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Tajikistan

Environmental Performance Reviews

Second Review

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ECE/CEP/163

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ENVIRONMENTAL PERFORMANCE REVIEWS

TAJIKISTAN

Second Review

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The United Nations issued the first Environmental Performance Review of Tajikistan (Environmental Performance Reviews Series No. 21) in 2004.

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Foreword

In 1993, Environmental Performance Reviews (EPRs) of the United Nations Economic Commission for Europe (ECE) were initiated at the second "Environment for Europe" Ministerial Conference, in Lucerne, Switzerland. They were intended to cover the ECE States that are not members of the Organisation for Economic Co-operation and Development (OECD). Subsequently, the ECE Committee on Environmental Policy decided to make them part of its regular programme.

At the fifth "Environment for Europe" Ministerial Conference (Kiev, 2003), the Ministers affirmed their support for the EPR Programme, and decided that the Programme should continue with a second cycle of reviews. This second cycle, while assessing the progress made since the first review process, puts particular emphasis on implementation, integration, financing and the socio-economic interface with the environment.

Through the peer review process, EPRs promote dialogue among ECE member States and the harmonization of environmental conditions and policies throughout the region. As a voluntary exercise, EPRs are undertaken only at the request of the countries concerned.

The studies are carried out by international teams of experts from the ECE region, working closely with national experts from the reviewed country. The teams also benefit from close cooperation with other organizations in the United Nations system, for instance the United Nations Environment Programme, as well as with other organizations.

This is the second EPR of Tajikistan to be published by ECE. The review takes stock of the progress made by Tajikistan in the management of its environment since the country was first reviewed in 2004. It assesses the implementation of the recommendations contained in the first review (Annex I). This second EPR also covers ten issues of importance to Tajikistan related to policymaking, planning and implementation, the financing of environmental policies and projects, and the integration of environmental concerns into economic sectors, in particular the sustainable management and protection of water resources, waste management, climate change, and forestry, biodiversity and protected areas.

I hope that this second EPR will be useful in supporting policymakers and representatives of civil society in their efforts to improve environmental management and to further promote sustainable development in Tajikistan, and that the lessons learned from the peer review process will also benefit other countries of the ECE region.

Sven Alkalaj
Executive Secretary
Economic Commission for Europe

Preface

The second Environmental Performance Review (EPR) of Tajikistan began in June 2010 with a preparatory mission. During the mission, the final structure of the report was discussed and established. A review mission took place from 27 September to 6 October 2010. The team of international experts taking part included experts from Bulgaria, Germany, Italy, Kazakhstan, Portugal, Slovakia and Ukraine, as well as from the secretariats of the ECE and the World Health Organization (WHO).

The draft EPR report was submitted to Tajikistan for comments and to the Expert Group on Environmental Performance for consideration in May 2011. During its meeting on 3-4 May 2011, the Expert Group discussed the report in detail with expert representatives of the Government of Tajikistan, focusing in particular on the conclusions and recommendations made by the international experts.

The EPR recommendations, with suggested amendments from the Expert Group, were submitted for peer review to the Committee on Environmental Policy on 24 May 2011. A delegation from Tajikistan participated in the peer review. The Committee adopted the recommendations as set out in this report.

The Committee on Environmental Policy and the ECE review team would like to thank the Government of Tajikistan and its experts who worked with the international experts and contributed their knowledge and assistance. ECE wishes the Government of Tajikistan further success in carrying out the tasks involved in meeting its environmental objectives, including the implementation of the recommendations contained in this second review.

The United Nations Economic Commission for Europe would also like to express its deep appreciation to the Governments of the Netherlands and Switzerland for their financial contributions; to the Governments of Germany, Italy and Portugal for having delegated their experts for the review; and to WHO and the United Nations Development Programme for their support of the EPR Programme and this review.

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LIST OF ABBREVIATIONS

ACMPS	Aid coordination and project management systems
ADB	Asian Development Bank
BAT	Best available technologies
BOD	Biochemical oxygen demand
CACILM	Central Asian Countries' Initiative for Integrated Land Management
CAIF	Central Asia Investment Facility
CAREC	Regional Environmental Centre for Central Asia
CBD	Convention on Biological Diversity
CCA	Common Country Assistance
CDM	Clean Development Mechanism
CEHAPE	Children's Environmental Health Action Plan
CEP	Committee on Environmental Protection
CES	Committee for Emergency Situations and Civil Defence
CFI	Climate Investment Funds
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COP	Conference of Parties
CP	Communities Programme
CPAP	Country Programme Action Plan
CPI	Consumer Price Index
CPS	Country Partnership Strategy
CTSD	Concept of Transition to Sustainable Development
DAC	Development Assistance Committee (OECD)
DED	German Development Service
DFID	Department for International Development
DNA	Designated National Authority
DOTS	Directly observed treatment short-course
EBRD	European Bank for Reconstruction and Development
ECO	Economic Cooperation Organization
EIA	Environmental Impact Assessment
ENP	European Neighbourhood Policy
EMS	Environmental management systems
EMSs	Environmental management standards
EnvSec	Environment and Security
EPR	Environmental Performance Review
EU	European Union
FAO	Food and Agriculture Organization
FDI	Foreign direct investment
FLEGT	Forest Law Enforcement, Governance and Trade
GBAR	Gorno-Badakhshan Autonomous Region
GEF	Global Environment Facility
GDP	Gross Domestic Product
GEOOS	Global Observing System
GHG	Greenhouse gases
GIS	Geographical information system
GTN-H	Global Network of Terrestrial Hydrology
GTZ	German Agency for Development Co-operation
HDI	Human Development Index
HPP	Hydropower plant
IAEA	International Atomic Energy Agency
ICSD	Interstate Commission on Sustainable Development
ICWC	Interstate Commission for Water Coordination
IDA	International Development Association
IDN	Irrigation and drainage network

IFAS	International Fund for Saving the Aral Sea
IFC	International Finance Corporation
IMAC	Information Management and Analytical Centre
IMF	International Monetary Fund
IUCN	International Union for Conservation of Nature
IFC	International Finance Company
ISTC	International Science and Technology Centre
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
JCSS	Joint Country Support Strategy
LRTAP	Long-range Transboundary Air Pollution
LULUCF	Land use, land use change and forestry
lcd	Litres per capita per day
KMK	"Khojagii manziliyu- kommunali"
MACs	Maximum allowable concentrations
MDG	Millennium Development Goals
MEAs	Multilateral environmental agreements
MEDT	Ministry of Economic Development and Trade
MICS	Multiple Indicator Cluster Survey
MoLRWR	Ministry of Land Reclamation and Water Resources
MoH	Ministry of Health
MoIE	Ministry of Industry and Energy
MoU	Memorandum of Understanding
MSW	Municipal solid waste
MTEF	Medium-Term Expenditure Framework
NAMA	National Appropriate Mitigation Actions
NBSAP	National Strategy and Action Plan on Conservation and Sustainable Use of Biodiversity
NCSD	National Commission for Sustainable Development
NDS	National Development Strategy
NEAP	National Environmental Action Plan
NEHAP	National Environmental Health Action Plan
NIF	Neighbourhood Investment Facility
NIP	National Implementation Plan
NPD	National Policy Dialogue
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
ODP	Ozone depletion potential
ODS	Ozone-depleting substances
OP	Obsolete pesticides
OSCE	Organization for Security and Co-Operation in Europe
PA	Protected areas
PCA	Partnership and Cooperation Agreement
PM	Particulate matter
PHARE	Poland and Hungary Assistance for Economic Restructuring Programme
PPCR	Pilot Project for Climate Resilience
PPP	Purchasing power parity
PRS	Poverty Reduction Strategy
PRTR	Pollutant Release and Transfer Registers
PSC	Public Service Contract
RCRE	Centre for Research and Use of Renewable
REACT	Rapid Emergency Assessment and Coordination Team
REAP	Regional Environmental Action Plan for Central Asia
RES	Renewable energy sources
REMAP	Regional Energy Market Assistance Program
RRS	Regions of republican subordination
SCES	State Commission for Emergency Situations
SCF	Strategic Climate Fund

SCI	State Committee on Investment and State Property Management
SDC	Swiss Agency for Development Cooperation
SDR	Standardised Death Rates
SEA	Strategic environmental assessment
SECO	Swiss State Secretariat for Economic Affairs
SEE	State Ecological Expertise
SES	State Epidemiological Service
SIDA	Swedish International Development Cooperation Agency
SOE	State-owned enterprises
SPARE	School project on resources and energy use
SPECA	Special Programme for the Economies of Central Asia
SSESS	State Sanitary and Epidemiological Surveillance Service
SSPPQ	State Service on Phitosanitary and Plants Quarantine
SSVI	State Sanitary and Veterinary Service
SUE	State unitary enterprise
SUMTACA	Sustainable management of the transboundary aquifers in Central Asia
ToR	Terms of Reference
TSP	Total suspended particles
UNCCD	United Nations Convention to Combat Desertification
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
WB	World Bank
WFP	World Food Programme
WHC	World Heritage Centre
WHO	World Health Organization
WUA	Water Users Association
WWF	World Wide Fund for Nature
WWTP	Wastewater treatment plant
YGPE	Youth Group Protection of Environment

SIGNS AND MEASURES

..	not available
-	nil or negligible
.	decimal point
°C	degree Celcius
$	dollar
Ci	Curie
GWh	gigawatt-hour
ha	hectare
kg	kilogram
kJ	kilojoule
km	kilometre
km^2	square kilometre
km^3	cubic kilometre
kgoe	kilogram of oil equivalent
ktoe	kiloton of oil equivalent
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
l	litre
m	metre
m^2	square metre
m^3	cubic metre
MW	megawatt
PJ	petajoule
ppm	parts per million
s	second
t	ton
TJ	Terajoule
toe	ton of oil equivalent
tofe	ton of fuel equivalent
TWh	terawatt-hour

CURRENCY CONVERSION TABLE

Year	somoni /US$
2000	2.076
2001	2.372
2002	2.764
2003	3.061
2004	2.971
2005	3.117
2006	3.298
2007	3.443
2008	3.431
2009	4.143
2010	4.379
2011	4.379
2012*	4.759

Source: UNECE common database, accessed December 2011.
Note: *March 2012 figure.

Executive summary

The first Environmental Performance Review (EPR) of Tajikistan was carried out in 2004. This second review intends to measure the progress made by Tajikistan in managing its environment since the first EPR, and in addressing environmental challenges.

Since the last EPR Tajikistan has had a 17 per cent population increase. Tajikistan is not a densely populated country, but the population density varies significantly due to the mountainous geography, making the lowlands of northern and western Tajikistan the most densely populated areas. Apart from the growth of the total population, the demographic indicators have been stable during the past 10 years.

Lack of diversification and reliance on a few export products make Tajikistan vulnerable to fluctuations in global commodity prices and terms of trade. Tajikistan's economy is based on cotton, aluminium and electricity, from which Tajikistan derives three quarters of its total export earnings. This figure has been almost constant for the past 10 years. Cotton alone, as the main agricultural export crop, contributes 90 per cent of agricultural export income, which in 2004, was 24 per cent of gross domestic product (GDP). Agriculture also provided 66 per cent of employment. The country's aluminium plant is one of the largest in the world, and accounts for about 40 per cent of Tajikistan's total industrial output.

The economy of Tajikistan has developed steadily since the last EPR and the country's economic situation has improved markedly. Careful fiscal management has kept the budget deficit low, and the exchange rate has been very stable. Foreign debt is at a reasonable, low level compared to the earlier period. Rising GDP since the first EPR has improved the living standards of the population, while the level of poverty has diminished notably. However, the international economic crisis that began in 2008 has had an effect on Tajikistan's economy, causing its GDP growth to drop from the previous 8.2 per cent per annum average to 3.4 per cent in 2009. The unemployment figure remains low because much of Tajikistan's labour force is living and working abroad.

By exporting cheap labour Tajikistan has been achieving a transition from a planned to a market economy with a considerably lower level of international official development assistance per capita than other post-communist countries. The migration of workers from Tajikistan and their consequent remittances are unprecedented in their magnitude and economic impact. They have played an important role as one of the drivers of Tajikistan's robust economic growth during the past several years; they have increased incomes and, as a result, have helped significantly reduce poverty.

Policymaking framework for environmental protection and sustainable development

The policy framework for environmental protection changed significantly during the reviewed period. A number of new policy documents on environmental protection and sustainable development have been adopted, as well as several sectoral policy documents that include environment-related provisions.

In general, Tajikistan has already developed an environmental legal framework and some new environment-related laws have been adopted since the first EPR. Several international environmental agreements ratified by Tajikistan have also been incorporated in its legal system. Environmentally related provisions can also be found in several sectoral laws, including in energy, tourism, transport and urban planning and construction.

There have also been a number of institutional changes. In January 2004, the Ministry of Nature Protection was abolished and replaced by the Committee on Environmental Protection and Forestry. Following reorganization, the Ministry of Agriculture and Nature Protection was given functions of integrated environmental management until further reorganization. The functions of the national environmental authority were designated to the newly established Committee on Environmental Protection under the Government.

Although a great number of environmental protection and sustainable development strategies, programmes and plans have been adopted in Tajikistan, for many of them financing has not been secured, and therefore they have not been implemented. Providing sufficient State funding for environmental protection measures

remains a key challenge for Tajikistan. Also, some programmes do not provide any indicators or measurable results and the accomplishment of planned actions is difficult to assess. Some actions are therefore duplicated in different programmes.

Compliance and enforcement

The sectoral monitoring of compliance of organizations and enterprises is carried out by a number of ministries and other public authorities. However, the scope of application of monitoring is shrinking due to the process of privatization. Economic legal entities are also required to undertake self-monitoring. Most enterprises may be inspected not more than once every two years, with the exception of the enterprises that are defined as entities with high risk.

The 2007 Rules on Conducting of Inspections of Economic Legal Entities defines a range of enforcement tools available to the environmental inspectors. The common range of enforcement tools available and used is similar to those in many other countries. However, there is no clear sequence of application of enforcement tools such as inspector's written directions, warnings and administrative fines. Monetary sanctions are the most important enforcement tool but, although very high for forest protection, in the case of industrial pollution Tajikistan avoids the application of high monetary sanctions on operators of industrial activities.

Data on inspections and enforcement of the legislation and standards in various environmental domains are not consolidated, analysed or published. Statistical information on inspections and law enforcement activities is kept separately by various units and agencies of the Committee on Environmental Protection. Also, it seems that this information is not considered at all in the planning of inspections.

There have not been any significant changes in emission standards since the first EPR. Most standards are still the same as were used in the Soviet era. They are one of the main bases for establishing emission level values and issuing environmental permits. In practice, emission limits for a given facility are calculated taking into account the background pollution and the ambient quality standards. The exceeding of limits results in administrative action, including financial sanctions.

Information, public participation and education

Compared with the situation during the first EPR of Tajikistan, the environmental monitoring set-up has not undergone the needed changes. The current monitoring system does not provide sufficient and reliable data on background ambient air and water pollution. There are, so far, no significant investments for the restoration of the environmental monitoring system through expanding the existing network; for modernizing equipment for air and water monitoring, sampling and testing; or for communication equipment. Owing to insufficient funding, the surface water pollution monitoring network continues to shrink, the system of monitoring of background pollution of ambient air has been drastically reduced, and the hydrometeorological observation network has not been substantially improved.

A positive step towards dissemination of statistical information is the Statistical Agency's website, which provides access to some statistical data in various areas. However, the statistical yearbook on environmental protection does not contain statistical information on industrial waste, inspections and law enforcement on protection of the environment and natural resources. In particular, information on the use of water resources is excluded due to inconsistencies in the statistical data in that area.

The Aarhus Centres play an important role in terms of planned and regular work to improve access to environmental information. However, since the beginning of 2010, due to the lack of funding both the Aarhus Centre in Dushanbe and its website are not operational. The Aarhus Centres in Khujand and Qurghonteppa focus more on increasing the awareness of the local population on environmental matters, through the publication of booklets, brochures, videos on environmental topics, as well as posting information on bulletin boards in public areas. The adoption of the Law on Citizens' Appeals in 2006 has changed the legal framework for obtaining environmental information from public authorities upon written request.

The 2006 Procedure of Environmental Impact Assessment (EIA) sets the public participation requirements for decision-making on specific activities, which are subject to the EIA procedure. The EIA regulation is not fully consistent with the public participation requirements of the Aarhus Convention.

The 1996 State Programme on Environmental Education is not yet implemented. The Programme focused on environmental education in the formal education system, i.e. in kindergartens, schools, colleges and universities. However, its implementation was not effective due to lack of funding and recognition of environmental education as a priority area. Currently, a new programme on environmental education is under development. The most problematic area of environmental education is the lack of training and retraining for the staff of public authorities.

Implementation of international agreements and commitments

So far, Tajikistan has acceded to several international environmental agreements. However, out of the five UNECE environmental conventions, it is only Party to the Aarhus Convention on Access to Information, Public Participation on Decision-making and Access to Justice. Because of Tajikistan's limited human and financial resources, the implementation of multilateral environmental agreements mostly depends on external cooperation and support. Foreign investments are also essential for allowing the country to face and deal with environmental challenges.

As a member of the Interstate Commission on Sustainable Development, Tajikistan has taken the lead among Central Asia countries for addressing the issue of mountain ecosystems degradation. This is one of five priorities, which include water resources and water pollution; air pollution; land degradation; waste management; and degradation of mountain ecosystems.

Additionally, in 2007, a transboundary water agreement on the use of water and energy resource of the Syr Darya River basin was signed between riparian countries. Although Parties tried to find a mutually beneficial solution, problems and disputes concerning the use of common basins remain unresolved. A major concern is the need for access to water and sharing of water use among the upstream and downstream countries.

Tajikistan is not yet a Party to the Basel Convention, the most comprehensive global environmental agreement on hazardous and other wastes. Given the large amount of accumulated hazardous waste in the country, and the lack of means to properly dispose of it, acceding to this Convention could be considered as a priority for the near future.

Economic instruments and expenditures for environmental protection

Tajikistan is facing major environmental problems, such as air and water pollution, and land erosion, with attendant severe adverse impacts on human health. Environmental damages are estimated to have a considerable economic cost, including the costs of adverse health impacts, corresponding to some 5 per cent of GDP.

In general, revenues from water supply and sanitation services are not sufficient to recover operational costs, let alone the preventive maintenance costs, of water companies. This is reflected in the progressive deterioration of the water sector infrastructure and a decline in the quantity and quality of water supply and sanitation services provided. The pervasive financial losses of water companies are owing to the basic tariffs, which are below unit production costs, but also the considerable volume of water revenue lost due to leakages in the infrastructure and inefficient billing mechanisms.

The existing energy sector infrastructure is very old and in poor condition, following two decades of low investment and considerable damage resulting from the civil war. While virtually all the urban and rural population has access to electricity, most of the rural population is faced with frequent power outages. One of the major priorities of the Government has therefore been the rehabilitation, modernization and expansion of the electricity generation facilities, as well as of the transmission lines and substations. Part of the energy sector development strategy is a reform of electricity tariffs and improvement of collection rates to ensure financial sustainability of energy utilities and thereby also attracting external investment funds.

The social affordability issue has become more acute in view of the more or less simultaneous increase in tariffs for water supply and sewerage, electricity and waste collection in recent years. The increased costs of these services fall disproportionately on low-income households, given that they account for a larger share of their income. Social assistance is considered to be insufficiently targeted at the poorest parts of the population, and the Government therefore intends to develop a new social targeting mechanism within the framework of a shift to a unified social benefit system, which will also integrate assistance needs for purposes other than electricity and gas bills.

Achieving sustained economic growth is the main preoccupation of the Government, given that it is an essential condition for making progress in creating jobs and reducing the still high levels of poverty. Environmental protection does not really figure among the main policy priorities. The very limited mobilization of financial resources for environmental protection in the State budget and in environmental (special) funds points to a clear marginalization of environmental protection in public sector spending.

There is a lack of transparency concerning the strategies, if any exist, and operations of environmental funds. Their number appears to be excessively large, amplifying management costs and diluting the already very limited resources available. In a more general way, this points to the importance of ensuring the effective management of very limited financial resources based on transparent policies for priority settings.

Climate change

Tajikistan joined the UNFCCC in 1998 as a non-Annex I Party and ratified the Kyoto Protocol in 2008 and established a Designated National Authority in 2009 for the implementation of the Clean Development Mechanism under the Kyoto Protocol. It has developed several policies, strategies and action plans that address climate change issues. Their implementation is in general hampered by lack of financial resources and insufficient institutional capacity. The action plans also often lack quantifiable objectives, and mid-term and final evaluations are often not carried out before new plans are elaborated.

Being a small country, Tajikistan's contribution to global greenhouse gas (GHG) emissions is quite limited. It has the lowest carbon dioxide (CO_2) emissions per capita among the Central Asian countries, and contributes only some 2–3 per cent of total CO_2 emissions in the region. The structure of GHG emissions has changed significantly over the past 15 years. The peak emissions of CO_2 and total GHG occurred in 1990, but since 2000 GHG emissions appear to have been again on an upward trend.

The Committee for Emergency Situations and Civil Defence, established in 2006, aims at increasing the resilience of the economic infrastructure to global warming and ensuring that the State institutions and authorities at all levels are prepared to take immediate action and provide support in case of a natural or man-made emergency. It is responsible for management and coordination of all disaster-related activities for prevention, preparedness and mitigation.

In the last decade several initiatives have addressed land degradation, across a number of sectors and geographical regions of the country, to promote sustainable land management in the face of climate change. Climate change is expected to worsen current problems, and to increase the need for effective approaches to sustainable land management. Useful lessons from current initiatives can be shared at the country level among practitioners and the donor community, as well as concepts and practices to help rural communities respond to climate change. It is noteworthy that Tajikistan has been selected, together with eight other countries and two regions, to participate in the Pilot Programme for Climate Resilience within the framework of the Strategic Climate Fund.

To ensure that the country's distant regions receive power at a low price, the Government has initiated a long-term construction programme for small hydroelectric power stations from 2009 to 2020. This programme represents the beginning of hydropower adaptation to climate change, including appropriate design and setting up, and mixing, where possible, with other renewable energy sources to reduce the climate vulnerability of the energy sector. In 2007 and 2008, the hydropower system faced major shortfalls in winter generation due to low water supply. Significant increases in the next few decades, from enhanced melting of glaciers and accumulated snow, will be followed by drastic reductions in supplies as the mass of glacial ice and accumulated snow shrinks due to climate change.

Sustainable management of water resources

Tajikistan has abundant water resources, but its water sector infrastructure is in a poor state. Only some 60 per cent of the population has access to safe drinking water. The functioning of the water supply and sewerage systems is, moreover, frequently interrupted by power outages, which are also a source of water contamination. There is considerable scope for the improvement of national water governance, which is currently split between a number of bodies. None of these various Government bodies involved in water management has sufficient competences and strong enough responsibility to design and execute a countrywide water sector strategy.

Water use in Tajikistan is dominated by irrigated agriculture, which now accounts for over 90 per cent of total water use. Water losses in irrigation are high, with estimates exceeding 40 per cent. Industrial water consumption has declined significantly during the 2000s, despite a significant increase of around 50 per cent in industrial activity. The decline, by 87 per cent compared with 2002, likely reflects the process of structural change in the industrial sector and a more economical use of water resources. Tajikistan generates nearly all its electricity (98 per cent) from hydropower, which corresponds to some 94 per cent of total annual energy supply.

Since the first EPR, the 2000 Water Code has been subject to important amendments in 2006, 2008 and 2009. The 2006 amendment allows for water supply systems to be owned not only by the State but also by legal entities, such as municipalities. Newly built water supply infrastructure can also be owned by private sector entities, which financed the construction. The Water Code now also incorporates flood prevention and the associated need for State and local flood prevention programmes for each river, as well as protective measures for strategic objects.

The 2009 Draft Water Sector Development Programme aims at relaunching the reform of the water sector and the rehabilitation of the water sector infrastructure during the period up to 2020. Besides the traditional problem areas of water supply and sanitation in urban and rural areas, there are new areas that require attention, such as the improvement of the irrigation and drainage infrastructure, the planned increase of hydropower capacity, water disaster management and the improvement of the water resources protection systems, and the adaptation needs that will be caused by climate change. The Poverty Reduction Strategy for the period 2010–2012 has so far not provided a significant additional stimulus for progress in water sector development.

The Government supports the concept of integrated water resources management (IWRM), and in 2008 included the basic IWRM principles in the 2000 Water Code. Plans have been drafted to incorporate IWRM in the strategic water sector development plans. Projects have in general taken into account the IWRM principles and increasingly appear to ensure better involvement of water users and other local stakeholders in project design and implementation. At the State level the split responsibilities among various ministries and other bodies, the bureaucratic structures and a lack of communication and cooperation continue, however, to adversely impact on the effectiveness of IWRM.

Waste management

Waste management in Tajikistan is receiving more attention than at the time of the first EPR. Key drivers for this change include aspirations of the Government and municipal representatives to improve living standards in towns, in combination with foreign donor activities in municipal solid waste management and privatization of key industries, which opens up the possibility for new approaches to solving industrial waste problems.

The key problems of waste management include: lack of information; lack of regulations and methodologies for proper treatment and disposal of waste; and insufficient legislation regulating waste management. Although the legislative framework is quite extensive, it is not sufficiently supported by implementing secondary legislation and does not reflect the key problems. Concrete activities were identified in various strategic documents.

The system of municipal solid waste collection, transportation and disposal is improving in the capital, Dushanbe, as are the disposal practices, by concentrating waste to a single disposal site. The campaign in 2001 to reduce dumping in Dushanbe to just one site had a positive impact: most municipal solid waste is now delivered to this site and the number of illegal disposal sites has decreased. However, the existing landfill does

not meet international sanitary norms and standards. Moreover, rural areas, which represent some 75 per cent of the population, are mostly not covered by municipal waste collection services.

There is little information on industrial waste available, because regular reporting is not carried out. Industrial enterprises and organizations transport their waste to the municipal disposal site, where it is disposed of together with municipal waste. Significant amounts of waste are stored inside industrial premises. Enterprises also sell some of their waste to other companies or to individuals for recycling, but no data are available. Experience from other countries shows that the amount of waste reported in the inventory of industrial waste should be significantly larger.

Storage of toxic waste is a key issue in Tajikistan, where there appears to be some progress. Based on prepared plans, Tajikistan is ready to start concrete investment projects aimed at improvement of long-term storage of obsolete pesticides. The country may benefit from experience gained in Eastern European countries, in particular the Republic of Moldova, the Russian Federation and Ukraine. However, the state of radioactive waste storage remains one of the main problems of Tajikistan. Due to the size of the problem it is hard to envisage that it will be solved in the foreseeable future.

Biodiversity, forestry and protected areas

Tajikistan's diversity of ecosystems is much higher than that of most other countries of similar area. The exceptional diversity of ecosystems is also reflected by the country's inclusion in the Global Biodiversity Hotspot "Mountains of Central Asia", one of Conservation International's 34 global biodiversity hotspots, and in the Global 200 of the World Wide Fund for Nature (WWF), a list of priority ecoregions for global conservation. The wide range of ecosystems that are represented in the country offers habitats to an equally rich diversity of flora and fauna.

However, the conservation status of most recognized biodiversity values is poor, with a deteriorating trend. The main current pressure on the country's biodiversity and natural resources is their unsustainable use, while additional threats such as climate change, desertification and alien and invasive species may also be increasing. Unsustainable natural resource use is occurring in various ways, including fuel wood collection, hunting, fishing and collection of animals, grazing and wild plant collection. A major root cause is rural poverty and the lack of livelihood alternatives to natural resource use.

Hunting and collection of wild animals for international trade threatens the fauna of Tajikistan, while the potential for sustainable management of wildlife resources to contribute to rural livelihoods and economic development remains underused. Tajikistan has not acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), although this would allow an extended international marketing of sustainably sourced wild products from Tajikistan. The Committee on Environmental Protection and local State forestry enterprises have only limited capacity to regulate hunting and do not generate significant income from hunting permits.

Grazing pressure throughout the country is increasing significantly. Excessive grazing precludes successful forest rejuvenation and afforestation. It also contributes to erosion and land degradation. Domestic animals that graze in areas inhabited by mountain ungulates or other wild herbivores compete with them and thereby compromise efforts to conserve these wild species. Sustainable pasture management is currently not included in policies, strategies and plans for natural resource use and forest management. Economic incentives to exclude livestock from forests and afforestation areas are generally lacking.

There is currently no national biodiversity monitoring system, no national forest monitoring system and no active database or monitoring system of protected areas and their biodiversity in Tajikistan. Insufficient monitoring has been implicated as a contributing factor to several management constraints affecting biodiversity management in Tajikistan. The generally cited reasons for the lack of monitoring systems in Tajikistan are the insufficiency of human resources able to maintain a monitoring system, the absence of reliable primary information, a dearth of agreed criteria and indicators for monitoring, and inadequate funds, infrastructure and facilities for monitoring.

The protected areas (PA) of Tajikistan are not managed effectively. Although there are currently no protected area management plans being implemented, a management planning guideline for PAs has recently been developed and approved. This guideline generally reflects international best practice and International Union for Conservation of Nature (IUCN) standards for PA management planning.

The legislation for biodiversity conservation and natural resources management is currently undergoing a phase of rapid development. The State Programme on Protected Areas Development for the period 2005–2015 sets out general objectives for the development of the PA system, with a particular focus on infrastructure and capacity development. The authorities responsible for PAs are currently underfinanced, under-resourced, and often understaffed, and their staff often lack relevant qualifications. However, two major adjustments to the institutional framework of the natural resources and biodiversity sector have improved its performance since the last EPR: the formation of a dedicated agency for PAs in 2008, and the establishment of the National Biodiversity and Biosafety Centre in 2010.

Human health and the environment

In the past decade improvements have been made in public health in Tajikistan, including in the areas of maternal and child mortality, the spread of communicable diseases, child nutrition and the overall health of the population. Overall trends in life expectancy have also been improving over the past decade. However, the health-care system in Tajikistan still experiences the burden of problems experienced in transition periods. Malnutrition is still a concern in Tajikistan, although there have been some overall improvements over the last few years.

The occurrence of waterborne diseases in Tajikistan remains high although there are some improvements. Analysis of the major infections reveals a notable incidence of viral hepatitis in the period from 2003 to 2009. In contrast, morbidity by bacterial dysentery declined, as did the incidence of typhoid fever. The most important among all problems related to the water resources is the problem of poor water quality and a lack of safe drinking water.

Since the 1960s, a rise in air temperature has been observed in Tajikistan and precipitation levels have changed and become more variable, with more irregular precipitation occurring. These changes, the effects of climate change, have health impacts now and for the future. These include: increased waterborne infections related to increased floods and mudslides; risk of increasing malnutrition as food production is affected from extreme weather events; increased cardiovascular and respiratory disease during heat and cold waves; and increases in other infectious diseases.

Stockpiles of obsolete chemicals and other stored waste remain a big problem. Populations are exposed to unprotected stockpiles of obsolete pesticides. Uranium tailings also remain an environmental and ecological risk. Located near the Syr Darya River, uranium tailings are not rehabilitated. There is still no established body for monitoring and controlling exposure to radiation. In addition, new sanitary norms for medical waste are not yet fully implemented, so the problems of safe disposal still exist.

The 2000 National Environmental Health Action Plan for the period 2000–2010 was never implemented. There are also no plans to extend the plan or to develop a new one in the future. In addition, Tajikistan has not developed a children's environmental health action plan. However, since the first EPR, new legal acts were adopted in this area.

Introduction

I.1 Physical context

Tajikistan is a land-locked country in South-East Central Asia. It is bordered to the north by Kyrgyzstan (border length 630 km), to the east by China (430 km), to the south by Afghanistan (1,030 km), and to the north and west by Uzbekistan (910 km). With a land area of 143,100 km^2, Tajikistan is the smallest of the Central Asian countries. Tajikistan is an extremely mountainous country, and earthquakes are frequent because it is situated on an active seismic belt extending throughout the entire south-eastern section of Central Asia.

Three mountain systems, the Tien Shan, Gissar-Alay and the Pamir mountains, cover about 93 per cent of Tajikistan's land area. Topography ranges from 300 to 7,495 meters in elevation, and almost half of the land area lies above 3,000 m. In addition to its highest mountain peak, Qullai Ismoili Somoni (7,495 m), situated in the Pamir mountain range, Tajikistan has 72 mountain peaks over 6,000 meters high. The western part of the country consists of foothills and steppes (semi-arid grassy plains) while the lowland areas are limited to river valleys in the south-west and in the extreme north, where a strip of country's territory extends into the fertile Fergana Valley.

The high mountains are permanently covered by snow and ice. The glaciers extend over approximately 6 per cent of the country's entire land area and are estimated to hold 550 km^3 of fresh water reserves. The glaciers are shrinking, and the largest of them, the Fedchenko Glacier, is estimated to have regressed 1 km in length and diminished 11 km^2 in area and 2 km^3 in volume during the 20th century.

The glaciers and permanent snow feed the rivers of the Aral Sea basin with over 13 km^3 of fresh water annually. Together, the combined watershed areas of the major rivers; the Syr Darya River (total length 2,400 km), which flows for 195 km across the Fergana Valley in the north, the Zeravshan river (Zarafshon), which runs through central Tajikistan, and the Kafirnigan, Vakhsh and Panj rivers, drain more than three-quarters of Tajikistan's territory.

A specific feature of Tajikistan is its high-altitude lakes covering more than 680 km^2 and situated mostly in the eastern Pamir region. Out of some 1,000 lakes, 80 per cent are situated higher than 3,000 m above sea level. The largest lake is saltwater Lake Karakul (380 km^2), in the north-east at an elevation of 3,914 m, while the deepest freshwater lake is the 490-meter deep Sarez Lake (3,239 m above sea level, 86.5 km^2) in the western Pamirs.

The distinct natural environments, ranging from hot deserts to cold alpine areas, feature very diverse fauna. The rich flora varies from drought-resistant grasses and low shrubs on the steppes to the dense forests of coniferous trees covering the mountain slopes. The fauna of the steppes includes deer, wolves, foxes and badgers, while the lower mountain regions are populated by brown bears, lynxes, wolves and wild boars. Tajikistan also has several rare species, such as the Tajik markhur, the Siberian horned goat, the Marco Polo argali mountain sheep, the Urial sheep, the Bukhara red deer and the snow leopard.

The climate is continental but the huge variations in elevation, combined with a very complicated relief structure, creates unique regional and local climates, causing great temperature differences with considerable seasonal and daily weather fluctuations. In addition to the elevation differences, precipitation patterns depend on the location and orientation of mountain ranges affecting the air mass circulation. The huge annual variations in mean precipitation stretch from 70 to 160 mm in the hot deserts of southern Tajikistan to 2,000 mm in the cold high mountain deserts of the eastern Pamirs in central Tajikistan.

I.2 Human context

Since the last 2002 EPR report, Tajikistan has had a 17 per cent population increase from 6.4 million to 7.5 million people (in 2009). With an average population density of 51.5 persons per km^2 Tajikistan is not a densely populated country. However, population density varies significantly due to the mountainous geography, making the lowlands of northern and western Tajikistan the most densely populated areas.

Tajikistan was the least urbanized republic of the former Soviet Union, and even in 2008 only 26.3 per cent of its population lived in urban areas. The largest city is the capital, Dushanbe, with 562,000 inhabitants. Other cities include the important cotton-processing centre Khujand (pop. 149,000), Kulob (pop. 78,000) and Qurghonteppa (pop. 60,000).

According to the latest census (2000), Tajikistan is an ethnically homogenous country. The largest ethnic group, the Tajiks, make up 79.9 per cent of the total population. The Uzbeks, who live primarily in the Fergana Valley and in the vicinity of Kulob in south-central Tajikistan and Tursunzade in western Tajikistan, are the second largest population group with 15.3 per cent of the population. The number of Russians, the third largest group, has been steadily diminishing since 1989, and currently Russians represent around 1.1 per cent of the population. The remaining 2.6 per cent of the population is composed of at least 25 different small minority groups, such as Kyrgyz, Turkmen, Tatars, and Arabs.

Apart from the growth of the total population, demographic indicators have been stable during the past 10 years. Since the fertility, birth and mortality rates in 2008 were almost exactly the same as in 2000, the increase in total population from 6.3 million to 7.5 million inhabitants is mainly due to the longevity of the population. Between 2000 and 2008, life expectancy increased steadily. Average life expectancy at birth, which was 68.2 in 2000, increased to 72.2 years in 2008 (74.8 years for women and 69.7 years for men) (Table I.1).

In 2000, Tajikistan's composite human development index (HDI), as measured by the United Nations Development Programme (UNDP), was 0.493 (on a scale of a minimum of 0.0 to a maximum of 1.0) and the country ranked 112th out of 173 countries. The 2005 HDI was higher at 0.550 but Tajikistan's relative position weakened, dropping to 122nd out of 177 countries. In 2010, the HDI rose to 0.580 and Tajikistan again ranked 112th out of 169 countries measured. In past years, HDI has trended higher from an international perspective, as a result of which Tajikistan's relative position stayed the same despite the increase in its HDI.

I.3 Economic context

The economy of Tajikistan is based on cotton, aluminium, and electricity. It was the third largest cotton-producing republic in the Soviet Union, with cotton production peaking at 800,000. tons/year, but the civil war and several years of drought brought the production volume down. Even in 2006, cotton production was about half of the pre-independence level. Notwithstanding the drop in production levels, cotton is still central to the agricultural sector. In 2004, the agricultural sector produced 24 per cent of GDP, provided 66 per cent of employment, and brought in 26 per cent of exports. Cotton alone, as the main agricultural export crop, contributed 90 per cent of agricultural export income.

The industrial sector is dominated by aluminium production. The Tursunzade aluminium plant is one of the largest in the world and the aluminium industry, producing 348,000 tons of aluminium in 2009, accounts for about 40 per cent of Tajikistan's total industrial output. Almost all aluminium is exported and in 2009 aluminium brought in 58.4 per cent of the export earnings, consuming some 40 per cent of the country's annual electricity production.

With a hydropower potential of 300 billion kWh, Tajikistan could be one of the world's largest hydroelectricity producers, but due to a lack of investment in the energy sector, only 5 to 10 per cent of its hydroelectric capacity is currently utilized. In early 2010, Tajikistan launched an ambitious programme to finance the completion of the 3,600 MW Roghun hydropower dam project (HPP), which is perceived as the country's road to energy independence. About three-quarters of Tajikistan's total export earnings are derived from cotton, electricity and aluminium, a figure that has been almost constant for the past 10 years. Lack of diversification and reliance on a few export products make Tajikistan vulnerable to fluctuations in global commodity prices and terms of trade.

The economy of Tajikistan has developed steadily since the last EPR (2002) and the country's economic situation has improved markedly. Careful fiscal management has kept the budget deficit low and the exchange rate has been very stable. Foreign debt is at a reasonable, low level compared to the earlier period. Inflation measured by the Consumer Price Index (CPI), which was 38.6 per cent in 2001, fell to 6.4 per cent in 2009, a very moderate figure compared to the wild inflation figures the country posted in the 1990s, when the highest annual CPI was over 2,100 per cent. Tajikistan has not been very successful in attracting foreign direct investment (FDI) and the cumulative FDI level is low. However, the situation has improved during the past five years, as FDI inflows have picked up.

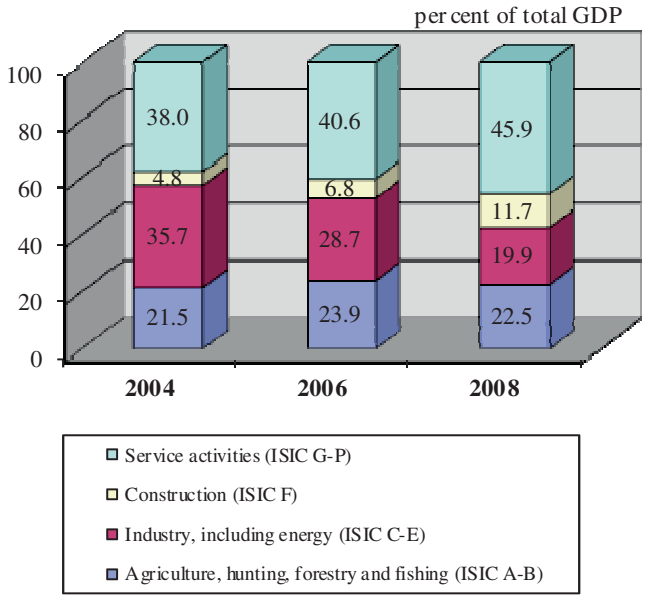
Tajikistan's Gross Domestic Production (GDP) growth over the past ten years has been very robust, averaging an 8.2 per cent increase per year. However, the international economic crisis that began at 2008 has hit Tajikistan's economy, cutting its GDP growth to 3.4 per cent in 2009. Rising GDP since the first EPR has improved the living standards of the population, while the level of poverty has diminished notably. The increase of almost 70 per cent in per capita GDP after 2000 is a substantial figure, even when the very low original GDP per capita level is taken into consideration.

Table I.1: Demography and health indices, 2000-2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Population (permanent, in millions)	6.3	6.4	6.5	6.6	6.8	6.9	7.1	7.2	7.4	7.5
Birth rate (per 1,000)	27.0	27.2	27.3	27.1	26.8	26.4	26.7	28.0	27.9	..
Total fertility rate	3.5	3.5	3.5	3.4	3.4	3.3	3.3	..	..	..
Life expectancy at birth (in years)	68.2	69.1	69.1	70.1	71.0	70.6	71.8	71.7	72.2	..
Life expectancy at birth: male (in years)	66.1	67.0	67.1	67.9	68.6	68.1	69.3	69.4	69.7	..
Life expectancy at birth: female (in years)	70.3	71.2	71.1	72.3	73.4	73.2	74.4	74.0	74.8	..
Percentage of population aged 0–14 years	42.2	41.3	40.3	39.4	..	..	..	36.4	..	..
Percentage of population aged 65+ years	3.7	3.8	3.9	4.0	..	..	..	4.2	..	..
Mortality rate (per 1,000)	4.7	5.1	4.8	5.1	4.4	4.6	4.6	4.7	4.4	..
Infant mortality rate (per 1,000)	15.6	15.6	..	..	..	..	..	..	..	..

Source: http://w3.unece.org/pxweb/Dialog/Saveshow.asp: Accessed on 19.10.2010.

Figure I.1: GDP - composition by sector in 2004, 2006 and 2008



Source: UNECE database 28.1.2010 at http://w3.unece.org/pxweb/Dialog/Saveshow.asp.

Table I.2: Ministries

Ministry of Agriculture and Environment Protection
Ministry of Culture
Ministry of Defense
Ministry of Economic Development and Trade
Ministry of Education
Ministry of Energy and Industry
Ministry of Finance
Ministry of Foreign Affairs
Ministry of Health
Ministry of Interior
Ministry of Justice
Ministry of Labor and Social Protection of the Population
Ministry of Land Reclamation and Water Resources
Ministry of Transportation and Communication

Source: http://tjus.org/Government.htm: Accessed on 19.10.2010.

The State Statistical Agency, together with the World Bank, conducted a Tajikistan Living Standard Survey in 2007 using two methods to examine the poverty and living standards of the population. The method, which measured poverty using the international purchasing power parity standard (income less than PPP US$ 2.15/day), found that the population's total poverty rate declined from 64 per cent in 2003 to 41 per cent in 2007. The second method compared per capita consumption with household needs. Available data showed that, from 2003 to 2007, the poverty rate declined from 72.4 per cent to 53.5 percent. Both methods found that poverty levels are almost identical in urban and rural areas.

According to the State Statistical Agency, 11.5 per cent of the working age population is unemployed although the official registered unemployment rate in 2009 was very low at 2.1 per cent. The unemployment figure has remained low because a large share of Tajikistan's labour force lives and works abroad.

According to estimates provides by the International Monetary Fund (IMF), 1.5 million Tajiks live and work abroad, especially in the Russian Federation, and send remittances back home. This foreign remittance flow from migrant workers abroad is estimated to increase the country's GDP by an additional 36 per cent and has become a main source of income for millions of people living in Tajikistan.

Workers' migration from Tajikistan and their consequent remittances are unprecedented in their magnitude and economic impact. By exporting cheap labour, Tajikistan has managed to achieve a transition from a planned to a market economy with a considerably lower level of international Official Development Assistance (ODA) per capita than other post-communist countries. The World Bank Tajikistan Policy Note in 2006 concluded that remittances have played an important role as one of the drivers of Tajikistan's robust economic growth during the past several years and have increased incomes, thereby helping to significantly reduce poverty.

1.4 Institutions

The Head of the State and its executive authority is the President, who is directly elected for a seven-year term. The President appoints the Prime Minister and the members of the Council of Ministers, but these appointments are subject to legislative approval. He is also the Supreme Commander of the Armed Forces.

The Government consists of the Prime Minister, his first deputy and other deputies, ministers, and the chairpersons of the State committees. The Government is the supreme executive body, led by the Head of the Government – the President of the country.

The Parliament, the *Majlisi Oli,* has two chambers. The lower chamber, the *Majlisi Namoyandagon*, convenes once a year, from October to June. Its 63 members are elected by popular vote for a five-year term: 22 are elected by proportional representation (in which representatives are elected from party lists in proportion to the number of votes that each party receives) and 41 are elected from single-member constituencies (geographical areas that have one representative each). Should the Presidents so wish, he may also become a member of the *Majlisi Milli*.

The upper chamber, the *Majlisi Milli*, convenes at least twice a year and has 33 members, who are indirectly elected for a five-year term; 25 are elected by local deputies and 8 are appointed by the President.

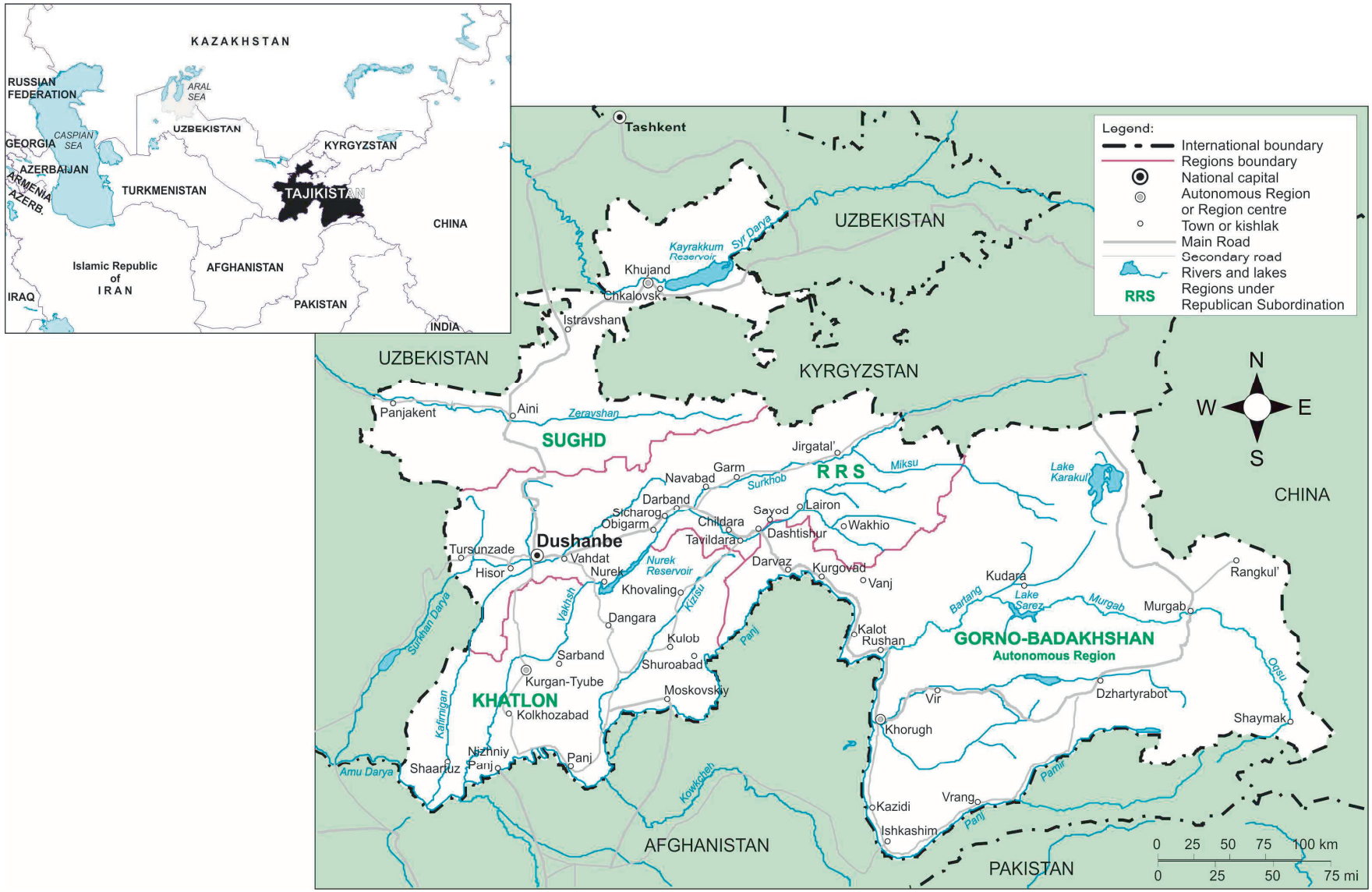
The Constitution provides for an independent judiciary. The Supreme Court is the highest court. The other high courts are the Supreme Economic Court and the Constitutional Court. The President appoints the judges of these three courts, with the approval of the legislature. Other courts include the Military Court, the courts of the Gorno-Badakhshan Autonomous *Oblast* (administrative region) and local courts. All judges are appointed for a five-year term. The Chairman, deputy chairpersons and members of the Constitutional Court, the Supreme Court and the Supreme Economic Court are elected by the *Majlisi Oli* at the recommendation of the President. All other courts are appointed by the President at the recommendation of the Minister of Justice.

Tajikistan is divided into four administrative units: Sughd Region, Khatlon Region, the Gorno-Badakhshan Autonomous Region, and the Regions under Republican Subordination. Each of these units is divided into districts, which in turn are subdivided into self-governing cities, towns, settlements and rural administrative units called *jamoats*. As of 2010, there were 62 districts, 17 cities and towns and 369 *jamoats*. Regions under Republican Subordination comprise several districts and cities, including the capital, Dushanbe.

All these local administrative units have councils, whose members are elected for a five-year term. Council chairmen are appointed by the President and seen as his representatives. The local administration is in charge of local budgets, communal property, and communal assets. They also deal with the economic, social, cultural, ecological and other issues of local relevance delegated to them by law.

Photo I.1: Timur Dara Lake in Karatag Valley, Central Tajikistan.

Map I.1: Tajikistan



Source: United Nations Cartographic Section, 2010.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

PART I: POLICYMAKING, PLANNING AND IMPLEMENTATION

Chapter 1

POLICYMAKING FRAMEWORK FOR ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

1.1 Policies and strategies

The policy framework for environmental protection has changed significantly during the period under review. A number of new policy documents on environmental protection and sustainable development have been adopted since the first EPR. Also, environment-related provisions have been included in some sectoral policy documents.

The policy documents adopted define the relevant priorities and goals and set out a number of different measures and activities to achieve these goals. However, these policy documents are sometimes not properly coordinated and harmonized with each other. Some goals according to relevant documents on the implementation of planned activities are in an implementation phase at 2011. It should also be mentioned that for the development of almost all programmes, the monitoring system is under implementation.

Despite some adopted action plans, no work has been done on some recent documents, like the National Implementation Plan on Realization of the Stockholm Convention. The National Centre for Implementation of the Stockholm Convention on Persistent Organic Pollutants was established, but no activities have been implemented. It is also planned to establish a centre on glaciology and hydrometeorology for the implementation of the State Programme for the Study and Preservation of Glaciers for the period 2010-2030.

The 2010 National Strategy on Disaster Risk Management for the period 2010-2015 requires the overall structure to be put in place for monitoring implementation and measuring impact. It is foreseen that the National Platform for Disaster Risk Reduction will perform these duties.

On the whole, the corresponding mechanisms for intersectoral coordination of policies, plans and actions aimed at environmental protection and sustainable development do not work efficiently.

Sustainable development policies and strategies

Tajikistan is implementing sustainable development principles through three phases. Phase one is mainly based on the implementation of the Poverty Reduction Strategy for 2007-2009. During this phase, the aim is to understand and manage economic processes in a way that limits their impact on the environment. It is also important to pay special attention to public awareness of environmental problems, afforestation measures and implementation of commitments under the global environmental conventions signed.

The second phase, which deals with the implementation of the National Development Strategy (NDS) for the period 2015, has to take the structural changes to a new quality level, make development more sustainable, eliminate poverty and consistently improve the living standards of the population. In this phase, preventive measures will be developed aimed at the pilot use of sustainable development instruments for adaptation to climate change, land degradation and air pollution. Special marker mechanisms will be used to prevent the import of environmentally hazardous technologies and consumer goods.

Promotion of the concept of transition to sustainable development is the objective of the third phase of the strategy. In this phase, it is proposed to start developing an environmentally oriented economic system that integrates sustainable development principles into all spheres of society. Environmental well-being is promoted first of all by the rational use of the natural potential through the integration of innovation technologies, and the design and establishment of environmentally sound production, urban planning and infrastructure.

National Development Strategy for the period to 2015

As one of the main strategic documents, the 2007 National Development Strategy (NDS) for the period

to 2015 presents the general direction of the country's long-term development. It sets the course in terms of action to implement economic reforms that will promote sustainable economic growth and reduce poverty with a view to achieving the Millennium Development Goals (MDGs). In the NDS, the Chapter on Promotion of Environmental Sustainability defines the main priorities as:

(a) Strengthening institutional potential with a view to promoting environmental sustainability;
(b) Solving problems associated with natural disasters through their prevention and the effective management of natural resources;
(c) Promoting conservation and proper management of biodiversity and ecosystems.

The NDS provides a basis for all current and developing public, sectoral and regional conceptual frameworks, strategies, programmes and plans for the country's development, as well as the activities of all public administration bodies. It has further been complemented by the successive strategies on poverty reduction, which have acted as an implementation instrument.

Poverty Reduction Strategies

According to the NDS, poverty reduction strategies (PRS) will be developed for each three-year period. Since the first EPR, Tajikistan has developed poverty reduction strategies for the period 2004-2006 and the period 2007-2009 and, most recently, for the period 2010-2012.

Tajikistan has put in place two mechanisms to facilitate implementation of the PRS. The 2007 Presidential Decree on the Establishment of the National Development Council, No. 355, promotes cooperation between all branches of Government and civil society based on constructive principles of partnership.

In addition, Government Resolution No. 216 (2008) on Monitoring and Evaluating the Implementation of Medium-term Poverty Reduction Strategies provides for monitoring and evaluating the effectiveness of the implementation of medium-term poverty reduction strategies.

During the PRS implementation period for the period 2007-2009, some results were achieved with regard to increased access to water supply, sanitation and housing, and to municipal services. In 2008, 90 per cent of the urban population was provided with drinking water, which meets Government standards, but this dropped by 3 per cent compared to 2005 (93 per cent). In addition, 47 per cent of the rural population were provided with drinking water, which met the Government standards for 2008, but this was a decrease of 2 per cent compared to 2005 (49 per cent). Around 94.8 per cent of the urban population in 2008 were provided with basic sanitation and hygiene services, an increase of 74.8 per cent compared to 2005 (20 per cent). The State budget expenditure on water supply, sanitation and housing, and municipal services was 1.5 per cent of GDP in 2008, an increase of 0.4 per cent compared to 2005 (1.1 per cent of GDP).

Also, in 2009, around 5 million somoni were allocated for land reclamation, improving soil quality, and reducing wind erosion and desertification, making it possible to reclaim 8,774 ha of land.

The PRS for the period 2010-2012 determines the major socio-economic development of the country during this period, factoring in the impact of the global economic and financial crisis. It takes into account available resources and additional needs, indicating concrete actions for implementing institutional and economic reforms.

These concrete measures are expected to promote strong and sustainable economic growth and improve the scope and quality of social services aimed at mitigating the burden of poverty in the country (Chapter 5). The PRS includes a chapter on promotion of environmental sustainability, and defines the action plan with specific tasks to 2012 in the following areas:

- Waste management
- Control of air quality
- Improvement of water resource management
- Land management
- Protection and management of the mountainous ecosystem
- Climate change
- Prevention of natural disasters

As a result of the lessons learned from PRS implementation for the period 2007–2009, a number of measures and changes were included in the current PRS. For example, in order to strengthen coordination between ministries, agencies and local authorities, an adjustment was made to the mechanism for monitoring implementation of the current PRS. In addition, the measures for implementing its objectives were clearly identified, in line with the goals, and their number reduced by half compared to the previous PRS.

Concept of Transition to Sustainable Development for the period 2007-2030

The 2007 Concept of Transition to Sustainable Development (CTSD) for the period 2007-2030 determines the vision, goals, objectives and key implementation mechanisms for sustainable development through the integration of economic, environmental and social solutions, and is aimed at increasing the living standards of the population.

CTSD priorities include the achievement of stable economic growth; reduction and elimination of poverty; provision of social, food and energy security; as well as adequate natural resource management through the creation of a well-integrated economy, including industrial investments organized countrywide and funded through the sale of shares to the public. The Concept is not a separate planning process with regard to the existing programmes or processes. Rather, it is aimed at the adaptation of current actions at the national and regional levels to the principles of sustainable development.

The National Commission for Sustainable Development (NCSD) was established in 1998 in order to coordinate the work of ministries and organizations involved in the development and implementation of the strategies and programmes for sustainable development, as well as to coordinate with international and regional organizations and programmes for sustainable development. It is designed to facilitate introduction of the principles of sustainable development into all spheres of society.

Environmental policies and strategies

National Environmental Action Plan

The National Environmental Action Plan (NEAP) was adopted by the Government in 2006. The implementation of the activities and projects envisaged by the NEAP is planned for 2007-2011. Its main goals are to create a basis for the optimal use of natural resources and the preservation of the most fragile and valuable ecosystems, and ensure development, taking environmental matters into account in the economy. The NEAP proposes coordination of the implementation of environmental activities at the State and local level; integration of the activities proposed within it with all existing relevant national policies and programmes; and the mainstreaming of cooperation among institutions responsible for natural resource conservation and sustainable development.

The methodology for identifying priorities is based on a series of national and local workshops organized in regions. The NEAP describes top-priority environmental issues and activities focusing on further reduction of negative human impact on the environment. Improvement of the state of the environment is presented as the major factor ensuring the physical, psychological and social well-being of the country's population. The NEAP has identified the following major environmental issues:

- Pollution problems (water, land, and air pollution);
- Environmental degradation: overexploitation of natural resources including water, land, forestry, and biodiversity;
- Environmental hygiene;
- Natural disasters, specifically floods, mudslides, and landslides.

The NEAP supplements and better specifies the set of activities envisaged by the State Environmental Programme for the period 1998-2008, which in turn has promoted positive changes in nature conservation and sustainable nature management.

The NEAP comprises a practical set of activities to eradicate the causes of environmental violations at the local level. These activities can become the basis for a comprehensive strategy for integrated environmental management in the country.

Concept of Environmental Protection

In December 2008, the Government adopted the Concept of Environmental Protection. This instrument defines the main directions for the implementation of State policies in environmental protection and rational use of natural resources; provides an analysis of the state of the environment; and indicates major problems and needs.

The priorities of the Concept are as follows: strengthening institutional capacity; preventing natural disasters; effectively managing natural resources; preventing and reducing soil degradation related to salinity, rise of groundwater level and erosion; improving the protection and management of water resources; reducing emissions from automobile transport and improving air quality in big cities; protecting and managing biodiversity, especially protected natural areas, conservation and management of ecosystems; improving waste management; and developing a continuous system of environmental education for the population.

In February 2010, the Government also adopted the medium-term plan (2010-2012) for implementation of the Concept.

Environmental Programme for the period 2009-2019

The 2009 State Environmental Programme for the period 2009-2019 provides an opportunity to solve the issue of rational use of natural resources and environmental protection. It sets out the activities needed to restore or maintain an ecological balance or rectify a particular environmental problem.

Programme on the Development of Protected Areas for the period 2005-2015

The main goal of the 2005 Programme on the Development of Protected Areas for the period 2005-2015 is to improve the management of protected areas. The Programme includes terms; responsible authorities; necessary financial resources and sources of funding. It should be noted that most of the actions were planned to be carried out in the period from 2005-2010 (Chapter 9).

The Programme sets out the main tasks and includes actions that cover the following main directions: further development of the legislation on protected areas; restoration, development and improvement of existing protected areas in line with international standards; establishment of new protected areas, including cross-border inter-state natural parks; resumption of scientific research; capacity-building among the protected areas staff; publication and dissemination of information on protected areas; and awareness-raising.

Programme on the Development of Forestry for the period 2006-2015

The major goal of the 2005 Programme is the protection, recovery and efficient use of forest resources. The Programme provides for the planning and cultivation of forests; reforestation and protection of forests (walnut, pistachio and briar) and the fruitful use of forest natural resources. The Programme's action plan lists the relevant activities, terms, estimated cost and responsible authorities Chapter 9).

The basis for the development of this Programme was the 2004 Programme of Economic Development for the period to 2015, the Poverty Reduction Strategy, the National Strategy and Action Plan on Conservation and Sustainable Use of Biodiversity, and other programmes and reports on the development of agriculture and forestry.

Programme of Recovery of Hydrometeorological Stations and Hydrological Posts for the period 2007-2016

The strategic objective of the 2006 Programme is the restoration of the National Hydrometeorological Service to the optimum level (Chapter 3). The main goals are:

- Providing information on current and expected weather conditions (including extreme weather events, crop forecasts, river regime, environmental monitoring) to the Government, different organizations and the population;
- Providing special forecasts for key sectors of the agriculture, tourism, recreation and medicine;
- Assessing the impact of climate change, its socio-economic and environmental impact;
- Providing users with climate information;
- Assessing the condition of mountain glaciers and lakes, mudflow and avalanche areas.

National Implementation Plan on Realization of the Stockholm Convention on Persistent Organic Pollutants

In the 2007 National Implementation Plan for the Stockholm Convention on POPs, major POPs problems and the way to address these up to the year 2028 are defined. The Plan is considered as the initial political instrument for the elaboration of national programmes on chemicals management. It will be integrated with the policy for national development and environment protection and with the consecutive PRS.

According to the Plan, the priorities to be addressed are as follows: conducting a full-scale inventory of all POPs categories; improving legislation in the sphere of chemical safety and establishing a mechanism for its implementation; creating an effective system for POP management; and building capacity in POPs management.

Programme for the Study and Preservation of Glaciers for the period 2010-2030

The purpose of the 2010 Programme is to study the state of the glaciers for the period 2010-2030 and how to preserve them. It intends to plan specific measures for establishing an effective system of glaciological monitoring of the state of glaciers and snowfields and of river basins, for rapid adoption of

effective measures to mitigate the impacts of climate change on people, the country's economy and the regions (Chapter 6).

A centre on glaciology and hydrometeorology for the implementation of the Programme would be established. It would study the distribution of precipitation and snow cover as well as the conditions for the formation of avalanches and landslides, and the hydrometeorological regime of rivers, lakes, reservoirs and glaciers.

Environment-related provisions in sectoral policies and strategies

Programme of Economic Development for the period to 2015

The 2004 Programme of Economic Development for the period to 2015 describes environmental problems as being among the main problems of economic development. It provides a set of measures for different areas of environmental protection. Although adopted before the NDS and some other programmes, most of the measures contained in the Programme are reflected in later policy documents (e.g. the NDS and PRS, and the Programme on the Development of Forestry for the period 2006-2015).

National Strategy on Disaster Risk Management for the period 2010-2015

The most frequent disasters faced by the population of Tajikistan are:
- Earthquakes; the most serious risk to Tajikistan in the long term;
- Epidemics, avalanches, mudflows, floods and earthquakes pose significant risk in the short term, i.e. on an annual basis;
- Droughts are not frequent, but cause significant damage.

Almost all the hazards that threaten Tajikistan in the short term are linked with climate and weather conditions. Heavy rainfall causes avalanches, mudflows, and floods. Severe winter storms occurring very often are a key factor causing landslides.

The objective of the 2010 National Strategy on Disaster Risk Management for the period 2010-2015 is to define actions to reduce the impact of disasters for the benefit of every person in Tajikistan, through the integration of disaster risk reduction into all development activities of Tajikistan; and the improvement of disaster preparedness and response.

The Strategy requires a wide range of measures in several sectors. Its successful implementation will enable Tajikistan to develop faster and improve living standards in the country, despite the ongoing natural and man-made challenges it constantly faces. The Strategy provides a framework for the establishment of the Disaster Risk Reduction National Platform. This structure will be determined by the Government, together with the authorized disaster response and prevention bodies of Tajikistan.

The Strategy complements and integrates the measures on disaster risk management, as provided for in some previous programmes and action plans, including the following:
- 2008 Programme of Development of the System of Emergency Situations and Civil Defence for the period 2009-2014;
- 2006 National Environmental Action Plan;
- 2003 National of Action Plan for the Mitigation of Climate Change.

The Strategy consists of five components:
(a) Institutional Mandates and Legal Issues;
(b) Disaster Risk Assessment;
(c) Disaster Risk Management and Achievement of Sustainable Development;
(d) Disaster Preparedness and Response;
(e) Knowledge Management: Education, Training and Public Awareness.

Each component contains goals, objectives and concrete actions to achieve them. The scope of these actions, the level of required funding, and the range of parties involved require an overall structure for monitoring implementation and measuring impact. It is foreseen that the National Platform for Disaster Risk Reduction will perform these duties. Meanwhile, before the National Platform is established, the Committee on Emergency Situations and Civil Defence is responsible for coordinating and monitoring its implementation of the Strategy.

Concept of Tourism Development for the period 2009-2019

The 2009 Concept of Tourism Development for the period 2009-2019 defines the priorities of tourism in Tajikistan as follows:
- Recreation and health services;
- Rock climbing, mountain sports and ecotourism;
- Historical and educational and ethnographic tourism;
- Business tourism;
- Rafting;
- Alpine skiing;
- Hunting tourism (targeted at foreigners).

Statistics on inbound tourism indicate that, in view of the natural and recreational features of the country, foreign tourists preferred ecotourism, mountain sports and adventure tourism, which have little ecological impact.

Protected areas, including the Tajik National Park, are of interest to foreign tourists and thus provide a good basis for further development of ecologically sustainable ecotourism in Tajikistan.

The Concept is supported by the 2009 Programme of Tourism Development for the period 2010-2014. The Programme defines the strategy, main directions, priorities, goals and implementation mechanism for the State policy of tourism development over the medium term. Among its main thrusts, the Programme includes the development of ecotourism as a component of sustainable development.

As the main measures to enhance the development of ecotourism in Tajikistan the Programme proposes:

- Improving the general plans of the national park and State natural reserves in order to develop ecotourism infrastructure in protected natural areas;
- Improving international cooperation in the field of ecotourism;
- Implementing obligations under the conventions ratified on conservation of biological diversity and protection of world natural and cultural heritage.

Sectoral policy documents

Annex IV lists all policy documents relating to environment, health and use of natural resources. Some other policy documents relating to environment, health and use of natural resources are:

- 2007 Integrated Programme on the Use of Renewable Energy such as the Energy of Small Rivers, Solar, Wind, Biomass, and Energy from Underground Sources for the period 2007-2015;
- 2006 Programme on Improvement of the Supply of Clean Drinking Water for the period 2007-2020;
- 2006 Programme of the Development of the Geological Sector for the period 2007-2015;
- 2010 National Strategy of Public Health for the period 2010-2020;
- 2005 Programme on Planting, Harvesting, Processing of Medicinal Plants and Production of Medicines from them for the period 2005-2014;
- 2007 Programme of Recovery and Equipping of Anti-hail Works for the period 2007-2012;
- 2004 Concept of Land Use;
- 2006 National Concept of Nurture.

Assessment of implementation

For all documents mentioned above, it seems that there is no mechanisms or procedures to assess the implementations of these documents.

1.2 Legal framework

Legislation on environment protection

In general, Tajikistan has already developed a quite robust environmental legal framework. Tajikistan has also ratified several environmental international agreements that have also been incorporated into its legal system (Chapter 4).

Some new environment-related laws have been adopted since the first EPR: the 2005 Law on Biological Safety, the 2004 Law on Nuclear Energy, the 2008 Law on Fauna replacing the 1994 Law on the Protection and Use of Animals, the 2008 Law on Land Administration, and the 2009 Law on Soil Protection.

In addition, most laws have been amended several times since the first EPR. Some amendments provide substantive changes, including terminology, relevant provisions on procedures, and other substantive provisions. Some others reflected the changes in the structure of the Government, and changes in the competence of the relevant authorities as well as new procedures adopted by other legislation.

For example, the Law on Inspections of Businesses was adopted in 2006 and established uniform procedures for inspections in different spheres, including the environmental, sanitary and epidemiological fields, and relevant amendments were introduced into laws with provisions on inspections, for instance, the Law on Nature Protection and the Law on Air Protection.

Despite the fact that most environment-related laws have been amended several times, they still need some improvement. Such improvement would focus on terminology and consistency, and there is still a need to adopt relevant sub-laws or enabling (procedural) regulations, as well as relevant environmental standards and rules. Some of the laws discussed below provide details on implementation procedures and measures. However, most require further legal or administrative action for their full implementation. Numerous environmental standards and rules in use still date from the Soviet era.

In recent years, however, Tajikistan has made some progress with regard to the adoption of regulations. For instance, regulations adopted now include the 2006 Regulation on Environmental Impact Assessment, the 2010 Regulation on the Red Data Book, and the 2010 Procedure for Environmental Migration. In addition, there are some draft pieces of legislation under consideration in Parliament, primarily amendments to current laws, e.g. to the Law on Production and Consumption Waste and the Law on Nature Protection.

A new draft of the Law on Nature Protection has also been proposed. The idea of drafting an Environmental Code is also being discussed. From one perspective, this could be considered as a positive step to consolidate environmental laws and regulations and to harmonize their terminology, principles and provisions. However, it depends very much on its quality and comprehensiveness, as there is also a risk that it could weaken some current well-developed and strong provisions and could cause some disruption to the system of environmental legislation.

Some general factors affecting the effectiveness of implementation of environmental legislation are:

- A lack of clear procedures and mechanisms for the implementation of legal norms;
- Inconsistency of different legal acts;
- Constant changes of legislation and institutional framework;
- A low level of compliance;
- Insufficient inter-agency coordination;
- A low level of awareness of environmental legislation, among citizens, government officials, business representatives and other groups.

The lack of a systematic approach to law-making and slow development of the relevant secondary legislation causes problems in terms of implementation and compliance. Sometimes the development and improvement of certain laws are not systematic and are poorly coordinated, leading to imbalance within the system and the use of different terminology and principles, as well as other legal clashes and failure to observe legal norms. It is important to combine law-making with the planning of effective further implementation of laws already initiated, e.g. by preparing in advance a list of legislation to be adopted or amended; defining the responsible authority; and in particular setting time frames for the drafting and adoption of implementing regulations. Furthermore, it is crucial to improve the capacity of national authorities as regards environmental law-making.

A number of international and donor organizations have provided assistance to the national authorities in implementing various projects, including those aimed at adjustment of environmental protection legislation (waste, climate, protected areas, forestry, environmental impact assessment (EIA)). Hence, more information exchange and development of a unified approach and coordination of efforts would improve the process of legislation development.

Law on Nature Protection

The framework environmental law is the Law on Nature Protection, which was adopted in 1993 and amended several times, in 1996, 2002, 2004 and 2007. The Law stipulates that environmental policy should give priority to environmental actions based on scientifically proven principles to combine economic and other activities that have an impact on the environment with nature preservation and the sustainable use of resources. In addition, individual rights to a healthy and favourable environment should be observed. The Law is designed to govern the interaction between nature and the community so as to protect the interests of both.

The Law defines principles, protected objects, competencies and roles of the Government, the specially authorized State authority on environmental protection, the local authorities, public organizations and individuals. It also establishes an economic mechanism for environmental protection and environmental standards and defines ecological requirements for different types of activities, including the construction of new enterprises, operations of existing enterprises, and other types of activity. As a framework law, it contains basic provisions on most regulatory areas, e.g. environmental insurance, ecological expertise, use of radioactive substances, use of chemicals, waste management, climate change and protection of the ozone layer, environmental emergencies and ecological disasters, protected areas, protection of flora and fauna, environmental rights of citizens and NGOs, environmental education, and international collaboration. The Law establishes several types of controls over compliance with environmental legislation, and defines the liability of persons or organizations that have caused damage to the environment, as well as for other violations of environmental law.

In the period since the first EPR, two major amendments to the Law on Nature Protection have been made. According to the 2004 amendments, most of the provisions on ecological expertise were removed, except the provision on public ecological

expertise, and the reference to the Law on Ecological Expertise was put in place instead. The 2007 amendments concerned the control over compliance with environmental legislation, the conduct environmental inspections and competence of the specially designated authority on nature protection, including the right to decide on the suspension of economic activity to prevent imminent threat to life or health, man-made disaster, or irreparable harm to the environment. Such a decision can be made in the case of two or more violations of the requirements and conditions on environmental protection and if prevention of such violations is impossible by others means (Chapter 2).

Forestry Code

The Forestry Code was adopted in 1993 and amended several times, in 1997 and 2008. Most of the changes in 2008 reflected the changes in the structure of authorities, as well as new procedures adopted through other legislation.

The Forestry Code regulates forestry aiming at rational use of forest resources, protection and conservation of the natural environment, and the promotion of production of timber and agricultural products. Forests are declared to be the common property of the people of Tajikistan and as such are owned by the State. The Forestry Code defines the following issues as within the competence of the State and local authorities: management of forest, use and protection of forest resources, and responsibilities for violation of legislation. There are two broad categories of forest: forest conservation and afforestation (Chapter 9). Since all remaining forests belong to the first category, their cutting is strictly prohibited because of their role in conservation, erosion and flood control, etc. Only sanitary tree-cuttings and forest amelioration works are authorized.

Law on Subsoil

The Law on Subsoil was adopted in 1994 and amended once in 1995 and twice in 2008. The Law establishes the legal framework of exploration, protection and use of mineral resources. It defines mineral resources contained in the subsoil as natural mineral substances in solid, liquid and gaseous state (including underground water and mud), suitable for use in production. According to the 2008 amendment, licenses for the use of the subsoil are granted according to the procedure defined by the 2004 Law on Licensing of Certain Activities.

Land Code

The Land Code was adopted in 1996 and amended several times, in 1999, 2001, 2004, 2006 and 2008. The Land Code makes provision for the regulation of land use control, and its purpose is to ensure rational use and protection of land, protection of the environment, and equal development of all forms of economic activity in Tajikistan. The land is declared to be in the exclusive ownership of the State.

National land resources are divided into categories according to the purpose of use, and include agricultural lands, settlements land (cities, villages), land used for industry, transport, communication, defense and for others purposes, land of the National Forest Fund, land of the National Water Fund, land for the protection of nature, health, recreation and historical-cultural purposes, and the state land reserves.

The Land Code also defines the competence and role of various national or local authorities, land assignment procedures, rights and liabilities of land users, provisions related to payment of rent and fees, compensation to land users and indemnification of agricultural losses, and the settlement of land disputes.

It regulates the provisions on the protection of land by providing rules for the supervision of the efficient use of land, regulates the use of land for different purposes; and provides for the State Land Cadastre and other land management instruments to control and monitor land use, responsibility for violation of land legislation and the application of international agreements.

Law on Protected Areas

The Law on Protected Areas was adopted in 1996 and revised (including the name) in 2002. The Law defines categories of the specially protected areas, different protection and use regimes, the competence and role of various national or local authorities and contains provisions on protection and management of certain protected territories (Chapter 9).

Law on Air Protection

The Law on Air Protection was adopted in February 1996 and amended in 1997, 2007, 2009 and 2010. This instrument defines the main principles of air protection, competence of governmental authorities, citizens' rights, measures on air protection, including

climate change and the ozone layer, economic mechanisms for air protection, including objectives, sources of financing for air protection measures, and payment for air pollution within and beyond established limits (Chapters 5 and 6).

Water Code

The Water Code was adopted in November 2000 and amended several times, in 2006, 2008 and 2009. It is aimed at protection of national water resources and lands of national water resources for the improvement of social conditions and the environment; protection of water from pollution, damage and exhaustion; prevention and elimination of adverse impacts on water; improvement of the state and protection of water bodies; strengthening of controls; and protection of the rights of individuals and legal entities on water use.

The Code specifies types and forms of water use and economic instruments for water use; sets the regulating body for water use and conservation; defines the competence of local government; and lays down procedures for the establishment and formation of water users associations. In addition, the Water Code includes the following issues: technical improvement of reclamation systems; strengthening of the rights and obligations both for water users and water consumers; protection of water resources; and control and responsibility for violations of water legislation.

The Code further sets principles for international cooperation on water relations. According to these principles, Tajikistan aims to ensure sustainable development of its economy and efficient water use and conservation on the basis of international water law, mutually beneficial and friendly cooperation with foreign countries, and general environmental safety. The economic provisions of water relations with other states are to be established on the basis of international water law and intergovernmental agreements.

Supplementary to the Water Code, the Law on Water User Associations was also adopted in 2006. A water user association (WUA) is a voluntary non-profit entity, managed by a group of farmers for land management. Its aim is to combine farmers' financial, material and technical means in order to improve the operation and maintenance of a water system (irrigation) and the productivity of farms through equitable distribution and efficient use of water. However, in Tajikistan, the 30 existing WUAs are still not fully functioning (Chapter 7).

Law on Production and Consumption Waste

The Law on Production and Consumption Waste was adopted in 2002 and amended in 2005. The 2005 amendment introduced changes related to the licensing of the waste management operations due to the adoption of the 2004 Law on Licensing of Certain Types of Activities. The latter establishes the general rules of licensing in different areas, including the collection, use, transportation and disposal of hazardous waste.

The Law on Production and Consumption Waste standardizes terminology and defines types of waste and technological processes for its use and disposal. It lays down the main principles of waste management and the competence and role of various national or local authorities, and stipulates the provisions on State control over all norms and standards for the management of waste, including industrial, hazardous and municipal waste. The Law requires landfills, especially sites that are at risk from natural disasters, to be monitored and a State Cadastre of Industrial and Municipal waste to be developed. It envisages the issuance of waste passports with information on the quantity and quality of waste, including its class of toxicity, and the licensing of hazardous waste activities. It further promotes waste minimization, recycling and the separation of valuable components from waste.

The Law on Production and Consumption Waste has a number of references to the regulations or procedures to be adopted by the Government or other authorized bodies (e.g. the procedure of transboundary transportation of waste, and the procedure on the State inventory of waste are to be defined by the Government). However, most of them have not been defined and approved yet (Chapter 8).

