

ECONOMIC COMMISSION FOR EUROPE
Geneva

WATER SERIES No. 4

**TRANSBOUNDARY
WATER COOPERATION**

**TRENDS IN THE NEWLY
INDEPENDENT STATES**



UNITED NATIONS
New York and Geneva, 2006

NOTE

The designations used and material presented in this publication do not constitute an expression by the United Nations Secretariat of any opinion concerning the legal status of any country, territory, town or region, or concerning their authorities or the delimitation of their frontiers.

ECE/MP.WAT/16

UNITED NATIONS PUBLICATION
Sales No. E.06.II.E.8
ISBN 978-92-1-116942-3
ISSN 1020-0886

FOREWORD

Cooperation on transboundary waters is a cornerstone of UNECE environmental activities. This is manifested in the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) and its Protocols on Water and Health (1999) and Civil Liability (2003).

With the emergence of new countries in the 1990s, new frontiers cut through Europe. As a result, the Danube river basin, Europe's largest, is now shared by 18 countries. The rivers Daugava-Zapadnaya Dvina, Dnieper, Kura, Syr Darya and Amu Darya as well as Lake Peipsi-Chudskoye Ozero also became transboundary waters after the break-up of the Soviet Union.

The process of change in Europe poses new and compelling challenges to regional cooperation in general and to cooperation on environment and security in particular. The newly independent States¹ require special attention. Managing their transboundary waters, including allocating water among users in sovereign States, now requires in many cases a new and jointly negotiated legal and regulatory framework.

The present publication is the outcome of the UNECE Water Convention's project on "Transboundary water cooperation in the newly independent States", which aimed to establish bilateral and multilateral cooperation and secure the adoption of measures for strengthening it.

Cooperation and dialogue on problems of shared water resources to prevent conflicts and contribute to confidence building are part both of the Environmental Strategy for Countries of Eastern Europe, the Caucasus and Central Asia and of the corresponding component of the EU Water Initiative.

UNECE and in particular its secretariat for the Convention on the Protection and Use of Transboundary Watercourses and International Lakes will continue to play a leading role in programmes and initiatives aimed at achieving the sustainable management of water resources in the region.



Marek Belka
Executive Secretary
Economic Commission for Europe

¹ The 12 countries referred to in this publication as the "newly independent States (NIS)" are: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. All these countries are also members of the Commonwealth of Independent States (CIS).

INTRODUCTION

Part I of the publication examines existing transboundary cooperation, including bilateral and multilateral agreements. It highlights the problems facing NIS countries and provides examples of new developments and trends of cooperation on transboundary waters. It draws conclusions and recommends action to improve the implementation of existing agreements and draw up new agreements in line with the basic principles of the UNECE Water Convention. These actions include: drafting and implementing legislation; setting up and strengthening national organizations and joint bodies as well as a system of consultation and mutual assistance; monitoring and assessment; access to information and public participation; and planning for river basin management. Part I also proposes measures regarding demonstration projects, programme development and financing by donors. Implementation measures and follow-up activities are also examined.

Part II of the publication sets out best practice, trends and bottlenecks in transboundary water cooperation for all 12 newly independent States as well as large transboundary river basins, such as the Aral Sea, Seversky Donets and Dniester basins. The practice of international organizations adds value to the experience of all these countries and will help them in their future work.

The partners that helped to implement and fund the project were: the United Nations Economic Commission for Europe (UNECE); the United Nations Environment Programme's Regional Office for Europe (UNEP/ROE); the Ministry of Natural Resources of the Russian Federation; the Swedish Environmental Protection Agency; and the Agency for Environmental Assessments (Ecoterra), a Russian non-governmental organization.

As the first stage of this project a workshop was convened to address bilateral and multilateral cooperation on transboundary waters in the NIS region (Moscow, 31 March - 1 April 2003). It brought together representatives of UNECE countries, among them 11 NIS, as well as representatives of NGOs and international organisations.

The material prepared by the experts participating in the workshop played an extremely important role. The work done by Mr. Nikolay Grishin (Ecoterra) to bring together and edit the material was very valuable. The priorities identified in this publication for future joint activities are now being further developed and implemented by UNECE and other partners in the region.

