;
 - (iv) Review the state of institutional capacities (including Environmental Information Management System (EIMS), laboratories, etc) to undertake environmental monitoring and management, and advise the planners to incorporate environmental dimensions in the planning processes and procedures, identify the constraints, and recommend measures to address the constraints;
 - (v) Review the state of regional cooperation in information exchange on the state of the environment in each country and identify potentially sensitive areas that may need urgent attention at the regional level;

¹ Team Leader's services will be staggered over a 24 month period during which implementation will be completed.

² The International Team Leader will assign specific responsibilities to the domestic consultants, who will serve as national team leaders in the country concerned, and Deputy Team Leaders for the Project as a whole.

- (vi) Review of experience within and beyond the region with environmental monitoring and management and develop appropriate institutional arrangements and agreements to resolve transboundary environmental conflicts, share and exchange information, and enhance transparency in environmental monitoring;
 - (vii) Carry out a needs assessment to determine the specific elements and strategies for strengthening the existing national EIMS;
 - (viii) Develop a strategy for implementation during and beyond the period of the Project and provision of technical support, modern facilities, materials and equipment, and training during implementation;
 - (ix) Consolidate all environment-related action plans to develop an implementation program with realistic budgetary commitments, financing options and appropriate institutional arrangements in each CAR, with a phased implementation strategy, in line with national budgetary commitments;
 - (x) Develop strategies, time-bound action plans and prepare and implement guidelines to (a) harmonize environmental indicators across the region; (b) streamline and standardize environmental assessment processes and procedures and practices; (c) mechanisms and means for regional cooperation in environmental monitoring and management including conflict resolution in environmentally sensitive areas;
 - (xi) Undertake case studies to enhance understanding of environmental implications of development processes, environment-poverty nexus, and regional implications of environmental mismanagement, and others as appropriate;
 - (xii) Provide technical support for strengthening regional cooperation through establishment of links to regional institutions, preparation and presentation of case studies at various regional seminars and workshops under the auspices of EC-IFAS, or ICSD, or others as appropriate;
 - (xiii) Facilitate dialogue and discussion on transboundary environmental issues under the auspices of Executive Committee–International Fund for Saving the Aral Sea (EC-IFAS); and strengthen the capacity of ICSD to serve as a regional institution for environmental information development, analysis, and dissemination through intra- and inter-net facilities in collaboration with national and regional institutions; and
 - (xiv) Organize and conduct regional ministerial meetings, seminars and workshops within the region to disseminate the experts' findings and enhance awareness and promote regional cooperation.
3. In the capacity of Project team leader, he/she will:
- (i) Prepare a comprehensive work program and a schedule of activities for the team aimed at achieving the objectives; supervise the work of all other international and domestic consultants assigned to the Project, with the assistance from the National Team Leader (domestic consultant);
 - (ii) Based on the specific expertise and qualifications of the team members and the terms of reference for each assignment under the TA (a) prepare elaborated terms of reference and work assignment for each international member of the team, providing in-depth guidance to carry out his/her functions, to achieve the objectives in a time-bound manner; (b) prepare comprehensive terms of reference for each domestic member of the team, specifying roles and responsibilities, as well as required qualifications for the assignment, duration of services, and reporting requirements; and (c) prepare work assignments in

- accordance with specific terms of reference to each domestic consultant; provide assistance to ADB in the selection and engagement of domestic consultants.
- (iii) Coordinate the TA activities with concerned donors, in particular UNDP, UNEP, World Bank, United States Agency for International Development, Technical Assistance for Commonwealth of Independent States, AKF and regional institutions such as IFAS, ICSD, and national governments' focal points;
 - (iv) Prepare a comprehensive inception report, in consultation with the other international members of the team, which among other things will include an evaluation of current practices of environmental monitoring with a clear and concise strategy for achievement of the objectives, identifying various tasks, including a Project framework indicating goal, purpose, output, activities and inputs, along with performance indicators, monitoring mechanisms, assumptions and risks;
 - (v) Guide the EIMS experts in developing an improved information management and dissemination in the ICSD related to environmental monitoring and management;
 - (vi) Guide the EIMS and Laboratory and Field Analysis experts in developing and implementing national and regional training programs, through exchange visits, secondments, and joint training exercises to enhance national capacities in the use of EIMS and Laboratory and Field Analysis for environmental monitoring and management including the use of remotely sensed information and the application of geographic information systems;
 - (vii) In consultation with other members of the team, organize and conduct training to enhance the capacity of environmental management agencies to institutionalize environmental information management, environmental analysis and environmental monitoring, including training laboratory and field analysis, data base development and analysis, data presentation, web-design, web-updates, hardware and software needs, internet and intranet communications, and other relevant disciplines; and
 - (viii) Submit regular monthly summary reports and detailed quarterly reports, as well as proceedings of seminars, workshops, and meetings, to ADB and the participating country counterpart agencies, as well as Chairperson of the ICSD.