Law on Hydrometeorological Activity

The Law on Hydrometeorological Activity was adopted in December 2002 and amended in 2006 and 2007. It establishes the legal framework for activities in hydrometeorology. In addition, it aims to meet the needs of the State, individuals and legal entities with regard to hydrometeorological information, as well as information on the state of the environment (Chapter 3).

Law on Ecological Expertise

The Law on Ecological Expertise was adopted in 2003 and amended several times in 2005, 2007, 2008 and 2010. It defines main goals, objectives, principles and objects of ecological expertise, types of

ecological expertise (State and public) and the procedure, its arrangements and implementation. Moreover, it contains provisions for State organs, public associations and citizens; and sets up competences and authority in the sphere of ecological expertise.

The Law sets out the rights and obligations of developers and other entities subject to ecological expertise. A chapter is devoted to environmental impact assessment.

The Law defines a wide range of projects subject to ecological expertise, covering not only new plans for projects and certain activities that may have a negative environmental impact but also the results of certain inspection.

These inspection results, subject to ecological expertise, include those for operating facilities, projects, and territories affected by ecological disasters or environmental emergencies. There are also provisions for ecological expertise of proposals to set up specially protected natural areas (Chapter 2).

Law on the Protection and Use of Plants

The 2004 Law on the Protection and Use of Plants sets out principles of State policy with regard to the protection and rational use of flora, defines the legal, economic and social basis in this area, and is aimed at the preservation and reproduction of flora resources (Chapter 9).

Law on the Use of Nuclear Energy

The 2004 Law on the Use of Nuclear Energy defines the legal framework and principles for the use of nuclear energy and aims to protect human health and safety and provide environmental protection, ensuring the nuclear non-proliferation regime, nuclear and radiation safety, and protection of property where nuclear energy is in use. It is designed to promote the development of science and technology, and to strengthen the international regime for the safe use of nuclear energy.

Law on Biological Security

The Law on Biological Security was adopted in 2005 and amended in 2007. It regulates activities on the development, testing, production, import, export, sale and release into the environment of genetically modified organisms (GMOs). It aims to reduce the risk posed by GMOs to human health, biodiversity, ecological balance and environmental status.

Law on Fauna

In January 2008, the Law on Fauna was adopted, replacing the 1994 Law on Protection and Use of Animals. The Law regulates the protection, restoration and sustainable use of wildlife; establishes the legal, economic and social basis; and aims to protect and restore wildlife resources. To implement the Law, a number of implementing regulations are to be adopted. Some of them have already been adopted, e.g. in 2008 the Procedure of Granting Permits for Hunting Migratory, Rare and Endangered Species of Animals, approved by the 2003 Government Resolution No. 301. In 2010, the Regulation on the Red Data Book was adopted (Chapter 9).

Law on Land Administration

The Law on Land Administration adopted in January 2008 replaced the 2001 Law on Land Administration. Among the principles defined by the new Law are the principle of the priority of environmental protection over the use of land for economic purpose, and the principle of protection and careful use of land resources and natural landscapes. The Law defines the main procedures of land administration, including the procedure for the rational use and protection of land.

Law on Soil Protection

The Law on Soil Protection was adopted in 2009. It defines the main principles of State policy and the legal basis for public authorities, individuals and legal entities, aiming at the rational use of soil, protection of its quality and fertility, and protection of soil from adverse events, as well as regulating other, similar issues.

Environmentally related provisions in sectoral laws

Environmentally related provisions can be found in several sectoral laws. Firstly, in regulating the energy sector, the 2000 Law on Energy included provisions related to the protection of environment and protection of the population from adverse impact activities of energy sector. There are also laws on energy efficiency and renewable energy: the 2002 Law on Energy Efficiency and the 2010 Law on the Use of Renewable Energy Sources.

The 2008 Law on Architecture, Urban Planning and Construction Activity establishes the legal, organizational and social basis for regulating architectural, urban planning and construction

activities. It defines the rights and responsibilities of public bodies, individuals and legal entities in this area. The Law also defines the rights of individuals, including the right to a favourable environment and a right to information. According to the Law, individuals involved in the implementation of architectural, urban planning and construction activities have the right to a favourable environment and to reliable, complete and timely information on the state of the environment and proposed changes therein, unless the Law provides otherwise. In addition, the Law establishes the requirements on safety and environmental protection, effective use of natural resources and protection of territories from emergencies during the development of architectural, urban planning and construction projects.

In the implementation of architecture, urban planning and construction activities, the requirements for the protection of historical-cultural values and protected natural areas must be met. The Law also provides for the setting of boundaries for protection zones, within which architectural, town planning or construction activities that may cause material damage to immovable historical and cultural treasures or specially protected natural areas are prohibited or restricted.

The Law on Tourism, adopted in 1999 and amended in 2005 and 2009, includes provisions on ecological tourism, and among the main goals of touristic activity lists protection of the environment and sustainable use of natural and cultural heritage.

The 2000 Law on Transport also contains several provisions on environmental requirements of transport and transportation.

1.3 Institutional framework

Tajikistan follows the principle of separation of State power into three branches: the legislative, the executive and the judiciary. Accordingly, the legislative branch, *Majlisi Oli* (Parliament) has the key role in defining policies, strategies and rules for environment protection and sustainable development, which it exercises by adopting laws. The executive branch, as represented by the President and the Government, also has a significant role in setting the rules. The structure of the central executive bodies includes the bodies under the President, the Government, the ministries, the State committees, the bodies under the Government (committees, agencies, services and departments), and other central bodies (the Security Council and the Council of Justice).

Local government at the regional, city and district level consists of the local representative bodies - *Majlis* of People's Deputies and the local executive body. At the village level, there is also local self-government (*Jamoats*).

The main environmental protection functions are delegated to the special body under the Government - the Committee on Environmental Protection (CEP). Some other central executive bodies also have functions related to the environment. The structure of the central executive bodies is under a constant process of improvement and is still in the process of development. The structure and the competence of different ministries, committees and agencies have changed several times in recent years.

The PRS 2010-2012 indicates that among the key problems in the public administration system are: (1) the duplication of functions and authorities among different levels of Government, leading to overlapping of their areas of competence; (2) the lack of a clear distribution of functions related to service provision to the public, resulting in poor quality of these services and difficulty in accessing them; and (3) the lack of uniformity in the administrative and territorial division of the country, which is a barrier to the proper distribution of functions, authorities and resources. In addition, local self-government is poorly developed.

To improve the public administration system, a numbers of policy and regulatory documents have been adopted. These include the Strategy for Reform of the Public Administration System, approved via Presidential Decree No. 1713 (2006), Decree No. 541 on Approval of the Concept for Improvement of the Public Administration System (2008), and Decree No. 582 on Approval of the Concept of the Government Personnel Policy (2008) as well as other regulatory legal acts.

Central and local government

The supreme highest representative and legislative body is the *Majlisi Oli* (Parliament). It is elected for a period of five years and consists of two chambers: the *Majlisi Milliy* (National Assembly), and the *Majlisi Namoyadagon* (Assembly of Representatives). A parliamentary Committee on Social, Gender and Ecological Issues and a Temporary Ecological Commission have been established. The Commission consists of representatives of other parliamentary committees, the Academy of Science, representatives of relevant ministries, and the public.

The President is the Head of State and the executive authority (Government). The President defines State policy and approves State programmes, coordinates the functioning and interaction of State bodies, monitors and ensures compliance with international treaties. The President issues decrees and resolutions on certain issues, and approves economic norms, including in the sphere of environmental protection and the use of natural resources. There is a Department on Environmental Protection and Emergency Situation in the Executive Administration of the President. The Head of the Department is also often appointed to serve as the secretary to the environmental intergovernmental commissions or councils.

The ministries and the committees adopt regulations, rules and other implementing regulations according to their competence. The specific competence of the Government and other executive bodies on certain issues is defined in the relevant laws, which usually include provisions on the competence of the Government, the competence of the especially authorized authority in the field regulated by the law, and the competence of the local government.

The *Majlis* of People's Deputies has among its functions the approval of local programmes on environmental protection, effective use of natural resources and, control of their implementation. The head of the local executive body has responsibility for land issues, implementing the local programmes, taking measures in emergency situations, and monitoring the use of nature and the construction and reconstruction of the objects for nature protection.

The local self-government functions include responsibility for maintenance and improvement of roads, streets, squares, cultural institutions, sources of water supply and local markets. Local self-government is also responsible for maintenance of cemeteries and cleaning up of waste as well as the approval of rules for the implementation of these functions. Finally, the head of the local self-government is responsible for environmental protection, control of the state of drinking water sources, land use control and land protection.

Committee on Environmental Protection under the Government

Since 1992, the authority responsible for environmental matters has undergone various changes. In 1992, the State Committee for Nature Protection was restructured as the Ministry for Nature Protection. Thus, the Government established a specifically designated body for the protection of nature vested with broad rights and authority in the sphere of environmental activities. In January 2004, the Ministry for Nature Protection was abolished and replaced by the State Committee for Environmental Protection and Forestry. In November 2006, the Ministry of Agriculture and Nature Protection was established and was delegated the functions of integrated environmental management. In February 2008, the Ministry of Agriculture and Nature Protection was reorganized and the functions of the national environmental authority were passed on to the newly established Committee on Environmental Protection under the Government (Figure 1.1).

According to the 2008 Regulation No. 189 on the Committee on Environmental Protection under the Government, the Committee is the central executive body responsible for environmental protection, forestry, specially protected areas, hydrometeorology, the sustainable use of resources and State control for the protection of environment and use of natural resources. The Committee's most important functions are:

- Implementation of State environmental policy;
- State environmental control for the protection and use of flora and fauna, specially protected areas, forests, water resources, air, land, mineral resources, management of chemical substances and fertilizers, waste and recycled goods, as well as the monitoring of compliance with environmental and biological security requirements;
- Ecological expertise of planned and ongoing activities;
- Management of protected areas, protection, conservation and restoration of the ecosystems, unique animals and plants species, regulation and development of ecotourism;
- Environmental monitoring;
- Scientific research on environmental issues;
- Drafting of laws and other regulatory documents, including environmental standards and methodologies for the use of resources;
- Development and implementation of national and regional environmental programmes, strategies and plans;
- Establishment of financial sources for funding of environmental protection and restoration of natural resources;
- Coordination of environmental activities with other ministries and committees, local governments, public and private entities;
- Coordination and ensuring compliance with ratified international environmental agreements;
- Provision of environmental information to governmental authorities, NGOs and the public;

- Recommendation to the Government on the appointment and dismissal of the Focal Points of the environmental conventions.

The management structure of the Committee includes the Central Apparatus, the State Ecological Expertise Department, departments and units in Gorno-Badakhshan Autonomous Region, the regions of Sughd and Khatlon, and regions under republican subordination and in Dushanbe City, and city and district units and sectors of Environmental Protection. Local offices, such as environmental protection departments and units, exist at the region, district and city level. The chief of the department is usually appointed on the recommendation of the head of local government (hukumat).

The offices in the regions and in Dushanbe City are subordinated and report to the Committee, while the local units report to the regional departments. In the CEP, the Chairperson supervises the departments in the regions under republican subordination, Khatlon Region and in Dushanbe City. One of the Deputy Chairpersons supervises the departments in Gorno-Badakhshan Autonomous Region and Sughd Region.

In Sughd Region, there are 17 district units of environmental protection, subordinated to Sughd Department. There are 21 units in Khatlon Region: 15 units in the region and 6 units of environmental protection of the Kulyab zone inspection, all of them subordinated to Khatlon Department. In the regions under republican subordination and in Dushanbe, there are 14 departments or units of environmental protection. The Department of Environmental Protection of Dushanbe City also includes four district units. In some cases, a unit has only one specialist. Currently, most inspection activities within the CEP take place at the level of its regional and local offices (Chapter 2).

There are also 10 non-commercial and 2 commercial organizations subordinated to the Committee:

Non- commercial:

- State Agency for Hydrometeorology
- State Agency for Forestry and Hunting
- State Agency Scientific-Research Institute for Forests
- State Agency Scientific-Research Laboratory for Nature Protection
- State Agency Scientific-Research Centre for Water Resource Protection
- State Agency for Specially Protected Areas
- Environmental Information Centre
- Centre for Analytical Control
- Centre for Standardization and Environmental Regulation
- State Agency Centre for implementation of the Stockholm Convention on POPs

Commercial:

- Unitary Enterprise “Saidu-Sayokhat”
- Scientific-Production Centre “Tabiat”

In February 2009, the State Agency Centre for Implementation of the Stockholm Convention on POPs was established and subordinated to the Committee. Its main task is the implementation of the National Implementation Plan on Realization of the Stockholm Convention on Persistent Organic Pollutants. The National Centre for Biodiversity and Biosafety was established to coordinate activities on the implementation of the National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity and to implement the commitments of Tajikistan related to the UN Convention on Biodiversity and the Cartagena Protocol on Biosafety to the Convention on Biodiversity. The Unitary Enterprise Saidu-Sayokhat deals with tourism and hunting.

Every department and organization has its own regulations defining its structure and responsibilities. Each set of regulations is approved by the Chairperson of the Committee, except for the State Agency of Hydrometeorology and the State Agency of Forestry and Hunting, whose regulations were approved by a governmental regulation.

In addition, the Committee within its authority controls the activity of the Tajikistan branch of the Scientific - Information Centre for the Interstate Commission on Sustainable Development on the implementation of investment projects for environmental protection. The Committee is also in charge of 4 nature reserves, 1 national park, 1 natural park, 1 natural historical park subordinated to the State Agency of Specially Protected Areas and 13 sanctuaries, 40 forests, and 5 tree nurseries subordinated to the State Agency for Forestry and Hunting.

The Chairperson and the two Deputy Chairpersons are appointed by the Government. All heads of the agencies and departments, according to the management scheme, are appointed by the Chairperson of the Committee, except the directors of the State Agency for Hydrometeorology and the State Agency for Forestry and Hunting. The directors of these two State bodies are appointed after the submission of the proposal by the Chairperson or dismissed by the Government.

The Chairperson of the Committee has, at the same time, the status of the Chief State Environmental Inspector. The Deputy Chairperson and the heads of the Department of Monitoring and Environmental Policy, the Control of Use and Protection of Water Resources Unit, the Control of Use and Protection of Air Unit, the Control of Use and Protection of Plants and Animals Unit and the Control of Use and Protection of Land and Waste Management Unit have the status of the Deputy Chief State Environmental Inspectors. The specialists of these units are mostly the State inspectors.

In the first EPR, the State Committee for Environmental Protection and Forestry was urged to review its structure internally and establish a department on air protection, water and waste management in order to promote proper environmental permit issuing and to avoid conflict of interests in issuing permits and checking their enforcement by one and the same structure (the inspectorates). However, in the current structure of the Committee on Environmental Protection, it is still an issue that the units responsible for issuing environmental permits are at the same time checking their enforcement.

Sectoral ministries and committees

Ministry of Land Reclamation and Water Resources

The Ministry of Land Reclamation and Water Resources is a central executive authority on water resources and land reclamation. It carries out functions relating to land irrigation; operation and maintenance of water facilities; development, use and protection of water resources; construction of water facilities; and the supply of water to rural areas. The Ministry mainly carries out administrative and economic functions, but does not have the authority to control the protection and use of water.

Ministry of Labour and Social Protection

The State Agency of Social Welfare, Employment and Migration within the Ministry of Labour and Social Protection is the authorized coordinating body on environmental migration. It is responsible for organizing and monitoring the process of relocation of the population from environmentally dangerous areas.

Ministry of Health

The Ministry of Health is responsible for, among other things, the provision of sanitary and epidemiological services to the population. This body establishes the State sanitary-epidemiological control; carries out activities on ecological and radiation safety, environmental protection and sanitary supervision; and develops and approves State and sectoral sanitary norms, rules and hygiene standards.

The Ministry of Health's Sanitary-Epidemiological Department develops and implements State policy on the sanitary well-being of the population; establishes standards and norms; carries out sanitary-hygienic and epidemiological expertises; and coordinates the activities of all sanitary-epidemiological services.

According to Regulation No. 186 (2007), sanitary-epidemiological control and supervision is carried out by the State Sanitary Epidemiological Control Service, which is the independent entity subordinated to the Ministry of Health's Sanitary Epidemiological Department.

Its main tasks are State control of sanitary hygiene and sanitary epidemic measurements to prevent and clean up environmental contamination, improvement of living conditions, and disease prevention and reduction. Its main responsibilities are sanitary control of water, food, air and radiation safety, and the development and improvement of national norms and regulation (Chapter 10).

Ministry of Energy and Industry

The Ministry of Energy and Industry is responsible for the implementation of State policy and legal regulations in the sphere of fuel and energy sector, natural resources, industrial, technical and technological regulations, the construction industry and the food processing industry. Among other functions, it ensures ministerial (institutional) ecological control of use of natural resources and compliance with environmental regulations and norms of industries.

In accordance with the 2009 Decree No. 393, the Government designated the Ministry of Energy and Industry to serve as a national authority for the Clean Development Mechanism (CDM) of the Kyoto Protocol. By the same Decree, the Government established an Intergovernmental Council on implementation of projects developed within the CDM framework in Tajikistan. The Ministry of Energy and Industry provides technical support to the Council, including expert review of carbon projects. The Ministry of Energy and Industry involves experts from other ministries and agencies in project reviews.

State Committee on Land Administration and Geodesy

The State Committee on Land Administration and Geodesy was established in May 2010. It is a central executive body responsible for developing and implementing State policy on land administration works, land cadastre, cartographic works, state registration of immovable property and rights to it. It is also responsible for State control of land use and protection as well as of cartographic works.

Geology Administration under the Government

The Main Geology Administration under the Government is the central executive authority responsible for the implementation of State policy as well as for the management and coordination of geological exploration, sustainable use, land restoration and protection of mineral resources.

Among other duties, it is authorized to conduct exploration of minerals, including underground water (fresh, mineral, industrial, thermal) and fuel and energy sources; and to implement institutional control of compliance with legislation in the sphere of use of subsoil during the management, use, and protection of mineral resources. It is further responsible for the State Register of Geological Information on Mineral Resources.

Administration on the State Control of Industry Safety and Mining under the Government

The Main Administration on the State Control of Industry Safety and Mining is a specially authorized central executive body responsible for the regulations, control and supervision over compliance with legislation in the sphere of industrial safety, the rational use and protection of mineral resources, and the use of explosives for civilian purposes, as well as for the control of mineral resources exploration.

Committee for Emergency Situations and Civil Defence under the Government

The Committee for Emergency Situations and Civil Defence under the Government is the executive body responsible for protecting the population and territories from natural and man-made emergency situations and civil defence.

The Committee is responsible, among other things, for implementation of State policy on disaster risk management, disaster prevention and implementation of mitigation and rehabilitation activities; assessment of socio-economic impact from emergency situations, and delivery of relief aid to the affected population and others.

Statistic Agency under the President

The main functions of the Agency are the collection and dissemination of the statistical data, including environmental statistics. It also publishes annual environmental statistical reports (Chapter 3).

Analysis of institutional arrangements for horizontal coordination and sectoral integration mechanisms

Despite the fact that the development of regulations by relevant ministries, committees and agencies requires coordination with other ministries and other governmental authorities, there is still a lack of coordination and regular exchange of information between different authorities with environmental functions. A number of official documents and reports highlight the need to improve the corresponding mechanisms for intersectoral coordination.

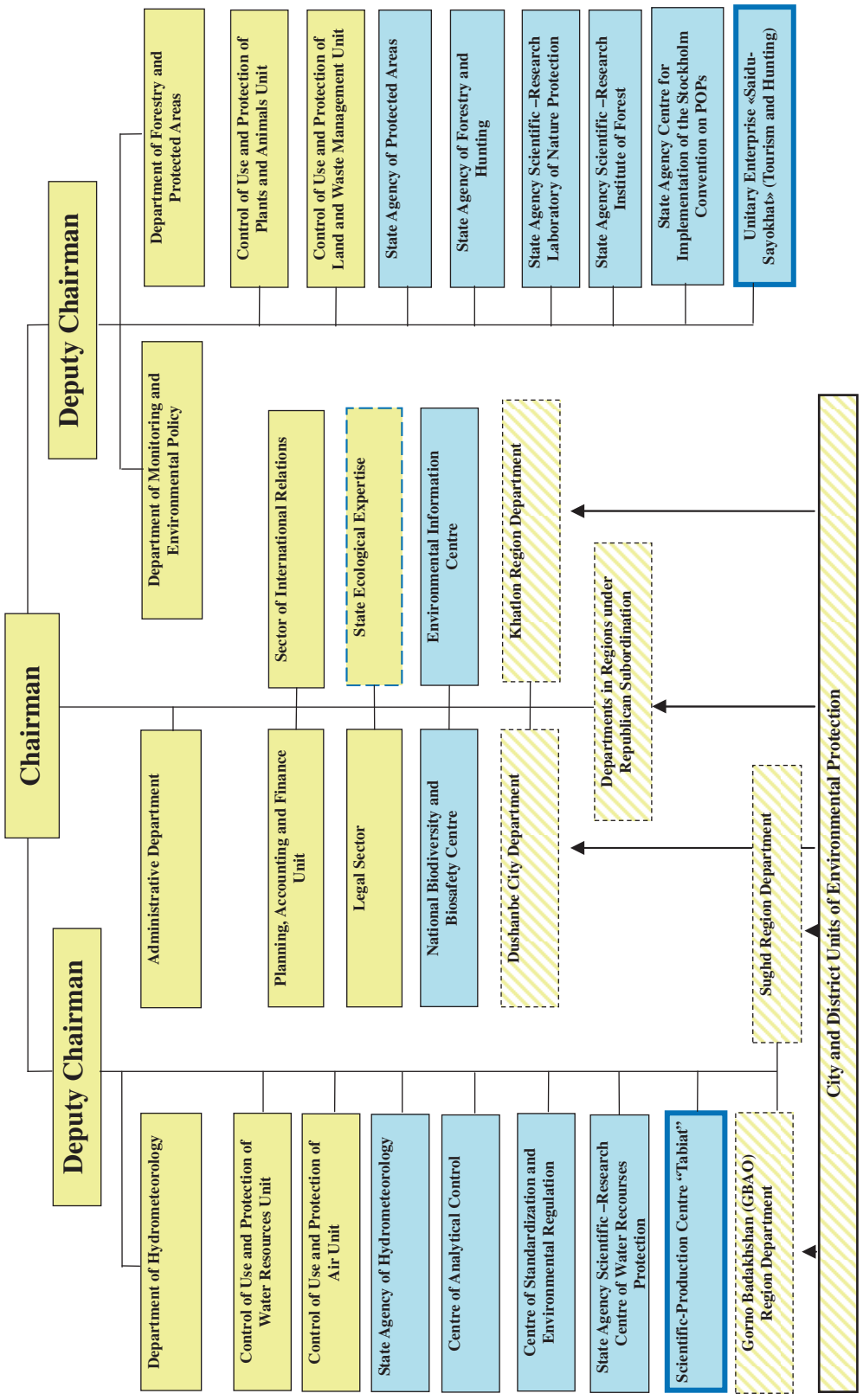
Also, implementation of most environmental policy documents is supposed to be coordinated by the CEP or its subordinated bodies, but the status of the Committee sometimes does not allow sufficient interaction with other ministries and committees to it to take the leading role in this process. In some cases, there is no clear distribution of functions and the areas of competence for different authorities overlap.

At times, this causes informal competition between the agencies to be the authority for control and decision-making as well as for the receipt of funding, including from foreign donors.

This does not provide a good atmosphere for collaboration and information exchange. However, most coordination happens in the form of permanent or ad hoc commissions, councils or working groups.

For example, in 2003 in order to coordinate the activities of ministries, departments and local authorities related to the control of use of chemicals, the regulation of measures on persistent organic pollutants, and to ensure environmental safety and public health, the Government established the Commission on Chemical Safety.

Figure 1.1: Structure of the Committee on Environmental Protection under the Government



Source: Committee on Environmental Protection under the Government, 2010.

Photo 1.1: Old castle, Hisor

There have been a number of other commissions or councils established on different issues: the National Commission on Sustainable Development in 1998; the State Commission of the Government on Emergency Situations in 2002; the Working Group for the Preparation of the Rules and Procedures for the Espoo Convention Implementation in 2004; the Intergovernmental Council on Implementation of Projects Developed within the CDM framework in 2009; the Coordination Council under the Government on Water-energy Issues in 2009; and the Commission on Flood Prevention in 2010.

The Government established such intergovernmental commissions, councils and working groups. Their functions, authority and composition are well defined. For permanent commissions or councils, the same decree usually approves the regulation for such a commission or council, including detailed provisions on its management, organization of work, and competence. Although some of these commissions, councils or working groups meet on a regular basis, some are currently inactive or have never met.

1.4 Conclusions and recommendations

A number of environmental protection and sustainable development strategies, programmes and plans have been adopted in Tajikistan; for many, however, financing has not been secured, so they are not implemented. Providing sufficient State funding for environmental protection measures remains a key challenge for Tajikistan. Also, some programmes do not provide any indicators or measurable results and the accomplishment of planned actions can hardly be assessed.

Some actions are simply repeated in different programmes (e.g. the State Environmental Programme of Tajikistan for the period 1998-2008 and the State Environmental Programme for the period 2009-2019). It is important that each new or renewed programme or action plan is adopted only after an evaluation of the results for the implementation of similar programmes and plans in previous periods.

Recommendation 1.1:
The Government should:

- *(a) Ensure that appropriate financial resources for the approved strategies, programmes and plans for environmental protection and sustainable development are allocated under the central and local budgets and ensure efficient use of foreign aid and support;*
- *(b) Establish an efficient and transparent mechanism to monitor and assess the implementation of the strategies, programmes and plans.*

Most environmentally related laws in recent years have been amended and updated several times. To be implemented, they also need to be reinforced by a more detailed secondary legislation to be developed by relevant authorities. Rather often, international donors and experts assist with the drafting of laws and policies, but this is not sufficient.

Sometimes, there is a lack of coordination between different initiators of the legislative or policy initiatives. This sometimes leads to a contradiction between different laws, regulations and policy documents, and to problems with terminology and intersectoral misunderstanding that mostly prevents improvement of environment sector and sustainable development. For example the Ministry of Land Reclamation and Water Resources interfers in ecological inspection and other works of hydrometeorology sector. It is also important to improve the capacity of national authorities for environmental law-making. Inclusion of environmental law courses in the curriculum of law schools or legal departments of universities (most of them do not provide such courses yet) may also contribute to capacity-building.

It is difficult to assess the effectiveness of existing environmental legislation, as in many cases its implementation depends on secondary legislation to be drafted. The lack of a systematic approach in law-making as well as the slow process for the development of relevant secondary legislation causes problems with the implementation of environmental legislation and compliance.

<u>Recommendation 1.2:</u>
To improve the current situation in law-making and with effective and timely implementation of laws related to environmental protection and natural resources, the Government should:

- *(a) Improve the coordination of the legislative initiatives and transparency of the lawmaking process at the national level;*
- *(b) Review existing environmental legislation to identify shortcomings in secondary legislation and ensure their drafting and adoption;*
- *(c) Request ministries, committees and agencies to combine law-making with the harmonization of principles and provisions and more consistency in the legal framework and with planning of effective further implementation of initiated laws;*
- *(d) Improve the procedure for the drafting and approval, by competent ministries, committees or agencies, of regulations to newly adopted laws, with timelines that are practicable and consistent with public participation requirements;*
- *(e) Coordinate intersectoral work of governmental agencies.*

During the process of past institutional change, the status of the national environmental authority has been changed several times and upgraded from a committee to a ministry and then downgraded from a ministry to a committee.

At the same time, performance of some of its functions, e.g. ensuring environmental protection or promoting sustainable development in various sectors, requires an appropriate status, one that grants broader capability for initiating and facilitating inter-ministerial and intersectoral cooperation.

However, the current status of the national environmental authority is too low to allow this. The low status of the environmental authorities, as a committee, weakens the management of environmental issues at national level, especially the enforcement of environmental legislation.

<u>Recommendation 1.3</u>:
The Government should:

- *(a) Raise the status of the Committee on Environmental Protection to that of a ministry to enable the national environmental authority to fulfil its mandate,*
- *(b) until this decision is made, ensure the Committee on Environmental Protection's active participation in the coordination of intersectoral and intergovernmental cooperation on environmental protection and sustainable development at national level to ensure environmental protection and promote sustainable development.*

- *(c) Upon proposal by the Committee on Environmental Protection, approve internal restructuring of the Committee in order to establish a department on airprotection, water and waste management to promote proper environmental permitting and to avoid conflict of interest in issuing permits and checking their enforcement by one and the same structure.*

Chapter 2

COMPLIANCE AND ENFORCEMENT MECHANISMS

2.1 Introduction

According to the 1993 Law on Nature Protection, the system of monitoring compliance with the environmental policies, strategies, plans and legislation is based on:

- State observation of environmental status and sources of environmental pollution;
- State control of compliance with and enforcement of the environmental legislation and standards by competent enforcement authorities;
- Self-monitoring of compliance by operators of industrial activities;
- Public environmental control through appeals and complaints by individuals and non-governmental organizations.

The monitoring of radiation and background pollution of ambient air and water is not used to detect non-compliance with requirements of the environmental legislation or environmental standards (Chapter 3). Self-monitoring by enterprises is limited in the country to the largest enterprises, such as the Tajik aluminium smelter or the Anzob mining and enrichment complex. Moreover, the provisions on self-monitoring by industrial operators and public environmental enforcement of the Law on Nature Protection are very limited and have no secondary legislation for implementation. One consequence is that self-monitoring data are not available to the public and even environmental inspectors have difficulty accessing them.

Public environmental control through citizens' appeals and complaints is limited to their administrative review by the Committee on Environmental Protection (CEP), its territorial offices and the sanitary epidemiological branches of the Ministry of Health. The practice of environmental litigation by members of the public does not exist in Tajikistan at all. In addition, the option for administrative review of citizen's complaints and appeals to the CEP and other executive authorities is very limited in Tajikistan and is not actively promoted by the CEP.

2.2 Institutional framework

According to the Law on Nature Protection, the public authorities dealing with monitoring compliance and enforcement of environmental legislation are the Committee on Environmental Protection, the State Sanitary Epidemiological Service of the Ministry of Health and the Main Department on State Control over Work Safety in Industry and Mining under the Government. Other mechanisms for compliance and enforcement of environmental policies, strategies, plans, and legislation are only used infrequently.

The State Sanitary Epidemiological Service is responsible for monitoring compliance with and enforcement of drinking water quality and waste treatment requirements, permissible levels of nuisance (noise, vibration, etc.) and radiation. In practice, however, on a regular basis they only monitor water quality at drinking water supply companies and inspect compliance with sanitary requirements for municipal waste collection and transportation and medical waste collection, storage and disposal. Nuisance and radiation are inspected mainly upon citizens' complaints, which are not numerous in Tajikistan.

The Main Department on State Control over Work Safety in Industry and Mining is the key enforcement authority in the mining sector. It also has responsibility for supervising industrial and chemical safety by monitoring preparedness for industrial accidents.

The key environmental inspection and enforcement authority is the CEP while the roles of the other two authorities in this area are limited. The CEP is responsible for compliance and enforcement with the environmental legislation and standards, on ambient air protection; water protection; land protection, including waste treatment; protection of flora and fauna; and forest protection.

Since 2004, the CEP inspectorates have been reorganized several times (Chapter 1). Their current structure was established in 2008, when the

Committee on Environmental Protection was withdrawn from the Ministry of Agriculture. Before that reorganization, four inspectorates (ambient air, water, flora and fauna, land and waste treatment) and the Centre for Analytical Control were part of the Service of State Control of Use and Protection of Nature. Now, the CEP includes the following bodies dealing with inspection and enforcement activities:

- The Control of Use and Protection of Air Unit;
- The Control of Use and Protection of Water Resources Unit;
- The Control of Use and Protection of Plants and Animals Unit;
- The Control of Use and Protection of Soil and Waste Management Unit.

Previously, each unit comprised around 20-25 staff members while now there are only 4 staff per unit. For instance, 14 inspectors in the CEP Control of Use and Protection of Soil and Waste Management Unit were dealing with soil protection and protection of underground resources in 2008. Currently, the Unit has only four inspectors. It deals with inspection and enforcement of three types of violations: soil protection, protection of mineral resources, and waste treatment.

As a result, most inspection activities within the CEP currently take place at the level of its regional and local offices. For example, the Department of Environmental Protection of Sughd Region consists of the Control and Inspection Unit; the Flora, Fauna and Fish Resources Protection Unit; the Analytical Control Unit, and 18 local environmental protection offices in towns and districts. In addition, the CEP includes the Centre for Analytical Control, the State Agency of Forestry and Hunting and the State Agency of Protected Areas. The Centre for Analytical Control monitors industrial pollution from stationary sources, while two other institutions are responsible for compliance and enforcement on forests and protected areas. Functions concerning compliance and enforcement of requirements covering air emissions by vehicles are shared by the CEP and the Ministry of Internal Affairs. There are 60 environmental policemen within the staff of the Ministry of Internal Affairs who deal with inspections and enforcement on air pollution by vehicles. They are subordinate to the Ministry of Internal Affairs but are on the CEP payroll (Chapter 1).

The sectoral monitoring of compliance by organizations and enterprises is carried out in Tajikistan by a number of ministries and other public authorities, including the Ministry of Land Reclamation and Water Resources, the Ministry of Agriculture, the Ministry of Energy and Industry, the Ministry of Health, and the Main Department of Geology under the Government. However, the scope of application of this mechanism is shrinking due to the process of privatization in Tajikistan.

2.3 Mechanisms to ensure compliance and enforcement

Inspections

In the case of economic legal entities, scheduled and non-scheduled inspections are carried out. They differ depending on why the inspection is being undertaken, namely according to an approved plan of inspections or a decision by the Government. Non-scheduled inspections are carried out following direct decisions by the Government or in the case of sanitary and epidemiological control following decisions by the Main State Inspector.

The conditions and procedure of both types of inspections are subject to the 2006 Law on Inspections of Economic Legal Entities, No. 223. In addition, each enforcement authority establishes its rules and checklist of questions for conducting inspections. In the case of the CEP, the rules were approved on 24 December 2007 while the checklist of questions was approved on 7 July 2008. There are also similar rules and checklists for inspections by the Ministry of Health and the Main Department on State Control over Work Safety in Industry and Mining.

Scheduled inspections are usually subject to annual plans approved by relevant public authorities. However, there might be plans of inspections for shorter periods (monthly and quarterly) or longer periods (up to three years) depending on the public authority. In the case of the CEP, there are annual and medium-term plans of inspection for up to three years.

However, even annual plans of inspection are not followed strictly by inspectors due to various reasons. One is that even a scheduled inspection, as a rule, has to be approved by the CEP Chairperson, which leads quite often to failures to follow plans of inspections. As a result, non-scheduled inspections following decisions by the Government are not as exceptional as they should be according to the 2006 Law. For instance, the Centre for Analytical Control often undertakes monitoring of stationary sources of pollution at the direct request of the Government rather than on the basis of annual schedules.

Table 2.1: Data on the detection of non-compliance and imposition of administrative fines by the Committee on Environmental Protection, 2004 - 2009

	2004	2005	2006	2007	2008	2009
Ambient air						
number of cases of non-compliance	165	173	191	184	92	20
amount of imposed fines, somoni	2,769	3,458	4,345	3,114	2,948	2,500
amount of imposed compensation for damage on ambient air protection, somoni	..	1,698	2,459	3,471	2,785	4,226
Water						
number of cases of non-compliance	..	..	..	992	1,053	1,188
amount of imposed fines, somoni	..	..	..	43,615	38,385	57,051
amount of imposed compensation for damage on water protection, somoni	..	..	..	21,162	19,103	24,705
Land						
number of cases of non-compliance	..	..	..	..	2,292	1,371
amount of imposed fines, somoni	..	..	..	..	33,205	18,535
amount of imposed compensation for non-compliance on land protection, somoni	..	..	..	..	17,851	14,223
Forest and hunting						
number of cases of non-compliance	..	873	810	1,269	601	1,092
amount of imposed fines, somoni	..	..	..	..	..	..
amount of imposed compensation for damage on forest protection and hunting requirements, somoni	..	75,914	135,600	165,093	81,255	226,964
Mineral resources						
number of cases of non-compliance	..	..	..	..	359	551
amount of imposed fines, somoni	..	..	..	..	45,968	93,135
amount of imposed compensation for damage on underground resources protection	..	..	..	..	61,570	21,109
Waste						
number of cases of non-compliance	..	..	..	..	3,652	3,093
amount of imposed fines, somoni	..	..	..	..	57,705	56,743
amount of imposed compensation for damage on waste management requirements	..	..	..	..	3,832	..
Specially protected areas						
number of cases of non-compliance	..	..	..	..	..	96
amount of imposed fines, somoni	..	..	..	..	..	9,957

Source: Committee on Environmental Protection, 2010.

Most enterprises in Tajikistan may be inspected not more than once every two years with the exception of the enterprises that are determined as high-risk entities. The list of high-risk enterprises is approved by the Government and relevant enterprises can be inspected not more than once every six months. The inspected economic legal entity must be notified of an inspection at least three working days before it starts. According to the law, inspections should be conducted on the basis of the approved checklist of questions. This requirement is not strictly followed by environmental inspectors, who claim that it is not very practicable and effective due to a number of reasons. Although the 41-question checklist approved by the CEP is quite comprehensive, many questions are irrelevant to a particular domain or too general to be addressed through inspections. This applies to questions concerning poaching and illegal fishing prevention and to general questions relating to compliance by ministries and other public authorities with obligations under international environmental conventions. On the whole, while the intention to define the subject of inspections was a positive change, it has not been specified for various areas of environmental inspections existing within the competence of the CEP (ambient air, water quality, land and waste treatment, flora and fauna, protected areas, and forests). In addition, the Committee did not make the necessary practical arrangements to apply the new approach to conducting inspections based on the checklist, such as development of relevant performance indicators and training for inspectors.

In certain areas of CEP competence, monitoring of compliance and law enforcement is not subject to the requirements of the Law on Inspections of Economic Legal Entities and approval by the CEP Chairperson.

This applies to patrolling of protected areas and forests by park and forest wardens, respectively. Moreover, less regulated inspections are allowed for detecting, monitoring and law enforcement for certain types of violations by individuals (improper disposal of municipal waste, illegal cutting of trees, and pollution of water objects). In the latter case, inspections and law enforcement can be carried out on the grounds of citizens' complaints and appeals.

In the case of detection of non-compliance with environmental legislation and standards, such non-compliance should be reported by environmental inspectors for a decision by the CEP or its regional and district offices. Then they decide on what measures, including sanctions, should be used to bring the inspected economic legal entity into compliance within specified time limits. In the case of decisions by regional and local offices, they can be appealed to the CEP and the CEP's decisions, through a court procedure. The same requirements are applicable to inspections by other enforcement authorities.

As mentioned above, the CEP human resources dealing with compliance and law enforcement functions have been reduced significantly while regional and local offices merely conduct inspections, impose sanctions when necessary and report to the CEP. Thus, there is a lack of capacity within the CEP to deal efficiently with monitoring and reporting and the staff do not perform even simple tasks in this area. For instance, the inspection activity and law enforcement are not compared by year, and such data for previous years are kept in archives and not used in subsequent years. Furthermore, data on the inspection activity and enforcement of the environmental legislation and standards are never published. It seems that for the CEP itself, the main strategic goal with regard to inspections and law enforcement is how to ensure collection of enough fines and compensation payments for environmental harm.

The amounts received in fines and payments, to the State and to the local funds for nature protection, are low because of the restricted regime for conducting inspections of economic legal entities. In this regard, the only data on law enforcement analysed by the CEP are imposed and collected fines and compensation for environmental harm.

In principle, current legislation refers to post-inspection compliance assurance and monitoring of how non-compliance issues are addressed. It includes some provisions of the 2007 Committee's rules on conducting inspections of economic legal entities and the checklist of questions. However, there are no tools available for use by inspectorate staff to help operators of economic activities in meeting their environmental regulatory requirements, e.g. guides, training, counselling. In general, it is not clear how the CEP and other public authorities can deal with post-inspection compliance assurance. While post-inspection is not subject to the limitations of periodicity of inspections set by the 2006 Law, it can be conducted only at the request of inspected economic legal entities.

Air protection

Currently, the main priority for Tajikistan in the case of air protection is inspection of compliance with the requirements relating to air pollution by vehicles. The procedure was developed in 2004 and launched by the CEP in 2007 through the introduction of quarterly passports for toxicity. Drivers are inspected for the presence of such a document at entry points to cities, districts, protected areas and main tourist sites as well as on highways (so-called "ecoposts") and specialized policemen can also inspect vehicles for air emissions. However, it is absolutely unclear what Tajikistan can achieve through this inspection, in terms of ambient air quality, since so far there are no restrictions on either the import or on use of outdated vehicles in Tajikistan, with the exception of a shift from the use of petrol to natural gas, of a part of public transport. In practice, the new procedure was more of an escape from the excessively bureaucratic procedure of inspections of economic legal entities to a less regulated type of inspection. At present, this approach does not allow the achievement of clear environmental benefits (Figure 2.1).

In the case of ambient air protection in the review period, the inspection activity was focused on emissions from mobile sources. The number of inspections of stationary sources of pollution and detected cases of non-compliance has gradually declined since 2006 due to the more complicated procedure for inspection of economic legal entities introduced by the 2006 Law and the significant reduction in the number of environmental inspectors. As a result, in 2009 the CEP's Control of Use and Protection of Air Unit reported only 20 cases of non-compliance concerning industrial air pollution, i.e. almost 10 times less than in 2006. By way of comparison, only the Department of Environmental Protection of Sughd Region reported 509 detected cases of non-compliance for mobile sources of air pollution for the first quarter of 2009. Aggregated data on inspection and enforcement with regard to air emissions by vehicles throughout all regions of Tajikistan are not available.

Water protection

Detection of non-compliance by economic legal entities with requirements and standards for water protection is a little bit less complicated than in the case of air protection. Some violations, such as illegal wastewater discharges, pollution of water bodies by waste disposals and non-compliance with the water protection zones requirements, can be detected by monitoring water bodies without necessarily inspecting the enterprises. Nevertheless, the number of inspections in this area also fell – from 3,043 in 2007 to 2,507 in 2008 then to 1,180 in 2009.

Again, the reduction of inspections is a consequence of the significant reduction in the number of environmental inspectors, especially in 2008. However, the number of detected cases of non-compliance increased from 992 in 2007 to 1,053 in 2008, then to 1,188 in 2009. This rise can be explained by the shift in the focus of the inspection of water protection from monitoring compliance by economic legal entities to detection of violations by individuals.

Soil protection

In the cases of soil protection and protection of mineral resources, the number of detected cases of non-compliance declined significantly due to the reduction in the number of inspectors and a more complicated procedure for inspection of economic legal entities.

Because of the reduction in the number of inspectorates, the number of detected cases of non-compliance on land protection dropped from 2,292 in 2008 to 1,371 cases in 2009.

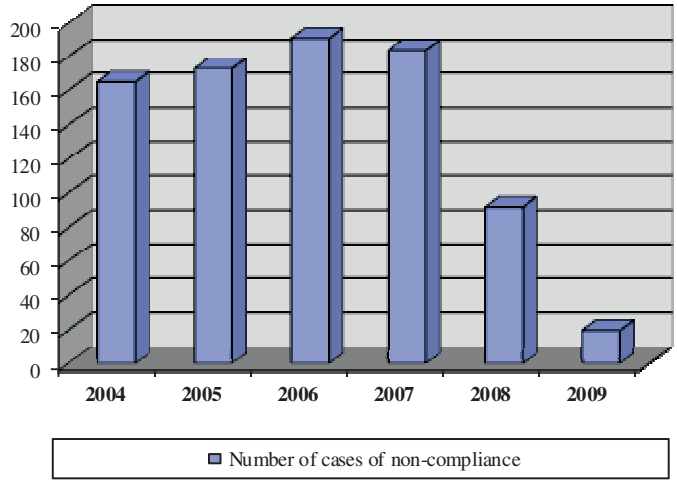
Protected areas

Monitoring of compliance and enforcement activities in protected areas is carried out by park wardens or inspectors of the CEP State Agency of Protected Areas. Their law enforcement activity covers four natural reserves and three natural parks. Currently, it focuses on the following types of violations: unauthorized cutting of trees, illegal hunting and fishing, unauthorized grazing and illegal presence of individuals in protected areas. The administrations of protected areas report on the inspection and enforcement activities to the CEP State Agency of Protected Areas. Most reported cases of non-compliance relate to four natural reserves (Balka, Dashti-Jum, Ramit, Tigrovaya and Zokul) and Tajik National Park, while two other parks (Sari-Khosor and Shyrkent) reported only a few violations per year (Figure 2.2).

Forests

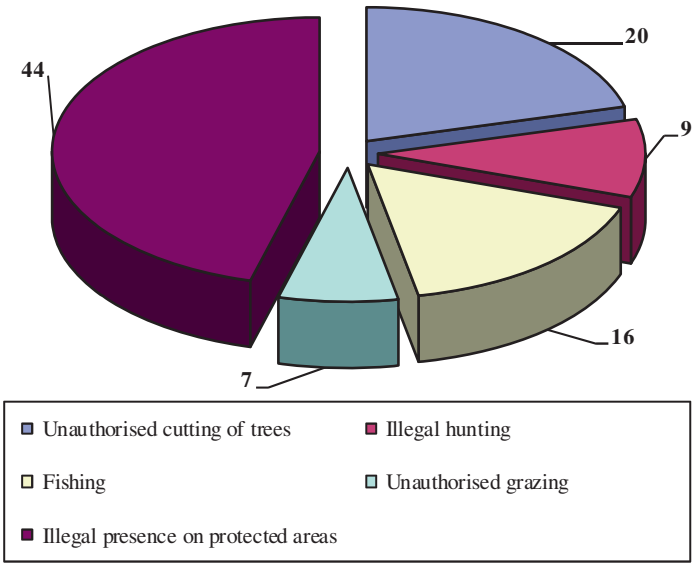
The main priorities for monitoring compliance and law enforcement on forests are prevention of illegal logging, illegal tree-cutting by individuals, fire prevention, and monitoring of compliance with requirements for hunting, grazing and mowing. This monitoring, conducted by forest wardens, is based on the Regulation on State Forest Protection approved by Government Resolution No. 134/1999 and is not subject to the requirements of the 2006 Law on Inspections of Economic Legal Entities. According to the State Agency of Forestry and Hunting, the number of forest wardens has not changed significantly. Such a performance indicator of their activity as numbers of detected cases of non-compliance remained more or less stable in the period 2005-2009.

Figure 2.1: Detected cases of non-compliance for stationary sources of air pollution, 2004-2009



Source: Committee on Environmental Protection, 2010.

Figure 2.2: Types of detected violations on protected areas, 2009



Source: Committee on Environmental Protection, 2010.

2.4 Assessment tools

Environmental Impact Assessment

The system of environmental impact assessment (EIA) in Tajikistan has two main elements (stages). These are: (1) preparation by the developer of the project documentation, which includes EIA documentation (OVOS); and (2) assessment of this documentation, its completeness and correspondence to the legislation and other instruments, which is carried out by certain authorized State bodies, and is called the State Ecological Expertise (SEE).

The direct translation of OVOS from Russian is Environmental Impact Assessment (EIA). In translation, however, "OVOS" is generally used for the national procedure, while "EIA" is used to describe the general term and the whole process of environmental assessment (OVOS plus SEE), comparable with international standards. Tajikistan's legislation contains clearly defined provisions, regulated by the law, with regard to the OVOS procedure and its relationship with the State Ecological Expertise.

The OVOS is implemented by the developer of the planned activity or by the entity authorized by the developer to conduct the EIA and to produce the relevant OVOS documentation. The main SEE objectives are to assess, on behalf of the State, compliance of the submitted OVOS materials and other documents with the legislation and ecological requirements related to the planned activity. The SEE is implemented by the authorized State body or the body authorized by such an expert body or by the ad hoc established expert commissions.

Legislation

The main normative and legal act, the legal basis for the OVOS and SEE, is the Law on Ecological Expertise. The Law stipulates that the new projects and types of activities, which may have environmental impacts, shall be subject to EIA and to mandatory State Ecological Expertise. The Law also includes provisions for inspection of operating facilities, areas affected by ecological disasters or environmental emergencies and provisions to set up specially protected natural territories.

The Law defines main goals, objectives, principles of and projects for ecological expertise, types of ecological expertise (State and public) and the arrangements and implementation procedure. It also contains provisions for the State bodies, public associations and citizens, and sets the authority for ecological expertise. It explains the rights and obligations of developers and other entities subject to ecological expertise. In addition, in order to implement the provisions of the legal acts, a number of supplementary regulations have been adopted to regulate the issues of competence and authority, payment for the SEE and requirements for documentation. However, it does not establish any procedure for preparation of the OVOS documentation apart from the indicating the types of activities and facilities.

Projects and activities requiring EIA

Requirements for the EIA procedure and the documentation as well as the list of facilities and types of activities which require mandatory elaboration of the EIA documentation are defined by the No. 464/2006 Procedure of Environmental Impact Assessment (OVOS). The Procedure also includes the list of facilities and types of activities, which may require mandatory elaboration of the OVOS documentation; content of documentation on environmental impact assessment of the planned economic activity during the process of investment planning, content of the OVOS materials for developing specially protected natural territories, and the General Scheme of the OVOS Procedure (Figure 2.3). The Procedure integrates a number of provisions related to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context and also contains definitions for the post-project analysis and a number of the related provisions. The OVOS materials are the integral part of the documentation used for the further administrative and management decisions.

The list of projects and activities that require the mandatory elaboration of the OVOS documentation includes the list of activities identified in the Espoo Convention, as well as hydro power stations. However, activities related to nuclear energy, ports and offshore oil are excluded from this list. Hypothetically, such projects are possible, not today but in the future, and radioactive waste management in Tajikistan is topical even today (Chapter 8).

There is also another list of projects and types of activities that is used according to the 2007 Order of the State Committee on Environment Protection and Forestry, No. 79. This list classifies the activities into four categories according to the level of ecological hazard. The level of elaboration of the environmental assessment documentation is defined. The projects and activities of the first category, which corresponds to the list of the Procedure of Environmental Impact Assessment, require the mandatory preparation of the full OVOS documentation while others do not require full EIA documentation but need to include the chapter on environmental assessment in the project documentation, except for activities under category 4, which only need approval by the authorized body.

These lists of objects and activities also include most of the activities from the list in the Aarhus Convention on Access to Information, Public Participation on Decision-making and Access to Justice. This being so, it may be more practical to have two lists of activities: one to trigger the national OVOS procedure including the relevant activities listed in the Aarhus Convention, and a second list for transboundary EIA. The list of activities may also be reviewed in the future when the second amendment to the Espoo Convention enters into force.

The process

The Procedure defines the key elements for environmental impact assessment, which, in general, correspond to international practice. The participants in the OVOS process are also defined. However, in most of the cases, clear implementation mechanisms are not included. In most of the cases the Procedure defines what should be done and who should do it. However, it is not always clear how things should be done. In practice, the approach is chosen to meet the specific situation and OVOS documentation (report) focuses on the outcomes rather than the procedures. Often, the developer approaches the authorized body with documentation already prepared, and since that body is not closely involved in the OVOS preparation process, it is hard to know if the full OVOS procedure and the rights of participants in the different processes are duly observed.

The absence of clearly established norms regulating the entire OVOS Procedure and its separate stages, including appropriate timing for their execution, does not allow full assessment of efficiency of implementation as far as this procedure is concerned.

Public participation

A great deal of attention in the Procedure is paid to public participation in the OVOS. Pubic participation is included in each stage of the elaboration of OVOS documentation and is to be organized by the developer. The Procedure states that public notification of the planned activity is an integral part of the OVOS process. At each stage, the developer is required to inform the public and other stakeholders. Information on the planned activity is disseminated by means of any mass media in the territory where the planned activity is proposed and in the countries where such activity may have significant transboundary impact. However, the timing for public notification at different stages is not defined.

One of the important and positive aspects is the requirement to develop the terms of reference (ToR) and coordinate them with the authorized State body, including the possibility for the public to review the draft ToR and submit recommendations. This stage of the ToR development corresponds to the EIA scoping; at this point the OVOS objectives are

identified (identification of significant impact). However, the timing for review of ToR and for submission of comments is not mentioned. The Procedure states that the developer shall accept and document notes and comments submitted by the public and interested parties in terms established by the legislation and other normative and legal acts. Yet, in the other normative and legal acts such terms and timing is not defined. The Procedure also stipulates that the specially authorized bodies on environment protection and nature use and their territorial units shall participate in the review of ToR for the OVOS, but the corresponding procedure is not described.

The same applies to the public inspection of the OVOS materials: the Procedure also indicates how the results of public hearings should be registered. However, neither the stage at which the public hearing should take place nor the procedure for organizing public hearings is specified. Public participation in the development of OVOS materials and discussion is to be organized by the developer, while the authorized bodies and their territorial units are to assist the developer in organizing public participation in the OVOS Procedure; implement control over compliance with the OVOS Procedure, including timely notification by the developer about the planned activity via mass media; and inform the general public of the decision made on the planned activity.

The Law on Ecological Expertise also empowers local authorities to facilitate public hearings, questionnaires and referendums regarding a planned activity which is subject to ecological expertise. Local authorities are also empowered to take decisions, within their competence, on the ecological expertise issues based on the results of public hearings, referendums, polling and statements made by public and ecological organizations, and information about the projects for ecological expertise (article 13). In addition, the Law establishes the obligation of an authorized body to provide local authorities, public organizations and individuals (who have submitted relevant comments regarding ecological aspects of the planned activity) with the materials demonstrating how their comments have been taken into account during the State ecological expertise process. As indicated above, the absence of distinct demarcation of the functions and powers of different stakeholders at different stages of OVOS and SEE may result in either an inefficient public participation process or its complete omission.

Therefore, despite the fact that the Procedure stipulates the main requirements for public participation and that they, in principle, correspond to international requirements, the absence of implementing procedures may mean that the possibility of due implementation of such requirements and control over their implementation is questionable. In practice, public participation does in general take place during the preparation of projects financed by international financial institutions, and the process complies with their requirements. Sometimes, in the later stages, public participation takes place in the form of public ecological expertise.

Implementation and control

At the OVOS stage, the main responsibility is vested in the developer, who undertakes to develop all of the OVOS materials, including probable alternatives and mitigation measures, ensure public participation in discussions and take comments into account. The role of the State at this stage is limited to the selection of the project site and approval of the terms of reference (the latter usually never occurs in practice). The main participation of the State authorized body is at the stage of quality control of the developed documentation, the SEE stage. It is especially important that the specially authorized State body play an effective role in the early stages of the process. One such stage is the preparation of the declaration (statement) of intent and its submission, or as it is defined in the OVOS Procedure, the stage when a short description of the project is submitted. The Procedure suffers from certain omissions such as a single reference to the declaration (statement), as part of the short project description (mentioned in the Scheme). The role of the declaration, its preparation, submission and process for consideration by the specially authorized body are not defined clearly and require additional regulation.

The timing for the SEE depends on the complexity of the project but may not exceed 45 calendar days. The SEE is conducted by the SEE expert commission set up by the CEP. Such a commission may include CEP staff members in addition to experts from elsewhere. After its official conclusion by the CEP, the conclusion of the SEE expert commission gains the status of the SEE conclusion. The legal consequence for a negative SEE conclusion is the prohibition of the project implementation. About 350–400 applications covering different categories of activities were submitted and considered during the period January–September 2010, 90 per cent of which had a positive conclusion.

The General Scheme of the OVOS Procedure (Figure 2.1) reflects the main stages and elements. However, the descriptive part of the Procedure does not clearly

reflect the Scheme: for instance, the project screening process, identification of the OVOS objectives (identification of significant impact), and the environmental impact statement (EIS)). There is no correspondence between the names of certain stages defined in the Scheme and titles listed in the descriptive part. This leads to misinterpretation or ineffective implementation and control of the process.

Public ecological expertise

The procedure for public ecological expertise is defined in the Law on Ecological Expertise. Public ecological expertise may be initiated both by individuals and by environmental public organizations. However, such independent expertise may be performed only by public organizations which, according to their charters, focus on environmental issues and where performing such public ecological expertise is expressly mentioned in their charters. Even then, public ecological expertise may not be initiated unless an application for such expertise has been registered by the local government. Furthermore, the local government may refuse such registration on formal grounds.

Public ecological expertise is currently an overly complicated undertaking that requires a public organization to devote significant time, effort and money in order to comply with formal legal requirements. This draws down their scarce resources, which would otherwise be used for their core activity. Moreover, the conclusion of the public ecological expertise is only a recommendation and may become binding only after its results have been approved by a State ecological expertise body. It is worth noting that public ecological expertise, with its current status and procedure, may not be considered as an effective tool for the general public and cannot be the only way for the public to participate in EIA. A public ecological expertise does not replace the public's right to inspect and comment on OVOS documentation, nor is it a substitute for other forms of participation in OVOS and SEE.

2.5 Environmental licensing and permit issuing

Although licenses and permits are not clearly differentiated in the legislation, licenses generally give the right to engage in a certain activity, while permits allow their holders to take a certain number or amount of a particular natural resource within a defined territory and time period or allow the release of a certain amount of polluted matter (gases, liquids, solid waste) into the environment.

Licenses

Licenses are instruments designed to regulate certain potentially hazardous activities where minimal qualifications and strict adherence to rules are required to ensure that they are carried out efficiently and safely and do not result in potentially very significant and irreparable damage to the environment and human health. Licenses are normally issued by the relevant licensing authorities (ministry or committee) or an entity to which this duty has been delegated. The CEP and its subordinated bodies are responsible for most of the environmental licenses, while industrial safety and certain types of activities related to extraction of mineral resources fall within the purview of other relevant authorities.

Licensing authorities have the following powers: granting of licenses; re-registration of the documents confirming the existence of the license; renewal, suspension and revocation of licenses; maintenance of a register of licensees; and monitoring of compliance with license requirements and conditions.

The 2004 Law on Licensing of Certain Types of Activities establishes the general rules for licensing in different areas including the environment, use of nature resources, environmental safety and others as well as defining the list of activities that require licenses. Among others, such types of activities are listed:

- Operation of explosive, flammable, chemically hazardous production facilities;
- Extraction, production, development of oil, gas, and coal;
- Collection, use, disposal, transportation and disposal of hazardous waste;
- Acquisition, sale, use, disposal and destruction of substances that deplete the ozone layer and products containing them, as well as all activities related to the installation, maintenance and repair of equipment, working with ozone-depleting substances;
- Collection of medicinal plants and harvesting medicinal plants;
- Subsoil use;
- Use of flora and fauna listed in the Red Data Book.

Before 2006, licenses were also required for the activities of environmental experts, including experts on environmental audits, ecological expertise, SEA and other environmental consulting activities, but according to the amendments from June 2006 they were excluded from the list.

Environmental permits

There are two types of permits: (a) permits to use natural resources; and (b) permits for emissions or discharges of pollutants. The natural resource use permits allow their holders to take a certain number or amount of a particular natural resource within a defined territory and time period. They are issued both to individuals and to organizations, e.g. permits to extract ground or surface water for a particular use.

By law, permits are needed for any commercial use of any resource. The authority that issues the permit and the legislation (government resolution) that applies depend on the type of resource used. There are several ministries, committees and agencies responsible for different types of resources and recourse use (e.g. water, land, minerals (subsoil) (Chapter 1). Permits to discharge polluted substances are normally granted for one year and indicate the maximum allowed concentration of the pollutants in the released matter, the maximum volume of the polluted substances and the pollutants allowed. Such permits are issued by the relevant unit of the CEP.

2.6 Compliance assurance: monitoring and reporting

Environmental management systems

Among its main provisions, the 2008 Concept of Environmental Protection defines the principles related to establishment of the economical mechanism of environmental protection, which include:

- Application of international standards to establish environmental management systems;
- Application of environmental management systems as part of an overall system of administrative management of enterprises.

The process of implementation of environmental management standards (EMSs) in Tajikistan is still at an early stage. According to the 2008 and 2009 ISO Survey of Certifications, there is no ISO 14001:2004 certified company in Tajikistan as yet. There have not been many activities by public authorities to promote EMS in enterprises. Nor is there any established system of incentives encouraging domestic industries to adopt ISO standards.

Enforcement tools, fines, penalties and non-compliance fees

The 2007 Rules on the Conduct of Inspections of Economic Legal Entities define a range of enforcement tools available to the CEP environmental inspectors. They include soft response measures for non-compliance such as inspectors' written directions and warnings, harder measures such as administrative fines, compensation for environmental harm, suspension of activity and even criminal prosecution of offenders. Moreover, in some cases involving violations related to forest protection and hunting, inspectors can confiscate items used to commit offences. The range of available enforcement tools varies depending on the area of inspection. Figure 2.4 shows the information on use of measures to respond to non-compliance with the legislation and standards on water protection.

The common range of enforcement tools available and used in Tajikistan is similar to those used in many other countries of the UNECE region. However, there is no clear sequence of application of enforcement tools such as inspectors' written directions, warnings and administrative fines. Due to the restricted procedure of inspections, in practice, inspectors use these tools interchangeably but not in a consistent way. Normally, the detection of non-compliance by an economic legal entity is followed by the imposition of an administrative fine and a number of inspectors' written directions. Also, an inspector's written direction is not necessarily followed later on by a warning or the imposition of an administrative fine.

Monetary sanctions are the most important enforcement tool in Tajikistan. The Code of Administrative Offences sets administrative fines for all types of cases of non-compliance with the environmental legislation. Amounts are set in penalty rates and vary for legal entities, officials and individuals. The penalty rate for 2010 is 35 somoni. The highest administrative fines in the case of legal entities can be applied for non-compliance with the requirements on forest protection, such as illegal logging and tree-cutting, and fire safety in forests, with fines between 200 to 500 penalty rates. Meanwhile, the Code of Administrative Offences sets lower amounts of fines on legal entities for unauthorized air and water pollution by stationary sources (100-200 penalty rates), including exceeding emission and discharge limit levels. Also according to the Criminal Code, fines can be applied to certain criminal offences. In this case, they vary from 300 to 2,000 penalty rates and again, the highest amounts of criminal fines are set for non-compliance with the legislation on forest protection and hunting. Thus, Tajikistan sets very strict sanctions for forest protection, while in the case of industrial pollution it avoids the application of high monetary sanctions to operators of industrial activities.

Figure 2.3: General Scheme of OVOS procedure

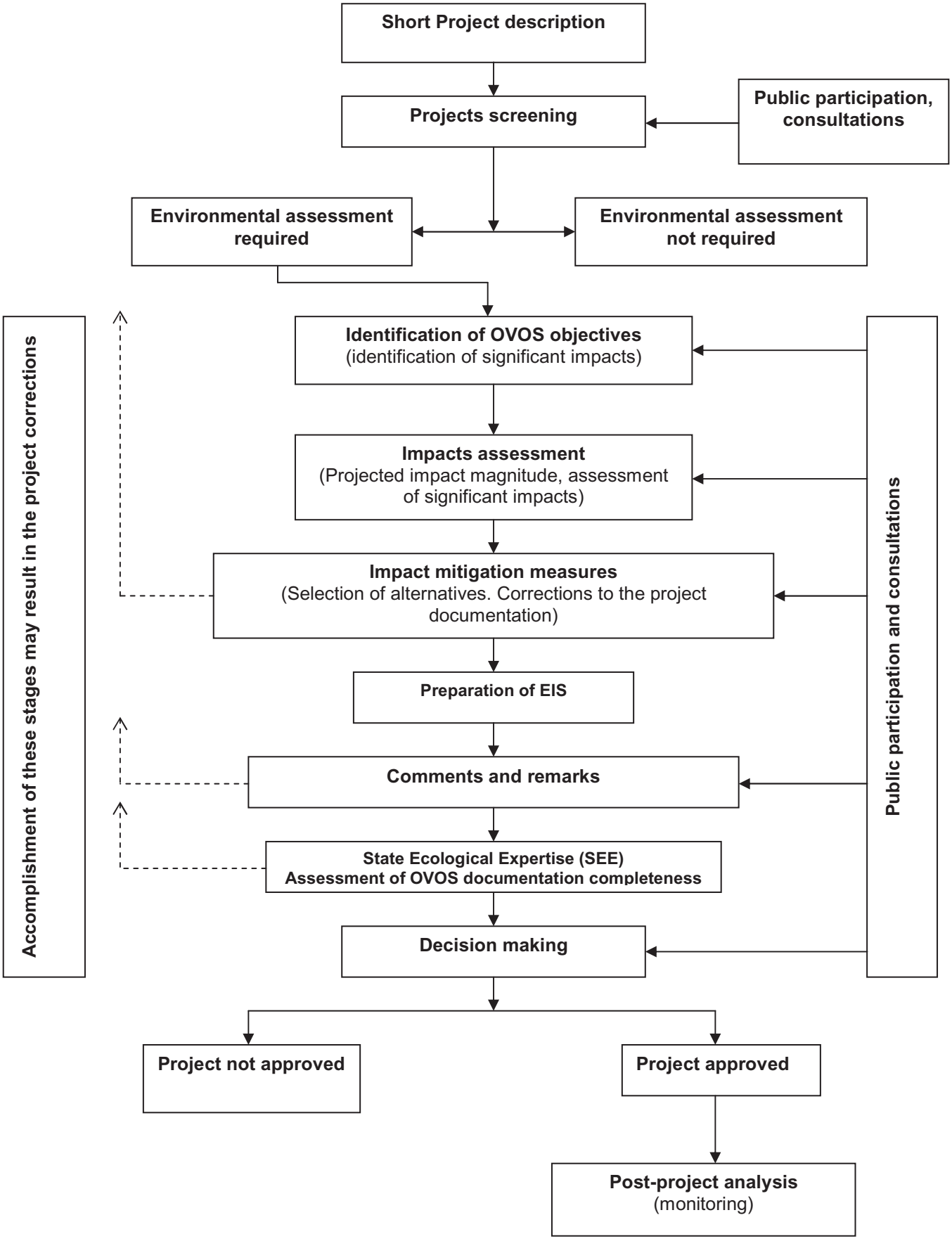


Photo 2.1: Choryakorroni Dara Village, Rudaki District

Table 2.2: Types of response measures to non-compliance with the legislation on water protection, 2009

Type of response measure	Amount
Total of all responses	4,937
Inspector's written directions	3,648
Imposed fines	1,183
Requests for compensation of environmental damage	70
suspensions of activity	20
Claims for compensation through courts	8
Criminal prosecutions	8

Source: Committee on Environmental Protection, 2010.

2.7 Emission standards and their enforcement

There have not been any significant changes on the emission standards since the first EPR. The Law on Environmental Protection defines several types of norms and standards such as maximum allowable concentrations (MACs), maximum allowable volume of the discharge of polluted matter, and maximum allowable level of the influence of physical factors. Most standards are still the same as the ones used in the Soviet era. They are one of the main bases for establishing emission level values and issuing environmental permits. In practice, emission limits for a given facility are calculated taking into account the background pollution and the ambient quality standards (i.e. MACs). Exceeding limits leads to administrative action, including financial sanctions.

Non-compliance with emission standards is subject to administrative liability according to the Code of Administrative Offences. This instrument sets the following sizes of fines for non-compliance with approved air emission limit and water discharge limits: from 3 to 7 penalty rates for individuals; from 10 to 15 penalty rates for officials; and from 100 to 200 penalty rates for legal entities. Moreover, non-compliance can lead to criminal prosecution, in accordance with the Criminal Code.

2.8 Conclusions and recommendations

There is a lack of priority with regard to monitoring compliance and enforcement of the environmental legislation and standards by industrial entities. On the political level, it is mainly viewed as an administrative barrier hindering the economic

development of the country. Possibilities for conducting inspections of economic legal entities were reduced in 2006 by the adoption of the 2006 Law on Inspections of Economic Legal Entities, the establishment by the Committee on Environmental Protection of the new procedural rules on inspections in 2007, and the significant reduction in the number of inspectors in 2008.

As one of the consequences, environmental inspectorates have switched their attention to monitoring and law enforcement with regard to environmental violations by individuals. On the whole, there is no clear environmental enforcement strategy at all, and inspection and enforcement activities serve as a mere tool for collecting fiscal revenues.

Recommendation 2.1:
The Government should develop a transparent mechanism to ensure implementation of environmental policies, strategies, plans, and legislation with the focus on environmental performance.

Data on inspections and enforcement of the legislation and standards in various environmental domains are not consolidated, analysed and published. Statistical information on the inspections and law enforcement activities is kept separately by various CEP units and agencies (ambient air, water, soil and waste treatment, protected areas, and forests).

Even the CEP does not aggregate data on various areas of law enforcement within its competence. Moreover, it would appear that this information is not considered at all when inspections are planned.

Recommendation 2.2:
The Committee on Environmental Protection should ensure that data on the results of its inspections and law enforcement activities are analysed, reported and made publicly available for further utilisation in decision-making and updating of strategies, policies, programmes and plans.

The Procedure of Environmental Impact Assessment (OVOS) defines the key elements for environmental impact assessment, which in general correspond to international practice and define functions of the actors participating in the OVOS Procedure. However, they do not contain clear implementation mechanisms. In most cases, the Procedure defines "what" shall be done and by "whom" and also defines the content of OVOS documentation. However, it is not always clear "how" the OVOS should be conducted. The absence of clearly established provisions regulating the entire OVOS Procedure and its separate stages, and first of all, a well-defined time frame for their execution, does not allow full assessment of the efficiency of the implementation procedure.

Recommendation 2.3:
The Committee on Environmental Protection should improve existing procedures, including through observation of certain stages and time frames, ensure collection and recording of written comments, and also improve control within the EIA procedure (both within OVOS and within the process of acceptance of the documentation for the State Ecological Expertise).

Despite the adoption of the Procedure of Environmental Impact Assessment in 2006, the practice of public participation in the decision-making processes on specific activities in Tajikistan still remains limited to a few projects funded by international financial institutions. Moreover, many officials, non-governmental organizations and experts are not aware of the existence of this document.

In addition, even the Committee on Environmental Protection (the national authority responsible for implementation of the Aarhus Convention) is not very open to involving the public in discussions of environmental aspects of proposed specific activities and strategic decisions on policies, programmes and plans relating to the environment.

In this regard, by developing such a practice whereby citizens, NGOs, and experts can exercise their rights to participation in environmental decision-making processes, Tajikistan can achieve two goals simultaneously; improving the ability of public authorities to carry out their responsibilities, and providing the necessary conditions for the public to enjoy their environmental rights.

Recommendation 2.4:
The Committee on Environmental Protection should promote the practice of involvement the public more actively in the environmental impact assessment and State ecological expertise procedures as well as in discussion of policies, programmes and plans relating to the environment, inter alia, through publication of guidance documents, training for officials and NGOs, providing consultations to NGOs and citizens.

Chapter 3

MONITORING, INFORMATION, PUBLIC PARTICIPATION AND EDUCATION

3.1 Legal framework for environmental monitoring

Compared with the situation during the first Environmental Performance Review (EPR) of Tajikistan carried out in 2004, the environmental monitoring set-up has not changed significantly. It is regulated by the 1993 Law on Nature Protection and the 2002 Law on Hydrometeorological Activity, which was slightly amended in 2006 and 2007 with regard to the licensing of hydrometeorological services.

The draft Programme for Hydrometeorological Monitoring for the period 2003–2007 has never been approved. However, in 2006 the Government approved the Programme for the Restoration of Hydrometeorological Stations and Hydrometeorological Posts for the period 2006–2016. The main objective of the 2006 Programme is to plan activities aimed at modernizing the equipment of the hydrometeorological and environmental monitoring system, establishing new stations and posts, as well as mobilizing resources for the implementation of these planned activities. The total expected budget for the Programme has been estimated at approximately 14.4 million somoni (about US$ 3.3 million). The approved Action Plan for implementation of the Programme stipulated for 2007–2009, inter alia, the purchase of mobile laboratories and monitoring posts to observe pollution of ambient air, surface water and soil, and the restoration of the observation network for transboundary pollution of surface water. In general, it was planned to mobilize more than 4.2 million somoni (about US$ 960,000) for the Programme component related to the restoration of the environmental monitoring system. However, the data on the funding of planned measures are not available.

The State budget, international grants and programmes of voluntary cooperation, including with potential users of environmental monitoring data, were indicated as the expected funding sources. So far, the adoption of this policy document has not resulted in the expected improvement of the environmental monitoring system in the country.

State funding of the State Administration for Hydrometeorology (Tajikhydromet) activities only covers resources for current operational costs. The 2009 World Bank Report on Improving the Hydrometeorological Service notes that around 70 per cent of the budget allocated to the national hydrometeorological system is spent on salaries, the corresponding taxes and social benefits. The remainder is used for current needs, power supply, heating, transportation, communication, and consumables. In addition, low salaries, along with outdated equipment, are considered to be the main reasons for the decline in organizational capacity.

3.2 Institutional framework for environmental monitoring

Currently, the key organization responsible for environmental monitoring in Tajikistan is the State Administration for Hydrometeorology (Tajikhydromet) under the Committee on Environmental Protection (CEP). Since 2004, it has gone through a series of structural changes associated with the reorganization of the superior body and the lowering of its status in 2008. Before 2004, it was called the Main Hydrometeorology Department under the Committee on Environmental Protection. From 2004 until 2006, Tajikhydromet was an Agency within the structure of the State Committee on Environmental Protection and Forestry. In 2007, the Agency of Hydrometeorology was transferred to the authority of the Ministry of Agriculture and Environmental Protection. The current structure of Tajikhydromet was established in 2008, when the CEP was withdrawn from the Ministry of Agriculture and the Agency was turned into the State Administration for Hydrometeorology under the CEP. At the State level, however, there is also the Hydrometeorology Department which is a part of the CEP and mainly studies incoming information from Tajikhydromet, e.g. on hydrometeorological regimes.

The national system for observation and monitoring of the environment *per se* is within the structure of the State Administration for Hydrometeorology and consists of monitoring posts, the Hydrometeorological Centre in Dushanbe, the Sughd

and Khatlon regional hydrometeorological centres, the Hydrometeorological Observatory of the Gorno-Badakhshan Autonomous Region, the Centre for Environmental Monitoring, the Centre for Monitoring Climate Change and the Ozone Layer, and the Automated Communication Centre.

There is also a public authority dealing with environmental monitoring outside the CEP's competence. It is the Main Department of Geology under the Government (Tajikgeology). This body is responsible for monitoring groundwater.

3.3 Environmental monitoring

The Tajikhydromet Centre for Environmental Monitoring monitors surface water and ambient air pollution in the largest cities, and gamma activity at ten stations. It includes a laboratory for observation of surface water pollution and for radiometry, a laboratory for observation of ambient air pollution, and a branch for monitoring and studying ambient air in the city of Qurghonteppa.

Water

Currently, the monitoring of surface water pollution is carried out at 38 sampling posts. During the first EPR, 40 such posts were mentioned, while in 1990 there were 86. Thus, the surface water pollution monitoring network continues to shrink. This results from insufficient funding from the State budget and again shows that the implementation of the 2006 Programme on the Restoration of Hydrometeorological Stations and Hydrometeorological Posts has not yet brought about any improvement.

The Centre for Environmental Monitoring takes water samples from surface sources and analyses them in the only hydrochemical laboratory, located in Dushanbe. For instance, for the first nine months of 2010, 162 water samples were taken to identify pollution. Table 3.1 provides information on the location of monitoring posts for pollution of surface water and the number of samples taken during the year. In total, the analysis of water sampling in the laboratory is carried out on 33 parameters. The equipment in use by the hydrochemical laboratory of the Centre of Environmental Monitoring has still not been modernized.

Groundwater is monitored by the Main Department of Geology under the Government (Tajikgeology). Annually, such work is carried out by the Kairakkum Integrated Geological Branch in Sughd Region and the South Geological Branch in other regions of the country. The list of parameters for groundwater monitoring has not been changed since the first EPR. Samples are analysed on 12 parameters in 2 laboratories, one of which is located in Dushanbe in Tajikgeology, and the second is in Kairakkum Integrated Geological Branch. However, access to some wells for conducting monitoring is hindered by transfer of ownership due to land privatization.

Ambient air

Air pollution monitoring is currently carried out at four manual stations, two of which are located in Dushanbe, one in Qurghonteppa, and one in Khujand. The total number of stations for monitoring ambient air pollution has not changed as a result of restoration of the post in Khujand, but one has stopped working in Dushanbe. However, compared with the beginning of 1990, the system for monitoring background pollution of ambient air has been drastically reduced. Until 1992, such monitoring was conducted in 21 stations across 7 cities.

Currently, sampling for analysis of ambient air pollution is done three times a day. In Dushanbe and Khujand, it is done daily, in Qurghonteppa twice a week. Samples are analysed in local laboratories, and results are transferred to the Centre for Environmental Monitoring in Dushanbe every day via telephone. In 2004, various posts analysed from five to eight parameters, whereas currently only three to five parameters are being analysed.

Radiation

The Centre for Environmental Monitoring monitors gamma activity at ten stations, whereas beta activity from nuclear fallout is not currently monitored. There is a noticeable deterioration in this sphere. In the early 1990s, monitoring of gamma activity was carried out at 27 stations. In 2004, the number of stations dropped to 16. Again, the problem stems from insufficient funding as well as wear and tear of old equipment and the absence of specialists for performing such functions.

Stationary sources of environmental pollution

The CEP Centre for Analytical Control carries out the monitoring of stationary sources of environmental pollution. It conducts analysis of samples for pollution levels in the laboratories in Dushanbe, Khujand, Kulyab and Qurghonteppa. At present, however, the Centre monitors a very limited number of stationary sources of environmental pollution.

From January to September 2010, the Centre took samples from 29 facilities with a view to testing compliance with ambient air emissions and water discharge level limits. Monitoring of stationary sources of environmental pollution is highly centralized. It concerns both CEP internal procedures and the widespread practice of monitoring conducted upon direct instructions of the Government. Currently, the possibilities for more active and regular State monitoring of the sources of stationary pollution are very limited due to drastic staffing cuts at the Centre for Analytical Control, obsolete laboratory equipment, and shortages of chemicals for analysis.

The self-monitoring system has not been significantly improved, compared to the situation in 2004, and is limited to the largest enterprises in Tajikistan. It used to be carried out daily in several industrial enterprises and in sewage treatment facilities of water supply companies (*vodokanals*). At the same time, an appropriate legislative and methodological basis has not been developed in Tajikistan, and self-monitoring data are provided to the CEP only upon special requests, signed by its Chairman.

