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Preface

The Review of Turkmenistan began in November 2010 with the preparatory mission, during which the final structure of the report was established. Thereafter, the review team of international experts was constituted. It included experts from Bulgaria, the Czech Republic, Estonia, Germany, Kazakhstan, Portugal, the Russian Federation, Slovakia, Switzerland and Ukraine, together with experts from the secretariat of the United Nations Economic Commission for Europe (ECE).

The review mission took place from 21 February to 3 March 2011. The draft EPR report was submitted to Turkmenistan for comment and to the Expert Group on Environmental Performance Reviews for consideration. During its meeting on 13-15 March 2012 held in Ashgabat, Turkmenistan, the Expert Group discussed the report with expert representatives of the Government of Turkmenistan, focusing in particular on the conclusions and recommendations made by the international experts.

The EPR report, with suggested amendments from the Expert Group, was then submitted for peer review to the ECE Committee on Environmental Policy on 18 April 2012. A delegation from the Government of Turkmenistan participated in the peer review. The Committee adopted the recommendations as set out in this report.

The report covers major issues for Turkmenistan, divided into three sections, including the framework for environmental policy and management, management of natural resources and pollution, and economic and sectoral integration. Among the issues receiving special attention during the reviews were the policy, legal and institutional framework; public participation in decision-making and access to information; air pollution; water resources management and Caspian Sea issues; land management; forestry; biodiversity; management of waste; climate change and environmental concerns in the energy sector.

The ECE Committee on Environmental Policy and the ECE review team would like to thank both the Government of Turkmenistan and the many excellent national experts who worked with the international experts and contributed with their knowledge and assistance. ECE wishes the Government of Turkmenistan further success in carrying out the tasks before it to meet its environmental objectives and implement the recommendations of this review.

ECE would also like to express its deep appreciation to the Governments of the Netherlands, Norway and Switzerland for their financial contributions; to the Governments of Portugal and Switzerland for having delegated their experts for the review; and to UNDP Turkmenistan for its support of the EPR Programme and this review.

Executive summary

The Environmental Performance Review (EPR) of Turkmenistan began in November 2010. It analyses the progress made in Turkmenistan from 2000 on environmental protection, and proposes recommendations on how the country can improve its environmental management and address upcoming environmental challenges.

Turkmenistan is a landlocked country in Central Asia, with a continental climate and an insufficient constant surface water flow. The harsh climatic conditions and the transboundary nature of its water resources make the country vulnerable to climate change impacts and water-related pollution threats.

Turkmenistan's budgetary performance remains strong. However, the non-continuous budget data seem to represent only a part of overall government expenditure. The country's gross domestic product (GDP) has been growing since 2005. It is not possible to assess the level of inflation due to the lack of available consumer price index (CPI) and producer price index (PPI) data.

Decision-making for environmental protection

Since its independence, Turkmenistan has been facing rapid economic development which has not been followed by the commensurate development of environmental legislation. Although the system of government is very centralized, the frequent changes in the titles, structure and functions of State bodies create confusion regarding their legal status.

There is no legal definition of the term "sustainable development" and the terms "socioeconomic development" or "economic, political and cultural development" are used instead. The President's 2003 National Strategy of Economic, Political and Cultural Development of Turkmenistan for the Period until 2020 (Strategy 2020) was the main policy document on sustainable development and it is now succeeded by the 2010 National Strategy of Economic, Political and Cultural Development of Turkmenistan for 2011-2030 (Strategy 2030). The economy and nature use are treated as a single unit by Strategy 2030 and State policy is oriented around the following tasks: protection of air quality and development of green belts; water protection; protection and exploitation of land and forest resources; and conservation of biodiversity.

The year 2000 was the starting point for the development of Turkmenistan's environment-related programmes and plans. The National Environmental Action Plan (NEAP), which covered the period 2002-2010, was the main instrument assisting the implementation of environmental strategies. However, NEAP had a limited role and it failed to integrate environmental concerns into all sectors of the economy. The Biodiversity Strategy and Action Plan (BSAP), which has never been formally adopted, and the National Caspian Action Plan (NCAP) aim to implement the State's environmental policies in their respective areas.

Environmental legislation consists of key legal acts regulating the use of natural resources and their protection. These acts are not fully comprehensive and are frequently ineffective in protecting the environment and regulating the rational use of natural resources. For this reason, in March 2011, the Ministry of Nature Protection (MoNP) created a working group on improving national environmental legislation in order to complement existing legislation and improve environmental management in Turkmenistan.

Regulatory instruments for environmental protection

Turkmenistan has no clearly defined procedures for conducting inspections, detecting administrative offences and reporting on such offences. Provisions regulating non-compliance with environmental requirements are outdated and many of the environmental regulations are either not available or not easily accessible for the general public.

The main mechanisms for monitoring compliance with environmental regulations are scheduled inspections and patrolling of natural sites. However, these are done irregularly, without strict criteria for deciding which enterprises are to be inspected, and the results are kept for internal use only. Furthermore, inspections conducted by MoNP are ineffective since they are based mainly on comparison with previous reporting periods.

The Code on Administrative Offences and the Civil Code provide a range of enforcement tools – mainly administrative fines and compensation for environmental harm – while criminal sanctions are rarely applied. Moreover, when cases of non-compliance are detected, the environmental inspectorates do not have enough flexibility to deal with them in a way that is tailored to the specific nature of the offence. The current system does not contain effective sanctions to deter further non-compliance and there is an obvious lack of proportionality between the level of offences and the level of the fines set by the Code on Administrative Offences (which is currently under review).

As of 2000, environmental impact assessment (EIA) has been part of the national legislation and quite a broad range of activities are subject to EIA. However, in most cases, EIA is carried out without application of the public participation procedures. Strategic environmental assessment is not applied at present, and the environmental audit procedure is not included in the current legislation.

Economic instruments and financing of environmental protection

Turkmenistan has experienced strong economic expansion over the past decade. This has been mainly State led although there has been a gradually increasing role played by the private sector. The protection and rational use of natural resources is considered a fundamental principle of Government policy which, as of 2003, also identifies the welfare of the population and the raising of living standards as priority areas.

Fees charged as a feature of the economic instruments introduced to help prevent pollution are much too low to provide incentives for polluters to engage in pollution abatement. Charge rates for the pollution of air and water have not been adjusted for cumulative inflation over the last decade, and their effectiveness cannot be assessed due to the lack of available data. However, the level of revenues appears to be largely insufficient for the task of financing environmental expenditures.

The generous subsidies for the use of electricity, gas, petrol and water create perverse incentives for consumers, which leads to excess consumption and a wasteful use of resources. Due to a lack of metering, there is no effective control over the population's water use; hence, the setting of an upper limit is hard to observe. Despite the 2008 increase in petrol prices, gasoline and diesel are still heavily subsidized.

Administrative fines are imposed in cases of infringement of environmental regulations. However, the fines are set at levels that correspond to only a small fraction of the minimum wage and, hence, are an ineffective instrument for changing the behaviour of those who do not abide by the law.

The State budget is the main source of environmental expenditure financing, but there is a very limited amount of published information on actual expenditure levels. There has been relatively little international assistance given to the country over the past decade, and moderate reliance on international financial institutions, special mechanisms and bilateral assistance.

International cooperation

Turkmenistan is currently a party to 11 international environmental treaties and is making efforts to bring its legislation in line with its international obligations. However, the roles of MoNP and of the State Commission to Guarantee the Implementation of Commitments of Turkmenistan Arising from UN Environmental Conventions and Programmes are not clearly defined. In light of the expiration of NEAP, MoNP is developing a draft national environmental programme for the period 2012-2016.

There has been a significant level of involvement by Turkmenistan with the international environmental community in activities related to biodiversity, nature conservation and desertification. On the other hand, the level of Turkmenistan's commitment to United Nations Economic Commission for Europe (ECE) conventions is low, and the country still has not acceded to other important environmental agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS).

Non-compliance with the multilateral environmental agreements (MEAs) to which it is a party remains an issue for Turkmenistan, especially regarding its obligations under the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention). Further implementation measures need to be taken in order to increase compliance with the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) and the Cartagena Protocol on Biosafety to the Convention on Biological Diversity (CBD).

Water management deserves a special focus in Turkmenistan's policies, and the country's bilateral and regional cooperation with other Central Asian countries needs to be reinforced. The transboundary nature of the water system and the great strain that has been placed on the water resources of the Central Asian region by intense economic expansion show the need for Turkmenistan to engage in productive dialogue with neighbouring countries.

Environmental monitoring, information, public participation and education

After gaining its independence, Turkmenistan managed to maintain its environmental monitoring through a minimal monitoring observation network. However, there are still several issues which need to be addressed, such as obsolete equipment and a lack of publicly available data.

Air quality monitoring is conducted manually and the equipment is obsolete. While a high concentration of dust is observed, the current monitoring system does not distinguish between dust coming from natural and anthropogenic sources. Airborne concentrations of pollutants harmful to human health and the environment, such as PM_{2.5} and PM₁₀ and ground-level ozone, are not measured.

Water monitoring is scattered and uncoordinated. Only two of 16 reservoirs are monitored, while drainage collectors and heavy metals are not monitored (except at the Caspian Sea). Furthermore, information is not being exchanged among the various monitoring institutions. Monitoring of the

Caspian Sea, however, is being done quite effectively by the Caspian Ecological Service (CaspEcoControl).