One of these activities is the project on "Capacity for water cooperation" (CWC project). In accordance with the Convention it will facilitate the exchange of experience between joint bodies, such as river basins organizations, and countries of the NIS region and elsewhere. The project has a dual aim. On the basis of the outcome of the Moscow workshop it is necessary, firstly, to create a framework for exchange of experience among representatives of the NIS and, secondly, to facilitate at the same time the transfer of experience from successful institutions within and outside the region. This long-term capacity-building project will be developed around a series of workshops for NIS decision-makers and experts between 2004 and 2007.

The CWC project has links to other European programmes and initiatives on the sustainable management of water resources.

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PART I

***TRANSBOUNDARY WATER
COOPERATION
IN THE NEWLY INDEPENDENT STATES***

N. GRISHIN, F. BERNARDINI, R. ENDERLEIN and B. LIBERT

1. Introduction

This paper is the main output of the “Transboundary Water Cooperation in the Newly Independent States” project. It builds on and further develops the conclusions from the High-level Meeting on the Strategic Partnership on Water for Sustainable Development held in Moscow on 5-6 March 2003 (see below). It aims to define the status, trends and further needs with regard to transboundary water cooperation in the newly independent States (NIS), and between NIS and their neighbours. The analysis and recommendations will provide a basis for future actions and projects for the development of cooperation in the NIS on transboundary waters, in particular within the work programme of the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) and the Strategic Partnership on Water for Sustainable Development.

A draft of the paper was discussed during the Workshop on Transboundary Water Cooperation in the newly independent States (Moscow, 31 March - 1 April 2003), organized within the framework of the project. The paper was finalized and agreed upon by the project’s partners on the basis of the discussions during the Workshop. It was drafted by Mr. Nikolay Grishin, a UNEP consultant, and Ms. Francesca Bernardini, Mr. Rainer Enderlein and Mr. Bo Libert from the UNECE secretariat. The document was made available during the Fifth Ministerial Conference “Environment for Europe” (Kiev, 21-23 May 2003) and the third meeting of the Parties to the UNECE Water Convention (Madrid, 26-28 November 2003).

2. Transboundary waters in the NIS region

Annex 1 lists the major transboundary rivers and lakes shared by the NIS, and the relevant agreements². There is considerable interdependence between countries with regard to water resources. In particular in Central Asia, cooperation between countries sharing rivers such as the Syr Darya and

the Amu Darya is crucial for life, the economy and political stability. The reliance of Azerbaijan on water from the transboundary river Kura for irrigation, drinking and other purposes is another example.

Many water allocation and pollution problems that were previously national issues within the Soviet Union are now transboundary. This requires a new and negotiated legal and regulatory framework for water resources management between sovereign States, which will take some time to develop. There is generally a positive attitude towards establishing good cooperation on transboundary water issues in the NIS, and much has been achieved since the dissolution of the Soviet Union. However, examples can be found of difficulties in establishing good cooperation. In some cases agreements have not yet been established between countries. Or, if there are agreements, these are not always fully implemented, and may not be effective tools to tackle the relevant issues, nor address social, economic and environmental aspects.

3. Regional and global conventions

The NIS subregion is part of the UNECE region, the only region where a legal environmental framework has been put in place. This legal framework provides a basis for the establishment of cooperation on specific rivers and lakes.

The Convention on the Protection and Use of Transboundary Watercourses and International Lakes was signed in Helsinki (17 March 1992). It was developed under the auspices of UNECE, and entered into force on 6 October 1996. It plays an important role in the development of transboundary water cooperation in many parts of the UNECE region. Its Protocol on Water and Health addresses the prevention, control and reduction of water-related diseases.

A decade has passed since the signing of the Convention, and there are issues that were not fully dealt with during the negotiations and which need to be further developed. Landscape protection, the ecosystem approach, flood protection and water allocation are a few examples. Work under the

² No inventory of shared groundwater resources has so far been drawn up.

Convention is currently dealing with some of them, such as flood protection and water allocation. During the third meeting of the Parties to the Convention in November 2003, it was decided to extend the Convention's scope beyond the UNECE region, as is already the case for several UNECE protocols.