2. Environmental Information Management Systems and Geographic Information Systems (3 person-months, international); **and Information Technology** (hardware and software including web design and operation; 12 person months, domestic, in each country)

4. The consultants will:

- (i) Assist the Project team leader in carrying out (a) a needs assessment to determine specific elements for strengthening existing national EIMS including hardware and software, and capacity strengthening of concerned institutions for data collection, data analysis, documentation, data presentation, and dissemination through a unified environmental monitoring system; and (b) an evaluation of current practices and standards as a basis for (i) an agreement among the countries in the region on a set of environmental indicators; (ii) harmonization of environmental standards and procedures across CARs against the most critical environmental indicators (for air quality, water quality, hazardous waste, land degradation); and (iii) standardization of monitoring procedures;

- (ii) Design and install an appropriate EIMS in each of the participating countries, using the existing EIMS as the base system, which should be improved and expanded;
- (iii) In consultation with other members of the team, organize training for participants with the objective of capacity enhancement in environmental management including data gathering, EIMS, and other aspects related to effective environmental management;
- (iv) In consultation with other members of the team, conduct training workshops to enhance the capacity of environmental management agencies to institutionalize environmental information management, environmental analysis and environmental monitoring, data presentation, web-design, web-updates, hardware and software needs, internet and intranet communications, and other relevant disciplines;
- (v) Prepare training materials for (a) environmental monitoring as a management tool; (b) data analysis and data management, focusing on extension of the existing environmental information management systems; (c) environmental information networks; (d) website designs and updates; (e) interpretation and analysis of monitoring air, water, and soil quality; (f) preparation of monitoring programs; (g) preparation of monitoring reports; (h) review of environmental assessment reports and other documents; (i) environmental standards, including ISO 14000; and (j) risk-based environmental management;
- (vi) Assist in identification, procurement, and installation of modern equipment for EIMS, materials for sampling, analyses, data management, and other needs including estimates for costs and human resources required, and proposals for operations and maintenance.
- (vii) Organize and manage the import, purchase, assembly works, maintenance, and use of the data management equipment, and user training including preparation of manuals in English and Russian languages; and
- (viii) Assist the team leader in any other tasks assigned in ensuring achievement of TA objectives.

3. Environmental Analysis and Monitoring—(3 person-months, international);
and Analytical Laboratory Development and Operation (12 person-months, domestic) in each country

5. The consultants will:

- (i) Assist the Project team leader in carrying out a needs assessment to determine specific elements for strengthening existing methods and procedures for data collection, data analysis, documentation, data presentation, and dissemination; and (ii) an evaluation of current practices and standards as a basis for (a) harmonization of environmental standards and procedures across CARs; and (b) standardization of monitoring procedures;
- (ii) Design and install an appropriate system for environmental monitoring including field and laboratory analysis to establish a data base for the most critical environmental indicators (for air quality, water quality, hazardous waste, land degradation);
- (iii) In consultation with other members of the team, design and organize training for participants with the objective of capacity enhancement in environmental monitoring including data gathering, laboratory and field analysis, environmental indicators and analysis, environmental information management systems

- including data base development, data presentation, internet and intranet communications, and other relevant disciplines;
- (iv) Assist in identification, procurement, and installation of modern equipment for field and laboratory analysis, materials for sampling, data management, and other needs including estimates for costs and human resources required, and proposals for operations and maintenance; provide necessary training to the counterpart staff and the use of modern equipment and facilities.
 - (v) Organize and manage the import, purchase, assembly works, maintenance, and use of the field and laboratory analytical equipment, including preparation of manuals in English and Russian languages; and
 - (vi) Assist the team leader in any other tasks assigned in ensuring achievement of TA objectives.

C. Reports

6. Within four weeks after commencement, a regional workshop to be held at Dushanbe, with the participation of all national focal points, national economic planning and finance ministries, EC-IFAS and ICSD, concerned donors, regional and national NGO representatives, will deliberate and endorse the inception report (IR) and a draft work program prepared by the team leader. Four months, 12 months and 18 months after commencement, second, third (first mid-term) and fourth (second mid-term) reports, respectively, will be presented at regional workshops, to be held at Bishkek, Kyrgyz Republic, Almaty, Kazakhstan, and Ashagabat, Turkmenistan. The reports will provide an update on progress and achievements, a work program for the remaining period of implementation, and an updated framework. The draft final report will detail outcome of the TA and demonstrate how the outcome responds to achievement of objectives. Exact timing for the submission of first mid-term, second mid-term and draft final reports, as well as various seminars and workshops, will be indicated in the work program presented in the inception report. Additional regional workshops and/or Ministerial level meetings would be held in consultation with EC-IFAS and ICSD at Almaty, Ashagabat, Dushanbe, or other agreed locations, where case studies and other issues of regional significance would be discussed and conclusions and recommendations adopted. Options will be explored to hold a regional summit and sign agreements to address transboundary environmental issues. The final report will be submitted two weeks after its presentation in the final regional workshop at Dushanbe, incorporating comments made at the workshop or otherwise communicated. All reports will be translated into Russian.