There has been no qualitative assessment of lands in Turkmenistan since the State Committee for Land Use, Land Management and Land Reform under the Cabinet of Ministers was abolished in 1998. Geographic Information System (GIS) technologies are not applied, remote sensing data are not used in cadastre preparation and equipment is obsolete and outdated.

Turkmenistan is making little effort to ensure that environmental information is accessible to the public. Most of the monitoring results and reports are not publicly available and the information that can be found on the various ministry websites is not comprehensive, not regularly updated and often not available in the Turkmen language.

Turkmenistan does not publish state-of-environment reports. This is contrary to the country's obligations under the Aarhus Convention, to which Turkmenistan is a party. Moreover, MoNP has established neither a legal nor an institutional framework for producing regular environmental assessment reports.

Currently, registered public associations are the only means by which citizens can participate in environmental matters and actions. Furthermore, the laws containing provisions on access to justice are vague and it is unlikely that they are used by citizens extensively, if at all.

The right to environmental education is established in the 1991 Law on Nature Protection. Elements of environmental education are included in all levels of education and there have been considerable investments in new buildings and resources for teaching and research. Sustainable development principles do not appear to be integrated into school curricula. The country has not yet developed an action plan for the implementation of the ECE Strategy on Education for Sustainable Development (ESD).

Air quality management

Air quality assessment and management is amongst the priorities of the country's environmental policy. Although certain practical measures have been taken to reduce emissions from stationary and mobile sources, the existing air quality and emission standards do not allow for proper monitoring and assessment.

Permitting procedures are based on obsolete practices and integrated pollution prevention and control (IPPC) has not been introduced. Furthermore, best available techniques (BAT) have not been defined and, therefore, they are not taken into account during the permit-issuing procedure. The role of EIA is not clearly defined.

The current air quality management system is being developed and implemented separately from mitigation of climate change, and potential synergies cannot be exploited. There is no coordinated approach between these two targets, and measures aiming at energy efficiency or the use of renewable energy sources are not being supported.

Water management and protection of the Caspian Sea environment

Water management is one of the key issues for Turkmenistan, since almost 90 per cent of its water resources go to irrigation. The inefficient and wasteful irrigation system is one of the most acute water management problems. In addition to the water losses, the extensive use of old, traditional

irrigation technology, which uses increasing amounts of water, has salinized more than 60 per cent of agricultural land.

Turkmenistan still lacks a national integrated water resources plan. Currently, there are no instruments to help economize on water use and there are no flexible financial mechanisms or incentives to stimulate the introduction of modern water-saving technologies and practices.

Access by the population to safe drinking water is officially declared to be a priority of State policy. Considerable steps have been taken to reformulate the existing legislative and regulatory framework in this regard, in particular through the recently adopted 2010 Law on Drinking Water. Still, water quality monitoring is rather scattered, uncoordinated and geared towards concrete sectoral interests.

The Caspian Sea plays an important role for Turkmenistan, since the main oil and gas industry is concentrated in the coastal zone. The most important forms of pollution in the Caspian Sea are oil spills caused by oil-related activities, and eutrophication caused by chemical nutrients originating primarily from sewage and agricultural run-off. The Government has made efforts to tackle these pollution sources by implementing the Caspian Sea Environmental Programme, Oil Spill Prevention and National Response Plan, which has resulted in pollution having generally diminished along Turkmenistan's Caspian Sea coast in recent years.

Land management

Agriculture plays an important role in Turkmenistan's policy to make the country self-sufficient with regard to food. Of the country's total surface area of 49.4 million ha, 40.7 million ha are classified as agricultural. Irrigated agriculture provides more than 70 per cent of gross agricultural production.

The main environmental problems are the degradation of vegetative cover of pasture lands, salinization of irrigated lands and waterlogging of desert ranges. Soil salinity and waterlogging has increased in the last decade from roughly 25 per cent to 50 per cent of the irrigated land, resulting in a decline in crop yield of 20-30 per cent. The drainage system is deficient and all discharged waters are diverted into the desert without any treatment. Furthermore, the inefficient irrigation system induces waterlogging and the free allocation of water for agricultural use does not provide any incentive for water-saving practices.

Overgrazing and the destruction of the vegetation cover is an acute problem in Turkmenistan. The draft Pasture Code is a step towards mitigating desertification. The current Land Code contains all the necessary provisions for territorial planning, land surveying and monitoring, and land and soil conservation; however, more detailed regulations for the implementation of its provisions, such as pasture rules, soil protection and liability for damages to the land cover, are still lacking.

Since 1991, no soil analyses have been performed. The lack of available data concerning the state of the soils and pollution by industrial activities in Turkmenistan impedes decision-making on the implementation of measures adapted to the state of the soils. Furthermore, there are no legal provisions regarding the installation of buildings or exploitation sites by enterprises, nor obligations upon enterprises to handle with care and eventually restore the vegetation cover.

Waste management

Waste management has only just begun to be recognized in Turkmenistan to be a priority in environmental management. Waste management is underdeveloped and lacks specialized

legislation, and the practice of disposal of municipal solid waste is poor and does not meet international standards. However, there are financial and human resources available for the necessary modernization of waste management practices.

Management of medical waste receives significantly more attention than other types of waste. The 2009 Medical Waste Management Strategy defines methods of collection and sorting, transportation, treatment and disposal. Other sectors, particularly the oil industry and municipal solid waste sector, still lack sectoral strategies which take waste management into account.

Current waste disposal practices are either non-existent, not followed, or do not comply with international standards. Disposal sites for municipal waste are often located near towns to minimize transportation distances, exposing populations to nuisance and danger, and presenting a long-term threat to human health and the environment. Government institutions do not seem to be sufficiently informed about the status of disposal sites to enable them to efficiently regulate development of the country's waste management sector.

Although a party to the Basel Convention, Turkmenistan does not sufficiently implement it. The country does not fully participate in the activities of the Convention, and in the period 1999-2007 the required annual reporting was submitted only once.

Biodiversity and protected areas

The biodiversity of Turkmenistan has declined significantly over the past century due to desertification, land degradation and overexploitation. However, a comprehensive, up-to-date assessment of the conservation state of ecosystems and species throughout Turkmenistan is impossible due to the incomplete system of biodiversity monitoring. Recent assessments have identified the lack of capacity at the individual, institutional and systemic levels as a limiting factor in biodiversity and protected area (PA) management in the country.

NEAP and BSAP have been the fundamental national policy and planning documents on biodiversity and PA management. Both plans expired in 2010, creating a significant policy gap that calls for the creation of a realistic, effective and sufficiently supported national planning framework.

Turkmenistan's PA system currently consists of eight State reserves which have a strict protection regime. However, the system's effectiveness is limited by its small area of coverage, restricted range of PA categories and governance types, insufficient devolution of decision-making and financial authority, and the restricted participation of local stakeholders and resource users. There is now a critical mass of know-how which should be used to enlarge and diversify the PA system.

Reliable, up-to-date information on the status of and trends in biodiversity is an indispensable prerequisite for proper biodiversity management and decision-making. The third *Red Data Book of Turkmenistan*, published in October 2011, is not fully consistent with the current International Union for Conservation of Nature (IUCN) Red List system. A comprehensive State biodiversity monitoring system has not been established to date, and MoNP and its subordinate bodies lack sufficient capacity to establish it alone.

Turkmenistan has not acceded to a number of key international conventions on biodiversity. Ratifying key international agreements, such as CITES, the CMS and the Agreement on the Conservation of African–Eurasian Migratory Waterbirds (AEWA), would greatly benefit biodiversity governance in the country.

Forestry and forest management

The contribution of forests to environmental protection and the maintenance of the ecological balance is widely recognized in the country. For this reason, the establishment and proper management of State-protected natural reserves and significant areas of planted forests should continue. The new Forest Code, which came into force in July 2011, provides an important basis for better coordination of work and activities aimed at sustainable forest management.

The lack of recent data hinders the comprehensive and consistent classification of forests and wooded lands. Currently, there is no accurate, comprehensive, reliable and up-to-date information supporting sustainable forest management. The latest countrywide forest inventory was implemented in 1988/89.

Turkmenistan has a wealth of experience in the afforestation of desert areas. The country uses several techniques to manage desertification. These include establishing protective forest shelter belts; fixing moving sands; selecting and introducing appropriate resistant species; introducing advanced technology and agrotechnology; and applying more advanced methods in the organization of forestry work. However, these activities are still insufficient to meet countrywide needs.

The lack of appropriate funding and sufficient qualified specialists prevent proper forest monitoring. Proper organization and development of the forestry sector in Turkmenistan is prevented by the lack of budgetary provision. All the measures undertaken by the Government so far have not yet been sufficient to raise the forestry profile to the level of real sustainable forest management.

Climate change

Turkmenistan is faced with serious environmental threats in the light of climate change. The main impacts will be temperature increase and reductions in humidity and rainfall, and as well as in available water resources. The major sources of greenhouse gas (GHG) emissions are the oil and gas industry, the electricity subsector and the transport sector. Inefficient management of energy resources and the use of obsolete technologies add to this problem.

Turkmenistan recognizes the importance of taking initiatives related to climate change at the regional level. Climate change is one of the pillars of the Water Management Development Concept of Turkmenistan until 2030. However, the country has prepared neither a programme to adapt to climate change nor a low-emission development strategy. A major gap overall is that the methodology used to conduct ecological expertise does not address carbon dioxide (CO₂).