Two other regional conventions, and their recent protocols, are also important for cooperation on transboundary waters: the UNECE Convention on the Transboundary Effects of Industrial Accidents and the UNECE Convention on Environmental Impact Assessment in a Transboundary Context.

These regional conventions are complementary and have provisions on public participation, environmental impact assessment, joint bodies, etc.

The legal framework continues to grow and at the Ministerial Conference in Kiev the Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents as well as the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context were open for signature. The Protocol on Civil Liability was signed by 22 countries and the Protocol on Strategic Environmental Assessment by 36 countries and the European Community.

The NIS have been active at the international level, participating in the negotiations of UNECE environmental conventions, ratifying many environmental conventions and protocols, and developing subregional cooperation on the basis of various bilateral and multilateral agreements. An inventory of agreements on transboundary rivers and lakes in the NIS is presented in annex 3. Annex 4 lists some examples of environmental agreements in force in the NIS. Annex 5 lists examples of draft agreements proposed or under negotiation. The status of ratification of the UNECE environmental conventions is detailed in annex 6.

After the recent ratification by Belarus of the UNECE Water Convention, there is a continuous space from the north coast of the Baltic Sea (Finland) to Kazakhstan through the Russian Federation– (Estonia - Latvia - Lithuania - Russian Federation (Kaliningrad region) - Belarus - Poland - Ukraine - Hungary - Romania - Republic of Moldova - Ukraine - Russian Federation – Kazakhstan) where the Water Convention is in force.

Some countries in the Caucasus (Armenia, Georgia) and in Central Asia (Uzbekistan, Tajikistan, Kyrgyzstan and Turkmenistan) have not yet ratified the Convention.

The Water Convention is made up of two main parts. Part I contains provisions relating to all Parties, whereas Part II sets out provisions relating to Parties that are riparian to a given transboundary watercourse.

Important provisions for the development of water cooperation in the NIS are found in Part II of the Convention. These are provisions on bilateral and multilateral cooperation (art. 9), consultations (art. 10), joint monitoring and assessment (art. 11), common research and development (art. 12), exchange of information between riparian countries (art. 13), warning and alarm systems (art. 14), mutual assistance (art. 15) and public information (art. 16). Some will be discussed in this paper.

The number of NIS that become Parties to different UNECE international treaties is increasing (annex 6). The role of the UNECE environmental legislation, and in particular of the UNECE Water Convention, is growing in the NIS. This trend is positive, also as the UNECE environmental conventions may contribute to the harmonization of legislation between the EU and the NIS.

The EU Water Framework Directive³ is an important addition to the legal framework even if it is not legally binding on the NIS. It can be seen as a subregional response to implement the Water Convention, and it will foster the development of transboundary cooperation on shared water basins

³ Directive 2000/60/EC of 23 October 2000, published in Official Journal L 327 of 22 December 2000.

inside the European Union and along its borders. The EU Water Framework Directive will have a significant and broad effect on the development of integrated water resource management and water cooperation also in NIS, one reason being the link that is already being made between the Directive and assistance provided by the EU. In general the Directive has become a reference for most NIS, which are aligning their national legislations with it, especially those countries that are aiming to become EU members.

The United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (1997) is a global convention providing a framework for cooperation on shared water resources. This Convention focuses more on water allocation but is in other parts “softer” than the Water Convention, for example with regard to the obligation to conclude river basin agreements. It has been discussed as an alternative for a framework for transboundary cooperation in Central Asia. None of the NIS has yet ratified this Convention.

4. Transboundary water agreements before and after the break-up of the Soviet Union

4.1. Transboundary water agreements of the Soviet Union

The Soviet Union signed some agreements dealing with transboundary waters regulating different aspects of their use and protection. Examples of such agreements are found in some earlier UNECE publications⁴ and in annex 3.

In some cases Joint Commissions were established under the agreements. Joint Commissions were established between the Soviet Union and Persia according to the Soviet-Persian agreement of 1926⁵, between the Soviet Union and Turkey, according to the Turkish-Soviet Convention of 1927⁶. Joint Commissions between

the Soviet Union and China was established according to the Soviet-Chinese Agreement of 1986⁷. On the other hand, no commission was established under the Norwegian-Soviet Agreement of 1957. Commissioners appointed by the the Contracting Parties worked together under the Soviet-Norwegian Agreement of 1959⁸ and the Soviet-Iranian Agreement of 1963⁹.