Table 3.1: Posts of monitoring pollution of surface water and number of samples per year

Basin	River / Lake	Location of monitoring points	Samples per year
Basin of the Pyanj River	Pyanj River	Khorug-Gunt	1
	Pyanj River	Khirmandjo	4
	Pyanj River	Darvoz-Khundov	1
	Pyanj River	Yahsu-Karbostanak	4
	Pyanj River	Yazgulom	1
Basin of the Kafarnigan River	Varzob River	Dushanbinka River-Dos'lyan	3
	Varzob River	Gushyari kishlak	9
	Takob River	Taikutal	1
	Varzob River	Maikhura	1
	Pandema River	Mouth	9
	Varzob River	Chorbog	1
	Varzob River	0.5 km downstream of the cement plant	8
	Ilyak River	Yangiyul kishlak	8
	Varzob River	Dakhana	3
	Kafarnigan River	Tartki kishlak	5
	Varzob River	Dushanbinka River, railway bridge	3
	Varzob River	Zidi, mouth	4
	Kafarnigan River	Wasterwaters treatment facility	3
	Khonako River	bridge	2
Basin of the Vakhsh River	Vakhsh River	Komsomolabad post (Nurabad)	7
	Vakhsh River	hydropower plant	12
	Vakhsh River	0.5 km downstream of the Vakhsh nitrogenous fertilizers' plant	12
	Vakhsh River	Kyzylkala kishlak	12
	Yavansu River	Upstream of the Yavan urban village	6
	Yavansu River	Downstream of the Yavan urban village	6
	Vakhsh River	Surkhob	1
Basin of the Zeravshan River	Sarytag River	Mouth	1
	Zeravshan River	Dupula	1
	Fandarya River	Upstream	1
	Fandarya River	Downstream	1
	Anzob River		1
	Zeravshan River	Panjakent	1
Basin of the Syr Darya River	Syr Darya River	Kzylkishlak	
	Syr Darya River	Akjar	2
Basin of the Surkhandarya River	Karatag River	Karatag kishlak	10
	Karatag River	Bridge	4
	Shirkent River		4
Lake	Iskandarkul lake	Internal security service	1
Total			157

Source: State Administration for Hydrometeorology, 2010.

Hydrometeorological observations

The Tajikhydromet hydrometeorological observation network has not been substantially improved – in fact, it has deteriorated slightly in comparison with 2004. At present, there are 57 hydrometeorological stations and 81 hydrological posts operating in Tajikistan. According to the first EPR, there were 58 stations and 83 hydrological posts in 2004. As already mentioned, there is a problem of insufficient funding to change the obsolete equipment, including devices needed for collection, processing and dissemination of information, for instance, the data obtained from hydrological posts. The implementation of a large-scale programme for the improvement of information services and the modernization of the national hydrometeorological service equipment over three to five years is estimated at approximately US$ 6.08 million (medium cost-based option).

3.4 Environmental information

The majority of publicly available environmental data is gathered and processed by Tajikhydromet. The organization is a key source of information on background ambient air, water and radiation pollution, climate change as well as on hydrometeorological data. Information on water, ambient air and radiation background pollution is disseminated and published, mainly at the State level. It is processed by the Centre for Environmental Monitoring and the Hydrometeorological Centre of Tajikhydromet.

The Centre for Environmental Information provides data on water pollution monthly to the CEP and the Committee on Emergency Situations. Data on ambient air pollution are published daily on the website of Tajikhydromet (http://www.meteo.tj). In addition, Tajikhydromet prepares two or three copies of the yearbook on monitoring of environmental pollution data, which are only available to the Government and the CEP. Data from this yearbook can be provided to scientists, researchers and other interested parties upon their request.

Since 2004, Tajikhydromet has prepared hydrological yearbooks. Furthermore, the Hydrometeorological Centre publishes a daily newsletter with weather forecasts for the coming day for major regions (Khatlon and Sughd regions, districts of republican subordination and the Gorno-Badakhshan Autonomous Region), large cities (Dushanbe, Khujand, Khorog and Qurghonteppa), as well as five-day and monthly forecasts for regions. Overall, information work done by Tajikhydromet has noticeably improved, both in terms of hydrometeorological information provision and information on air pollution. Tajikhydromet established a website and quite regularly updates information on it. However, there has not been any progress at all in regional hydrometeorological centres and in the majority of stations and posts, where a problem of access to the ordinary postal and telephone communication is still acute.

Tajikgeology reports annually on the monitoring of groundwater quality. If groundwater monitoring reveals significant changes in groundwater quality, this information is sent to the Government, the CEP, and the Ministry of Land Reclamation and Water Resources. In general, despite certain improvements in Tajikgeology's work with information provision, it is quite difficult to get access to the monitoring data on groundwater, as already underlined in the first EPR. For instance, on the website of Tajikgeology (http://www.gst.tj), the hydrogeology section provides some very general information, namely the main types of groundwater in Tajikistan and its general characteristics.

The Statistical Agency collects environmental statistical data through a set of reporting forms on ambient air emissions from stationary sources of pollution, on water use and wastewater discharge, on forest cover and the protection and restoration of forests, flora and fauna of the specially protected areas, on investments in environmental protection and in natural resources management, and on industrial and municipal waste.

The Statistical Agency has its own website (http://www.stat.tj), which provides access to some statistical data in various areas. On the website, among other things, many statistical reporting forms are downloadable, but the ones on environmental protection and natural resources are missing. No environmental statistics are provided. The Statistical Agency publishes the statistical yearbook on Environmental Protection in the Republic of Tajikistan in a hard copy version in Russian and Tajik. This publication includes sections on land resources, water, air, climate change, fauna, natural disasters, municipal services, transport and waste, but does not contain statistical information on industrial waste, inspections and law enforcement on protection of environment and natural resources. In addition, some environmental data collected for statistical reporting are not published in the statistical yearbooks. These mainly concern specific data from the reporting form, on the use of water resources,

Photo 3.1: Zorkul Strict Nature Reserve, Pamir

industrial waste, and specific data on forest conservation. Statistical reports are published and available to the public but the fees, around US$ 10–20 per publication, are very high for the general public in Tajikistan.

The CEP is not very active in terms of information dissemination. For instance, the last state of the environment report was published in 2005 with the support of UNEP. The Centre for Environmental Information is supposed to carry out this function, but it has no Internet access or equipment for copying and publishing environmental information. Although it has 12 staff on its payroll, most of them work on other assignments. Moreover, it is unclear what kind of environmental information the Centre deals with. The underlying problem is that the CEP does not consider environmental information as an important tool for decision-making on environmental protection and sustainable development issues. It does not even analyse the information which it possesses, and funds available to cover the staff in order to work with it are not used for their intended purpose. For instance, in the case of data on activity on compliance and enforcement of environmental policies, strategies, plans, and legislation, the Committee only consolidates data on amounts of fiscal revenues from payments, fines, and compensation for environmental damage. However, even these data are not publicly available.

The Department of Monitoring and Environmental Policy does not possess even the basic data on implementation and enforcement of environmental policies, strategies, plans, and legislation.

3.5 Access to information, public participation and access to justice in environmental matters

Access to information

The adoption of the new Law on Citizens' Appeals in 2006 has changed the legal framework for obtaining environmental information from public authorities upon written request. Currently, implementation of the provisions of the Law is subject to supervision by the prosecutors' offices. However, the number of information requests from the public for environmental information in the country remains relatively low.

NGOs provided a number of examples where in response to their requests for environmental information submitted to the Committee of Environmental Protection and Tajikhydromet, the answers provided were incomplete or not within the set time limits, or they did not receive any answer at all.

The use by public authorities of electronic tools for active dissemination of environmental information to

the public remains very limited in Tajikistan, and is mostly through the website of Tajikhydromet. The websites of Tajikgeology and the Statistical Agency contain limited and very general environmental information.

The CEP does not yet have a dedicated website, though its launch was scheduled in 2010 in accordance with the Medium-Term Action Plan for the period 2010–2012 on the Implementation of the Concept of Environmental Protection approved by 2010 Government Resolution No. 94.

Other information tools used by public authorities for active dissemination of information in Tajikistan are the publication of newspapers, thematic reports, TV and radio. However, the CEP has very limited opportunities to use these awareness-raising tools. In 2008 the CEP stopped publishing the newspaper "Navruzi Watan", which had been published monthly since 1991.

The Aarhus Centres or Centres for Public Environmental Information established with the support of OSCE play an important role in terms of planned and regular work to improve public access to environmental information. In addition to the Aarhus Centre in Dushanbe under the CEP established in 2003, two regional Aarhus centres hosted by NGOs were established in 2005 in Khujand and in 2008 in Qurghonteppa.

The activities of the Aarhus Centre in Dushanbe has been focused primarily on improved access to existing sources of environmental information and the development of legislation for the implementation of the Aarhus Convention in the country. In particular, the Centre maintained a website, which presented rather large amounts of environmental information, including copies of the basic laws on environmental protection and natural resources. Since the beginning of 2010, however, due to a lack of funding, neither the Aarhus Centre in Dushanbe nor its website is operational. The Aarhus Centres in Khujand and Qurghonteppa focus more on increasing awareness of local population in environmental matters by publishing booklets, brochures, videos on environmental topics and posting information on bulletin boards in public areas.

Public participation in environmental decision-making

The basic law governing public participation in environmental decision-making is the 2003 Law on Ecological Expertise. It provides for the rights of citizens and public associations to initiate a public ecological expertise of planned projects, as well as to participate in State ecological expertise (Chapter 2). The Law still does not provide the procedures for public participation in State ecological expertise as is required by the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention).

The 2006 Procedure of Environmental Impact Assessment (OVOS Regulation) sets the public participation requirements for decision-making on specific activities, which are subject to the OVOS procedure. However, it relates only to the stages preceding the state ecological expertise, when the CEP decides whether to authorize the proposed projects or not. The OVOS Regulation provides the definitions of public and public participation, declares that taking account of public opinion is one of the principles of the OVOS Procedure, and contains a section on public participation.

However, developers are fully responsible for organizing public participation during the OVOS Procedure, namely notifying the public, organizing the public participation procedures, providing access to environmental information and taking into consideration of the outcomes of public participation (Chapter 2).

Public involvement in proposed activities which are subject to EIA starts with notification through radio, TV, newspapers, Internet and other information and communication means. The EIA Regulation sets minimum standards with regard to the content of such public notices and requires developers to provide the report on the state of the environment and natural resources at the location of proposed activities and to ensure access to the information on the proposed activity for further review by the public.

Developers are also responsible for registering all comments and opinions from the public, submitted in writing. This should be put in the minutes of any public hearing. Thereafter, the outcomes of public participation, as a part of the EIA documentation, are submitted to the CEP for purposes of the State ecological expertise review. The EIA Regulation is not fully consistent with the public participation requirements of the Aarhus Convention. It does not set any timeframes with regard to organizing public participation. Nevertheless, the adoption of the Procedure marked a positive step towards the establishment of the national legal framework for public participation in environmental decision-making processes in Tajikistan (Chapter 2).

Nevertheless, the EIA is very rarely applied in Tajikistan, as are the public participation procedures on whether or not to permit a proposed activity. The 2008 second implementation report on the Aarhus Convention did not provide examples of public participation in the EIA procedure and State ecological expertise. The available information on public consultations on EIA relates only to the projects financed by international financial institutions, e.g. the CAREC III Transport Corridor Improvement (Dushanbe-Uzbekistan Border) project financed by the Asian Development Bank.

The 2008 second implementation report on the Aarhus Convention also states that public participation only took place for some strategic environmental decisions. It provides examples such as the National Action Plan for Environmental Protection, the Poverty Reduction Strategy, and the Concept of Transition towards Sustainable Development. Nevertheless, public participation in strategic environmental decisions on plans, programmes, policies and legislation related to the environment is still not a regular practice in Tajikistan. The most recent example is the Medium-term Plan on Implementation of the Concept of Environmental Protection, developed by the CEP without public involvement and approved by the Government in 2010.

In addition, in the view of a number of environmental NGOs, public participation usually takes place at the final stage of the strategic decision-making process and thus is merely pro forma. According to some officials and NGO representatives interviewed, the CEP is not open to involvement by NGOs in discussion of draft strategic environmental decisions. Public involvement in the preparation of strategic environmental decisions at the regional and local levels is promoted by the Aarhus Centres in Khujand and Qurghonteppa. For example, the environmental strategy and action plan of Taboshar town was developed with an active input by the local population before further approval in December 2007.

Access to justice

Access to justice in environmental matters is currently limited in Tajikistan to administrative review procedures to challenge acts and omissions which contravene provisions of the national legislation relating to the environment. From January to September 2010, the Department of State Control of Use and Nature Protection for Sughd Region considered 17 such appeals and complaints by citizens and legal entities. They concerned, inter alia, illegal tree-cutting, wastewater discharge, and improper waste disposal.

3.6 Environmental education, education for sustainable development and public awareness-raising

Environmental education and education for sustainable development does not seem to be considered as a high priority in education by the Government and the Ministry of Education. The 1996 State Programme on Environmental Education has not yet been implemented. It focused on environmental education in the formal educational system, i.e. in kindergartens, schools, colleges and universities. However, according to the report by GEF/UNDP Environmental Learning and Stakeholder Involvement as a Tool for Global Environmental Benefits and Poverty Reduction, its implementation was not effective due to lack of governmental funding and recognition of environmental education as a priority area. Currently, a new programme on environmental education is under development. Nevertheless, it is unclear when this programme will be adopted and similarly unclear as to the national plan for the implementation of the UNECE Strategy for Education for Sustainable Development, which has been promoted since 2009 with support from the Regional Environmental Centre for Central Asia (CAREC).

Two key public authorities responsible for promotion of environmental education and education for sustainable development are the Ministry of Education and the CEP. In practice, the Committee on Youth Affairs, Tourism and Sports is also actively involved in informal education through supporting summer camps and walking tours. At present, however, international organizations and non-governmental organizations are, in many respects, more active in this area while the public authorities often merely distribute the publications and training materials produced by these organizations. Nevertheless, some progress was made during the review period with regard to availability of textbooks and further incorporation of ecology and sustainable development into the formal educational system.

In 2005, the Ministry of Education published the textbook “Ecology” for the 9th grade in secondary schools. The former National Centre for Environmental Education and Education for Sustainable Development, with the support of UNESCO and OSCE, published the textbook for grades 5-8 called “Environment for future generations”. The 5,000 copies produced are currently being distributed by the Ministry of

Education and CAREC among secondary schools. The Tajik National University, National Agrarian University and Russian Tajik University have developed and published new subject programmes in "Ecology" and "Environmental Protection". The NGO "Little Earth" is implementing the project "School project on resources and energy use" (SPARE) with the involvement of 60 schools. Despite the fact that SPARE is not part of the official school curriculum, the project conducts educational classes and seminars for pupils and their teachers with practical exercises, competitions and excursions, as a result of which all develop solar facilities for demonstration.

The NGO "Youth Environmental Centre" has developed textbook and training modules on education for sustainable development, while the NGO "Youth21", working together with "Youth Group Protection of Environment" (YGPE), has produced an electronic handbook on environmental education.

Retraining

The most problematic area of environmental education is the lack of training and re-training for the staff of the CEP and other public authorities. Within the development of the environmental component for the National Development Strategy and the Poverty Reduction Strategy for the period 2007–2009, the Ministry of Agriculture and Environmental Protection in 2007 worked on strengthening the capacity of public authorities for development of environmental strategies and implementation of programmes for sustainable development. This involved a number of seminars and training for the staff of the Ministry, regional, districts (*khukumats*) and local (*dzhamoats*) authorities, and for teachers of all levels.

At present, however, the CEP does not conduct any training for its employees. One of the negative aspects of this is a gradual decrease in the capacity of the Committee's staff, including the ability to effectively develop and implement new strategies, programmes and plans, to monitor compliance and to enforce environmental legislation and standards compliance and to apply new tools for environmental protection. This is particularly relevant to the capacity of the staff working in regional and local offices of the CEP and Tajikhydromet. They are less involved in workshops, seminars and conferences on various environmental topics conducted by international organizations and bilateral assistance programmes.

Public awareness

With regard to raising public awareness in environmental matters, the CEP does not currently have sufficient tools for such activities, i.e., it does not have a website and does not publish a newspaper or any other periodical on environmental topics. Information means, such as television and radio, are also used too little. Once again, the main activities in this area are mostly carried out by non-governmental and international organizations.

The Aarhus Centres in Dushanbe, Khujand, and Qurghonteppa have implemented a number of projects on raising public awareness in environmental matters by using both electronic information tools and more traditional tools (information posters, publication of thematic brochures and booklets). Activities of the Aarhus Centre in Dushanbe are aimed at raising awareness of NGOs on international environmental conventions, national environmental legislation, programmes and plans. Regional Aarhus Centres in Khujand and Qurghonteppa focus on raising awareness of local people about local environmental issues. During the review period, the NGO "Zumrad" established a number of children's environmental clubs, where rural youth and school pupils are actively involved. The NGO "Youth Environmental Centre" carried out a project to raise awareness on climate change issues among farmers and local communities.

3.7 Conclusions and recommendations

Despite the adoption of the Programme for the Restoration of Hydrometeorological Stations and Hydrometeorological Posts for the period 2007–2016 in 2006, there has not been any significant investment to restore the environmental monitoring system by expanding the existing network as well as modernizing equipment for air and water monitoring, sampling and testing, and communication equipment so far. The current systems do not provide sufficient and reliable data on background ambient air and water pollution.

For instance, in the case of background ambient air pollution, Tajikistan analyses three to five parameters, while the World Health Organization (WHO) advises monitoring at least six most important pollutants: lead; particulate matter (PM_{10}, $PM_{2.5}$); carbon monoxide; sulphur dioxide; nitrogen dioxide and ground-level ozone. Currently, some major air pollutants are not measured by the existing manual monitoring stations. The scarcity of measurements precludes a comprehensive

comparison with data provided by enterprises from their stationary sources.

Recommendation 3.1:
The Government should ensure adequate funding for monitoring networks and for the development of monitoring programmes through:

(a) The implementation of the Programme for the Restoration of Hydrometeorological Stations and Hydrometeorological Posts for the period 2007–2016 in order to provide reliable environmental data for decision-making as well as for further dissemination to the public;

(b) The modernization of the laboratories of the Centre for Analytical Control.

The CEP has limited funds and staff to process, analyse and disseminate environmental information. But even the available resources are used for some other purposes, e.g. staff of the CEP and the Control and Analysis of Management of Environmental Monitoring and Policy Unit are actively used to deal with routine CEP business. This situation leads to an obvious lack of information on CEP implementation of its policy, programmes and plans and its activity on compliance with and enforcement of national environmental legislation and standards. It also results in ineffective implementation of the requirements on public access to environmental information of the Aarhus Convention. The last state of the environment report was published in 2005.

Recommendation 3.2:
The Committee on Environmental Protection should give more priority on processing, analysing, disseminating and publishing environmental information and resume publication of state of the environment reports.

Tajikistan has no official programme or plan on environmental education and education for sustainable development. The 1996 State Programme on Environmental Education was adopted for the period until 2010 but it was not funded properly and thus it has not been implemented. Currently, the draft State Programme on Environmental Education is being developed with the assistance of GEF/UNDP "Environmental Learning and Stakeholder Involvement as a Tool for Global Environmental Benefits and Poverty Reduction", while the Regional Environmental Centre for Central Asia is promoting the draft National Plan on Implementation of Education for Sustainable Development. However, the critical issue is not when any of the above documents will be approved by the Government but whether their adoption can solve the problem of the lack of financing of planned measures on environmental education and education for sustainable development from the central budget.

Recommendation 3.3:
The Government should ensure that the programme on environmental education and plan on implementation of education for sustainable development are adopted and are financially secured.

* * * * *

The following recommendation from the first EPR of Tajikistan that is still applicable and its preceding conclusions are listed below.

Tajikistan's legislation on access to environmental information, public participation in environmental matters and access to justice in environmental matters consists of several laws, one of which is the framework Law on Nature Protection. The laws provide some general rules, definitions and principles, but few procedural rules.

Provisions on public participation seem to be the most insufficiently implemented. The legislation on ecological expertise provides public associations with the possibility of carrying out a public ecological expertise in parallel to the State ecological expertise, but it makes "public experts" liable for the results. While the State ecological expertise is at the expense of the programme or project proponent, the law obliges the interested public association to finance its own expertise. There is no obligation on the State ecological expertise authorities to involve the population in any discussion of the documentation that is subject to expertise. Programme or project proponents are not obliged to enter into discussion with the public. These restrictions on public participation are in breach of the Aarhus Convention, to which Tajikistan is a Party.

The State Ecological Expertise of the State Committee for Environmental Protection and Forestry is not transparent. Ecological expertise authorities in the *oblasts* (administrative districts) seem to be more open to dialogue with the public and enjoy greater trust and support from the local population. They have initiated innovative (albeit informal) ways of obliging project proponents to ensure support from the residents. There are also cases of local residents pressing *oblast* and local authorities to undertake State ecological expertise of projects that have been launched without it (Recommendation 2.3).

Recommendation 4.5:

The State Committee for Environmental Protection and Forestry should prepare, for submission to the Government and, thereafter, to the Majlisi Oli, amendments to the Law on Ecological Expertise to streamline its provisions with those of the Aarhus Convention. Particular attention should be given to:

- *Clarifying the accessibility of environmental information;*
- *Informing the public about applications for projects which require ecological expertise0; Setting deadlines for supplying information; Setting timeframes for different phases of public participation;*
- *Clarifying the definition of the public concerned which should be informed;*
- *Involving the public in the State ecological expertise.*

Pending the adoption of such amendments, the State Committee for Environmental Protection and Forestry should issue detailed guidelines on public participation for its ecological expertise branches using international experience, including the guidelines on public participation prepared under the Convention on Environmental Impact Assessment in a Transboundary Context.

Chapter 4

IMPLEMENTATION OF INTERNATIONAL AGREEMENTS AND COMMITMENTS

4.1 Introduction

Tajikistan joined the United Nations in March 1992 and subsequently established cooperation with a number of United Nations (UN) bodies. The country became a member of the United Nations Economic Commission for Europe (UNECE) and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and collaborates with the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF). Tajikistan also has signed agreements with a number of international financial institutions, including the Asian Development Bank (ADB) and the World Bank (WB).

Tajikistan is a member of several regional and subregional organizations and forums, including the International Fund for Saving the Aral Sea (IFAS); the Interstate Commission for Water Coordination (ICWC) and the Interstate Commission on Sustainable Development (ICSD), and the Economic Cooperation Organization (ECO). In general, these organizations or forums include Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

At the time of the review, because of Tajikistan's limited human and financial resources, the implementation of multilateral environmental agreements (MEAs) mostly depends on external cooperation and support. Foreign investments are also essential for allowing the country to face and deal with environmental challenges.

So far, Tajikistan has acceded to several international environmental agreements (Annex III). Out of the five UNECE environmental conventions, it is only a party to the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice.

The implementation of the Aarhus Convention is supported by the Committee on Environmental Protection and the Aarhus Centre in Dushanbe and the two regional centres located in Khujand and in Kurgan-Tube (Chapter 3).

4.2 International cooperation

Sustainable development and Millennium Development Goals (MDGs)

In 2007, the Government adopted the strategic document on sustainable development, named the Concept of Transition towards Sustainable Development for the period 2007–2030. The Concept defines overall priorities, strategic objectives, tasks and implementation stages towards the achievement of sustainable development goals. The Concept's core deals with poverty reduction; energy security; food safety; social security; environmental sustainability; and, good governance. Tajikistan also works on sustainable development in partnership with the other Central Asian countries through the Interstate Commission on Sustainable Development (ICSD). This body was established to provide a forum for partnership and to support preparation of their national sustainable development reports for 2002, on the occasion of the World Summit on Sustainable Development (Johannesburg, 2002).

ICSD now operates as a forum for coordinating a regional sustainable development strategy and managing regional environment programmes, action plans and projects. It also provides information for high-level decision-making and is responsible for collecting data in the field of sustainable development. ICSD has a secretariat, a scientific information system and a steering committee that includes experts, NGOs and donors; the chair rotates every two years among the five Environment Ministers of the Central Asia countries. In its activities, ICSD follows decisions taken by the Heads of the Central Asian States, the International Fund for the Aral Sea and the various United Nations conferences on Sustainable Development. This initiative has led to the programme of action to improve the environmental, social and economic situation in the Aral Sea basin for the period 2003-2010.

ICSD could potentially be a very important forum for providing strategic linkages in regional and sub-regional negotiating processes. Nevertheless so far,

ICSD activity in Tajikistan has not provided tangible results in terms of facilitation of Central Asia countries' dialogue.

Regional Environmental Action Plan for Central Asia

The Regional Environmental Action Plan for Central Asia (REAP), developed under ICSD auspices with support from ADB, UNEP and UNDP has five priorities. One of these priorities is water resources and water pollution, a sensitive topic for the country. The other four priorities are air pollution, land degradation, waste management, and degradation of mountain ecosystems. Each of the five Central Asian States has the lead for one of these priorities. Tajikistan has the lead for mountain ecosystems degradation. REAP identifies both short-term (2002-2007) and long term (2007-2012) measures for each of the five issues as well as for public involvement.

Water

Prior to independence, the Central Asia countries were closely interconnected through a unified system incorporating water, energy and food sectors under the control of the Soviet Union. The centralized scheme functioned effectively, meeting the needs of both upstream and downstream countries. Once they became independent, the Central Asia countries started prioritizing their own economic development policies without due consideration of regional concerns such as the joint use of water resources, which led to instability in the region. The topic where there is most potential for conflict is the management of water in the Syr Darya River basin.

Central Asian Governments have been negotiating for over a decade in order to meet on the one hand, the water needs of downstream countries, and on the other, the energy supply needs of upstream countries. This process led to the agreement between the Governments of Kazakhstan, Kyrgyzstan, and Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin, which Tajikistan signed in 1998.

Additionally, in 2007 a transboundary water agreement on the use of water and energy resources of the Syr Darya River basin was signed between Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Parties tried to find a solution of mutual benefit, but problems and arguments for the use of common basins remain unsolved. A major concern is the need for water access and sharing of water use amongst the upstream and downstream countries. The plans of upstream countries to expand the capacity of their reservoirs and hydroelectric power generation are a source of concern for the downstream countries, given their economic dependence on irrigated agriculture.

Several projects in Central Asia region have been launched to tackle these issues, focusing in particular on better management and rehabilitation of irrigation systems, on upgrading and extending energy transmission lines, and on introducing energy-saving measures. The fact that the current irrigation systems in the Central Asian Countries still stem from the centralized model creates an obstacle to the achievement of concrete steps towards the implementation of rational, shared use of water. In this context, the Interstate Commission for Water Cooperation (ICWC) plays an important role. It consists of five members, appointed by the Central Asian Governments, with equal rights and responsibilities for water resources management and maintenance of sustainable hydro processes on transboundary water resources. The five countries are represented by their respective Ministers dealing with water resources and irrigation. Among the ICWC responsibilities are the coordination of annual consumption quotas, the management of water resource allocation based on actual availability, and the development of joint programmes.

Climate change, ozone layer and air pollution

United Nations Framework Convention on Climate Change and the Kyoto Protocol

Tajikistan has been a non-Annex I Party to the United Nations Framework Convention on Climate Change (UNFCCC) since 1998 and ratified the Kyoto Protocol in 2008. Tajikistan submitted its First National Communication to the Conference of Parties (COP) in 2003. It was aimed at informing Parties to the Convention of the trends in GHG emissions, the vulnerability to global climate change of the environment, the national economy and human health. The Second National Communication, submitted in 2008, identifies priorities and objectives in terms of mitigation potential (Chapter 6).

By acceding to the Kyoto Protocol, which became effective in April 2009, Tajikistan is eligible to implement projects under the Clean Development Mechanism (CDM). Tajikistan can participate in the market mechanism conceived for both developed and developing countries. However, Tajikistan must comply with a number of fundamental participation requirements. These requirements extend from the initial agreement to be legally bound by the Kyoto

Protocol, through to the establishment of dedicated domestic structures and procedures in order to give effect to the CDM within the domestic jurisdiction. In addition, specific domestic legal measures are necessary to achieve compliance.

To successfully host a CDM project, key requirements to be met are:
(a) Establishment of a Designated National Authority (DNA);
(b) Development of domestic modalities and rules for CDM project assessment;
(c) CDM approval criteria;
(d) CDM capacity building.

In the context of climate change negotiations, Armenia, Kyrgyzstan and Tajikistan communicated to UNFCCC their agreement to establish the Group of Mountain Land-locked Developing Countries. The alliance is expected to give mountainous countries an opportunity to raise their climate-related concerns in major international forums such as the UN climate conference and to provide opportunities to influence UNFCCC decision-making process.

The Group's greatest concern is the retreat of glaciers due to temperature increases caused by rising concentrations of greenhouse gases in the atmosphere. This has triggered fears of lakes and rivers swelling to dangerous levels in the near term and running dry in the long run, spelling disaster for the local population who rely on the river systems. The participation of Tajikistan in the Group is very important, given that mountain areas occupy 93 per cent of the whole territory.

Vienna Convention for the Protection of the Ozone Layer

Following accession to the Vienna Convention, the Montreal Protocol and its London Amendment, Tajikistan has an ozone-depleting substances (ODS) officer participating in the global ozone network and has implemented GEF-funded projects that have transferred new technologies, enhanced recycling operations and provided training to reduce ODS use in the country. In 2010, GEF invested US$ 0.9 million in supporting development and implementation of a 3R operations programme (namely, Recycling, Recovery, and Reclamation) and a national Refrigerant Management Plan - a retrofit financial incentive programme for the refrigeration industry. The consequent ODS phase-out is equal to 50.7 tons ODP (ozone depletion potential), so the country returned to compliance with the Protocol in 2006.

Stockholm Convention on Persistent Organic Pollutants (POPs)

Tajikistan signed the Stockholm Convention in 2002 and ratified it in February 2007 through Presidential Decree No. 417. The Government adopted the National Implementation Plan (NIP) for the Stockholm Convention on POPs in 2007. This instrument points out the key issues to be addressed, such as the coordination mechanism of certain NIP activities, including reviewing, reporting, assessing and updating of NIP and finally, the establishment of a National Centre on Implementation of the Convention (Chapter 1).

For the time being, the establishment of the National Centre remains one of the most important priorities to be promptly achieved in order to strengthen the institutional capacity with the purpose of elaborating the national infrastructure for more effective management of POPs. The National Centre on the Stockholm Convention on POPs is expected to be established under the Ministry of Agriculture with the task of controlling and evaluating NIP realization and making decisions on its revision. Moreover, other ancillary functions will include the organization of seminars to train specialists and the trainers who will be training the population. The Centre is also expected to provide the instrument for implementation of the Tajikistan's commitments under the Aarhus Convention.

Desertification and biological diversity

United Nations Convention to Combat Desertification

Recognizing the problem of desertification and land degradation, Tajikistan acceded in 1997 to the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa. The 2001 National Action Programme to Combat Desertification deals with environmental degradation and unsustainable use of land resources. It serves as an implementation tool for the Convention to Combat Desertification. The Programme encompasses a series of recommendations to be submitted to the Government. Nevertheless, the list of recommendations needs to be updated. Tajikistan submitted national reports in 2000, 2002 and in 2006. To implement the Convention, the Government has adopted the Programme of Economic Transformations of Agricultural Complexes and the Programme of Ecological Education of the Population up to 2010.

Convention on Biological Diversity

Tajikistan acceded to the Convention on Biological Diversity in 1997 and to its Protocol on Biosafety in 2004. In early 2009, the Government submitted the Fourth National Report, underlining that by 2010 it was planned to expand the network of protected areas by establishing additional areas. The Government has adopted the State Protected Areas Programme for the period 2005–2015. The policy comprises the harmonization of regulations related to reserves and site management and aims to ensure that they correspond to the international agreements on restoration of degraded valuable natural habitats, and the building of human and institutional capacity (Chapter 9).

Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat

Tajikistan acceded to the Ramsar Convention in 2001. The country has five Ramsar sites (Lake Karakul, Kayrakum Reservoir, the lower parts of Lakes Pyandj Rivert, Shorkul and Rangkul, and Lake Zorkul). In 2008, Tajikistan submitted the National Report for the implementation of the Convention. Nevertheless, due to the very limited domestic funding available to implement it, very little is being done for the sites identified and only a very basic management system has been adopted (Chapter 9).

Bonn Convention on the Conservation of Migratory Species of Wild Animals

Tajikistan acceded to the Bonn Convention on 1 February 2001. On 16 May 2002 in Dushanbe, Tajikistan, the Environment Ministers of Kazakhstan, Tajikistan and Turkmenistan signed the Memorandum of Understanding for the Conservation and Restoration of the Bukhara Deer, underlining the importance of joint coordinated and concerted activities to be taken urgently in order to prevent the further decrease and disappearance of the remaining populations.

To that end, Parties committed to providing protection for the Bukhara Deer and to identifying, conserving and - where feasible - restoring those habitats of the species that are of importance to reverse the danger of extinction of the sub-species. To implement the MOU's provisions in their respective countries, Parties annexed the Action Plan to the Memorandum as a basis for the conservation and restoration of the species.

Convention for the Protection of World Cultural and Natural Heritage

Tajikistan acceded to the Convention on 28 August 1992. In 2010, the World Heritage Committee entered the archeological site of Sarazam on the list of eligible cultural or natural sites.

4.3 Relevant agreements not yet ratified

Convention on the Protection and Use of Transboundary Watercourses and International Lakes

Tajikistan has not yet ratified the Convention because there is an understanding in the country that ratification could prejudge and limit the Government's exclusive right to use water. This misunderstanding is one of the main obstacles to the country's accession to the Convention.

Espoo Convention on Environmental Impact Assessment in a Transboundary Context

In 2004, the President issued the Decree on Accession to the Espoo Convention, No. 1287. However, the Convention Depositary did not receive any notice. Nevertheless, through a number of legal acts and international reports, Tajikistan has displayed its intention to introduce and implement provisions of the Espoo Convention. Separate provisions concerning transboundary impact are defined in the Law on Ecological Expertise, and in 2006 a number of provisions on transboundary impacts were fixed in the Procedure for Environmental Impact Assessment (Chapter 2).

Convention on Long-range Transboundary Air Pollution

Tajikistan is currently not a member to the Convention on Long-range Transboundary Air Pollution (LRTAP) or any of its Protocols. The Executive Body of the Convention has given priority to assisting the countries of Eastern Europe, the Caucasus and Central Asia in implementing and ratifying the Convention and its Protocols, in an effort to improve air quality in the region. This has been complemented by the recently launched project between the Russian Federation, Belarus and Kazakhstan to implement and ratify the last three Protocols of the Convention (namely, the Heavy Metals, POPs and Gothenburg Protocols). As the project continues to develop, Tajikistan is considering establishing a dialogue with the UNECE to assess its current situation with respect to LRTAP.

Convention on the Transboundary Effects of Industrial Accidents

The Convention has adopted a mechanism, the Assistance Programme, for countries of Eastern Europe, Caucasus and Central Asia and South-Eastern Europe, with a view to supporting them in their efforts to improve industrial safety through the implementation of the Convention.

In November 2010, the Governing Body under the Convention adopted a new instrument to help countries identify challenges for the implementation of the Convention and, consequently to identify needs for assistance. Tajikistan is one of the countries participating in the Programme and is also eligible to request such assistance to improve industrial safety.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

Tajikistan is not yet a Party to the Basel Convention, the most comprehensive global environmental agreement on hazardous and other wastes. Given the large amount of accumulated hazardous waste in the country and the lack of means to properly dispose of it, acceding to this Convention could be considered as a priority for the near future (Chapter 8).

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Trade in endangered species is a problem for biodiversity in Tajikistan, and the ratification of CITES should be taken into consideration (Chapter 9).

Protocol on Pollutant Release and Transfer Registers

Tajikistan has signed the Protocol on Pollutant Release and Transfer Register (PRTR Protocol) to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters in 2003. It has thereby demonstrated its political support to the treaty but has failed to ratify the Protocol, due to the country's low capacity with regard to Protocol requirements. Tajikistan is expected to benefit from assistance, to be given through the Strategic Approach to International Chemicals Management (SAICM), in establishing its national PRTR.

The project would strengthen the country's capacity for meeting Protocol requirements. Promoting ratification of the Protocol in Tajikistan would therefore be very timely. Being a Party to the Protocol would not only enhance public access to information on pollution, but would also exert downward pressure on levels of pollution, as no company would want to be identified as among the biggest polluters. The major challenge for Tajikistan after ratification will be to ensure compliance with the Protocol's provisions, which would involve sufficient human and financial resources and technical means to maintain PRTRs.

4.4 International coordination and assistance

Foreign aid accounts for the bulk of the Public Investment Programme. External assistance plays a major role in development expenditure financing, and increased from about US$100 million in 1997 to US$300 million in 2009 (Chapter 5). Many international organizations have been involved in supporting Tajikistan's development. The UN Common Country Assistance (CCA), which is closely linked to the Poverty Reduction Strategy and the Millennium Development Goals, has identified five development challenges common to all sectors assessed: increased access to information; decision-making; services; resources and assets; and institutional reform to promote efficiency, transparency and inclusiveness.

UN agencies: FAO, WFP and UNDP are sponsoring the creation of the Green Initiative for Tajikistan (GIFT) under the President. As a starting point, GIFT will be budgeted at US$ 23 million over 6 years. Four objectives will be supported under the programme: coordinating tree-planting programmes; enhancing environmental awareness through various campaigns; promoting fuel efficiency and alternative energy; and strengthening institutional capacity to support community-based forestry.

UN Special Programme for the Economies of Central Asia

The UN Special Programme for the Economies of Central Asia (SPECA) provides a neutral forum for discussing complex strategic issues relating to intra- and inter-regional cooperation such as the Cooperation Strategy to Promote the Rational and Efficient Use of Water and Energy Resources. In 2010, Tajikistan adopted the law on Hydraulic Structures, which also deals with dam safety.

Photo 4.1: Goitered Gazelle (Gazella subgutturosa)

United Nations Development Programme

UNDP in Dushanbe supports the country's reform efforts and the development of a national strategy for poverty alleviation. The Organization is guided in its work by the Country Programme Action Plan (CPAP) for the period 2010-2015, signed jointly with the Government. The Government has, with UNDP assistance, developed the National Development Strategy for the period to 2015, which was adopted in 2003 and outlines the most appropriate policies to be adopted and investments necessary to reach the identified goals.

UNDP is mainly working on three fields: biodiversity, climate change mitigation and adaptation. It supports the country in preparing the legislative framework on renewable energy sources in cooperation with civil society and Parliament and is supporting Tajikistan's preparation of a national strategy for adaptation in line with the NEAP (Chapter 6).

The UNDP Country Programme for the period 2010–2015 addresses the priorities in Tajikistan's National Development Strategy (NDS) and the various poverty reduction strategies. The promotion of national development policies and programmes will be undertaken through a combination of policy instruments, special support for the MDGs and capacity development support for service delivery, strategic planning, and resource mobilization.

The Country Programme dovetails with the United Nations Development Assistance Framework (UNDAF) for Tajikistan (2010–2015) and is also linked to the Joint Country Support Strategy for Tajikistan (JCSS), launched in 2007 by twelve development partners. UNDAF was developed through an extensive consultative process involving all stakeholders and is part of JCSS. It has four pillars: poverty reduction and governance; food and nutrition security; clean water; sustainable environment and energy and quality services. The third pillar of UNDAF promotes the sustainable management of the environment, energy and natural resources with concrete support to the Government for improving the design of national and trans-national policies.

Through JCSS, partners commit to support Tajikistan's overall development strategy; to outline a shared vision for a more coordination management of partners' resource flows; and to define the necessary measures to achieve this.

World Bank

Tajikistan became a member of the World Bank (WB) and the International Development Association

(IDA) in 1993. Currently, in Tajikistan there are 18 ongoing projects in health; education; agriculture; water and energy; municipal infrastructure; and public sector management. These aim to help Tajikistan's poorest people to weather the financial crisis and pave the way for sustainable economic development.

The World Bank Country Partnership Strategy (CPS) for the period 2010–2013 envisages addressing the most relevant challenges for Tajikistan through a constructive partnership with the Government, civil society and donors. The CPS objective for Tajikistan builds on the lessons learned in implementing the Bank's previous CPS for the period 2006–2009. The twofold objective is to reduce the negative impact of the economic crisis on poverty and vulnerability and to pave the way for post-crisis recovery and sustained development.

Given that Tajikistan is facing the economic crisis from a weak position, CPS envisages strengthening mechanisms to foster good governance and sustainable capacity and to advance structural reforms. The indicative allocation for Tajikistan is projected to be about US$86.6 million, US$30 million of which has already been used to finance the final year of the previous CPS for the period 2006-–2009. The remaining allocation (about US$57 million) will finance the first two years of the proposed CPS.

To unleash the potential of assets such as land, water, hydropower, and human capital, Tajikistan will need to mitigate the effects of the economic crisis while working to build capacity towards post-crisis recovery and sustained development. There is a need to speed up these reforms. The country's remote, landlocked location, together with deteriorating infrastructure, high input costs and weak regulation, poses barriers to international trade, connectivity and investment. Access to services remains limited, especially in rural areas, and there is little scope for achieving the Millennium Development Goals (MDGs).

The World Bank (WB), in conjunction with the Central Asia Regional Economic Cooperation (CAREC) programme, is conducting social, environmental and economic impact assessment on the Rogun dam project. By the end of 2010, it is expected that WB will have conducted a feasibility study on the project.

Concerned by the dangerous chemicals used in the agricultural sector such as fertilizers, WB is launching a project, which is still very provisional, whereby the country would develop a set of projects (for a total amount of US$ 4.0 million) over four years to phase out the use of pesticides. The national strategy towards the reduction of use of pesticides is under the responsibility of the Ministry of Agriculture and Water Resources, whilst the Centre is responsible for funding and the Focal Point for the POPs Convention is the coordinator. This division of labour does not facilitate effective policy management for a progressive reduction of POP substances.

Asian Development Bank

The Asian Development Bank (ADB) has been developing a new Country Partnership Strategy (CPS) and defining a road map to anchor phased physical and non-physical investments to improve connectivity, energy security and private sector development. CPS will also address thematic concerns including regional cooperation.

ADB has identified some key sectors for technical assistance, adopting a two-pronged approach to environmental improvement which, as well as directly strengthening environmental management capacity, introduces environmental concerns into sectoral projects to raise awareness in the public and private sector, of the critical links between environmental protection, development, and sustained growth.

The ADB Technical Assistance plan up until 2012 identifies key constraints to improving environmental management. These include the inadequate policy and legislative framework; the absence of economic incentives to use natural resources more efficiently; the Government's emphasis on restrictive control rather than facilitative regulation; institutional weaknesses such as organizational structure and a shortage of qualified staff; poor communication and data management; inappropriate technical approaches; limited financial resources and inefficient financial arrangements; and a lack of awareness of environmental issues.

ADB has also developed the Implementation Support for the Private Sector Development Strategy in Tajikistan (2007–2010). Although this initiative was partially financed, the Government did not approve the strategy, so the scope has been slightly reformed but maintains the core objective of supporting the private sector and coordinating donor efforts. ADB is also working on implementing the Convention to Combat Desertification, with an emphasis on achieving environmentally sustainable growth, and supporting the sustainable management of land.

Global Environmental Facility

The Global Environmental Facility (GEF) is currently supporting eight projects in Tajikistan, with a total grant worth US$ 7 million. The projects are related to biodiversity, climate change, ozone depletion, POPs, agriculture and watershed management and a national capacity needs self-assessment. In addition, GEF provides grants for six regional projects in which Tajikistan participates. Totalling US$ 43.769 million, these cover activities in ozone depletion, biodiversity, international waters and land degradation.

EU Financial assistance for environmental protection

The main agreement underpinning the EU partnership with Tajikistan is the Partnership and Cooperation Agreement (PCA), which was signed in 2004 and entered into force in January 2010, following the ratification of all Parties involved. PCA operates with the primary objective of fostering economic growth and supporting sustainable development through a three-pronged approach: political dialogue, cooperation (including finance, science, information society, technologies and legislative cooperation), and trade.

The EU cooperation with Tajikistan has some overarching objectives closely linked to the implementation of the MDGs, such as the eradication of poverty, the promotion of democracy and good governance, respect for human rights, and dissemination of the rule of law. Particular attention is drawn to the protection of the environment. In fact, the EU is assisting Tajikistan in developing measures to preserve and improve the quality of the environment as well as to address the sustainable management of global natural resources, climate change and biodiversity losses, in order to ensure sustainable development.

In 2007, the EU launched the Neighbourhood Investment Facility for the countries covered by the European Neighbourhood Policy, a financing mechanism aiming at mixing non-refundable financial contributions from the European Commission and from voluntary contributions of the Member States and other donors with loans of multilateral and bilateral European Development Finance Institutions.

According to the indicative programme 2007-2010 for Central Asia, the overall EU assistance budget for the Environment is €16.2 million, of which €13.2 million are allocated for the environmental programme called Central Asia Environment. The remaining €3.0 million are pooled in the Central Asia Investment Facility, which covers energy and environment as the initial priority focus. There are two projects focused on the sustainable management of the transboundary aquifers in Central Asia - SUMTACA (€2 million) and the project in the Fergana Valley for improved integrated water and land resources management (€2 million). In particular, the latter could assist the development of strategic plans for the Fergana Valley for integrating transboundary aquifers from Kyrgyzstan, Tajikistan and Uzbekistan in the overall use of water resources.

From June 2008 to December 2009, the NIF Board approved 25 projects representing a total investment of €7.4 billion. The NIF contribution to these projects totalled €170 million (€148 million from the EU budget, €22 million from voluntary contributions by Member States), leveraging a total loan amount of €3.8 billion from the European financial institutions. Expected results are as such: to contribute to a better energy infrastructure (transit connections between the EU and Central Asia as well as between partner countries); to improve energy efficiency and energy savings while increasing production and use of renewable energy; and to introduce integrated water management, including the necessary related infrastructures.

Principals' Group and Donor Coordination Council

The Principals' Group and the Donor Coordination Council are platforms for donors' activities in Tajikistan. Regular meetings take place within these two mechanisms involving donors and various institutional bodies.

The Principals' Group is a coordinating body of ambassadors, representatives of donors and international financial institutions, which participate in regular coordination meetings with a rotating chairperson. They share information with one another on development assistance programmes and seek to draw further attention to important issues confronting Tajikistan. The Donor Coordination Council was established with the purpose of improving the multidirectional flow of relevant information among donors, Government agencies and civil society institutions. This mechanism would facilitate networking and broader collaboration within the donor community, a more constructive dialogue and shared vision with the Government on country's priorities, and serve to strengthen overall aid coordination and management.

Box 4.1: Platform for Environment and Water Cooperation

The Platform for Environment and Water Cooperation has been conceived within the framework of the EU Strategy for a New Partnership with Central Asia (CA). Representing an opportunity to share experience on domestic climate change mitigation and adaptation activities, the Platform is based on three pillars: environmental governance, climate change and water issues. To implement the Platform, Parties agreed to establish the EU-Central Asia Working Group on Environmental Governance and Climate Change to strengthen policy cooperation and to provide guidance on cooperation activities between the EU and CA. The Working Group serves as the key mechanism for facilitation of the Environment and Water pillar of the Strategy to be tailored to the specific conditions and needs of CA countries. The first meeting of the EU-CA Working Group on Environmental Governance and Climate Change was hosted in Brussels in October 2010 in a back-to-back mode with the meeting of the EU Water Initiative's EECCA Working Group. The Working Group identified some priorities as such: strengthening CA institutional frameworks and capacity to manage climate-related risks and opportunities in an integrated manner at the local, national and regional levels using BATs (best available technologies) and approaches, develop low carbon strategies and NAMA (National Appropriate Mitigation Actions) and establish low-emission development strategies within the framework of national overall mitigation strategies, including emissions pathways for the mid/long term, in the context of sustainable growth plans.

The Council offers value added to already existing sector or thematic coordination groups and the Donor Principals. The Donor Coordination Council was established with the purpose of improving the multidirectional flow of relevant information among donors, Government agencies and civil society institutions. This mechanism would facilitate networking and broader collaboration within the donor community, a more constructive dialogue and shared vision with the Government on country's priorities, and serve to strengthen overall aid coordination and management. The Council offers value added to already existing sector or thematic coordination groups and the Donor Principals.

Organization for Security and Co-operation in Europe

The Organization for Security and Co-operation in Europe (OSCE) monitors environmental developments and assists Tajikistan in developing environmental legislation. The Concept of Environmental Protection, an important policy document, was developed with OSCE support and approved by the Government in 2008. This document aims to promote rational use of natural resources and to reduce poverty (Chapter 1). OSCE also backed the work on amendments to the Law on Nature Protection. The proposed amendments, approved by Parliament in 2009, are closely related to the provisions of the Aarhus Convention and include improvements in environmental inspections, standards and certification. This represents an important step towards the final vote following yet another round of legislative and executive deliberations.

Implementation of the Aarhus Convention is facilitated by OSCE and the UN, and legislation will be reviewed to bring it into line with the Convention and the international standards on environmental sustainability. A joint initiative called Environment and Security (EnvSec) is supported by OSCE and the UN; it facilitates cooperation on environmental issues across borders, provides a framework for vulnerability assessments, monitoring environment and developing policy, as well as undertaking capacity-building, institutional development and advocacy.

OSCE further supported the development of the National Action Programme for the Mitigation of Climate Change, which was approved in 2003. It serves as a tool for implementation of the UNFCCC precautionary measures to anticipate, prevent or minimize causes of climate change and to mitigate its adverse effects. The 2003 Action Plan sets priorities and measures to address the problem of climate change, to develop capacity for further research and analysis of the climate system, and to strengthen international cooperation in this area (Chapter 6).

4.5 Bilateral arrangements

German Agency for Development Co-operation

Since 1995, the German Agency for Development Co-operation (GTZ) has mostly worked in cooperation with the Government on rebuilding the domestic economy, while in the environmental field, this body has supported technical cooperation. The priority areas agreed with the Government are economic reform and development of the market system with a focus on micro-finance, basic education and food security programmes.

To address environmental issues, GTZ developed a project for sustainable management of natural resources in Gorno-Badakhshan for the period 2008–2010. This project has resulted in the reduction of natural resource destruction in the Gorno-

Badakhshan Region, accompanied by a notable improvement in living conditions for the local people. The project, implemented together with the German Development Service (DED), in cooperation with the Gorno-Badakhshan State Land Use Committee, the State Forestry Authority of Gorno-Badakhshan and various local partners from outside the public sector, follows a two-pronged approach: the promotion of energy efficiency measures through a microfinance organization and the restoration of the flood plains in Gorno-Badakhshan. Reforestation is being achieved with the support of the forestry authorities, by introducing a forest management system which also involves the local forest users.

United States Agency for International Development

The United States Agency for International Development (USAID) began providing assistance to Tajikistan in 1993, soon after the country became independent. Since then, USAID has provided about US$ 300 million in programmes that assist the development of the country's economic sector, education and healthcare systems, and democratic institutions. In this regard, USAID cooperates with ministries, governmental and non-governmental organizations, businesses, and communities to improve laws, create jobs, increase incomes, improve services, and better manage available resources.

In 2006, USAID launched the Regional Energy Market Assistance Program (REMAP) with two goals: assisting with the development of a transparent competitive electricity market in Central Asia, and increasing electricity trade and energy efficiency in order to attract investments and stimulate economic growth. Recently, USAID has supported economic policy reform and privatization and provided micro-credits to farmers and small businesses operating under a bilateral agreement with the Government.

Swiss development cooperation

Swiss development cooperation aid has been provided through two Swiss federal offices for coordinating international development: the Swiss Agency for Development and Cooperation (SDC) and the Swiss State Secretariat for Economic Affairs (SECO). In the context of the Regional Cooperation Strategy for the period 2007-2010, the most important actions aimed at achieving transparent, accountable and effective public institutions, equitable access to quality public services, and sustainable, private sector-led growth.

In line with the Regional Mid-term Programme for Central Asia and the Swiss Water Strategy for Central Asia, since 2001, the Swiss Agency for Development and Cooperation has invested US$4 million in reforming the irrigation sector. The core element of this investment is the Integrated Water Resource Management Project in the Fergana Valley shared by Kyrgyzstan, Tajikistan and Uzbekistan. The project is designed to improve the effectiveness of water use through the introduction of integrated water resource management principles. The project consists of two components: land productivity and fair water distribution on the one hand, and construction of water measuring devices on the other hand. The current budget phase is US$ 3.7 million with a cumulative budget of US$ 9 million.

4.6 Conclusions and recommendations

Several environmental agreements are relevant for the environmental challenges which the country faces, but in order to elaborate plans of action and put into practice the provisions of these international environmental agreements, Tajikistan is still dependent on technical assistance and financial support from international organizations, foreign donors or, often NGOs.

There is a risk that this apparent dependence might impede, inter alia, the development of the country's own national capacity in terms of problem-solving and institutional development. It is essential to avoid a perverse mechanism which might lead to international assistance serving to discourage and divert from an autonomous decision-making process or the adoption of concrete actions owned and executed by the country.

Recommendation 4.1:
The Government should ensure sufficient financial resources for the autonomous implementation of multilateral environmental agreements and other environmental agreements' strategies, on the ground through Tajikistan's own priority programmes which meet Tajikistan's own specific needs from ratified multilateral environmental agreements.

The Committee on Environmental Protection should propose actions aimed at a progressive reduction of the foreign assistance dependency and at the same time promote a learning-by-doing approach, taking advantage of the expertise offered by foreign assistance technical plans and in the context of country-led approaches.

International cooperation has played and continues to play a critical role in supporting environmental

protection efforts in Tajikistan. Although cooperation through multilateral environmental agreements (MEAs) has informed its environmental policies and legislation, Tajikistan has yet to become a party to key global and regional MEAs, several of which have been developed under the aegis of UNECE.

The Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes, one of the five UNECE environmental treaties, is the basic international legal instrument on transboundary water cooperation. Based on equality and reciprocity, the Convention creates a balanced framework for cooperation by laying down principles, obligations and mechanisms for transboundary water cooperation, applicable to both upstream and downstream countries.

Nowadays, the misunderstanding that the accession to the Helsinki Convention could prejudge and limit the Government's rights to use water largely dominates the public opinion and political thinking in Tajikistan and is one of the main obstacles to accession.

There is a need to promulgate the correct interpretation of the Helsinki Convention in Tajikistan and other countries of Central Asia, in order to show how it can act as a framework for preventing and addressing differences and disputes among Central Asia States, drawing on examples from its effective application in other countries.

Recommendation 4.2:
The Committee on Environmental Protection in cooperation with other relevant authorities should assess the costs and benefits of and promote the ratification of the following environmental agreements:

- *(a) Convention on International Trade in Endangered Species of Wild Fauna and Flora;*
- *(b) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal;*
- *(c) Convention on the Protection and Use of Transboundary Watercourses and International Lakes and its Protocol on Water and Health;*
- *(d) Convention on the Transboundary Effects of Industrial Accidents;*
- *(e) Convention on Long-range Transboundary Air Pollution;*
- *(f) Protocol on Pollutants Release and Transfer Registers to the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice.*

Although the Law on Ratification of the EspooConvention on Environmental Impact Assessment in a Transboundary Context went through the whole parliamentary procedure in 2005, no instrument of ratification was deposited. However, Tajikistan has demonstrated its intention to introduce and implement provisions of the Espoo Convention in a Government Resolution (No. 161-p/2004) approving creation of the Working Group for the Preparation of the Rules and Procedures for the Espoo Convention Implementation and, through provisions on transboundary impact in the Law on Ecological Expertise and within the Procedure of Environmental Impact Assessment.

Recommendation 4.3:
The Government should

- *(a) Finalize the accession procedure to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context by duly informing the Convention Depositary;*
- *(b) Identify the competent authority(ies) and its (their) functions and competency, and amend the effective law with provisions regarding the transboundary environmental impact assessment procedure in order to duly implement the Espoo Convention.*

Although not a Party to the Convention on the Transboundary Effects of Industrial Accidents, Tajikistan is participating in the Assistance Programme under the Convention. In 2005, it committed to implementing the Convention. Successful implementation will require a coherent and flexible legal framework that conforms to international standards.

Tajikistan's awareness of the need to solidify its legal framework is clear from its accession to some UNECE Conventions and to the Kyoto Protocol. However, a number of MEAs that have been signed still await ratification.

Recommendation 4.4:
In view of the ratification of the Convention on the Transboundary Effects of Industrial Accidents, the Government should

- *(a) Ensure the continuous involvement of the relevant bodies in activities under the Convention and notably under the Assistance Programme;*
- *(b) Ensure that the relevant bodies make use of the benchmarks for the implementation of the Convention to identify challenges in the implementation of the Convention and possible needs for further assistance activities.*

PART II: ECONOMIC INSTRUMENTS AND FINANCIAL RESOURCES

Chapter 5

ECONOMIC INSTRUMENTS AND EXPENDITURES FOR ENVIRONMENTAL PROTECTION

5.1 Introduction

The Government's national development strategy puts the main emphasis on economic growth and poverty reduction. The challenge is to reconcile these goals with the need to address major environmental problems such as air, water and waste pollution, land degradation, and exposure to natural disasters. Environmental damage is estimated to have a considerable economic cost, including the costs of adverse health impacts, corresponding to some 5 per cent of GDP. Yet there are no effective institutional mechanisms in place that would foster the integration of environmental protection with the industrial development strategies. In other words, environmental protection is not mainstreamed into the development strategy for the economy as a whole.

The domestic resources allocated to environmental protection are very small and their impact on environmental quality is marginal, at best. Funding of major national development projects as well as environmental projects relies predominantly on foreign resources. The potential of environmental taxes and charges for financing environmental projects is not exploited. User charges for water supply, sewage and power have, however, become more cost-reflective in recent years. The Government applies a range of economic instruments for environmental protection, but these mainly serve to generate small fiscal revenues. There is a need notably to reform the unwieldy system of pollution charges, to review the size of payments for use of natural resources, and to make further progress in tariff reform for utility services and communal services (waste management).

5.2 Use of economic instruments for environmental protection

Pollution charges

At the time of the review, the basic methods and procedures for determining pollution charges were still those specified in the 2001 version of the "Methodological instructions on charging payments for environmental pollution" issued in 1993 (RD-01-93). [1] Pollution charges have to be paid for emissions of air and water pollutants from stationary sources and for waste generated by enterprises. It should be noted that payment for waste generation is distinct from payment of service charges for waste collection and disposal. There are also payments for air pollution from mobile sources, but they are not directly related to the volume of emissions. A salient feature of the system of pollution charges is the very large number of regulated pollutants; there are 121 air pollutants from stationary sources and 197 water pollutants of which 101 pesticides that are potentially subject to payment of emission charges. Regulation of production waste charges distinguishes between various hazard categories of industrial and mining waste as well as different groups of recyclable waste. For comparison, in OECD countries, charges on air emissions are applied to a small number of pollutants (such as SO_2, NOx and CO_2) only. In a similar vein, charges for water pollutants focus on organic matter (measured in BOD or COD) and nutrients (nitrogen and phosphorous).

Permits specify annual maximum values[2] for emissions of specific pollutants and waste. Standard rates per ton of pollutants apply up to the established maximum value. The methodology for defining the standard rates across the large spectrum of pollutants and waste groups is not clear. Emissions above the maximum values are subject to non-compliance fees, which in general amount to five times the standard rate. In this way, non-compliance fees are integrated into the system of pollution charges. Non-compliance with permits can, moreover, lead to fines, including payment of compensation for environmental damages. These cases are in general heard by criminal courts.

While the number of regulated air and water pollutants is very large, the number of pollutants that is actually monitored is much smaller, but exact numbers are not available. It is noteworthy that $PM_{2.5}$ and PM_{10}, two major universal air pollutants, are not

[1] See Chapter 3 of the first EPR on Tajikistan for a detailed presentation.

[2] Emission limit values are based on a register of maximum allowed concentrations (MACs) of pollutants designed to avoid any adverse human health impacts.

directly regulated, but rather total suspended particles (TSP), which is an antiquated regulatory measure of concentration of particulate matter (PM) in ambient air. In general, the volume of emissions subject to pollution charges is estimated by the polluting enterprises themselves based on input and technology parameters. There is no empirical evidence as to what extent these estimates may deviate from the actual volume of emissions.

Standard rates of payments for emissions are subject to adjustment by a so-called local coefficient, which is intended to reflect the prevailing environmental conditions at the location of the polluting source. The values of these "location coefficient" vary within a range of 1 (the standard rate applies) to 2 (twice the standard rate applies). The latter coefficient is only applied in the capital, Dushanbe. It is noteworthy that local coefficients have not changed since they were established in 1993.

The Law on Nature Protection stipulates that payments for pollution should also be adjusted for inflation. But whereas the consumer price index (CPI) rose by some 140 per cent in 2009 compared with 2001, the actual inflation adjustment made during this period led to an increase in rates per ton by only some 7 per cent. In the event, the payments per ton of pollutant declined by in real terms by some 56 per cent in 2009 compared with 2001.

Table 5.1 illustrates the calculation of pollution charges for SO_2 emissions. The erosion in the real value of pollution charges would be partly reversed, however, by a general increase in base rates by 56 per cent scheduled for the beginning of 2011.[3] The official reason for this revision of base rates is to compensate for the inflation between 2001 and 2007. But it is not clear, which inflation measure has been used for this purpose.[4] By way of comparison, the CPI increased by 87 per cent between 2001 and 2007. Yet despite this planned increase in nominal rates, real rates in 2011 would still be some 40 per cent lower than in 2001, but some 5 per cent higher than in 2007 (Table 5.1).

Revenues from pollution charges are rather small. In 2009, they amounted to 3.2 million somoni, corresponding to US$ 0.77 million. Pollution charges corresponded to less than 0.1 per cent of current State budget revenues (excluding grants) and less than 0.02 per cent of GDP in 2009 (table 5.2). More than half of the revenues were accounted for by waste generation; some 38 per cent originated in payments for air pollution from stationary sources; water pollution related payments accounted for the remaining. Water pollution related revenues had a share of only some 6 per cent, which suggests that these charges are not enforced. There is, however, no information on collection rates for all these payments. The bulk of these payments are earmarked for environmental funds.

There is no evidence that pollution charges have had any meaningful impact on the behaviour of polluters. Any potential incentives, moreover, must have been largely eroded by the lack of adjustment for the considerable cumulative inflation in the 2000s. This has also considerably weakened what appears to be the main function of pollution charges, namely the generation of fiscal revenues. Nor is there any assessment to what extent revenues from pollution charges correspond to the administrative costs incurred by Government agencies for regulating polluters.

More generally, the system of pollution charges targets an excessively large number of pollutants, which is neither technically or economically feasible. Even it were feasible, however, the opportunity costs of the resources involved would likely far outweigh the environmental benefits achieved. There is a need for a significant reform of the system of pollution charges with the main aim to focus on (a few) major pollutants only. This would also be in line with recommendations made by OECD and the European Commission.

Charges for waste collection and disposal

Municipal waste management is still in an incipient stage in Tajikistan (Chapter 8) Waste services in many cities and villages are provided by the State Unitary Enterprise "Khojagii Manziliyu Kommunali" (SUE KMK), which was established in 2001. However, in a number of larger cities (such as Khujand), waste collection and disposal services are organized by local public companies that are subordinated to the municipal administration. In Dushanbe, waste management has been delegated to a special department of the municipal administration in each of its four districts.

Waste charges are established by local authorities, but they are subject to the approval of the Ministry of Economic Development and Trade.

[3] The increase was adopted on 12 March 2010; it is tantamount to a revision of base rates established in 1993 regulation RD-01.

[4] The inflation indexation coefficients are communicated by the National Bank to the Committee on Environmental Protection.

Table 5.1: Pollution charges for SO_2 emissions

Item	Remarks	Unit	2001	2007	2009	2010	2011
1. Base rate		somoni/ton	1.00	1.00	1.00	1.00	1.56
2. Inflation coefficient		Index (1993=1.00)	2.40	2.57	2.57	2.57	2.57
3. Inflation adjusted base rate	(=row 1* row 2)	somoni/ton	2.40	2.57	2.57	2.57	4.01
4. Local coefficient		Dushanbe	2.00	2.00	2.00	2.00	2.00
5. Total nominal effective rate	(=row3* row4)	somoni/ton Dushanbe	4.80	5.14	5.14	5.14	8.02
6. Total nominal effective rate		Index (2001=100)	100.00	107.10	107.10	107.10	167.10
7. CPI		Index (2001 = 100)	100.00	187.00	240.60	257.40	278.00
8. Total real effective rate	(=row 6/row7)* 100	(2001=100)	100.00	57.27	44.50	41.60	60.10
Memo-item							
9. Total nominal effective rate		US$/ton Dushanbe	1.16	1.24	1.24	1.24	1.93

Source: Committee on Environmental Protection; own calculations.
Note: Inflation adjusted base rate is minimum charge rate; Dushanbe rate = maximum charge rate.
Rates in US$ are expressed at constant dollar exchange rate of 2009 (1US$ = 4.14 somoni).
Data for 2010 and 2011 are forecasts, assuming an annual inflation rate of 7 per cent for 2010 and 8 per cent for 2011, and the implementation of the increase in base rates by 56 per cent as from 2011.
Source for the inflation forecasts: IMF, World Economic Outlook Database, October 2010 (www.imf.org).

Table 5.2: Revenues from pollution charges in 2009

Payments for:	somoni million	US$ million
Air emissions (stationary sources)	1.20	0.29
Water discharges	0.20	0.05
Production waste	1.80	0.43
Total revenues	**3.20**	**0.77**
Memorandum item		
Total as per cent of GDP	0.016	
Total as per cent of current state budget revenues	0.083	

Source: Committee on Environmental Protection; Government MTEF 2011-2010 and UNECE calculations.
Note: Average annual exchange rate for 2009: 1 US$ = 4.14 somoni. Government revenues excluding grants.

The system of municipal solid waste charges applied in Tajikistan was established back in the 1980s and not undergone any significant change since then.

There is no transparent tariff methodology from which waste charges are derived. Waste charges for households are established on a per capita basis. Monthly payments for waste are directly proportional to the number of persons in a household.

Fees for Government budget-funded institutions (such as ministries) and commercial enterprises are set per m^3 of waste collected. Total monthly fees to be paid; however, are not based on actual waste collected but on "waste volume norms". These are expressed in terms of physical indicators, such as waste per square meter of business premises, floor space of shops; number of seats in a restaurant, number of beds in hospitals, number of children attending a school or kindergarten. Waste collection from institutions and private enterprises is based on special contractual arrangements with the local municipality, including the rates to be paid, given that they are not obliged to use the public operated services. In Dushanbe, e.g. there are private companies that provide waste collection services to larger companies, such as hotels and construction companies, but also to public institutions. In view of the insufficient number of trucks, the municipality has also engaged some private companies for the collection of solid waste. The general feature is that revenues from waste collection are largely insufficient to cover the corresponding costs.

The European Bank for Reconstruction and Development (EBRD) has been operating a solid waste management project in Dushanbe since 2008 designed to rehabilitate the city's landfill site and to reorganize and modernize waste collection. The general aim is to provide Dushanbe and surrounding regions with an adequate and affordable waste management system. In this context, a major objective has been put on the commercialization, i.e. achievement of full cost recovery, of the municipal waste services.

Waste charges for private households in Dushanbe depend on the type of residence and the presence of refuse chutes in apartment buildings. Charges per capita have been increased considerably in 2009, when they rose, on average, by some 200 per cent (table 5.3). Waste charges per m^3 doubled for enterprises. To a large extent, however, these increases only offset the decline in the real value of waste charges due to the high cumulative inflation during preceding years. On average, monthly waste payments for a single person household amounted to some 0.9 somoni in 2010 (about US$ 0.20). This corresponds to only 0.25 per cent of the average monthly wages and salaries (348 somoni, about US$ 79) in the first half of 2010. This suggests that, in general, affordability of higher waste tariffs has not been an issue so far. For certain population groups, such as lowest-income households and war veterans, there is a municipal subsidy scheme to pay for waste fees. These subsidies, which cover some 3 per cent of the population, are in the range of 50-100 per cent of waste tariffs.

Monthly payments for waste collection are in general directly collected by specially appointed bill collectors, who knock on the door and request payment against a receipt. There is no waste bill as such. Households living in apartments are visited by persons belonging to a special revenue collection unit of the municipality. Persons living in private houses pay to the chairman of the *Mahalla,* a kind of cooperative that represents the interests of home owners in a settlement at the municipal administration. As an incentive for ensuring a high collection rate, bill collectors are entitled to a certain percentage of payments collected. This way of fee collection appears to be very costly; it is also not very transparent and can be open to corruption.

The average collection rate for waste revenues was 80 per cent in Dushanbe in 2008. These revenues met only 36 per cent of operational expenditures (mainly fuel costs for trucks). The shortfall was financed from the budget of the municipality. Revenues receivable (billed) met 45 per cent of operating expenses. Cost recovery should significantly improve, however, in view of the strong increase in waste fees in 2009, provided the collection rate can be maintained at a high level or raised even further.

Photo 5.1: Collecting of teresken bush in Chadud village, Pamir

Table 5.3: Waste collection fees in Dushanbe, 2002 and 2006-2010

Category	Unit	2002	2006	2007	2008	2009	2010
Households							
Residents of apartment block without refuse chute	somoni/capita/month	0.15	0.15	0.25	0.25	0.75	0.75
Residents of apartment block with refuse chute (as from 9th floor and above)	somoni/capita/month	0.20	0.20	0.30	0.30	0.90	0.90
Residents of private houses and barracks	somoni/capita/month	0.25	0.35	0.35	0.35	1.00	1.00
Unweighted average	somoni/capita/month	*0.20*	*0.30*	*0.30*	*0.30*	*0.88*	*0.88*
Other							
Government budget funded institutions	somoni/m^3	2.00	5.00	5.00	5.00	5.00	5.00
Commercial enterprises	somoni/m^3	3.00	7.00	7.00	7.00	14.00	14.00

Source: EBRD, Dushanbe Solid waste management project. Inception report. November 2009.
Note: Household tariffs for 2007 applied since March of that year. Non-household tariffs for 2006 were applied as from October 2006. Tariff increases in 2009 entered into force in June 2009.

The use of the landfill site in Dushanbe is paid for per m3 of waste to be dumped. In 2009, 1.5 somoni (US$ 0.33) were charged for 15 m^3 of waste. Revenues of the landfill, which is located in the Shokhmansur District of Dushanbe, amounted to some 210,000 somoni (some US$ 48,000), less than half of the operating costs. This discrepancy is currently financed from the municipal budget.

Charges for water supply and sanitation services

Institutional framework

Water supply and sewage services in Dushanbe (the capital) and Khujand (the second largest city) as well as in some other towns (Chkalovsk, Rogun, Kairakkum, Nurek, Sarband) and two districts (Varzob and Spitamen) are provided by local water companies (*vodokanal)* that are owned by local municipalities (*khukumats).*

In other cities and districts, the water supply and wastewater treatment infrastructure is owned by the State unitary enterprise "Khojagii manziliyu-kommunali" (SUE KMK), which is responsible for the renovation and extension of the infrastructure network. Local water companies have to conclude service contracts with KMK and pay a fee for services (such as maintenance) provided by KMK. In rural areas, the provision of water supply is under the responsibility of the Ministry of Water Resources and Land Reclamation, but the operational responsibility lies with the local municipal administrations.

Water tariffs

Prices for water supply and sanitation are determined by the governmental regulatory authorities. This has typically involved the anti-monopoly agency and the Ministry of Economic Development and Trade. Tariff setting is based on, but need not reflect, tariff proposals established by local water companies, which are reviewed by the corresponding supervising local municipality or KMK. There is no transparency concerning the tariff-setting methodology or main objectives to be achieved by tariff policy. Water tariffs can differ significantly among cities (such as Dushanbe and Khujand), where the local water companies operate under the municipal administrations. In contrast, the local *vodokanals* that operate under KMK apply the same standard tariff, although their production costs differ depending on their location.

Tariffs are specified separately for water supply services and sewerage services (where the latter are available) and for three categories of customers:

- Residential users (private households);
- Government budget-funded institutions;
- Commercial users (enterprises).

The dominating feature is that tariffs for enterprises are significantly higher than the tariffs for private households and budget-funded institutions. In other words, there is considerable cross-subsidization of the latter by the corporate sector. By way of illustration, in Dushanbe, the water supply tariff paid by commercial users was more than seven times the rate applied to private households in 2009. In general, average tariff levels do not cover operational and maintenance costs.

Nevertheless, water supply and sanitation tariffs have increased in recent years. To a large extent, this reflects the need to adjust to the considerable increases in prices for electricity consumption, a major cost component of water production, and other cost items, notably salaries. But it also reflects an increasing emphasis on gradually improving the degree of cost recovery. This has been the case in particular with Khujand, where EBRD has been

operating, in cooperation with the Swiss State Secretariat for Economic Affairs (SECO), a water supply project since 2004.

The price of drinking water for private households in Khujand rose by 420 per cent in 2010 compared with 2006. Commercial users, who paid five times the price charged to private households in 2010, experienced a corresponding increase by 112 per cent. The pattern is similar in Dushanbe, but the price increases faced by private households are much less pronounced than in Khujand (table 5.4). As regards the *vodokanals* that are subordinated to KMK, drinking water tariffs for private households rose to 0.40 somoni per m^3 as from October 2010, twice the amount of 0.20 somoni that was paid before. Tariffs for commercial/industrial enterprises rose to 0.70 somoni, up from 0.29 somoni before.

Water consumption and metering

Although water tariffs specify the price per cubic meter of water consumed, there is only a very small share of domestic users have actually had individual meters installed to control water consumption. In Dushanbe, less than two per cent of private households had water meters installed in 2009. In Khujand, installation of meters has been increasing at a rapid rate, reaching 30 per cent of households in 2009 within the framework of the EBRD-SECO water sector project. In fact, there is evidence that water metering led to a significant decline in water consumption not only in Khujand, but also in Dushanbe.

In the absence of water meters, monthly water bills for private households are mainly based on average per capita consumption norms. These norms can, as in Dushanbe, depend on the type of housing and water-related equipment (such as bathtubs; showers). To illustrate, in Dushanbe, the drinking water consumption norm per month for a person varies from 9.9 m^3 per month (330 litres per capita per day (lcd)) to 14.4 m^3 per month (480 lcd) depending on the characteristics of the apartment (there are other consumption norms for persons living in individual houses).

These water consumption norms are quite high, and appear excessive when compared to actual water consumption in developed countries. There is, however, (anecdotal) evidence that actual water consumption by households is, in general, significantly above the established norms. The main reason is that there are no incentives for saving water, given that there is no link between charges and consumption.

As regards other user categories, there also appears to be a widespread lack of water meters, with the significant exception of Dushanbe. In Khujand, only 20 per cent of Government-funded institutions and 60 per cent of commercial/industrial users had metered water consumption in 2009. In the absence of meters, consumption is typically calculated on the basis of the daily flow capacity of connection pipes to the urban water supply network.

Revenues and financial viability of water utilities

In general, revenues from water supply and sanitation services are not sufficient to recover operational costs, let alone preventive maintenance costs, of water companies. This is reflected in the progressive deterioration of the water sector infrastructure and a decline in quantity and quality of water supply and sanitation services provided. The pervasive financial losses of water companies are reflected in the main tariffs, that are below unit production costs, but there is also a considerable volume of non-revenue water due to leakages in the infrastructure and inefficient billing mechanisms.

Bill collection rates have improved in recent years. On average, they are within a range of 80-90 per cent for private households and 90-100 per cent for commercial users. Collection rates for Government budget-funded institutions tend to be low (at some 50 per cent), but this mainly reflects the rigid budget allocations for water payments, which cannot, albeit only temporarily, be met in case of unanticipated tariff increases. There are no penalties for non-payment of bills by private households.

Only Government budget-funded organizations and commercial/industrial entities can be disconnected from the water network in case of non-payment, but this requires a court order. Nevertheless, incomplete collection of bills has led to the accumulation of considerable arrears, which amounted in the aggregate to some US$ 3.1 million during 2005-2008. These losses, in turn, are reflected in the inability of water utilities to pay their electricity bills and taxes due to the State.

A case in point is Khujand Water Company which, at the end of June 2009, had outstanding liabilities of 2.2 million somoni (about US$ 0.5 million) to Barki Tajik, the main electricity supplier. It owed a similar amount of tax payments to the State.

Table 5.4: Tariffs for drinking water supply in Dushanbe and Khujand, 2006-2010

Consumer group	somoni/m^3, excl. VAT				Memo-item US$/$m^3$
	2006	**2008**	**2009**	**2010**	**2010**
			Khujand		
Private households	0.098	0.220	0.340	0.510	0.12
Budget-funded institutions	0.160	0.430	0.670	0.830	0.20
Commercial entities	0.500	1.390	2.150	2.540	0.61
			Dushanbe		
Private households	0.025	0.100	0.118	0.160	0.03
Budget-funded institutions	0.087	0.300	0.350	0.540	0.08
Commercial entities	0.279	0.750	0.850	1.350	0.21

Source: Khujand Water Company Business Plan 2010-2019; World Bank (2010).
Note: Figures in US$ are based on applying the average annual exchange rate for 2009 (1US$=somoni 4.14)
Note: VAT was 20 per cent till end of May 2009; as from June 2009 VAT is 18 per cent.

Table 5.5: Electricity tariffs, 2007-2010

Customer category	VAT	**2007** February somoni/kWh	**2008** May somoni/kWh	**2009** December somoni/kWh	**2010** July somoni/kWh	Memo-item **2010** July US$/kWh
Residential customers (incl. VAT)	incl.	0.027	0.048	0.09	0.09	0.022
up tp 250 kWh per month	incl.	0.02	..	..	0.09	0.022
more than 250 kWh per month	incl.	0.034	..	..	0.09	0.022
Industrial and non-industrial users	excl.	0.036	0.1095	0.213	0.213	0.051
Talco	incl.	..	0.052/0.082	052/0.082	0.052/0.082	0.012/0.020
State budget funded institutions	excl.	0.02	0.0435	0.085	0.085	0.021
Pumping stations for water supply and irrigation	incl.	0.013	0.0291	0.015/0.057	0.015/0.057	0.004/0.014

Sources: 2007 Decree No. 37 on theTariffs for Electrical and Thermal Energy; 2009 Decree No. 678; 2010 Decree No. 259. Barki Tojik, direct communication.
Note: Tariffs for Talco and pumping stations are subject to seasonal variation. The first figure is for May-September; the second figure is for October-April.
WS = water supply

Revenues collected by the Dushanbe Water Company corresponded to only some 57 per cent of operating costs in 2009, but up from 40 per cent in 2002. Payments for water consumption are collected from special bill collectors, who go from customer to customer. Overall (monthly) bill collection rates were quite high (close to 90 per cent in 2009), but a major problem is that a large proportion of households and commercial users are not visited and therefore do not receive any bill at all. Given that payments are based on per capita consumption norms, there is also an incentive to understate the number of persons living in a household. In contrast, the financial situation of the Khujand water company has improved significantly in recent years, reflecting tariff increases combined with increased metering of consumption and managerial reforms. The company, which is heading for commercial viability, has been operating as an independent legal commercial entity since August 2006. It has concluded a Public Service Contract (PSC) with the municipal administration specifying the terms and conditions of its services, including incentives for performance improvements. The PSC is basically designed to ensure that KWC will develop into a financially sustainable water services provider. It is based on the corresponding OECD guidelines. The legal transformation of the Khujand water company took place within the framework of the Khujand Water Management Project, which has been implemented by EBRD since 2004.