The level of public awareness regarding climate change in Turkmenistan is low. Currently, water, electricity (up to a certain limit), gas and a significant amount of fuel are free of charge to the population, resulting in non-efficient use. There is a general lack of conscience among those using these free-of-charge commodities.

Energy and environment

It is believed that Turkmenistan has one of the world's largest reserves of natural gas. Natural gas is the most critical export in terms of national export revenue. However, the production and export of oil and gas can cause severe damage to the environment and there are no publicly available data which ensure that preventive measures are taken during these activities.

As oil and gas pollution poses a major threat to Turkmenistan's coastline, the Caspian Sea deserves special attention. The environmental aspects of production-sharing agreements (PSAs) with foreign companies are not made publicly available. There are no data directly related to pollution caused by refineries; however, the refinery in the city of Turkmenbashi is considered to be a significant source of air, water and land pollution.

The most critical environmental problem related to the hydrocarbon sector is the burning of associated petroleum gas (APG). Nonetheless, regular and reliable statistics on APG flaring are non-existent in Turkmenistan. The country faces major challenges in addressing APG flaring and venting due to the lack of a legislative framework, technologies and resources.

Turkmenistan's energy intensity is very high. The Government has not yet developed any legal or institutional framework for energy efficiency and saving, and electricity tariffs are not attractive enough for investors in energy-efficiency projects. Turkmenistan possesses a certain potential for wind and solar energy production, which could be used to promote sustainable development.

Conclusions and recommendations

Chapter 1 Decision-making for environmental protection

The importance of the coordinating role of the interdepartmental State commissions dealing with environment-related concerns cannot be underestimated. Their effectiveness is far from satisfactory. Their legal status and the rules for their operation, including the issues of their powers and the decision-making procedure, are unclear.

Coordination of the work of different ministries and committees relating to different sectors of the economy is impeded by the lack of sufficient exchange of information. As a result, it is not always possible to include environmental and sustainable development concerns in the governmental decision-making process regarding some economic sectors which have negative environmental impacts.

Appropriate environmental information, accessible to governmental officials in a timely and comprehensive manner, is often lacking. SCS is not able to ensure effective provision of information to decision-makers to help ensure that the interests of environmental protection and the rational use of natural resources are considered on an everyday basis.

Recommendation 1.1:

The Cabinet of Ministers should improve:

- (a) *The effectiveness of interdepartmental State commissions dealing with environment-related issues by strengthening their mandates;*
- (b) *The exchange of information between different ministries and committees by creating a uniform environmental information system at the governmental level.*

The National Environmental Action Plan expired in 2010. At the end of 2011, the drafting of a new national environmental programme for the period 2012-2016 had started. This document will specify the country's environmental priorities.

Recommendation 1.2:

The Cabinet of Ministers should adopt the draft national environmental programme for the period 2012-2016 with effective mechanisms of financing, control over and monitoring of its implementation.

The current legal framework for environmental protection is not sufficient to ensure effective environmental management and rational use of natural resources in the context of the country's rapid economic development. Some important laws are lacking, a factor which does not allow the effective protection of the environment and prevention of environmental degradation.

Recommendation 1.3:

The Cabinet of Ministers should:

- (a) *Facilitate drafting and adoption of new laws on flora and fauna, on protected natural areas, on waste management, on renewable energy and energy efficiency, and on pastures;*
- (b) *Facilitate the introduction of provisions on access to environmental information to existing laws, and the updating of existing laws, such as those regulating biodiversity conservation, protection of atmospheric air and ecological expertise;*

- (c) *Develop and adopt secondary legislation that would strengthen the system of environmental, land and water legislation.*

National and international experience has shown that the existence of a national strategy for sustainable development is a prerequisite for the effective integration of environmental policy into economic and social sectors.

In the case of Turkmenistan, although the term “sustainable development” is used in some subregional policy documents adopted by the country, a functional legal definition has not yet been developed.

Recommendation 1.4:

The Cabinet of Ministers should:

- (a) *Develop a functional legal definition of “sustainable development” that will allow its integration into policy documents;*
- (b) *Improve policies that promote sustainable development;*
- (c) *Develop a national sustainable development strategy, including a coherent set of targets;*
- (d) *Strengthen institutional mechanisms of intersectoral cooperation by creating a body that will promote the development and implementation of sustainable development programmes and plans.*

Chapter 2 Regulatory instruments for environmental protection

Currently, the inspection activities of MoNP lack effectiveness and efficiency. One of the main reasons for this is that the performance appraisal undertaken by environmental inspectors from MoNP is based mainly on comparison with previous reporting periods. As mentioned above, the only data from the reporting by inspectors, nature reserves and the Ministry’s departments which is analysed are the number of inspections conducted, the number of detected cases of non-compliance, amounts of fines imposed and collected, and level of compensation payable for environmental damage.

It is not surprising that some provincial DNPs report almost identical results on inspections and detection of non-compliance with environmental requirements from one year to another. Accordingly, it can be concluded that many environmental inspectors are simply trying to repeat once-achieved results, and this is not considered to be a deficiency of the current reporting system.

Recommendation 2.1:

The Ministry of Nature Protection should:

- (a) *Improve its current approach to the performance appraisal of environmental enforcement activities of its subordinated structures;*
- (b) *Review, by taking into account international practices, performance indicators allowing measurement of progress achieved through the inspection and enforcement activities.*

EIA is already included in national legislation, and EIA documentation is reviewed in approximately half of the projects subject to SEE. In most cases, however, EIA is carried out without the application of public participation procedures. The few examples of projects with some public consultation seem to be inconsistent with the requirements of international standards on public participation in EIA. Affected populations and even the few environmentally focused public associations in Turkmenistan have not been involved in discussion of the potential environmental impacts of relevant projects. This also concerns strategic decisions relating to the environment,

including plans and programmes, which are usually made without the active involvement of the public.

Recommendation 2.2:

The Ministry of Nature Protection should undertake necessary practical measures for the implementation of the requirements on public participation of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, and the national environmental impact assessment (EIA) legislation through the involvement of the public in the EIA procedures and State ecological expertise process, as well as into decision-making on programmes, plans and policies relating to the environment.

The lack of public access to information is deemed to be one of the most serious shortcomings of enforcement of the environmental protection regime in Turkmenistan. Even basic data on inspection and enforcement activity collected through statistical reporting are kept confidential. Furthermore, the texts of many environmental regulations and requirements are either not available or not easily accessible for the public, making the overall process of environmental enforcement non-transparent and less understandable for the regulated community and the public.

Recommendation 2.3:

The Ministry of Nature Protection should ensure the availability to the general public of information and data on environmental inspections and enforcement, and on environmental regulations and requirements.

As a whole, environmental enforcement lacks clear priorities and target goals with regard to ensuring compliance by the regulated community with environmental legislation. No policy or legal documents establish such objectives, priorities and targets. Moreover, analysis of data included in inspectorate reports and information has not shown a clear relationship between the inspection and enforcement activities carried out and achievement of the country's environmental objectives. At least, such analysis is not considered to be a priority by the provincial DNPs, CaspEcoControl, nature reserves and MoNP inspectors.

On the one hand, it seems that environmental enforcement is too focused on detection of environmental violations by individuals and the application of sanctions upon them. On the other hand, when they inspect industrial operations, environmental enforcement authorities are focused on compliance with formal requirements, such as the requirement for facilities to have positive conclusions from SEE, approved ecological passports, and emission and discharge limit values. However, environmental enforcement is insufficient to adequately tackle real-time environmental and health-related issues such as water, air and land pollution, particularly by operators of industrial activities.

Recommendation 2.4:

The Ministry of Nature Protection should develop an environmental enforcement strategy with a focus on the environmental performance of operators of industrial activities and measures taken by operators for the achievement of better compliance with environmental requirements.

The system of permit-issuing for installations is fully based on former Soviet ad hoc practice (with MAEs calculated ad hoc on the basis of MACs); neither technology-based ELVs nor generally binding quantitative technical requirements are in place. The concept of IPPC has not been introduced. BATs are not defined and therefore not applied in EIA procedures.

Recommendation 2.5:

The Ministry of Nature Protection, in cooperation with other relevant ministries, should:

- (a) Consider, in the medium term, preparing new legislation setting rules for environmental permit-issuing, taking into account the concept of integrated pollution prevention and control (IPPC);*
- (b) Define guidance for national best available techniques (BATs), taking into account country-specific conditions; these national BATs should be utilised as a background for setting technology-based emission limit values and for permit-issuing;*
- (c) Introduce technology-based emission limit values and other generally binding, quantified requirements to reduce, step by step, air and water pollution in selected major polluting sectors and industries (including technically and economically achievable compliance deadlines).*

Chapter 3 Economic instruments and financing of environmental protection

Turkmenistan imposes charges on enterprises for the pollution of air and water. Rates were set some 10 years ago and have remained unchanged ever since. Nominal rates have declined significantly in real terms due to the lack of compensation for considerable cumulative inflation since 2000. There is evidence to support the environmental effectiveness of such pollution charges which, however, are much too low to create meaningful incentives for polluters to engage in pollution abatement. While there are differentiated charge rates for major air pollutants, there is no equivalent system of effluent charges. Instead, enterprises pay a nominal charge per m³ of wastewater discharged.