Some of these agreements were prolonged after the dissolution of the Soviet Union, as they had been working successfully for decades.

4.2. Development of cooperation after 1991

Several water basin agreements have been negotiated and signed in recent years. In many cases these agreements have followed the principles of the Water Convention. New agreements were concluded between the Russian Federation and Estonia on the Lake Peipsi/Chudskoe - River Narva basin, between Russian Federation and Belarus, Russian Federation and Kazakhstan, and between Kyrgyzstan and Kazakhstan on the rivers Chu and Talas. The agreement of 1992 between the Central Asian States to continue their cooperation on water and its allocation in the Syr Darya and Amu Darya basins according to practices and quantities used during Soviet times, and its implementation have been very important for a region where access to water is restricted¹⁰.

The first international multilateral agreement on transboundary waters in the NIS - the Agreement between Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan on Cooperation in the Joint Management of Use and Protection of Water Resources of Interstate Sources¹¹ was signed in Almaty (Kazakhstan), on 18 February 1992. Under this agreement the Inter-State Commission for Water Coordination (ICWC)¹² of Central Asia was established. ICWC

⁷ Annex 3, Agreement 16.

⁸ Annex 3, Agreement 5.

⁹ Annex 3, Agreement 6.

¹⁰ Annex 3, Agreement 15.

¹¹ Annex 3, Agreement 15.

¹² Other subregional organizations involved in cooperation on water and environment are the International Fund for Saving the Aral Sea (IFAS) and

⁴ Bilateral and multilateral agreements and other arrangements in Europe and North America on the protection and use of transboundary waters (ECE/ENVWA/32 and Add.1 and 2).

⁵ Annex 3, Agreement 1.

⁶ Annex 3, Agreement 2.

is responsible for the development of water-management policy in the region, taking into account the needs of all branches of industry and the economy, the rational use of water resources, and a programme of water supply for the regions and measures for its realization (art. 8). Article 9 of the Agreement defines the executive and control bodies of the Commission: the Basin Water-Management Joint Companies “Amu Darya”¹³ and “Syr Darya,”¹⁴ responsible for activities in these two major rivers.

A memorandum of understanding was concluded between the Ministry of Environment of Georgia and the State Committee for Ecology and Natural Resources of Azerbaijan on collaboration in the development and implementation of a pilot project on monitoring and assessment in the Mtkvari / Kura river basin¹⁵. However, further progress has not been made for other parts of the catchment area (i.e. the area shared by Armenia, Azerbaijan, the Islamic Republic of Iran and Turkey, the sub-basin of the river Araks).

The Agreement on General Principles for Cooperation on the Rational Use and Protection of Transboundary Water Bodies of the CIS was signed in Moscow in 1998¹⁶, and it entered into force on 6 June 2002. It has three Parties: Belarus (from 6 November 1998), the Russian Federation (6 June 2002) and Tajikistan (16 January 2001). The Agreement is based on the UNECE Water Convention (Preamble of the Agreement), but also deals with other important problems.

In particular, Parties to this Agreement have an obligation to (Preamble):

- Use common methodologies to assess damage to water bodies;
- Avoid carrying out water management measures that are likely to have a negative effect on water bodies;
- Determine general principles of use and distribution of water resources (of transboundary watercourses).

the Interstate Commission for Sustainable Development (ICSD).

¹³Annex 3, Agreement 16.

¹⁴Annex 3, Agreement 17.

¹⁵Annex 3, Agreement 33.

¹⁶Annex 3, Agreement 37.

The future application of the Agreement is not clear, and may depend on the further development of the cooperation in the Commonwealth of Independent States.

Annex 3 gives a more detailed account of the present situation with regard to transboundary water agreements.

5. Trends and bottlenecks

Cooperation in many transboundary river basins is developing well in the NIS. Several new agreements have been concluded and joint commissions have been established (annex 3).

The increasing influence of the UNECE Water Convention on the development of new transboundary water agreements in the NIS is one of the main trends. The Convention is directly referred to in the preambles of several recent agreements and its provisions are used in their substantive articles.