Nevertheless, the dominant feature is that the operations of *vodokanals* in Tajikistan are currently not financially viable. The necessary further rehabilitation of the water sector infrastructure, notably the sewage and wastewater treatment infrastructure, are major challenges that lie ahead, given the considerable means required for financing these projects. Achieving commercially viable operations of water utilities will require action on a broad front, involving *inter alia* tariff reform designed to move closer to cost recovery, replacing the system of cross-subsidization with a unified tariff

for comparable services, ensuring complete collection of bills, and defining a transparent policy for targeted social assistance to ensure affordability of adequate water supply for financially vulnerable members of society. There is also an urgent need to expand the installation of water meters, which is complementary to tariff reform, in order to provide effective incentives for rational water use. In a similar vein as in Khujand, moreover, institutional reform may be required, which establish water utilities as independent public companies that are accountable to the municipality on the basis of a service contract.

Electricity tariffs

Background

Some 98 per cent of electricity production in Tajikistan comes from hydropower plants (HPP). Electricity is the major cost factor for the production of cotton and aluminium, which account for the lion's share of Tajikistan's exports. The national aluminium company, Talco, accounts for about half of national electricity consumption in 2007. Pumping stations for irrigation water accounted for another 11.5 per cent and residential consumers for some 21 per cent in 2007. But the potential for hydropower in Tajikistan is largely unexploited.

The creation of additional power-generating capacity could become a mainstay of economic growth in the event that this additional electricity can be exported to neighbouring countries in Central Asia and beyond. In this context, the Government has been putting major emphasis on the completion of the 3600 MW Rogun hydroelectric power plant project, which was started in the 1976 but had to be discontinued for lack of funds after the collapse of the Soviet Union. At the request of the Government, the World Bank is currently organizing an assessment of the economic, technical, social, environmental and riparian issues involved as well as the cross-border impacts of this major project.

For the time being, however, Tajikistan has difficulties in meeting even the domestic annual demand for electricity. This is reflected in energy supply shortages during winter, when demand is high. The existing energy sector infrastructure is very old and run-down, reflecting more than two decades of only insignificant investment and considerable damage from the civil war (1992-1997). While virtually all of the urban and rural population has access to electricity, most of the rural population is faced with frequent power outages.

One of the major priorities of the Government has therefore been the rehabilitation, modernization and expansion of the electricity generation facilities as well as of the transmission lines and substations. Part and parcel of the energy sector development strategy is a reform of electricity tariffs and improvement of collection rates to ensure financial sustainability of energy utilities and thereby also attract external investment funds. In this context, foreign investment was attracted for the construction of two important hydropower plants, i.e. Sangtuda 1 (Russian Federation) and Sangtuda 2 (Islamic Republic of Iran) as well as for the construction of South-North transmission lines (China). The Asian Development Bank (ADB) has been making considerable loans available within the framework of its project on rehabilitation of the energy sector. The World Bank, in cooperation with SECO, has been operating an "Energy Loss Reduction Project", which is designed to reduce commercial losses in the electricity system of Dushanbe City by replacing obsolete counters with modern ones, thereby increasing the financial viability of electricity utilities. The Kuwait Development Bank has also made soft loans available for the rehabilitation of the electricity grid in Dushanbe.

Regulation of electricity market

The energy market in Tajikistan is largely dominated by Barki Tojik, a 100 per cent State-owned joint-stock company. Barki Tojik controls the generation, transmission and distribution of electricity in all of Tajikistan with the exception of the Gorna-Badakhstan Autonomous Oblast (GBAO). In GBAO, the electricity network has been operated by a private company, Pamir Energy since 2002. It was established with the support of the Aga Khan Foundation for Economic Development and the International Finance Company (IFC).[5]

The Government intends to separate energy generation from transmission and distribution, but so far Barki Tojik has only been unbundled into three vertically integrated network companies, i.e. there is no separation of the above-mentioned functions.

The tariff-setting policy is defined by the 2001Law on Natural Monopolies; but there is a lack of transparency concerning the effective principles of tariff setting. The State Agency for Antimonopoly Policy and Industrial Development, which was established in 2001, had a mandate to oversee natural monopolies. Yet it was abolished in 2006 (2006

[5] Pamir Energy has been operating under a 25-year concession agreement with Barki Tojik since 2002.

Decree, No. 9) and its regulatory functions were transferred to the Ministry of Economic Development and Trade. This decision was, however, reversed in March 2010, when new legislation (Decree No. 832/2010) re-established the Anti-monopoly service under the Government. In any case, there has not been any independent energy sector regulator so far. The ultimate authority for setting electricity tariffs is the Government, which typically announces tariff changes by decree.[6]

The general feature has been for average tariffs to be set below cost recovery levels during recent years. Moreover, there has been strong cross-subsidization of private household electricity consumption by industry. Other important problems have been the non-payment of bills by large consumers and high technological and commercial losses. The mirror image to this has been the considerable quasi-fiscal deficits accumulated by Barki Tojik.

Against the background of an unsustainable tariff regime, the Government agreed with ADB and World Bank a programme for progressive increases in tariffs for all customer categories with the target to achieve full cost recovery by 2010. Since 2007, when the tariff reform was launched, there have indeed been sizeable increases in electricity tariffs for all customer categories (table 5.5).

Tariffs for private households had risen by a factor of 4.5 in July 2010 compared with the beginning of 2007. Industry tariffs had risen by a factor of about 5.8. It is noteworthy that the seasonal tariffs for Talco, which accounts for about half of the electricity consumption in Tajikistan, are significantly below the sector average.

In addition, the collection rate for electricity bills has increased in recent years, amounting to some 75 per cent in the first half of 2010. ADB-supported projects aim at a collection rate of 90 per cent by 2012. Barki Tojik revenues from electricity bills covered 84 per cent of production costs in 2008-2009.

The degree of non-payment of electricity bills, notably by public sector entities and private households, has been considerable in past years. The total arrears, broadly equally shared by the two sectors, amounted to some 360 million somoni (some US$ 80 million) at the end of June 2010. As regards public entities, the accumulated debt stems from the costs of electricity for pumping stations for water supply and irrigation, which in principle have to be paid for mainly by the Ministry of Land Reclamation and Water Resources and the Ministry of Agriculture.

As regards the affordability of electricity consumption for the population, a minimum consumption of electricity consumption was available at a preferential tariff ("lifeline tariffs") for all households (table 5.5) until 2007, but it was abolished within the framework of the tariff reform. It is noteworthy, however, that the implicit subsidies in lifeline tariffs are, in general, not well targeted given the substantial leakages to higher-income households.

However, the Government operates a subsidy scheme targeted at poor and vulnerable persons, which provides compensation for electricity and gas bills.

The programme is implemented by the State Agency for Social Protection, Employment and Migration within the Ministry of Labour and Social Protection. Assistance is authorized by special local committees (at the town/rayon/village level) based on a review of the financial situation of the applicants, i.e. assistance is, in principle, means-tested.

Every family entitled to assistance is reimbursed a certain amount of consumed gas and electricity. In 2009, some 241.000 households were entitled to such support, amounting in the aggregate to some 36 million somoni (US$ 8.7 million).[7] The average annual payment per household amounted to some 150 somoni (US$ 36).

Social assistance is, however, considered to be insufficiently targeted at the poorest parts of the population, so the Government intends to develop a new social targeting mechanism within the framework of a shift to a unified social benefit system, which also integrates assistance needs for purposes other than electricity and gas bills.

The social affordability issue has become more acute in view of the more or less simultaneous increase in tariffs for water supply and sewage, electricity and waste collection in recent years. The increased costs of these services fall disproportionately on low-income households, given that they account for a larger share of their income.

[6] In fact, Article 6 of the Law on Energy stipulates that the Government decides the general price and tariff policy in the energy sector.

[7] At average annual exchange rate of TJS 4.14 per dollar for 2009.

Table 5.6: Selected fees for the use of wild animals and plant species, 2010

Species/Products	Unit	Price per unit	
Animals		**somoni**	**US$**
Markhor (*Capra falconeri)*	Piece	166,388.4	40,190.4
Marco Polo sheep (*Ovis ammon polii)*	Piece	51,000.3	12,318.9
Brown bear (*Ursus arctos*)	Piece	6,375.0	1,539.9
Wild boar (*Sus scrofa)*	Piece	63.7	15.4
Quail (*Coturnix coturnix*)	Piece	1.9	0.5
Plants			
Anzur chives (*Allium grandiflora)*	kg roots	3.2	0.8
Rosehip (*Rosa canina)*	kg fruits	1.9	0.5

Source: 2008 Government Decree, No. 324.
Note: Markhor = wild goat of mountainous regions from Afghanistan to India. Figures in US$ were calculated using the average annual exchange rate for 2009 (1US$ = 4.14 somoni)

Fees for natural resource use

Fauna and flora

The use of fauna and flora requires a permit[8], which is issued by the CEP Control Department for the Use of Flora and Fauna. All forests are State property ("State Forest Fund"), and there are forest management enterprises (*leskhozes*) in charge of sustainable management of natural resources in designated areas (Chapter 9).

These enterprises collect fees for the use of natural resources (fishing, hunting, timber, flora collection), which finance the bulk of their budget expenditure.

Revenues from resource use and fines collected by forest enterprises amounted to 655,000 somoni (about US$ 158,000) in 2009. These revenues are, however, also subject to taxation by local and central government. Fees for use of natural resources in areas that are not managed by the *leskhozes* are collected by the CEP Control Department and transferred to a special SCEP fund (formerly known as the Environmental Fund) of the CEP.

Fees for natural resource use are set by the Government. The currently applicable tariffs are specified in the 2008 Government Decree, No. 546. The methodology for setting these fees is not transparent, and it has not involved the CEP Control Department. User fees are, in principle, adjusted for annual inflation. Some examples of user fees for 2010 are shown in table 5.6.

The CEP Control Department considers that the hunting fees for some of the larger mammals are excessively high. In the event, the legal exploitation of these species is not financially viable for hunters; rather, it encourages their unsustainable illegal exploitation. In turn, this erodes the income of local communities and businesses from sustainable resource use, in addition to threatening the conservation status of the corresponding species. The same applies to numerous species which are quite attractive to trophy hunters, including those that are listed in the Red Book but not threatened by extinction (such as the Marco Polo sheep). In contrast, the fees for many of the most hunted species are very low and therefore generate only negligible revenues.

Total official fees from hunting, which are collected by the CEP Control Department, amounted to only some 28,000 somoni (US$ 6,750) for the 2008/2009 season and some 21,400 somoni (US$ 5,170) for the 2009/2010 season. Total fees for use of fauna and flora channeled to the State Environmental Fund amounted to 36,000 somoni (about US$ 8,700) in 2009.[9]

Irrigation of agricultural land

Agricultural production in Tajikistan is largely dominated by cotton and is therefore primarily based on irrigation farming, which accounts for some 85 per cent of total water use in Tajikistan. Although all agricultural land has been privatized, the State has retained ownership of the irrigation and drainage network.

[8] Licenses are required for the exploitation of Red List species and for medicinal plant collection, processing and marketing. These licenses are issued by the Ministry of Health. However, revenue from license fees appears to be very small.

[9] Amounts in US$ were calculated using the average annual exchange rate for 2009 (4.14 somoni = US$ 1).

The Ministry of Land Reclamation and Water Resources (MoLRWR) is in charge of implementing water resources management related to irrigation in agriculture. This is done in cooperation with the Water Users Associations (WUAs), which carries out water management functions at the level of (agricultural) households and agricultural fields, including the collection of bills for water use. However, the WUAs do not have any reporting obligation *vis-à-vis* MoLRWR.

Payments for use of water for irrigation were introduced only in 1996[10]. The rationale was to ensure that water users should pay for the costs of operation and maintenance of irrigation and drainage systems. Tariffs are set by the Ministry of Economic Development and Trade. Fees were raised in 2002 and then in again 2008. The current fee is 0.018 somoni per m^3 incl. VAT of 18 per cent. This corresponds to about US$ 0.04 at average 2009 exchange rates. This tariff is about 90 per cent higher than in 2002. When adjusted for inflation (CPI), however, fees in 2009 were actually some 10 per cent lower in real terms than in 2002.

There have been persistent problems with the measurement of water used; at most water intake points there are no meters and available resources for alternative controls of water flows (based on time and technical parameters) are inadequate. Water use is therefore estimated largely by applying "rules of thumb". The collection rate of payments for water used for irrigation services is only 30 per cent. Revenues cover only a small share of the operating costs of the irrigation network, which in the absence of adequate maintenance has been deteriorating progressively.

The mirror image to the low collection rate is a sizeable accumulation of arrears by farmers, which at the end of June 2010 amounted to some US$ 50 million. Sanctions for non-payment of bills in the form of cut-off from the supply network are not applied by local authorities, given that lack of water for irrigation would adversely affect agricultural output and thus tax revenues for the Government budget. In turn, non-payment for irrigation water has led to the accumulation of huge debt by MoLRWR, which does not have the resources for paying the bill (to Barki Tajik) for the electricity used by pumping stations for irrigation water.

[10] 1996 Presidential Decree on Introduction of Payment for Water Supply Services from State Sources and 1996 Government Policy on Approval of Policy of Payment for Water Supply Services from State Sources, No. 281.

Payments for the exploration and extraction of mineral resources

Tajikistan has the world's largest reserves of barite, lead and tungsten, and is also among the leading countries as regards reserves of chromite, silver, zinc and manganese. In addition, it has considerable deposits of copper, gold, iron ore and coal. Many of these resources are not yet exploited on a significant scale. Licenses for these activities are issued by the State for mineral resources such as metal ores and precious metals and stones. Local Governments (*hukumats)* issue licenses for "common mineral resources", such as sand, clay and gravel.

The exploration and extraction of mineral resources is subject to a range of charges (license fees, royalties, bonus payments), which are detailed in the Tax Code. All these payments are specified in the mineral use contract between the Government and the extracting enterprise. Payments are solely aimed at generating Government budget revenues, without any known concern for environmental impacts of the associated activities. It is noteworthy that the new Tax Code, which entered into force in 2005, also established a royalty payment for mining of groundwater. The use of water resources for production of electric energy at hydropower plants is also subject to a royalty, currently set at 0.06 somoni per 1,000 kWh of electricity generated per month. There is, however, a tax exemption for facilities with a generating capacity of 1,000 kW or less.

Road transport-related taxes and fees

The rapid increase in the number of motor vehicles in circulation has become a major source of urban air pollution in Tajikistan. In 2009, the number of registered motor vehicles rose by some 45 per cent compared with 2006. While the authorities gave priority to rehabilitating the transport infrastructure, regulatory measures for effective control and abatement of emissions from motor vehicles are largely absent. The existing system of pollution charges and motor vehicle taxes is mainly geared to raising fiscal revenue. Excise rates on gasoline are relatively low, while those for diesel are negligible.

Pollution charges

The regulation of payment for air emissions (RD 01-93) includes payments for emissions from mobile sources, mainly for on-road vehicle classes as well as trains and airplanes. However, there are no pollution charges based on a system of emission factors; rather, there are "product charges" for broad classes of vehicles. To illustrate, in 2010, the charge rate for an

individual motor car was 5.4 somoni (corresponding to some US$ 1.20) per annum. In a similar vein, there are payments for the use of different kinds of fuels, with an average charge rate of some 0.035 somoni (US$ 0.008) per ton. These are purely fiscal instruments for raising Government revenue, which do not have any environmental purpose. These charges will be increased by 56 per cent as from the beginning of 2011, but as noted above (in the section dealing with pollution charges), this only partly offsets the erosion of the real value of these payments through inflation since 2001.

Vehicle ownership tax

A local tax on motor vehicle owners is differentiated by type of motor vehicle. The Tax Code stipulates that the tax base is the engine capacity, but tax rates are only differentiated for very broad categories of motor vehicles (Chapter 47, Articles 334/355 of the Tax Code). Tax rates for each vehicle category are expressed as a percentage (within a range of 1 to 5.5 per cent) of minimum monthly wages in force at the time the tax payments are due. Total revenue amounted to 45 million somoni (US$ 10.1 million), corresponding to 0.2 per cent of GDP in 2009. Revenue is projected to rise to some 50 million somoni in 2010.

Road tax

Enterprises that deliver goods and/or provide services subject to VAT have to pay a road tax (Chapter 40 of the Tax Code). Deliveries of imported goods that are subject to VAT are, however, excluded from the road tax. However, the tax is not related to actual road use. The tax base is total turnover; and the statutory tax rate is 2 per cent, with the exception of trade, procurement and distribution companies, which are subject to a tax rate of 0.5 per cent. Tax revenues are considerable, amounting to 187.4 million somoni (US$ 45.3 million) corresponding to 0.9 per cent of GDP in 2009. For 2010, tax revenue is projected to increase to some 210 million somoni.

Road tolls

A road toll was introduced in April 2010 for a 350 km highway, which leads from Dushanbe to the Uzbek border town of Chanak. A rehabilitation project for this highway was launched in summer 2006, largely financed by a 20-year loan (US$ 281 million) at favourable terms from the Government of China (the associated construction work has been carried out by a Chinese company). Additional financing of US$ 14 million has been provided by the Government.

The collection of the road toll is organized by a private company within the framework of a public-private partnership with the Government. The private company is also in charge of road maintenance and other road services. Details about the use of revenues collected have not been made public. The user fee per km is 0.30 somoni (about US$ 0.07) for a standard passenger car, corresponding to 105 somoni (about US$ 23) for the maximum distance of 350 km. The corresponding charges for a truck (14 tons and above) are 1.5 somoni (US$ 0.33) per km and 525 somoni (about US$ 115) for the maximum distance. Given the average low incomes in Tajikistan, these fees appear to be quite high.[11]

Fuel quality standards

There is only minor domestic refinery capacity in Tajikistan, and the bulk of gasoline is imported from the Russian Federation. Smaller suppliers are Kazakhstan, Kyrgyzstan and Turkmenistan. Quality standards for imported fuels are quite low. A recent study by the International Fuel Quality Centre ranked Tajikistan 90th out of 100 countries in terms of gasoline quality, as was gauged by sulphur content. Other countries in Central Asia (Kazakhstan, Turkmenistan and Uzbekistan) had a similar ranking. Given that countries from which Tajikistan imports fuels have officially banned the production of leaded gasoline, all imported gasoline should, in principle, be free of lead since 2000. In reality, however, leaded gasoline is still used widely in Tajikistan, reflecting *inter alia* weak monitoring systems at customs and technical inspections. Nor is there any official regulation banning the use of leaded petrol or any economic incentive for the production and use of clean fuels.

Excises on petrol for motor cars are negligible. They amount to €50 (some 300 somoni) per ton of (regular) gasoline, corresponding roughly to € 0.035 (0.21 somoni) per litre. This amounted to some 5 per cent of the pump price (4.20 – 4.50 somoni per litre) in September 2010. Diesel is taxed much lower at €6 (some 36 somoni) per ton, broadly equivalent to €0.0056 (0.034 somoni) per litre.[12] Gasoline prices were within a range of 4.20 – 4.50 somoni per litre in early October 2010. Excises for diesel corresponded to less than 1 per cent of the pump price (about 4 per litre somoni) in early October 2010. Besides excises,

[11] To illustrate, the fee for a standard passenger car driving on the highway from Paris (France) to Geneva (Switzerland, a distance of some 530 km, is €40.40.

[12] One ton of regular gasoline corresponds to some 1,430 litres; for diesel fuel one ton corresponds to some 1,170 litres.

all fuels are subject to the standard VAT rate, which was lowered from 20 per cent to 18 per cent as from 1 July 2010.

Technical inspections

There are mandatory technical inspections for motor vehicles, performed in State-owned facilities that operate under the authority of the Ministry of Internal Affairs. Control of exhaust emissions was introduced only in 2010. Inspections are annual for passenger cars and bi-annual for trucks. The inspection fee for passenger cars amounted to 63 somoni (US$ 13.8) in 2010. However, inspections lack stringency in view of the high age of most cars and the low incomes of most car owners. It is, nevertheless, envisaged within the framework of the Transport Strategy for the period 2008-2025 to gradually reduce the maximum age allowed for imported passenger cars to 10 years and 15 years for buses compared to the current 25 years.

5.3 Expenditures for environmental protection and their financing

The National Development Strategy (NDS) for the period up to 2015 (adopted in 2007) defines the major challenges, goals and priorities for three major policy spheres:

- Creation of an effective institutional and legal framework (functional sphere);
- Development of agriculture, industry and services (production sphere);
- Promotion of education, research, social welfare, environmental protection, water supply, sanitation, housing and communal services (social sphere).

Within the NDS framework, the Government has developed a Poverty Reduction Strategy (PRS), which is basically a rolling three-year medium-term programme designed to progressively achieve the main targets defined in the NDS. So far, the Government has adopted a PRS for three periods: 2004-2006; 2007-2009; and 2010-2012. The other pillar for implementation of the NDS is a three-year Medium-Term Expenditure Framework (MTEF), which the Government decided to develop in 2006. A main purpose of the MTEF is to gauge the size of financial resources needed in order to implement existing policy commitments. It also provides a framework for considering policy trade-offs in the face of scarce financial resources. This instrument is being introduced gradually and is currently limited to sectors that are priority areas for the NDS and the PRS. To date, these do not include environmental protection.[13] The latest MTEF is for the period 2011-2013.[14]

Given the scarcity of domestic financial resources, the bulk of financing needs for projects within the NDS framework are met by foreign sources. One key mechanism for promoting major investment projects designed to modernize and enhance the infrastructure and boost industrial development is the Public Investment Programme (PIP).

Projects under this umbrella are fully financed by foreign loans and grants. Infrastructure projects under the heading of "Environmental protection" account for only a very small share of total resources committed.

Outside the PIP, however, foreign assistance plays a dominant role in the financing of environmental protection projects, reflecting the fact that only modest resources have been made available from the Government budget and environmental funds.

Government expenditures on environmental protection

State budget

During the review, no information at all was provided on the budget of the Committee on Environmental Protection.

The financial support provided by the Government for environmental protection can be gleaned from the projected expenditures for the PRS for 2007-2009 and 2010-2012 (table 5.7). There is no information on the detailed actual expenditures under the PRS 2007-2009. The PRS for 2007-2009 envisaged total spending of some US$48 million on "environmental sustainability", of which US$ 1.8 million (a share of 3.8 per cent) were to be financed from the State budget, and some 96 per cent from foreign assistance.

It should be noted, however, that about half of the total financial needs for implementing the entire PRS for 2007-2009, including for environmental protection projects, had not been confirmed by the time the PRS was adopted by the Government in April 2007.

[13] These are education, health, social protection, agriculture, energy, transport and communication, land melioration, water industry, and culture.

[14] In principle, there should have been a MTEF for 2010-2012, but it was postponed because of the adverse impact of the global financial crisis on Government finances.

Table 5.7: Environmentally-related expenditures in the Poverty Reduction Strategy (PRS), 2007-2009 and 2010-2012

US$ million

Economic sector	PRS	Total funds needed	Approved financing			Potential sources for financing		
			Government budget	Foreign financing	Total	Government budget	Foreign financing	Total
Environmental sustainability	2007-2009	47.8	1.8	22.5	24.3	0.0	23.5	23.5
	2010-2012	61.0	2.5	9.6	12.1	20.0	28.9	48.9
sanitation,housing and municipal services	2007-2009	180.2	5.4	35.6	40.9	0.0	139.3	139.3
	2010-2012	90.9	1.0	0.0	1.0	1.0	88.9	89.9
Total above	**2007-2009**	**228.0**	**7.2**	**58.1**	**64.4**	**0.0**	**162.8**	**162.8**
	2010-2012	**151.9**	**3.5**	**9.6**	**13.1**	**21.0**	**117.8**	***138.8***
Total expenditures on PRS	**2007-2009**	**4,798.7**	**239.3**	**2,014.4**	**2,253.7**	**0.0**	**2,545.0**	**2,545.0**
	2010-2012	**10,951.1**	**891.9**	**1,957.7**	**2,849.7**	**294.0**	**7,786.5**	**8,101.4**
Memorandum item:								
Percentage shares in total PRS								
Environmental sustainability	2007-2009	1.0	0.8	1.1	1.1	0.0	0.9	0.9
	2010-2012	0.6	0.3	0.5	0.4	6.8	0.4	0.6
Water supply, sanitation,etc.	2007-2009	3.8	2.3	1.8	1.8	0.0	5.5	5.5
	2010-2012	0.8	0.1	0.0	0.0	0.3	1.1	1.1
Total above	**2007-2009**	**4.8**	**3.0**	**4.8**	**2.9**	**0.0**	**6.4**	**6.4**
	2010-2012	**1.4**	**0.4**	**0.5**	**0.5**	**7.1**	**1.5**	**1.7**

Sources: Poverty Reduction Strategy of Tajikistan for 2007-2009, appendix 1. Poverty Reduction Strategy of Tajikistan for 2010-2012, Dushanbe 2010; table 5.
Note: Approved financing and uncovered funds at the time PRS was adopted by the Government of Tajikistan.

The share of the "environmental sustainability" sector out of total PRS financing needs amounted to one per cent. Less than four per cent of total financing needs for environmental protection was to come from the Government budget. In fact, Government resources to be allocated to environmental protection within the framework of the PRS 2007-2009 (i.e. US$ 1.8 million) amounted to a scant 0.1 per cent of actual State budget expenditure (5,643 million somoni, or US$ 1,363 million) in 2009. There is a broadly similar pattern as regards the environmental projects to be financed from the State budget under the PRS 2010-2012. Total planned environmental expenditures of US$ 22.5 million during 2010-2012 correspond to only 0.4 per cent of projected total State budget expenditures (some 24,000 million somoni, or some US$ 5,800 million) during 2010-2012. [15]

A recent action plan of November 2009 for the implementation of the new Environmental Protection Concept, which was developed with the support of OSCE, indicates various projects to be financed from the State budget, State special funds (formerly known as environmental funds; see below) and foreign assistance during 2010-2012. The overall funds involved are rather modest, amounting to 32 million somoni (US$ 7.8 million at average 2009 exchange rate), or, on average, some 11 million somoni per annum (table 5.8). The latter corresponds to 0.15 per cent of total Government expenditures in 2010. But resources from the State budget are to finance only about one- third of total project costs during 2010-2012, equivalent to some 3.3 million somoni per annum or 0.05 per cent of total State budget expenditures in 2010.

Environmental (special) funds

In general, environmental funds are earmarked financing mechanisms designed mainly to overcome the problem of limited availability of financial resources and low priority attached by Governments to the environment in the budgetary process. In Tajikistan, the number of environmental funds is very large. Besides the State Environmental Fund, which is managed by CEP, there are some 50 other funds at the local Government level (regions, cities, municipalities) administered by the corresponding CEP local branches.

Since 2010, environmental funds are no longer classified as extra-budgetary funds, but rather integrated - as earmarked "special funds"- in the State budget. (Order of Ministry of Finance on Environmental Funds No. 16/2010) From 2007 to May 2009, however, the Government decided to

[15] Budget expenditures as indicated in the MTEF 2011-2013 (pp. 20-21). Figures in US$ were calculated using the average annual exchange rate for 2009 (US$ 1= 4.14 somoni).

divert the revenues earmarked for environmental funds to the general State budget. The background to this was the impact of the global financial crisis on the national economy. However, the diverted funds were returned to their original purpose in 2009.

The main revenue source for environmental (special) funds has been payments by enterprises of air and water pollution charges and for waste generation. Notwithstanding, the 2010 Order No. 16 of the Ministry of Finance concerning environmental funds, which entered into force February 2010, stipulates, that water pollution charges are no longer earmarked for environmental funds but are used for financing general Government expenditure. It is noteworthy that 10 per cent of revenues collected by local branches of CEP in the so-called regions of Republican subordination, which includes notably Dushanbe, are not earmarked for environmental protection but are part of general Government revenues.

Besides charges for air pollution and waste generation, other revenues earmarked for environmental protection are payments for use of fauna and flora; and payment of compensation for environmental damage. In 2009, aggregate revenues of environmental funds amounted to some somoni 3.3 million somoni (US$ 0.80 million).

Some 55 per cent of total resources were accounted for by payments for production waste (table 5.9). This revenue is shared between the environmental funds at the State and local level following a defined distribution key In 2009, the State Environmental Fund received somoni 0.78 million (some 25 per cent) of the total revenue, while the remaining somoni 2.42 million was shared among the 50 local funds.

On average, each local fund had some somoni 48,000 (US$ 11, 600) at its disposal. The total earmarked revenues of 3.3 million somoni corresponded to only 0.05 per cent of total State budget expenditure (5,643 million somoni) in 2009. Environmental (special) funds account for some 7 million somoni (some 20 per cent) of estimated resources for the draft action plan for the implementation of the new Environmental Protection Concept during 2010-2012 (Table 5.8). This corresponds to some 2.3 million somoni per annum (US$ 0.55 million), equivalent to 0.03 per cent of total State budget expenditure in 2010.

There is no published information on issues such as collection rates of payments due or activities of these special funds in recent years. It may be surmised that the very limited funds were mainly used for administrative needs. It is not known to what extent the funds' revenue actually covers the costs of their administration, including revenue collection.

Foreign financing resources

Tajikistan relies heavily on foreign financial resources to implement economic, social and environmental investment projects within the framework of its national development strategy. The bulk of costs for national development projects, including for environmental protection, is financed by means of bilateral and multilateral loans at concessional terms (i.e. at more favourable conditions than available commercially) and grants. Besides multilateral assistance from IFIs and bilateral assistance from OECD/DAC member countries, there has been a conspicuous increase in bilateral assistance from China, the Islamic Republic of Iran, Kazakhstan, the Russian Federation and Saudi Arabia.

The latter countries have largely focused their support (soft loans) on infrastructure projects in the energy and transport sectors. Inflows of FDI have been relatively modest so far compared to other countries from Central Asia and the Caucasus, which have been benefiting from the fact that they are exporting oil and natural gas. However, the weak FDI performance also reflects investors' concerns over property rights issues, corruption and unpredictable bureaucracy.

Since end-2006, a new body - the State Committee on Investment and State Property Management (SCI) – has been mandated to focus on the issues of promoting a favourable investment climate (notably for foreign investors), support for entrepreneurship and foreign aid coordination in accordance with the Regulation on the Committee on Investment and State Property Management adopted in December 2006.

Following the 2006 Presidential Decree on Improving the Structure of Central Executive Bodies, No. 9, SCI has taken over the functions of the former Committee for State Property Management, established in 1997, as well as the functions of the Aid Coordination Unit under the Executive Administration of the President.

A special database "Aid coordination and project management systems" (ACMPS) has been created with the help of ADB, which contains information on foreign assistance since 2002.

Table 5.8: Environmental projects, 2010-2012

Million somoni

Area	Funds required	Projected financing sources		
		Special funds	State budget	Foreign assistance
Environmental safety	1.70	0.38	0.21	1.11
Environmental education	1.84	0.41	0.13	1.30
Environmental legislation	0.53	0.13	0.08	0.33
Scientific support	0.90	0.30	0.30	0.30
Quality of water resources	2.14	0.27	0.13	1.74
Land resources	7.73	0.24	6.07	1.42
Waste management	2.04	0.42	0.28	1.34
Ambient air	0.15	0.05	0.01	0.09
Biodiversity	5.15	1.83	0.81	2.51
Nature protection areas	5.75	1.95	1.20	2.60
Forestry	1.85	0.67	0.26	0.92
Environmental monitoring	0.12	0.03	0.02	0.07
Environment and human health	0.72	0.17	0.08	0.47
Environmental statistics	1.22	0.18	0.12	0.92
Environment and business sector	0.31	0.03	0.03	0.25
Civil society organizations	0.05	0.01	0.01	0.04
Total above	**32.20**	**7.06**	**9.73**	**15.41**
Memo-item				
Percentage shares	100.00	21.94	30.22	47.85
Total above in US$ million	7.78	1.71	2.34	3.72

Source: Annex 1. Draft Action Plan as of 3 November 2009 on Activities for the implementation of the Environmental Protection Concept of Tajikistan.
Notes: Figures in US$ were calculated using the average annual exchange rate for 2009 (1 US$ = somoni 4.14).

A Joint Country Support Strategy (JCSS) for 2010-2012 was, moreover, prepared by major development partners[16] in the wake of the June 2007 Tajikistan Development Forum in Dushanbe, *inter alia* with the aim of ensuring not only a shared strategic vision but also more effective coordination and management of financial support provided and common benchmarks for monitoring aid effectiveness. At the same time, a Donor Coordination Council has been established, which comprises representatives of all major bilateral and multilateral and UN agencies, as well as of diplomatic missions of countries that are providing assistance to Tajikistan. The major goal of the Council is to create an environment conducive to networking, strengthening the exchange of information and fostering broader cooperation within the donor community. In the past, the effectiveness of foreign aid in Tajikistan has, however, not only been affected by a lack of donor coordination but also by the low absorptive capacities and institutional weaknesses in the Government sector.

It is noteworthy that Tajikistan has been selected, together with eight other countries and two regions, to participate in the Pilot Programme for Climate Resilience (PPCR) within the framework of the Strategic Climate Fund (SCF). SCF is a multi-donor trust fund which, together with the Climate Technology Funds, constitutes the Climate Investment Funds that are channelled by major multilateral development banks[17] to developing countries.

The objective of the pilot programme is to promote the integration of climate resilience concerns in national development planning in a manner that is consistent with poverty reduction and sustainable development goals (Chapter 6).

[16] These are (in alphabetical order) the Aga Kahn Foundation, the Asian Development Bank, the European Bank for Reconstruction and Development, the European Commission, Germany, the Organization for Security and Co-operation, the Swedish International Development Cooperation Agency, Swiss development cooperation, the UK Department for International Development, United Nations Agencies, the United States Agency for International Development, and the World Bank Group [see www.untj.org/jcps/documents].

[17] These are the African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, the Inter-American Development Bank, and the World Bank Group.

In its national development strategy, the Government has put major emphasis on the rehabilitation and extension of the energy sector and the road transport infrastructure. These two sectors accounted for some 70 per cent of the Government's public (infrastructure) investment programme (PIP) for 2007-2009, which is fully financed by foreign loans and grants. Investments in environmental protection projects had a share of only 0.5 per cent of the total; water supply and sewage accounted for another 2.5 percentage points (table 5.10).

Energy and transport projects account for some two-thirds of foreign financial assistance (commitments and disbursements) provided to Tajikistan between 2003 and 2008. Total disbursements of foreign assistance amounted to some US$ 1.1 billion, corresponding to some 64 per cent of total funds committed. Total funds committed to the category "environmental sustainability" amounted to US$ 41.7 million, corresponding to 2.5 per cent of overall commitments (table 5.11). More than half of the total funds committed for environmental projects are accounted for by an ADB project loan of US$ 22 million for addressing flood risk in Khatlon province. This project started in 2008 and is scheduled for completion in 2013.

Total disbursements of funds for environmental protection represented a share of less than 1.8 per cent of overall disbursements during 2003-2008. Apart from the ADB loan, all the other resources made available for environmental protection are grants from a large variety of donors.

As regards commitments of resources for the water supply and sewage sector (US$ 68.7 million, or 4 per cent of overall commitments), these are largely accounted for by grants and/or loans for projects in Dushanbe. The World Bank Group accounts for the lion's share (US$ 40.2 million, or 58.5 per cent) of total commitments, with an exclusive focus on Dushanbe. The development of the Dushanbe water supply and sewage infrastructure was also supported by a large loan (US$ 9.5 million) from the Islamic Development Bank. Outside Dushanbe, a project on "Potable water supply improvement in Mir Said Alii Khamadoni district" was supported by a large grant (US$ 12.8 million) from the Government of Japan.

In the aggregate, projects under the heading of environmental sustainability accounted for US$ 107 million (or 6.5 per cent) of total commitments and some US$ 60 million (or 5.7 per cent) of total disbursements at the end of 2008. Although these figures reflect the situation at the end of 2008, they tend to indicate that the expectations for external financing of environmental and water supply projects built into the PRSP 2007-2009 were probably too optimistic (table 5.7).

By way of comparison, table 5.12 depicts environmentally-related ODA reported by OECD/DAC during 2004-2008. Cumulative gross disbursements, including for water supply and sanitation, amounted to some US$ 62 million or about 7 per cent of all ODA to Tajikistan during 2004-2008. This is similar to the disbursements of US$ 60 million reported by the Tajikistan SCI. But direct comparisons are difficult, given that not all countries and financial institutions that provide assistance to Tajikistan report to the OECD/DAC.

More generally, the similarity of total disbursements conceals more or less large differences in foreign aid classification systems and in the definition of what constitutes an environmentally-related project.

It should also be recalled that projects in sectors other than environment can have more or less large direct and indirect environmental benefits. A case in point is the World Bank-supported Energy Loss Reduction Project, which is designed to help the electricity and gas sector to reduce commercial losses, *inter alia* via the installation of modern meters for energy consumption. In combination with tariff reform, this should lead to more rational use of energy by consumers, with associated reduced demand for energy. The same holds e.g. for investments that reduce power transmission losses.

5.4 Enterprise sector and expenditures on environmental protection

The privatization of medium- and large enterprises, which started in 1990, has been largely completed. However, the State has retained control of some larger industrial companies, which are considered to be of strategic importance.

These include notably the aluminium producer Talco, the dominant energy company, Barki Tajik and the national cement company, TajikCement. Taken together, these large companies account for a significant share of employment and output in the economy.

The process of privatization has been governed by the 1997 Law on Privatization and complementary regulations. The agency that is now responsible for the privatization of State-owned enterprises (SOEs) is the State Committee for Investment and State Property Management.

Table 5.9: Financial resources of environmental funds, 2009

Source	somoni million	US$ million	Percentage share
Pollution charges	3.20	0.78	95.8
Production waste	1.80	0.43	53.9
Air emissions	1.20	0.29	35.9
Water discharges	0.20	0.05	6.0
Use of fauna & flora	0.036	0.01	1.1
Environmental damage compensation	0.10	0.02	3.0
Total	**3.34**	**0.81**	**100.0**
Memorandum item			
Total as per cent of total state budget expenditures	0.05		

Source: Committee on Environmental Protection; direct communication; own calculations, 2010.

Table 5.10: Sectoral structure of Public Investment Programme (PIP), 2007-2009

Sector	2007	2008	2009	Total 2007-2009	
	US$ million			US$ million	Percentage shares
Environmental protection	0.2	2.0	4.0	6.2	0.5
Water supply and sewage	16.0	7.5	3.9	27.4	2.4
Irrigation and rural water supply	15.6	18.4	8.2	42.2	3.7
Energy	169.2	117.9	125.3	412.4	36.0
Transport	145.5	158.3	74.8	378.6	33.1
Agriculture	32.7	40.6	34.6	107.9	9.4
Other	42.4	58.7	68.9	170.0	14.9
Total above	**421.6**	**403.4**	**319.7**	**1,144.7**	**100.0**
Memorandum items					
Sources of financing					
External financing	381.1	355.9	289.5	1,026.5	89.7
Loans	365.6	345.6	284.2	995.4	87.0
Grants	15.5	10.3	5.3	31.1	2.7
Domestic	40.5	47.5	30.2	118.2	10.3
Budget	36.6	43.4	25.8	105.8	9.2
Other sources	3.9	4.1	4.4	12.4	1.1
Total above	**426.6**	**403.4**	**319.7**	**1,144.7**	**100.0**

Source: Government, Public investment programme and technical assistance needs, 2007-2009.

Table 5.11: Commitments and disbursements of foreign assistance provided to Tajikistan by major sectors, 2002-2008

Sector	Commitments		Disbursements	
	US$ million	Per cent	US$ million	Per cent
Environment	41.7	2.5	18.7	1.8
Water and sanitation	65.4	4.0	41.5	3.9
Energy	488.8	29.5	347.6	32.7
Transport	455.6	27.5	321.0	30.2
Health	125.2	7.6	61.2	5.8
Agriculture and irrigation	223.4	13.5	94.1	8.9
Other	255.7	15.4	178.5	16.8
Total	**1,655.8**	**100.0**	**1,062.6**	**100.0**

Source: Government of Tajikistan, State Committee on Investment and State Property Management, Foreign Aid Report 2008, Dushanbe 2009 (table 4.9, p. 21).
Note: Projects started and partly completed within the period since 2002. Disbursements are cumulative expenditures since 2002. The large majority of projects under the heading "environment" were started in 2007/2008.

Table 5.12: Environmentally related official development assistance provided to Tajikistan, 2004-2008

US$ million

Purpose	2004	2005	2006	2007	2008	Cumulative 2004/2008
Water supply and sanitation (14020)	7.3	12.1	4.8	3.3	8.4	35.9
Waste management/disposal (14050)	..	..	0.6	0.6	2.0	3.2
Education/training water supply (14081)	..	0.2	..	..	0.0	0.2
Power generation/renewable sources (23030)	3.3	1.7	2.6	4.6	0.0	12.2
Hydro-electric power plants (23065)	..	0.4	0.4	0.1	0.2	1.1
Forestry development (31220)	..	..	..	0.3	..	0.3
Environmental policy and admin. management (41010)	0.3	1.8	2.1	1.6	1.1	6.9
Biodiversity (41030)	0.7	..	..	0.1	0.9	1.7
Site preservation (41040)	..	..	0.0	0.1	..	0.1
Flood prevention and control (41050)	..	0.2	0.0	..	..	0.2
Environmental education/training (41081)	..	..	..	0.0	0.3	0.3
Total above	**11.6**	**16.4**	**10.5**	**10.7**	**12.9**	**62.1**
Memorandum item:						
Total ODA (all purposes)	152.8	186.5	176.4	165.5	235.9	917.1
Percentage share of environmentally related ODA	7.6	8.8	6.0	6.5	5.5	6.8

Source: OECD DAC, creditor reporting system at (www.stats.oecd.org), data extracted on 22 September 2010.
Note: Gross disbursements. Bilateral assistance from OECD/DAC countries and multilateral assistance. Figures in brackets behind sector names are OECD/DAC purpose codes.

A new Law on Foreign Investment was adopted in 2007, mainly designed to make investing in Tajikistan more attractive. It establishes a number of rights for foreign investors, notably the right to repatriate profits.

There is no information on the treatment of environmental issues, notably past environmental liabilities, in the privatization process. In principle, privatization and the often associated investments in new machinery and equipment, which constitute potentially cleaner technologies, could have reduced pollution per unit of output. However, there is no analysis of the impact of privatization on pollution. Nor is there any systematic collection of information on expenditure by industrial firms on pollution abatement and control.

It is noteworthy that the Tajikistan Aluminium Company, Talco, which operates one of the largest aluminium smelters in central Asia, reports on its website that it has collected and stored 23,500 tons of secondary raw materials in order to regulate problems of collection, removal and processing of waste products from its premises. Talco indicates that it spent 19.1 million somoni (US$ 5.6 million at average exchange rate for 2007) on environmental protection measures in 2007, representing some 3 per cent of gross sales. In 2006, the corresponding amount was 17.4 million somoni (US$ 5.1 million). The reliability of these figures is, however, difficult to gauge. It is noteworthy that an external audit of the company, agreed between the Government and the IMF back in 2008, had not yet been published at the time the report was drafted.

5.5 Conclusions and recommendations

Tajikistan is facing major environmental problems, such as air and water pollution; and land erosion, with attendant severe adverse impacts on human health. It is therefore a matter of urgency to address these problems with effective policy measures. These include application of stringent environmental standards in combination with economic instruments that provide effective incentives for polluters to change their behaviour and for rational use of natural resources. It also requires the real integration of environmental protection into development strategies for major economic sectors as well as adequate support for environmental protection in Government medium-term expenditure programmes. In spite of the importance and urgency of all these issues, there has been hardly been any noteworthy progress.

There is a need to reform all the various payments for pollution, including fines, and charges for use of natural resources in order to improve their incentive function and revenue-raising function. In particular, pollution charges have remained an ineffective instrument for implementing the polluter-pays principle, given that rates are generally far too low for inducing pollution abatement measures. Any potential incentive effect has, moreover, been eroded by the failure to properly adjust rates to the considerable cumulative inflation.

Furthermore, the overall system of pollution charges targets an excessively large number of pollutants. This is neither meaningful from an environmental perspective nor feasible from an economic, technical and administrative viewpoint.

The system, as designed, simply cannot be implemented. The hypothetical costs of full enforcement would, moreover, exceed the associated environmental benefits by a large margin. Rather, pollution charges should be applied to major pollutants only and be complemented by the implementation of effective environmental standards.

Recommendation 5.1:
The Committee on Environmental Protection, in cooperation with other relevant stakeholders, should carry out a special study of the existing system of pollution charges and fines with objective view to

(a) Focusing the system on a few major air and water pollutants;
(b) Defining adequate, technically feasible, air pollution and surface water quality standards;
(c) Raising incentives for pollution abatement and control by means of an adequate combination of environmental standards and economic instruments;
(d) Ensuring that revenues from pollution charges cover at least the associated administrative costs of policy design and effective implementation.

Recommendation 5.2:
The Committee on Environmental Protection, in cooperation with other relevant stakeholders, should review charges for the use of flora and fauna with a view to make them supportive of nature protection.

See Recommendation 9.1.

Tariffs for utility services (drinking water supply and sewage; electricity), as well as for municipal waste collection and disposal, and irrigation water for agriculture, have been raised, partly considerably, in recent years. In general, however, they are still below cost recovery levels. This has been reflected in persistent financial losses of service providers, with a consequential lack of funds for adequate investments in repair and maintenance and modernization of the underlying sector infrastructure, which is therefore in a dilapidated state. It is therefore important to ensure the financial viability of utility companies and waste management firms which have to rely on user charges for financing their activities and maintaining the infrastructure intact.

Tariffs at cost-recovery levels should, in principle, also create stronger incentives for more rational use of water and electricity as well as for reducing waste production by household and enterprises. Notwithstanding, tariff adjustments for water and power supply need to be accompanied by further progress as regards the installation of meters to allow consumers to control their water and power consumption.

Recommendation 5.3:
The Government and its competent bodies for tariffs applied to utility services, waste services, and irrigation services should

(a) Ensure that tariffs are gradually approaching levels that allow, in combination with a high collection rate of bills, to recover production costs, including an adequate profit rate to finance investments;
(b) Introduce clearly defined and transparent policy measures for providing targeted social support measures that ensure adequate access of the poorest and vulnerable parts of the population to these services;
(c) Promote the progressive installation of meters, notably as regards water use, in households and enterprises, including farms, for monitoring consumption.

Achieving sustained economic growth is the main preoccupation of the Government, given that it is an essential condition for making progress in creating jobs and reducing the still high levels of poverty. This is reflected in the strong emphasis that the authorities put on improving the energy and transport sector infrastructure, which is still a bottleneck for faster economic growth.

Environmental protection does not really figure among the main policy priorities. The very limited mobilization of financial resources for environmental protection in the State budget and in environmental (special) funds points to a clear marginalization of environmental protection in public sector spending.

Recommendation 5.4:
The Government, in cooperation with its competent bodies, notably the Committee on Environmental Protection, the Ministry of Finance and the Ministry of Economic Development and Trade, should

(a) Include environmental protection within the medium-term expenditure framework and give greater priority to environmental spending;
(b) Define, in cooperation with major Government spending units, medium-term

priorities and objectives for environmental policy across major sectors of the economy and prepare estimates of associated costs and benefits that would be used in the preparation of the medium-term expenditure framework;

(c) Take measures designed to mobilizing private sector resources for environmental protection based on a more effective application of the polluter-pays and user-pays principles.

There is a lack of transparency concerning the strategies, if any exist, and operations of environmental funds. Their number appears to beexcessively large, amplifying management costs and diluting the already very limited resources available. It is therefore very likely that nothing meaningful can be achieved. In a more general way, this points to the importance of ensuring the effective management of very limited financial resources based on transparent policies for priority settings.

Recommendation 5.5:

The Committee on Environmental Protection in cooperation with other competent bodies, such as the Ministry of Finance and the Ministry of Economic Development and Trade, should

(a) Review the management and operations of environmental funds;

(b) Assess the potential advantages of consolidating environmental funds into a much smaller number, if not a single fund;

(c) Publish an annual report on the activities and achievements of environmental funds.

PART III: INTEGRATION OF ENVIRONMENTAL CONCERNS INTO ECONOMIC SECTORS AND PROMOTION OF SUSTAINABLE DEVELOPMENT

Chapter 6

CLIMATE CHANGE

6.1 Legal and institutional framework

Legal framework

Tajikistan joined the United Nations Framework Convention on Climate Change (UNFCCC) in 1998 as a non-Annex I Party and ratified the Kyoto Protocol in 2008 (Parliamentary Resolution No. 1142). The 2009 Governmental Resolution No. 393 established the Designated National Authority (DNA) for the implementation of the Clean Development Mechanism (CDM) under the Kyoto Protocol. The Resolution established the Ministry of Industry and Energy (MoIE) as the DNA and an interdepartmental council for coordinating CDM implementation. The Department of Energy within the MoIE deals with DNA responsibilities. The 2009 Governmental Resolution No. 654 approved the procedure for selecting and approving projects under the CDM. The Resolution clarified the project proposal cycle, from submission of the idea, through analysis and approval, up to the UNFCCC Executive Board submission, including monitoring implementation of investment plans.

The first legal act concerning greenhouse gases (GHG) was the 1996 Law No. 223 on Nature Protection, amended in 2002 and 2007. It addresses climate change issues and ozone-depleting substances through a number of specific articles. In particular, articles 40, 45 and 54 cover prohibition of projects of risk to climate change and the ozone layer; maximum permissible emissions; reduction of emissions from power plants; treatment of infringements; integration of environmental measures into agriculture to protect land, soils, water, forests; flora and fauna.

The 1997 Law on Air Protection No. 498, amended in 2007, 2009 and 2010, established State control over use of the air in cities, industrial centres, other settlements, and other air pollution sources. Article 8 sets up the Committee on Environmental Protection (CEP) and the Ministry of Health (MoH) as the authorized State bodies for air protection. These entities specify maximum permissible concentrations of air pollutants; establish and manage a registry of emissions; promote, direct and stimulate related scientific research; collect emission authorization fees; enforce the law and pursue court action in cases of infringement. The local authorities are vested with powers to plan, finance and protect the atmosphere against harmful influences in their territories; maintain the registry of emission sources; and control the activity of enterprises, organizations and establishments regarding atmospheric air. Article 27 repeats and reinforces the measures against GHG emissions established in the Law on Nature Protection.

The 2006 Programme for the Recovery of Meteorological and Hydrological Stations Posts for the period 2007-2016, No. 408, in accordance with the 2002 Law on Hydrometeorological Activities, No. 86, tasks the State Administration for Hydrometeorology *inter alia* with conducting regular observations on the climate system and the natural environment. The Programme goals include improved monitoring and evaluation of climate and climate change, in order to integrate the Global Observing System (GEOOS) and Global Network of Terrestrial Hydrology (GTN-H). Other objectives cover the socio-economic and environmental impact of climate change; provision of climate information; and assessment of mountain glaciers, glacial lakes, mudflow and avalanches.

According to the 2010 National Disaster Risk Management Strategy for the period 2010-2015, No. 164, disaster management issues are regulated by the Constitution as well as some 29 separate laws and 37 resolutions and normative acts. A Disaster Risk Management Act is planned to implement the Strategy. The National Disaster Management Authority, which is under the authority of the State Commission for Emergency Situations (SCES), was established in 2002 (No. 323/2002) and modified in 2007 (No. 416/2007). The 2006 Government Decree on the Committee of Emergency Situations and Civil Defence, No. 611, establishes the institution responsible for managing and coordinating disaster-related activities aimed at prevention, preparedness and mitigation. The Committee is also tasked with ensuring the preparedness of relevant institutions and communities.

The 2010 Order on the Procedure for Environmentally Induced Migration, No. 211, regulates population relocation from environmentally dangerous zones and defines the Executive bodies involved in the process. Environmentally induced migrants are persons forced to leave their place of residence due to environmental disasters such as landslides, floods, avalanches, earthquakes and technological accidents. Citizens may be considered environmental migrants upon direct request, to the central Government by the corresponding State bodies, or if their home is located in a dangerous environmental zone. The Government is responsible for meeting all basic needs during relocation, including the establishment and maintenance of medical institutions, educational facilities, water supply, electricity and rural infrastructure within relocation areas. Environmental migrants are to be provided with a plot of land for building a house and assistance with construction; preparation of farming land; loans and financial planning.

In 2010 the Law on Renewable Energies, No. 724, applies to plants with installed capacity below 30 MW. This instrument sets out the principles and objectives of State policy on renewable energy; identifies ways to integrate renewable energy into the national energy system; regulates activities aimed at increasing renewable energy use; correlates the various activities of renewable energy sources (RES) production such as manufacturing, distribution and use; and determines economic and organizational measures to stimulate production and use of RES.

Other legislative acts establish the powers of central and decentralized authorities dealing with natural resources, users' rights and duties, and responsibility for infringements. Organizational and legal norms to protect the population, property, industrial and social assets, soil, water, air, flora and fauna and other natural resources, and the environment within Tajikistan are also covered by legislation.

Institutional framework

A large number of institutions and entities are involved in climate change-related issues in Tajikistan. This section merely describes some of the major players.

The UNFCCC focal point is the Head of State Administration for Hydrometeorology (Tajikhydromet). The latter encompasses several divisions, which cover weather, climate and meteorological forecasting and the assessment of natural and hydrometeorological disasters; observation of natural and anthropogenic factors; study of hydrological regimes; pollution monitoring; automated data collection; and international cooperation.

Tajikhydromet also hosts the Centre for Study of Climate Change and Ozone, which coordinates scientific and technical work on climate change. Activities include preparation of the GHG inventory and communications to UNFCCC; vulnerability assessment; participation in early warning system development (extreme weather events, etc.); contribution to national, regional and global strategies and action plans; development of adaptation and mitigation project proposals; and participation in CDM project evaluation. Currently, the Centre is understaffed.

The Ministry of Energy and Industry, as the Designated National Authority (DNA) for analysis and implementation of CDM, works with an Interdepartmental Council to supervise CDM projects. The Chair of the Council is the Prime Minister's assistant, the Vice-Chair is the Director of Tajikhydromet, and the Secretary is the Head of the Department of Ecology and Emergency Situations in the Presidential Executive Office. The Secretary also serves the State Commission for Emergency Situations. The Council's members are the Deputy Ministers of Energy, of Economic Development and Trade, of Finance, of Justice, and of Agriculture, and the First Vice-President of the State Committee on Investments and Management of State Property, and the deputy of CEP.

The CDM Centre, located within the Ministry of Energy and Industry, serves as the DNA secretariat. Its functions encompass processing of CDM project proposals, *inter alia* consultations with relevant parties including potential investors, local partners; analysis and monitoring. The Interagency Council gives final approval to selected projects. The CDM centre consults with experts from different ministries and other State institutions. CDM Centre staff has other duties within the Ministry, which reduces their time to work on CDM issues.

The highest policy and decision-making body for emergency management is the State Commission for Emergency Situations, chaired by the President. The Prime Minister is the first deputy chairperson. The Head of the Department of Ecology and Emergency Situations manages the secretariat. The structure is replicated at regional and local levels. Regional commissions are chaired by the Chairman of the regional Hukumat, and the regional deputy of the Committee on Emergency Situations and Civil Defence (CES) is the deputy chair. District

commissions are similarly chaired by the Chairman of the district Hukumat, and the local head of CES is the deputy. The Commission is supposed to meet each quarter, or on either extraordinary cases of warning thresholds or in the event of a disaster. The Commission aims at increasing the resilience of the economic infrastructure to global warming and ensuring that State institutions and authorities at all level are prepared to take immediate action and provide support in case of a natural or man-made emergency.

The Committee for Emergency Situations and Civil Defence (CES) established in 2006 is responsible for managing and coordinating all disaster-related activities on prevention, preparedness and mitigation. The main office is in Dushanbe, and provincial and district branch offices respond to and are funded by the District Councils. The Committee undertakes a range of activities, including administration of the system for emergency situations; training for continuous preparedness; search-and-rescue coordination; and organization of population warning systems and civil defence. It delivers humanitarian aid and carries out urgent works in the event of accidents and emergencies. In addition, the Committee has a key planning role: it develops contingency plans for natural and man-made emergency situations, and participates in town planning and construction project design compliance with, for example, the Design Standards for Engineering-Technical Structures. Hence, it has a major part to play in climate risk management and adaptation. However, the Committee lacks resources to deal fully with natural disasters.

For environmentally induced migration, the coordinating body is the State Agency for Social Protection, Employment and Migration, of the Ministry of Labour and Social Affairs. The Agency creates commissions in regions and districts for this purpose. The local commissions zone areas by danger level, and submit to the Agency lists of families needing resettling. The Agency prepares a yearly plan for the resettlement of environmentally induced migrants, working in coordination with the relevant ministries and committees and regional and local Government and detailing relocation and economic circumstances.

Within the framework of the Renewable Energy Programme for the period 2007-2015, the Academy of Sciences established the Centre for Research and Use of Renewable Energy (RCRE) in 2008. Its objectives are to create a database of renewable energy sources in the country; undertake research on devices for renewable energy use; train technicians; and raise awareness among the public. The Centre has produced rough estimates of gross renewable energy resources, and the technical and economic capacity for exploitation of different RES types (sun, wind, biomass, small scale hydropower and geothermal), as well as potential locations. RCRE currently has 17 staff. The Centre for Innovative Technologies of the Technical University has opened a Clean Energy Laboratory, particularly for training students, including through an EU-sponsored Masters Degree. It can also test and develop equipment, particularly for solar energy.

6.2 Trends and sources of GHG

As it is a small country, Tajikistan's contribution to global GHG emissions is quite limited. It has the lowest CO_2 emissions per capita among the central Asian countries, and contributes only some 2-3 per cent of total CO_2 emissions in the region. The inventory of GHG emissions and sinks established in 2008 has data for the period 1990-2003. During this period, the peak emissions of CO_2 and total GHG occurred in 1990. Thereafter, there was a sharp decline in emissions on account of the transformational economic crisis and the associated downsizing and restructuring of industrial activity. Since 2000, however, GHG emissions appeared to be once again on an upward trend. Yet in 2003, total GHG emissions without land use, land use change and forestry (LULUCF) accounted for only 33 per cent of the level attained in 1990. CO_2 emissions without LULUCF in 2003 only came to 15.5 per cent of their 1990 level (table 6.1). LULUCF emissions have acted as a sink for CO_2 emissions. Estimates point to broad stability of CO_2 removals during 1990-2003, though these numbers are subject to a large margin of uncertainty (table 6.1). Whereas LULUCF removed some 12 per cent of total gross CO2 emissions in 1990, this share was up to some 70 per cent in 2003, reflecting the sharp decline in total gross emissions and the broadly stable removals (table 6.1). From 2003, the area devoted to afforestation increased to more than 2,000 ha per annum, reflecting the greater political importance and support from several donors (Chapter 9). The area of irrigated agricultural land increased on account of the conversion of pasture lands; but it appears that some agricultural land was also converted to non-agricultural purposes. There is, however, no adequate monitoring and reporting of these changes.

The Second National Communication revised and updated information on climate change on the basis of research undertaken by different expert working groups, and presented general and specific data on climate change.

Table 6.1: GHG Emissions 1990, 2000, and 2003

Gg CO_2 equivalent

	1990	2000	2003	2003 Index (1990=100)
CO2 emissions without LULUCF	17,895	2,540	2,768	15.5
CO2 net emissions / removals by LULUCF	-1,916	-1,878	-1,929	100.7
CO2 net emissions / removals with LULUCF	15,779	662	839	5.3
GHG emissions without LULUCF	25,544	7,397	8,489	33.2
GHG net emissions / removals by LULUCF	-1,916	-1,878	-1,929	100.7
GHG net emissions / removals with LULUCF	23,628	5,519	6,560	27.8

Source: Second National Communication of Tajikistan under UNFCCC. Annex 2. Dushanbe 2008.

It identified the priorities for addressing climate change as adaptation measures for vulnerable communities and systems; development of hydropower; and research and climatic observations, which are, respectively, of local, regional and global importance. National Communications are prepared by the CEP State Administration for Hydrometeorology with inputs from others; for instance, the Centre for Study of Climate Change and Ozone coordinated the Second Communication and involved a series of experts from different institutions.

To comply with obligations under UNFCCC, Tajikistan reports on GHG emission and absorption for gases not covered by the Montreal Protocol on Substances that Deplete the Ozone Layer. Tajikhydromet coordinates the preparation of the inventory. The inventory is prepared with statistical data from State agencies, including the State Statistical Committee, Committees for Land Management and Forestry, the Customs Committee, and specialized companies and enterprises. For separate categories of the GHG inventory, FAO data is used. However, data for the sectors contributing most to GHG emissions have medium-to-high levels of uncertainty[18]. The Energy sector has a medium uncertainty level due to the lack of energy balance data. For categories such as Agriculture (the largest emitter), LULUCF (the only sink), and Waste, uncertainty is high. The industrial process sector has the most accurate data.

The uncertainties relate to a larger problem of a lack of periodic and frequent measurements and a lack of systematic registration of greenhouse gas emissions, due to a dearth of standards and reporting forms. Tajikhydromet's meteorological and hydrological network is quite limited and was significantly scaled back in the 1990s. There are major gaps in monitoring snowpack and glacial retreat. Currently, there are only three air quality measuring devices in the country in only two cities. The capacity of other national laboratories charged with environmental monitoring is reduced. The limited data and the limited capacity to undertake fieldwork also contribute to poor understanding of the geomorphic stability of local glacial lakes, and sub-regional glacial dynamics. All this leads to a weak capacity to produce national climate impact scenarios and risk assessments, which in turn severely compromises Tajikistan's ability to adapt to and prepare for climate hazards. It is for this reason that several policy and strategy documents in Tajikistan refer to the strengthening of Tajikhydromet as a vital step towards adaptation to climate change.

The structure of GHG emissions has changed significantly over the last 15 years. In 1990, the energy sector contributed 67 per cent of total emissions, followed by agriculture (20 per cent), industrial processes (10 per cent) and the waste sector (3 per cent). Since 2000, decreased fossil fuel use left agriculture as a key GHG emission source. In 2003, fuel combustion amounted to 27 per cent of the energy sector, while agriculture accounted for 50 per cent of total emissions. For the entire reporting period, the waste sector, with 3 to 9 per cent in CO2-eqv, contributed least. The total amount of GHG emissions is mainly due to C02 with 69 per cent (1990) and 32 per cent (2003), CH_4 with 14 per cent (1990) and 33 per cent (2003), and N_2O with 12 per cent (1990) and 29 per cent (2000).

With industry's collapse after independence, C02 emissions decreased dramatically. More recent initiatives have been taken to reduce emissions from cement factories and aluminium smelters, including rehabilitation of aspiration systems, use of gas fuel for cleaning scrubbers, and improved sealing of electrolytic tanks.

[18] The uncertainty in the inventory is a combination of uncertainties in coefficients of emissions and uncertainties in data on activities.

Table 6.2: Emissions from stationary and mobile sources, 2007-2008

	2007						2008					
	Stationary		Mobile		Total		Stationary		Mobile		Total	
	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%	1,000 tons	%
Total	37.2	100.0	241.5	100.0	278.7	100.0	35.1	100.0	261.5	100.0	296.6	100.0
Dushanbe	3.2	8.6	29.3	11.7	32.5	12.1	1.2	3.4	40.9	15.6	42.1	14.2
Eastern Tajikistan	0.0	0.0	5.8	2.4	5.8	2.1	0.0	0.0	6.6	2.5	6.6	2.2
Northern Tajikistan	3.5	9.4	85.7	35.5	89.2	32.0	3.1	8.8	97.9	37.4	101.0	34.1
South and west	7.2	19.4	61.3	25.4	68.5	24.6	7.5	21.4	58.8	22.5	66.3	22.3
Regions under Republican	23.3	62.6	59.4	24.6	82.7	29.6	23.3	66.4	57.3	21.9	80.6	27.2

Source: Statistical Yearbook, 2009.

Currently, air emissions are monitored only in larger factories and mining. In 2009, air emissions were estimated as follows: aluminium smelter (57 per cent), cement factory (13 per cent), fertilizer factory - mostly nitrogen (5 per cent); gold mining (1.5 per cent) and Vostok mining (1 per cent). Of the remaining 23 per cent, an estimated 19 per cent is from large cotton farms, waste dumps, and metal plants. The rest remains unaccounted for.

According to data presented in Table 6.2, emissions from mobile sources increased substantially between 2007 and 2008. Due to a lack of air quality measuring stations, data is uncertain, and real values might be higher. The share of emissions from air transport increased from 9 per cent (1990) to 12 per cent (2000), and is expected to keep in increasing.

Methane (CH_4) emissions in 2003 were 70 per cent of 1990 levels. The main sources are agriculture (76 per cent in 2003) and waste (18 per cent in 2003). CH_4 emissions in the agricultural sector are mostly due to enteric fermentation in domestic animals (83 per cent in 2003), manure waste (12 per cent in 2003) and rice cultivation (more than 5 per cent in 2003).

The relative growth of livestock and farmers' financial constraints deter development of livestock and husbandry facilities, hence the increase in methane emissions, which is expected to continue. A decrease in CH_4 emissions in rice cultivation has followed a decrease in the area under rice cultivation, which was around 20,000 ha in 2000 and had decrease some 20 per cent by 2003. Waste sector CH_4 emissions are due mainly to solid waste, and to a much lesser extent wastewater.

The total number of solid waste disposal sites fell from 70 to 52 (in 2003), while waste generation increased around 1-2 per cent per annum, with CH_4 emissions from the waste disposal sites becoming more intensive. CH_4 emissions from industry also lack certainty. Due to a lack of data, inventories do not account properly for these emissions. It is estimated that losses of natural gas (mainly methane) in main and local pipelines amount to 30 per cent, which is equal to electricity losses, but a decrease in natural gas supply suggests that associated methane emission is relatively low. On the other hand, emissions from the coal industry are expected to be higher, although coal mining has declined significantly since the Soviet period.

In general, N_2O emissions are observed from agriculture (96 per cent) and waste (4 per cent). Agricultural N_2O emissions occur in cultivated soils, with organic and nitrogen mineral fertilizers accounting for over 95 per cent of all N_2O emissions in this category, and in animal manure. From 1990 to 2003, N_2O emissions declined from 10,000 to less than 6,000 tons, but have risen since 2000 due to increased fertilizer use. There is a high degree of uncertainty as regards N_2O emissions from waste. Other sources of N_2O emissions are high-temperature fuel combustion, in heat power plants, and from transport, but are considered negligible for the period 1990 to 2003.

The largest source of perfluorocarbons (PFCs: CF_4 and C_2F_6) is the Tajik Aluminium Plant. PFC emissions fell from 0.69 Gg in 1990 (corresponding to 4,647 Gg of CO2-eqv) to 0.29 Gg in 1997, but rose subsequently due to increased production.

Because aluminium production emits hazardous pollutants such as nitric oxide, carbon oxide, sulphur dioxide and fluorides, the aluminium plant has been undergoing improvements in air emissions, which has contributed to the recent decrease in specific fluorocompound emissions; however, there is no systematic data on this subject.

The 2008 GHG inventory states that from 1990 to 2003, emissions of GHG precursors and SO2 decreased by five to eight times, similar to the trend for total GHG emissions. However, the recent increase in high-emitting vehicles might have a significant impact on CO emissions, a precursor of methane, which had declined from 430 Gg in 1990 to 96 Gg in 1996.

It is also quite certain that emissions of SO2, which is one of the most harmful components of anthropogenic emissions and had decreased from 35 Gg in 1990 to 3 Gg in 1998, are increasing rapidly due to transport.

6.3 Foreseeable impacts in the country

Tajikistan is affected by various natural processes which frequently lead to natural disasters. The irregular topography, active tectonic processes, advanced hydrological network, occurrence of episodic intense precipitation, and arid climate in some regions are natural factors causing geodynamic processes and phenomena such as landslides and snow avalanches, which leave disintegrated rock formations in river channels and lead to mudflows and floods. The result is destruction of crops and infrastructure, including irrigation canals, drainage systems and pumping stations.

Considerable yearly weather variability also occurs. The floods of spring 1998 caused damage of more than 100 million somoni (over US$ 20 million). A drought across most of the country, with insufficient stream flow subsequently wrought significant crop damage in many areas from 2000 to 2001. Analysis of data by Tajikhydromet from 30 stations for 1940 to 2005 reveals that the irregularity and intensity of precipitation are increasing. Numerical models indicate that this trend will continue, not only in amount and intensity of precipitations, but also days of precipitations (Table 6.3).

According to the official data, the major cause of financial damage in the last decade has been droughts and heavy snows, with avalanches being by far the major cause of death. According to the World Bank, every year, the country's upland is exposed to around 50,000 landslides, 5,000 tremors and earthquakes, and hundreds of avalanches and mud flows. Currently, around 1,200 families are subject to obligatory resettlement due to natural disasters related to water.

Map 6.1 shows areas most prone to hydrogeological disasters, while Map 6.2 shows flood-rleated risks. Greatest mudflow activity is in the Vakhsh, Obihingou, Kyzylsu, Pyanj and Zeravshan river basins, where as many as 70-100 mudflows occur annually. In the foothills and mid-mountains, mudflows occur in spring, whereas in the high mountains, they occur mainly in summertime, caused mainly by intense precipitation (80 per cent).

The analysis from Tajikhydromet using data from 30 stations for the period 1940-2005 revealed an increase in annual mean temperature of about 0.1-0.2°C per decade in the plain throughout Tajikistan; a minimum of 0.3º for the whole period in Khujand and a maxima of 1.2ºC in Dangara and 1.0ºC in Dushanbe.

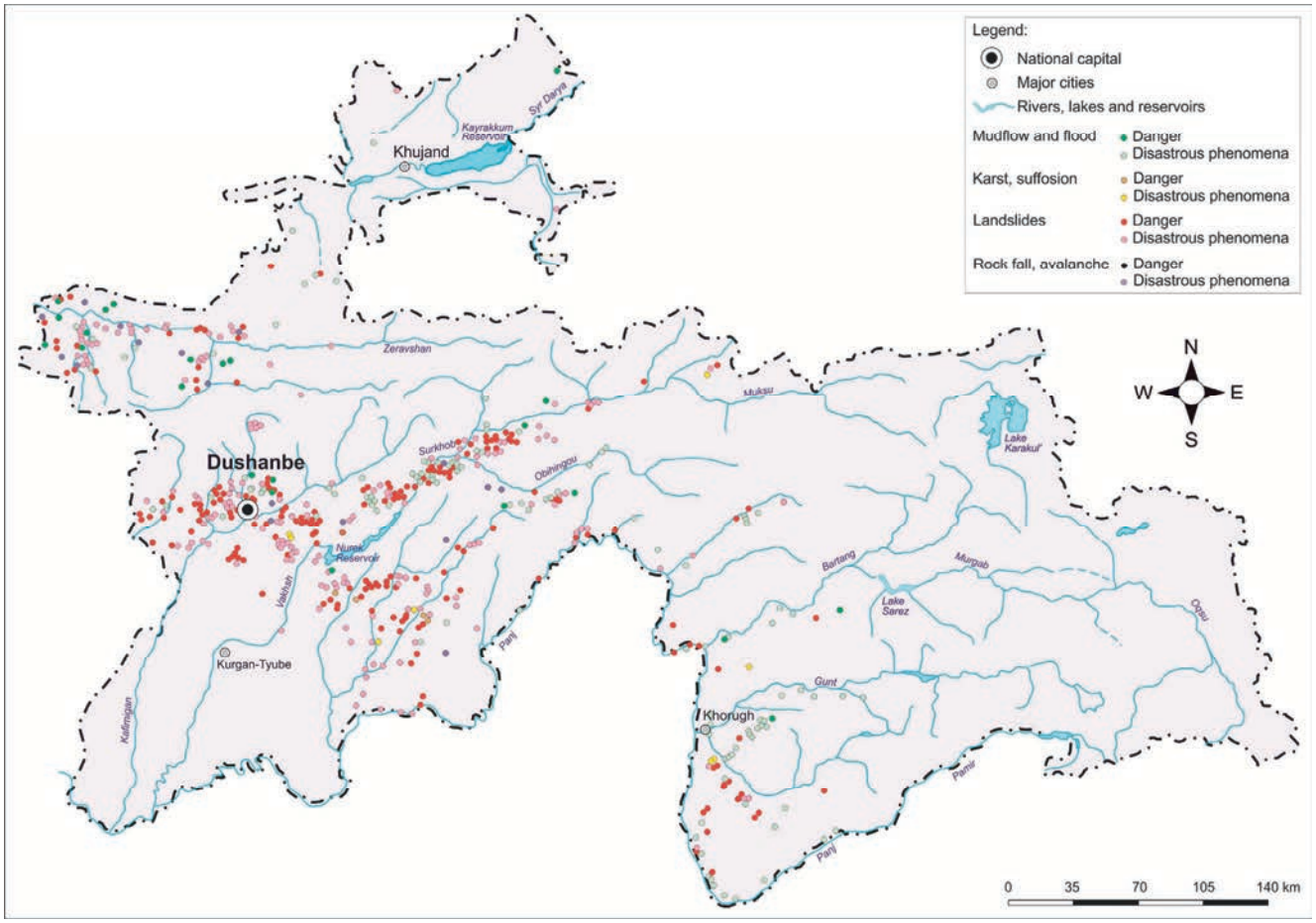
In the mountainous areas, with the exception of isolated valleys, the rise is 0.3-0.5°C over a 60 year period, and for higher altitudes (over 2500 m) 0.2-0.4°C on average. During this period, a fall in temperature (-1.1°C) was noted in the Eastern Pamirs. The study showed warming during the cold season of 1-3°C, and a temperature drop at high altitudes in February, March, May, June and October.

Table 6.3: Largest impacts and frequency of natural disasters, 1997-2007

	Number of Occurences	Highest number of victims in one event	Total Damage in 10 years US$ million
Epidemics	48	12	..
Landslides	124	46	..
Avalanches	1,253	24	124
Heavy snow	17	..	23
Floods	114	..	13
Droughts	57	..	97
Earthquakes	208	..	50

Source: Information Management and Analytical Centre, 2008.

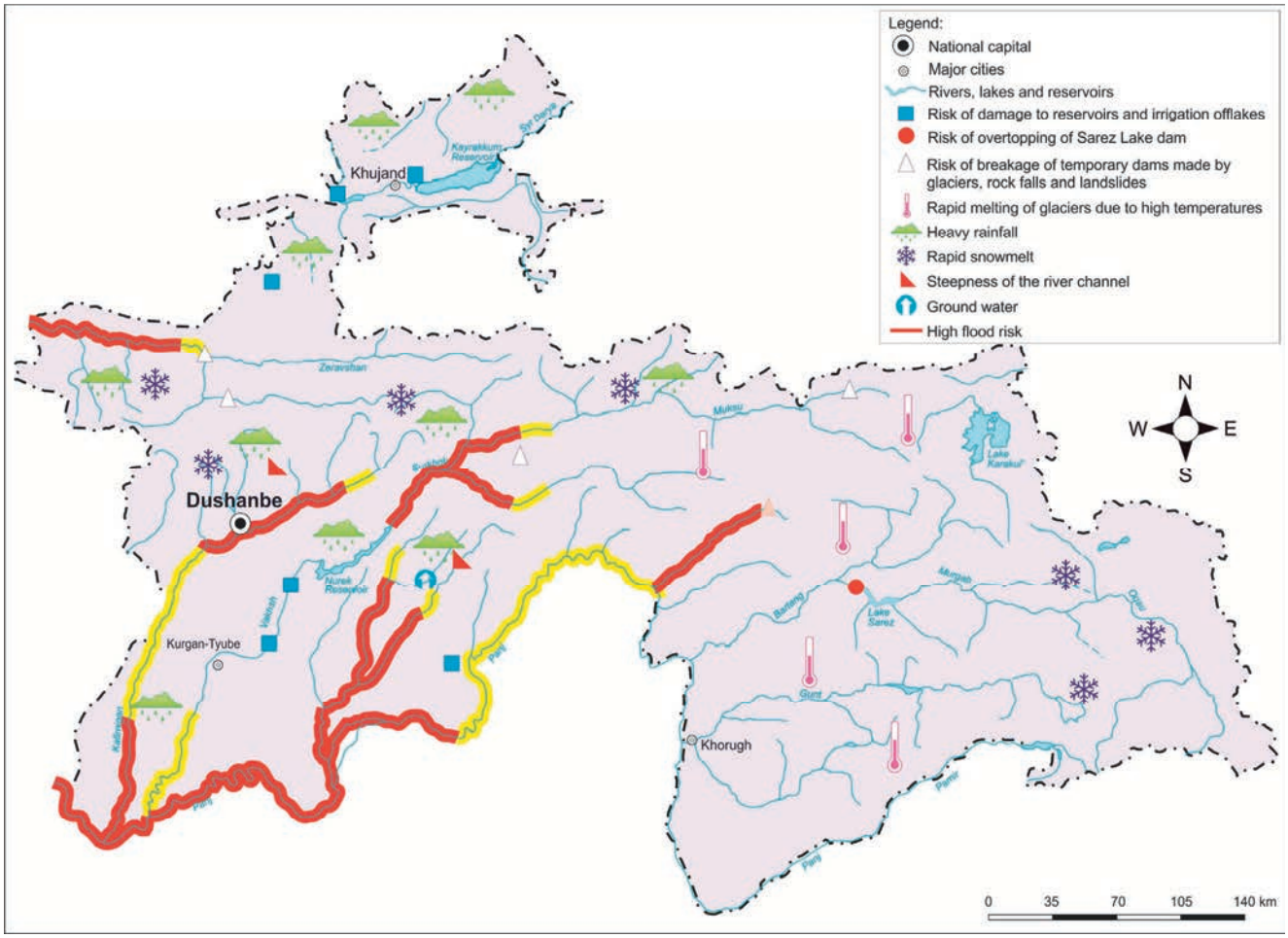
Map 6.1: Distribution of hydrogeological disastrous phenomena



Source: Ministry of Emergencies, 2010.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Minimum mean temperatures also increased, especially in autumn, by 0.5-2.0 °C with some exceptions in high-mountain regions (-0.1°C). These temperature changes increase the duration of the frost-free period, with a stable transition above and below 0° occurring earlier in spring and later in autumn. In general, snow cover is unstable below 1,000 m; from 1,000-2,000, m it lasts from December to mid-March; and from 2,000-3,000 m height for about 100-135 days. In the high mountainous zone of 3,000-4,000 m, the stable snow cover is not complete, and in the arid climate of the Eastern Pamirs in particular, the average number of snow cover days is 45, while in the Gissar Mountains it is 245 days. Above 4,000 m, permanent snow and ice occurs. The trend of increasing temperature has been confirmed by a forecast up to 2030 by Tajikhydromet, using model ECHAM4/OPYC3. It suggests low availability of water in the future. The model shows increases of mean annual temperature of 0.2-0.4°C (0.1-0.2°C in decade) in most areas, with a maximum winter temperature at least 2°C higher. In some areas, lower precipitation is already seen (Eastern Pamirs, south lowlands), while others (Western Pamirs) show an increase. However, forecasting precipitation is complex due to the topography, and longer-term impacts remain uncertain. The impact on glaciers from temperature and precipitation changes is expected to be high. Glaciers occupy about 6 per cent of the country. Annually melting provides 10-20 per cent of the flow in large rivers, and in dry and hot years this can reach 70 per cent. Tajikhydromet's study revealed that since formal observations starting in the 1930s, the glacier area of Tajikistan decreased by around 1/3. Glaciers can be significantly affected by warming at high altitude, particularly in the Pamirs, Zeravshan and Pamir-Alai. They are vulnerable ecosystems and a vital water resource in the region. Glacier melt can also cause sudden and catastrophic glacial lake outbursts when the melt water overflows or bursts through natural dams made of mixed ice and moraine material. There are currently four susceptible sites in the Surkhob River basin and six in the Varzob River basin. In 2002, a whole village, Dasht, was completely destroyed by a glacial lake outburst that killed 25 people and displaced around 450 more.