The upshot is that the current system of pollution charges is quite distant from an effective application of the “polluter pays” principle. Also, the effectiveness of the fees applied for the use of flora and fauna in ensuring adequate nature conservation has not been established. These fees have also declined in real terms due to the lack of adjustment for cumulative inflation over the past decade. Revenue generated by pollution charges and fees for the use of flora and fauna is therefore likely to be quite modest, although there are no data available to assess their revenue-generating capacity.

Recommendation 3.1:

The Ministry of Nature Protection, in cooperation with relevant authorities, should:

- (a) Strengthen the effectiveness of pollution charges in creating adequate incentives for pollution abatement and control. It is also important to create a legal provision that ensures a timely adjustment of charge rates and fees for use of flora and fauna to compensate for inflation;*
- (b) Review existing charges for air emissions and wastewater discharges in order to introduce an optimal and effective set of charges based on a limited number of specific pollutants;*
- (c) Abolish existing exemptions from payment of air pollution charges by oil companies working on the basis of production sharing agreements.*

A striking feature of Turkmenistan’s economic system is the generous provision of subsidies for use of water by the population and in agriculture. Agriculture is by far the dominant water user (and a major water polluter) in Turkmenistan, given the strong concentration on the cultivation of irrigation-intensive crops (cotton and grain). Farmers do not pay for the volume of water abstracted, and only a nominal fee is charged for the maintenance of the internal irrigation and drainage networks, while the external network is maintained with funds allocated from the State budget.

As regards water supply tariffs, the feature has been free provision of water to the population since 1993. Although there is a legal provision for an upper limit to water supply, it cannot be enforced because of the general lack of water meters. The subsidy policy does not discriminate between the poor, who would need some support to afford adequate access to water resources, and the better-off strata of society, who could afford paying a price that covers the costs of water supply and sewerage services. In fact, it may be assumed that many people would be prepared to pay for these services if this were accompanied by an improvement in quality of service delivery. The current system tends to create perverse incentives for consumers, who do not know the real value of the water resources they are using. There are, therefore, no incentives for resource savings, which, in turn, leads to a wasteful use of water resources.

Yet Turkmenistan has relatively scarce water resources, which can be expected to diminish with progressive climate change over the coming decades. The Government is investing heavily in modernizing the water supply and sewerage networks, notably in rural areas, which can be expected to reduce major technical water losses. The irrigation and drainage network also needs to be rehabilitated, which should also result in water savings due to the planned shift to more efficient irrigation techniques, such as drip irrigation.

But these technical measures are not a substitute for creating effective incentives for a rational use of water resources by private households and in agriculture. The experience gained in developed countries and beyond suggests this is best done by putting a price on water resources, which, in turn, requires measuring the actual use of water. In other words, the installation of water measuring devices and charging for water use are part and parcel of an effective water conservation policy.

Given the current situation in Turkmenistan, these measures can only be implemented over a longer time period. They need to be embedded in a broader package of complementary reforms which address issues such as the modus operandi of water utilities and their financial sustainability; the financing of the installation of water meters; and the affordability of adequate water use by low-income earners.

Recommendation 3.2:

The Cabinet of Ministers should develop and implement a strategy for the introduction of effective mechanisms and instruments for rational use of water resources. This involves, notably:

- (a) The universal installation of water measuring meters in households and water user associations and provision of appropriate financial support for that purpose;*
- (b) Gradually raising water tariffs to a level that allows full recovery of operating and investment costs and therefore ensures the financial sustainability of the water sector.*

Operations in the energy sector of Turkmenistan are not based on commercial principles. The sector has remained vertically integrated and State owned. There are frequent disruptions of electricity supply. Power generation and distribution networks are in poor condition and require significant upgrading. Free provision of electricity and gas to the population and tariffs which are most likely significantly below cost recovery levels, preclude efficient use of energy and, instead, stimulate excessive consumption. Subsidized prices for electricity and gas have also adversely affected the competitiveness of renewable energy sources (wind and solar power). There is a need for gradual price reform for energy products which could be part and parcel of a general reform of the energy sector, involving the unbundling and commercialization of the various activities.

Recommendation 3.3:

The Cabinet of Ministers should

- (a) Ensure the installation of gas meters to all households and provide appropriate financial support for that purpose;*

- (b) *Consider reforming energy tariffs by gradually raising prices of electricity and gas to levels that ensure full cost recovery and create effective incentives for the efficient use of energy.*

The traditional supply of petrol for all owners of motor vehicles at a nominal price of only 1 to 2 US cents per litre came to an end in February 2008, when the Government enacted a significant increase in petrol prices. However, petrol prices are still heavily subsidized. Moreover, the authorities have introduced a coupon system that entitles every owner of a motor vehicle to obtain a certain amount of petrol per month free of charge. In the event, the costs of petrol are still so low that there are no real incentives for vehicle owners, with the possible exception of those in low-income households, to economize on the consumption of petrol, with associated adverse consequences for urban air pollution. In principle, the pump price of petrol includes an ad valorem excise tax which amounts to 40 per cent of the pump price. It is not clear whether this tax was applied to all vehicle owners before 2008, when pump prices corresponded to only 1 to 2 US cents. In any case, in order to uncouple the corresponding tax revenues from the petrol price, the Government could consider introducing a specific excise tax per litre of petrol sold.

Recommendation 3.4:

The Cabinet of Ministers should continue the process of gradually raising vehicle fuel prices to levels which limit the adverse environmental impacts of higher vehicle fuel consumption, while taking into account broader socioeconomic implications of such measures and, at the same time, supporting environmentally sustainable modes of transport.

There is very little publicly available information on *actual* domestic environmental expenditures in Turkmenistan. This pertains notably to the public sector, which is reported to account for the large bulk of these expenditures. But the information that is available suggests that environmental expenditures are relatively high, although it is another matter whether or not they are sufficient for effectively addressing all the major environmental problems. The use of foreign assistance (grants and loans) has remained relatively limited so far. Turkmenistan has relied only moderately on international financial institutions, special mechanisms (such as GEF and the Montreal Protocol's Multilateral Fund) and bilateral assistance.

Recommendation 3.5:

The Cabinet of Ministers should:

- (a) *Ensure that there is adequate funding for the implementation of the country's international environmental commitments;*
- (b) *Increase transparency concerning the environmental expenditures made by the State and the enterprise sector;*
- (c) *Increase cooperation with multilateral institutions and bilateral donors – notably, developed countries – to benefit more than in the past from targeted financial and technical assistance.*

The extent to which environmental considerations have been effectively integrated into various long-term national development strategies is difficult to gauge in the absence of detailed information on the implementation of these strategies. However, the fact that there are no overall institutional mechanisms for cross-sectoral discussions of economic and environmental issues suggests that there is a need for strengthening the integration of environmental considerations in development strategies for major economic sectors. In this context, it would also be useful to have a forum for discussing the best combination of economic and regulatory instruments to increase the overall effectiveness of environmental policy.

Recommendation 3.6:

The Ministry of Nature Protection, in cooperation with other competent governmental bodies, should review the extent to which the existing combination of regulatory and market-based (economic) environmental policy instruments should be changed in order to improve the effectiveness of environmental policy.

Chapter 4 International cooperation

Turkmenistan has increased its international cooperation with multilateral bodies. The country has expanded its engagement within the international community on environmental issues over the last 20 years and has made progress with respect to a number of international environmental issues. It is currently a party to 11 MEAs. The country has made use of several international mechanisms to acquire technical and financial assistance in support of its national environmental priorities and is actively engaged in a number of regional agreements. Progress has been made in pursuing national follow-up to the Conferences of the Parties of almost all conventions to which the country is a party.

However, further rationalizing and improving environmental legislation would strengthen provisions with respect to enforcement of international obligations and overcome some inconsistencies in the way international obligations are being transposed. These inconsistencies can be overcome by efforts over time to plug the loopholes, enforce compliance and adopt a coherent approach. NEAP, the main State programme on the environment, has expired and national priorities for external assistance are not clearly defined, which are weaknesses which undermine the cohesion of environmental measures and the effectiveness of external assistance.

Recommendation 4.1:

The Cabinet of Ministers should:

- (a) Continue strengthening national actions in support of multilateral environmental agreements (MEAs) and programmes;*
- (b) Utilize fully the technical and financial support available from the international community through these mechanisms by concluding the alignment of national legislation with international and regional obligations of MEAs to which the country is a party.*

Although the institutional framework for enforcing international environmental obligations in Turkmenistan is solidly developed, there is an unclear boundary between the powers of the State Commission to Guarantee the Implementation of Commitments of Turkmenistan Arising from UN Environmental Conventions and Programmes, and those attributed to MoNP, in meeting the country's obligations. MoNP has insufficient capacity to implement the wide range of international obligations stemming from international conventions.

Recommendation 4.2:

The Cabinet of Ministers should:

- (a) Improve the mechanism of work and the coordinating functions of the State Commission to Guarantee the Implementation of Commitments of Turkmenistan Arising from UN Environmental Conventions and Programmes;*
- (b) Strengthen the capacity of focal institutions responsible for multilateral environmental agreements and programmes and expand their participation in international environmental networks.*

Despite progress made so far, Turkmenistan has to strengthen implementation of some MEAs such as the Basel Convention, Aarhus Convention and the Cartagena Protocol, at both the level of implementing measures and the level of reporting.

There is a need for the country to keep up the pace as part of international efforts to address biodiversity challenges. Acceding to MEAs to which Turkmenistan is not a party would be another step, given the efforts made within the country to protect the environment. This would also raise the country's international profile. A matter concerning non-compliance with the Aarhus Convention has not yet been resolved.