Another important trend is the increasing interest of international organizations and donors in transboundary water cooperation. There are several international projects promoting cooperation on transboundary waters. Pilot projects under the UNECE Water Convention in the NIS on monitoring and assessment of transboundary waters (rivers Kura, Pripyat, Severski Donets and Tobol) are funded by the EU TACIS programme¹⁷. In Central Asia there are numerous projects funded by different donors to improve cooperation on water resources, such as the projects under the Aral Sea Basin Programme. The Swedish Environmental Protection Agency funds a programme on transboundary waters discharging into the Baltic Sea.

However, the overall economic situation makes it at this stage very difficult to finance capital investment for water protection such as building water-treatment installations or more efficient irrigation systems. It is also difficult to

¹⁷Other pilot projects on the rivers Bug (Belarus, Poland, Ukraine) and Latoriza/Uhz (Slovakia, Ukraine), financed under the TACIS programme, were completed in 2003.

find resources to decrease the risk of accidents in hazardous installations, tailing dams, etc. In addition, there are several bottlenecks in the further development of transboundary water cooperation in the NIS.

Since the dissolution of the Soviet Union, many NIS have struggled to match their administrative resources with the tasks of a sovereign country. In some cases they lack the human resources or the staff involved in transboundary cooperation do not have the required expertise.

The fully integrated management of water resources, which takes account of the interests of different sectors and ecosystems and applies the water basin principle, is gaining ground but is generally not yet the basis for national water policy. The lack of dialogue, of coordinated action and of cooperation between different national authorities with regard to water management is a significant problem, which also has a negative impact on cooperation with other countries. The lack of cooperation between ministries in charge of water management and those in charge of environmental protection in Central Asia is one obvious example.

In some cases, conflicting interests of countries have a negative impact on the development of cooperation. Competition among water users on how to share water both within countries, and internationally between upstream and downstream countries, is in many cases not resolved. In Central Asia, for example, upstream countries may give priority to the use of water for hydroelectricity generation in winter whilst downstream countries mainly use water for irrigation in summer. There is no agreement on reasonable and equitable use of water resources in river basins such as the Kura basin (shared by Azerbaijan, Georgia, Armenia, Turkey and the Islamic Republic of Iran) or the Samur basin (between the Russian Federation and Azerbaijan). Cooperation with other non-NIS is also difficult, for instance between the Russian Federation and China or between Georgia and Turkey.

The lack of a legal and regulatory framework for bilateral or multilateral cooperation is frequently a bottleneck. It is a demanding process

to start and conclude negotiations, in particular when there are significant conflicts that have to be solved in the process.

In some cases the authorities responsible for the management of transboundary waters do not have the clout and/or the mandate to develop broadly based cooperation.

Monitoring programmes are often a weak link in the water management chain. The available data are insufficient, unreliable and not harmonized between countries, impeding the development of strategies to improve water management.

The shortage of information and the fact that it is not shared between countries or made available to the public are difficult issues at present. Furthermore, public participation is generally weak.

6. Recommendations for further development of cooperation on transboundary waters

Cooperation on transboundary waters cannot be seen as separate from the other national and international tasks of the water management authorities. In the development and implementation of cooperation on transboundary waters, prioritization and cost-efficiency are factors that should be taken into account. The allocation of resources should reflect an in-depth analysis and clear, agreed joint targets. There are instances where cooperation on several shared water basins is made within the framework of one agreement (e.g. agreement between the Russian Federation and Kazakhstan), which is one way of making cooperation more efficient.

The interests of different sectors and ecosystems should be taken into account. The water basin should be used as the framework for cooperation.

Experience shows that it is positive to develop cooperation step by step. This approach contributes to the establishment of mutual confidence, and to an active prioritization of the most important issues to focus on within the available resources.

To take advantage of the achievements of cooperative work and reach the objectives of their regional agreements, it is recommended that the NIS should as a priority ratify and implement the UNECE Convention on the Protection and Use of Transboundary Watercourses and its Protocols on Water and Health and on Civil Liability, the UNECE Convention on the Transboundary Effects of Industrial Accidents and the UNECE Convention on Environmental Impact Assessment in a Transboundary Context. An overview of the ratification status of the NIS is given in annex 6. The ratification of these conventions and their protocols is also important to show commitment to international cooperation and build trust among the international community, including among donors. The principal components of cooperation on transboundary waters are outlined below. The overall recommendation is that all these components should be developed in the river basins listed in annex 1. The drawing-up of river basin agreements (6.1) and the establishment of joint bodies (6.2) should be seen as the top priorities.