Map 6.2: Distribution of floods



Source: First National Communication to UNFCCC, 2003.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Vulnerability to climate change is heightened by many factors in Tajikistan, and the economic capacity of the country to respond to climate change is limited, which is reflected by its low per capita income. Poverty, poor governance and a lack of public awareness; poor scientific understanding, land-use planning, and natural resource management; environmental degradation; increasing population growth in exposed areas and rapid unplanned urbanization are heightening vulnerability to climate change. Climate variability effects are already visible, and it is expected that in the next five years, migration as a result of ecologic distress will increase by more than 10,000 families.

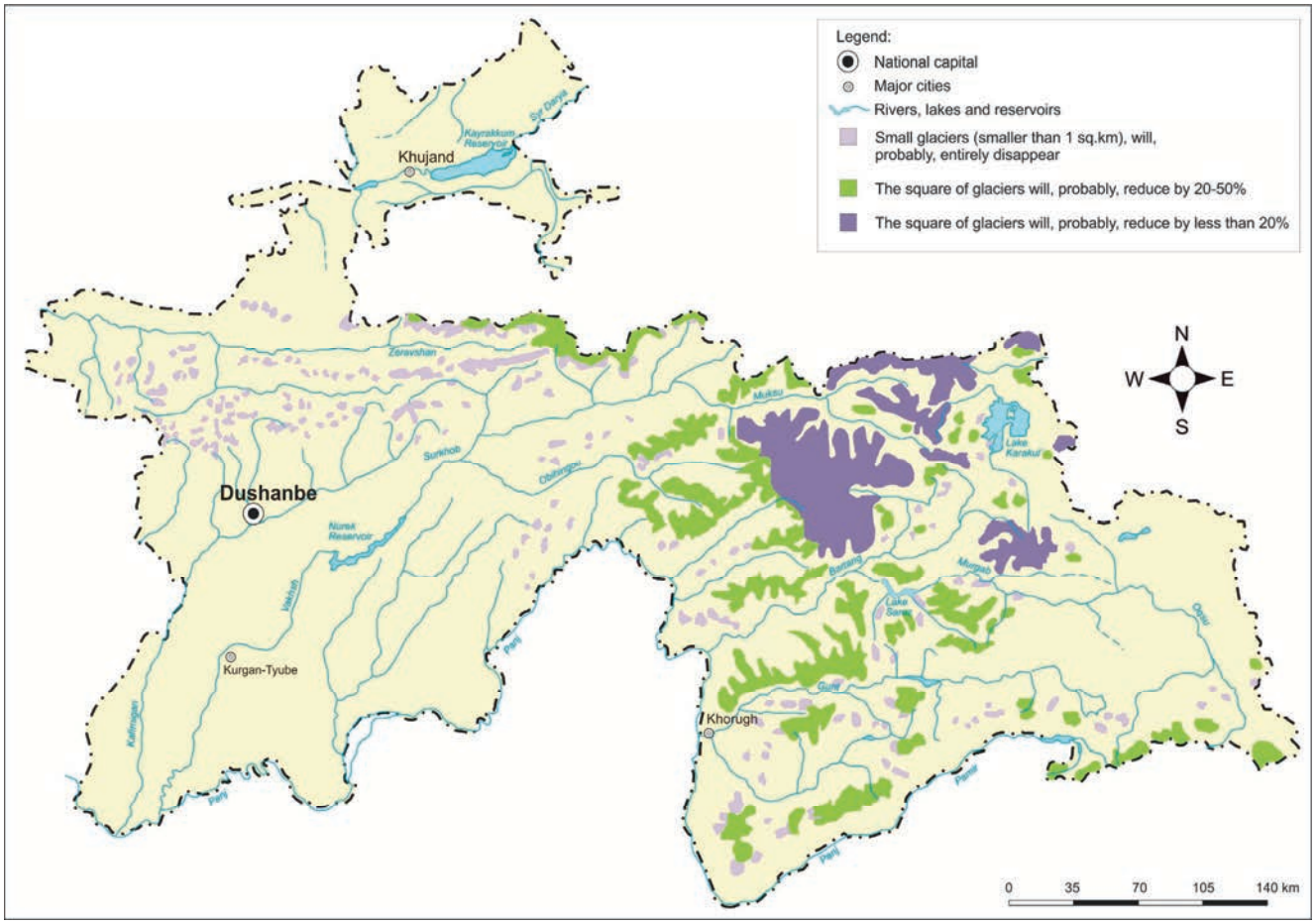
The most pressing needs regarding the expected climate change, identified by the Government in the Communication to UNFCCC and the Pilot Project for Climate Resilience (PPCR), related to water, land management, food security, energy security and human health. Most important are those impacts directly related to human health (Chapter 10). Examples are: waterborne diseases, linked to flooding and drought; food security, related to land management and biodiversity preservation; and heat and cold waves, which affect energy security.

Water supply and demand

Climate change impacts in Tajikistan are mostly about water. About 70 per cent of the population is rural, and most inhabitants reside in river basins and require water for their livelihood. The national economy and critical infrastructure and services depend largely on glacier and snowpack-fed river basins. Over 90 per cent of energy generation is from glacier-fed hydropower plants. Agricultural irrigation accounts for the biggest share of water use in the country by far. Floods caused by glacier melting and heavy rains can result in contamination of water resources.

The dynamics of vital rivers and lakes of Tajikistan are not well understood due to data gaps following the decrease in hydrological observations since 1994.

Map 6.3: Expected melting of glaciers by 2050 due to climate change



Source: Inter State Commission on Sustainable Development, 2010.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Tajikhydromet reports nonetheless that in the decade of 1981-90, the flow volume in the rivers of ice-snow nutrition decreased slightly (by 1-10 per cent) relative to the previous decade, while the flow volume in the rivers of snow-ice and snow-rain nutrition increased (by 5-25 per cent). The study further notes that due to greater melting of snow and glacial reserves and increased precipitation, particularly in 1990-93 and 1998-99, the overall average flow in1990 to 2000 was greater than in the previous decade. Accumulation of snow reserves in high mountains has, however, declined, and is expected in the long term to lead to a 5-15 per cent decrease in runoff.

Water flow in the Varzob River, which is most significant for Dushanbe's water supply, is closely linked to snow stocks and precipitation patterns in high mountains. The trend over recent decades has been an overall reduction in river flow due to decreases in snow stocks. The flow in the Yakhsu River (south stream) in the south increased predominantly due to greater spring floods following increased rain intensity. In the summer of 2008, however, the river flow was considerably lower, resulting in water shortages in farming areas in the lower reaches of the river.

Glaciers melting into Lake Sarez in the mountains of the Western Pamirs pose a serious risk of dam failure, which would be catastrophic for downstream populations. Over the past 50 years, the area of glaciers in the lake basin fell by some 20 per cent, causing the lake water level to increase steadily, with a maximum being registered in 1994 and 2005. Also in Lake Iskanderkul in Central Tajikistan, the water level has increased slightly in the last 50 years, probably due to considerable retreat of glaciers in the basin, observed in 2006. These water inflows will decline in the future. The climate in the Eastern Pamirs influences the water level in Lake Karakul. Again, despite decreased precipitation, water level is increasing from melting glaciers and ice mounds in the Valley of Muzkol River. In contrast, small closed mountainous lakes in the Eastern Pamirs, such as Bulunkul, Shorkul, Rangkul and Tuzkul, are shrinking. The drying-up of these closed lakes has a

significant impact on local ecosystems and biodiversity locally, as well as on species migrations.

According to the PPCR conclusions, most if not all infrastructure investments and community-based development projects have been designed without accounting for possible climate-induced extreme weather events or climate change. Despite strong dependence on the natural environment, most water-based development projects do not use an integrated ecosystem-based approach. Reduced water availability and increased temperatures, associated with climate change, are expected to place increased stress on agricultural water use.

Development of a multi-sector methodology is proposed in the PPCR, to help determine vulnerability and approaches to risk management for river basins and dependent critical infrastructure and priority development projects, at high risk from climate change hazards.

Agriculture and food security

Throughout Tajikistan, rural livelihoods are being affected by degradation of arable land (loss of soil fertility, salinization, and waterlogging); degradation of pastures and rangeland from overgrazing and excessive harvesting; degradation of forests due to illegal logging, fires, and excessive grazing; and erosion, from landslides, mudflows and wind storms onto productive land. The expected warming, reduced rainfall and increased frequency of extreme events such as floods, droughts and storms could exacerbate an already problematic situation. Unprotected soil will be exposed to more extreme conditions, and it will be increasingly difficult for existing land management practices to maintain the fertility and buffering capacities of the land and livelihood assets.

Land vulnerability is very high, with 70 per cent of agricultural land at altitudes of 800 to 2,500 meters, and about 14.6 per cent of the total area is land with 10-20 degree slopes, and therefore prone to active soil erosion if cultivated. The area of agricultural lands exposed to desertification reached 3.03 million ha in 1990, while those exposed to erosion reached 2.65 million ha. During the last decade, desertification grew by 1.3 million ha to a total of 4.3 million ha. Annually, 20,000 to 70,000 ha of irrigated land is not fully used as a result of intensification of bush-cutting and weeding processes, and more than 50,000 ha of irrigated land have been lost over the past 55 years. Hundreds of farms in different localities are subject to constant or periodic inundation. Waterlogging (especially in Sughd and Khatlon regions) due to the elevation of underground water has led to soil deterioration of soil and, ultimately, to population resettlement.

According to the 2006 National Report on Combating Desertification, about 87 per cent (in spring and autumn) to 97 per cent (in winter) of the 3.52 million ha occupied by pasture in the territory are subjected to excessive exploitation, exposing them to erosion or desertification. As a result, their productivity has declined by almost 50 per cent in 20 years. Due to its extremely severe climate, the Pamir region, occupying 45 per cent of the territory of which 95 per cent of agricultural land is pasture, is particularly vulnerable, with an annual fertile soil loss of 430 ha due to excessive use and bush-cutting. In 55 years, the forest area in Tajikistan has shrunk by 20 per cent. The total area of the State Forest Fund is 1.8 million ha, including the areas covered by forest (410,000 ha). Recently, forest-cutting reached 10,000-10,500 ha per year. According to the first EPR in 2004, annual forest destruction as a result of illegal logging, cattle grazing and natural disasters, is estimated at 5,000 to 10,000 m^3, i.e. up to three times more than the natural increase and forest renewal in certain regions of Tajikistan.

Under these circumstances, the agricultural economy is struggling, and opportunities for most people to increase their incomes or make their livelihoods more secure are limited. In some areas, the likelihood of increasing drought, combined with severe floods, may make farming untenable. Fishing, hunting, medicinal herbs, timber or wood and other nature by-products are already the direct source of income for many families. A lack of knowledge of alternatives, or negligence, can lead to degradation of the environment through unsustainable practices, or by poaching in protected areas of Red Data Book species. Some families most vulnerable to food insecurity are already migrating, and unauthorized spontaneous settlements have resulted in water and land pollution; cutting of scarce forest resources for fuel; and erosion of mountain slopes, increasedg mud flows and the washing away of fertile soil.

Climate change is expected to worsen these scenarios, and increases the need for effective approaches to sustainable land management. In the last decade, several initiatives have addressed land degradation, across a number of sectors and geographical regions of the country, to promote sustainable land management. Useful lessons from these activities can be shared at the country level among practitioners and the donor community, as well as concepts and practices to help rural communities respond to climate change. The PPCR

therefore proposes an inventory review of such initiatives as a timely first step to adaptation.

Energy security

Some 98 per cent of electricity in Tajikistan is provided by hydropower from glacial-melt and snow-melt rivers, and is therefore greatly exposed to climate risk. According to the 2010 Human Development Index Report, Tajikistan ranks 8th in the world for hydropower resources, the potential for which currently exceeds 527 billion kWh. However, there are energy shortages in Tajikistan, and the Report states that that regional integration and participation in a joint regional power market is the main thrust in terms of utilization of the country's unique water power resources and efforts to cope with the energy crisis. This goes alongside the construction of small hydroelectric power to ensure provision of power security to the distant regions of the country with power at low price established in Government Regulation No. 73/09. Henceforth, construction of hydroelectric power stations to boost national energy security and enable exports of electric power to deficit countries in Central Asia are current priorities.

Despite its vast hydropower potential, the country is still a net importer of electricity as a consequence of years of underinvestment, both in new generation capacity and rehabilitation of existing capacity. In recent years, average net imports have been estimated at 800 GWh per annum. The power system consists of two isolated sub-systems – southern and northern, and while the northern one experiences shortage, the southern one is redundant. As stated in the 2010 HDI Report, until the autumn of 2009, part of the northern power grid needs were met by Uzbekistan, and Tajikistan supplied Uzbekistan with the same amount in the south in the summer. In order to help balance the energy within the country in both summer and winter, the Government has built transmission lines running from south to north with a capacity of 500 Kwh. However, there is still an autumn-winter shortage leading to a regime of limited power supply. This regime affects drinking water purity, medical services, and access to education, employment, and environment due to illegal tree-cutting for firewood, increasing the risk of natural disasters.

Existing power plants in Tajikistan, including the large Vakhsh cascade with a total capacity of over 4.5 GW, were designed in the 1950s, with no regard for climate change implications. In 2007 and 2008, the Tajik hydropower system faced major shortfalls in winter generation due to poor low water supply. Significant increases in the next few decades, from enhanced melting of glaciers and accumulated snow, will be followed by drastic reductions in supply, as the mass of glacial ice and accumulated snow shrinks due to climate change. Uncertainties exist around timing, but it is certain that changes will occur and will impact the operation of hydropower plants and downstream water availability and flow. These changes could exacerbate political tensions with downstream neighbouring countries.

To ensure that the country's distant regions receive power at a low price, the Government has initiated a long-term construction programme for small hydroelectric power stations from 2009 to 2020 (GR No. 73/2009). The programme proposes 66 stations with a total capacity 43.5 MW by 2011, and another 70 stations with a total capacity of 32.8 MW by 2015, reaching 189 small hydroelectric power stations with a total capacity 103 MW by 2020, with annual power production of more than 641 billion kWh. This programme represents the beginning of hydropower adaptation to climate change, including appropriate design and set-up, and combination, where possible, with other RES to reduce the climate vulnerability of the energy sector.

According to the 2010 HDI Report, Tajikistan has considerable deposits of fossil fuels. Estimated deposits are 4,452 million tons of coal; 117.6 million tons of oil; and 8,517 billion cubic meters gas. However, production of coal, at 97,000 tons, only meets some 16 per cent of demand by users; at 21,000 tons, oil meets about 4.7 per cent of demand by users; while gas at 30 million m^3, meets 5.4 per cent of demand by users. One of the reasons for the five-fold increase in electricity consumption from 1988 to 2002 when it reached 4.8 billion kWh was the deficiency in centralized thermal power and natural gas supply to settlements, and the inadequate supply of containers to villagers. The population used electricity to warm their houses, cook food, and provide hot water. Introduction of energy-efficient gas heaters, and low energy-consumption appliances adapted to renewable energy could be a solution for reducing energy consumption. Existing thermoelectric power stations could be switched to coal on the basis of new ecological firing technologies. As a result, the coal industry would be developed, urban populations would be better supplied with hot water and heating, and additional jobs would be created. This approach has the potential to attract CDM funds.

Agriculture, mostly through mechanized irrigation, is another major electricity consumer. Renewable energies, other than hydropower, could help supply electricity. Research by the Academy of Sciences of

Tajikistan on RES resources indicates the gross, technical and economic capacity of these renewable resources in the country (table 6.4).

6.4 Policies and programmes

Tajikistan has developed several policies, strategies and action plans that address climate change issues. Their implementation is in general hampered by a dearth of financial resources (implementation is highly dependent on mobilization of international funding in grants or concessional loans) and insufficient institutional capacity (human and technical resources). Action plans often lack quantifiable objectives, and mid-term and final evaluations are often not carried out before new plans are elaborated.

The Concept of Transition to Sustainable Development for the period 2007-2030 establishes the development of adaptation measures and activities to reduce damage associated with climate change as the first priority for environmental sustainability. The recommendations in this strategic document are drawn from the First National Communication to UNFCCC, and therefore raise the political level of climate change issues.

Tajikistan's First National Communication to UNFCCC, submitted in 2003, consisted of a National Action Plan for Climate Change Mitigation, and a needs assessment entitled Capacity-Building in Priority Areas. Mitigation aims focus on enhanced energy efficiency; a shift to energy sources with economic growth potential and low emissions; enhancement of natural sinks and GHG reservoirs; and promotion of sustainable, low-emitting agriculture. Adaptation aims focus on various areas such as research into impacts on natural resources, economy and health; development of specific measures; improved monitoring, data collection and analysis; enhanced interpretation, forecasting and dissemination; early warning systems for floods and mudflows; training on assessment, protection measures; and adaptation techniques.

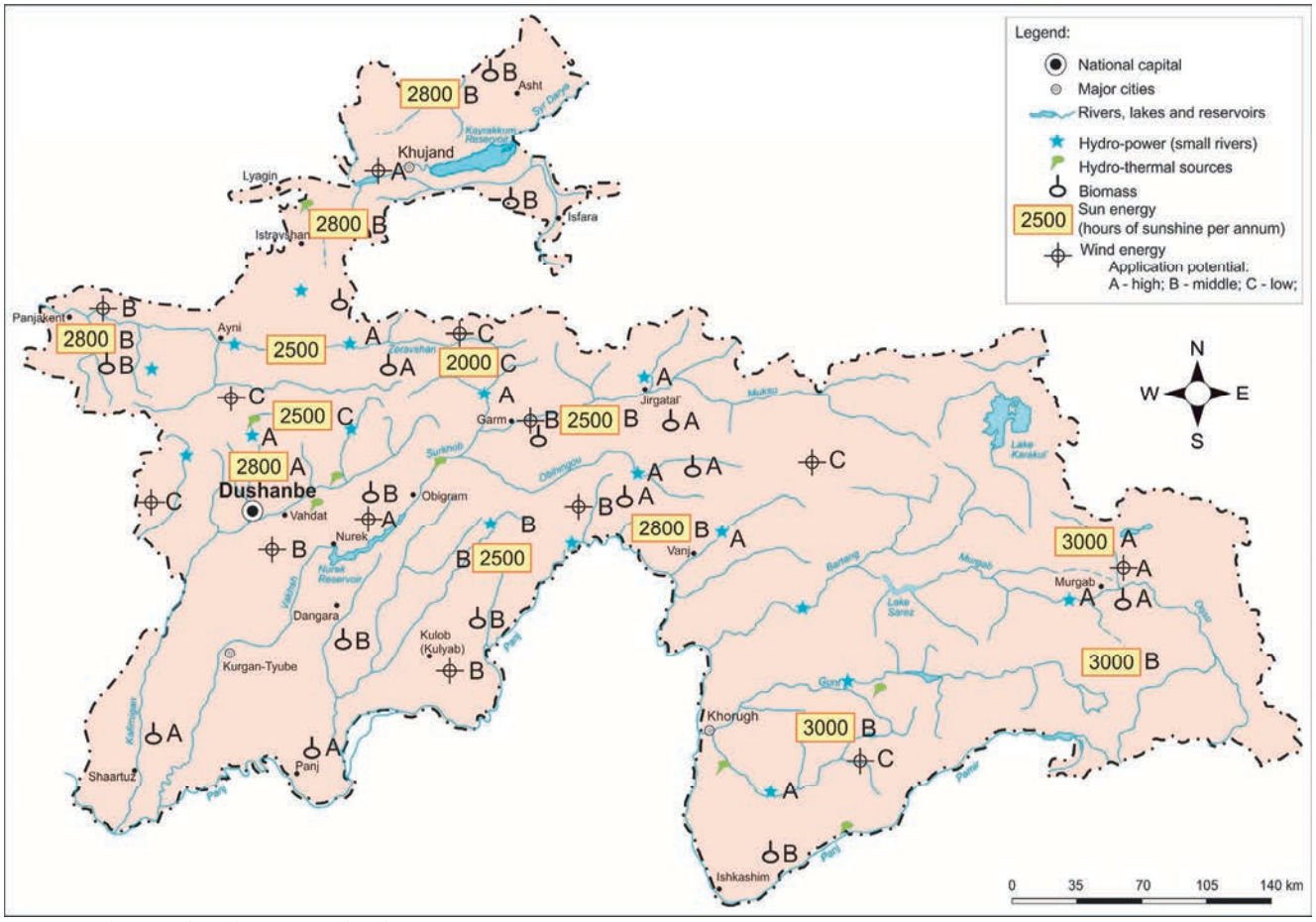
Capacity needs assessment focuses on existing technological improvements needed in energy, industry, agriculture, forestry and land management, and on adaptation needs in water management, agriculture, transport infrastructure, public health and natural disasters. Improvements are proposed to institutional capacity for governance and management of projects, a financial mobilization strategy, and improved participation in systematic observation networks.

State Environmental Programme No. 123/2009 for the period 2009—2019 does not address climate change directly, but rather sets out a series of innovative mechanisms for environment protection and sustainable use of natural resources which, if implemented, will substantially increase adaptation to climate change in Tajikistan. However, the 2010-2012 activities depend on 50 per cent donor funding. The Programme addresses different components of the environment, with a specific focus on agricultural soils, water resources, atmospheric air, forests, disaster risk prevention and management, and human health. The Programme recommends reorientation of the national economy to take into account ecological aspects, such as obligations and incentives for the environmental friendly management of land and for the use of cleaner technologies and waste reduction. It advocates increased engagement of the private sector and a strengthening of the role of community-based organizations in co-management. In addition, it addresses institutional capacity-building, ways to increase the amount of data, and creation of knowledge on environmental aspects.

The Second National Communication to UNFCCC submitted in 2008 establishes natural ecosystems; forests; land and water resources; agriculture; and human health as priority areas for adaptation. Proposals include increased support for protected area systems and forest expansion, exchange of good land management practice, improved water regulation and resource-use efficiency, breeding of resistant crops, and more research into health issues.

The Poverty Reduction Strategy for the period 2010-2012 (PRS) addresses climate change issues. In line with the Second National Communication, it centres the priority on soil degradation such as erosion, waterlogging, deforestation and salinization, explaining that the problem is due to both climate change and man-made factors. The impacts of climate change in the water cycle and on public health are also of great concern to the PRS. The PRS proposes concrete measures on a subset of areas: strengthening the Centre for Study of Climate Change and Ozone; developing legislation for adaptation; rehabilitating the networks of snow measurement stations; rehabilitating and expanding the forest to ten per cent of mountainous, river banks and desert ecosystems; and stabilizing the water flow process and strengthening the banks of major rivers. The latter two measures are also recommended as natural disaster prevention. However, except for the measurements of forests, the other indicators used by PRS for climate change-related measures are not quantifiable, and funding for implementation is not secured.

Map 6.4: Mapping of Renewable Energy Resources



Source: First National Communication to UNFCCC, Part B, 2003.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Table 6.4: Estimates of Renewable Energy Resources

million ton-eq per year

Resources	Capacity		
	Gross	Technical	Economic
Hydro energy, total	179.2	107.4	107.4
including small	62.7	20.3	20.3
solar energy	4,790.6	3.9	1.5
biomass energy	4.3	4.3	1.1
wind energy	163.0	10.1	5.1
geothermal energy	0.0	0.0	0.0
Total (excluding large HPP)	**5,020.6**	**38.6**	**28.0**

Source: Centre for research and use of renewable energy sources, Academy of Sciences, 2010.

The 2010 Programme of Studying and Preservation of Glaciers for the period 2010-2030, No. 209, aims to establish a Centre of Glaciology within Tajikhydromet; to create a catalogue of large, average and small glaciers; to develop in situ and remote sensing monitoring systems; and to undertake research with other national, regional and international institutions. The research will also focus on climate change adaptation measures for hydropower engineering, agriculture and population settlements, based on expected changes to glaciers, lakes and river flow regimes.

A number of sectoral strategies have particular relevance to climate change. Among them, the 2005 Forest Development Programme for the period 2006-2015, No. 396, foresees the restoration and expansion of forests, and their use for income-generating

activities (Chapter 9). It further provides for plantations of fast-growing trees to supply building material and fuel for the population; afforestation to prevent erosion; and improvement of pasture management.

The 2008 Concept Agrarian Policy, No. 658, aims at restructuring and increased planning of agriculture activities. The country is subdivided into agricultural zones, with the most appropriate activities defined (farming, gardening, pastures). The Policy calls for the increased involvement of the private sector and establishment of farmer cooperatives to allow modernization of agriculture. Despite the fact that agriculture is the largest GHG emitter, no mitigation measures are identified. Nevertheless, particularly in Article 9, the Policy includes environmental and adaptation measures. These are protection of soils, plants, and animals via research, improvement of extension services, promotion of adequate technologies, and training of farmers. Protection of water resources will include water management reform by decentralization of management and transfer of the economic functions to local powers, private sector and water users associations, restoration of irrigational systems, and updating of water production and management assets.

The purpose of the 2007 Integrated Programme on Wide Use of Renewable Energy Sources for the period 2007-2015, No. 41, is the creation, development and wide use of technologies for the utilization of electric and thermal energy resources contributing to the fuel and energy balance of the country. The goal is to research, design, test, and introduce renewable energy systems such as solar energy use for heating and electricity; wind power for electricity and mechanical work; biogas from biomass and agriculture waste; improved methods and devices for energy accumulation; and to estimate efficiency of transformation of various kinds of renewable energy sources and their potential within Tajikistan. The Programme will set up demonstration and testing of prototypes of RES power systems; create industrial installations for parts production and assembly of RES systems; develop skilled expertise in the field of RES power; undertake training and awareness-raising of the population to extend the use of RES power; develop books, brochures, information leaflets and instructions about RES, RES equipment, and opportunities for their use in different sectors and regions of the country. The total amount of this programme is estimated at 6.3 million somoni until 2015. Financial resources are expected to be drawn from the following main sources: about one-quarter from the State budget, one-quarter from private companies and persons, and half from international organizations.

A main goal of the State Programme on Transport for the period 2008-2025, is to reduce emissions from transport. A legal act has been adopted in 2008 to regulate the number of old cars with the aim of a gradual reduction by 2015 of cars older than 10 years, and of buses older than 15 years. Currently, the corresponding diploma is only applied to municipal public transport (public and private), but from 2013 it will be applied more widely. Car inspections already exist, but will be gradually expanded up to 2015 for younger cars (less than 10 years) and public transport (less than 15 years) and to wider technical and environmental aspects, and a certificate of inspection will be required for private cars, trucks and buses. The introduction of a fuel tax for end users is also proposed as well as a regulation on liquefied petroleum gas and natural gas to set requirements for the vehicles already using them.

The overall aim of the 2010 Strategy on Disaster Risk Management for the period 2010-2015, No. 164, is to include disaster risk reduction in all development projects in Tajikistan and to increase the efficiency of disaster reduction and preparedness. The five components are to improve legislation and clarify mandates; define disaster risks and establish databases and prevention funding; promote disaster risk management in all national policies, programmes and projects; increase disaster risk preparedness through contingency planning, early warning, coordination and public participation; and increase training and public awareness.

6.5 Selected international assistance activities

Tajikistan has succeeded in proposing and defending its case to be one of only nine countries chosen for implementation of the Pilot Project for Climate Resilience (PPCR), under the Climate Investment Funds (CFI) of the multilateral development banks (MDB). The PPCR has three phases: the first was an inception phase to take stock of the range of climate change-related activities in Tajikistan and reach agreement with the Government on the process and the definition of the main areas for further work, from the existing broad scope of potential activities of the PPCR. In the second phase, which is starting, a Strategic Programme for Climate Resilience will be developed, and in the third phase, a sum of over US$30 million will be earmarked for the implementation of the Programme in the next four to five years.

Photo 6.1: Nisur village, Bartang valley, Pamir

The main sectors identified for technical assistance are energy security, land management and livelihoods at the river basin level. The first phase, worth US$1.5 million, will include mainstreaming climate change considerations into key policy areas; assessing Tajikistan's capabilities for climate change scenario planning and information use; raising awareness of policy-makers, stakeholders and trainers; assessing hydropower vulnerability to climate change and increasing its resilience; developing inventories and analysis of sustainable land management activities and issues to address in PPCR; and working out methodology to identify and enhance climate resilience for livelihoods and priority investments in vulnerable river basins.

The 2004 UNDP Disaster Risk Management Programme is a collaborative endeavour designed to address the serious and chronic problem of natural disaster management faced by Tajikistan and its neighbours, comprising preparedness, response, mitigation and prevention. The first phase supported and increased the Government's capacity to implement disaster reduction policies, by using new information technologies for monitoring and forecast, increasing public understanding of risk, vulnerability and disaster reduction, and improving coordination and enhancing interdisciplinary commitment and inter-sectoral partnerships, locally, nationally and regionally. The second phase aims to reduce the impact of natural disasters on vulnerable communities by strengthening national capacity to prevent, coordinate and respond to natural disasters.

The establishment of the Information Management and Analytical Centre (IMAC) at the CES in Dushanbe and five regional offices, to improve management of disaster-related information and data, is an example of this programme's outputs. The programme also serves as the secretariat for the Rapid Emergency Assessment and Coordination Team (REACT), established in 2001 by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and now a fully-fledged Disaster Management Partnership including around 40 member organizations and led by the Tajik Committee of Emergency Situations (CoES). Following the global cluster approach, established by the UN Inter-Agency Standing Committee, five sectoral groups were established within REACT, covering non-food items and shelter, food, water and sanitation, health and education. Regional REACT groups have also been set up to cover specific geographical areas (Rasht and Zerafshan Valleys, Kulyab region and Sughd).

The Swiss Agency for Development Cooperation (SDC) and DFID are also engaged in disaster risk management at local and national level. One of the largest initiatives in the country addressing adaptation to climate change is the 2007 Khatlon Region Flood Risk Management Project. The aim of the project is to minimize risks from flooding to the lives and livelihoods of rural communities along the Pyanj River in Khatlon Region. The project is financed by a US$ 22 million loan from the Asian Development Bank (ADB).

The regional project Protecting Health from Climate Change is implemented by WHO and funded by Germany. The project, which will end in December 2010, aims to strengthen the capacity of Tajikistan (and other countries) to understand the health risks of climate change and to respond by developing a national health adaptation plan, with particular emphasis on evaluating health impacts; assessing the capacity of the local health system to respond to climate change; developing contingency plans for health facilities in close cooperation with other sectors; building capacity of the local health system including provision and response to early warning; and improving water security for health care institutions through cost-effective technologies.

UNDP and other UN agencies operating in Tajikistan support the Government in the implementation of the Communities Programme (CP), a multi-year and multi-focus programme bringing together critical partnerships with Government and donors (mainly UNDP, DFID, EU, SDC, etc), to support implementation of the Poverty Reduction Strategy for the period 2007-2009 and the National Development Strategy to 2015.

The CP engages in participatory processes to deepen local ownership and partnership between Government and communities; build local and regional capacity; strengthen participatory planning and budgeting mechanisms; and support community advocacy and participation in decision-making. It has five area offices in Sughd, Khatlon, Rasht and Zeravshan Valleys. One of the projects is the Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities. This is a US$3.5 million project spanning four years to increase household incomes through promotion of income-generating end-use applications of renewable energy in areas with either unreliable or limited or no power supply.

The UNDP-GEF project Sustaining Agricultural Biodiversity in the Face of Climate Change for the period 2009-2014 will use local pilot activities, covering approximately 15 million ha, to test and demonstrate replicable ways for rural farmers and communities to benefit from agro-biodiversity conservation while at the same time building their capacity to adapt to climate change. The project aims to strengthen relevant existing policy and regulatory frameworks; build community, institutional and system capacities; and develop agro-enterprises supporting agro-biodiversity products to offset the negative effects of climate change.

SIDA has implemented four projects through the Natural Resource Management and Strategic Crop Production (2004-2010) initiative to develop seeds adapted to climate change: Strengthening the Seed Sector; Seed Quality Control; Genetic Resource Conservation and Management; and Higher Education. This is currently the only donor support targeted directly at genetic resources, plant breeding, seed production and marketing, which form a continuum of closely linked issues and activities underpinning crop production. The projects are now focused on leaving a sustainable system after closure.

The European Union has sponsored (1996 to 2006, €39.5 million) and continues in the period 2007-2013 to support, among other sectors (total amount €66 million) the Tajikistan Food Security Programme, with the objective of increased food security and rural incomes, so that beneficiary communities are better prepared, capable and resilient to cope with recurring “lean seasons” as well as external shocks. Interventions are mainly focused on the most food-insecure areas, communities and groups in subsistence households, principally in the northern ad southern uplands. In turn, the Tajik Agricultural Finance Facility provides revolving credit lines to Tajik financial intermediaries (banks and non-bank financial institutions) which lend seasonal finance. The objective is to provide alternative finance to small farmers and support the freedom-to-farm concept while employing best farming practices, particularly on environmental and labour issues.

Although still in the conceptual phase, the Green Initiative for Tajikistan (GIFT) is an environmental funding mechanism sponsored by UN agencies (FAO, WFP and UNDP) and budgeted at US$23 million over six years. The programme framework consists of four objectives: supporting the scale-up of large scale community tree-planting programmes; enhancing environmental awareness through a “Go Green Tajikistan” campaign; promoting fuel efficiency and alternative energy; and strengthening institutional capacity to support community-based forestry.

The Sustainable Management of Natural Resources in Gorno-Badakhshan Autonomous Region (2008-2010) is an example of a mitigation project and is implemented in collaboration with the German Development Service (DED) and the Gorno-Badakhshan State Land Use Committee, the State Forestry Authority of Gorno-Badakshan and various other local organizations. The project aims to promote household energy efficiency through micro-

credit and provide incentives for formerly illegal users of wood (FLEGT) to manage the resource sustainably.

The Ministry of Water Resources and Land Reclamation is implementing large-scale projects on irrigation and water flow regulation including the Ferghana Valley Water Resources Management Project (2005-2016), a US$13 million project supported by the World Bank, in order to boost capacity for increased irrigated agriculture productivity and improved safety and regulation of the Kayrakum Dam and Reservoir.

The Irrigation Rehabilitation Project (due to finish in 2011), which has ADB backing and is worth US$227 million, aims to rehabilitate irrigation and drainage systems and institutions; support *dehkan* farmers; improve rural potable water supply; and enhance project management, monitoring, and evaluation. EBRD also backs several large water projects such as the Khujand Water Supply Improvement Project II (2010-2011) which, in addition to priority investments on water supply, also involves institutional development for metering.

Several organizations, especially international NGOs, are implementing participatory processes to determine how climate-related risks are affecting the well-being of the population, and then identifying adaptation strategies. Many other projects are carried out with funds from international donors or the International Finance Corporation (IFC), to address water resources and flood protection, land management, food security, as well as other aspects that contribute to adaptation. As a result, the foreign aid earmarked for water, agriculture and irrigation, and environmental protection accounts for the largest amount invested by international donors and multilateral development bodies (MDBs).

6.6 Participation in the global Clean Development Mechanism

Tajikistan has been actively engaged withon the CDM since 2009. The CDM Centre has been working to compile an information series and documents, such as forms for submission of project proposals, project design documents, the format for draft agreements on the purchase of emission reductions, notification letters to UNFCCC on CDM projects, etc. All this information can be found on the CDM Centre website (http://www.cdm.tj). The site also contains guidelines for verification and validation of CDM projects and for filling in project proposal forms. The site shows the project approval process and the legal basis and structure of the DNA for CDM.

The largest enterprises would implement the majority of the CDM projects. The Ministry of Agriculture and the Committee on Environmental Protection are also part of the group of CDM Centre partners. As yet, no projects are in the UNFCCC pipeline. Those under consideration and the expected Certified Emission Reduction (CER) for each project are given in table 6.5.

Some CER values are still being refined by the CDM Centre so the current list is not accurate. The 4,600 tons of CO_2-eqv per year currently referred to, from the 2008 GHG inventory, correspond to about 1 per cent of the country's total sink capacity. Not all of the projects listed in Table 6.5 will be implemented, even if they pass preliminary registration processes. The factor in project selection is the amount of CER the project may produce, the investment cost, and the business environment of the country (namely, clarity of investment processes and investors' faith in national governance).

Table 6.5: List of project applications, proposed for implementation under the CDM

Project Title / Proposals	Expected volume of CERs (thousand tons CO_2 - equivalent / year)
SUE Nafta Gas	1,948.6
SUE "Tadzhiktransgaz"	2,357.0
OAXK Barki Тоҷik "	140.1
Dushanbe	80.0
SUE Talco	40.0
Committee for Environmental Protection under the Government	(CER to be computed)
Total	**4,565.7**

Source: http://www.cdm.tj

6.7 Conclusions and recommendations

The Government has demonstrated its interest and commitment to moving forward on adaptation to climate change. Tajikistan has ratified UNFCCC and its Kyoto Protocol, aligned key strategic documents, and established a Centre for Study of Climate Change and Ozone and a CDM Centre. Given Tajikistan's high occurrence of natural disasters, disaster risk reduction needs to be a major part of long-term climate change adaptation planning. The Government has just adopted a Disaster Risk Management Strategy, and the country is making progress in terms of adaptation to climate change and mitigation, which it is starting to address in different strategies. The appropriate conditions exist for climate change considerations to be mainstreamed into policy and programmes at all levels of Government, across all ministries, particularly at the departmental and municipal level.

Most line ministries understand that climate change is a threat and recognize the need to enhance their understanding of the possible impacts on their policy area. In 2007, the Government adopted a series of strategies and laws on State Ecology, Agriculture, Renewable Energies, Transport, and Disaster Risk Management. The ministries are used to addressing issues together and to being consulted on their respective strategies.

Different studies, strategies, reports, international cooperation partners, etc. have identified the major needs of the country for climate change adaptation. These are water quantity and quality, land management and food security, energy security, disaster risk management and the need for improving environmental migration efforts, health and climate change, air quality, waste management and livestock management. The international community is supportive and is helping the Government in a number of initiatives, sectors, and geographic regions. A major recommendation is that the Government coordinates all these activities, with a broad overview in order to increase the efficiency and effectiveness of the actions; this can be achieved through the establishment of a unit or an office dedicated to these issues.

Recommendation 6.1:
The Government should consider establishing a body on climate change issues to inter alia:

- *(a) Address climate change issues;*
- *(b) Procure studies on climate change impacts in different sectors;*
- *(c) Coordinate and monitor adaptation and mitigation activities;*
- *(d) Coordinate fund mobilization for climate change;*
- *(e) Raise awareness on adaptation and technology transfer issues at different levels;*
- *(f) Ensure the integration of climate change issues into strategies policies, programmes, plans and investment projects.*

Recommendation 6.2:
The Government should

- *(a) Develop a national adaptation strategy as well as a low-emission development strategy in line with the recent strategies developed on relevant topics;*
- *(b) Ensure financial and human resources for the implementation of these strategies and continue fund mobilization for adaptation and mitigation actions.*

Stakeholder consultations conducted by PPCR processes since 2009 indicate that the notion of climate change and the risks and challenges it poses are relatively new and unfamiliar for the Government and population. There is a basic understanding of the associated risks, but understanding of even the broad implications for different communities, sectors of the economy, ecosystems and development is low. Raising the awareness of the press media could help in diffusing information and reaching remote areas. Awareness on climate change risks and the need for adaptation might have also to be raised among local government. Improving public awareness could increase the climate resilience of particularly vulnerable groups, such as the rural poor, women, children and the chronically ill. Efforts aimed at increasing awareness on climate change in Tajikistan must be sustained for the long term.

Recommendation 6.3:
The authorities dealing with climate change issues should

- *(a) Raise the level of expertise at the national, regional and municipal levels, through capacity-building and training programmes;*
- *(b) Carry out awareness-raising campaigns on climate change risks, mitigation and adaptation to climate change in cooperation with NGOs and community-based institutions.*

Regional studies confirm that water storage and management should be a major priority in Central Asia. Snowpack and glaciers are the major source of water supply for all water-dependent sectors in Tajikistan. Key river basins, such as the Pyanj, Vakhsh, Amu Darya, and Sir Darya, are vulnerable to

glacial melt and extreme events, affecting livelihoods and economy in Tajikistan as well as downstream neighbouring countries, for which they are vital. Hydrometeorological information is also key in a prominently rural country like Tajikistan, for ensuring sustainable agriculture; determining the appropriate time for crop sowing and harvesting; protecting harvests from hail; designing buildings, bridges, roads, and canals; providing safe cargo and passenger traffic, etc. The monitoring and forecasting of severe hydrometeorological phenomena reduce the scale of their adverse impacts and allow the prevention of damage.

As stated throughout this EPR and in different national documents, Tajikhydromet and scientific institutions have very limited capacity to conduct meteorological and hydrological monitoring and forecasting, environmental monitoring as well as monitoring of snowpack and glacial retreat. Under these circumstances, the country is making significant efforts to try and produce results such as the GHG inventory and running models of climate change impacts like PRECIS. Nevertheless, current global circulation models have limited value for Tajikistan because of coarse grid resolution and the topography of the country. Downscaling of models to finer grid is hampered by lack of data, and it is very difficult to understand what to adapt to. Lack of data, and of remote sensing capacities and funds for field trips do not help to overcome the deficiency in understanding the geomorphic stability of local glacial lakes and subregional glacial dynamics. Some field trips are run from time to time, but not on a systematic basis. There are ongoing initiatives involving the development of climate impact modelling in high mountain fragile ecosystems, in impact projections modelling for river basins, on glacial retreat and adaptation project, etc. Tajikistan could benefit a great deal from these initiatives, but for the time being national institutions like Tajikhydromet have no staff or resources to do so.

The lack of proper hydrometeorological and glacier data production also poses difficulties in terms of the country's integration into the Global Observing System, which would significantly boost international cooperation. The Government adopted the Programme for the Recovery of Meteorological and Hydrological Stations Posts for the period 2007-2016 (2006 Resolution No. 408) and more recently the Programme for Studying and Preserving Glaciers for the period 2010-2030 (2010 Order No. 209). However, these depend heavily on foreign assistance, and little progress has been made on the former.

Recommendation 6.4:
The Government should strengthen the capacities of observations and monitoring on meteorology, hydrology, and glaciers by ensuring

(a) The development of a network of automatic hydrological gauges and early warning systems, particularly in the upper reaches of river basins prone to formation of mudflows and floods;
(b) The information transfer and exchange systems.

See also recommendation 3.1.

Despite the significant efforts undertaken by Tajikistan to draw up a GHG inventory, there are uncertainties. This is one of the consequences of the overall weakness of environmental monitoring, in particular on air quality. There is a need to improve capacity and know-how in terms of environmental monitoring. More regular monitoring is needed to acquire a more accurate picture of developments on the ground, namely, efforts to limit air emissions by industry, but also to account for the increase of emissions in road transport, which has grown rapidly in recent years. This monitoring would also help to improve the focus of actions on transport already underway, and to draw attention to areas in need of improvement such as the quality of fuels and monitoring of vehicles, with a view to addressing the high GHG emissions. Given the ongoing reforestation efforts, it is possible as well that carbon absorption will increase, as will the impacts of renewable energy efforts. The lack of a proper system for monitoring GHG may hinder the computation of CERs on which CDM projects are based.

Recommendation 6.5:
In order to produce a more robust inventory of Greenhouse Gases, the Government should ensure:
(a) Availability of financial and human resources for the development of a reliable system of monitoring and registering of Greenhouse Gases;
(b) Cooperation between key players in the statistical reporting related to the country's Greenhouse Gases inventory.

Chapter 7

SUSTAINABLE MANAGEMENT OF WATER RESOURCES

7.1 Introduction

Tajikistan has abundant water resources. However, due to institutional weaknesses as well as inadequate funding and outdated infrastructure in the water sector, there are multiple challenges in the use and protection of water resources. Only some 60 per cent of the population has access to safe drinking water, and there are frequent outbreaks of water-borne diseases, creating severe human health risks. The functioning of the water supply and sewage systems is, moreover, frequently interrupted by power outages, which is also a source of water contamination. Over 90 per cent of water is used in irrigated agriculture and water losses in irrigation are high, comprising at least 40 per cent.

Because of their geographical location, all Central Asian states rely heavily on the valuable water resources of Tajikistan. As an upstream country, Tajikistan is in a privileged position to provide other States with water, mainly for irrigation purposes. The use and management of water in Tajikistan is therefore important to the region, and underscores the special demands of transboundary river basin management. These challenges will be accentuated by climate change.

7.2 Water resources and key challenges for water management

Quantity

Average annual precipitation is 760 mm, which is distributed very unevenly throughout Tajikistan. It ranges from under 400 mm over approximately 40 per cent of the country, particularly in the Gorno-Badakhshan Autonomous Region, up to 1,500 mm in the central mountainous regions and their river basins. In total, the annual amount of precipitation is 98.6 km³ of water.

Mountainous regions, which account for 93 per cent of the country, feed the flow of water from their glaciers and annual precipitation. There are over one thousand registered glaciers with a length of more than 1.5 kilometers and occupying an area of about 8,500 km², corresponding to 6 per cent of Tajikistan's land area. Sixteen glaciers, such as the Fedchenko and Grumm-Grzymailo glaciers, have a length of more than 16 kilometers. The total amount of water from glaciers was estimated at 845 km³ in 2006. The share of glacial water usually does not exceed 25 per cent of the annual flow of the rivers, as in the winter period the rivers are rather fed by groundwater.

The mean annual flow of water formed in Tajikistan is estimated at 64 km³, comprising 62.9 km³ of runoff in Amu Darya River basin and 1.1 km³ in the Syr Darya River basin. Both rivers flow into the Aral Sea basin and provide some 55 per cent of the overall run-off into the basin. Currently, however, after a long journey through a number of countries, natural seepage, evaporation and heavy exploitation, only the Syr Darya River retains an inflow to the Aral Sea. The mean annual flow from all rivers in Tajikistan is 80.2 km³ (table 7.1). After the confluence of the Kafirnigan, Vakhsh and Pjandj rivers, the flow becomes the Amu Darya River.

The man-made irrigation and drainage canals have a total length of around 45,000 km across the arable land. They are fed by intakes from rivers and connected to the groundwater through seepage and leaks.

Tajikistan has around 1,300 lakes, mostly in mountainous regions higher than 3,500 m above sea level and with an area of 705 km². They contain 20 km³ of freshwater and 26.3 km³ of salty or muddy water. There are nine operational water reservoirs, which can hold up to 7,424 million m³ of water (Table 7.2). The area of these reservoirs is approximately 700 km². Evaporation rate is high because of the warm, dry climate. A typical evaporation profile is illustrated in figure 7.1. The mean annual groundwater regeneration is estimated at 18.7 km³, while total groundwater volume is estimated at 664 km³. Feeding into this is water from the deteriorated irrigation canals and network, from municipal sewage and from the smaller irrigation channels. There are also some 200 mineral springs as well as sources of thermal water.

Water quality and anthropogenic pressures

Water from Tajikistan's mountains is cold and clear because it is derived from a geology naturally rich in lime and minerals. Half of the surface water and groundwater utilized is extremely hard and mineralized.

In the headwaters of rivers, no appreciable capacity for self-cleaning can be expected because the bacteria, which would reduce organic load over time, are unable to establish due to the low temperature and high flow rate. However, fish and makrozoobenthos are present in these headwaters. Rivers near agricultural and industrial agglomerations, as is the case with human settlements, are rich in nutrients, salt and all the substances used in human activities. Map 7.1 shows pollution of surface water.

Surface water quality assessment and regulation in Tajikistan are based on the specification of the maximum allowable concentration (MAC) for harmful substances (Table 7.3). Water users also have to pay for the discharge of water pollutants (Chapter 5). However, the number of pollutants covered is excessive, and monitoring is weak as a result of very limited resources (Chapter 2). Figure 7.2 shows some parameters of Syr Darya River water quality in Khujand.

Three measurement points are under continued supervision during the year. Phosphate values briefly fall below the limit of 0.3 mg/l. Despite the high flow (average 500 m³/s), the Syr Darya River is suffering from eutrophication, which starts at 0.1 mg/l phosphate. BOD values are also briefly below a MAC of 3 mg/l, which is sharper than in the European Union (EU). As for the oxygen demand of the organic load, the Syr Darya River is in a satisfactory state. Chloride values are at a natural low with a high MAC. The pollution recorded is caused by agriculture from upstream agricultural areas. No analysis of industry-borne chemicals was submitted.

Table 7.1: Annual average river flow

River	km³	m³/s
Pjandj	33.4	1.1
Kafirnigan*	5.2	165.0
Surchandarja*	1.0	32.0
Vakhsh	18.9	599.0
Zerafshan*	5.1	163.0
Syr Darya**	16.0	507.0
Isfara	0.5	15.0
Katazaisk reservoir - rivers	0.1	5.0

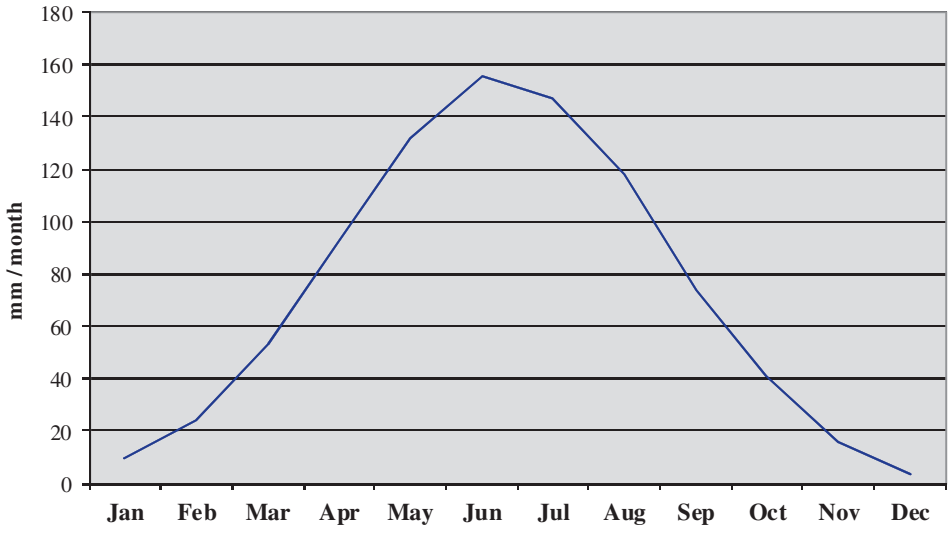
Source: Statistical Yearbook of Tajikistan, 2009.
Note: * tributary of Amu Darya
**Syr Darya River basin runoff in Tajikistan territory is 1.1 km³

Table 7.2: Reservoirs

Reservoir	Location	River	Volume million m³		Regulation type	End of construction
			Total	Useful		
Daganasay	Sughd	Daganasay	28.0	14.0	seasonal	1983
Selbur	Khatlon	Kyzylsu	20.7	17.0	seasonal	1966
Golovnoye	Khatlon	Vakhsh	94.5	20.0	daily	1962
Muminabad	Khatlon	Obi-Surkh	31.0	30.0	seasonal	1959
Kattasaysk	Sughd	Kattasay	55.0	36.6	seasonal	1966
Sangtuda 1	Dangara dist.	Vakhsh	250.0	120.0		2009
Kairakkum	Sughd	Syr Darya	4,160.0	2,600.0	seasonal	1956
Nurek	Khatlon	Vakhsh	10,500.0	4,500.0	seasonal	1983
Baipaza	Khatlon		125.0	87.0	multiyear	1989
Total			**15,264.2**	**7,424.6**		

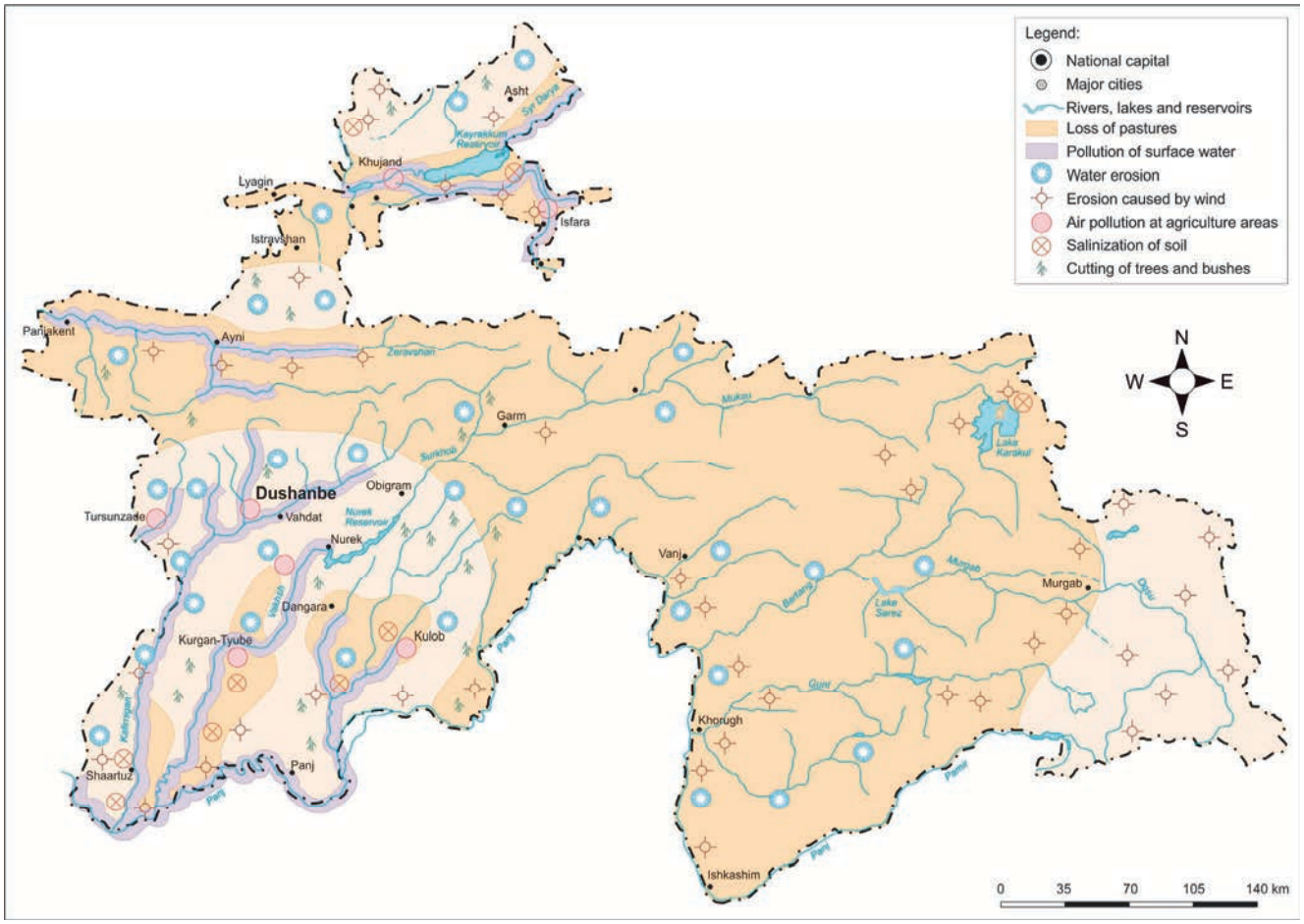
Source: Draft Water Sector Development Programme, 2009.

Figure 7.1: Average evaporation at Kairakkum Reservoir, 2001-2009



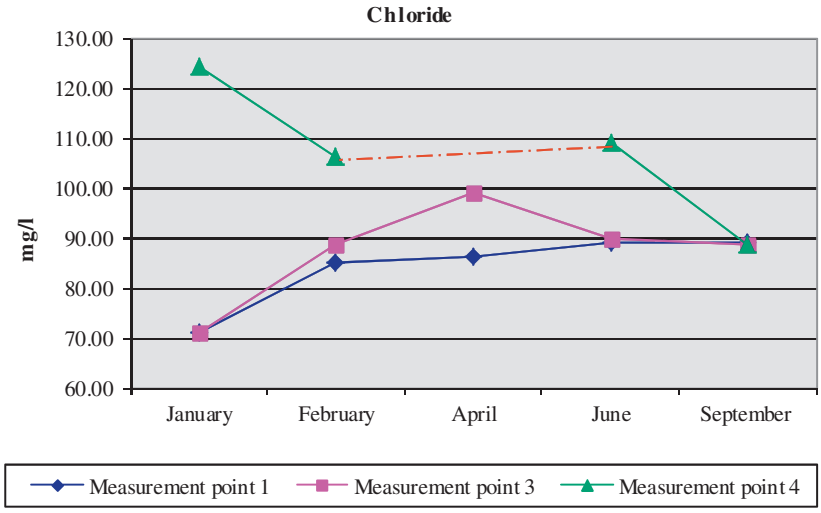
Source: Fergana Valley Water Resources Management Project, 2010.

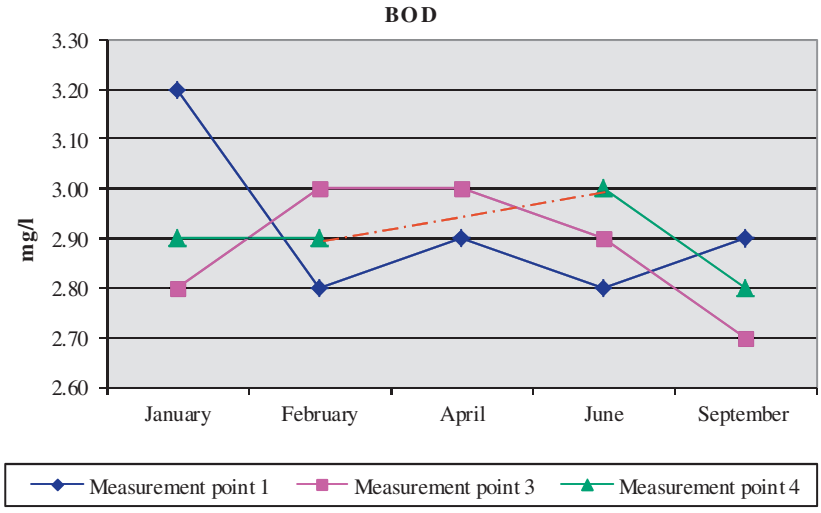
Map 7.1: Pollution of surface water and related activities



Source: School Atlas Tajikistan, 2004.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Figure 7.2: Water Quality of Syr Darya River





Source: Table of water quality measuring in Sughd Committee on Environmental Protection, 2010.

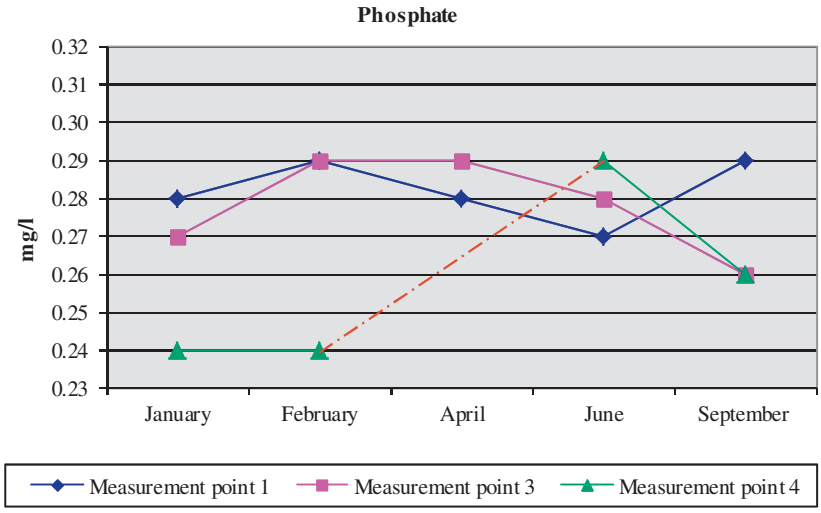


Table 7.3: Selected substances

	mg/l
Dried solid content	< 1,000
Chloride	< 300
NH_3	< 2
Nitrite	< 0.02
Nitrate	< 10
Oxygen	> 4
BOD	< 3
Phosphate	< 0.3

Source: Table of water quality measuring in Sughd Committee on Environmental Protection, 2010.

Around 45 per cent of surface water are rich in chemicals. Although the very low temperature of the water in Lake Iskanderkul does not rule out life, the lake is so contaminated with mercury that no fish can live there. In most cases, pollution is of anthropogenic origin. Because of erosion during flood periods, the level of turbidity of the rivers becomes high. Polluted substances also accumulate in the water reservoirs.

The communal irrigation systems, criss-crossing every small settlement, are misused for discharge of domestic waste and wastewater. In the event, organic nutrients and floating garbage flow into the rivers.

Mass development of algae can occur in hot summer periods. This causes elevated oxygen demand from the decomposing biomass and affects water quality, especially in reservoirs.

Water-related natural hazards

Because of the nature of the mountainous terrain, the usual results of heavy precipitations are greater in Tajikistan than elsewhere. Snow avalanches or pulsating glaciers also have the potential to create outbursts from high-mountain lakes. Landslides, mudslides and flood disasters are often a direct threat to people, infrastructure and arable land.

For example, in 2006, 25 mudflows and more than 50,000 landslides occurred. About 1,200 of these landslides threatened settlements, and 142 settlements were constantly impacted by floods. Almost 500 settlements suffered from seasonal floods during the irrigation season.

Eroding mountains, pastures and fields, affected by legal and illegal cutting of trees and bushes, are a permanent danger. The loss of tree cover means that, in the event of heavy precipitation, the flood risk is much higher than before, and the warning time is shorter because the flow is faster. The resulting deterioration of soil structure, due to prolonged flooding, has a largely irreversible impact on agriculture and on groundwater capacity. In the event of droughts, these areas have only limited groundwater capacity.

Flood protection

In Tajikistan, flood protection infrastructure exists in major cities, i.e. concrete walls. In the mountainous regions of Tajikistan, river bank protections are often provided by wire boxes filled with rocks (gabions). Moreover, erosion has an impact on river banks, e.g. the right bank of the Panj River.

These constructions have partly deteriorated due to lacking maintenance and flood events, but are repairable. By implementing the concept of integrated water resources management (IWRM) and basin river management, there is a good chance to realize the State and local flood prevention programmes for each river as well as protective measures for strategic targets and objects.

A growing problem is new settlements directly under obviously eroding mountain slopes, and even in the riverbed. The Varzob valley, the region for recreation and tourism, is highly affected. And not only flood protection is difficult now: negative effects on water quality are seen in Dushanbe, where the water from the Varzob River is used for drinking water supply.

The capital, Dushanbe has been developed directly behind the concrete protection walls along Dushanbinka River. Construction is partly deteriorated and increases exposure to flood risks. A positive example is the city of Khujand, where the settlements extend right up to the natural flood zone. Some sensitive areas, e.g. where wells with electrical pumps are located, are protected by a concrete wall up to the level to which the river would rise in the case of a disaster at the Kairakkum reservoir.

In rural areas, in order to avoid flood risks, the water flow through irrigation channels can be redirected by weirs and gates. In general, timely use of these installations can ensure positive outcomes.

Water protection zones

Water protection zones are to be designated around water catchments to prevent short-term anthropogenic influence on water quality. They must be controlled by the water companies and supervised by CEP regional branches. Water protection zones in Tajikistan are mostly proposed by geology experts and extend for 30 m beyond the catchment area. This

offers insufficient drinking water protection, because long-term anthropogenic influence must also be excluded. Ideally, water protection zones should cover the entire area of the water body used.

Water protection zones in Tajikistan are also situated along every river where, theoretically, anthropogenic influence within 5 m minimum of the river bank, including cattle pasturing, is forbidden. The width of the protection strip depends on the river's size. The CEP can choose the dimension between 5 m and 50 m or more.

Management of accidents involving dangerous substances

Numerous cross-connections between irrigation channels and sewage channels are a risk in the event of traffic accidents when motor oil/fuel or transported substances such as milk, fuel and chemicals can enter the sewage system and cause damage to the WWTP. No accident prevention service has so far been provided.

Tailings from mining and waste deposits on unsafe landfills are an underestimated danger. An environmental assessment could help to reduce or prevent leakage.

Dam vulnerability to earthquakes and floods

Dam reservoirs are often in an unsatisfactory state. Some international programmes are under way to improve observation, monitoring and measurement of dam operations. Under the UNECE dam safety project, training courses were run in 2010 for delegations from all Central Asia Countries with support from the Russian Federation. At Kairakkum reservoir, the International Development Association (IDA) financed a study as a basis for future measures to safeguard the dam from earthquake and flood risks. Emergency plans are also required.

Climate change

Global climate change has already triggered glacier and snowfield reduction and repeated dry years and droughts. Continuing climate change will bring an increase of extreme weather conditions. Temperature is expected to rise by 2-3 °C or even 5° C during the hottest season. Agriculture will be severely affected as evapotranspiration from vegetation increases by 10 to 20 per cent. With a doubling of CO_2 concentration in the atmosphere, water resources are expected, in the long run, to decline by 10-20 per cent with increased run-off during the low-flow period and a reduction of flow in what would previously have been the high-flow season (Chapter 6).

7.3 Water use

Water use in Tajikistan is dominated by irrigated land farming, which accounts for some 84 per cent of total water use. Household and agricultural water supply has a share of 8.5 per cent. The remainder is taken up by industry (4.5 per cent) and fisheries (3 per cent).

According to data provided by the Statistical Yearbook for the years 2002 to 2005 and the 2009 Water Cadastre of the Ministry of Land Reclamation and Water Resources (MoLRWR), the reported consumption of water appears to have been broadly stable 2004, 2005 and 2009. It amounted to some 8.5 million m³ in 2009. Tajikistan's consumption rate is thus significantly below the agreed quota for Aral Sea countries of 15 million m³ per year.

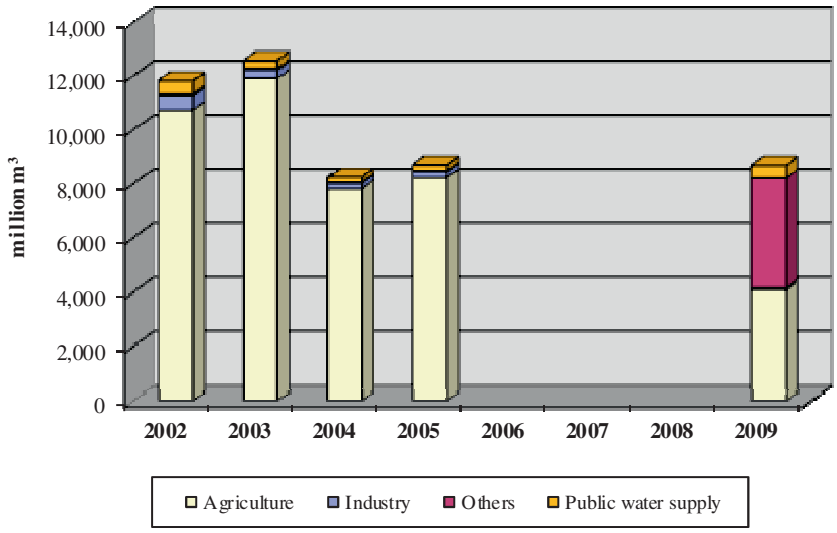
Water intake from the Amu Darya River basin amounts to some 9.5 billion m³. Another 1.2 million m³ is from the Syr Darya River basin. There is no information on water intake from the Zerafshan and the Suchandarja rivers. The known amount of water intake of some 10.7 km³ is reduced by evaporation and leakage.

Agriculture

Agriculture is of major importance for the Tajik economy, accounting for about a quarter of GDP and exports and some two-thirds of total employment. Agricultural land covers some 4.7 million ha (33 per cent) of the country area. Some 3.8 million ha (about 81 per cent) of agricultural land are pastures. Irrigated land covers some 0.7 million ha, corresponding to 15 per cent of total agricultural land and 5 per cent of the total country area.

On average, 12,000 m³ of water is used per ha in irrigated agriculture. However, this figure conceals a range of 8,000 to 16,000 m³ per ha. The heavy water use largely reflects the predominance of cotton production, which is grown on more than half of irrigated farm land, and the traditional system of furrow irrigation. The irrigation period is from March to October, during which time cropland is irrigated three times a day. After the introduction of the water supply fee system in 1996, farmers reduced water demand for irrigation. Currently, for the irrigation of 743.000 ha, the water intake from rivers consists of not more 9 billon m³ per year.

Figure 7.3: Water consumption, 2002-2009



Source: Statistical Yearbook, 2002-2005. Water Cadastre of the Ministry of Land Reclamation and Water Resources, 2009.

The amount of irrigation water appears to have stabilized at around 8 million m³ since 2006, and a considerable amount of this is groundwater. Forty-five per cent of irrigation water is drawn through pumps. More than 300,000 ha of land is simultaneously irrigated and drained, and some 3.75 million m³ of irrigation/drainage water is discharged into rivers. Discharges are polluted with a high mineral load and pesticides. Through run-off water and land erosion, manure and other fertilizer, soil and pesticides also reach the rivers. Only 47,400 ha (some 6.5 per cent) of irrigated lands are drained by vertical wells. It is noteworthy that nearly 80 per cent of the 2,356 vertical wells working in 2004 were out of order in 2009.

The irrigation and drainage network (IDN) consists of 45,000 km of conduits, most of them open channels and only 298 km pipes. Pressure pipelines of the pump stations diameter ranges from 400 to 2,400 mm. Thirty per cent of pumps have deteriorated and suffer from power failure. For cross-regional water transport, five main pipes are in operation. Some pipe subways and tunnels exist, for instance, the 13.4 km long Dangara tunnel. Most of the installations have been in use for nearly 50 years and are obsolete due to lack of adequate repair and maintenance. The MoLRWR and its regional branches are responsible for financing construction, operation and maintenance of the IDN. However, the revenues it collects from service charges for irrigation water supply are largely insufficient. Nevertheless, the 2009 draft water sector development programme estimates an amount more than 2.8 billion somoni for activities concerning IDN rehabilitation and development up to the year 2025.

Large water losses are caused by evaporation, leaks and seepage. Losses influence the water balances but are not accounted for in the intake statistics. In the end, the groundwater is fed by these sources and enriched with the nutrients they contain. By replacing the old water transport system with covered channels or pipes, the polluted surface water intake could be minimized. This would have positive consequences for rivers and the downstream users and also for the quality of the ground water.

Continual irrigation leads to soil salinization. Evaporating water leaves a high mineral load, which accumulates, affecting crop growth and reaching the groundwater. At least 55,000 ha of land are no longer in arable use because of salinization. The MoLRWR is responsible for centralized salinization monitoring, but in reality farmers get little advice and help. In order to remove some of the minerals, farmers try to dam up the fields and rinse out the salt and later to grow clover for some years.

Industry

Industrial water consumption declined significantly during the 2000s despite a significant increase in industrial activity by some 50 per cent. Water consumption amounted to some 64.4 million m3 in 2009, a decline of 87 per cent compared with 2002 (figure 7.3). This sharp drop likely reflects the process of structural change in the industrial sector and more economical use of water resources. There are still a number of large State-owned enterprises that have high demand for water and discharge considerable volumes of polluted water. These include *inter alia* Talco, the national aluminium

smelter, the Vakhsh nitrogen fertilizer plant and some chemical plants. Frequent power failures and lack of heating meant that many of the smaller firms could not operate during winter periods, which, in turn, adversely affected their water installations.

Large enterprises to a large extent abstract their own water from groundwater or from river intakes of surface water, whereas smaller enterprises are supplied through the public water supply pipelines. All enterprises have meters installed for controlling water consumption. There is a requirement for pretreatment of industrial wastewater according to norms before it is discharged. This requires industrial firms to be equipped with corresponding installations, such as cyclones and equipment for neutralization and temperature balance, which have to calibrate depending on the production capacity of the firm. Available information suggests that currently, all industrial wastewater is discharged into public sewage treatment plants and no longer directly into rivers. Water recycling is apparently not common, given abundant domestic water resources and low water tariffs.

The mining sector is also a major water user. Gold, mercury, antimony, lead and zinc are among the major mineral resources in Tajikistan. Uranium mining stopped in the 1980s and left tailings, which constitute various risks (Chapter 10). There are no figures about water use and tailings, but it can be assumed that there are serious problems caused by leaching of mine tailings.

Frequent change of ownership, inaccessible sites, and insufficient technical and financial information make the issue of mining water pollution difficult to assess. Since 2008, academic research institutions are no longer authorized to enter mining sites. Tailings and dumps in the mountainous regions pose a threat to water resources, and hence, to public health. It is open to question whether this risk is appropriately assessed by the Tajik authorities.

The Ministry for Energy and Industry is responsible for issuing permits for industrial activities, including mining. The permits for water intake and for wastewater discharges are issued by CEP. Water discharge fees are set by CEP; the amount per ton depends on the type of substance (Chapter 5). Enterprises are obliged to conduct self-monitoring of water discharges and to report to the corresponding local CEP office. Inspections aim at validating the information received and compliance with existing pollution standards, but available resources for this are insufficient (Chapter 2).

A 2007 Government decree foresees the further establishment of cotton processing enterprises up to 2015 and also the processing of leather, wool, tobacco and silk cocoons. In addition, the Government has expressed an intention to increase aluminium processing in Tajikistan.

Hydropower

Tajikistan generates nearly all its electricity (98 per cent) from hydropower, which corresponds to some 94 per cent of total annual energy supply. On a per capita basis, Tajikistan is the global leader in hydropower resources. Currently, however, only around 5 per cent of the technically and economically feasible potential is exploited through 17 large and more than 150 small hydropower plants. Annual production of electricity amounts to some 17 GWh per year. The hydropower system has some large water reservoirs, notably at the Nurek HPP (10.5 million m^3) and Kairakkum (4.2 million m^3). These reservoirs serve not only for the production of hydropower but also for the seasonal regulation of flow for irrigation, which primarily benefits downstream countries (Kazakhstan, Turkmenistan and Uzbekistan).

Most of the power is generated in the summer period according to the rising flow in the rivers. Potential surplus production is mainly regulated by water discharges. Existing reservoir capacities do not allow all-season power production.

A large portion of hydroelectric capacity is used for aluminium production, which accounts for some 40 per cent of total electricity consumption. Throughout the country, most of the water supply companies experience power failures during the winter period, with associated adverse impacts on water installations and associated health risks. The potential for a better balance in power supply through energy-saving measures is generally recognized. With the assistance of the World Bank, new electrical energy meters were installed in Dushanbe to reduce commercial losses of the electricity utilities. There was also a campaign to replace traditional bulbs with energy-saving bulbs, though lighting's share of total energy consumption is relatively small. It is also noteworthy that energy-saving bulbs can cause a serious water contamination problem in case of inadequate disposal and recycling facilities.

One main Government priority is to increase hydropower capacity in order to achieve energy independence and become a major exporter of electricity to neighbouring countries. The Government has plans and programmes to build new

reservoirs and to use them throughout all seasons in a cascade connection system.

The key role in the Government strategy is occupied by the Roghun HPP, for which the construction started already in 1976 but was frozen in the early 1990s. Construction was resumed in 2008 with domestic funds, but has again come to a halt. The planned capacity of Roghun HPP is 13 GWh of electricity per annum, which compares with the current generation of 16 billion kWh per annum. The Roghun project is located on the Vakhsh River, which is a tributary of the Amu Darya River. The dam for the water reservoir is supposed to be 335 meters high, which would make it the tallest in the world. Since the Amu Darya River has a transboundary characteristic, the modification of its hydrology is subject to notification and consultation with downstream countries. The project is controversial. There are some concerns in downstream countries, notably Uzbekistan, about the impact of the project on access to irrigation water for agriculture. Currently, there is an ongoing assessment of the economic, financial and environmental impacts of the Roghun project on behalf of the World Bank.

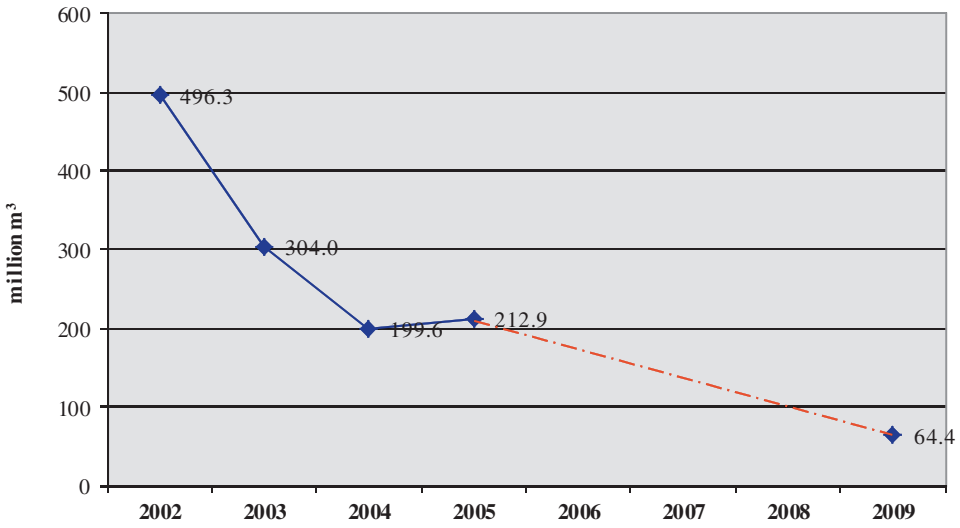
Hydropower production does not directly affect water quantity, but all the reservoirs, with a surface of around 700 km², are prone to evaporation. Water quality is also changed by the reservoirs. Containing the water in the reservoir makes water temperature rise, especially in shallow bays. Mass development of algae can occur there, affecting water quality through strong oxygen demand. Reservoirs also accumulate toxic and dangerous substances in their sediment.