Recommendation 4.3:

The Ministry of Nature Protection, in cooperation with other relevant authorities, should take appropriate measures to fully comply with the:

- (a) *Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal;*
- (b) *Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice;*
- (c) *Cartagena Protocol on Biosafety to the Convention on Biological Diversity.*

Recommendation 4.4:

The Ministry of Nature Protection, in cooperation with other relevant authorities, should assess the costs and benefits of and promote accession to those multilateral environmental agreements to which it has not yet become a party, such as the:

- *Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade;*
- *Stockholm Convention on Persistent Organic Pollutants (POPs);*
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora;*
- *Convention on Migratory Species;*
- *Agreement on the Conservation of African-Eurasian Migratory Waterbirds;*
- *Convention on Long-range Transboundary Air Pollution, and its protocols;*
- *Convention on Environmental Impact Assessment in a Transboundary Context, and its Protocol on Strategic Environmental Assessment;*
- *Convention on the Transboundary Effects of Industrial Accidents;*
- *Nagoya Protocol on Access to Genetic Resources to the Convention on Biological Diversity.*

Once these have been ratified, the Cabinet of Ministers should take steps to achieve their effective implementation.

Water management in Turkmenistan depends not only on the country's own efforts but also on cooperation among the riparian States of the Amu Darya river basin. Given the transboundary nature of the water system, the long-term solution needs to be a negotiated one. Ratification of MEAs embodying the principle of equitable and reasonable utilization of transboundary waters would support these efforts.

Recommendation 4.5:

The Ministry of Water Economy, in cooperation with other relevant authorities, should assess the costs and benefits of, and promote accession to, the following multilateral environmental agreements:

- *United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses;*

- *Convention on the Protection and Use of Transboundary Watercourses and International Lakes, and its Protocol on Water and Health.*

Recommendation 4.6:

The Cabinet of Ministers should extend the dialogue with neighbouring countries on issues related to transboundary rivers, with a view to ensuring sound management of water quality and quantity, and increasing cooperation among Central Asian countries.

Chapter 5 Environmental monitoring, information, public participation and education

The country's monitoring system of air quality is not adapting fast enough to growing needs. The current number of monitoring stations is insufficient given the rapidly growing population in big cities and newly built urban areas. Important pollutants, such as ground-level ozone, are not measured.

The monitoring equipment used by RPCEM ranges in age from 15 to 30 years old. Owing to the insufficient supply of testing chemicals, reference specimens and other reagents, some parameters are measured only sporadically. All RPCEM laboratories need to be modernized, which would make it possible to conduct new types of chemical analysis. RPCEM plans to enhance the monitoring information network by introducing automatic processing and storage of information in a single electronic hub. In addition, it plans to equip the laboratories in the NPDs with computers, to enable automatic exchange of monitoring data.

Responsibility for water monitoring is shared among various institutions in Turkmenistan, but there is little cooperation and exchange of information between them. The coverage of water bodies remains low; for example, only two of 16 reservoirs are monitored.

Recommendation 5.1:

The Ministry of Nature Protection should review the national environmental monitoring system to identify gaps, weaknesses and inconsistencies, and to develop a strategy with an action plan for further modernization and upgrading of the monitoring networks in line with international guidelines and best practices.

Turkmenistan is making little effort to ensure that environmental information is accessible to the public. MoNP does not regularly update its website. Other ministries, such as MoHMI, MoWE, MoA and the Ministry of Energy and Industry, as well as SCS, do not actively communicate to the general public the environment-related data and information that they collect or produce. National reports and communications to the governing bodies of MEAs are not uploaded onto websites and are thus not available to the general public.

Recommendation 5.2:

The Cabinet of Ministers should ensure that relevant ministries and other government bodies regularly upload onto their websites environment-related data and information that they collect or produce.

Recommendation 5.3:

The Ministry of Nature Protection should regularly upload onto its website copies of national reports and communications submitted to the governing bodies of multilateral environmental agreements in the national and, if available, other languages.

Turkmenistan produces a substantial amount of environmental data and information. However, it does not publish state-of-environment reports. This is contrary to the country's obligations under

the Aarhus Convention, to which Turkmenistan is a party. The Cabinet of Ministers has not established a legal and institutional framework for producing regular environmental assessment reports, as recommended by the Guidelines on the Preparation of Governmental Reports on the State and Protection of the Environment, and the Guidelines for the Preparation of Indicator-based Environment Assessment Reports in Eastern Europe, Caucasus and Central Asia, which were endorsed at the 2003 (Kiev) and 2007 (Belgrade) Environment for Europe Ministerial Conferences, respectively.

Recommendation 5.4:

The Cabinet of Ministers should establish a system for periodically producing national indicator-based environmental assessment reports, taking into account the internationally agreed guidelines.

For this purpose, in particular:

- (a) The Cabinet of Ministers should establish an inter-agency expert group composed of all relevant State institutions and representatives of academia and non-governmental organizations;*
- (b) The Ministry of Nature Protection should establish a dedicated supporting working unit.*

Due to its current status and number of staff, the Service for Land Resources under MoA cannot perform all the same activities as did the State Committee for Land Use, Land Management and Land Reform under the Cabinet of Ministers (the State Committee was abolished in 1998). There has been no qualitative assessment of land in Turkmenistan since that date. In the process of cadastre preparation, GIS technologies are not applied, and remote sensing data and satellite images are not used. The equipment is obsolete and there is no information centre with an electronic database of information on land cover and use in Turkmenistan.

Recommendation 5.5:

The Cabinet of Ministers should ensure that:

- (a) The land assessment of the country is carried out and the land cadastre is updated periodically, through modern technologies such as geographical information systems technologies, remote sensing data and satellite images;*
- (b) An information centre with data on all land users in the country is established.*

Following the introduction of the 2003 Law on Public Associations, the number of such associations in the country has been reduced. As a result of changes introduced by the 2003 Law, the only available channel for interested citizens to engage with or in environmental initiatives is through the handful of currently registered national public associations, since non-registered associations and initiatives are prohibited by law. This is not in accordance with international practices and is considered to restrict the ability of the wider public to participate in non-centralized, non-bureaucratized and spontaneous initiatives aimed at improving environmental protection, education and awareness.

Recommendation 5.6:

The Cabinet of Ministers should consider revising the 2003 Law on Public Associations to encourage environmental initiatives, and to facilitate the registration and operation of environment-related public associations.

The absence of an adequately developed conceptual approach to the broader issues of ESD in schools makes it difficult for the majority of school graduates to gain a holistic understanding of environmental concerns. ECE has developed the Strategy on ESD to assist the efforts of member States to better apply ESD principles and introduce relevant materials in school curricula.

Recommendation 5.7:

The Cabinet of Ministers should:

- (a) Develop and adopt an action plan for the implementation of the ECE Strategy on Education for Sustainable Development (ESD) and nominate focal points for ESD in the Ministry of Education and the Ministry of Nature Protection;
- (b) Strengthen cooperation with ECE and its Steering Committee on ESD to enhance the implementation of ESD, and to exchange materials, experiences and good practices.

Chapter 6 Air quality management

Every year, air quality standards for TSP are reported as having been exceeded in all big cities, but the contribution of dust of natural origin to total air pollution by suspended particulate matter is not known. Existing air quality standards are not sufficient to enable up-to-date air quality assessment. Standards are lacking for certain important pollutants – mainly particulate matter PM₁₀ and PM_{2.5}.

The existing system of air quality monitoring is obsolete and not coordinated, and its results are not being interpreted by dispersion models (taking into account emissions and meteorological data). There is no automated monitoring station in operation. No air quality information system is available to the public. The national emission inventory is not complete, as it does not cover all relevant emission sources and pollutants.

Recommendation 6.1:

The Ministry of Nature Protection and the Ministry of Health and Medical Industry, in cooperation with relevant institutions, should:

- (a) Develop methodology for calculations and measurements to assess the contribution of nature-originated dust to total pollution by suspended particulate matter (measurement of mass-size distribution of particles and analysis of the chemical composition of particulate size fractions);
- (b) Consider revision of existing air quality standards and the introduction of additional standards (in the first stage for PM₁₀ and, in the second stage, for PM_{2.5}), taking into account the contribution of nature-originated dust, and set realistic compliance deadlines;
- (c) Replace, gradually, existing manual stations by automated air monitoring stations;
- (d) Ensure coordination between the stations' respective air quality monitoring programmes;
- (e) Introduce a methodology for air quality assessment (interpretation of monitoring data by the dispersion model, taking into account emissions and meteorological parameters);
- (f) Improve the existing national air quality information system and operate it in cooperation with the National Committee on Hydrometeorology under the Cabinet of Ministers.

Recommendation 6.2:

The Ministry of Nature Protection, in cooperation with the State Committee on Statistics, should:

- (a) Improve the methodology of national emission inventories (including emissions from mobile sources, small (not registered) stationary sources and diffused sources);
- (b) Strengthen reporting mechanisms on emission data;
- (c) Incorporate emission data into the national air quality information system.

An air quality assessment and management system is being developed and implemented separately from mitigation of climate change (reduction of GHG emissions), as a result of which potential synergies cannot be used.