6.1. The legal and regulatory framework and its implementation

In accordance with the Water Convention and its Protocol on Water and Health, Riparian Parties -- on the basis of equality and reciprocity -- are recommended to draw up bilateral or multilateral river basin agreements or other arrangements, where these do not yet exist, or adapt existing ones, where necessary, to eliminate the contradictions with the basic principles of these legal instruments and to define their relations and conduct regarding the aims of these instruments. It would be appropriate to reflect the relevant obligations of global and regional conventions in the river basin agreements. Where a river basin includes both NIS and EU accession countries, the drawing-up of the agreements should take into account, as appropriate, the requirements of the EU Water Framework Directive.

Attention should be given to drawing up/developing existing agreements in the following river basins:

- Amu Darya, shared by Uzbekistan, Tajikistan, Turkmenistan and Afghanistan;

- Syr Darya, shared by Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan;
- Zeravshan, shared by Uzbekistan and Tajikistan;
- Kura, shared by Georgia, Armenia, Azerbaijan, Turkey and the Islamic Republic of Iran;
- Samur, shared by Azerbaijan and the Russian Federation;
- Psou, shared by the Russian Federation and Georgia;
- Bug, shared by Poland, Ukraine and Belarus, no agreement exists between Belarus and Poland;
- Daugava/Zapadnaya Dvina, shared by the Russian Federation, Belarus and Latvia, no agreement exists between Belarus and Latvia; and
- Nemunas, shared by the Russian Federation, Belarus and Lithuania, no agreement exists between Belarus and Lithuania.

The establishment of river basin conventions on the Dnepr and Dniester would help further develop cooperation, and would raise the political status of this cooperation.

A dialogue and information exchange should be established between China and the Russian Federation on the Irtysh river.

There is also a need to formalize cooperation on smaller rivers, for example in the Fergana Valley of Central Asia and smaller rivers shared by Turkmenistan and the Islamic Republic of Iran.

It is particularly important to revise existing water basin agreements in Central Asia, and negotiate and agree on agreement(s) in the Caucasian States. It is a weakness of some existing agreements and cooperation (for example in Central Asia) that water quality and protection of ecosystems are not seen as central and are rarely even considered.

All water basin agreements should define the relations and conduct of the countries sharing the basin regarding integrated water resources management and water-related diseases. They should define their duties with regard to unilaterally planned water use, procedures for transboundary environmental impact assessment and

responsibilities in the event of floods, drought or other emergencies. They should provide consultation arrangements and operational mechanisms to prevent, control and reduce transboundary impact including identification of pollution sources, water pollution abatement, monitoring of water quality, health risks and water-related disease, public information and participation, liability regime for damage, and dispute settlement. The recommendations and guidelines adopted by the Parties to the Water Convention could provide further guidance on the drawing-up of subregional agreements and the implementation of regional environmental conventions and protocols.

The establishment of agreements facilitates the further development of cooperation. It is easier to revise, adapt and further develop the agreement if a framework for cooperation and dialogue is in place. The Finnish-Russian agreement¹⁸ is a successful example of an agreement whose scope of cooperation has been progressively extended.

Cooperation should also aim at harmonizing national water policies, and in particular water norms and standards in the national legislation, in countries sharing water basins. In the longer term, countries can move towards the norms and standards set by the EU countries.

6.2. Establishment and strengthening of institutions

National organizations

The coordination of different institutions dealing with water management is of the utmost importance. Gaps and overlaps in responsibility should be removed, and proper coordination mechanisms established.

A specific national authority should have overall responsibility for the management of transboundary waters. This authority should involve different stakeholders and sectors in the development and implementation of the cooperation. The framework for the bilateral or

multilateral cooperation should facilitate local cooperation on water between countries.

To be effective, institutions should have adequate human resources, sufficient financial resources, clear jurisdictions and appropriate powers, and broad stakeholder involvement.