Turbines, generators and hydraulic equipment of HPPs, as well as the electricity distribution equipment, have been in operation for more than 30 years. These technical resources are fully utilized and require regular maintenance and major repair. With international help, the power production from Nurek HPP has been improved by replacing the generators. Power production is under the responsibility of the Ministry for Energy and Industry (MoEI), which is also in charge of a coordination centre for the completion of the HPP Programme that was established by the Government. The Government issues permits for HPP with more than 1 MW capacity, while MoEI issues permits for energy production at smaller HPP sites.

Reservoir infrastructure and management is often insufficient due to the lack of cooperation between the Tajikistan authorities (Barki Tojik, MoEI, MoLRWR), just as the neighbouring countries' authorities. Split responsibilities for power generation, production ordering and for purposes like flood protection, irrigation and fishery lead to imbalanced reservoir management.

For example, due to high water discharge, irrigation channels ran dry in sensitive growth periods, while low-water discharge interrupted fish spawn in the river. About 20 per cent of irrigated land is affected by water shortages, caused by poor regulation of river flows.

Figure 7.4: Industrial water consumption



Source: Statistical Yearbook, 2002-2005. Water Cadastre of the Ministry of Land Reclamation and Water Resources, 2009.

Missing cooperation and forecasting is a key problem between Tajikistan and its neighbouring countries, i.e. in flood warning and strategic reservoir management.

More than twenty international agreements and declarations provide a framework for cooperation between the countries of Central Asia. In principle, these agreements constitute a good basis for productive dialogue and cooperation among countries. However, they are often either totally ignored or implemented loosely or selectively. Accordingly, there seems to be a need for a new legally binding accord to cement the new rules for water distribution and integrated use of water resources of rivers in the Aral Sea basin, in the light of current circumstances.

Domestic water supply and wastewater treatment

Only one-third of the 7.2 million inhabitants of Tajikistan have access to chlorinated piped water; some 30 per cent rely on spring water. The remainder of the population depend on river and ditch water sources. Some 70 per cent of the urban population are connected to centralized water supply, but only some 30 per cent are connected to sewage systems. The rural population of 5.4 million people is especially affected by the lack of access to potable water. Only some 20 per cent have access to chlorinated piped water. There is, moreover, a general lack of wastewater systems, as only 5 per cent of the population are connected to public sewerage.

To fulfil the MDG aims, the drinking water supply for 1.2 million inhabitants has been improved since 2005. However, access to the new central water supply was limited to Dushanbe, Khujand and eight other pilot cities, and there was hardly any improvement for the rural population. Consumption data in figure 7.4 highlights the impact of the amelioration measures. The declining consumption from 2002-2005 can be traced to a decreasing supply and insufficient customer capture.

In accordance with the Programme on Drinking Water (2008-2020) another 31 per cent of the rural population will be connected to the public water supply and some 65 per cent will be connected to public sewerage. In their strategy for developing the domestic water supply and sewerage, the authorities have to take into account the strong population growth, projected at an average annual rate of 2.1–2.2 per cent in the decades ahead. This accentuates the need for more efficient water use and in some cases surely the development of new water resources.

The water supply and sewerage facilities are, in general, in a dilapidated state, reflecting decades of inadequately funded repair and maintenance. Revenues from water supply and sewerage services have been depressed on account of low tariffs that hardly covered main operational cost items, such as for staff and electricity. The absence of water meters, moreover, creates no incentives for rational use of water (Chapter 5).

There are 20 wastewater treatment plants in Tajikistan, but only two – in Dushanbe and Khujand - are operational. Considerable problems exist with the huge amount of surface water, which enters the sewerage system, substantially diluting the wastewater. Through cross-connections to the open irrigation systems, a great amount of floating plastic bottles and other garbage reaches the treatment plants and can block the rack system.

Some 5,000 m³ of rack screenings and sand are rinsed out into the open for drying-out in the sun per annum at the Dushanbe wastewater treatment plant (WWTP). Technical facilities are not in a good condition there; aeration installation is no longer in use; and treatment is entirely mechanical.

An innovative experiment was started at Dushanbe (WWTP) in 2010. The upper part of its extended wetlands was seeded with water hyacinth (*Eichhornia Crassipes Solms)*, which is known for its water purification properties, but also for increase of evaporation and critical oxygen reduction. In addition, it is a source of biofuel, and it is expected that a biogas production enterprise will start harvesting the plants in autumn 2010.

Other systems exist, such as septic tanks in yards, and in rural areas, the usual pit latrines. Both systems affect the groundwater by more or less direct contamination.

Given the poor state of the water supply and sewerage, there is a persistent risk of infectious waterborne diseases. These have mainly been occurring in the rural areas and small towns, where technical standards of water pipes tend to be largely insufficient. Frequent power cuts, moreover, limit water supply to a few hours per day, which in turn favours the inflow of contaminated groundwater (through loose joints) or wastewater flows into the system. At the same time, the lack of electricity prevents the population from using electric devices for water purification.

There is an overall trend towards improving drinking water quality (Chapter 10). Nevertheless, there is still

no water safety strategy in Tajikistan. Adequate water protection zones are rare in Tajikistan. Groundwater from great depth may be safe, but in rural areas the wells which provide people with drinking water are often only shallow.

The State Epidemiological Service (SES) takes drinking water samples at public water supply units, but not from private taps. More analysis is undertaken by the two accredited laboratories, which are water companies Dushanbe and Khujand. SES supervision of the laboratories is through annual spot checks.

7.4 Water resources management

Policy framework

The Government has included water resources issues in its key policy targets. It aims in particular to ensure enhanced access to safe drinking water supply and sanitation services and to shift to integrated water resources management, consistent with the MDGs and Agenda 21.

For the purpose of prioritization and the detailed description of required measures in water management, various programmes and strategies have been drawn up, most of which have been drafted with the support of international organizations. However, progress with implementation has been limited thus far, reflecting *inter alia a* lack of financial resources, inadequate domestic absorptive capacities and insufficient coordination between the donors providing the assistance and developing various water sector strategies.

The 2006 Water Sector Development Strategy, prepared with the support of UNDP, contains an assessment of the state of the water sector. There are matrices of planned measures and action plans as well as associated expenditures and expected results. However, the adoption of the Strategy was not followed up by the required process of reforms and improvements of water sector infrastructure.

The large water supply projects in Dushanbe and Khujand received international support from the World Bank Group, the European Bank for Reconstruction and Development (EBRD) and other sources on the basis of this Strategy. A programme for the improvement of clean drinking water supply during 2008-2020 was approved by Government Decree No. 514 of December 2006, involving potential investment requirements totalling more than 3.3 billion somoni (some $900 million at 2006 exchange rates). The Water Supply and Sanitation Sector Note published in 2009 updates and highlights the most urgent measures within the programme and calculates the investment requirement for these to be more than US$87 million. However, in the light of the impact of the global financial crisis on Tajikistan, there will likely to be a need for downward adjustments of planned measures. The 2009 Draft Water Sector Development Programme, prepared with the financial support of the Organization for Security and Co-Operation in Europe (OSCE), aims at relaunching the reform of the water sector and the rehabilitation of the water sector infrastructure between now and 2020.

Besides the traditional problem areas of water supply and sanitation in urban and rural areas, there are new areas such as the improvement of the irrigation and drainage infrastructure, the planned increase of hydropower capacity, water disaster management and the improvement of the water resources protection systems, as well as the adaptation needs caused by climate change. The OSCE-initiated Water Sector Development Programme has not been implemented.

The May 2010 final report of the EU TACIS Water Governance in Central Asia project (Contract Nr. EuropeAid/125803/C/SER/MULTI) presented a detailed analysis of the water policy challenges and recommended a step-by-step approach to introducing the IWRM principles in Tajikistan.

The proposed implementation sequence was as follows: (1) separate the water resources management and regulatory functions of the existing water agency and its operational functions; (2) integrate water quantity and water quality planning and regulation; (3) integrate surface and groundwater planning and regulation; (4) create an IWRM Agency; and (5) use the river (or tributary) basin as the planning and management unit.

Proposed by the FAO, the Water and Irrigation Sector Reform started in 2009. It is part of the broader agriculture sector reform, which is why the main focus of the reform is rather narrow - on the reform of the irrigation subsector. These objectives included (1) transfer of the irrigation system management to the Water User Associations (WUA), and creation of a sustainable economic mechanism and a basis for sector development; (2) establishment of Sub-Basin Irrigation Management Units (SBIMU); (3) expanding Water User Associations' scope of activities to cover inter-sector channels; (4) creating conditions for extensive participation of water users in the maintenance and management of irrigation and drainage systems.

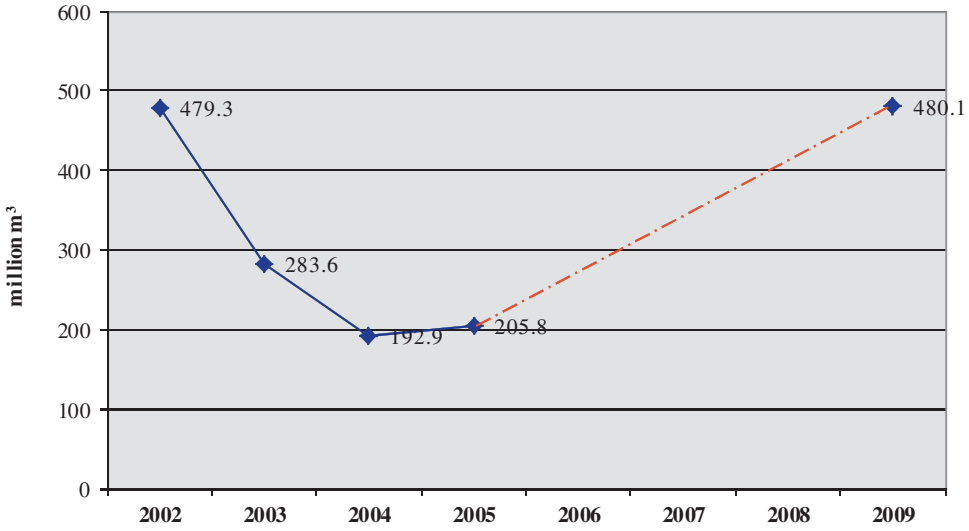
Box 7.1: Khujand Water Supply

With the help of the European Bank of Reconstruction and Development (EBRD) and the Swiss Secretariat for Economic Affairs, the municipally owned Khujand water company (Vodokanal) has made great efforts to improve the drinking water supply. In the first project phase, 2004-2008, the water company rehabilitated the infrastructure and improved its institutional capacity. It invested in technical equipment: i.e. 80 pumps to replace defective ones, 38,700 m of pipes to replace the dilapidated ones, 30,000 water meters and 14 technical emergency cars.

A Master Plan will serve for long-term stability in financial and operational performance. Since 2008, the Khujand water company has a stable economic balance; industrial customers have started to pay off their debts; accounting is subject to controlling measures; and all customers are registered in a computer system.

The second project phase is ongoing. Some 40,000 metres of new pipes are planned, more water meters and also the extension of public supply to suburbs. The Khujand water company is continuing to reduce water losses and makes use of all economic instruments i.e. payment for new connections to the public water supply.

Figure 7.5: Drinking water supply



Source: Statistical Yearbook, 2002-2005. Water Cadastre of the Ministry of Land Reclamation and Water Resources, 2009.

With time, it has become clear that reforming the irrigation sector without reforming the whole water sector was not possible. Through wider coordination with other international and donor organizations, such as UNDP, OSCE, SCD, the EU, and UNECE, water sector reform is expanding along with IWRM-oriented objectives. As of end of 2010, the following guiding principles of the reform have been outlined:

- The major objective of the water sector reform is to ensure a sustainable, reliable and quality water supply for benefit of all citizens of Tajikistan;
- Future water management must be based on clearly defined hydrologic boundaries—the "River Basin Management" concept—rather than administrative boundaries—and according to agreed upon international principles of Integrated Water Resources Management;
- There must be a single body responsible for overseeing nationwide water resources management;
- Control of all future water operation and management functions must be conducted through appropriate technical agencies;
- Organization and maintenance responsibilities for water use systems must be devolved, through management transfer, to organized groups of water users at the highest system level for which they are competent to perform.

To implement the river basin management approach, the water sector reform proposes the following four "River Basin Management Units":

- Syr Darya; consisting of the Syr Darya River within Tajikistan and its tributaries; also includes the Zefarashan River as part of this River Basin Management Unit, (both have transboundary issues);
- Kafirnigan; consisting of the entire Kafirnigan River and its tributaries; also includes the upper reaches of the Surchandarja River that are in Tajikistan as part of this River Basin Management Unit, (has transboundary issues);

- Vakhsh; consisting of the entire Vakhsh River and its tributaries except that part which lies in Kyrgyzstan, also includes the Kizilsuu and Yaksuu Rivers and their tributaries as part of the River Basin Management Unit;
- Badahshan: includes all of the tributaries of the Pjandj River in Badahshan upstream of the easternmost tributary of the Kizilsuu/Yaksuu river system, which are in this River Basin Management Unit.

This reform is still ongoing, and the main conclusions and suggestions are expected to be adopted by the Government in 2011.

Until now, water sector reform was developed in cooperation between the Ministry of Land Reclamation and Water Resources and international donors. There was little or no involvement of other ministries in agencies. Within the EU Water Initiative National Policy Dialogue (NPD) on Integrated Water Resources Management (IWRM) starting in 2010-11, the proposed principles and activities within the reform will be further discussed with high-level representatives of the Government of Tajikistan and decision-makers from other ministries and agencies.

A high-level Steering Committee of the NPD IWRM is being established, and will include representatives of the Cabinet of Ministers and other sectors' ministries and agencies. The Steering Committee meetings to discuss the ongoing water sector policy reform are scheduled to start in March 2011 and will take place on a biannual basis. The NPD IWRM, steered by UNECE, will also address water resources management issues from a longer-term perspective.

Legal framework

While there were a number of amendments to water legislation, current water legislation is not based on the IWRM principles. Although amendments were made to the Water Code, these changes were not reflected in the water management regulations and rules.

Since the first EPR, the 2000 Water Code was subject to major amendments in 2006, 2008 and 2009. The 2006 amendment concerned water use by the population and industry; prevention and elimination of harmful impacts on water, including water resources protection from pollution and depletion; and the improvement and strengthening of water bodies as well as the rights of legal and physical entities in water management. The amendment allows for water supply systems to be owned not only by the State but also by legal entities, such as municipalities. Recently built water supply infrastructure can also be owned by the private sector entities that financed their construction.

A further amendment, adopted in 2008, extended the goals of the Water Code to the protection of State-owned water assets and the land beneath water bodies and under water facilities, installations and protective areas. It also defines the tasks of the State control body, which comprise quantitative registration of water use; monitoring of water quality, control of measures for exploitation or protection of the water resources; validation of compliance with normative requirements; and identification of strategic issues and objectives for water management.

The latest amendment, in 2009, concerned notably the incorporation of flood prevention in the Water Code and associated the need for State and local flood prevention programmes for each river as well as protective measures for strategic objects. Elimination of flood risks is stipulated to be a State responsibility. Disaster control responsibility is allocated to the State Commission, which has authority to coordinate necessary protective measures and obtain refunds for associated expenditures. There are also provisions for a disaster protection programme for Lake Sarez.

There are ten separate legal measures included in the Water Code, which describe the responsibilities of the incorporated institutions. Among them, the 2005 Guidelines for the Regulation of Water Use and Protection are of particular importance.

These guidelines include institutional procedures, descriptions of operational documents for use of surface and groundwater or discharging wastewater, and documentation of duties. In line with the first EPR recommendations, the guidelines aim to facilitate the implementation of a permit system for groundwater use and to ensure fair and open dealings between the relevant parties.

A number of other laws concerning the water sector have been passed in recent years. The Water User Associations (WUAs) are regulated under the 2006 Law on Water User Associations. A number of WUAs have been established since then in various projects, with international support, as voluntary bodies for irrigation management.

Photo 7.1: Damaged water bridge, Dushanbe

The 2009 Law on Improvement of an Irrigation System Plan sets out the Government's plans to rehabilitate and improve irrigation and drainage networks. In addition, the 2009 Law on Hydropower concerns the Government project to expand energy production from hydropower, as well as a list of planned construction of HPP and their electricity supply capacities. The 2010 Law on Communalization of Water Supply and Sanitation foresees that the GUP will be denationalized and further managed by municipalities. However, mechanisms for handover have not yet been set up.

The Law on Natural Monopolies, which came into force in 2007, categorizes urban water supply and sanitation companies as natural monopolies and subjects them to regulation and tariff approval by the Ministry of Economic Development and Trade (MEDT). The rationale is to ensure a balanced water tariff structure in the country (Chapter 5).

Institutional framework for water sector management

The institutional structure is still based on the traditional sectoral approach from the Soviet period, with different water management issues handed by different organizations. For instance, while regulation of water quality is the responsibility of the Committee on Environmental Protection, water quantity comes under the Ministry of Land Reclamation and Water Recources, precluding holistic approach to water management challenges. None of these various Government bodies involved in water management has sufficient competence and strong enough responsibility to design and execute a countrywide water sector strategy. Responsibilities of the ministries and agencies for water resources management are described below.

State level

The Ministry of Land Reclamation and Water Resources (MoLRWR) is the main authority responsible for water issues. It deals with the State-owned central irrigation and drainage system, canal construction and maintenance, all reservoirs, and the rural water supply. Its responsibilities were enlarged in 2008 with the inclusion of river bank fortification. The State Institute for Designing Water Projects "Tajikgiprovodchoz" is subordinated to the Ministry. The Ministry works in close cooperation with the Institute for Hydraulic Engineering and Melioration at the State Agricultural University Dushanbe.

Another institution under MoLRWR is the State-owned "Tajikobdehot" ("TOD"), the leading supplier of water (water supply and sanitation; irrigation, drainage) in rural areas. MoLRWR has drafted various strategies and programmes for rehabilitation and improvement of irrigation, rural water supply and reservoir management.

The State Unitary Enterprise (SUE) "Khojagii Manziliyu-Kommunali" (KMK) is in charge of managing drinking water supply and sewerage in 15 cities and 40 district Centres, where it has local branches. KMK is the successor organization to the

former Ministry of Ministry of Community Facilities and Housing Services (MCFHS), and it serves some 850,000 people. Water supply and sewerage services in a number of cities (Dushanbe, Khujand, Kairakkum, Nurek, Roghun and Sarband) are organized under the auspices of the corresponding local authorities, which also own the water sector infrastructure. However, they are advised and supported on technical questions by KMK. It is noteworthy that there is no up-to-date inventory and assessment of water related facilities and installations.

The Committee of Environmental Protection (CEP) was reformed in 2008 (Chapter 1). The Control of Use and Protection of Water Resources Unit was affected by the reform and had its water inspectorate role reduced. The number of CEP staff fell from 16 to 4 (Chapter 2). However, the Unit is supported by 3 staff in each region and 1 in each of the 67 districts. The Department of State Ecological Expertise is involved in water management activities such as validation of environmental impact assessment.

The State Administration for Hydrometeorology, Tajikhydromet, was also reformed, resulting in outsourcing of activities and reduction of staff in the State service.

After the restructuring of the local Tajikhydromet divisions, it was decentralized and must now operate with insufficient resources, e.g. an annual fuel quota of 1,500 litres per car, which is a tight constraint on mobility. Basic technical equipment seems to be of an acceptable standard, thanks to support from the Central Asia Initiative in 2004 (Chapter 3).

The Main Department of Geology under the Government (Tajikgeology) is an autonomous institution, which possesses expertise on geology and groundwater. Tajikgeology runs a post network to measure groundwater levels. Data are not publicly available or do not exist. For instance, groundwater balances in river basins are not known. Nothing seems to have been published, and only formal connections exist to the other ministries and commissions. In the permit issuing process for the use of water, Tajikgeology is formally involved because of its expertise.

The State Committee for Emergency Situations and Civil Defence (CES) is responsible for prevention of disasters and first-line disaster response. It provides technical structures for rapid response.

Local and State water companies are responsible for maintaining the sewerage system. There is a telephone hotline service for reporting any incidents, such as leakages.

The State Committee for Standardization and Normalization issues licenses for imported technical equipment, i.e. water meters were tested and licensed. The Ministry of Energy and Industry (MoEI) is responsible for energy generation, industry and mining in Tajikistan. It coordinates the State-owned enterprises and mining activities, and deals with industrial wastewater treatment and tailings. MoEI issues permits for energy production from smaller HPPs. It was involved in the Government's strategic plan for hydropower development and coordinates the Centre for Implementation of the Tajikistan HPP-Programme.

The Ministry of Health (MoH) is involved in water issues through the Sanitary Epidemiological Service (SES). This body inspects the quality of drinking water in the whole country and runs central laboratories. In the permit issuing process for the use of water, or the discharge of wastewater, SES is involved due to its technical expertise (Chapter 10).

Local government level

The region and district administrations are involved in water issues through the ministries and committee branches. CEP has branches in all the regions and a staff of one in each district. Tadjikobdehod (TOD) on behalf of MoLRWR is present in districts. The Committee for Emergency Situations and Civil Defence also has branches in districts. In general, local authorities do so far not have substantive competences in water sector management except in some towns (Dushanbe and others) mentioned above. The municipal administrations of these towns establish tariff proposals for water supply and sewage, which are then subject to the approval by the Ministry of Economic Development and Trade. However, a draft law intends to transfer responsibilities and ownership of water supply and wastewater facilities to municipalities.

Inspections

CEP has established quarterly schedules for supervision of water users. Visits to large plants are organized centrally and include experts from all environmental domains. However, visits have to be announced, which may reduce their effectiveness compared to *ad hoc* inspections. Among the major problems encountered, often permits have not been issued or have not even been requested. Moreover, industrial firms frequently lack internal rules and procedures for water management, including water

treatment. What is more, treatment reagents such as chlorine or lime may not be available. In general, inspections are summarized in written reports, which specify measures to be implemented in order to conform to existing legal norms. The timeframe for remedial action is in general one to three months. In case of non-action, fines can be imposed. Given notably the shortage of staff, follow-up inspections are more the exception than the rule (Chapter 2).

Regulatory instruments

Permits for water use and licenses for discharge of wastewater are issued centrally by CEP to applicants, which comprise Government bodies, municipalities, State or private enterprises, or private persons. Procedures take between one and five months, including further investigation and clear-up matters (Chapter 2). Before applying for a water use permit, endorsements from regional offices of Tajikgeologija and the SES have to be submitted.

MoLRWR receives an annual permit from the CEP Control of Use and Protection of Water Resources Unit that specifies the maximum volume of water intake for irrigation and rural water supply. In turn, MoLRWR issues permits for constructions crossing their water channels, such as bridges and subways, as well as for discharges into the channels.

The licenses specify the type of polluted substances and the maximum volume that can be discharged. Moreover, discharge activities also require the endorsement of the local water companies (Vodokanal and KMK) office and the municipal administration. The validity of licenses and permits can range from 3 to 25 years. The permits and licenses issued are manually listed every year. A copy is passed on to the ministries involved, but this information rarely reaches the lower level administration such as municipalities.

Water tariffs

A water tariff is applied to supply of drinking water and sewage service. There is also a fee for use of water for irrigation in agriculture (Chapter 5). The bulk of water consumption is for irrigation in agriculture, reflecting the predominant specialization of cotton production, which is closely controlled by the Government.

Irrigation fees do not cover the costs of operating and maintainiing the rural irrigation and drainage network. This, in turn, has contributed to the progressive deterioration of the irrigation and drainage network.

Education and training

Technical vocational training on water issues is almost non-existent in Tajikistan, and KMK and water companies do not seem to be very interested in such apprenticeships. There is, however, a strong potential demand for qualified staff. This is particularly true for agricultural water supply, where 30 per cent of pumping stations are of a complex cascade nature and require highly qualified operators, who are difficult to find.

Technical study of water sector technologies is offered at the State Technical University (TU) and at the State Agricultural University. The TU offers a courses and a degree in rational use of water resources, which enable the graduates to qualify for posts with the State and municipal administration. However, high study costs are a major obstacle to a university degree. There are, moreover, some opportunities for exchange of experiences and capacity-building. MLRW has created an Educational Unit in Varzob Valley, and KMK sometimes organizes workshops and other capacity-building initiatives. . In a more general way, the upgrading of skills of professional staff could also be promoted by ensuring adequate participation in international technical fairs and conferences, but use of this option has been narrowly circumscribed, given the lack of financial resources.

Public awareness

Although environmental protection is a key topic of public interest, the practice of communication between the government administration and its public in matters of environmental protection is not well developed (Chapter 3). This reflects on the main a lack of understanding of the key role of information for building a rapport with the general public or other stakeholders, such as enterprises and NGOs. However, the building of public relations is also limited by the lack of adequate communication equipment, including personal computers (PCs). As regards the water sector, this is illustrated by the fact that monitoring data concerning water quality are not published. The same holds for descriptions of major infrastructure projects. The use of the Internet for communication is not yet very common. In the autumn of 2010, the homepage of Tajikhydromet (www.meteo.tj) provided information only up to the month of April 2009.

International cooperation and obligations

Tajikistan is party to a number of international environmental agreements, including for the water-

related ones (Chapter 4). It is also striving to achieve the MDGs, notably the goal of reducing by half by 2015 the proportion of people without sustainable access to safe drinking water and sanitation, although this will likely not be possible. In July 2010, Tajikistan supported the United Nations General Assembly resolution to make access to water a basic human right. The Government has also been taking an active role in the International Decade for Action "Water for Life" (2005-2015), and hosted the mid-term-conference in Dushanbe in June 2010.

Moreover, the country participates in the Interstate Commission for Water Coordination of Central Asia (ICWC), which was established in 1992 to ensure rational use of water resources among its five member countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.) ICWC is part of the International Fund for Saving the Aral Sea. The Aral Sea is the main water basin in the Central Asia region, and all the Central Asia countries are connected through transboundary water resources. Major considerations are therefore not only the annual quota of water consumption, but also the quality standards and plans for water use.

7.5 Conclusions and recommendations

The Government has included water resources issues in its key policy targets, and integrated water resources management (IWRM) is the key to the sustainable development of the water sector. For every newly planned, water-related construction or settlement or industrial activity, an assessment of environmental impact is necessary. In the case of energy-oriented reservoir-management, agricultural food production is often affected, leaving a questionable effect on sustainability. All concerned parties, such as MoEI, Barkitojik, MoLRWR, local Goverments and WUAs, are to work in an integrated way in strategic planning and forecasting. The strategic direction of water sector reform is development of a clear and robust institutional and legal basis for managing water.

In the short term, therefore, implementation of the guiding principles of the water sector reform supported by FAO will be the priority. To ensure development of the longer-term vision for water management based on the IWRM principles, the EU Water Initiative National Policy Dialogue on IWRM should be launched. This will also support the intersectoral dialogue (with ministries and agencies responsible for energy, and other sectors) as well as provide a forum for better donor coordination.

The strong impacts of agriculture, forestry, infrastructure and settlement development on water quantity and quality must be better considered. Although the Water Code has provisions for flood prevention, the country is still under threat of flooding. Floods cannot be forecasted, but at least their associated risks can be prevented. A disaster protection programme exists for Lake Sarez, but this experience could be scaled up to the whole country. Specific activities to ensure dam safety are among priority actions in terms of water management.

Recommendation 7.1:
The Ministry of Land Reclamation and Water Resources should:

- *(a) Implement the guiding principles and activities under the water sector reform developed in the cooperation with Food and Agriculture Organization of the United Nations (FAO) and other international organizations;*
- *(b) Support the start of the European Union Water Initiative National Policy Dialogue on Integrated Water Resources Management (IWRM) as a forum for the high-level inter-sector communication on the development and implementation of the water sector reform and as a vehicle for donor activities' coordination;*
- *(c) Set up guidelines for flood risk assessment and calculation of protective measures.*
- *(d) In cooperation with Ministry of Energy and Industry, draw up management rules for water reservoirs and involve all stakeholders;*
- *(e) Analyze existing water protected areas and, where appropriate, initiate pilot projects for setting appropriated water protection areas for groundwater, which is used for drinking water;*
- *(f) Ensure that flood prevention programmes follow common rules and take into consideration the integration of forestry, agriculture and settlement issues;*
- *(g) Ensure that management of water reservoirs is balanced and avoid giving single priority to power generation.*

Recommendation 7.2:
The Government should ensure appropriate planning activities of water works as well as renovation and extension of existing water sector infrastructure, taking into account the needs to elaborate well-optimized technical solutions, including pre-treatment needs to the industrial wastewater treatment.

Recommendation 7.3:
The Committee on Environmental Protection should encourage developers to include erosion and natural risks prevention when carrying out an environmental impact assessment.

The high water demand of Tajikistan's agriculture largely reflects the predominance of cotton production and the traditional system of furrow irrigation. All ongoing and planned projects for the improvement of IDN offer an opportunity to implement sustainable and organic farming rules. Those would for example, prevent dangerous land erosion and minimize water run-off, which carries soil, manure, fertilizer and pesticides into the rivers. There are some plans to change cotton proceeding. Should these plans be implemented, modern technologies in wastewater treatment would have to be considered in the development.

Recommendation 7.4:
The Ministry of Land Reclamation and Water Resources, in cooperation with the water users associations, the Ministry of Health and other relevant stakeholders, should ensure that the rehabilitation of irrigation and drainage networks is accompanied by training and guidelines to farmers for improved water economy and sustainable farming.

Education is one of the keys to changing peoples' behaviour, to making them part of economic development based on ecological criteria. The people of Tajikistan display various types of behaviour towards drinking water. Those who live in rural areas and have no safe drinking water are well aware of the value of this precious source of life and health, whereas those who live in the main cities do not really suffer from a lack or insufficient supply. Most people have little knowledge of and sensitivity to the damage they can cause on water resources. Technical vocational training on water issues is almost non-existent in Tajikistan. There is, however, a strong potential demand for qualified staff. Moreover, there are a few opportunities for exchange of experiences and capacity-building for internal water sector staff.

Recommendation 7.5:
The Government should:

(a) Raise awareness of the population on water issues by organizing campaigns in cooperation with relevant stakeholders, NGOs and international organizations;
(b) Ensure capacity-building and appropriate training at all levels of water management.

Recommendation 7.6:
The Ministry of Land Reclamation and Water Resources, the Khojagii Manziliyu-- Kommunali , the Ministry of Education, and the Committee on Environmental Protection should revise vocational training in water issues and increase capacity-building, fully utilize internal skills and experiences (i.e. out of pilot projects).

Chapter 8

WASTE MANAGEMENT

8.1 Introduction

Waste management in Tajikistan is receiving more attention than at the time of the first EPR. Key drivers for this change include aspirations of the Government and municipal representatives to improve living standards in towns in combination with foreign donor activities in municipal solid waste management and privatization of key industries, opening up the possibility for new approaches to solving industrial waste problems.

8.2 Current situation

The system of municipal solid waste (MSW) collection, transportation and disposal is improving in Dushanbe as are disposal practices, by concentrating waste at a single disposal site. However, the existing landfill does not meet international sanitary norms and standards. Collection of waste improved after the city purchased new vehicles. Waste separation is operated through a system of buy-out points, where citizens receive payments for recyclables. Other cities in Tajikistan are served by municipal collection companies. However, disposal practices do not meet required standards. On the whole, rural areas are not covered by municipal waste collection services.

Municipal solid waste

Based on the disposal figures, municipal solid waste (MSW) generation in Dushanbe is estimated at more than 800,000 m3/y (about 212,000 t/y). The impact of unofficial recycling under current conditions is not estimated. The total amount of MSW delivered for disposal in Tajikistan is estimated at 3 km^3/y.

Collection of MSW in Dushanbe is organized at the district level. Three of the four districts of Dushanbe have assigned responsibility for MSW collection to the Road Maintenance Unit, which also carries out road maintenance, street cleaning and other urban services. The fourth, the central district of Somoni, has established a specialized unit responsible solely for MSW collection.

Vehicles used for MSW collection are old: 60 per cent of them have been in operation for more than 15 years and the remaining 40 per cent are out of order. As a result, only some five per cent of vehicles used for MSW collection are specialized waste collection vehicles, while the remaining collection is covered by other means of transport (trucks, tractors).

MSW collection services are only provided for the urban population, which represents about 26 per cent of the total population. The rural population is not served, as the assumption is that their MSW generation potential is minimal.

MSW is collected from designated places, which may or may not be equipped with containers. If waste is dumped on the ground, a front-loader is used to transfer the waste to collection trucks. This is mainly used in areas with apartment blocks. Another option is large containers (skips) located at entrances to family housing areas.

MSW is disposed of in allocated areas, which lack basic measures for avoiding dispersion of pollution from waste. Within Tajikistan, 67 disposal sites have been identified, covering 263 ha of land, but this information is considered by the draft national waste strategy to be incomplete. Every collection company is expected to have its own disposal site.

Until 2001, each of the four districts of Dushanbe was using its own dump and the city was surrounded by illegal dumping sites. However, the disposal site in Shokhmansur District was designated as the only official site for disposal of MSW in 1997, but was receiving only about 50,000 m3/y. The campaign to reduce dumping at other sites in 2001 had a positive impact, as available information indicates that most MSW is delivered to this site (Figure 8.1) and that the number of illegal disposal sites has decreased. As a result, the amount of MSW disposed of at the disposal site in Shokhmansur District has increased twofold in recent years when compared with 2001.

The disposal site of Dushanbe in Shokhmansur District is located in a valley some 10 km from the town centre. The reception area is equipped with a weighbridge but this is not used, as incoming vehicles exceed maximum allowable capacity. Thus, the staff registers volumes of delivered waste based on the capacity of incoming vehicles. Waste in the disposal area is spread by a bulldozer, but there is no

compaction of waste and no coverage with soil of the fully filled areas.

Waste collection and disposal are under the close supervision of the Mayor, directors of Road Maintenance Units and chairmen of housing areas, who meet daily to discuss communal issues including waste management. The disposal site is required to provide reports on delivered waste on a daily, 10-day, monthly and annual basis. These reports indicate the number of waste collection points in total, from each area served, the number of trucks delivering the MSW to the disposal site, and provide estimates of the volume of waste delivered by each district (Table 8.1). Also, the Municipality of Dushanbe has already implemented several improvements, which include:

- Allocation of responsibility for the disposal operations and, reporting on the amount of waste delivered;
- Contractual relations between waste generators, collecting companies and the disposal site;
- Adjustment of waste fees to achieve cost recovery.

The Dushanbe Solid Waste Management Project "Corporate Development and City Support Programmes for the City of Dushanbe and the Dushanbe Solid Waste Management Programmes" started in 2008 and is financed by the EBRD. The objective of this project is to contribute to the transformation and modernisation of the collection and disposal services in Dushanbe.

There is little available information on the MSW management in other cities of Tajikistan, but USAID and the Urban Institute have focused on improvement of the collection and disposal practice in nine towns of Tajikistan, including Vakhdat (population ca. 50,000), Isfara (population ca. 40,000) and Kulob (population ca. 100,000), under the Local Governance and Citizen Participation Programme.

This assistance was a combination of training and practical action, and, depending on the situation in individual towns, resulted in better understanding of waste management by municipalities, reinstating or more efficient collection of waste or development of new disposal site.

Industrial waste

There is little information on industrial waste available, because regular reporting is not carried out. Although the system of data collection of the Statistical Committee includes a specific form 2-TP for reporting solid waste, this is not used by companies nor requested by responsible authorities. Industrial enterprises and organizations, based on an agreement with the Road Maintenance Units transport their waste to the municipal disposal site where it is disposed of together with municipal waste. Significant amounts of waste are stored inside industrial premises (Aluminium plant, cement plant, asbestos and cement plant, and Tajiktekstilmash). Enterprises also sell some of their waste to other companies or to individuals for recycling, but no data are available.

Due to decrease of industrial activities, only a small amount of industrial waste is generated compared to the past. For example, only four companies produced 75 per cent of all reported collected industrial waste in Dushanbe (Special Motor Depot, Airport, MOU-109 and Market Shokhmansur).

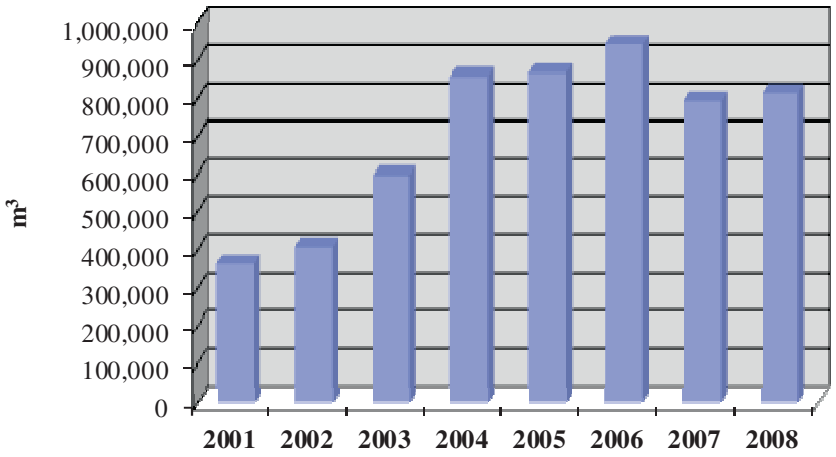
An inventory of industrial waste in 42 companies from chemical, mining, machinery and metallurgy industries revealed only 548.5 t of solid waste generated annually, in comparison to 1,047.8 t of gaseous emissions and 4,354.6 t of discharge to waters. Experience from other countries shows that the amount of waste should be significantly larger – at least on the level of waste water amount. These figures indicate that only some types of waste are reported and suggests the need to improve the existing waste classification, as well as the efforts of Government in enforcement of the existing waste legislation.

Due to missing regular annual reporting of waste amounts, available data on industrial waste indicate only total accumulated amount, which is not very informative for the assessment of actual industrial waste generation. An overview of accumulated waste is shown in table 8.2.

Mining industries are mainly concentrated in the Sughd Region, and their activities resulted in a number of tailing ponds which contain heavy metals. Anzob Integrated Mining and Concentrating Plant generates antimony and mercury polluted waste. In addition, the activities of Adrasman Integrated Mining and Concentrating Plant result in lead and zinc pollution and gold mining in Zeravshan generates cyanide pollution.

The Yavan electrochemical plant further generates wastes related to production of caustic soda and chlorine-based bleaches. However, production from industries dropped by 80 per cent compared with the situation in 1990, so current generation of industrial waste is minimal.

Figure 8.1: Disposal of municipal solid waste in Dushanbe, 2001-2008



Source: (2001-2006) Dushanbe Solid Waste Management Project Final Report, Sweco International, 2008. (2007-2008) Environmental Protection in the Republic of Tajikistan, State Committee of Statistics of Tajikistan, 2009.

Table 8.1: Sample Waste Collection Report for 24 May 2010

District	Container stands							Number of vehicles	Number of trips to disposal site	Volume of MSW disposed
	Total	Low-rise houses (up to 6 floors)		High-rise houses (over 6 floors)		Family houses				
		Total	Served	Total	Served	Total	Served			
Somoni	138	63	61	10	10	65	63	9	15	490
Sino	588	178	177	342	340	68	67	25	35	912
Shokhmansur	203	143	141	23	23	37	37	18	28	661
Firdavsi	209	55	55	118	118	36	35	13	26	588
Other								11	13	132
Total	**1,138**	**439**	**434**	**493**	**491**	**206**	**202**	**76**	**117**	**2,783**

Source: Direct communication with the Executive Body of the State Power of the City of Dushanbe, 2010.

Hazardous waste

Tajikistan continues to use the former Soviet system of five hazard classes, which are based on toxicity of individual substances present in waste. However, the Annual Report on Environmental Protection of the State Statistic Agency presents MSW statistics according to the European Waste Classification.

There are no comprehensive data on the amounts of hazardous waste in the country, but non-aggregated information is available on several types, which are considered the main problem.

Medical waste

Medical waste management remains a problem, as old practices continue. Medical waste, which may be infectious, is disinfected then disposed of with other municipal type waste. Waste from surgery is disposed of at Becker pits, which are purpose-designed storage in the ground, for biological waste. However, there is no centralized information on their number or location in the country.

Throughout the implementation of a measles vaccination campaign in 2009, according to the information of the Ministry of Health, 4-6 small-scale incinerators for destruction of used syringes were installed in hospitals. However, these are not currently in use due to a lack of funding to purchase the diesel fuel needed for their operation (Chapter 10).

Radioactive waste

Approximately 54.8 million tons of waste from past uranium mining operations are still located in unsecured sites in northern Tajikistan, a number of them close to Khujand, the country's second-largest city. The largest single dump site, containing some 12 million tons of radioactive waste, is in the town of Taboshar, north of Khujand.

The company Vostokredmet was established in 1945 in Leninabad (now Khodzhent) for processing uranium ore from Kyrgyzstan, Tajikistan and Uzbekistan. During the period of its operation, some 35,000 m^3 of low-level radioactive waste was accumulated on its territory.

Table 8.2: Accumulation of Industrial Waste in Economic Sectors

thousand tons

Sectors, industry	Accumulated industrial waste	
	2000	2001
Non-ferrous metallurgy	1,331.2	1,774.8
Light industry	14.5	15.5
Food industry	5.7	9.8
Chemical industry	0.7	0.6
Building materials industry	11.0	12.3
Mechanical engineering and metal refining	3.7	3.9
Others	1.1	1.1
Total	**1,367.9**	**1,818.0**

Source: National Environmental Action Plan, 2006.

The waste is stored in 9 tailing dumps with a total area of 1.7 km^2 and 21 dumps of unyielding ores with a total area of about 225,000 m^2 in the mining and processing enterprises. Table 8.3 provides an overview of accumulated radioactive waste as identified in 1990. However, due to the current standstill in this industry sector, no changes are expected in the figures.

The Government of Tajikistan, in cooperation with UNDP, prepared a Review of Uranium Tailing Dumps in Tajikistan: Problems and Ways to Address Them, for the International Forum in Geneva (June 2009). The Review presents a description of the current situation in the area of Tabashar and Adrasman and proposes concrete projects for the rehabilitation of tailing dumps in this area. Table 8.4 shows additional details on tailing dumps in the Tabashar/Adrasman area.

The International Atomic Energy Agency (IAEA) is implementing and preparing 19 regional and national projects aimed at improved management of radioactive materials and radioactive waste in Tajikistan. These include:

- Improving Quality Management of Radioactive Waste (regional project approved in 2009);
- Supporting Preparation for Remediation of Uranium Production Legacy Sites (regional project approved in 2009);
- Establishing a Radiation Monitoring System at Uranium Tailing Sites in Northern Tajikistan (national project, 2006-2009);
- Applying International Safety Standards to the Management of Uranium Milling Residues (national project, 2005-2008).

Regional projects are aimed at strengthening international cooperation and information exchange supporting the capacity-building of local experts. National projects are used to improve the knowledge base and monitoring, and propose plans/strategies for decreasing risks to human health and environment.

Obsolete pesticides and POPs

The stock of expired pesticides is concentrated in large burial storage in Vakhsh and Kanibadam. Additional obsolete pesticides are buried in small stores close to the places where they were used. The Vakhsh storage area is located in Hatlon Region, to the south-west of the regional centre. It occupies about 12 ha. The distance from it to Vakhsh settlement is about 30 km. The Vakhsh irrigation channel is at a distance of 17 km and the nearest settlement, Ak-Gaza, is some 8 km away. The Vakhsh area storage receives for burial the obsolete and banned pesticides from commercial activities in the Hatlon Region, Gorno-Badakhshan Autonomous Region and regions of republican subordination (RRS).

The Kanibadam storage area is located in Sugd Region to the south-east and is 7 km from Kanibadam town. It occupies an area of around 2 ha. The Kanibadam burial site receives banned and obsolete pesticides from Sughd Region and also from the border districts of Uzbekistan and Kyrgyzstan.

Information from the 2007 National Implementation Plan on Realization of the Stockholm Convention on Persistent Organic Pollutants in Tajikistan states that during the period 1973 – 1991, some 7,500 tons of various pesticides was buried at the Vakhsh storage site and in Kanibadam 3,000 tons were stored. However, the latest information, from 2010, on the amount of pesticides in Vakhsh storage indicates only 4,000 tons of pesticides remaining in this storage. This decrease is explained by their removal from this storage area by people from the local population, who are using and/or selling these pesticides, despite awareness-raising activities by the authorities.

Table 8.3: Radioactive waste accumulated in Vostokredmet, 1 January 1990

Type of site	Area (m^2)	Volume (m^3)	Amount (ton)	Activity (Bq)
Unyelding ores dumps	224,000	2,678,000	1,847,000	$7{,}0x10^{12}$
Tailing ponds	1,741,000	32,229,000	33,684,000	$2{,}5x10^{14}$
Underground leaching areas		14,754,000		$4{,}0x10^{12}$

Source: International Science And Technology Centre, Project # 245 "Radleg", 1996.

Photo 8.1: A stock of fire wood in the Shulmak Village, Almosy Valley

The information base on obsolete pesticides in Tajikistan is sufficiently developed and the Government should consider participation in activities financed by international donors aimed on destruction and/or safe disposal of obsolete pesticides.

8.3 Policy and strategy in waste management

The 2008 Concept of Environmental Protection for the period 2010—2012, No. 645, gives appropriate attention to the problems of waste management and defines the key problems of waste management and the targets that need to be achieved in the future. Except for a specific chapter on waste management in this strategy, the impact of inadequate waste management is reflected in chapters on Environmental Safety and Public Health Protection, reflecting an understanding of the importance of waste management within the framework of effective environmental protection.

The key problems of waste management identified in this document include:

- A lack of information on waste, both quantitative and qualitative;
- A lack of regulations and methodologies for proper treatment and disposal of waste;
- Insufficient legislation regulating waste management.

This strategy was further developed to identify concrete activities in the 2006 National Environmental Action Plan and draft Waste Management Strategy up to the year 2015.

The Environmental Action Plan defines three tasks in Section VII on Waste Management:

- Improvement of municipal waste management;
- Improvement of industrial waste management;
- Inventory of waste and development of database of waste types and waste generators.

Table 8.4: Tailing Dumps in the Taboshar/Adrasman area

Name	Location	Expl. Period	Area (ha)	Volume of waste (million m^3)	Exposure dose rate (mR/h)	Amount of waste (million tons)	Curie	Status	Insulation barrier
Tailing dump	Digmay pit, 1,5 km South from Gaziyon	1963 -	90.00	20.00	40-250 (max. 2000)	36.00	4,218	open	
Tailing dump	Gafurov city, 0.5 km West	1945-1950	4.00	0.24	20-60	0.04	159	closed	2.5 m soil cover
Tailing dump	Chkalovsk city, 2 km North-West	1949-1967	18.00	2.60	20-60	3.03	779	conserved	0.5 m soil cover
Tailing dump I-II	Taboshar city, 2 km East	1945-1959	24.70	0.99	40-60	1.69	218	conserved	0.7-1 m soil cover
Tailing dump IV	Taboshar city, 0.5 km East	1947-1963	11.06	1.06	40-60	1.80	232	conserved	0.7-1 m soil cover
Tailing dump III	Taboshar city, 1 km East	1949-1965	18.76	2.40	40-60	4.13	510	conserved	0.7-1 m soil cover
Tailing dump of former shop #3	Taboshar city, 3 km East	1949-1965	2.86	0.07	40-60	0.12	152	conserved	0.7-1 m soil cover
Tailing dump of the basse shop	Taboshar city, 4 km East	1950-1965	3.35	1.20	40-300	2.03	253	open	
Tailing dump #2	Adrasman settlement, 1 km North-West	1991-	2.50	0.24	50-60	0.40	160	covered	rocky cover
Mine-3 (4 dumps)	Khujand city, 2km West, right bank of Mogoltau River	1976-1985	5.90	0.20	60-80	0.35	110	conserved	0.5 m soil cover
Republican Radioactive Waste Disposal Site	Faizabad Settlement, 7 km East	1962-		3.4 thousand	20			open	

Source: Review of Uranium Taining Dumps in the Republic of Tajikistan: Problems and Ways to Address Them (June 2009).

Box 8.1: Examples of international donor activities in reduction of obsolete pesticides risks.

Some 353 tons of obsolete pesticides (OPs) were eliminated in Albania in April to June 2006, financed by the Dutch government. In 2001 and 2002 the EU programme PHARE financed the elimination of an additional 360 tons.

Around 2,000 tons of OPs have been repackaged in North-Western Russia in 2008 under the Arctic Council Action Plan to Eliminate Pollution of the Arctic.

The World Bank initiated the clean-up of around 1,150 tons of POPs together with 1,060 tons of PCBs and PCB-contaminated soils in Republic of Moldova in 2007.

The Dutch Ministry of Foreign Affairs financed a project to eliminate acute risks of OPs in Republic of Moldova, Kyrgyzstan and Georgia from 2005 to 2008, together with the Dutch Foundation DOEN and PSO (Capacity-Building in Developing Countries). By the end of 2008, more than 400 tons of OPs had been repacked and safely stored.
A project covering capacity-building and repacking in Ukraine is in progress under the same programme. Between 1999 and 2003, the Danish Government supported a specific programme on OPs with funds of around €1.56 million (DANCEE, 2003). In Ukraine, work is ongoing to eliminate 1,000 tons of OPs and export them to Germany for destruction. Another tender is in progress for the elimination of a further 2,000 tons.

Source: Obsolete Pesticides – A Ticking Time Bomb and Why We Have To Act Now. Centre for European Policy Studies, May 2009

These tasks are further broken down into individual activities reflecting the key problems identified in the Environmental Protection Strategy, and their implementation would significantly improve the information base for decisions on the further development of waste management in Tajikistan.

The draft waste management strategy describes the current situation in waste management, devoting separate chapters to municipal waste, agricultural waste, waste originating from transportation, construction waste, medical waste and industrial waste.

This draft strategy presents the current situation and recommendations for each of these waste streams. However, it lacks estimates on quantification of these waste streams.

The Committee on Environmental Protection is developing a system for licensing waste disposal sites, which includes an environmental assessment of the impact of such sites.

8.4 Legal framework

The basis for regulating waste management is stipulated in the 1993 Law on Nature Protection, which stipulates in Article 52 the requirement to minimize generation of waste and to manage municipal and industrial waste in compliance with environmental, hygienic and anti-epidemic standards. This article also bans dumping of waste in watercourses, forests and on agricultural soil as well as inside inhabited areas. The Law delimits the competence of the Government in all matters related to environmental protection and pollution abatement. This includes issuing permits for solid waste disposal and other polluting activities. It further defines the competence of local government bodies (Local Majlises of People's Deputies, i.e. local parliaments), which include the organization and collection of solid waste.

The 2002 Law on Waste from Production and Consumption defines the terms used in waste management, principles of national waste management policy as well as the duties and rights of State institutions on waste management. In addition, it defines financial instruments for the regulation of waste management, requiring payments for waste disposal according to its toxicity category and penalties for violations of this Law.

Supplementary legislation regulating waste management includes the 2004 Law on Licensing Selected Types of Activities, No. 37, (Chapter 2) and the 1999 Law on Sanitary Control.

This legislation is supported by the 2005 Governmental Regulation on Approval of Guidelines on Specific of Licensing of Selected Types of Activities, No. 337, and the 1993 Council of Ministers Regulation on Approval of Payment Levels for Environmental Pollution, including Waste Disposal, No. 619.

Radioactive waste is regulated by the 2004 Law on Radiation Safety, which defines the main responsibilities of State authorities, standards, and licensing rules for radioactive materials.

No specific law has been developed for the movement of hazardous wastes in Tajikistan, but

basic rules for transboundary control are presented in the 1993 Law on Foreign Economical Activity, which requires foreign companies to observe domestic legislation and international norms and rules.

This is further specified in the 1999 Law on State Regulation of Foreign Trade, which requires all companies to observe the standards and criteria of safety when importing commodities (including hazardous wastes) and the rules on their control.

However, the participation of Tajikistan in the Basel Convention on Transboundary Movement of Hazardous Wastes and their Treatment would enhance the country's possibility of accessing the international database of disposal facilities maintained by the Secretariat of the Convention and exporting hazardous waste for safe disposal abroad, when necessary.

Although the legislative framework is quite extensive, it is not sufficiently supported by implementing secondary legislation and does not reflect the key problems of waste management as described in the Environmental Protection Strategy.

This legislative framework is complemented by a set of technical and sanitary norm, but most of them date back to the Soviet era and are not appropriate for implementation of effective modern waste management systems.

8.5 Institutional framework

Primary responsibility for drafting waste management legislation lies with the Environmental Committee of the Madjlis Namoyandagon (Parliament). The Committee on Environmental Protection is responsible for implementing this framework at national level; implementing international treaties and conventions on environment; and monitoring the environmental situation in Tajikistan.

Municipalities have a right to issue local regulations on waste management within their purview. Two systems for providing MSW collection services are in place:

- Enterprises that are part of the State Unitary Enterprise Khojagii Manziliyu Komunali (SUE/KMK);
- Enterprises subordinated to local administration.

Nationwide, the SUE/KMK includes 62 communal services enterprises that are responsible for waste collection as well as for street cleaning and maintenance, landscaping, park maintenance, etc. SUE/KMK is also responsible for maintenance of disposal sites. Enterprises subordinated to the local administration operate only in eight cities: Chkalovsk, Dushanbe, Kayrokum, Khujand, Nurek, Rogun, Sarband and Varzob.

The Agency for Nuclear and Radiation Safety at the Academy of Science is also responsible for keeping records on and monitoring radioactive waste for the safe operation of disposal and deactivation of radioactive waste.

Responsibility for obsolete pesticides is assigned to the Committee on Environmental Protection, which also represents Tajikistan with regard to the Stockholm Convention.

8.6 Conclusions and recommendations

Tajikistan could be on the verge of significant changes in the management of all types of waste. If the Government's attention remains on this issue, it can benefit from the changes recently made in this sector and can also expect and prepare for an increasing number of waste management projects financed by international donors.

The management of municipal waste is garnering increasing attention, and concrete steps are being taken to improve the current situation by the Municipality of Dushanbe and by international donors. The results of the EBRD project in Dushanbe will provide an example of the application of the principles of modern waste management in the context of Tajikistan and can be used as an example for other cities in Tajikistan.

The State Unitary Enterprise Khojagii Manziliyu Komunali could develop a nationwide municipal waste management company and help with the implementation of the waste legislation via the development of regional disposal sites. The firm could gain additional experience through cooperation with international donors in future investment projects in the field of waste management.

Recommendation 8.1:

In order to improve the management of municipal waste, the Committee on Environmental Protection, in cooperation with municipalities and the State Unitary Enterprise Khojagii Manziliyu Komunali, should:

(a) Finalize the draft national waste management strategy and its action plan with concrete funding plans for their implementation and promote their adoption;

(b) Develop secondary legislation for municipal waste management at the national and municipal level, with special attention to the regulation on waste segregation, waste recycling and disposal practices;
(c) Develop the system of separate collection of recyclable waste;
(d) Further develop a system of regional disposal sites and allocation of suitable land.

The changes in the management of industrial waste are mainly driven by the privatization of State-owned properties. Privatization has been extensive and some 90 per cent of enterprises have been transferred to private hands. This change has an impact on waste management. Privatization has both positive and negative impacts on industrial waste management.

The negative impact is that the State is no longer able to apply the traditional directive approach to control management of waste. In several cases, new owners have ignored hazards related to improper waste management. However, the positive impact is that new owners try to get rid of waste accumulated on industrial properties. Foreign investors also invest in improvement of waste disposal facilities and introduce stricter in-company control of wastes.

Recommendation 8.2:
The State Property Committee, in cooperation with the Committee on Environmental Protection, should include environmental clauses in contracts in case of privatization or change of ownership of industries, and identify possibilities and elaborate concrete plans for remediation of industrial wastes with new owners.

The state of radioactive waste storage is one of the main problems of Tajikistan. The activities of the International Atomic Energy Agency are an important element towards improvement of the situation. Results which have been achieved through IAEA projects should be implemented and supported on a long-term basis. However, due to the magnitude of the problem, it is hard to envisage that this issue will be solved in the foreseeable future.

Recommendation 8.3:
The Agency for Nuclear and Radiation Safety at the Academy of Sciences should pursue the implementation of the International Atomic Energy Agency projects and identify opportunities for financing modernization and remediation measures by involving international donors as well as new owners of privatized companies in the mining sector.

Considering the prepared plans and information collected, Tajikistan is prepared to start concrete investment projects aimed at improvement of long-term storage of obsolete pesticides. The country may benefit from experience gained in Eastern European countries and the Russian Federation, the Republic of Moldova and Ukraine, which have already successfully implemented projects in this area.

Recommendation 8.4:
The Committee on Environmental Protection should:
(a) Cooperate and exchange practical experience with countries, which have already improved their situation in management of obsolete pesticides;
(b) Approach donors for assistance with investment projects for improvement of obsolete pesticides storage.

The situation in medical waste management needs improvement but no changes in practice have been identified in Tajikistan. Equipment provided to hospital by foreign donors is not used due to a lack of funding.

Recommendation 8.5:
The Ministry of Health, in cooperation with the Committee on Environmental Protection, should ensure that the following medical waste-related issues are included in the Waste Management Strategy:
(a) Clear definition of responsibilities at national as well as at local level for hospital waste management;
(b) Introduction and enforcement of monitoring and reporting of this waste;
(c) Setting out of appropriate and suitable methods for storage, transport and disposal of this waste.

Participation in the Basel Convention on Transboundary Movements of Hazardous Wastes and Their Disposal could increase the protection of Tajikistan from illegal imports of hazardous waste, but the more important dimension is that the country would improve its access to information on hazardous waste management and to facilities for disposal of hazardous waste abroad. Moreover, cooperation with neighbouring countries, Parties to the Convention, might improve. See also recommendation 4.2.

Chapter 9

BIODIVERSITY, FORESTRY AND PROTECTED AREAS

9.1 Description of the current situation

The monitoring system for forests, biodiversity and protected areas was fully designed after the approval of the National Strategy and Action Plan on Conservation and Sustainable Use of Biodiversity (NBSAP).

However, due to the lack of human and financial capacities, the monitoring is not fully in place. Since the approval of NBSAP in 2004 and on the basis of its capabilities, the country continued to regularly monitor and evaluate the current status of the country's forests, biodiversity and protected areas.

Since 2004 the National Biodiversity and Biosafety Centre has submitted four national reports to the Government and to the Secretariat of the Convention on Biological Diversity. The Fourth National Report describes all the problems and achievements in biological monitoring.

Diversity of ecosystems

By way of global comparison, the diversity of ecosystems represented on the territory is much higher than that of most other countries that are similar in terms of area. This is due to the pronounced vertical zoning of ecosystems along an altitude gradient of almost 7,200 m, and to pronounced precipitation gradients ranging from less than 100mm yr-1 in the far southeast of the country to more than 1,000 mm yr-1 in the western and central mountainous areas.

The major ecosystem types in Tajikistan are high mountain deserts and steppes between 3,200 and 4,500 m altitude, as well as nival (snow line) ecosystems above 4,500 m altitude, which together occupy two-thirds of the country's territory. Forest and savannah ecosystems, taken together, account for about 18 per cent, while wetlands and freshwater ecosystems occupy 3.5 per cent of the territory (Figure 9.1).

The exceptional diversity of ecosystems found in Tajikistan is also reflected by the country's inclusion in the Global Biodiversity Hotspot "Mountains of Central Asia", one of Conservation International's 34 global biodiversity hotspots, and in the Global 200 of the World Wide Fund for Nature (WWF), a list of priority ecoregions for global conservation. There are five wetlands of international importance (Ramsar sites) and 18 important bird areas of international significance in Tajikistan. No shift in the contribution of ecosystem types to the overall area of Tajikistan has been reported since 2004.

Species diversity

The wide range of ecosystems that are represented in Tajikistan offers habitats to an equally rich diversity of flora and fauna. Species numbers of 9,771 plants and 13,231 animals have recently been estimated. However, the various ecosystems are not equally important for biodiversity: the highest species richness is found in forests and savannahs at altitudes between 600 and 3,000 m (Table 9.1).

There are more than 1,100 endemic plant species among the country's flora, including trees, grasses and herbs. These species are of considerable global conservation interest and harbor significant genetic resources. Noteworthy are the numerous endemic species of wild onion (*Allium* spp.) and tulips (*Tulipa* spp.).

Among the animals, groups of particular conservation interest include the mountain ungulates (four species including the Marco Polo sheep: *Ovis ammon polii*, the Urial: *Ovis orientalis* and the Markhor: *Capra falconeri*), carnivores (e.g. the snow leopard: *Uncia uncia*) and raptors (e.g. several species of falcons: *Falcon* spp.). The global Red List of Threatened Species of the International Union for Conservation of Nature (IUCN) includes 23 animal and 16 plant species occurring in Tajikistan (Table 9.2).

No monitoring of biodiversity is currently carried out in Tajikistan. Therefore, it is impossible to systematically assess trends in the conservation status of individual species since 2004.

However, the NGO "Nature Protection Team" has published direct population counts from the Gorno-

Badakhshan Autonomous Region (GBAO) and population estimates for ungulates as a major component of Tajikistan's animal biodiversity.

These estimates indicate that there are still viable populations of Marco Polo sheep and ibex in various parts of Tajikistan, and that most populations of Markhor are very small but apparently relatively stable. On the other hand, Urial (*Ovis orientalis bocharensis/vignei*) appears to be on the brink of extinction.

Forest resources

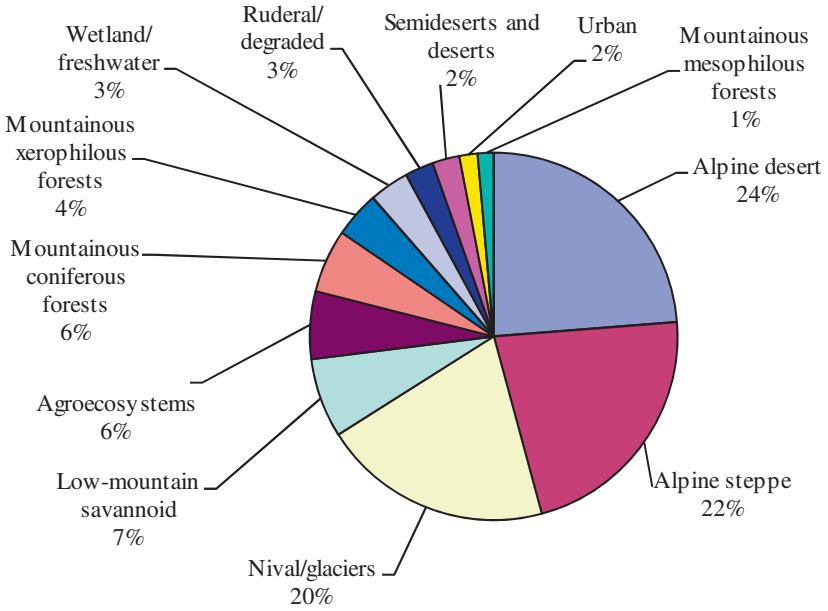
With 410,000 ha or less than 3 per cent of the country's territory covered by forests according to official data, Tajikistan currently has the lowest forest coverage in Central Asia. This is the outcome of a prolonged deforestation process, particularly in the plains and foothills of Tajikistan, which reduced forest cover from possibly as much as 25 per cent over the 20th century. The remaining forests are concentrated in mountainous western areas (Map 9.1).

Table 9.1: Ecosystems

Ecosystem	Altitude (m)	Area (10^6 ha)	Population (1,000)	No. of animal species	No. of plant species
Nival/glaciers	> 4,500	2.90	2*	180	16-17
Alpine desert	3,500-4,500	3.40	82	1,100	650
Alpine steppe	3,200-4,000	3.15	150	2,400	730
Mountainous coniferous forests	1,100-3,000	0.80	20	2,900	1,280
Mountainous mesophilous forests	1,300-2,400	0.20	50	3,390	1,700
Mountainous xerophilous forests	1,100-2,000	0.58	20	5,950	2,400
Low-mountain savannoid	600-1,600	1.00	1,443	4,500	450
Semideserts and deserts	400-600	0.34	475	2,000	520
Wetland/freshwater	300-4,200	0.50	90	4,000	400
Agroecosystems	350-3,000	0.85	2,070	3,000	900
Urban	400-2,000	0.23	1,700	2,000	250
Ruderal/degraded	600-2,500	0.36	100	2,000	70

Source: National Biodiversity and Biosafety Centre, 2009.
* seasonal (tourists, alpinists)

Figure 9.1: Distribution of the territory among ecosystem types



Source: National Biodiversity and Biosafety Centre, 2009.

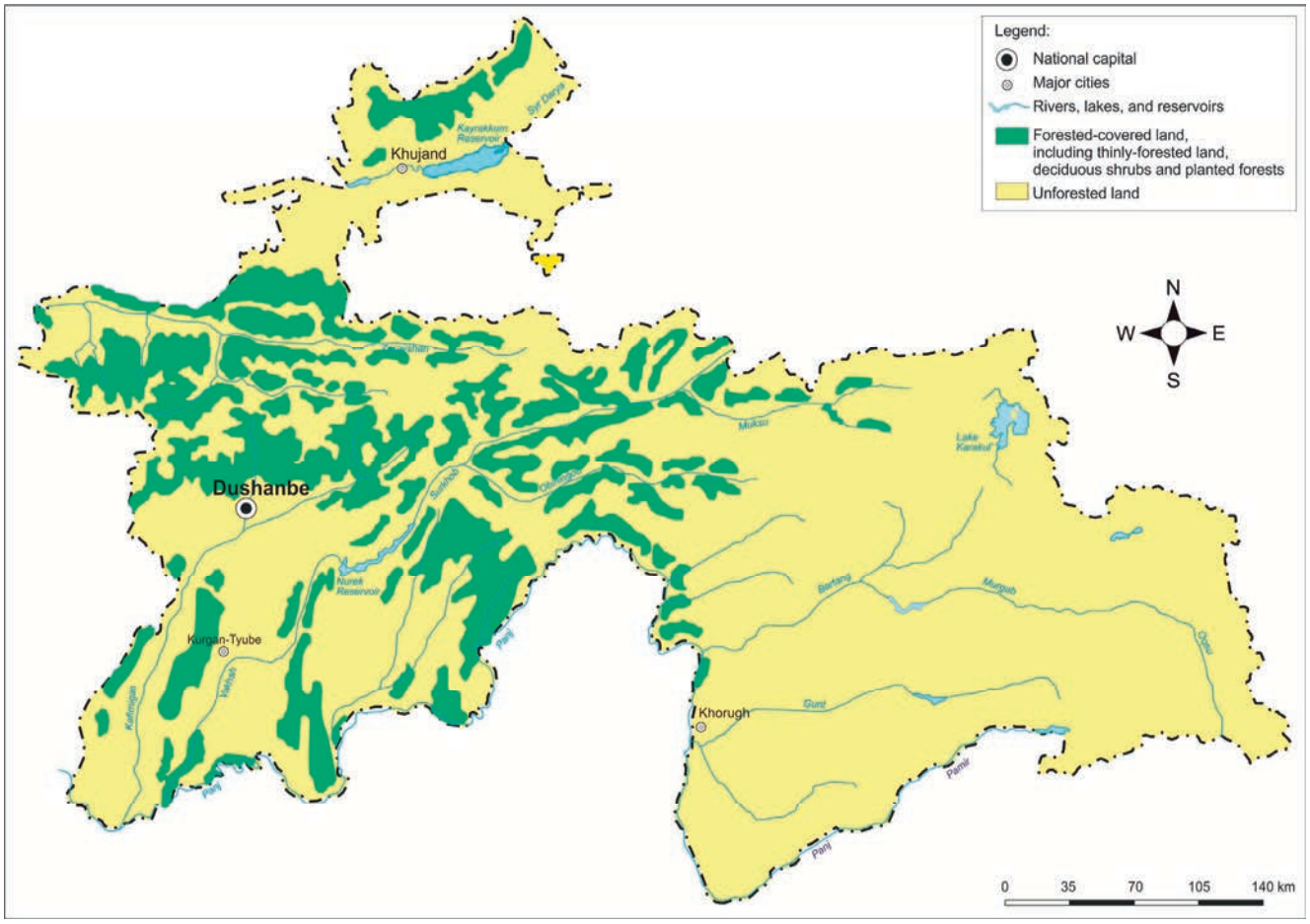
Table 9.2: Species on the global IUCN Red List of Threatened Species for which Tajikistan is listed as a range country

Species	English name	Assessment
Plants		
Amygdalus bucharica	Wild Almond	Vulnerable
Betula pamirica	Pamir Birch	Vulnerable
Betula schugnanica	birch	**Critically Endangered**
Crataegus darvasica	hawthorn	**Critically Endangered**
Crataegus necopinata	hawthorn	**Critically Endangered**
Lonicera paradoxa	honeysuckle	Endangered
Malus sieversii	apple	Vulnerable
Prunus tadzhikistanica	plum	Endangered
Pyrus cajon	pear	Endangered
Pyrus korshinskyi	pear	**Critically endangered**
Pyrus tadshikistanica	pear	**Critically endangered**
Rhus coriaria	sumac	Vulnerable
Swida darvasica	dogwood	**Critically endangered**
Zygophyllum darvasicum	bean-caper	**Critically endangered**
Invertebrates		
Parnassius autocrator	apollo butterfly	Vulnerable
Saga pedo	Predatory Bush Cricket	Vulnerable
Fish		
Aspiolucius esocinus	Pike Asp	Vulnerable
Cyprinus carpio	Wild Common Carp	Vulnerable
Luciobarbus brachycephalus	Shorthead Barbel	Vulnerable
Luciobarbus capito	Bulatmai Barbel	Vulnerable
Pseudoscaphirhynchus fedtschenkoi	Syrdarya Shovelnose Sturgeon	**Critically endangered**
Reptiles		
Testudo horsfieldii	Central Asian Tortoise	Vulnerable
Phrynocephalus strauchi	Strauch's Toad-agama	Vulnerable
Birds		
Chlamydotis undulata	Houbara Bustard	Vulnerable
Columba eversmanni	Pale-backed Pigeon	Vulnerable
Falco cherrug	Saker Falcon	Endangered
Haliaeetus leucoryphus	Pallas's Fish-eagle	Vulnerable
Marmaronetta angustirostris	Marbled Teal	Vulnerable
Neophron percnopterus	Egyptian Vulture	Endangered
Otis tarda	Great Bustard	Vulnerable
Oxyura leucocephala	White-headed Duck	Endangered
Vanellus gregarius	Sociable Lapwing	**Critically endangered**
Mammals		
Capra falconeri	Markhor	Endangered
Cuon alpinus	Dhole	Endangered
Gazella subgutturosa	Goitered Gazelle	Vulnerable
Ovis orientalis	Urial	Vulnerable
Uncia uncia	Snow Leopard	Endangered

Source: IUCN Red List of Threatened Species, IUCN, 2010.

Currently in order to get information it is necessary to conduct forest inventory at country level and for implementation of this outlined assignment Tajikistan has appropriate base. But only discrepancy is that in many cases light forests are not counted as forests. However, a recent calculation based on the 1990 coverage of 408,000 ha, an annual deforestation rate of 2 per cent - realistic in the context of the global average deforestation rate and known pressures on forest resources in Tajikistan - and the reported negligible afforestation rates, yielded an estimate of actual forest cover of only 250,000 ha, or less than 2 per cent of the country's area. Consistent with this estimate, the first EPR for Tajikistan reported that valuable juniper, walnut, birch and pistachio forests turned into light forests in recent decades. The remaining forests are heavily degraded. Only activities during last years (2010-2011) allowed conducting seedling-growing activity for forestry to rehabilitate degraded forests. In this connection, financial activities have been conducted by international organizations.

Map 9.1: Geographical distribution of forest resources



Source: Forest and forest products country profile: Tajikistan, Timber and Forest Discussion Paper No. 46, UNECE, 2008.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

In terms of forest biodiversity, Tajikistan's remaining forests are comparatively rich. All types of natural forests are represented in the country. The five principal ones are juniper forests, hard-leaved xerophilous or Shibliak forests, broad-leaved forests, Tugai forests and small-leaved forests, with juniper forests and Shibliak each making up approximately one-third of the overall forest area and the remaining three types accounting for the rest. The forest type richest in tree and shrub species is Shibliak forests, followed by small-leaved mountain forests and broad-leaved forests. Of particular conservation concern are Tugai forests, which stretch along rivers and consist of dense undergrowth and brush in combination with stands of common reeds and oxbow lakes. Due to their location on accessible plains, some 90 per cent of their former area has been lost over the last 100 years.

Tajikistan's forests have low yields (mainly yield Classes III and IV, with an average yield potential of 35 m^3 ha-1 yr-1) and are not exploited for timber production. However, they perform important functions for soil protection; regulation of the water balance; climate regulation; provision of natural resources, including meat, fuel wood and wild plants; slope stabilization; and recreation. Given the low area of coverage coupled with the great importance of forests in Tajikistan, there is clearly a need for extensive afforestation.

Use of biodiversity and forest resources and impact on their conservation status

The biodiversity and natural resources have traditionally been used in various ways, including fuel wood and timber production, hunting, grazing, and collection of wild plants for medicinal as well as other purposes. A high percentage of the population (20-80 per cent in various regions), and particularly of the rural poor, depend on various natural resources for at least part of their livelihoods and/or cash income. This means that sustainable natural resource use needs to be an integral part of strategies aimed at rural poverty reduction.

All of the above types of natural resource use can turn into pressures on biodiversity and natural

resources if managed unsustainably. The dual character of resource use as an important support to rural livelihoods and economies on the one hand, and pressures/threats on biodiversity and natural resources on the other hand, is discussed for the major natural resources below. In this discussion, pressures are defined as factors that negatively affect the conservation status of identified biodiversity values or natural resources, while threats are defined as factors that may turn into pressures.

Fuel wood

Three-quarters of Tajikistan's population live in rural areas, but less than nine per cent of all electricity is consumed there. It has been estimated that more than 90 per cent of the rural population use solid fuels (wood, coal or dung) for heating and cooking, and that almost 50 per cent used wood as their principal fuel in 2002. Another estimate put the dependency on fuel wood at 70 per cent of the country's population.

An extremely conservative estimate of total fuel wood demand in Tajikistan amounted to 168,000 m^3 yr-1 in 2008. Considering that, according to the above figures, approximately 5 million people rely on wood as their principal fuel, the above demand estimate would equal an annual fuel wood consumption of about 0.03 m^3 yr-1 per individual. This figure is two orders of magnitude lower than what was estimated in 2010 (3-4 m^3 yr-1 per individual), taking into account the climatic conditions, the poor quality of insulation, and heating technology in Tajikistan. As a consequence, a more realistic estimate of national fuel wood demand would be in the neighbourhood of 15-20 million m^3 yr-1, far beyond the production capacity of the country's remaining forests.

No fuel wood is imported into Tajikistan, and the only legal domestic source of fuel wood (or indeed any wood) is sanitary cutting and forest clearing operations, which yielded a scant 9,245 m^3 yr-1 in 2009. This would account for between 0.003 per cent and 5 per cent of annual demand, depending on the demand estimate. Since there is no official market for fuel wood, potential buyers approach the State forest enterprises (*leskhozes*) to buy wood or use unofficial ways to procure it.

The latter is likely to account for most fuel wood traded and used in Tajikistan. All types of forests and woodland, including mountain and Tugai forests, are used as fuel wood sources. One striking example of the impact of fuel wood use on vegetation is the use of Teresken (*Ceratoides papposa*) shrubs in eastern Tajikistan, which has led to the virtual disappearance of this vegetation type in many areas).

The major role of fuel wood as a major forest product and key energy source for Tajikistan's rural population is only incompletely reflected in current national policies, programmes and procedures for the forestry sector.

For instance, the State Programme for the Development of the Forestry Sector for the period 2006-2015 acknowledges the impact of fuel wood dependence among rural inhabitants on forest resources and lists the establishment of timber and fuel wood plantations among the general needs that drive the programme, but does not contain measures to address the fuel wood issue among its specific objectives, tasks or actions. This lack of adequate policy in relation to fuel wood collection weakens the governance of forest resources in Tajikistan.

According to national policy documents and/or analyses of international organizations, potential intervention points to lessen the pressure from fuel wood collection on the forest resources of Tajikistan include the following:

- Increase of the forest area available for fuel wood production: reforestation and the establishment of energy plantations around villages would reduce pressure on natural forests while possibly generating cash income and contributing to erosion control;
- Reduction of per capita fuel wood demand: improved thermal insulation has been shown to reduce per capita fuel wood demand in GBAO villages by 50 per cent; an estimated reduction of 80-90 per cent may be achievable through a combination of improved insulation and more efficient heating/cooking technologies;
- Creation of economic incentives to informal fuel wood harvesters to manage forests sustainably: based on the concept of Joint Forestry Management, lease agreements to formerly informal forest users have been implemented successfully in GBAO since the first EPR and could be applied on a much wider basis;
- Improved forest law enforcement through simplified and transparent regulations for forest use, sufficient remuneration and rewards to law enforcement staff and equipment as well as operational budgets. An improvement in forest law enforcement could build on Tajikistan's commitment as a signatory of the St. Petersburg Declaration on Forest Law Enforcement and Governance (FLEG) in Europe and North Asia (2004). Tajikistan has not initiated a national FLEG process to date.

Photo 9.1: Collection of Teresken shrubs in the Eastern Pamirs

Hunting, fishing and collection of animals

Wildlife is hunted by local inhabitants living near wildlife habitats and by hunters from afar; hunting is practiced both for subsistence and commercially. Hunting areas are not restricted to forests, but include non-forested alpine areas and open woodlands. According to the 2003 NBSAP, the species hunted most intensely are Chukar partridge, ibex and Marco Polo sheep. Occasionally, marmots and bears are also hunted for medicinal purposes (fat and gall bladders, respectively). Hunting of snow leopards, for skins and trophies was documented in the 1990s and may continue. Tajikistan has not acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), although this would allow extended international marketing of sustainably sourced wild products from Tajikistan.

Tajikistan has international hunting tourism for ibex, wild boar and Marco Polo sheep. Local hunters complement their income by working as guides, guards or beaters for foreign hunting companies. Some companies also employ wildlife wardens. There is reportedly also illegal hunting tourism for the globally endangered Markhor and Urial.

Collection of wild animals for international trade also threatens the fauna of Tajikistan in other ways: falcons used to be traded from Tajikistan in the 1990s, and although a trade suspension of the CITES Standing Committee on Saker (*Falco cherrug*) from Tajikistan was withdrawn in June 2010; trade in falcons remains a threat. The same is true for the collection and trade from Tajikistan of the tortoise *Testudo horsfieldii*, which is currently under examination by the CITES Review of Significant Trade.

Hunting is carried out by the local State forestry enterprises, individual hunters and commercial hunting enterprises in Tajikistan. While in theory there are six forestry hunting enterprises (317,500 ha in total) that are managed by the State Forestry Enterprise and 36 hunting fields (more than 1 million ha in total) that are managed by the Society of Hunters and Fishermen, and a licensing system (UNECE 2004), hunting reportedly also takes place outside designated hunting areas and without the required permits and licenses.