Recommendation 6.3:

The Ministry of Nature Protection, in cooperation with other relevant ministries, should:

- (a) *Introduce an integrated approach to measures related to air quality management and climate change mitigation (the “one measure, two effects” approach);*
- (b) *Support non-combustion renewable sources of energy (hydro, solar, wind) as well as energy efficiency measures and energy savings.*

Chapter 7 Water management and protection of the Caspian Sea environment

The water management sector in Turkmenistan plays a significant role in the whole country's economy, as a big share of agricultural production depends on water availability, mainly for irrigation. There are also water supply needs for the population and for industry. The water sector has developed over the past 20 years based on a planned economic management system. The President and the Government outlined the country's priorities for water management in Strategy 2030. Much attention is given to reformulating and extending the legislative and regulatory framework, and the recently adopted Law on Drinking Water was a key step in that direction.

However, despite current regulations and programmes, water resources are not used efficiently and the quality of surface water bodies is degraded and under continuous pressure. Although the main principles of IWRM are set out in the Water Code, it is necessary to reorganize the water management system throughout the country, by means of a national IWRM plan covering not only the country as a whole but also individual water basins separately.

Recommendation 7.1:

The Ministry of Water Economy, in cooperation with relevant authorities in water management, should develop legal acts on integrated water resources management (IWRM) in water basins, based on the results of analysis of the current water legislation, to identify how to apply principles of IWRM.

Recommendation 7.2:

The Ministry of Water Economy should:

- (a) *Develop a national IWRM plan with the involvement of relevant water users in the planning process;*
- (b) *Establish basin management structures for the Murgab, Tejen and Atrek Rivers, and also for relevant canal systems, and ensure the coordination of actions according to a detailed plan.*

According to the Water Code, water in Turkmenistan for irrigation and drinking water purposes is free of charge within the allocated limits. The Government is responsible for the development of irrigation and drainage systems at the basin and sub-basin level. Although the Government pays great attention to water-saving ideas, there is still a shortage of analyses and practical guidelines on how to save water, using both economic and technological means. To reduce the water deficit, it is possible to take measures by improving the technical state of irrigation systems and applying modern water-saving irrigation techniques and a closed system of water supply.

Recommendation 7.3:

The Ministry of Water Economy should:

- (a) *Analyze water economy and environmental consequences on water delivery by both open canals and pipelines;*
- (b) *Ensure water savings, and optimal and environmentally sustainable water use, by effective and cost-efficient regulatory, economic and technical measures.*

The value of water in the country is high. The national event, “A drop of water is a grain of gold”, is widely celebrated every year at the beginning of April. There is widespread public understanding that water should be managed economically in a sound way. It became clear during the past decade that there would be a water shortage if the volume of water in the Amu Darya River were to decrease owing to the traditional method of water use.

The elaboration and implementation of modern economic instruments may help to better control the delivery and rational use of water. Use of economic instruments may also improve accountability for resources used, and provide incentives to improve technologies and management techniques. It is important to introduce effective economic mechanisms between water users and governmental water delivery institutions.

Recommendation 7.4:

The Cabinet of Ministers should:

- (a) *Develop further legislation facilitating the improvement of existing economic instruments, and the introduction of incentives and subsidiary mechanisms to support effective water use;*
- (b) *Develop a national water-saving programme with concrete incentives for introducing efficient water-saving methods;*
- (c) *Review the norms for household water use in order to promote water savings.*

There are governmental programmes to improve the water management situation in the country, both in irrigation and in the water supply and sanitation sector. There are concrete tasks to undertake regarding the main drainage collectors and Lake Altyn Asyr. Important works are planned for the rural water supply sector. A State programme is being implemented for improving water supply. The Government plans to pursue its investment in the water sector. At the same time, there is a need to look for new funding possibilities (e.g. in the private sector), especially with the idea of improving settlements' water supply systems.

Recommendation 7.5:

The Cabinet of Ministers should continue mobilizing new investments programmes by more actively pursuing all possibilities, including the involvement of the private sector, in areas such as modern water-saving technologies for efficient irrigation practices and better water supply infrastructure.

The Caspian Sea and its resources are important for Turkmenistan. Turkmenistan has elaborated several plans and programmes to tackle environmental problems affecting sea areas. Among these are CEP and the Oil Spill Prevention and National Response Plan. The Government attaches high priority to implementing these programmes and plans, and the general level of pollution along the Turkmen part of the Caspian coast has fallen in recent years, giving Turkmenistan an opportunity to use the potential of the Caspian Sea coast for recreational purposes. Accordingly, it is important to coordinate all available resources in a more effective way under coastal zone management plans, with clear and measurable indicators for supervision.

Recommendation 7.6:

The State Enterprise of Caspian Sea Issues under the President of Turkmenistan, together with other relevant institutions, should:

- (a) *Develop coastal zone management plans to significantly improve control over water pollution, introduce environmentally sustainable aquaculture and increase the marine area under protection;*
- (b) *Develop further monitoring capacity, both offshore and on the coast;*

- (c) *Expand the capacity for pollution response to minimize the risks from the activities of the oil and gas sector;*
- (d) *Assist with the implementation of obligations under the signed protocols on the protection of the Caspian environment.*

Chapter 8 Land management

Overgrazing and destruction of the vegetation cover is an acute problem in Turkmenistan, in particular around the settlements and the wells in the desert ranges. Pilot projects and actions against desertification have been developed which focus on this issue. The implementation of the relevant regulations and promotion of sustainable land management would impact upon desertification. It is estimated that the current capacity of the utilized grasslands could be maintained if proper measures on the preservation and rehabilitation of pastures were implemented, even if grassland productivity were to decrease further as a result of climate change. Although there is cooperation between various public stakeholders on some topics related to desertification, it is still weak. For example, full scale monitoring and assessment of desertification is still lacking.

The National Framework Programme on Sustainable Use of Land Resources has been developed within CACILM. As an integral part of Strategy 2030, it proposes activities aimed at increasing the amount of irrigated land and solving the problem of soil salinization, but the country lacks a strategy on sustainable land management. The 1997 NAPCD is of a descriptive character and lacks concrete activities and measures. A revision of NAPCD and related actions would strengthen activities on fixing sand dunes and other erosion control measures.

Recommendation 8.1:

The Cabinet of Ministers should:

- (a) *Strengthen cooperation between the governmental authorities in charge of forestry, pastures, agriculture and water management to promote sustainable land management focusing on desertification monitoring and assessment, early warning systems, water resource use, combating soil deflation and salinization, and rangeland management;*
- (b) *Develop a sustainable land management strategy taking into account the National Framework Programme elaborated under the Central Asian Countries Initiative for Land Management;*
- (c) *Revise the National Action Plan to Combat Desertification, to strengthen actions for fixing sand dunes and other erosion control measures, including actions which could be delegated to farmers' and other associations.*

Overgrazing and destruction of vegetation cover pose an issue around the settlements and wells in the desert ranges. The current capacity of the used grasslands could be maintained if proper measures for the preservation and rehabilitation of pastures were implemented, even if grassland productivity were to decline further as a result of climate change.

The necessary measures for the preservation and rehabilitation of grasslands are part of a comprehensive approach to flock management in cooperation with flock owners. This includes the creation of grassland and protecting fodder fields with wood and bush plants. The irrigation of some grassland territory and the cultivation of new forage species in the crop rotations are additional measures to decrease pressure on natural ranges. Furthermore, integrated feeding management of flocks could be developed, combining adequate grazing, pasture rotations, fodder crop feeding and distribution of winter reserves in cattle pens.

Recommendation 8.2:

The Ministry of Agriculture and the Association Turkmenmellary should introduce extension services at district level, in order to help the farmers' associations, private owners and shepherds to make animal production both more profitable and environmentally friendly.

Turkmen crop rotations are limited and cotton often occupies more than half of the surface, which is not sustainable and causes soil degradation and loss of fertility. To combat this problem, soil fertility can be increased by enforcing science-based crop rotation adapted to the specificities (climate and soil potentials) of the country's territories. Integrated good practices, which also limit the use of pesticides and fertilizers, have been developed in pilot projects, supported by foreign donors. Lessons can be drawn from these pilots and extended to the country as a whole.

The main reason for the loss of soil fertility is the salinization and secondary salinization of the agricultural soils that are irrigated, but where the drainage system is deficient. The rehabilitation and maintenance of the irrigation and drainage channels are necessary. Water is free of charge for agricultural use. Most probably, pricing for water as a resource – even at a symbolic price such as that which applies to the land rented to the farmers – would help implement water-saving practices.

The State gives a 50 per cent discount on payment for seeds, techniques and machinery services, and chemical and mineral fertilizers. However, the provisions of such grants are not conditional on respecting sound crop rotations and good agricultural practices.

Recommendation 8.3:

The Ministry of Agriculture should:

- (a) Develop and implement market mechanisms conducive to improving land and water management in relation to the specific land and soil quality conditions of each district;*
- (b) Revise guidelines on agricultural systems and crop rotations for agricultural stockholding societies, to promote the prevention of soil degradation and loss of fertility, among other purposes.*

Recommendation 8.4:

The Cabinet of Ministers should introduce rewards to farmers and farmers' associations using environmentally friendly agricultural and water-saving practices.

Since 1991, no comprehensive soil analyses have been performed. The central Soil Monitoring Laboratory was closed in 1997. As a result, no updated and reliable figures can be produced on the state of the soil in Turkmenistan over recent decades, hampering decision-making on the implementation of measures adapted to the state of the soil.

The assessment of irrigated farmland by means of an electronic database and a monitoring system for soil salinization is poorly developed in Turkmenistan. This is one of the serious issues demanding urgent resolution.

Recommendation 8.5:

The Cabinet of Ministers should:

- (a) Establish a system of regular soil monitoring and assessments by the Ministry of Agriculture;*
- (b) Re-establish agrochemical laboratories at the provincial level for soil analysis to be performed both to meet the needs of agricultural production and support environmental protection.*

The impact of industrial development on the desert increases every year. Cities and settlements make use of desert lands near the oases. As a result, significant areas of open, unfixed sand surfaces appear and require urgent attention. Moving sands pour onto infrastructure facilities (ring-roads, railways, highways, and pipelines), threatening their use.

These sands may also cover fertile soil, turning it into desert soil. According to the Land Code, land damaged as a result of extraction of mineral resources and construction of infrastructure must be reclaimed. In addition, soil quality and the soil cover must be protected.

This is applicable to grazing activity but not to industrial activities which are polluting the soil and destroying the land cover. There are currently no laws or by-laws containing provisions on soil protection inspections.

Recommendation 8.6:

The Ministry of Nature Protection, in cooperation with relevant institutions, should extend existing legislation on soil protection to cover damage to land cover caused by industrial activities.

In 1989, the pasture map (scale 1:200,000) was prepared with extensive field scouting and a great level of accuracy (samplings in transects, laboratory analysis of the samples, use of air photographs). This map is an important basic tool for environmental research and the application of environmental policy. It has not been updated.

Recommendation 8.7:

The Ministry of Agriculture and the Ministry of Nature Protection should:

- (a) Ensure the updating of the pasture map using modern survey systems to account for the progression of the desertification;*
- (b) Ensure that the results of State inspections of the land cover are used for updating the pasture map.*

Chapter 9 Waste management

Waste management in Turkmenistan is underdeveloped in general. On the other hand, there are financial and human resources available for the necessary modernization of waste management.

The key issue for the improvement of waste management in Turkmenistan is defining waste management on a level equal to air pollution control or water management. In addition, it is necessary to stress that there is in-country expertise which was used in the formulation of a very good medical waste programme, and there is capacity for action, as was proven by TurkmenChemistry in the clean-up of toxic waste throughout the country.

Recommendation 9.1:

The Ministry of Nature Protection, in cooperation with the Ministry of Communal Services, the Ministry of Health and Medical Industry and other relevant bodies, taking into consideration international waste management practices, instruments and agreements, should develop:

- (a) Draft legislation on waste management and on a waste classification system;*
- (b) A national waste management programme.*

Following the example of the National Programme of Safe Management of Medical Waste in Health Facilities, other sectors would also need to consider developing sectoral programmes on waste management. Priority could be given to the oil industry as the key industrial sector and to MSW, as it is the most common waste generated in the country.

Recommendation 9.2:

The Ministry of Oil and Gas Industry and Mineral Resources, the State Concern TurkmenNeft, and all relevant oil and gas sector agencies, together with the Ministry of Nature Protection, and preferably in cooperation with international companies active in Turkmenistan, should prepare an action plan on management of waste from the oil and gas sector.

Recommendation 9.3:

The Ministry of Nature Protection, on the basis of the national waste management programme to be developed and together with other relevant institutions, should:

- (a) Identify priorities where international expertise can be effectively utilized for the programme implementation;*
- (b) Include waste management components in projects aimed at the development of municipal infrastructure, water protection and industry modernization.*

Recommendation 9.4:

The Ministry of Health and Medical Industry should continue implementing the Programme of Safe Management of Medical Waste in Health Facilities and monitor progress made in its implementation.

The current practice of waste disposal does not fully consider the application of modern technology in this area. New waste disposal sites are planned. The situation is critical, especially with regard to the disposal of MSW and industrial waste. Information on disposal sites exists at the local level only.

Recommendation 9.5:

The Ministry of Nature Protection should:

- (a) Develop, in cooperation with the State Committee on Statistics, for the municipalities of Ashgabat, and other main cities, provinces and relevant ministries and agencies, a register of disposal sites for municipal solid waste and for industrial solid waste;*
- (b) Apply risk assessment methodology for the estimation of risks resulting from industrial waste disposal to ensure the development of safe disposal methods and replacement of old dumps by modern facilities.*

Chapter 10 Biodiversity and protected areas

Both NEAP and BSAP expired in 2010. This creates both the need and the opportunity to fundamentally improve the practice of national action planning on biodiversity and to arrive at new planning documents which are both realistic and sufficiently supported.

Recommendation 10.1:

The Ministry of Nature Protection should:

- (a) Analyse the results of the implementation of the 2002 National Environmental Action Plan of Turkmenistan until 2010 and the Biodiversity Strategy and Action Plan for Turkmenistan for the Period 2002-2010, including challenges and constraints;*
- (b) Use lessons learned to develop a new, realistic and focused strategy and action plan in accordance with the Aichi Biodiversity Targets under the Convention on Biological Diversity, and submit them to the Cabinet of Ministers for adoption.*

The effectiveness of Turkmenistan's PA system is limited by its small area coverage, restricted range of PA categories and governance types, insufficient devolvement of decision-making and attraction of financial resources, and restricted participation of local stakeholders and resource users. At the same time, there is now a critical mass of know-how and information to draw upon to

enlarge and diversify the PA system, which creates a unique opportunity to improve its overall effectiveness.

Recommendation 10.2:

The Ministry of Nature Protection should:

- (a) *Strengthen the protected nature areas system, through the creation of new protected areas in identified high-value areas and the introduction of internationally established protected areas categories;*
- (b) *Improve the protected areas' activities in order to attract additional financial resources;*
- (c) *Involve the public, particularly local resource users, actively in protected areas governance.*

Regularly updated, reliable information on the state of biodiversity and natural resources is an indispensable prerequisite for effective biodiversity management. However, MoNP and its NIDFF lack sufficient capacity to establish a viable countrywide monitoring system for biodiversity and natural resources that is based on international good practice. Therefore, a concerted effort by MoNP, NIDFF and all relevant national institutions – possibly with international donor support – is needed to collaboratively establish a national biodiversity monitoring system, based on existing monitoring schemes in State reserves. To achieve these goals, MoNP could seek assistance from international donors.

Recommendation 10.3:

The Ministry of Nature Protection, in cooperation with academia and non-governmental organizations, should:

- (a) *Improve the national biodiversity monitoring system based on international good practices;*
- (b) *Use monitoring results to improve the system of quotas for key biodiversity resources that are currently used in Turkmenistan;*
- (c) *Use results of scientific research in decision-making regarding biodiversity conservation;*
- (d) *Raise awareness of the value of ecosystems services in order to promote biodiversity conservation.*

Recent assessments have identified a lack of capacity at the individual, institutional and systemic levels as a limiting factor of biodiversity and PA management in Turkmenistan, including within the MoNP Department of Protection of Flora and Fauna. This could be improved by continued capacity-building efforts at all levels of the administration as well as among local PA stakeholders, and improving simple training courses and university courses on ecology, nature conservation and natural resources management.

Recommendation 10.4:

The Ministry of Nature Protection should

- (a) *Continue implementing capacity-building programmes at the institutional and systemic levels to address the limitations of biodiversity and protected areas management;*
- (b) *Collaborate more intensively with academic institutions in order to improve academic training on biodiversity conservation and natural resources management.*

Chapter 11 Forestry and forest management

Turkmenistan has extended areas of planted forests, including the green belts around cities, towns and other settlements. The planting and growing of indigenous tree species resistant to droughts

and high air temperatures allows irrigation intensity to be reduced and, at the same time, increases the vitality of trees and further development of plants.

These are needed for the protection of water and soil, in addition to providing recreation opportunities for the population and contributing significantly to the mitigation of climate change effects and the adaptation of natural ecosystems to present-day environmental conditions.

Properly protected natural sandy desert forests and OWL prevent the degradation of desert ecosystems, and provide excellent areas for distant pastures. The same holds true for juniper forests with their key ecological and protective function; the rich genetic fund of natural pistachio trees and stands, offering major potential for selection work; wild/natural fructiferous stands, which are important for the national economy; and *tugai* forests – ecosystems with an indispensable water protection and anti-erosion function.

For sustainable forest management, accurate, comprehensive, reliable and up-to-date information is badly needed but is currently not readily available. Currently available data are based on various ad hoc surveys, research and scientific analyses. The latest countrywide forest inventory was implemented in 1988-1989.

Recommendation 11.1:

The Cabinet of Ministers should:

- (a) *Expand afforestation/reforestation activities to address country needs with regard to afforestation/reforestation, the fixation of moving sands, combating soil erosion and salinization, and the creation of agricultural shelter belts, by adopting new and implementing existing local plans for sustainable forest management;*
- (b) *Explore funding opportunities with international and donor organizations.*

Recommendation 11.2:

The Cabinet of Ministers should

- (a) *Carry out a countrywide comprehensive forest inventory, forest accounting and the State forest cadastre in order to:*
 - (i) *Facilitate the decision-making process;*
 - (ii) *Elaborate, on the basis of results, detailed forest management plans for all forest enterprises and a map of key forest ecosystems;*
- (b) *Prepare cartographic materials for various types of wooded lands.*

The priorities regarding forestry and forest management are well understood by the Government, and the key components required to draw up a forest programme aimed at the protection, restoration and rational utilization of forests and other wooded lands are, in fact, available. Despite the fact that the programme of tree planting and establishing “green belts” has been given the rank of a State programme, the absence of a national forest programme and an action plan is one of the main obstacles to the development of sustainable forest management in the country.