CEP and local State forestry enterprises have only limited capacity to regulate hunting, and do not generate significant income from hunting permits. For example, the total income of the State Agency for Forestry and Hunting from hunting fees (outtake permits) in the 2009/2010 season was a mere 21,400 somoni (about US$ 4852 at 2009 exchange rate).

Hunting quotas are set by the Control Department for the Use and Protection of Flora and Fauna, while hunting fees for each species have been defined by Regulations No. 546 (2007) on License Fees for the Use of Natural Resources. In theory, annual hunting quotas are calculated from standing stock data provided by scientific monitoring programmes and

counts that are conducted by forest enterprise staff or field staff of the Control Department, using species-specific removal rates (e.g. 0.5 per cent of standing stock per year for a given species). However, systematic monitoring programmes have not been conducted since the 1990s, and field staff lack skills and resources to conduct meaningful counts. This means that the reported abundance estimates and resulting quotas are not based on actual standing stock. The regulation about hunting fees includes unrealistically high fees for some species, which render their legal exploitation economically unviable (Chapter 5).

Among the areas where hunting is comparatively well-regulated are large commercial hunting concessions in the Eastern Pamirs and private Markhor conservancies in southern Tajikistan, which use income from ibex and wild boar hunting to support Markhor conservation activities.

Based on the development of the situation since 2004, possible hunting-related interventions include the establishment of a reliable monitoring system to inform quota-setting; more realistic fees; a more transparent legal framework that clarifies who is allowed to hunt what in which area; improved hunting law enforcement and benefit-sharing of hunting resources; accession to CITES; and better economic incentives for the sustainable use of hunting resources.

Hunting schemes of communities based on defined groups of hunters have recently succeeded in engaging informal hunters to manage their traditional hunting areas sustainably, at the level of local pilot projects. Replicating this experience and adjusting national policies and plans accordingly would improve hunting management throughout Tajikistan.

Fishing is an additional type of natural resource use, although less is known about its contribution to livelihoods and local economies or the areas and species affected. The only fishery of national importance is at the Kayrakkum Reservoir, with a yield estimate of 100 t in 1998. No recent yield statistics on this or other fisheries are available.

No trends regarding pressures and threats from hunting, fishing or the collection of wild animals were documented between 2004 and 2010. Several species - particularly the Urial - remain under critical pressure from poaching. At the same time, the potential of sustainable management of wildlife resources to contribute to rural livelihoods and economic development remains underused.

Grazing

Grazing is a key use of natural pastures and forests of Tajikistan. After a collapse in the early 1990s, livestock numbers have been steadily increasing in the recent past. According to Government statistics, livestock numbers in Tajikistan have increased by 38 per cent since 2004 (Figure 9.2). Stocks of sheep and goats have increased by 47 per cent over the same period. Even if these numbers do not capture the full amount of livestock, as appears likely, the trend indicates that grazing pressure throughout the country is increasing significantly.

Besides alpine and subalpine meadows, juniper and pistachio forests are frequently used for grazing. This includes 960,000 ha of land that is part of the Forest Fund but is officially designated as pasture. Because of the limited capacity of the staff of local state forestry enterprises and protected areas for effective law enforcement, access for livestock grazing to most forests and other natural ecosystems of Tajikistan is essentially open at present. Excessive grazingnot only precludes successful forest rejuvenation and afforestation but also contributes to erosion and land degradation. Domestic animals that graze in areas inhabited by mountain ungulates or other wild herbivores also compete with them, comprising efforts to conserve these wild species.

Sustainable pasture management is currently not included in policies, strategies and plans for natural resource use and forest management. The State Programme on Pasture Management for the period 2009-2015 is primarily concerned with an increase in pasture productivity. Economic incentives to exclude livestock from forests and afforestation areas are lacking. Exceptions are Joint Forest Management areas in GBAO where forest users are granted long-term user rights, conditional on the implementation of agreed management plans, and are thereby incentivized to protect their leases against grazing.

Potential measures to control unsustainable grazing are the inclusion of pasture management into forest management strategies, participatory land use planning, and the strengthening of economic incentives through Joint Forest Management, following the example of existing local schemes.

Collection of wild plants

According to Government Programme No. 160/2005 for the Cultivation, Collection and Processing of Medicinal Plants for the period 2005-2015, there are 70 medicinal plant species in Tajikistan, 23 of which

are in use. The Programme highlights the national importance of wild plant resources.

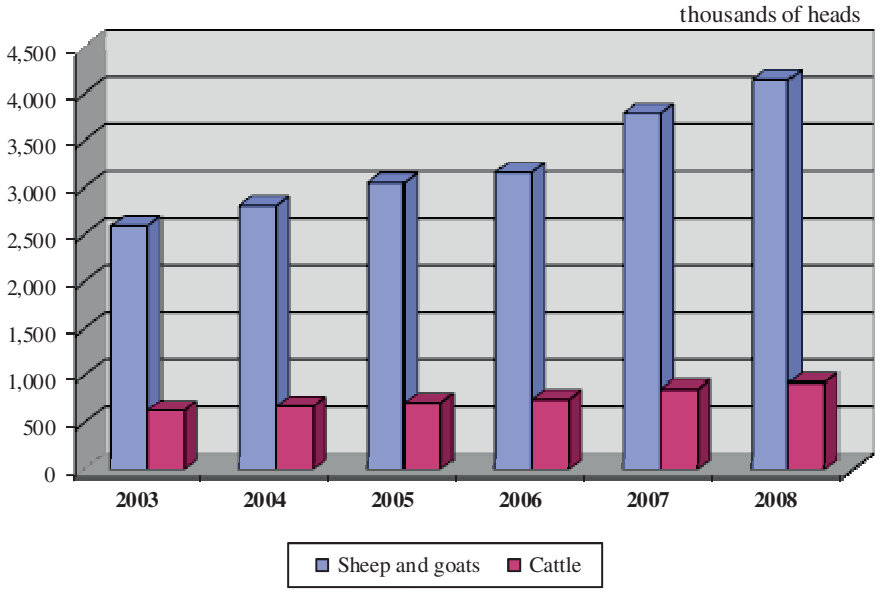
Wild plant collection plays an important role in supplementing the diet and sometimes the income of local populations. Some species are of greater commercial importance than others: for example, commercially significant species of wild plants include Anzor chive (*Allium grandiflora*), liquorice (*Glycyrrhiza glabra*), rosehip (*Rosa spp*.), and ferula resin (*Ferula foetida*/*F. foetidissima*), the latter three of which are collected for export. The only collection method for Ferula resin destroys the plants before they can reproduce – sustainability can hence only be achieved by sparing a proportion of plants from exploitation each year, which is not being done sufficiently. This has already led to a significant reduction in the abundance of this species. Anzor chive is also commercially collected, tinned and marketed. Exploitation has reportedly led to decreases of abundance in the more accessible parts of its distribution area, indicating that this species is not collected sustainably either. The State Agency of Forestry and Hunting, collection companies and individual collectors try to offset outtake by the sowing of collected seeds in collection areas, and cultivation in the case of some species.

Wild rhubarb, the cumin *Bunium persicum*, berries including sea buckthorn (*Hippophae rhamnoides*), barberries (*Berberis* spp.), nuts such as walnut (*Juglans* spp.), pistachio (*Pistacia* spp.), as well as various species of medicinal plant species are also collected, mainly for domestic consumption. Domestic demand for medicinal plants (e.g. teas) is currently met primarily by imported products.

The main user groups of wild plants are the rural population, a few private businesses and the local State forestry enterprises, some of which generate most of their income from plant collection. While collection companies have to obtain a license from the Ministry of Health for collection of medicinal plants, regulation of annual outtake is the responsibility (i.e. planning, control, monitoring) of the CEP Control Department for the Use and Protection of Flora and Fauna and the State Agency of Forestry and Hunting. However, collection is often driven by the initiative and vested interests of individual local State forestry enterprises. While private collectors on the territory of State forest enterprises can obtain collection permits there, they would have to travel to Dushanbe to acquire a permit for collection on other land from the Control Department. It is unlikely that a significant proportion of them do so.

Fees for wild plant collection are set out in Order No. 546 concerning Tariffs for Wild Plant Collection dated 2 November 2007. The fees for many species are so high that they preclude economically viable legal collection of wild plants. There are collection limits for most species, but there is no centralized monitoring or uniform permit issuing procedure, and consequently little control over the amounts of wild plants harvested. Efforts to make wild plant collection sustainable are aimed at collection bans, cultivation, or sowing to replenish crops, not sustainable wild collection (Chapter 5).

Figure 9.2: Development of livestock, 2003-2008



Source: State Committee for Statistics, 2009.

Potential ways of achieving greater sustainability of - and greater benefits from - wild plant use in Tajikistan include the development of a resource monitoring system and sustainable collection methods; the introduction of realistic collection fees; and support to the long-term sustainability and benefits of local resource users using international marketing based on ecological certification and value chain approaches, where the necessary demand exists.

Other pressures and threats to biodiversity

The above analysis shows that a large proportion of the population of Tajikistan depends on natural resources for their livelihoods and income and that sustainable management of natural resources is therefore a key prerequisite for the country's economic development. At the same time, the analysis shows that the current pattern of natural resource use is unsustainable in several ways.

There are other pressures and threats to biodiversity that are not connected to the direct consumption of resources. These include climate change, land degradation/desertification, habitat destruction for the construction of infrastructure, conversion of natural ecosystems to agricultural land, introduction of alien and invasive species, and environmental pollution. These threats may increase in the future.

Climate change, which is discussed in more detail in Chapter 6 of this report, is closely linked to the forests, biodiversity and natural resources of Tajikistan: On the one hand, the few remaining forests of Tajikistan represent small but important carbon stores. Their conservation and additional afforestation would contribute to climate change mitigation. On the other hand, climate change will increasingly affect the status of biodiversity and availability of natural resources, and challenge the regulatory capacity of the country's natural ecosystems (e.g. flood and erosion control, small-scale climate regulation).

This is likely to trigger important indirect effects on natural resource-based rural livelihoods and economies, some of which may be as profound as the expected direct effects of climate change. The exact consequences of climate change for the biodiversity and ecosystems of Tajikistan - or Central Asia in general - have not been studied systematically to date, but data from comparable systems show that climate change has been linked to a shift of vegetation belts in mountainous ecosystems; increased pressure on alpine species and species occurring in already fragmented habitats; and increased incidence of alien and invasive species. The Scientific Institute of Forestry plans to study such impacts in Tajikistan, finances permitting. Planned projects of the Central Asian Countries' Initiative for Integrated Land Management (CACILM) may address linkages between climate change and natural resources in the near future.

As a practical consequence, the close relationship of forests, biodiversity and natural resources with climate change needs to be considered while developing both climate change mitigation projects and climate change adaptation strategies for Tajikistan. Afforestation programmes need to make use of the natural reforestation potential and use indigenous tree species, in order to achieve ecologically robust and sustainable results and maximize synergies between climate change mitigation/adaptation and biodiversity conservation.

Protected areas system

No new protected area (PA) has been established in Tajikistan since 2004, and there are currently no immediate plans to establish additional PAs. The nominal percentage of the country's territory under protection is still at a comparably high 21.6 per cent, and the major ecosystems occurring in the country are covered by the PA system. About 2.6 million ha (83 per cent of the total PA territory) belong to Tajik National Park, and another 313,000 ha (10 per cent) of the total area belong to 13 managed reserves (*zakazniks*).

The managed reserves have no status as legal entities and are currently under the authority of the State Agency of Forestry and Hunting, not under the State Department for Protected Areas. They have theoretically been established for a limited time only, but all have been extended repeatedly in the past.

There is also a Nature Park (established in 2003) and a Nature-Historical Park, neither of which corresponds to the internationally accepted IUCN PA categories. Tajik National Park, Zorkul Strict Nature Reserve and Zeravshan Managed Reserve are situated on the borders with Kyrgyzstan, Afghanistan and Uzbekistan, respectively, but are not managed as transboundary PAs. Redesignation of Romit Strict Nature Reserve (*Zapovednik*) as a UNESCO Biosphere Reserve is currently under consideration at CEP. The overall current structure of the national protected area system is summarized in Table 3. Their spatial distribution was mapped previously.

Table 9.3: Protected areas

PA Category	IUCN PA Category	Number	Area (*1000 ha)
Strict Nature Reserves (Zapovedniks)	I	4	173
National Parks[1]	II	3	2607
Natural Monuments	III	26	..
Managed Reserves (Zakazniks)	IV	13	313

Source: National Biodiversity and Biosafety Centre 2009.
Note: [1] includes a nature park and a nature-historical park.

The fact that 21.6 per cent of Tajikistan's area has been designated under various PA categories does not mean that the entire area is indeed managed for nature conservation. Several assessments and evaluations since 2004 have concluded that the management effectiveness of most if not all Tajik PAs is currently insufficient. The 2006 IUCN Assessment of Management Effectiveness of Protected Areas of Central Asia and a series of individual PA evaluations by UNDP in 2006 highlighted the following key constraints: lack of management plans; infrastructure and equipment; staffing and staff qualification; and funding.

There are currently no protected area management plans being implemented in any of the PAs of Tajikistan. An interim and now outdated management plan (2007-2009) was developed but not implemented in Tajik National Park. In addition, management plans have reportedly been drafted for Tigrovaya Balka Strict Nature Reserve (which benefits from strong involvement of the national NGO Kuhiston Foundation and WWF Russia) and Dashtijum Managed Reserve. However, these are not publicly available currently.

Most PAs in Tajikistan lack even the basic infrastructure and equipment. For example, a visit to the Tigrovaya Balka Strict Nature Reserve during the mission revealed that there was only one car and apparently no computers available at the PA administration to manage an area of almost 50,000 ha.

The salaries of most PA staff are not competitive in national comparison. PA directors and rangers receive monthly salaries of 200 and 110 somoni, respectively. Many protected area staff have low or inappropriate qualifications, and there are currently insufficient opportunities to train them on the job.

The PA system of Tajikistan is severely underfunded, which is one of the root causes of the other management constraints listed above. The 2007 budget for the entire PA system (including salaries) was estimated at $300,000, or 10 per cent of the minimum estimated necessary amount. It was also observed that the administration of the Tigrovaya Balka PA engages in economic activities (e.g. pomegranate plantations) and maintains several houses as free accommodation for staff, apparently in order to compensate for the limited available salaries and budget funding. While this example shows a commendable entrepreneurial commitment of the administration to the well-being of the PA and its staff, it is likely to distract from the core responsibilities of a PA administration.

The Government submitted a nomination for Tajik National Park (Mountains of the Pamirs) as a natural World Heritage site to UNESCO in 2009. According to the Decision 34 COM 8B.3 of the World Heritage Committee in 2010, examination of this nomination was deferred. The Committee, following the IUCN advice as its relevant advisory body, considered the area a potential World Heritage site but noted the use of inappropriate World Heritage criteria (criteria ix and x – for the specific area nominated), suboptimal boundary-setting, an insufficient management regime, and the compromised integrity of the site. This negative assessment of the current management regime and integrity of Tajik National Park reinforces concerns about the current management and intactness of the country's PAs.

Management planning guidelines for the PAs of Tajikistan were developed recently by the State Department for Protected Areas, jointly with UNDP, and approved by the Head of the State Department in June 2010. They generally reflect international best practice and IUCN standards for PA management planning. It is planned to develop a generic format for management plans based on this guideline and to initiate a process of "learning by doing", in the course of which the capacity to develop management plans for protected areas is to be developed at the State Department. A draft national PA system concept and draft amendments to the 1996 Law on Specially Protected Natural Territories and Objects, No. 328, have also been elaborated in cooperation with the State Department and UNDP.

Photo 9.2: Teresken area around of Karakul Lake in the reserve zone of Tajik National Park

Although these recent developments are encouraging, no substantial improvement in the conservation status of the PAs of Tajikistan has been documented since 2004. Current management effectiveness is assessed as insufficient for addressing the multiple pressures and threats, as identified in the Fourth National Report to the Convention on Biological Diversity (CBD): grazing, logging and fuel wood collection, hunting and fishing, and illegal land use and extension of settlements into PAs.

Illegal grazing by the steadily growing livestock on the territory of protected areas is a major factor in the degradation of all PAs, including shifts in the flora and vegetation, land degradation, and competition for wild herbivorous mammals. This effect is enhanced by rural poverty and the lack of alternative livelihood options for people living nearby.

Wood is removed from protected areas mainly for fuel as a consequence of the lack of other energy resources, but possibly also for building materials and commercial processing. Deforestation leads to erosion, desertification and changes in the microclimate of the areas affected. It also alters the habitat quality of the former forest areas, thus indirectly affecting the entire biota of the PAs.

Local resource users living in or near PAs (e.g. Tajik National Park) continue to engage in illegal hunting and less significantly fishing. This trend has been exacerbated by increasing rural poverty during the course of economic transition.

As noted in the first EPR Report, a particularly striking example of this pressure is Romit Strict Nature Reserve, where settlements and intensive grazing have changed the character of the PA. However, this is not the only example of the intrusion of other land uses into PAs.

At least three of these key factors identified by the Government are related to unsustainable natural resource use and hence follow the same pattern as the general pressures on biodiversity and natural resources of Tajikistan – they merely affect more valuable natural areas. A lack of alternative livelihood options is listed as the root cause for the unsustainable natural resource use.

Therefore, an improvement in the conservation status of most PAs in Tajikistan will only be possible if improvements in management effectiveness are complemented by positive economic incentives for traditional and informal resource users living in their vicinity. Pilot projects on Joint Forestry Management and Community Hunting Management, which have been implemented with the support of international donors since the first EPR, are promising examples that could also be applied in some managed reserves. However, the current understanding of the 1996 Law on Specially Protected Natural Territories and Objects among Government officials excludes most natural resource use from PAs of Tajikistan, including PAs that correspond to “lower” IUCN management categories (e.g. Category IV). This understanding precludes the application of the concept of conservation through sustainable use, for

instance to sustainable hunting. A more modern understanding would be to allow and regulate defined forms of natural resource use, which tends to increase local ownership and support and ultimately the overall conservation effectiveness of suitable PAs.

In conclusion, improving the extremely poor management effectiveness, local ownership and law enforcement of existing PAs in Tajikistan promises large conservation benefits, while there appears to be no immediate priority in terms of extending the current PA network. The establishment of ecological corridors and very small strict nature reserves ("micro-zapovedniks"), as recommended by NBSAP and the first EPR, might generally yield conservation, benefits but is unlikely to have any significant impact as long as the overall management system of existing core PAs is weak.

Since 2004, there have already been several activities aimed at improved management of existing PAs. UNDP is implementing the above-mentioned project on biodiversity management in the Gissar Mountains. A GEF-funded project aimed at improved PA management in the Dashtijum Zakaznik was implemented in cooperation with the World Bank in 2004-2007. In addition, the international NGO Fauna and Flora International has supported the development of training modules on PA management.

Information systems on forest management, biodiversity and protected areas

There is currently no national biodiversity monitoring system, no national forest monitoring system and no active database or monitoring system of protected areas and their biodiversity in Tajikistan. Insufficient monitoring has been implicated as a contributing factor to several management constraints affecting biodiversity management in Tajikistan (e.g. NBSAP). Among the generally cited reasons for the lack of monitoring systems in Tajikistan, are the insufficiency of human resources able to maintain a monitoring system, the absence of reliable primary information, a dearth of agreed criteria and indicators for monitoring, and inadequate funds, infrastructure and facilities for monitoring.

The establishment of a geographical information system (GIS) database of PA properties is currently envisaged as part of the UNDP Gissar Mountains project. Draft guidelines for the monitoring of mountain ungulates are also under revision (CEP 2010). The NGO Nature Protection Team has initiated monitoring programmes for a number of mountain ungulate species, in cooperation with CEP and the German development cooperation agency Gesellschaft für internationale Zusammenarbeit (GIZ). The Institute of Zoology and Parasitology of the Academy of Sciences of Tajikistan also has strong monitoring capacities. Hence, considerable expertise relevant to the monitoring of biodiversity, forests and protected areas is concentrated in academic institutions, NGOs and international donor organizations outside CEP. These stakeholders are in a position to contribute significantly to the future development of the necessary monitoring systems in Tajikistan.

A new edition of the national Red List of Threatened Species of Flora and Fauna of Tajikistan is currently being prepared by a wide range of national stakeholders, under the leadership of CEP and the Academy of Sciences of Tajikistan, and with backing from GIZ.

9.2 Policies and strategies

General policy framework

In theory, the 2003 National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (NBSAP) with its core action plan and 15 more specific thematic action plans remains the central policy and planning document on biodiversity conservation and natural resources management in Tajikistan. The general strategic priorities of the plan were listed in the first EPR Report, whereas the thematic component plans, as well as the distribution of the 373 specific measures listed in the core plan and the component plans, are shown in Table 9.4.

Low implementation of the NBSAP during 2008-2011 can be linked to various factors, including financial crisis. Due to the limited human capacities in the Committee on Environmental Protection during 2008-2010, main objectives of the NBSAP were not reached. During the implementation of NBSAP the National Biodiversity and Biosafety Centre has submitted 12 reports to the Government and the Committee on Environmental Protection under the Government.

NBSAP is still used as guidance by the Committee on Environmental Protection, NGOs and international organizations. They refer to NBSAP in their programmes and plans. While developing NBSAP, the Committee on Environmental Protection staff members have participated in and conducted several workshops, published brochures and disseminated them to general public in all regions. Some NGOs have also published books and brochures on biological diversity.

Table 9.4: Thematic component plans, specific measures, necessary funding estimates and implementation of the NBSAP

Action Plan	Required Budget (*1,000 Somoni)	Measures	Fully implemented	Partly implemented*	Not implemented	No information
General AP on biodiversity conservation	10,921	75**	5	11	51	8
Creation of national ecological network	1,900	15	1	4	8	2
Biodiversity conservation at geosystem level	10,187	28	0	7	19	2
Conservation of nival glacier ecosystems	2,843	11	0	3	6	2
Conservatin of high mountain desert ecosystems	4,901	20	0	1	15	4
Conservation of high mountain desert and steppe ecosystems	4,807	17	0	1	14	2
Conservation of mid-mountain conifer forest ecosystems	2,647	17	0	3	13	1
Conservation of mid-mountain mesophylic forest ecosystems	3,119	21	0	1	18	2
Conservation of mid-mountain xerophytic light forest ecosystems	3,608	15	0	1	12	2
Conservation of mid- and low-mountain semisavanna ecosystems	2,726	15	0	1	12	2
Conservation of foothill semidesert and desert ecosystems	2,093	14	2	0	12	0
Conservation of wetland ecosystems	3,838	25	1	1	18	5
Biodiversity conservation of Agroecosystems	6,776	27	0	0	20	7
Biodiversity conservation in urban ecosystems	1,951	12	0	1	10	1
Biodiversity conservation *in-situ*	3,703	43	2	6	33	2
Biodiversity conservation *ex-situ*	1,759	18	0	0	18	0
Total	**67,778**	**373**	**11 (3%)**	**41 (11%)**	**279 (75%)**	**42 (11%)**

Source: National Biodiversity and Biosafety Centre, 2003.
Notes: * this figure includes measures that may have been implemented to a certain degree, as well as un-measurable actions
** in cases where a hierarchy of measures was presented in the plan (e.g. 1.1., 1. 2. etc.), only the lowest and most concrete level of measure was included in the analysis.

These efforts resulted in raising public awareness on the matter. In 2004-2010 three international conferences, 12 national conferences and workshops have been conducted in the country and more than 200 theses have been published.

Specific policy framework for subsectors of the biodiversity and natural resources sector

Several policies, State programmes and plans have been developed since 2004, in order to guide specific subsectors of the biodiversity and natural resources sector of Tajikistan. The most of important of these, which refer to NBSAP as one of their foundations, are the following:

- 2005 State Programme on Protected Areas Development for the period 2005-2015, No. 795;
- 2005 Government Programme for the Cultivation, Collection and Processing of Medicinal Plants and Production of Medicines for the period 2005-2015, No. 170;
- 2005 State Programme on the Development of the Forestry Sector for the period 2006-2015, No. 396;
- 2008 State Programme for the Improvement and Rational Use of Pastures for the period 2009-2015, No. 481;
- 2009 State Environmental Programme for the period 2009-2019, No. 123.

The 2005 State Programme on Protected Areas Development for the period 2005-2015. No. 79, sets out general objectives for the development of the PA system, with a particular focus on infrastructure and capacity development. Key objectives include the strengthening of the conservation regime of managed reserves, the revision of the Law on Special Protected Areas, and the establishment of a biosphere reserve at the site of the Romit Strict Nature Reserve. The funding estimate for this programme is nearly 3 million somoni (about US$ 680,272).

The main focus of the 2005 State Programme for the Cultivation, Collection and Processing of Medicinal Plants and Production of Medicines for the period 2005-2015, No. 170, is the extended sustainable exploitation of wild medicinal plants as an economic resource.

The need for the conservation of some heavily exploited species is acknowledged, and plantations or replenishments of wild populations through sowing are prescribed as the main strategy of achieving a sustainable use. Sustainable collection practices or joint management schemes are not explicitly addressed, and no financial requirements are included.

The 2005 State Programme for the Development of the Forestry Sector for the period 2006-2015, No. 396, focuses on forest conservation and afforestation as well as the sustainable use of forest products; all remaining forests of Tajikistan belong to the first forest category (forests that are excluded from timber exploitation because of their role in conservation, and erosion and flood control).

Programme objectives include the revision of the Forest Code and the establishment of poplar and pine plantations for fuel wood and construction materials. The funds necessary for implementation are estimated at more than 13 million somoni (about US$ 3 million).

The 2008 State Programme for the Improvement and Rational Use of Pastures for the period 2009-2015, No. 481, is aimed exclusively at improving the extent and productivity of pastures (particularly winter pastures) through sowing, improved access, etc. The programme is mainly directed at the Ministry of Agriculture. The potential threats of overgrazing and land degradation are not addressed. The funds for the Programme's implementation are estimated at 1.5 million somoni (about US$ 340,136).

The 2009 State Environmental Programme for the period 2009-2019, No. 123, highlights the importance of forestry, biodiversity and PAs as part of overall environmental protection field. It contains a number of measures that are consistent with the recommendations of the first EPR and priority areas identified by this report. However, the Programme lacks a specific action plan and its implementation is slow.

CEP representatives often referred directly to the above-mentioned State programmes when explaining the policy basis for their work rather than NBSAP, probably because they were more directly involved in the development of these programmes. As a result, these programmes appear to have a comparably high practical impact on the activities of relevant CEP subunits.

Implementation of policies and strategies

Since the publication of its NBSAP, Tajikistan has reported regularly on the plan's general implementation, as well as the implementation of some aspects of CBD. The latest and most comprehensive review was presented in the Fourth National Report to CBD in 2009. However, no

systematic overview of the implementation of the 373 specific measures of NBSAP and its component thematic plans has been included in the present report or previous ones. A general comparison of the progress in the biodiversity and natural resources field, as identified by this EPR and the NBSAP objectives, suggests that only very few of the NBSAP objectives were met during their official implementation period (Table 9.4).

Based on available information, only 3 per cent of the measures prescribed in the plan have been fully implemented, while 11 per cent have been partly implemented. No sufficient information was available to decide whether another 11 per cent of the measures have been put into practice. This means that at least 74 per cent of the specific objectives of the plan have not been not implemented at all.

There are several reasons contributing to the incomplete implementation of Tajikistan's biodiversity planning. Some of them are listed in the Fourth National Report to CBD (2009):

- A lack of funding;
- Limited capacity of institutions responsible for NSAP implementation;
- Insufficient mainstreaming and inter-agency coordination and cooperation, as well as insufficient cooperation between State agencies at the various levels (national, regional, local);
- Several restructuring initiatives in the biodiversity sector in the recent past;
- A lack of legislation and implementing regulations.

However, an additional reason is the structure of the plan itself. The great number of measures (373) and the overlapping and potentially confusing hierarchy of general strategic goals and priorities have not been balanced out by detailed (e.g. annual) implementation planning based on specific, measurable, attainable, relevant and time-bound objectives.

Moreover, many specific objectives are not realistic, given the current limited financing and capacity of the responsible institutions and the current governance framework of the sector. This has weakened the implementation of NBSAP and its downstream planning documents, as already implied by the first EPR report.

Implementation of the more specific Government programmes relevant to forestry, biodiversity and protected areas has also been incomplete because these programmes have been affected by the same constraints as listed for NBSAP above, particularly by insufficient financing.

On a more general level, key constraints on the effectiveness of the governance framework and performance on biodiversity conservation and natural resource use are:

- A lack of monitoring and a poor information base for policy formulation and action planning;
- Policies and programmes that are not always sufficiently realistic and action-oriented;
- A lack of clarity and inconsistencies in the legal framework;
- Inconsistencies of the institutional set-up and lack of institutional capacity and funds;
- Insufficient ownership of nature conservation and sustainability objectives among local resource users – the group that is directly responsible for the major pressures on biodiversity and natural resources. Lacking ownership, in turn, is caused by a lack of incentives for sustainable management, as could be afforded by long-term user rights, and by an insufficient value enhancement of the resources offered by Tajikistan's natural ecosystems.

Assessment

The 2003 National Strategy and Action Plan for the Conservation and Sustainable Management of Biodiversity has not provided sufficient policy guidance and strategic prioritization of actions to CEP and its subordinate institutions since the last EPR and appears only weakly connected to implemented policy. During the same period, a number of important more specific State programmes have been developed. Although these are more relevant to the activities of CEP and its subordinate institutions in the relevant subsectors, their implementation has also suffered from financial and capacity constraints.

Since sector funding from the State Budget is unlikely to increase dramatically in the near future, an explicit, realistic consideration of all possible funding sources, including international donors; a prioritization of policy and strategic objectives that is clearly communicated to donors; and activities to build the necessary institutional capacity for policy implementation and effective spending of donor funds, will need to be an integral part of future initiatives related to the development of policies and strategies for the biodiversity and natural resources sector of Tajikistan.

9.3 Legal framework

The basic legal framework for biodiversity conservation and natural resource use in Tajikistan was described in the first EPR Report. Tajikistan is

still a party to most multilateral environmental agreements (MEAs) (CBD, World Heritage Centre (WHC), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Framework Convention on Climate Change (UNFCCC), the Ramsar Convention and the Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS)) (Chapter 4).

The country has still not acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). A detailed analysis of the implementation of the various biodiversity-related commitments under the above MEAs has not been conducted to date, but Tajikistan reports regularly on CBD implementation.

Development of the legislative framework since 2004

In addition to the general Law on Nature Protection and other laws that were identified during the first EPR, the following relevant new laws have been approved since 2004:

- 2004 Law on the Protection and Use of Plants; No. 31;
- 2005 Law on Biosafety; No. 88;
- 2008 Law on Fauna; No. 354;
- Several regulations, including 2007 Regulations on License Fees for the Use of Natural Resources, No. 546.

An important current development regarding the legislative framework of the forestry sector has been the drafting of a new Forest Code. This new instrument, which was prepared with the support and input from international donors like UNDP and GIZ, is currently being reviewed by the Government. If approved as drafted, the Forest Code will include a clearer definition of the types of use of forest resources; a clearer demarcation of the responsibilities and jurisdictions of the various State institutions involved in forest management; and a sounder basis for the creation of economic incentives for rural resource users to support and benefit from sustainable forest management. This would be a significant step forward in terms of the legal basis for natural resource management in Tajikistan, and would respond directly to the objectives of the State Programme on Forestry Development and NBSAP.

Additional revisions or new developments of additional laws are being prepared by the competent Government institutions at the moment. A comprehensive revision of the Law on Specially Protected Territories, which dates back to 1996, is currently under review at CEP. The need for new hunting regulations and for the strengthening and harmonization of implementing regulations and bylaws has also been highlighted by national stakeholders.

Implementation of legislation

Recent Government documents (e.g. Fourth Report to CBD) show that, as weith other countries in transition, there are significant implementation gaps with regard to biodiversity-related legislation. These are caused by the following factors:

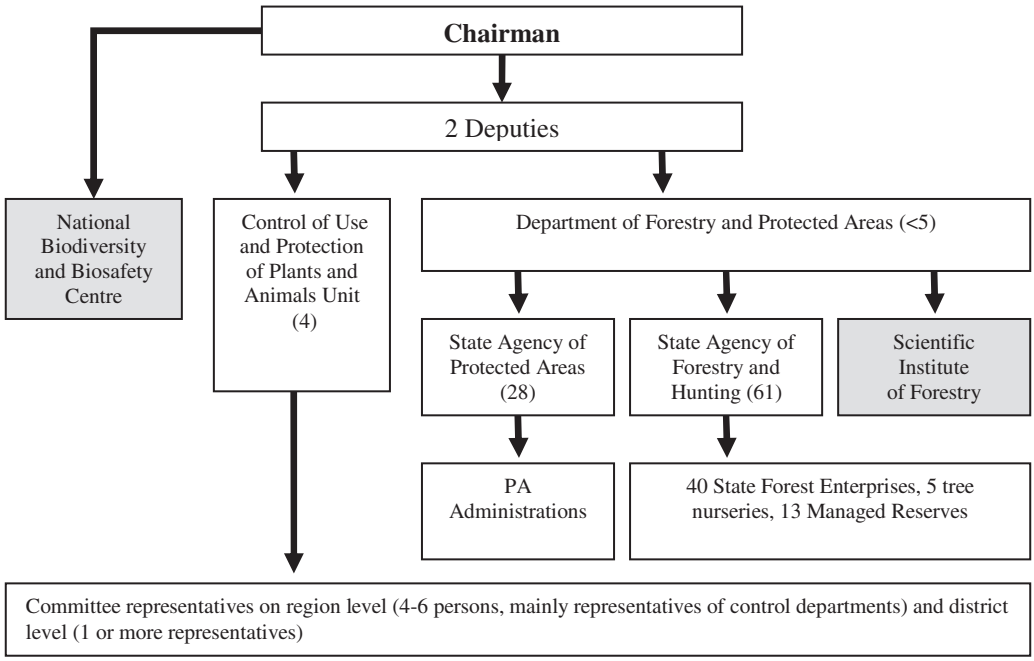
- A dispersal of the legal framework over numerous laws, which gives rise to gaps, contradictions and inconsistencies between laws;
- A lack of implementing regulations and by-laws (e.g. regarding forestry legislation);
- Technical flaws in some specific regulations and bylaws (e.g. unrealistically high use fees as well as unclear or unpractical licensing procedures for natural resource use);
- Unclear or overcomplicated institutional responsibilities (e.g. sharing of responsibility for parts of the protected area system between the State Agency of Protected Areas and the State Agency of Forestry and Hunting; licensing for medicinal plant collection by Ministry of Health);
- Failure to incorporate some internationally established principles (e.g. on the ecosystem approach, joint management of natural resources, rights of local and indigenous resource users) into existing legislation;
- A lack of implementation capacity at the national, but particularly at the local level.

This list shows that the implementation of the legislation of Tajikistan in the field of forests, biodiversity and protected areas is hampered by external factors like the weak institutional capacity of law enforcement institutions on the one hand, but that legislative shortcomings - particularly in bylaws and implementing regulations - also undermine the effectiveness of the legal framework.

Assessment

The legislative framework is generally comprehensive and in line with international standards on conservation legislation, but it does not achieve its full potential as an instrument to reach national policy objectives. It would be an oversimplification to conclude that the legislative framework as such is sound and that it is only the implementation that needs to be strengthened. There is considerable room for improvement in parts of the legal framework itself.

Figure 9.3: Institutional set-up for biodiversity conservation and sustainable natural resources use



Source: Kirchhoff & Fabian 2010: Forestry Sector Analysis of the Republic of Tajikistan.

The legislation for biodiversity conservation and natural resources management is currently undergoing a phase of rapid development. Several new laws have been approved since 2004; others are pending confirmation by the Government or CEP; while still others are being discussed by national stakeholders. The new Forestry Code and other laws in preparation have the potential to improve the legal framework in the near future.

9.4 Institutional framework

The institutional framework for biodiversity conservation and sustainable use of natural resources has been restructured several times since the first EPR report, and there have been some significant changes to the set-up described. The set-up of the key Government institutions involved is illustrated in Figure 9.3.

Under the general supervision of the Government and the Presidential Administration, the Committee on Environmental Protection is responsible for developing and implementing policy on forestry; biodiversity and protected areas; conducting the necessary research and monitoring; issuing permits for the use of natural resources; and monitiring the use of these permits.

The CEP substructures that are most relevant to biodiversity conservation and sustainable natural resource use are the Department of Forestry and Protected Areas and two agencies that are subordinate to it: the State Agency of Protected Areas, which was created in 2008 and oversees the administrations of four strict nature reserves (*zapovedniks*), one national park, and two nature/nature-historical parks; and the State Agency of Forestry and Hunting, which oversees the 40 State-owned forestry enterprises (*leskhozes*) five tree nurseries and 14 managed reserves (*zakazniks*). Another institution reporting to the Department of Forestry and Protected Areas is the Scientific Institute of Forestry. The most relevant Control Department is the Department for the Use and Protection of Flora and Fauna.The structure is essentially centralized and top down, with branch representations at the level of the regions and districts fulfilling centrally planned targets (e.g. issuing of licenses, collection of natural resources) and reporting to higher levels. However, a certain degree of independence is expected from local forest enterprises, which generate about half of their income from economic activity.

The National Biodiversity and Biosafety Centre was established in 2003 and is generally tasked with the coordination of CBD implementation. Through its activities related to NBSAP as well as the more specific plans, programmes and reports related to it, it has also assumed an important policy making function at the national and international level. As it is given in its statute NBBC conducts all its work regarding the biological diversity in cooperation and

in accordance to legal mechanisms of CEP. This may result in a desirable closer integration of the implementation of CBD and the development of related national plans, programmes and strategies on the one hand, and overall CEP activities on the other hand.

In order to implement the targets and objectives of biological diversity policy and strategy other institutions that are important in biological diversity and natural resources sector are cooperating together. Like at science and monitoring – Academy of Science and Tajik Academy of Agricultural Sciences, at education and personnel training – universities and thematic institutions, at awareness – NGOs. Fruitful activities on biological diversity are also conducted at regions. In order to keep sustainable implementation of activities CEP and NBBC continue to cooperate.

Several ministries and CEP and its subordinate institutions are involved in the governance of biodiversity and natural resources, including the Ministry of Agriculture for land and water use, grazing and sustainable agriculture; the Ministry of Justice for the drafting of laws and by-laws; and the Ministry of Culture for the nomination of natural World Heritage sites. Inter-agency cooperation among Government organizations at the national level leaves room for improvement: A problem that was reported repeatedly is a lack of cooperation of local authorities with CEP and its subordinate institutions, for example in relation to PA management.

An acute challenge to the effectiveness of the institutions in fulfilling their legal role is their insufficient capacity at both the national level and - even more so - the regional, district and local level. CEP and its subordinate institutions are underfinanced, under-resourced, and often understaffed; their staff often lacks relevant qualifications. For example, the institutional capacity of the State forest enterprises, which was assessed in 2010. The conclusion was that the enterprises were insufficiently staffed and lacked appropriate professional qualifications and professional capabilities. They did not have sufficient means of transportation and other equipment to patrol the large areas of their enterprises. It was observed that staffs were discouraged from independent decision-making by the centrally controlled quota system, and that there was a weak culture of leadership among the local forest enterprises' directors. This assessment most likely also applies to the local PA administrations and local CEP branches.

As a result, capacity shortages have been flagged, e.g. in Tajikistan's Fourth National Report to CBD, as constraints to the development of a functional PA system, NBSAP implementation, and general enforcement of laws and regulations that could be reduced by implementation of NBSAP. They have also been named as an obstacle to the effective implementation of donor-funded projects relating to biodiversity and natural resources.

Assessment

Two major adjustments to the institutional framework of the natural resources and biodiversity sector have improved its performance since 2004: a dedicated agency for the management of PAs was formed in 2008, and the National Biodiversity and Biosafety Centre was integrated in the structure of the CEP in 2010, which should increase the overall effectiveness of both structures.

At the same time, the relevant Control Department for the Use and Protection of Flora and Fauna has been weakened considerably, and a number of additional inconsistencies in the institutional framework remain. For instance, it appears unusual - and may compromise the development of a coherent PA system in Tajikistan - that only part of the PA network is managed by the relevant State agency and that other parts (i.e. the 14 managed reserves) are theoretically under the authority of the State Agency of Forestry and Hunting, but in practice hardly managed as PAs at all.

Additional key challenges to the effectiveness of the institutions involved in biodiversity conservation and natural resources management include their acute lack of institutional capacity (particularly at the local level), and an absence of mainstreaming of sustainability, which is reflected in poor cooperation of local authorities with the management of PAs, forests and other biodiversity values. Significant improvements in the institutional capacity of forest enterprises, PAs and subnational CEP branches will require not only increased salaries, staff training, and improved infrastructure/equipment, but first and foremost a strengthening of the competencies of the local administrations.

Only through decentralization and devolution of decision-making will these institutions be empowered to implement meaningful environmental management at the level of individual districts, forest enterprises and PAs, where it matters most.

Challenges related to strong centralization and insufficient capacity are typical of countries in transition and can be addressed through an institutional strengthening of the sector, particularly at the regional and local level. The shortage of institutional capacity is increasingly perceived as a priority by CEP, as reflected by the inclusion of projects on institutional capacity-building in bilateral projects of international development cooperation.

9.5 Conclusions and recommendations

If long-term user rights for the sustainable use of natural resources are granted to local resource users (e.g. through long-term leases), this will create incentives for their sustainable management and local stewardship of biodiversity values and ensure full utilization of the livelihood benefits of natural resource use by the rural poor. This applies to wood, wildlife resources and wild plants. It will require policy adjustments and changes to the sector's legal (e.g. realistic use fees, term of leases) and institutional framework (e.g. devolution of decision-making). These adjustments could draw inspiration from pilot projects that have recently tested this approach in Tajikistan and neighboring countries.

Recommendation 9.1:
The Committee on Environmental Protection should improve the policy, legal and institutional basis as well as increase human and financial capacity for the joint management of forest and other natural resources, and encourage the establishment of positive economic incentives and long-term user rights for sustainable natural resource use among traditional resource users.

The lack of reliable data and information to inform management planning, quota-setting, and prioritization of measures has been highlighted as a major constraint in national reports, including the recent Fourth National Report of Tajikistan to CBD. The lack of a functional monitoring system is partly due to the dearth of specific monitoring expertise within CEP and its local branches.

Therefore, development of a monitoring system will require the support and participation of all relevant experts and stakeholders, including those based at academic institutions such as the Institute of Zoology and Parasitology of the Academy of Sciences of Tajikistan, NGOs and international development cooperation. The establishment of a participatory monitoring system for biodiversity and forest resources could rely on experience with the ongoing revision of the Red List of Tajikistan.

Recommendation 9.2:
The Committee on Environmental Protection should establish a participatory monitoring system for priority elements of biodiversity and forest resources involving State agencies, the Academy of Sciences, NGOs, other experts and international organizations, building on the multi-stakeholder collaboration during the ongoing revision of the Red List of Tajikistan.

The protected areas (PAs) of Tajikistan are currently not managed effectively. Most of them are not under the authority of the State Agency of Protected Areas. The State Agency of Protected Areas should be given responsibility for managing the entire system of State PAs, including State-owned managed reserves (*zakazniks*), and should develop its own management planning (as well as PA finance planning) and implementation capacity, based on the recently approved national guidelines and further international best practice approaches.

This should go hand in hand with the training and empowerment of site managers to implement PA management plans. Improvement of the management regime of existing PA should have priority over the designation of new areas.

Recommendation 9.3:
The Government should:

(a) Develop the management and monitoring of all types of protected areas in a coordinated way;
(b) Support the Committee on Environmental Protection to develop and implement management and financing plans for all Protected Areas;
(c) Build the necessary capacity for their implementation among individual protected area administrations.

Current reforestation rates are far from offsetting deforestation rates in Tajikistan, and there is a strong demand for fuel wood among rural communities. There is a need for a nationwide refforestation programme that also addresses the pressures from unsustainable grazing and other forms of forest degradation. In order to result in locally adapted and resilient forests, it should utilize indigenous seeds and seedlings and the natural reforestation potential where possible. This programme will need to include dedicated fuel wood plantations to meet the large fuel wood requirements of rural communities. It should be implemented jointly with local forest resource users and businesses, and prioritized for international donor support by the Government.

Recommendation 9.4:
The Committee on Environmental Protection in cooperation jointly with forest resource users and businesses, should develop, seek financial resources for implementation and implement, a nationwide reforestation programme that aims at biologically viable forests and a better fuel wood supply to rural communities, while addressing the key pressures on the country's forest resources.

See Recommendation 1.4

In spite of its very limited forest area, Tajikistan's biodiversity is disproportionately rich compared to the country's size and of outstanding global importance. However, the conservation status of most recognized biodiversity values is poor, with a deteriorating trend.

The main current pressure on the country's biodiversity and natural resources is their unsustainable use, while additional threats such as climate change, desertification and alien and invasive species may also be increasing. Unsustainable natural resource use is occurring in various ways, including fuel wood collection, hunting, fishing and collection of animals, grazing and wild plant collection. A major root cause is rural poverty and the lack of livelihood alternatives to natural resource use.

Since the approval of the Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity (NBSAP) in 2003 and the establishment of CEP in 2008, Tajikistan has made significant progress towards developing a policy, legislative and institutional framework for biodiversity and natural resources governance, but has not succeeded in reversing the negative trends that affect its biodiversity and forest resources.

Accession to CITES was recommended in the first EPR back in 2004. There is still illegal trade in threatened species from Tajikistan. CITES accession would assist the relevant State institutions in stopping illegal trade and would provide incentives for export-oriented sustainable natural resource exploitation. Technical assistance to CITES accession is available from international organizations, such as GIZ, the CITES Secretariat and Traffic International.

Recommendation 9.5:
The Government should take all measures to assess and conserve the biodiversity typical of Central Asian mountains, bearing in mind that the country has been recognized as a global hotspot of Central Asian mountain biodiversity.

See also recommendation 4.2.

The lacking capacity of CEP and particularly its subordinate institutions for policy implementation and law enforcement needs to be improved through a targeted capacity-building programme that starts from a systematic capacity needs assessment, as well as the decentralization of decision-making and other necessary adjustments to the institutional framework. Since institutional capacity-building requires considerable funds over considerable periods, the inclusion of such activities in long-term international development cooperation programmes should be explored, building on existing involvement in this field by organizations and initiatives such as CACILM, UNDP and GIZ.

See Recommendation 1.4.

Chapter 10

HUMAN HEALTH AND THE ENVIRONMENT

10.1 Introduction

In past decades, some improvements have been made in public health in Tajikistan with regard inter alia to maternal and child mortality, the spread of communicable diseases, improvement of child nutrition, and improvement of overall public health.

Tajikistan is one of the poorest countries in the world, ranking 122nd out of 177 in the 2006 Human Development Report published by UNDP. In terms of Millennium Development Goals (MDGs), although there has been some progress on eradicating extreme hunger and poverty and universal access to primary education, the other indicators are unlikely to be achieved unless significant changes are made.

However, the health system in Tajikistan still experiences the burden of problems experienced in transition periods. These include:

- The continuous outward migration of health care staff;
- Incomplete reforms in the medical and nursing education system;
- Deteriorating infrastructure, outdated materials and technical base of health care facilities, and a lack of investment funds;
- Inadequate supply of drugs;
- Delays in the introduction of international best practices in diagnostic methods and treatment of common diseases;
- A lack of modern systems for medical care standards and quality control.

10.2 Population trends

Tajikistan has a rapidly growing population, which as of 1 January 2010 stood at more than 7.5 million inhabitants. Birth rates and population growth are one of the highest in the European region of the World Health Organization (WHO). The average number of the resident population in Tajikistan has increased from more than 6.2 million people (2000) to 7.5 million people (2009), i.e. by 12.2 per cent. The annual population growth rate in the country varies within 2.1 – 2.2 per cent. In 2008, the birth rate was 27.9 per 1,000 inhabitants, and in 2009 26.8 per 1,000 inhabitants.

Tajikistan's population is very young; over the past 70 years, the population has increased sixfold. In 2007, 38 per cent of the population was under the age of 15. According to the latest estimates, the average age of the population is 25, and median age is 21.2. The population is predominantly rural – 73.1 per cent, in urban areas 26.9 per cent, that is, about 2 million inhabitants (Table 10.1).

10.3 Trends in life expectancy and causes of death

Overall trends in life expectancy have been improving over the last decade. This pattern is found for both men and women, although women on average live 4-5 years longer than men.

As with many transition countries, there was a sharp fall in life expectancy during the early 1990s, which corresponds to the time period of the civil war. Although life expectancy is lower than the average European Union (EU) population, Tajikistan is slightly better off than the other Central Asian countries. However, data sources are not entirely complete.

The main causes of death in Tajikistan are cardiovascular diseases, including hypertension and coronary heart disease, the incidence of which are much higher than in the EU countries but lower than in other Central Asian countries. Cancer rates are relatively low, and the second leading cause of death is respiratory disease (chronic obstructive lung disease and bronchial asthma) (Table 10.2).

10.4 Infant and maternal mortality

Despite the implementation of required measures in the field of mother and child health, maternal and infant mortality remains relatively high, in fact one of the highest in the WHO European Region, posing a major problem for the health sector and its partners. The last decade has seen an overall reduction of under-five mortality rates (at 118/1,000 in 2003 and 0.5 per cent decrease from 2000- 2003). Infant mortality was estimated at 46 per 1,000 live births in 2007.

Table 10.1: Key demographic indicators, 2000-2009

Indicators	2003	2004	2005	2006	2007	2008	2009
Mid-year population	6,573,225	6,710,162	6,914,124	6,591,000	6,681,504	6,838,718	6,952,225
Population aged 0-14 years (per cent of total)	39.40	38.50	35.90	..	..	..	..
Birth rate (per 1,000 population)	27.10	26.80	26.20	26.70	28.00	27.90	..
Crude death rate (per 1,000 population)	4.10	4.00	4.20	4.60	4.70	4.40	..
Life expectancy (in years)	72.80	73.30	73.70	..	..	..	..
Life expectancy of men (in years)	70.80	71.10	71.20	..	..	..	..
Life expectancy of women (in years)	74.80	75.50	76.30	..	..	..	..
Urban population (per cent of total)	28.00	24.90	24.70	..	..	..	..
Average population density per km^2	45.90	46.90	48.30	46.10	..	..	..

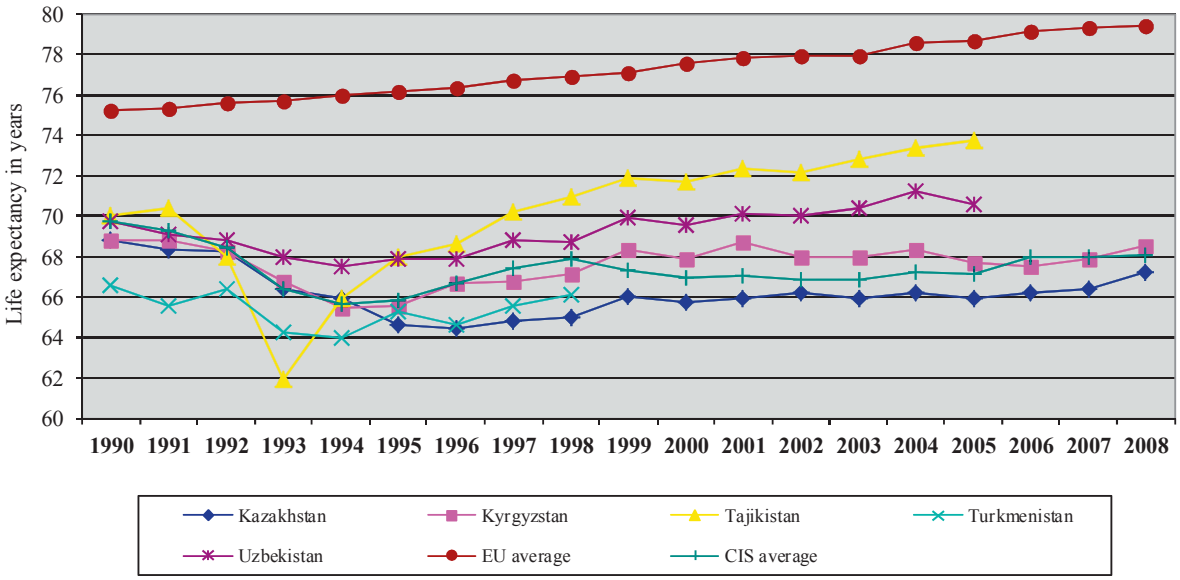
Source: WHO Regional Office for Europe. Health for All Database, July 2010.

Table 10.2: Standardized death rates (SDR) per 100,000 population by cause of death, 2005

	Tajikistan		Central Asian		CIS average		EU 27 average	
	SDR	%	SDR	%	SDR	%	SDR	%
All causes	940.5		1,240.0		1,393.5		671.6	
Diseases of circulatory system	560.6	59.6	759.0	61.2	799.8	57.4	266.7	39.7
Diseases of the respiratory system	78.8	8.4	81.4	6.6	63.4	4.6	48.5	7.2
Malignant neoplasms	72.8	7.7	106.9	8.6	158.7	11.4	177.9	26.5
Diseases of the digestive system	46.0	4.9	64.4	5.2	62.0	4.4	33.0	4.9
External cause injury and poison	32.9	3.5	81.1	6.5	158.7	11.4	41.5	6.2
Infectious and parasitic disease	28.7	3.1	27.8	2.2	27.1	1.9	8.8	1.3

Source: WHO Regional Office for Europe. Health for All Database, July 2010.
Note: After 2005, no data are available for Tajikistan in HFA-DB
CIS: Commonwealth of Independent States (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan)
EU27: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom

Figure 10.1: Life expectancy at birth, 1990-2008

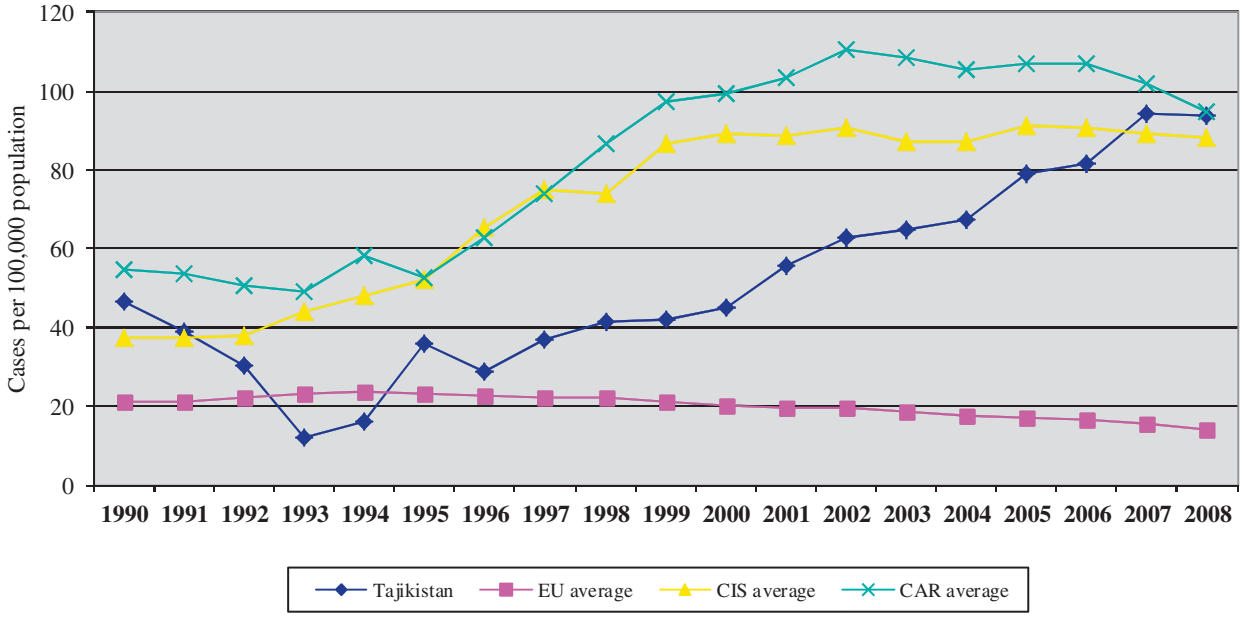


Source: WHO Regional Office for Europe. Health for All Database, July 2010.

At present, the tendency towards a reduction in infant mortality is continuing. According to official statistics, the infant mortality rate for 2007 was 14.2 per 1,000 live births; in 2008 - 15.2; and in 2009 - 17.7 per 1,000 live births, which can be explained by improved registration of child births and deaths as well as the introduction of new WHO-recommended live birth criteria. These figures are not entirely accurate, as approximately 40 per cent of children under three do not have a birth certificate and 60 per cent of children aged 0-4 are not registered in the civil State departments.

Infectious diseases are a leading cause of infant and child mortality. The proportion of deaths from infectious diseases in the post-neonatal period was 58.8 per cent. The prevalence of diarrhoea in 2005 was 59.5/100,000, with drinking water and poor food safety identified as the main causes of diarrhoea.

Figure 10.2: Incidence of tuberculosis, 1990-2008



Source: WHO Regional Office for Europe. Health for All Database, July 2010.
Note: CAR = Central Asian Republics

According to the Ministry of Health, maternal mortality almost halved in the period of 1990-2009, from 97.7 to 46.2 per 100,000 live births, respectively. Existing problems with under-registration of maternal mortality, variations in definitions, and a high incidence of unsafe home births (40-60 per cent), mean that this figure is probably underestimated. According to recent estimates, maternal mortality was estimated at 64/100,000 live births in 2008.

10.5 Trends in morbidity

Non-communicable diseases

Cardiological diseases (hypertension, coronary heart disease), respiratory diseases (chronic obstructive lung disease and bronchial asthma), diseases of the urinary tract (nephritis and nephrosis), endocrinology diseases (diabetes), and mental and neurological disorders are the main reasons for losses in life expectancy and morbidity, and are high compared to many countries of the WHO European Region. There has been a marked increase in morbidity from diseases of the circulatory system in Tajikistan, with an increase from 839.3 per 100,000 population (2000) to 1,073.8 (2003) and 975.4 (2005) i.e. 16.2 per cent.

Communicable diseases

The relative burden of communicable diseases remains high in Tajikistan. The section below highlights patterns in some of the more important communicable diseases in Tajikistan.

Tuberculosis

Tajikistan is among the 18 countries with the highest burden of tuberculosis (TB), where the implementation of the updated strategy “Stop TB” is a priority. The incidence of tuberculosis has almost doubled since 2000, when it was just over 40 cases/100,000 inhabitants, rising to over 90 cases/100,000 inhabitants in 2007 and falling to 78.7 per 100,000 inhabitants in 2009. High rates are

related to a decline in living standards, active internal and external migration, and increased levels of drug-resistant forms of the disease (Figure 10.2.).

It should be noted that since 2007, a trend towards the stabilization and reduction of TB morbidity and mortality has been observed in the country. This is due to TB control activities by national programmes and the implementation of the Directly Observed Treatment Short-Course (DOTS) strategy in all parts of the country; the quality of TB diagnostics and treatment has improved, prompting a reduction in the growth of key epidemiological TB indicators nationwide.

Water-borne infections

The occurrence of water-borne diseases in Tajikistan remains high, although there has been some improvement. Compared with 2003, the incidence rate fell from 1,031 to 879.7 per 100,000 inhabitants, although this figure is still high. Analysis of the major infections reveals a notable incidence of viral hepatitis in the period from 2003 to 2009. In 2003, the incidence was 83.7 (per 100,000 inhabitants), after which by 2009 this figure had increased by almost 50 per cent and stood at 145.5 (per 100,000 inhabitants). Rates are largely dependent on water quality and immunization coverage within the community.

In contrast, morbidity from bacterial dysentery fell from 28.6 (per 100,000 inhabitants) in 2003 to 20.2 in 2009. In addition, there has been a drop in the incidence of typhoid fever, which has declined more than threefold: in 2003, the morbidity rate was 42.3 per 100,000 inhabitants, whereby by 2009 this figure had declined to 12.5 per 100,000 inhabitants.

The polio outbreak that occurred in 2010 in Tajikistan was probably related to a number of factors, for example, due to movements of infected people from Afghanistan against a background of flooding, poor sanitation and water safety and low immunization coverage among the population. By December 2010, there were a total of 29 deaths and 712 acute flaccid paralysis cases, of which 458 were laboratory confirmed for wild polio virus 1.

The main reason for water-borne diseases is the poor quality of drinking water and the lack of adequate sanitation, particularly in rural areas, where the majority of the population live. The most important among all problems related to the water resources is the problem of poor quality and a lack of safe drinking water. Additionally, a lack of access to drinking water, especially in rural areas, where approximately only 25 per cent of the population have piped access to water, contributes to this problem.

Malaria

In Tajikistan, the malaria morbidity rate reached its peak in 1997, when there were about 30,000 cases registered. The worsened situation in 1990, which was linked with socio-political changes in the country, led to a massive displacement of the population through territories where malaria was endemic; breaks in public health care services; and a complete halt to malaria control activities. Additionally, significant changes took place in agricultural practices, such as the increase of irrigated areas for rice cultivation, leading to substantial growth of malaria vector breeding sites.

As a result of intensive anti-malaria measures, the incidence of malaria has substantially declined in the country in recent years, and only 81 locally acquired cases of malaria were reported in 2010. At present, the majority of P. vivax malaria cases have emerged in areas bordering Afghanistan, and the country, in cooperation with WHO and other partners, is in the process of promoting cross-border collaboration between Tajikistan and Afghanistan. Tajikistan recently revised its national malaria control strategy to reflect elimination challenges with a view to interrupting the transmission of malaria by 2015.

10.6 Environmental conditions associated with health risks

Climate change

Especially since the 1960s, a rise in air temperature has been observed in Tajikistan. An increase in the average yearly air temperature of 0.7-1.2^{0}C was observed in the wide flat valley areas. To a lesser extent, a temperature rise has also been observed in high-altitude areas (0.1 – 0.7^{0}C).

In the big cities (Dushanbe and Qurgonteppa), a considerable temperature increase has been observed. This has led to a rise in the occurrence of hot summers and heatwaves. Although winters are also becoming warmer, cold periods are still occurring, which have a significant impact on health.

Precipitation levels have changed over time with many areas, especially the valley areas, observing increases in precipitation. Precipitation patterns have also become more variable, with more irregular precipitation occurring. Deforestation and unsustainable land management in Tajikistan have

resulted in a number of impacts, including regular floods and mudslides (Photo 10.1).

The main health impacts now and for the future from climate change in Tajikistan include:

- Damage to health infrastructure;
- A potential increase in water-borne infections due to the deterioration of water quality and an increase in extreme events;
- A risk of increasing malnutrition as food production is affected by extreme weather events;
- Increased cardiovascular and respiratory diseases during heatwaves and cold snaps;
- Potential increases in other infectious diseases, for example food-borne diseases related to increased warmer periods and changes in habitats for vector-borne diseases, such as malaria.

Currently, the Ministry of Health in cooperation with WHO is developing national vulnerability assessments on the impacts of climate change on health and a national health adaptation strategy. Additionally, a number of Government and donor-led activities on adapting to climate change are ongoing in the country; however, these include health to varying extents.

Water safety

As during the first EPR review, inadequate drinking water quality and drinking water supply is still one of the main environmental health problems. Additionally, the quality of drinking water tends to deteriorate further with climate change related events, including heatwaves, floods events and mudslides. The UNICEF report on progress on sanitation and drinking water found that 94 per cent of the total population had improved sanitation levels, while the main problem was with drinking water supplies. This is especially true in rural areas, where in 2000, 20 per cent of the population had piped water on their premises; this figure had increased to 25 per cent by 2008, compared with urban levels of 78 per cent in 2000 and 83 per cent in 2008.

Around 50 per cent of water supply in Tajikistan comes from underground water sources, most of which are highly mineralized. In 2 to 40 per cent of surface water sources, pathogenetic bacteria were detected, which were later detected in drinking water. Regular purification of water supply is available only for 9.2 per cent of settlements. The water supply system is only available for less than 60 per cent of the Tajikistan population. Approximately 85 per cent of the population living in rural areas uses water for their households from open surface sources, and only 58 per cent of the population has piped clean drinking water. However, only 25- 32 per cent of the rural population are supplied with piped drinking water.

Monitoring and control of drinking water are performed by the State Sanitarian and Epidemiology Surveillance Service (SSESS). The SSESS takes 9,000-10,000 samples of drinking water annually (Table 10.3).

Photo 10.1: Infrastructure damage to tuberculosis ward from mudslide, District Hospital

There is an overall trend towards an improvement in water quality, with the percentage of samples which do not meet bacteriological standards falling from 36.5 in 2006 to 15 per cent in 2009.

As for chemical standards, the percentage is rather low – 4.1 per cent in 2006 and 2.8 per cent in 2009. The main problem in terms of water safety is bacteriological contamination. Observations have showed that the water and sanitation system is suffering from a series of infrastructural deterioration, especially outdated plumbing technical standards.

Food safety

Some progress has been made in this area since 2004, following training in food safety handling undertaken by WHO and the Ministry of Health. Additionally, a code of hygiene practices has been distributed to food industries and local authorities.

Food can be bacteriologically and chemically contaminated. The major cause of gastrointestinal diseases is contaminated food. In addition, chemical contamination of food is widespread, especially in areas where soil is contaminated with heavy metals and pesticides.

The laboratory analyses of food quality conducted by Gossanepidnadzor in recent years show a slight increase in bacteriologically contaminated food samples and a decrease in chemical contamination of food (table 10.5).

Nutrition

Malnutrition is still a concern in Tajikistan. The latest data for 2009 on global chronic malnutrition and global acute malnutrition showed its prevalence to be 21.8 per cent and 4.5 per cent. Data for 2006 on chronic malnutrition of children aged 6 to 59 months showed its prevalence to be 20.75 per cent, whereas in 2001 it was 37.5 per cent. Thus, there has been some overall improvement over the last few years.

The prevalence of chronic malnutrition in children aged 6- 59 months in Tajikistan appears to be improving over time, from 37.5 per cent of this population group in 2001 to 20.75 per cent in 2006 experiencing malnutrition. However, damage to crops from flooding and extreme weather events may increase the risk of malnutrition in vulnerable population groups.

According to MICS 2005 in Tajikistan, around 10 per cent of infants are born with low birth weight. This is three per cent higher than 2003, when the corresponding figure was seven per cent. The highest rate in Tajikistan is observed in Khatlon Region, at 16 per cent. The data from 2007 demonstrate that 15 per cent of children under 5 years of age are underweight, compared to WHO standards. The prevalence of very low body weight is six per cent according to WHO standards.

The impacts of climate change may worsen malnutrition levels through reduced food security. Flooding, mudslides and heatwaves have all damaged crops, with an annual loss of gross agricultural products because of extreme weather events estimated to be one-third of all losses. Future agricultural losses are likely to worsen over time as climate change impacts increase.

Additionally, the problem of iodine-deficiency disorders still exists in Tajikistan, as the country is within an endemic region. In 2005, the Government took a decision to undertake universal salt iodization. As a result, the 2007 Law on Iodized Salt, No. 264, was adopted. A study conducted in 2006 revealed that the level of public awareness of the importance of salt iodization reached 80 per cent, a substantial increase compared with 200, when it was 47 per cent.

Table 10.3: Analyses of drinking water, 2004- 2009

Year	Bacteriological analyses	Bacteriological analyses failed to meet standard		Chemical analyses failed to meet standard	
		Number	Per cent	Number	Per cent
2004	1,082	247	22.8		
2005	10,315	2,800	27.1	71	3.4
2006	7,417	2,706	36.5	91	4.1
2007	8,256	2,156	26.1	85	3.9
2008	9,724	1,859	19.1	74	2.9
2009	10,038	1,510	15.0	89	2.8

Source: State Sanitarian and Epidemiology Surveillance Service, 2010.

Table 10.4: National standards for drinking water quality and WHO Water Quality Guidelines

Indicator	Tajikistan maximum allowable concentration mg/l	WHO Guidelines mg/l
Total coliforms	0	0
Faecal coliforms	0	0
Boron	0.500	0.300
Cadmium	0.001	0.003
Molubdenum	0.250	0.070
Arsenic	0.050	0.005
Nickel	0.100	0.020
NO_3	45.000	50.000
NO_2	-	3.000
Mercury	0.001	0.001
Lead	0.030	0.010
Selenium	0.010	0.010
Fluoride	1.500	1.500
Chromium	0.050	0.050
Manganese	0.100	0.500
Cu	1.000	2.000
Chlorine	350.000	
Zinc	5.000	3.000

Source: State Sanitarian and Epidemiology Surveillance Service. Drinking water. Hygienic requirements for drinking water of centralized water supply. Quality control. Sanitary rules and norms. SanPiN 2.1.4.004-07

Table 10.5: Food analyses, 2004- 2009

Year	Bacteriological analyses	Bacteriological analyses failed to meet standard		Chemical analyses	Chemical analyses failed to meet standard	
		Number	Per cent		Number	Per cent
2004	6,243	621.0	9.9			
2005	8,370	1,049.0	12.5	4,054	595	14.7
2006	6,586	628.0	9.5	5,122	689	13.5
2007	6,452	631.0	9.8	6,895	854	12.4
2008	6,604	687.0	10.4	9,091	963	10.6
2009	6,493	731.0	11.3	8,730	721	8.3

Source: State Sanitarian and Epidemiology Surveillance Service, 2010.

Data for 2008 from the State Nutrition Centre showed that 54-57 per cent of the population use iodized salt. The recent data on the prevalence of iodine deficiency disorders among women and children under 5 showed that in 2003, their level was 57 per cent and 64 per cent, respectively, whereas in 2009 it was 58.6 per cent and 53 per cent, respectively. Thus, the problem of iodine deficiency disorder still exists.

Ambient and indoor air pollution

There are no systematic recent data on air pollution from industrial sources from the Ministry of Health. However, due to reduced industrial activity in recent years, it can be assumed that in air pollution in Tajikistan from stationary sources has declined. As during the first EPR review, the main emitters of pollutants in Tajikistan are the aluminium plant in Tursunzade, the cement factory in Dushanbe, the nitrogen fertilizer plant in Sarband City, and the chemical complex in Yavan.

Additionally, the increased number of cars in Tajikistan has led to an increase in air pollution from mobile sources. The situation is worsening, because most of the cars are second-hand with relatively high emissions of air pollutants. Although the import of cars older than 10 years is prohibited, the rolling stock is on average very old, and is characterized by high levels of emissions and poor maintenance and emissions control. Emissions from home heating are an additional source of contamination. There are no current studies in the country on the influence of air pollution on human health.

Waste and soil contamination by Persistent Organic Pollutant (POPs), including pesticides

The problem of obsolete pesticides in Tajikistan remains, and in fact is worsening. Stockpiles of obsolete pesticides were formed in the 1980s and 1990s. Over time, due to atmospheric influences, they have not been sufficiently well protected to prevent human exposure. For example, storage stockpiles buried underground have become uncovered, becoming more easily exposed to the population from direct access and due to contaminated water and soil. As a result, pesticides enter the human body through the food chain.

Currently, the amount of obsolete pesticides in Tajikistan is about 267,720 tons, or 148,110 m^3. The amount of POPs is 11,220 tons or 5,610 m^3. The amount of contaminated soil is 256,500 tons or 142,500 m^3. Since 2009, Tajikistan has been implementing a regional project by the World Bank called "Technical evaluation of obsolete pesticides in Kyrgyzstan, Tajikistan and Uzbekistan". Another current World Bank effort, "Project on elimination and suppressing of harmful influence of pesticides with characteristics of POPs", is being implemented.

The main industrial sources of environmental contamination from POPs are from machine-building, textiles, chemicals, petrochemical enterprises, non-ferrous metallurgy, processing of heavy metals, fuel-and-energy complexes, and building sector enterprises. The share of the above-mentioned enterprises of the total volume of pollutant emissions from stationary sources is about 88 per cent.

The problem of environmental contamination from POPs in Tajikistan is connected with agriculture, industry, the development of the transport sector, and also with consumption of fossil fuels and agricultural waste for the production of thermal energy and electricity to meet the needs of the public. The amount of dioxins and furans released into the air in 2009 was 34.94 tons.

Medical waste

In the area of medical waste management, since the first EPR review in 2004, new sanitary norms have been drafted - "Rules of collection, storage and disposal of wastes from medical establishments: SanPiN 2.1.7.020-09". These rules describe the requirements for, and management of medical wastes.

However, problems with medical waste remain. Medical waste is collected once a week. It is not separated from municipal waste. Postoperative waste collected, then decontaminated by chlorination and dumped in municipal waste sites. Biological samples are put into a dug hole and burned. There are only a few (five to six) incinerators for burning syringes.

Obsolete drugs are burned in the incinerator at Tajiktextilemash. In recent years, medical personnel have received some medical waste training. A project on the management of medical and other dangerous wastes trained medical specialists on how to deal with medical waste.

Ionizing radiation

In Tajikistan, uranium mining began in the late 1940s. It stopped in the 1980s, and since then uranium mines have not been in operation. Uranium tailings in Tajikistan remain as an environmental and ecological risk.

For example, in Sughd Region, they pose a transboundary risk because they are located near the Syr Darya River, where they can leak out into the river or be washed out by flash floods. Plant No. 6, known as State Enterprise "Vostokkredmet", was created here in 1946 in Chkalovsk, with the aim of processing uranium ores from the Tajikistan, Uzbekistan and Kyrgyzstan minefields.

The overall quantity of radioactive wastes accrued when the plant was in operation was 54.8 million tons, and covered an area of 180 hectares. Currently, there has been no rehabilitation work with these tailings, which continue to break down and pose a threat at local and national level, as well as downstream of the Syr Darya River, in both Uzbekistan and Kazakhstan.

An important forum held in 2009 in Geneva, Switzerland, was the "High-Level International Forum on Uranium Tailing Ponds in Central Asia: Local Problems, Regional Consequences, Global Solutions". The participating countries including Tajikistan agreed and announced joint action to solve the problem of uranium tailing ponds in Central Asia.

In the area of ionizing radiation, radiation safety and radioactive wastes management, currently some 30 projects are to be implemented in Tajikistan over the next few years, including:

- Participation with the International Atomic Energy Agency (IAEA) on 14 regional and 5 national projects;

- Participation with the International Science and Technology Centre (ISTC) on 2 national projects;
- Other ongoing projects – 9 projects.

Occupational health

In recent years, due to the migration of skilled workers and the worsening of the economic situation, many enterprises have closed down or are working at low capacity. Monitoring and analysis of working conditions in big factories are performed by their own laboratories. However, they are not responsible for occupational health. In previous years, analyses of working conditions have been performed four times a year, but now this occurs only twice a year. The ultimate responsibility for monitoring working conditions lies with SSESS.

In small factories and enterprises that do not have their own laboratories, SSESS monitors working conditions. The latest data from 2009 (according to SSESS) demonstrates that only 12 occupational diseases (8 of them were fluorosis) were diagnosed in Tajikistan. This number is lower than would be expected and could reflect under-diagnosis and the lack of a properly established occupational health service.

10.7 Decision-making framework for environmental health

Policy framework

There are a number of smaller national projects or programmes described in the first EPR; however the main relevant national policy on environmental health is the National Environmental Health Action Plan (NEHAP). This was developed jointly by the Ministry of Health and by the former State Committee for Environmental Protection and Forestry and was adopted in 2000, with the period of implementation from 2000 to 2010.

Notwithstanding, it should be noted that currently, NEHAP is not active and no major activities in this field are performed. Moreover, there are no plans at present to extend NEHAP in the future. Nor has Tajikistan developed a CEHAPE (Children's Environmental Health Action Plan). It should be noted that in some international meetings, it has been reported that Tajikistan has developed a National CEHAPE, however, what was referred to was the Child Protection Strategy, the National Strategy on Child and Adolescent Health Protection until the Year 2015 as opposed to an Environmental Health Protection Strategy.

Major progress in occupational health was made with the adoption of Programme No. 165/2010 on the Prevention of Occupational Diseases in Tajikistan for the period 2010-2015. The main objectives are the prevention of occupational diseases; a decrease in disability due to occupational diseases; early diagnosis of occupational diseases; provision of specialized medical treatment for patients with occupational diseases; reinforcement of health systems; and mobilization of specialists from health care services.

Legal framework

Some progress has been made in developing and adopting new legal acts since the first EPR review in 2004, including:

- Drinking water. Hygienic requirements for drinking water of centralized water supply. Quality control. Sanitary rules and norms. SanPiN 2.1.4.004-07;
- Requirements on water quality of non-centralized water supply. Sanitary protection of sources. Sanitary rules and norms. SanPiN 2.1.4.005-07;
- Zones of sanitary protection of water sources and water supply systems of municipal supply SanPiN 2.1.5.006-07;
- 2007 Decree on the Food Safety Programme for the period until 2015; No. 72;
- 2006 Laws on Food Quality, No. 176;
- 2007 Law on Food Safety, No. 305;
- 2007 Law on Iodized Salt, No. 264;
- Ratification of the Stockholm Convention on Persistent Organic Pollutants (POPs) in 2006;
- Rules for the Collection, Storage and Disposal of Waste from Medical Establishments. SanPiN 2.1.7.020-09;
- Sanitary regulations: Norms of radiation safety (SR-2.6.1. -001-06).

Water safety

Tajikistan is not a signatory to the UNECE/WHO Protocol on Water and Health, and has yet to draft a water safety plan or strategy. However, as a result of the amendment of the Water Code in 2006, current regulations concerning ISO standards for sampling and drinking water quality are now largely in accordance with WHO guidelines, (Table 10.4).

The new regulations include the following:

- Drinking water; hygienic requirements for drinking water of centralized water supply; quality control; sanitary rules and norms. SanPiN 2.1.4.004-07;

- Requirements on water quality of non-centralized water supply; sanitary protection of sources; sanitary rules and norms. SanPiN 2.1.4.005-07;
- Zones of sanitary protection of water sources and water supply systems of municipal supply SanPiN 2.1.5.006-07.

However, the Law on Drinking Water and Drinking Water Supply Sstems, which was prepared in 2003, has still not been adopted.

Food safety

Since the last EPR review in 2004, new food safety laws have been adopted in Tajikistan, including:
- 2006 Laws on Food Quality, No. 176;
- 2007 Law on Food Safety, No. 305;
- 2009 Decree on Food Safety Programme for the period until 2015, No. 72.

It should be noted that Tajikistan is now a member of Codex Alimentarius; to date; however, no national food safety agency had been established.

The safety of foodstuffs is mainly under the responsibility of three organizations:
- Agency for Standardization, Certification, Metrology and Trade Inspection (Tojikstandard);
- State Sanitary and Veterinary Service (SSVI) and State Service on Phytosanitary and Plant Quarantine (SSPPQ) of the Ministry of Agriculture;
- State Sanitary and Epidemiological Surveillance Service of the Ministry of Health (SSESS).