All of the measures undertaken by the Government so far have not yet been sufficient to raise the forestry profile to the level of genuine sustainable forest management. To move further along these lines, there is a need to elaborate a coherent forest policy system and a properly coordinated, legal, institutional and financial framework for national forestry. The first steps in this direction have already been taken. The direct involvement of local communities, public associations and individuals is also an important aspect to raise the profile of forestry and to achieve Government objectives.

Yet political will is not sufficiently effective without budgetary provisions for the development of forestry, especially for the preservation and re-establishment of the natural forests because the SFF is exclusively State owned and is subject to protection and rational use by the State.

At present, this is one of the most serious constraints preventing proper organization and development of the forestry, including forest monitoring and forest inventory, forest administration and management at the national and local levels.

Recommendation 11.3:

The Ministry of Nature Protection, in cooperation with relevant stakeholders, should develop a national forest programme and action plan based on a new forest inventory, and submit them to the Cabinet of Ministers for adoption.

Recommendation 11.4:

The Cabinet of Ministers should gradually reform and further develop the forestry funding system in order to promote sustainable forest management and protection.

Recommendation 11.5:

The Ministry of Nature Protection, in cooperation with local authorities, should develop and implement local programmes or projects aimed at the restoration of degraded forest lands.

Chapter 12 Climate change

Beginning with an already harsh climatic situation, Turkmenistan is faced with the prospect of further increased hardship with an increase in temperature and a reduction in humidity and rainfall, as well as a reduction in available water resources and the increasing needs of countries with which it shares water resources. This calls for adequate adaptation measures on health, water and food security, in view of the high vulnerability of the population.

At the same time, Turkmenistan is going through a phase of rapid economic development fuelled by the high value of its export commodities, natural gas and oil, and further increases in production are expected with the discovery of new deposits of natural gas, which are some of the largest in the world. The tendency will be towards an increase in GHG emissions, which can, however, be offset by improvements in energy efficiency and modernization of technology in oil, gas, electricity production and other industries.

There is political will to address climate change, as Strategy 2030 expresses concerns on sustainable development and has environmental protection as one of its three pillars. Most of the concerned 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. The State Commission on Climate Change and the Interdepartmental Commission on the Clean Development Mechanism focus on both adaptation and UNFCCC implementation; however, there is a need to strengthen everyday operational work on climate change, currently undertaken by a single staff member.

Recommendation 12.1:

The Cabinet of Ministers should establish an operational structure on climate change issues to coordinate and monitor adaptation and mitigation measures.

The First and Second National Communications to the UNFCCC are currently the main national documents reporting on climate change. The recent communication depicts a very clear situation. Although the GHG inventory ceases at 2004, the text provides insights on the current situation and proposes guidelines and measures to address climate change issues on both adaptation and

mitigation. However, further instruments to adequately address climate change are still lacking. When developing them, it would be important to keep in mind that the oil and gas industry, the electricity industry (production and consumption) and other industries, can contribute significantly to the improvement of national energy efficiency indicators and a reduction in GHG emissions.

Recommendation 12.2:

The Ministry of Nature Protection, in cooperation with other ministries and State agencies, should develop:

- (a) *A strategy on adaptation identifying priority areas and an action plan with a list of concrete activities;*
- (b) *A low carbon emission development strategy.*

As the recent communication to the UNFCCC reveals, there is a basic understanding of the risks associated with climate change, but understanding of the broad implications for different communities, sectors of the economy, ecosystems and development is low. Hydromet and other scientific institutions have very limited capacity to conduct meteorological and hydrological research and forecasts, and there is a lack of remote sensing capabilities. In these circumstances, the country is making a significant effort to try to produce results such as the GHG inventory and running models of climate change impacts. However, the model coarse grid resolution does not allow concrete results.

Recommendation 12.3:

The Cabinet of Ministers should:

- (a) *Strengthen the capacity of the National Committee on Hydrometeorology under the Cabinet of Ministers by expanding its observational network and types of observation in the area of climate change;*
- (b) *Improve the national statistical system with inclusion of indicators that are necessary to produce a greenhouse gas inventory.*

The level of awareness regarding climate change is low in Turkmenistan, among both rural and urban inhabitants. This could be explained by the use of free commodities – water, gas, electricity, and subsidized fuel. Improving public awareness can increase water and energy efficiency, and also increase the climate resilience of particularly vulnerable groups, such as the rural poor, women, children and the chronically ill.

Recommendation 12.4:

The Ministry of Nature Protection, in cooperation with the Ministry of Education and other relevant stakeholders, should:

- (a) *Raise awareness of climate change issues among local governments, the mass media and school teachers;*
- (b) *Promote the inclusion of materials related to climate change problems in the educational plans and programmes of educational institutions.*

In order to adapt to climate change, some priorities are identified in the recent communication to the UNFCCC. A key aspect that should be considered in all sectoral and specific research is the close relationship between climate change and natural resources, in particular biodiversity and forests. Forest ecosystems and OWL are considered to be: (a) important carbon sequestration pools (carbon sinks); (b) indispensable tools for combating desertification; and (c) vital cradles of biodiversity. Thus, proper sustainable management of forest ecosystems is key to the implementation by Turkmenistan, as a party, of all three Rio global conventions, namely the CBD, UNFCCC and UNCCD.

Recommendation 12.5:

When undertaking decisions on climate change, the Cabinet of Ministers, in cooperation with relevant stakeholders and academia, should expand afforestation programmes making use of the natural reforestation potential and indigenous tree species, and ensure grassland protection and recovery

Chapter 13 Energy and environment

Analysis of the structure and scale of the impact of energy sector activities on the environment is critical. Volumes of pollutant inputs into the environment should be examined by the energy operators and authorities. A detailed analysis of the sources, composition and degree of hazard of pollution components is a necessary component of environmental control. Pollution levels in different regions as well as ranges of typical pollutant levels in the surface waters and air should be provided for public consideration.

Recommendation 13.1:

The Ministry of Nature Protection should:

- (a) Improve the procedure of environmental impact assessment by companies and State enterprises involved in the energy sector in accordance with international standards;*
- (b) Introduce gradually, in cooperation with relevant agencies, environmental audits for these companies and State enterprises.*

The production of gas and oil can cause severe damage to the environment. In Turkmenistan, emissions from the oil industry account for 75-80 per cent of total national emissions of pollutants. Data on sources, types and volumes of pollution and waste discharges during oil and gas activities, are well known and allow environmental authorities to develop necessary preventive measures. However, these data are not publicly available. While the institutional and legislative framework has been created and Turkmenistan has signed several international environmental treaties, access to relevant information is lacking. For example, there are no data relating to oil and gas activities onshore, where only national companies operate.

It is clear that special attention should be paid to the Caspian Sea environmental issues. With oil and gas production and marine transport expected to increase in coming years, the risk of oil spills and other leakages will increase. Due to the fact that the Caspian Sea is a closed sea, pollution can remain in the area for decades. Oil and gas pollution is, unfortunately, one of the major causes of the environmental degradation of the Caspian Sea due to the accumulation of hydrocarbons, heavy metals and other toxins associated with oil and gas.

Recommendation 13.2:

The Cabinet of Ministers should:

- (a) Review the consistency of existing energy sector legislation with the requirements of the Aarhus Convention in terms of public access to environmental information and national environmental legislation;*
- (b) Encourage companies and State enterprises involved in the energy sector to voluntarily make environmental information publicly available.*

While the fuel and power sectors have the best prospects of operating with less energy loss, there are no available data on energy efficiency/saving potential. At the same time, the absence of an energy efficiency institutional and legislative framework, along with large subsidies for electricity and natural gas, represents a critical barrier for any energy efficiency measures. Turkmenistan needs to decrease its very high energy intensity. Through energy efficiency/saving activities, the nation could save a significant amount of natural gas which could be exported, especially when

new pipelines are commissioned. In addition, the country should meet the requirements of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) signed in 1995 and ratified in 1997, and formulate clear national policy aims for improving energy efficiency and reducing the energy cycle's negative environmental impact.

Furthermore, the Government could invest in alternative sources of energy, in particular small solar projects to ensure sustainable development of remote rural communities, as well as full-scale wind power projects, which could be cost effective when export prices for natural gas are taken into account.

Recommendation 13.3:

The Cabinet of Ministers should:

- (a) Prepare a draft law on energy efficiency;*
- (b) Develop a strategy on development of renewable energy for the period until 2030 taking into account international practices;*
- (c) Establish a State agency for energy efficiency and renewable energy, which will take a leading role in identification of energy efficiency and renewable energy potential, development of relevant policies, legislation, regulations and projects as well as in public awareness campaigns;*
- (d) Seek international experience and assistance in developing energy efficiency and renewable energy policies, measures and programmes.*

Effective regulations and the provision of the right incentives are crucial to reducing gas flaring. Turkmenistan lacks efficient, effective regulations on flaring and venting. Due to a lack of expertise, the Government needs international assistance with the preparation of relevant regulations and enabling the use of associated gas via the creation of the right incentives, such as proper regulatory structures governing pricing, distribution, shared transport, export facilities, etc. Moreover, procedures for issuing flaring and venting permits, monitoring flaring and venting volumes, and enforcing operational standards should be developed. International assistance with the development of legislation on gas flaring might be helpful.

Recommendation 13.4:

The Cabinet of Ministers should strengthen compliance with existing legislation related to gas flaring.