The Sanitary Epidemiological Service is responsible for overseeing food quality. However, without sufficient laboratory staff, equipment and reagents, overall oversight is ineffective. In recent years, there has been no supervision of food product safety.

The reasons are the same as for the monitoring system – the lack of laboratory equipment, lack of financial resources, and a lack of trained specialists.

Pesticides

Tajikistan ratified the Stockholm Convention on Persistent Organic Pollutants (POPs) on 6 December 2006. In accordance with Article 7 of the Convention, a National Implementation Plan was prepared and is being implemented.

Ionizing radiation

Over the last 6-7 years, a number of laws and regulatory norms in the area of radioactive waste management have been developed, which form the regulatory basis for radioactive waste management as well as regulating the handling of ionizing radiation sources. These normative acts include the following: Law No. 42/2003 on Radiation Safety; Law No. 69/2004 on the Use of Atomic Energy; Law No. 37/2004 on Licensing of Certain Kinds of Activity, with amendments No. 277/2007; Order No. 482/2004 on State Regulation of Radiation Safety; Order No. 377/2005 on Specifics for the Licensing of Certain Kinds of Activity; the Order on the Inter-agency Council for Ensuring Radiation Safety; and the Order on Radiation Inspectors of the Radiation Safety Science Academy.

Currently, Tajikistan has other documents concerning the regulation of radiation safety, which were recently approved or are in the process of agreement and approval. These include: Sanitary regulations "Norms of radiation Safety" (SR-2.6.1. -001-06), "Main Sanitary Regulations Ensuring Radiation Safety", Sanitary regulations "Handling radioactive Waste", "State Register and Control Procedure for Radioactive Substances and Radioactive Waste", "Requirements for Ensuring Radiation Safety during the Collection and Treatment of Metal Scraps", "Handling of Mineral Raw Materials with High Concentration of Natural Radionuclides", "Order on Expertise of Documents, Justifying the Provision of Nuclear and Radiation Safety, Sources of Radiation and Quality of Proposed Activity", Procedure for the "Arrangement and Conduct of Inspections by the Agency for Nuclear and Radiation Security at Facilities Engaged in the Handling of Radioactive Substances and Sources of Ionizing Radiation", "Rules for Radiation Security during the Transportation of Radioactive Substances and Radioactive Waste".

However, despite the number of regulatory acts, the regulatory framework in the area of the handling of waste from former uranium mining is insufficiently developed, and requires improvement and harmonization with international safety standards.

Institutional framework

The Tajikistan health care system has been developed in compliance with general governmental structure and consists of three levels:

- National level: Ministry of Health and its subordinate body, the State Sanitary and Epidemiological Surveillance Service: this is the level responsible for policy-making (Figure 10.3);
- Regional level: Department of Health of the Regions and Dushanbe;
- Local level: District and city: Central District Hospitals or Central City Hospital.

The Ministry of Health is responsible for the development and implementation of unified public health care policy. It manages the country's health care sector; implements and coordinates public policy issues; and supervises the activities of republican institutions, research and education in the State health care system.

In addition, it monitors coordination and oversees institutions in the State health system with a view to improving the quality of health care and the provision of pharmaceutical assistance by ministerial departments, agencies, and the private health care system; and is responsible for State health care development while the regional and local levels are responsible for the delivery of health care services and programmes.

Some progress had been made on improving health and environmental health information and monitoring systems. However, it is mainly only for drinking water that there is some regular monitoring, which in itself is still incomplete. Monitoring systems in and by the Ministry of Health feature little environmental health monitoring. The main reasons for this are the lack of resources, a lack of laboratory equipment, and insufficient human resources working in this area.

The State Sanitary and Epidemiological Surveillance Service is responsible for overseeing food quality. However, without sufficient laboratory staff, equipment and reagents, overall oversight is ineffective.

In recent years, there has been no supervision of food product safety. The reasons are the same as for the monitoring system – the lack of laboratory equipment, financial resources, and trained specialists.

The safety of foodstuffs is also under the responsibility of two other organizations:
- Agency for Standardization, Certification, Metrology and Trade Inspection (Tojikstandard);
- State Sanitary and Veterinary Service and State Service on Phitosanitary and Plants Quarantine of the Ministry of Agriculture (SSVI and SSPPQ).

Since 2001, Tajikistan has been a member of the International Atomic Energy Agency. The 2003 Law on Radiation Safety foresees the establishment of an agency on nuclear and radiation safety within the Academy of Sciences.

It functions as a State regulatory body for radiation safety and protection. However, such a body has still not been established. Monitoring the population's exposure and occupational exposure to radiation is still not performed.

10.8 Conclusions and recommendations

Climate change impacts are already being experienced in Tajikistan in the form of increasing heatwaves, floods and mudslides. Health impacts from these events include increased illnesses and deaths from water-borne and other infections, as well as cardiovascular and respiratory diseases. Additionally, there is damage to the health care infrastructure, and in the longer term there is a risk of increasing malnutrition as food security is affected by increasing extreme weather events. A National Climate Change Health Adaptation Plan is currently being developed by the Ministry of Health, spearheaded by a national Steering Committee. However, health is not routinely incorporated into mainstream climate change plans.

Recommendation 10.1:
The Ministry of Health, in cooperation with other relevant Government bodies, should promote the establishment of cross-governmental groups to identify and address risks from climate change for the health priorities of water safety and food security.

The Ministry of Health needs to develop comprehensive environmental health information systems, including databases and GIS. Additionally, it needs to organize inter-sectoral cooperation in providing data for receiving reports from monitoring systems. Since the last EPR, some improvements have been made in monitoring and surveillance, with increased albeit incomplete monitoring of water quality, especially in rural areas. Data for many diseases and environmental risk factors are still incomplete. Despite this progress, further recommendations are:

Recommendation 10.2:
The Ministry of Health, in cooperation with other relevant Government bodies should:

(a) Ensure the quality of the disease surveillance system;
(b) Identify areas of different diagnostic procedures and data collection to improve surveillance and engage in training of health professionals;
(c) Improve monitoring for drinking water quality, including in rural areas.

Although there are many donor-driven programmes for improving water quality, there is a need for an overarching national plan or strategy. Improvements have been made, and monitoring has increased. Future progress is likely, if particular attention is provided to water and sanitation, as outlined below.

There is a need to develop a system of specialized training for doctors and medical assistants, as well as specialized training for economic experts to enable them to analyze and solve environmental health and hygiene problems, especially those relating to water. Besides training of members of the medical professions, there is an urgent need to invest in vocational training of plumbers.

In many health services, including in district hospitals, plumbing systems are of poor and deteriorating quality due to lack of finances, training and regulation, are creating health hazards, and require qualified plumbing staff.

Moreover, the impacts of current climate change, including heatwaves, flooding and mudslides, pose a threat to improvements. Infrastructure, treatment and monitoring require further strengthening, and must be adapted to the impacts of current and future climate change. Additionally, visits to rural hospital sites revealed a deteriorating infrastructure of water treatment and supply systems as well as sanitation systems that potentially put patients at risk.

Recommendation 10.3:
The Ministry of Health should:
(a) Develop a national water safety strategy and implement the WHO Water Safety Plan nationwide;
(b) Undertake a nationwide review of water supply and safety and the sanitation sector in rural and district hospitals, and develop a national plan to improve the quality of water and sanitation in hospitals;
(c) Revise national water quality standards according to WHO guidelines;
(d) Ensure comprehensive coverage of microbiological sampling, to increase coverage of water treatment and supply;
(e) Develop and implement integrated Water Safety Plans in accordance with the international norms for water services
(f) Proceed with a resilience assessment of water supply and sanitation services in line with the methodology developed by WHO, and drawing on the Guidance on Water Supply and Sanitation in Extreme Weather Events.

Some progress has been made in the training of food handlers and the adoption of the Codex Alimentarius, but little progress has been made towards the development of a national food safety strategy or a responsible State body. Additionally, there are concerns about levels of malnutrition in Tajikistan, which could be worsened by the impact of climate change on food security.

Recommendation 10.4:
The Government should:
(a) Establish a centre of food safety education and training for professionals and the general public;
(b) Strengthen monitoring of food contamination in the food chain and surveillance of food-borne disease.

In Tajikistan, uranium mining began in the late 1940s. It stopped in the 1980s, since which time uranium mines have not been in operation. Uranium tailings in Tajikistan remain as an environmental and ecological risk. An agency for nuclear and radiation safety was expected to be established. However, there is still no established body for monitoring the population's exposure and occupational exposure to radiation.

Over the last 6-7 years, a number of laws and regulatory norms in the area of radioactive waste management have been developed, which form the regulatory basis for radioactive waste management as well as regulating the handling of ionizing radiation sources.

However, despite the number of regulatory acts, the regulatory framework of Tajikistan in the area of handling of waste from former uranium mining is insufficiently developed, and requires improvement and harmonization with international safety standards. As a result, it is very important to continue improving regulatory frameworks for activities relating to mining, reprocessing and uranium waste management.

The disposal of radioactive medical materials was described as being through the main sewage system.

Many countries now have guidelines on safe disposal of radioactive waste from medical research owing to the impact of such waste of contamination of the water cycle. Further work is needed to understand current practices and improve guidelines.

Recommendation 10.5:
The Government should:

(a) Promote the establishment of a Department for Monitoring and Evaluating Health Outcomes within the Nuclear and Radiation Safety Agency;
(b) Align legislation on radiation with international safety standards;
(c) Ensure the proper disposal of radioactive medical waste.

There is little strategic activity in the environmental health policy, and specifically no extension of the previously adopted National Environmental Health Action Plan (NEHAP) (2000 – 2010) currently planned. Nor has Tajikistan developed a CEHAPE (Children's Environmental Health Action Plan).

Recommendation 10.6:
The Ministry of Health, in cooperation with other relevant Government bodies, should undertake an implementation analysis of the current National Environmental Health Action Plan and develop a new one, which will include inter alia a chapter on children's environmental health to reflect the priorities identified by CEHAPE.

At present, there is little by way of routine occupational health monitoring or services within Tajikistan. Current monitoring under-reports occupational health issues and reflects the lack of a systematic occupational health service.

Recommendation 10.7:
The Ministry of Health, in cooperation with other relevant Government bodies, should establish and improve occupational health services and the registration of occupational diseases.

ANNEXES

Annex I: Implementation of the recommendations in the first review

Annex II: Participation of Tajikistan in multilateral environmental agreements

Annex III: Key data and indicators available for the review

Annex IV: List of major environment-related legislation

Annex I

*IMPLEMENTATION OF THE RECOMMENDATIONS IN THE FIRST REVIEW**

PART I: THE FRAMEWORK FOR ENVIRONMENTAL POLICY AND MANAGEMENT

Chapter 1: Poverty, environment and economy

Recommendation 1.1:

(a) The PRSP Monitoring Department should take the lead role in setting priorities for implementation of the poverty reduction strategy and for developing an action plan based on these priorities;

(b) The PRSP Monitoring Department should make sure that the measures included in the State Environment Programme, in the National Environment Action Plan (NEAP) which still has to be adopted and the recommendations of the National Sustainable Development Report Rio+10 are taken into account and that cooperation with the respective Committees is taking place. A National Sustainability Strategy, which might be developed, should integrate the different plans and programmes.

The Ministry of Economic Development and Trade, through the PRSP Monitoring Department, has the leading role with regard to implementation. During the period since the first EPR, Tajikistan developed the Poverty Reduction Strategy (PRS) for the period 2004-2006, the period 2007-2009 and the most recent – the PRS for the period 2010-2012. In all PRS papers, environmental matters are always taken into consideration. The last PRS also featured a part on climate change impact. Tajikistan has adopted the 2007 Concept of Transition to Sustainable Development (CTSD) for the period 2007-2030. The CTSD aim is to promote sustainable socio-economic development combined with the preservation of a congenial environment and rational use of natural resources aimed at meeting the needs of both current and future generations.

Recommendation 1.2:

Given the importance of the agricultural sector in Tajikistan, the measures in the poverty reduction strategy related to agricultural production and rural development should be addressed urgently. The Ministry of Agriculture, the Ministry of Land Reclamation and Water Resources and the State Committee for Land Administration should work closely with the regional and district governments in the implementation of these measures, with priority given to:

(a) Implementing, in cooperation with community-based organizations, programmes to inform farmers about their legal rights to acquire and use land. This includes informing farmers about the full implications of futures contracts, particularly in the cotton sector;

(b) Monitoring strictly the implementation of the land reform, in particular the distribution of land among workers of agricultural production entities;

(c) Providing farmers with training opportunities in agricultural production techniques, including the use of fertilizers and pesticides. The training should include awareness-raising on the consequences of unsustainable agricultural practices, especially with regard to land degradation and erosion;

(d) Encouraging the establishment of rural lending and savings associations;

(e) Promoting a wider range of employment options in rural areas;

(f) Ensuring metering of water use in irrigation agriculture.

The whole recommendation has not been implemented. However, the Government is dealing with various issues mentioned in the recommendation. Farmers are to a certain extent involved in various mechanisms leading to sustainable agriculture, in the cotton sector as well. Land reform was fully monitored. Training is

* The first review of Tajikistan was carried out and published in 2004. During the second review, progress in the implementation of the recommendations in the first review was assessed by the EPR Team based on information provided by the country.

provided to farmers but there is a need for continuous training. The Government is promoting new technologies and new practices. However, the majority of farmers are still not able to really implement them due to the lack of mostly financial resources. There are some programmes carried out by NGOs to promote employment in rural areas. Once again, due to low income, there is still migration from rural areas to urban areas. In addition, the irrigation infrastructure still needs to be either replaced or rebuilt.

Recommendation 1.3:
The PRSP Monitoring Department, in the execution of its tasks, should strengthen the involvement of governmental and non-governmental stakeholders, both in the setting of priorities for implementation and in the monitoring process.

All stakeholders, Government, NGO, the business community, the international community and civil society, are involved in setting priorities and the monitoring process.

Chapter 2: Policy, legal and institutional framework

Recommendation 2.1:
(a) The Government should establish an inter-ministerial commission, including representatives of all relevant ministries and State committees, chaired by the State Committee for Environmental Protection and Forestry, to facilitate and strengthen cooperation and coordination of policies, plans and actions related to environmental protection, the sustainable use of natural resources and forestry;
(b) The State Committee for Environmental Protection and Forestry should review its new structure internally and establish a department on air protection, water and waste management in order to promote environmental permit issuing properly and to avoid conflicts of interest in issuing permits and checking their enforcement by one and the same structure (the inspectorates).

(a) This recommendation has not been implemented.
(b) This recommendation has not been implemented. In the current structure of the Committee for Environmental Protection it is still an issue that the units responsible for issuing environmental permits are at the same time checking their enforcement.

Recommendation 2.2:
The State Committee for Environmental Protection and Forestry should:
- *Establish clear and precise rules of procedure for carrying out and reporting on inspections, including establishing the respective responsibilities of central and local inspectors;*
- *Provide the necessary means for the inspectorates to ensure compliance with the relevant laws;*
- *Ensure sharing of information among the inspectorates;*
- *Provide intensive training to inspectors and consider setting a national standardized and mandatory recruitment exam for all inspectors.*

This recommendation has been partly implemented. The conditions and procedure of inspections are subject to Law No. 223 of 2006 on Inspections of Economic Legal Entities. Also, each enforcement authority establishes its rules and checklist of questions for conducting inspections. In the case of the CEP, the rules were approved on 24 December 2007, while the checklist of questions was approved on 7 July 2008. There are annual and medium-term plans of inspections for up to three years. However, even annual inspections plans are not strictly followed by inspectors due to various reasons. One of them is that even a scheduled inspection, as a rule, has to be approved by the CEP Chairperson, a factor which leads quite often to failures in following plans of inspections. As a result, non-scheduled inspections at the decision of the Government are not as exceptional as they should be according to the 2006 Law.

Recommendation 2.3:
The State Committee for Environmental Protection and Forestry should redesign the principles and procedures of ecological expertise with environmental impact assessment legislation based on international experience and practices. In doing so, it should as a minimum:
(a) Clearly define all important steps of the environmental impact assessment process, including: screening, scoping, consultations, public hearings, access to information, decision-making and access to justice;

(b) Define procedures for public participation that facilitate a meaningful dialogue with non-governmental organizations and other appropriate entities and are consistent with the Aarhus Convention (Recommendation 4.5).

(a) This recommendation has been partly implemented. Requirements for the environmental impact assessment procedure and documentation as well as the list of facilities and types of activities which require mandatory elaboration of the environmental impact assessment documentation are defined by the Procedure of Environmental Impact Assessment (OVOS) that was adopted via Government Resolution No. 464/2006.

(b) This recommendation has not been implemented.

Chapter 3: Economic instruments, environmental expenditures and privatization

Recommendation 3.1:
The State Committee for Environmental Protection and Forestry, in cooperation with the Ministry of Economy and Trade and the Ministry of Finance, should develop proposals to amend the Tax Code and other legislation so that the provisions of the Law on Nature Protection related to tax breaks and preferential loan terms for companies making environmental investments can be applied. The banking community should be involved in developing these proposals.

Although in theory the use of these instruments could promote environmentally friendly investments in the private sector, the question is whether these instruments could have been effectively applied given the existing limited administrative and financial capacities in the country. Even in developed countries, these schemes are open to misuse (tax avoidance by enterprises; creation of a window for corruption in tax collection).

Recommendation 3.2:
The State Committee for Environmental Protection and Forestry, in cooperation with the Ministry of Economy and Trade and the Ministry of Finance, should develop proposals to the Government for reassessing the fees, charges and fines, taking into account the priority objectives of environmental planning and feasibility of measurements of pollution charge base. Such proposals should be designed for better application of the "polluter pays" and "user pays" principles, so that the rates provide incentives to reduce pollution and take environmentally sound measures.

There has not been any real follow-up to this recommendation concerning the reassessment of fees, charges and fines in order to achieve better application of the 'polluter-pays' principle. But there has been a noteworthy countrywide increase in tariffs for electricity that significantly improved the extent of cost recovery. In a similar vein, there have been significant increases in water tariffs in Dushanbe and Khujand and, to a lesser extent, in other parts of the country, which have improved cost recovery. In Dushanbe, cost recovery of municipal waste disposal services has also been boosted by increases in tariffs.

Recommendation 3.3:
(a) The State Committee for Environmental Protection and Forestry, in cooperation with the Ministry of Economy and Trade and the Ministry of Finance, should assess the financial needs based on environmental priorities with a view to elaborating a State Environmental Investment Programme. The Programme should clearly show the respective amounts coming from environmental funds, the State budget and other resources, including loans.
(b) The State Committee for Environmental Protection and Forestry, in consultation with the local environmental protection committees, the Ministry of Finance and other stakeholders, should establish a mechanism to coordinate the use of environmental funds and ensure both transparent decision-making and the allocation of money to environmental projects of highest priority.

(a) The recommendation has been implemented in a broad sense. The 2006 National Environmental Action Plan identified detailed priority projects across major environmental domains and associated financing needs and financing sources. Environmental projects are also part of Public Investment Programs, which rely predominantly on foreign funding. The new "Environmental Protection Concept" includes a draft action plan

(November 2009) with a list of environmental projects and financing sources. Tajikistan continues, however, to rely very strongly on foreign funding for financing of environmental projects.

(b) The activities of environmental funds have remained opaque. There has not been any follow-up to the recommendation to establish a coordinating mechanism for the various environmental funds and to ensure transparent decision-making and allocation of revenues to environmental projects in line with priority rankings.

Recommendation 3.4:
The State Committee for State Property Management should jointly with the State Committee for Environmental Protection and Forestry be involved in decision-making in the privatization process to promote environmental investments by new owners by:

- *Developing and introducing clauses on past environmental liabilities into the privatization agreements;*
- *Requiring enterprises and industries put up for privatization to carry out environmental audits; and*
- *Including compliance plans, prepared by the new owner, in the privatization agreements.*

These plans should specify the measures that enterprises and industries have to take to comply with environmental standards and regulations.

There has not been any CEP involvement in decision-making concerning the privatization process to promote environmental investments by new owners. There is no information on possible inclusion of clauses on past environmental liabilities in privatization agreements. The same holds for environmental audits for companies to be privatized and possible compliance plans to be prepared by the new owners.

Chapter 4: Information, public participation and education

Recommendation 4.1:
The State Committee for Environmental Protection and Forestry should:
(a) Develop, as a matter of urgency, an integrated programme for the rehabilitation of all its monitoring networks and the introduction of an effective computerized data management system. In preparing the integrated programme, the State Committee should follow the format of the draft programme of hydrological monitoring that was prepared by the Hydrometeorological Agency;
(b) Explore with the oblast*, city and* raion *authorities, business and industry and the donor community all possibilities for cofinancing their implementation of the above-mentioned programme before requesting funds from the State budget;*
(c) Design the requirements for self-monitoring by enterprises as a complementary system to the State monitoring networks.

This recommendation has been partly implemented. The Programme for the rehabilitation of hydrometeorological stations and hydrological points for 2007-2016 was approved by Government Resolution No. 408 of 7 September 2006. It includes measures on rehabilitation of its monitoring networks (funding earmarked – 18.6 million somoni) and improvement of the data management system (funding earmarked – 1.57 million somoni). In fact, according to the head of Tajikhydromet, it covers only operational costs of the organization and does not include investments for new monitoring equipment.

According to the staff of the central office and regional office of Tajikhydromet in Khudjand, local authorities and industry do not participate actively in cofinancing the programme. Available resources from donor organizations are concentrated in the central office of Tajikhydromet in Dushanbe. Donor funds have made it possible to improve the information services by Tajikhydromet to some extent, e.g. to establish and maintain a web site (www.meteo.tj), while the monitoring network has not been improved in comparison with the first EPR.

There are still no clear requirements for self-monitoring by enterprises and Tajikhydromet, and the Centre of Analytical Control can only access these data on the basis of requests signed by the CEP Chairperson. Thus, it is difficult to consider self-monitoring by enterprises in Tajikistan as a complement to the State monitoring networks.

Recommendation 4.2:
The Inter-ministerial Coordination Committee for Environmental Statistics should improve coordination of environmental monitoring and assessment by reaching an agreement on the following:
• Priorities for monitoring and assessment;
• Indicators to be measured;
• Unified sampling and analytical methods;
• Work-sharing arrangements between institutions involved in monitoring the same media;
• The step-by-step development of integrated assessment systems;
• The revision or the development of new environmental standards that are compatible with international ones;
• Coordinated or unified data reporting formats, protocols and procedures;
• The creation of a harmonized national environmental database using modern information technologies.

This recommendation has not been implemented. There is no evidence that such an agreement exists in Tajikistan.

Recommendation 4.3:
The State Committee for Environmental Protection and Forestry should:
(a) Prepare and publish biennial state-of-the-environment reports and ensure their wide availability;
(b) Establish, with the involvement of other ministries and agencies, a working group of officials and experts responsible for specific environmental data flows to contribute to and to revise draft state-of-the-environment reports;
(c) Consider nominating the working group as the national focal point for cooperation with the UNECE Working Group on Environmental Monitoring and Assessment, the preparation of the pan-European assessment report for the sixth "Environment for Europe" Conference in Belgrade in 2007, and other relevant international initiatives.

This recommendation has not been implemented. The most recent state-of-the-environment report was published in Tajikistan in 2005.

Recommendation 4.4:
The State Committee for Environmental Protection and Forestry, jointly with the Ministry of Education, should establish a centre to develop and support environmental education for sustainable development as stipulated in the State Programme on Environmental Education. To guide the work of the centre, they should consider establishing an advisory board of officials from the State Committee for Environmental Protection and Forestry and all relevant Ministries, prominent environmental educators, researchers and NGO researchers and NGO representatives, among others. It could, as a priority, develop practical proposals for training professionals, training teachers and trainers and preparing educational and methodological manuals for use in educational programmes at schools, technical colleges and universities.

This recommendation has not been implemented. The above-mentioned centre has not been established in Tajikistan.

Recommendation 4.5:
The State Committee for Environmental Protection and Forestry should prepare, for submission to the Government and, thereafter, to the Majlisi Oli, amendments to the Law on Ecological Expertise to streamline its provisions with those of the Aarhus Convention. Particular attention should be given to:

• Clarifying the accessibility of environmental information;
• Informing the public about applications for projects which require ecological expertise;
• Setting deadlines for supplying information;
• Setting timeframes for different phases of public participation;
• Clarifying the definition of the public concerned which should be informed;
• Involving the public in the State ecological expertise.

Pending the adoption of such amendments, the State Committee for Environmental Protection and Forestry should issue detailed guidelines on public participation for its ecological expertise branches using international

experience, including the guidelines on public participation prepared under the Convention on Environmental Impact Assessment in a Transboundary Context.

The recommendation has been partly implemented. The provisions of the Law on Ecological Expertise have not been streamlined with regard to the accessibility of environmental information and public participation in the procedure of State ecological expertise. However, on 3 October 2006 the Government of Tajikistan approved via Resolution No. 464 the procedure for environmental impact assessment (EIA), which is applicable to the stage of environmental decision-making preceding the State ecological expertise for certain new projects and activities with significant environmental impacts. Section IX of the above document concerns public participation in the environmental impact assessment (EIA) procedure. It requires developers to inform the public about new projects and activities that are deemed to be subject to EIA by means of mass media and through Internet; provide public access to EIA documentation; consider and make records of written submissions by representatives of the public; hold public hearings; and record public opinion in its minutes. However, the above Government resolution of 3 October 2006 neither sets timeframes for access to information and public participation in the EIA procedure nor clarifies the definition of the public concerned.

In 2010, a review of Tajik legislation on EIA in the context of the application of the Espoo Convention was carried out. It was designed to identify gaps in the national legislation with a view to the improvement of national legislation and transboundary EIA procedure in Tajikistan. The review was conducted within the framework of the UNECE-GTZ programme "Regional Dialogue and Cooperation on Water Resources Management", financed by the Government of Germany with the involvement of the representative of the Committee for Environmental Protection, the Ministry of Land Reclamation and Water Resources, and the Ministry of Justice. So far, the review has not been followed by relevant amendments to the 2003 Law on Ecological Expertise and the 2006 Procedure for Environmental Impact Assessment.

Chapter 5: International cooperation

Recommendation 5.1:
The State Committee for Environmental Protection and Forestry should promote:
• The ratification of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes; and
• The further development, adoption and implementation of a regional water strategy that would provide a common perspective on the allocation and the rational use and conservation of water resources.

The Cooperation Strategy to Promote the Rational and Efficient Use of Water and Energy Resources in Central Asia (SPECA) may provide the basis for the development of this strategy (Recommendations 6.1, 7.1 and 9.3).

The recommendation has not yet been implemented.

Recommendation 5.2:
The State Committee for Environmental Protection and Forestry should:
• Finalize the National Environmental Action Programme (NEAP) as soon as possible;
• Ensure that the NEAP provides a framework for understanding the linkages among existing strategies and plans at both national and regional levels and that it sets a limited number of priorities for short-term, medium-term and long-term action;
• Establish a regular dialogue with the donor community (Recommendation 1.1).

The National Environmental Action Plan (NEAP) was adopted by the Government in 2006. Its main goal is to create a basis for optimal use of natural resources; preservation of the most fragile and valuable ecosystems; and harmonized environmental and economic development. The Committee on Environmental Protection is dealing on a regular basis with the international community. On the donors' side, there are some attempts to coordinate their activities. A donor council was established in 2007.

The Donor Coordination Council (the Council) is being established with the purpose of improving the multi-way flow of relevant information among donors, government agencies and civil society institutions. This should facilitate networking and broader collaboration within the donor community as well as a more constructive

dialogue and shared vision with the Government on the country's priorities; and serve to strengthen overall aid coordination and management.

Recommendation 5.3:
The State Committee for Environmental Protection and Forestry and, where relevant, other ministries should:
• Develop comprehensive legislation for the implementation of the multilateral environmental agreements to which Tajikistan is already a Party;
• In the future, ensure that the need to develop new or modify existing legislation is analyzed prior to accession or ratification.

It is planned to develop a coherent and flexible legal framework that conforms to international standards in order to ensure implementation of international environmental agreements policies consistent with the national policy.

PART II: MANAGEMENT OF POLLUTION AND OF NATURAL RESOURCES

Chapter 6: Air quality management

Recommendation 6.1:
The State Committee for Environmental Protection and Forestry should develop and enforce:
• implementing regulations for the Law on Air Protection
• national legislation that contains all necessary provisions for implementation of the Stockholm Convention on Persistent Organic Pollutants, the United Nations Framework Convention on Climate Change and its Kyoto Protocol. The State Committee should also promote accession to the Kyoto Protocol.

The Air Protection Law has been amended three times in recent years (2007, 2009, and 2010). In practice, the CEP Control Unit for Air Use and Protection uses a manual dating back to 2006, which provides the procedure for issuing permits for discharges of pollutants into the atmosphere, as well as instructions governing the review and approval by State control of the location and design of new enterprises or buildings or the expansion and reconstruction of existing enterprises, buildings and other objects as far as ambient air pollution is concerned.

In 2007, a National Implementation Plan on Persistent Organic Pollutants (POP) was adopted. In October 2008, a project concept was agreed between CEP, GEF and World Bank. In April 2009, a project worth USD 4.02 million in grant funding was endorsed by CEP and by GEF CEO. The project will strengthen POP-related legislation and enforcement, as well as reduce risks posed by POP pesticide stockpiles and wastes in priority areas; reduce farmer reliance on POP pesticides; and promote regional information dissemination.

The Kyoto Protocol was ratified on 29 December 2008. A Designated National Authority has been established in the Ministry of Industry and Energy via Government Resolution No. 393 of 2009, and a regulation has been approved regarding the procedure for selection and approval of CDM projects in Tajikistan, through Government Resolution No. 654 of 2009.

Recommendation 6.2:

(a) In order to reduce emissions from mobile sources, the Ministry of Transport, in cooperation with the Ministry of Health, the State Committee for Environmental Protection and Forestry and the Ministry of Internal Affairs, should develop a sustainable transport strategy. The strategy should, inter alia, address the growing traffic problem; phase out completely the use of leaded petrol and poor quality fuel; develop public transport; establish differential taxes on transport fuels based on their quality; and establish an effective system of vehicle inspection.

(b) The Ministry of Health, in cooperation with the Ministry of Transport, the State Committee on Standardization and the State Committee for Environmental Protection and Forestry, should develop, adopt and implement:

• New fuel quality standards, which should, above all, establish limits on: benzene and polyaromatic hydrocarbons; the sulphur content in diesel fuel; and lead in petrol, preliminary to phasing out lead completely;
• New emissions standards for mobile sources according to international standards.

(a) The State Programme on Transport 2008-2025 has been adopted by Tajikistan. One of its goals is to reduce emissions from transportation by means of regulation. A legal diploma (15/10/2008) has been adopted to regulate the number of old cars. The aim is to reduce gradually by 2015 the number of cars older than 10 years, and of buses older than 15 years. Currently, the diploma is only applied to municipal public transport (public and private), but from 2013 it will be applied across the board.
The Programme also provides for the introduction of a tax on fuels (for end users), which does not exist at present. Only import taxes are used. The programme also includes the development of a regulation on liquefied petroleum gas and natural gas.

Regarding fuel quality, leaded fuel is still allowed. The importers take samples of the fuel to the Standards Agency Laboratory, to get the official certificate.

At present, there are car inspections. Car owners pay for a technical check and an environmental check. The ecological police request the certification of inspection from private cars, trucks and buses.

(b) This recommendation has not been implemented. The standards used are GOST Russian, and the last update for fuels adopted nationally dates back to 2002. Requests for new standards are in general submitted by the ministries to the Standards Agency. In order to be adopted nationally, the standards need to be accepted by the Euro-Asian Council for Standardization, Metrology and Certification.

Recommendation 6.3:
The State Committee for Environmental Protection and Forestry should review the issues related to accession to the Convention on Long-range Transboundary Air Pollution and its EMEP Protocol with the purpose of:
• Broadening air emission monitoring to include additional substances and emissions sources;
• Assessing the transboundary movement of pollutants in accordance with the CORINAIR methodology and EMEP guidelines.

• This recommendation has not been implemented. There continues to be only three monitoring stations in the country, two in Dushanbe and one only in Kurgan-Tube. The chemicals monitored are: sulphur dioxide, nitrogen dioxide, formaldehyde, sulphur hydrogen, carbon and ammonia oxide. According to Tajikhydromet, the stations are quite old and outdated and data are not very reliable. Some major industries as the aluminium factory, the fertilizers factory, the cement factory and the rare metals mines monitor their emissions, and the Laboratory of the Centre for Analytical Control of CEP takes samples.
• This recommendation has not been implemented.

Recommendation 6.4:
The State Committee for Environmental Protection and Forestry should:
• Draw up an inventory of persistent organic pollutant sources; and
• Promote accession to the Stockholm Convention on Persistent Organic Pollutants.

•This recommendation has been partly implemented. The inventory was done for some POPs, particularly resulting from agro-chemical waste, but not for the POP air emission sources.
•The recommendation has been implemented. The Stockholm Convention was ratified in 2007.

Chapter 7: Waste management

Recommendation 7.1:
(a) The State Committee for Environmental Protection and Forestry, in cooperation with the Ministry of Industry, municipalities and other relevant institutions, should:
• Develop and promote the adoption of a strategy and action programme for waste management;
• Facilitate the implementation of the Law on Production and Consumption Waste by developing the necessary secondary legislation.
(b) The Ministry of Emergencies and Civil Defence, in cooperation with the Nuclear and Radiation Safety Agency, should facilitate the implementation of the Law on Radiation Safety by developing the necessary secondary legislation.

(a) • This part of the recommendation has been partly implemented. The waste management strategy and action programme have been drafted, but have not yet been approved as the official document.

• This part of the recommendation has not been implemented. The secondary legislation has not been developed to enable full implementation of the Law.

(b) This recommendation has not been implemented. The secondary legislation has not been developed to enable full implementation of the Law.

Recommendation 7.2:

The Ministry of Industry and the Ministry of Economy and Trade should:

(a) Study the feasibility of industrial processes for the recycling and reuse of industrial waste, especially mining waste, as secondary raw material;

(b) Introduce environmentally friendly processes for disposal of industrial waste that cannot be recycled;

(c) Speed up the establishment of a cleaner production centre, as stipulated in the State Programme on Environmental Education, taking into account international experience.

(a) and (b) The recommendations no longer apply. Conditions have changed due to the privatization of key industries.

(c) This recommendation has not been implemented.

Recommendation 7.3:

The State Committee for Environmental Protection and Forestry, in cooperation with the Ministry of Industry, municipalities and other relevant institutions, should:

(a) Set up an information system on the generation, recycling and disposal of all types of waste and update the system of waste codes and classification, taking into account internationally accepted standards;

(b) Introduce a waste monitoring system at industrial and municipal landfills;

(c) Set up an inventory of all industrial and municipal waste disposal sites, including illegal ones.

(a) This recommendation has been partly implemented. The statistics for MSW in Dushanbe are published by the Statistical Agency, using European Waste Classification. There is a need to expand this system to other towns;

(b) This recommendation has been partly implemented. Waste monitoring is organized only in Dushanbe. There is a need to expand this system to other towns;

(c) This recommendation has not been implemented. No inventory of disposal sites was available during EPR II.

Recommendation 7.4:

(a) The State Committee for Environmental Protection and Forestry, in cooperation with municipalities and other relevant bodies, should urgently:

• Start developing project(s) for the construction of sanitary landfills for municipal waste disposal according to international standards;

• Begin rehabilitating those landfills that are overstretched and pose a threat to the population and the environment.

(b) The State Committee for Environmental Protection and Forestry, in cooperation with municipalities and other relevant bodies, should study the economic feasibility of:

• Introducing the separate collection of municipal waste (paper, glass, metal, aluminium) and teaching the population how to use the system; and

• Setting up facilities for recycling and processing valuable components separated from municipal waste.

(a) The implementation of this part of the recommendation has started. There are ongoing WB and EBRD initiatives that are targeting the problem.

(b) This recommendation has not been implemented. However, there are unofficial separation systems, which are effective. There are WB and EBRD initiatives that are targeting this problem.

Recommendation 7.5:

The Ministry of Emergencies and Civil Defence and the Academy of Sciences, through the Nuclear and Radiation Safety Agency and in cooperation with the State Committee for Environmental Protection and Forestry, should:

(a) Start the rehabilitation of mining tailings sites and landfills of radioactive waste, taking into account international experience in this field;

(b) Update and speed up the completion of the inventory of all radioactive waste, tailings and sources in the country;
(c) Monitor radioactive waste deposits and tailings by replacing or updating obsolete equipment and devices for measuring radiation.

(a) This recommendation has not been implemented;
(b) This recommendation has been partly implemented. The information base on tailing sites has improved, but the available information does not fully describe the environmental situation on all sites. IAEA projects are targeting this problem;
(c) This recommendation is in process of implementation. The IAEA projects aimed at improved management of radioactive materials and radioactive waste are targeting this problem.

Recommendation 7.6:
The State Committee for Environmental Protection and Forestry should prepare all necessary documentation for accession to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and submit it to Parliament so that Tajikistan can participate actively in and benefit from international cooperation on hazardous waste management.

This recommendation has not been implemented. Tajikistan has not yet acceded to the Basel Convention.

Chapter 8: Water resources management

Recommendation 8.1:
The Government should as soon as possible:
• Set up an inter-ministerial commission on water to develop a strategy and action plan for the Concept on the Rational Use and Protection of Water;
• Entrust the State Committee for Environmental Protection and Forestry with the coordination of this commission, which should bring together all main bodies involved in water management, as well as local authorities;
• Make the State Committee for Environmental Protection and Forestry responsible for implementing the water action plan.

• This part of the recommendation has been partly implemented. An inter-ministerial commission on water has not been established. The Water Sector Development Strategy was adopted in 2006. A Draft Water Sector Development Programme was developed in 2009 and is awaiting approval.
• This part of the recommendation has not been implemented.
• This part of the recommendation has not been implemented. However, the expertise and knowledge in water management is under the responsibility of the Ministry of Land Reclamation and Water Resources.

Recommendation 8.2:
The Government should strengthen the capacity of the State Committee for Environmental Protection and Forestry in water management. It should set up a water department to this effect, staffed with experts trained in modern water planning and management approaches. Assistance for staff training should be sought from the international partners developing water projects in Tajikistan.

The recommendation has been partly implemented. A water department was established under CEP. This department mainly deals with issuing permits. However, water management is under the responsibility of the Ministry of Land Reclamation and Water Resources.

Recommendation 8.3:
The State Committee for Environmental Protection and Forestry, in cooperation with all relevant ministries and bodies, should:
(a) Draw up an inventory of all water infrastructures (water supply and sanitation, irrigation and drainage, flood protection, including dams) and assess their status;
(b) Set national priorities for investment in water infrastructures, taking into account the needs and projects of the various sectors involved in water management. These priorities should follow the strategic lines expressed in the Concept on the Rational Use and Protection of Water, once these have been more concretely specified,

and other sub-strategies of the water sector (e.g. strategy on water supply and sanitation, strategy on flood management). These priorities should also be weighed in the overall context of the country's economic and social priorities and investment projects, with due regard to their affordability;
(c) Make all information regarding priorities and investment needs in the water sector widely known, in particular to all potential donors; and regularly organize meetings and improve cooperation with donors to keep them informed of the situation;
(d) Assess regularly the situation and readjust priorities accordingly, including keeping records of the projects in the water sector.

(a) This recommendation has not yet been implemented. The State Unitary Enterprise (SUE) "Khojagii Manziliyu-- Kommunali" and the Ministry of Land Reclamation and Water Resources have started to draw up inventories of water related facilities and installations.

(b) The 2009 Water Supply and Sanitation Sector Note highlights the most urgent measures within the programme for the improvement of clean drinking water supply during 2008-2020, and provides the required investment. This strategy refers to urban water supply, but not yet for rural water supply and sanitation in general. Flood management policy is being developed.

(c) The State Unitary Enterprise (SUE) "Khojagii Manziliyu-- Kommunali" and the Ministry of Land Reclamation and Water Resources are active in organizing regular meetings with donors.

(d) This recommendation has not been implemented.

Recommendation 8.4:
(a) The State Committee for Environmental Protection and Forestry should prepare and submit to the Majlisi Oli*, through the normal channels, a revision of the Water Code so that it fully incorporates integrated water management by hydrographic river basin;*
(b) In drafting this revision, the State Committee should work closely with the Ministry of Land Reclamation and Water Resources, Tajikgeologia, the Government Committee for State Control over Industrial Safety and Mining, the Ministry of Energy and local authorities. It should also consider inviting foreign experts to participate in an advisory capacity;
(c) The Government should start implementing integrated water resource management step by step, in particular through pilot projects involving local communities. These can be implemented in limited geographic areas, i.e. sub-basins, to test decentralized management. These pilot experiences should also be used to start building capacity in this new approach.

The whole recommendation has not yet been implemented. However, some activities in this field are ongoing, such as the Fergana Valley Water Resource Management Project (IWRM pilot project). These activities depend on financial support from the international community.

Recommendation 8.5:
The Authority responsible for river basin management, in close cooperation with all other concerned authorities and competent international organizations, should develop and implement flood risk management plans for each main river basin. These plans would include prevention, protection and mitigation actions and would be coordinated.

This recommendation has not been implemented.

Recommendation 8.6:
The respective competent authorities should draft the regulations called for in the Concept on the Rational Use and Protection of Water, including, inter alia, regulations on:
- *The water tariff structure;*
- *Monitoring water resources;*
- *Drinking-water supply and protection; and*
- *A system of permits for groundwater abstraction and use.*

This recommendation has not been implemented.

Recommendation 8.7:
The Government should accelerate finalization and approval of the national programme for clean water and sanitation and start implementing it as soon as possible.

This recommendation has not been implemented.

Chapter 9: Biodiversity and forest management

Recommendation 9.1:
The State Committee for Environmental Protection and Forestry should prepare a plan for reforestation. The ongoing reforestation should make use mainly of endemic species and should be increased to cover the deficit between the loss of forest and the current rate of reforestation.

Recommendation 9.1 of the first EPR stated that "the SCEP and Forestry should prepare a plan for reforestation. The ongoing reforestation should make use mainly of endemic species and should be increased to cover the deficit between the loss of forest and the current rate of reforestation."

No dedicated reforestation plan has been developed since 2004, but several documents including the new Forestry Code and Forestry Program (both in preparation) refer to reforestation. The Green Initiative for Tajikistan, which is supported by organizations of the international development cooperation, has also promoted reforestation using autochthonous species.

Apart from the limited extent of reforestation programs – as compared to deforestation rates - and the still widespread use of allochthonous species, major challenges to effective large-scale reforestation in Tajikistan are inappropriate tree-planting techniques; losses of seedlings to grazing by domestic livestock; and underutilization of the natural reforestation potential. Grazing losses are generally related to the growing livestock numbers throughout the country, but are also due to the limited support that reforestation efforts receive from local resource users. An exception to this general trend are existing donor-funded pilot programs using the Joint Forestry Management approach, which provide incentives to local resource users to support reforestation.

Recommendation 9.2:
(a) The State Committee for Environmental Protection and Forestry, with the support of the Academy of Sciences, should revise the Red Data Book in line with IUCN recommendations;
(b) For the most endangered species and habitats, the State Committee for Environmental Protection and Forestry should develop and implement protection and conservation programmes.

There has been no revision of the national Red List of Tajikistan since 2004. Nor have species conservation plans for particularly endangered species been elaborated to date, with the exception of the National Action Plan for the Conservation of the Snow Leopard (2010), which was developed with support from FFI. Experts from Tajikistan participated in a regional training on the IUCN Red List assessment methodology that was conducted by the IUCN Red List Unit within the framework of an project of the International Association for the Promotion of Cooperation with Scientists from the Independent States of the former Soviet Union (INTAS), but there was no immediate follow-up at the national level.

Efforts to revise the Red List of Tajikistan were renewed recently. There was a CEP Decree in early 2010 to initiate a new edition, and technical assistance to the revision process has been included in the scope of the Tajik-German technical cooperation. A national workshop aimed at kick-starting a sustained revision process was held under CEP supervision on 28 September 2010. The process is continuing, and it is not yet clear when the new Red List will be finalized and approved.

Recommendation 9.3:
The Government of Tajikistan should accede to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Tajikistan has not yet acceded to CITES. The general political will continues to exist, however, as illustrated by the recent inclusion of technical assistance for the preparation of accession within the scope of Tajik-German development cooperation.

In the meantime, illegal trade in species of wild fauna and flora continues to place significant pressure on biodiversity. Areas of particular concern are trade in hunting trophies, as well as trade in medicinal plants and (to a lesser extent) reptiles. It is complicated to export sustainably sourced specimens of species listed on the CITES Appendices from Tajikistan as long as the country has not acceded to the Convention, which means that potential income from international trade in sustainably sourced specimens cannot be used as a conservation incentive. At the same time, the CITES trade ban has reportedly been circumvented by illegal traders in the past. This situation highlights the need for Tajikistan to accede to CITES at the earliest opportunity.

Another issue in relation to trade in endangered species of wild flora and fauna is the capacity of law enforcement agencies. Finds of illegally traded specimens of wild fauna show that there is room for improvement of law enforcement regarding international trade in wild fauna and flora.

Recommendation 9.4:
The State Committee for Environmental Protection and Forestry should increase the protected area network and better protect the existing protected areas, particularly nature reserves and species management areas. Micro-reserves should be widely introduced whenever appropriate sites are identified.

No protected areas have been established in Tajikistan since 2004. Additional information and discussions on the current status of the protected areas system are included in Section 1.6 and in recommendation 9.4 of Chapter 9.

Recommendation 9.5:
The State Committee for Environmental Protection and Forestry, in cooperation with the National Biodiversity and Biosafety Centre, should collect and make publicly available data on fish and game stocks and establish reasonable quotas for hunting and fishing. The number of bagged game should also be provided.

No fish and game monitoring results have been published by SCEP or the Biodiversity Centre since 2004. According to current practice, hunting/fishing quotas are set centrally based on previous quota, scattered information from local state forestry enterprises and local SCEP branches and sometimes consultation with relevant institutes of the Academy of Sciences, without being informed by systematic monitoring. The National Biodiversity and Biosafety Centre has been subordinated under SCEP.

Recently, a guideline on the monitoring of mountain ungulates was drafted (SCEP 2010). At present, it is being considered by SCEP. If approved and implemented, it may form a basis for effective monitoring of mountain ungulates, which constitute a major component of the country's biodiversity riches. The NGO "Nature Protection Team", in cooperation with the Committee, recently published two surveys of mountain ungulates in the Gorno-Badakhshan Autonomous Oblast (Michel 2008, Michel et al. 2010). These publications could be used as a basis for quota-setting for the species and areas concerned and as a methodological resource, as long as there are no official monitoring data available.

PART III: ECONOMIC AND SECTORAL INTEGRATION

Chapter 10: Agriculture and land management

Recommendation 10.1:
The Ministry of Agriculture should, as a priority, support the development of extension services by continuing and expanding existing efforts. For example, the Centre for Extension Services and the Association of Water Users established within an ongoing World Bank project should be given the opportunity to continue its work after the conclusion of the project in 2006. Official support and some basic State funding is necessary and would also make it possible to attract additional donor funding. The support for extension and training should furthermore focus not only on official structures but also on organizations outside the State sector.

The recommendation has been implemented. The Centre for Extension Services is now subordinated to the Ministry of Agriculture and fully supported from the Ministry's budget. It works in cooperation with the Association of Water Users and farmers. Training and support are also provided to the farmers throughout the country. New technologies and practices are introduced when possible.

Recommendation 10.2:
The State Committee for Environmental Protection and Forestry, the Ministry of Agriculture and the State Committee for Land Administration should work jointly to implement the National Programme to Combat Desertification, inter alia by developing specific pilot projects to counteract erosion and desertification. Even if initial funding is low, it is important to establish and develop regular activities. Assistance from the international community would also be important for implementation of these projects.

The State Committee for Land Administration is the leading body on these activities. Some projects have taken place in order to improve productivity and generate income for rural communities in selected mountain watersheds, while at the same time curtailing degradation of fragile lands and ecosystems.

Recommendation 10.3:
The Ministry of Agriculture should establish a programme to promote environmentally safe cotton production in collaboration with the State Committee for Environmental Protection and Forestry. This programme should include selected activities in applied research, support to the development of integrated pest management, targeted advice and pilot application of environmentally friendly production practices. International institutions should be involved in an effort to transfer experiences from other countries. This, in turn, may attract cofunding from donors.

The Government established the Centre on Liquidation of Cotton Debt and on Development under the Ministry of Agriculture. The 2009 Environmental Programme for the period for 2009-2019 includes sections on environmentally agricultural production.

Recommendation 10.4:
The Ministry of Agriculture, together with the State Committee for Environmental Protection and Forestry, should initiate a genetic resources conservation programme based on the National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity to safeguard the genetic resources of crop plants and domestic animals. As this is of worldwide interest, discussions should be held with donors and international organizations on the funding of different activities.

All relevant authorities work in two main directions. One is to safeguard the genetic resources of crop plants and domestic animals. The other direction is to produce new crop plants that will be more adaptable to the climate change. The Academy of Agricultural Sciences is the leading agency.

Chapter 11: Ecotourism, mountains and national parks

Recommendation 11.1:
The Ministry of Economy and Trade, in cooperation with the State Committee for Environmental Protection and Forestry and in consultation with the National Tourist Company Sayoh*, tour operators and non-governmental organizations involved in tourism, should develop and implement a national strategy and action plan for tourism, consistent with the State Programme for the Development of Tourism. The action plan should clearly set priorities and identify sources of financing.*

The Government has adopted Concept No. 202/2009 for the Development of Tourism for the period 2009-2019, which the Committee for Youth Affairs, Sports and Tourism is responsible for implementing. To support the Law on Tourism and the Concept, regulations were issued such as the Government resolution on questions of State support for the development of ecotourism, mountain sports tourism and mountaineering in Tajikistan, and the Committee's Chairperson's rules on "Carrying out activities to manage subjects in the sphere of tourism".

Recommendation 11. 2:
The Ministry of Economy and Trade, in cooperation with the State Committee for Environmental Protection and Forestry, and in consultation with the National Tourist Company Sayoh*, tour operators and non-governmental organizations involved in tourism, should:*
• Adopt a set of standards for certification based on international standards;
• Develop and apply a certification scheme for ecotourism;
• Develop a special licence for those in the tourist industry who receive ecotourism certification. In implementing this recommendation, Tajikistan may wish to seek the support of the World Tourism Organization.

The recommendation has not yet been implemented. The various stakeholders are working on the topics mentioned in the recommendation.

Recommendation 11.3:
The State Committee for Environmental Protection and Forestry should accelerate the process of defining zones in Tajik National Park and prepare, adopt and implement a comprehensive management plan to develop Tajik National Park (and other protected areas if used for tourist purposes). The plan should include designated zones for protection and development, requirements for any construction that may affect the environment (e.g. environmental impact assessment), restrictions concerning waste disposal or sewage and a monitoring scheme.

A management plan for Tajik National Park has been drafted but has still not been adopted. To date, it has not been submitted for adoption. It takes into consideration all international standards.

Recommendation 11.4:
(a) The Government should establish a special subprogramme for ecotourism under the existing environmental fund.
(b) The Ministry of Finance, in coordination with the State Committee for Environmental Protection and Forestry, should increase the fees related to nature-based tourism and ensure that they are used for this purpose.

This recommendation has not been implemented. The different stakeholders are expected to develop plans, programmes to support the Concept of Development of Tourism for the period 2009-2019.

Recommendation 11.5:
(a) The Ministry of Education should develop a comprehensive curriculum, leading to a degree, for managers, guides and other trades working in tourism consistent with the State Programme for the Development of Tourism for 2004-2009;
(b) In developing this curricula, the Ministry of Education should set up an advisory body made up, inter alia, of representatives from the Ministry of Economy and Trade, the State Committee for Environmental Protection and Forestry, the National Tourist Company Sayoh*, tour operators and non-governmental organizations involved in tourism.*

This recommendation has not been implemented. The Ministry of Education has not developed such a curriculum, and the advisory body for its development has not been established.

Chapter 12: Human health and environment

Recommendation 12.1:
(a) The Ministry of Health should review and re-establish the disease surveillance system;
(b) The Ministry of Health should work closely with the State Committee for Environmental Protection and Forestry to re-establish and further develop comprehensive monitoring systems for air quality, drinking water quality, waste and hazardous waste disposal, ionizing radiation sources, and food safety, with a clear division of responsibilities. The monitoring data and health statistics should be the foundation for an integrated and coherent environmental health information system.

Some improvements have been made in monitoring and surveillance, with increases though incomplete monitoring on water quality, especially in rural areas. In contrast, there is no air quality monitoring. Data for many diseases and environmental risk factors are still incomplete. The following updated recommendations recognize that some progress has been made and are based on particular gaps identified.

Recommendation 12.2:
(a) The Government should modernize water treatment and distribution systems with the help of adequate investments in order to improve drinking water quality and extend the drinking water supply system to the rural areas in order to ensure access to safe drinking water to the vast majority of the population;
(b) The Ministry of Health should take all necessary measures to reduce the health risks from the microbiological contamination of drinking water;
(c) The Ministry of Health should revise national drinking water quality standards according to WHO guidelines.

Although there are many donor-driven programmes for improving water quality, there is a need for an overarching national plan or strategy. However, improvements have been made, with future progress likely; for example, WHO standards have been adopted and monitoring has increased. The most significant programme is to improve the rural supply and quality of drinking water between 2010- 2020, and improvements have been made in terms of overall quality and monitoring of water supplies. This is reflected in part by a declining trend for most water-borne diseases.

However, the impacts of current climate change, including heatwaves, flooding and mudslides, jeopardize improvements. Infrastructure, treatment and monitoring still need further strengthening, and must be adapted to the impacts of current and future climate change. Additionally, visits to rural hospital sites revealed a deteriorating infrastructure of water treatment and supply systems as well as sanitation systems that potentially puts patients at risk.

Recommendation 12.3:
The Ministry of Health, together with other institutions that have responsibility for food safety, should:
(a) Develop a national food strategy within the framework of the organization of the Ministerial Conference on Food and Nutrition in 2006;
(b) Establish a State body responsible for food safety;
(c) Designate a national body for participation in the Codex Alimentarius;
(d) Implement the Hazard Analysis and Critical Control Point (HACCP) system. Food handlers should be trained in the principles of food safety and hygienic handling of food;
(e) Prepare and distribute a code of hygiene practices to all food industries and local authorities.

Good progress has been made, especially with regard to the last three recommendations, which would benefit from further strengthening. However, little progress has been made in developing a national food safety strategy or a responsible State body. Additionally, there are concerns about levels of malnutrition in Tajikistan, which would be worsened by climate change impacts on food security.

Recommendation 12.4:
(a) The Ministry of Health should establish a Centre for Radiation Safety and Protection, with responsibility not only for radiation control of the environment, but also for monitoring and controlling the population's exposure and occupational exposure;
(b) The Ministry of Health should monitor the health status of the population around radioactive waste depositories and in the areas with elevated background radiation.

In Tajikistan, uranium mining has been in process since the late 1940s. It stopped in the 1980s, and since then uranium mines have not been in operation. Uranium tailings in Tajikistan pose an overall environmental situation and ecological threat.

Regarding recommendation (a) and (b), since 2001, Tajikistan has been a member of the International Atomic Energy Agency. The 2003 Law on Radiation Safety established the Nuclear and Radiation Safety Agency, within the Academy of Sciences. It functions as a State regulatory body on radiation safety and protection.

However, no body has been established to date for monitoring and controlling the population's exposure and occupational exposure to radiation.

Over the last 6-7 years, a number of laws and regulatory norms in the area of radioactive waste management have been developed, which form the regulatory basis for radioactive waste management and regulate the handling of ionizing radiation sources.

However, despite the number of regulatory acts, the regulatory framework for handling waste from former uranium mining is insufficiently developed and requires improvement and harmonization with international safety standards. Therefore, it is very important to continue improving regulatory frameworks for activities concerning mining, reprocessing and uranium waste management.

Recommendation 12.5:
The Ministry of Health should reactivate the working group in order to improve intersectoral cooperation and coordination in the implementation of the National Environmental Health Action Plan.

There is little strategic activity in this area, and no extension of the National Environmental Health Action Plan (NEHAP) (2000-2010) is planned at present. Nor has Tajikistan developed a CEHAPE (Children's Environmental Health Action Plan).

Recommendation 12.6:
The Ministry of Health should implement measures for the safe disposal of hospital waste and for the separation of medical waste from municipal and industrial waste.

In the area of medical waste management, since the first EPR review in 2004, new sanitary norms have been elaborated: "Rules of collection, storage and disposal of wastes from medical establishments, SanPiN 2.1.7.020-09". These rules describe the requirements for the management of medical waste. However, they have not been fully implemented, and the problem of safe disposal of medical waste remains.

Annex II

PARTICIPATION OF TAJIKISTAN IN MULTILATERAL ENVIRONMENTAL AGREEMENTS

	Worldwide agreements	Tajikistan	
		Date	Status
1971	(RAMSAR) Convention on Wetlands of International Importance especially as Waterfowl Habitat 1982 (PARIS) Amendment 1987 (REGINA) Amendments	2001	Ra
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)		
1971	(BRUSSELS) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage		
1971	(LONDON, MOSCOW, WASHINGTON) Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil thereof		
1972	(PARIS) Convention Concerning the Protection of the World Cultural and Natural Heritage		
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other 1978 (TORREMOLINOS) Amendments (incineration) 1980 Amendments (list of substances)		
1972	(LONDON, MOSCOW, WASHINGTON) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and their Destruction		
1972	(LONDON) International Convention on the International Regulations for Preventing Collisions at		
1972	(GENEVA) International Convention for Safe Containers		
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and 1979 (BONN) Amendment 1983 (GABORONE) Amendment		
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL) 1978 (LONDON) Protocol (segregated ballast) 1978 (LONDON) Annex III on Hazardous Substances carried in packaged form 1978 (LONDON) Annex IV on Sewage 1978 (LONDON) Annex V on Garbage		
1975	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)		
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)		
1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals 1991 (LONDON) Agreement Conservation of Bats in Europe 1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) 1995 (THE HAGUE) African/Eurasian Migratory Waterbird Agreement (AEWA) 1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	2001	Ra
1980	(NEW YORK, VIENNA) Convention on the Physical Protection of Nuclear Material		
1981	(GENEVA) Convention Concerning Occupational Safety and Health and the Working Environment		
1982	(MONTEGO BAY) Convention on the Law of the Sea 1994 (NEW YORK) Agreement Related to the Implementation of Part XI of the Convention 1994 (NEW YORK) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks		
1985	(GENEVA) Convention Concerning Occupational Health Services		

Ac = Accession; Si = Signed; Ra = Ratification.

	Worldwide agreements (continued)	Tajikistan	
		Date	Status
1985	(VIENNA) Convention for the Protection of the Ozone Layer	1996	Ac
	1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer	1997	Ac
	1990 (LONDON) Amendment to Protocol		
	1992 (COPENHAGEN) Amendment to Protocol		
	1997 (MONTREAL) Amendment to Protocol		
	1999 (BEIJING) Amendment to Protocol		
1986	(GENEVA) Convention Concerning Safety in the Use of Asbestos		
1986	(VIENNA) Convention on Early Notification of a Nuclear Accident		
1986	(VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency		
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and 1995 Ban Amendment		
	1999 (BASEL) Protocol on Liability and Compensation		
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation		
1992	(RIO) Convention on Biological Diversity	1998	Ra
	2000 (CARTAGENA) Protocol on Biosafety	2004	Ra
1992	(NEW YORK) United Nations Framework Convention on Climate Change	1998	Ra
	1997 (KYOTO) Protocol	2008	Ra
1993	(PARIS) Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction		
1994	(VIENNA) Convention on Nuclear Safety		
1994	(PARIS) Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	1997	Ra
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management		
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage		
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	1998	Si
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	2007	Ra

Si = Signed; Ra = Ratification.

	Regional and subregional agreements	Tajikistan	
		Date	Status
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats		
1979	(GENEVA) Convention on Long-range Transboundary Air Pollution		
	1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP)		
	1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30%		
	1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides		
	1991 (GENEVA) Protocol - Volatile Organic Compounds		
	1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions		
	1998 (AARHUS) Protocol on Heavy Metals		
	1998 (AARHUS) Protocol on Persistent Organic Pollutants		
	1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level		
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context		
	2003 (KIEV) Protocol on Strategic Environmental Assessment		
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Waters and International Lakes		
	1999 (LONDON) Protocol on Water and Health		
	2003 (KIEV) Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters		
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents		
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment		

Si = Signed; Ra = Ratification.

	Regional and subregional agreements	Tajikistan	
		Date	Status
1994	(LISBON) Energy Charter Treaty		
	1994 (LISBON) Protocol on Energy Efficiency and Related Aspects		
	1998 Amendment to the Trade-Related Provisions of the Energy Charter Treaty		
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	2001	Ra
	2003 (KIEV) Protocol on Pollutant Release and Transfer Register	2003	Si
1998	(STRASBOURG) Convention on the Protection of Environment through Criminal Law		
2000	(FLORENCE) European Landscape Convention		
2003	(TEHRAN) Framework Convention for the Protection of the Marine Environment of the Caspian Sea		
	The Protocol on Land-Based Sources of Pollution		
	The Protocol Concerning Regional Preparedness , Response and Cooperation in Combating Oil Pollution Incidents		
	The Protocol on EIA in a Transboundary Context		
	The Protocol on Protection of the Caspian Biodiversity		

Si = Signed; Ra = Ratification.

Annex III

KEY DATA AND INDICATORS AVAILABLE FOR THE REVIEW

Air pollution	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Emission of pollutants into the air, total (1,000 t)	..	164.0	204.7	251.2	278.7	296.6	322.2	292.7	..
- by source									
Stationary sources	30.1	36.0	34.4	31.9	37.2	35.1	36.0	36.4	41.0
Mobile sources	..	128.0	170.3	219.3	241.5	261.5	286.2	256.3	..
Emissions of SO_2, total (1,000 t)	..	..	..	..	..	..	..	..	..
- by source									
Stationary sources	6.2	5.6	4.5	3.3	3.4	3.8	3.9	3.4	3.2
Mobile sources	..	..	..	..	..	..	..	..	..
- per capita (kg/capita)	..	..	..	..	..	..	..	..	..
- per unit of GDP in constant prices 2005 PPP (kg/1,000 international dollars)	..	..	..	..	..	..	..	..	..
Emissions of NO_X (converted to NO_2), total (1,000 t)	..	..	..	..	29.5	35.2	37.3	30.6	29.6
- by source									
Stationary sources	0.5	1.4	0.8	0.7	1.2	6.1	6.2	0.6	0.6
Mobile sources	..	..	..	..	28.3	29.1	31.1	30.0	29.0
- per capita (kg/capita)	..	..	..	..	4.13	4.83	5.01	4.04	3.84
- per unit of GDP in constant prices 2005 PPP (kg/1,000 international dollars)	..	..	..	..	2.65	2.94	3.00	2.31	..
Emissions of CO, total (1,000 t)					200.7	215.3	306.2	279.9	300.2
- by source									
Stationary sources	20.5	20.8	20.6	21.0	22.4	19.7	19.9	19.9	22.2
Mobile sources	..	..	..	..	178.3	195.6	286.3	260.0	278.0
- per capita (kg/capita)	..	..	..	..	28.11	29.51	41.09	37.00	38.99
- per unit of GDP in constant prices 2005 PPP (kg/1,000 international dollars)	..	..	..	..	18.05	18.00	24.60	21.11	..
Emissions of total suspended particles (TSP), total (1,000 t)	..	..	0.009	..	..	..	0.011	..	..
- by source									
Stationary sources	..	..	..	..	..	..	..	..	..
Mobile sources	..	..	..	..	..	..	..	..	..
- per capita (kg/capita)	..	..	..	..	..	..	..	..	..
- per unit of GDP in constant prices 2005 PPP (kg/1,000 international dollars)	..	..	..	..	..	..	..	..	..
Emissions of hydrocarbons - Total (1,000 t)	..	..	..	..	35.5	37.7	39.3	39.9	42.1
- by source									
Stationary sources	0.1	0.6	0.8	0.2	0.8	0.9	0.5	0.9	0.9
Mobile sources	..	..	..	..	34.7	36.8	38.8	39.0	41.2
- per capita (kg/capita)	..	..	..	..	4.97	5.17	5.27	5.27	5.47
- per unit of GDP in constant prices 2005 PPP (kg/1,000 international dollars)	..	..	..	..	3.19	3.15	3.16	3.01	..

Climate Change	2003	2004	2005	2006	2007	2008	2009	2010	2011
Greenhouse gas emissions expressed in CO_2 equiv.									
- Total aggregated emissions (1,000 t)	8,489.0	..	..	..	..	..	..	..	..
- by sector (1,000 t)	..	..	..	..	..	..	..	..	..
Energy	2,176.0	..	..	..	..	..	..	..	..
of which combustion in stationary sources	..	..	..	..	..	..	..	..	..
of which combustion in mobile sources	..	..	..	..	..	..	..	..	..
of which fugitive emissions	..	..	..	..	..	..	..	..	..
Industrial processes	808.0	..	..	..	..	..	..	..	..
Solvent and other product use	..	..	..	..	..	..	..	..	..
Agriculture	105.0	..	..	..	..	..	..	..	..
Land use and forestry	..	..	..	..	..	..	..	..	..
Waste	26.0	..	..	..	..	..	..	..	..
Other	..	..	..	..	..	..	..	..	..
Emissions of									
- CO_2 (1,000 t)	5.05	5.43	5.80	6.39	7.23	..	..	..	..
- per capita (t CO_2 eq/capita)	0.79	0.84	0.89	0.96	1.07	..	..	..	..
- per unit of GDP in PPP (t CO_2 eq/1,000 international dollars)	..	..	..	..	..	..	..	..	..

Ozone layer	2003	2004	2005	2006	2007	2008	2009	2010	2011
Consumption of ozone-depleting	4.7	n/a	n/a	4.7	4.4	4.4	3.1	2.6	..

Water	2003	2004	2005	2006	2007	2008	2009	2010	2011
Renewable freshwater resources (million m^3/year)	..	..	..	..	..	..	..	..	..
Gross freshwater abstracted (million m^3/year)	..	..	..	..	..	..	..	..	..
Total water use by sectors (million m^3)									
- Communal sector	344.7	356.4	320.8	311.8	322.0	325.5	305.9	297.0	304.5
- Industry	304.0	200.0	213.0	..	..	..	64.0	..	..
of which water used for cooling	..	..	..	..	..	..	..	..	..
- Agriculture	11,918.0	7,817.0	8,249.0	..	..	..	..	..	..
Household water use per capita (l/capita/day)	92.6	94.5	77.3	76.4	73.2	71.5	62.7	57.5	

Biodiversity and living resources	2003	2004	2005	2006	2007	2008	2009	2010	2011
Protected areas									
- Total area (km^2)	..	28,690.0	28,690.0	28,690.0	28,690.0	28,690.0	29,630.0	..	..
- Protected areas by IUCN categories (% of national territory)	20.0	20.0	20.7	20.7	20.7	20.7	20.7	20.7	20.7
Ia Strict Nature Reserve	0.6	0.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Ib Wilderness Area (zakasniks)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
II National Park	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
III Natural Monument	..	..	..	..	..	..	..	..	..
IV Habitat / Species Management Area	..	..	..	..	..	..	..	..	..
V Protected Landscape / Seascape	..	..	..	..	..	..	..	..	..
VI Managed Resource Protected Area	..	..	..	..	..	..	..	..	..

Biodiversity and living resources (cont't)	2003	2004	2005	2006	2007	2008	2009	2010	2011
Forests and other wooded land									
- Total area (km^2)	4,100	4,100	4,110	4,100	4,100	4,100	4,100	4,124	..
- Total area (% of total land area)	3	3	3	3	3	3	3	3	..
- Undisturbed by humans (1,000 ha)	..	..	320	..	..	..	320	320	..
- Semi-natural (1,000 ha)	..	..	80	..	..	..	80	80	..
- Plantation (1,000 ha)	..	..	10	..	..	..	10	10	..
- Area of regeneration (1,000 ha)	..	..	..	..	..	..	..	..	..
Share of threateaned species (IUCN categories) in total number of species:	399	399	404	404	405	405	405	405	..

Land resources and soil	2003	2004	2005	2006	2007	2008	2009	2010	2011
Agricultural land (1,000 ha)	4,650.0	4,672.0	4,596.0	4,735.0	4,729.0	4,596.0	..	..	..
Soil erosion	..	..	..	..	..	..	..	..	..
- % of total land	..	..	..	..	..	..	..	..	..
- % of agricultural land	..	23.5	..	..	..	..	..	..	..
Total consumption of mineral fertilizers per unit of agricultural land (kg/ha)	63.5	72.9	79.2	60.5	62.1	58.7	54.9	53.8	58.0
Total consumption of organic fertilizers per unit of agricultural land (t/ha)	394.7	414.1	318.5	315.5	278.3	212.6	238.8	272.8	379.8
Total consumption of pesticides per unit of agricultural land (kg/ha)	..	..	0.04	0.06	0.06	0.06	0.05	..	..

Energy	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total final energy consumption (TFC) (Mtoe)	..	..	0.85	0.94	0.81	0.76	0.43	..	..
- by fuel									
Coal	..	..	0.03	0.04	0.01	0.05	0.05	0.06	..
Petroleum	..	..	0.19	0.28	0.19	0.22	0.16	0.15	..
Gas	..	..	0.63	0.61	0.62	0.49	0.22	..	..
Nuclear	..	..	..	..	..	..	..	..	..
Renewables	..	..	..	..	..	..	..	..	..
Electricity consumption (in million kWh)	16,518.0	16,835.0	17,325.0	17,528.0	17,582.0	17,012.0	16,160.0	16,581.0	16,113.0
Energy intensity TPES/GDP (PPP)	0.38	0.36	0.35	0.35	..	..	..	..	..

Transportation	2003	2004	2005	2006	2007	2008	2009	2010	2011
Passenger transport demand (million passenger km)	4,311.7	5,424.7	6,481.7	6,526.0	7,187.3	8,071.7	8,590.5	9,036.1	9,447.7
Freight transport demand (million ton km)	2,315.0	2,736.0	2,901.8	3,034.0	3,863.8	4,152.9	5,012.9	4,957.6	5,508.8

Waste	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total waste generation	..	..	..	..	..	..	..	..	..
of which:									
- Hazardous waste (t)	..	..	..	..	..	..	..	..	..
- Non-hazardous industrial waste (t)	..	..	..	..	..	..	..	..	..
- Municipal waste (1,000 m^3)	..	..	..	..	..	..	..	5,556.0	..
of which from households (1,000 m^3)	..	..	..	..	..	..	..	4,586.5	..

Health and Demography	2003	2004	2005	2006	2007	2008	2009	2010	2011
Population with access to safe drinking water, total (%)	..	..	..	67.0	..	70.0	..	..	..
- Urban (%)	..	..	..	93.0	..	94.0	..	..	..
- Rural (%)	..	..	..	57.0	..	61.0	..	..	..
Population with access to improved sanitation, total (%)	..	..	..	93.0	..	94.0	..	..	..
- Urban (%)	..	..	..	95.0	..	95.0	..	..	..
- Rural (%)	..	..	..	92.0	..	94.0	..	..	..
Active tuberculosis incidence rate (per 100,000 pop.)	167.0	171.0	198.0	185.0	206.0	199.0	202.0	..	..
Health expenditure (% of GDP)	..	..	..	..	..	..	..	..	..
Total population (million inhabitants)	6.6	6.7	6.9	7.0	7.1	7.3	7.5	7.6	7.7
- % change (annual)	2.0	2.0	2.0	2.0	2.1	2.1	2.1	1.5	..
- Population density (inhabitants/km^2)	45.9	46.9	47.9	48.9	49.9	51.0	52.1	52.9	..
Birth rate (per 1,000)	27.1	26.8	26.4	26.7	28.0	27.9	..	..	..
Total fertility rate	3.4	3.4	3.3	3.3	..	..	..	..	..
Mortality rate (per 1,000)	5.1	4.4	4.6	4.6	4.7	4.4	..	..	..
Infant mortality rate (deaths/1,000 live births)	67.0	64.0	62.0	60.0	58.0	56.0	54.0	52.0	..
Female life expectancy at birth (years)	72.3	73.4	73.2	74.4	74.0	74.8	..	..	..
Male life expectancy at birth (years)	67.9	68.6	68.1	69.3	69.4	69.7	..	..	..
Life expectancy at birth (years)	70.1	71.0	70.6	71.8	71.7	72.2	..	..	..
Population aged 0-14 years (%)	39.4	..	..	..	36.4	..	..	..	..
Population aged 65 or over (%)	4.0	..	..	..	4.2	..	..	..	..

Macroeconomic context	2003	2004	2005	2006	2007	2008	2009	2010	2011
GDP									
- change over previous year (% change over previous year; in 2005 prices and PPPs)	11.1	10.3	6.7	6.6	7.8	7.6	4.0	6.5	..
- in current prices and PPPs (million US$)	7,741.0	8,779.0	9,682.0	10,662.0	11,826.0	13,040.0	13,676.0	13,119.0	..
- in prices and PPPs of 2005 (million US$)	8,226.0	9,072.0	9,682.0	10,320.0	11,120.0	11,964.0	12,445.0	13,258.0	..
Registered unemployment (% of labour force, end of period)	2.3	2.0	2.1	2.3	2.5	2.1	2.1	..	..
Net foreign direct investment (FDI) (million US$)	32.0	272.0	54.0	339.0	360.0	376.0	16.0	..	..
Net foreign direct investment (FDI) (as % of GDP)	0.4	3.1	0.6	3.2	3.1	2.9	0.1	..	..
Cumulative FDI (million US$)	101.0	373.0	427.0	766.0	1,126.0	1,502.0	1,518.0	..	..

Poverty	2003	2004	2005	2006	2007	2008	2009	2010	2011
Population below national poverty line									
- Total (%)	72.4	..	..	..	53.1	..	47.2	..	..
- Urban (%)	68.8	..	..	..	49.3	..	41.8	..	..
- Rural (%)	73.8	..	..	..	54.4	..	49.2	..	..
Income inequality (Gini coefficient)	32.6	33.6	..	..	32.6	..	30.8	..	..

Telecommunications	2003	2004	2005	2006	2007	2008	2009	2010	2011
Telephone lines per 100 population	3.9	4.3	4.3	4.4	4.4	4.3	5.1	5.4	..
Cellular subscribers per 100 population	0.8	2.1	4.1	33.0	32.3	54.9	72.2	86.4	..
Personal computer in use per 100 population	..	0.3	1.3	..	..	..	..	..	..
Internet users per 100 population	0.1	0.1	0.3	3.8	7.2	8.8	10.1	11.6	..

Education	2003	2004	2005	2006	2007	2008	2009	2010	2011
Literacy rate (%)	..	..	..	..	..	..	..	..	..
Literacy rate of 15-24 years old, men and women (%)	..	..	..	..	..	..	99.9	..	..
Education expenditure (% of the GDP)	2.0	3.0	4.0	3.0	3.0	3.0	..	4.0	..

Gender Inequality	2003	2004	2005	2006	2007	2008	2009	2010	2011
Country Policy and Institutional Assessment gender equality rating (1=low to 6=high)	..	..	3.5	3.5	3.5	4.0	4.0	4.0	..
Share of women employment in the non-agricutlural sector (%)	41.1	39.8	39.4	37.1	..	..	..	..	..
Gender Parity Index in									
- Primary education enrolment (ratio)	0.95	0.95	0.96	0.95	0.96	0.96	..	..	..
- Secondary education enrolment (ratio)	0.83	0.84	0.83	0.83	0.84	0.87	..	..	..
- Tertiary education enrolment (ratio)	0.33	0.33	0.35	0.37	0.38	0.40	0.41	..	..

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Annex IV

LIST OF MAJOR ENVIRONMENT-RELATED LEGISLATION

Laws

- 1993 Law on Nature Protection
- 1993 Forestry Code
- 1994 Law on Subsoil
- 1996 Law on Air Protection
- 1996 Land Code
- 1996 Law on Specially Protected Territories and Objects
- 2000 Water Code
- 2001 Law on Land Valuation
- 2002 Law on Production and Consumption Waste
- 2002 Law on Hydrometeorological Activity
- 2003 Law on Ecological Expertise
- 2003 Law on Securing Sanitary and Epidemiological Safety of the Population
- 2003 Law on Production and Safe Handling of Pesticides and Agrochemicals
- 2003 Law on Radiation Safety
- 2004 Law on Protection and Use of Plants
- 2004 Law on Use of Nuclear Energy
- 2004 Law on Industrial Safety of Hazardous Installations
- 2005 Law on Biological Safety
- 2008 Law on Fauna
- 2008 Law on Land Administration
- 2010 Law on Protection of Soil

Concepts

- 2001 Concept of Rational Use and Protection of Water Resources
- 2007 Concept of Transition to Sustainable Development
- 2008 Concept of Environmental Protection

Strategies

- 2003 National Strategy and Action Plan on the Conservation and Sustainable Use of Biodiversity
- 2006 National Development Strategy for the period to 2015
- 2010 National Strategy on Public Health for the period 2010—2030
- 2010 National Strategy on Disaster Risk Management for the period 2010—2015
- 2010 Poverty Reduction Strategy for the period 2010—2012

Programmes

- 1996 State Programme on Environmental Education of the Population until 2000 and for the period until 2010
- 2001 National Action Programme to Combat Desertification
- 2002 National Programme on Phasing-out the Use of Ozone Depleting Substances
- 2004 Programme of Economical Development for the period to 2015
- 2005 State Programme on the Development of Protected Areas for 2005—2015
- 2005 State Programme on Planting, Harvesting, Processing of Medicinal Plants and Production of Medicines from them for the period 2005—2014
- 2005 Programme on the Development of Forestry for the period 2006—2015
- 2006 Programme of the Development of the Geological Sector for the period 2007—2015

- 2006 Programme of Recovery of Hydrometeorological Stations and Hydrological Posts for the period 2007—2016
- 2006 Programme on Improvement of Providing to Population the Clean Drinking Water for the period 2007—2020
- 2007 Integrated Programme on the Use of Renewable Energy such as the Energy of Small Rivers, Solar, Wind, Biomass, and Energy from Underground Sources for the period 2007—2015
- 2009 State Environmental Programme for the period 2009—2019
- 2009 State Programme of Tourism Development for the period 2010—2014
- 2010 State Programme of Study and Preservation of Glaciers for the period 2010—2030

Plans

- 2000 National Environmental Health Action Plan (NEHAP)
- 2003 National Action Plan for the Mitigation of Climate Change
- 2006 National Environmental Action Plan
- 2007 National Implementation Plan on Realization of Stockholm Convention on Persistent Organic Pollutants

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