Joint bodies

Agreements or other arrangements must provide for the establishment of joint bodies. A joint body is any bilateral or multilateral commission or other appropriate institutional arrangements for cooperation between the riparian parties, such as meetings of plenipotentiaries. To deal with specific issues of cooperation, working groups can be established under the joint bodies.

Annex 3 gives details on the establishment of joint bodies in different river basins/lakes. There is an immediate need to develop the existing joint bodies (the Interstate Coordination Water Commission, Water Basin Organizations) responsible for the rivers Syr Darya and Amu Darya.

It should be emphasized that, if there are different joint bodies in the same river basin, institutional and administrative arrangements should be made for them to cooperate. Similarly, cooperation should be established among joint bodies set up to protect inland waters and those set up to protect the marine environment.

The staff of joint bodies should have broad expertise, including in inland water and groundwater management, technical and legal issues.

There is a need for capacity-building and the sharing of experience and information between different river basins on issues such as regulatory, scientific, methodological and other aspects of integrated management of transboundary rivers and transboundary cooperation, as well as practical results achieved in this field.

To take advantage of the considerable regional experience and expertise, it is proposed to establish a network of experts and decision makers for the

¹⁸Annex 3, Agreement 4.

cross-fertilization between the different bodies acting in the region and, at the same time, to transfer capacity from successful institutions from outside the region.

Institutional and administrative arrangements for consultation and assistance

In critical situations, such as accidental pollution of transboundary waters, floods and droughts, the riparian parties should provide mutual assistance upon request. Assistance should also be provided in responding to outbreaks and incidents of water-related disease and significant threats of such outbreaks and incidents, especially as a result of water pollution or extreme weather. Consultations should be held between the countries in the river basin, on the basis of reciprocity, good faith and good neighbourliness, at the request of any one of them. Institutional and administrative arrangements should be made among the riparian countries to facilitate consultations and the provision of assistance. These procedures should include:

- The direction, control, coordination and supervision of assistance;
- Local facilities and services to be rendered by the party requesting assistance, including, where necessary, the facilitation of border crossing formalities;
- Arrangements for protecting, indemnifying and/or compensating the assisting party and/or its personnel, as well as for transit through territories of third parties, where necessary;
- Reimbursement of assistance services.

Positive experiences from the joint management of accidental pollution and flooding can be drawn from the Ukrainian-Russian cooperation on the river Seversky Donets.

6.3. Monitoring and assessment

A fundamental feature of transboundary cooperation is the design and establishment of joint monitoring and assessment programmes. This process requires countries to define common information needs on the basis of their water management policies, and thereafter to design and operate monitoring programmes, agree on assessment strategies and review their water

management strategies on the basis of the assessment results. Effective monitoring programmes should include the sharing of harmonized data and information.

In the design of the monitoring programmes the need of integrated assessments should be taken into account. Cost-effectiveness and a stepwise approach are also important.

Available experience, such as the work developed by the Working Group on Monitoring and Assessment under the UNECE Water Convention or the TACIS-funded pilot projects (see footnote 12), should be used.

6.4. Access to information and public participation

With a few exceptions, such as the cooperation between Estonia and the Russian Federation on the Lake Peipsi/Narva basin, ongoing cooperation on transboundary waters in the NIS does not really provide for public involvement. It is a challenge to significantly improve this situation.

Countries should strengthen public participation, also at the transboundary level, by establishing specific procedures, including communication strategies, and by supporting the formation and activities of NGO associations, on the basis of transparent and reasonable criteria. Increased use of the Internet could facilitate the distribution of information. An effective means of promoting the distribution of information on transboundary waters, to the public and to the experts, would be to establish an international journal on transboundary water issues, also available on the Internet.

The involvement of the public should receive particular attention in the design of monitoring and assessment programmes, in environmental impact assessments, and in the organization of institutions and the promotion of compliance.

The development and implementation of international documents (e.g. water management and contingency plans) and response measures should also involve the public. Riparian States are encouraged to provide for the participation of all

stakeholders in the preparation and development of agreements, and NGOs should be invited to participate in intergovernmental negotiations and to comment on draft texts. Due account should be taken of their input.

Involving water users' associations and NGOs, e.g. as non-voting participants in meetings and other activities of the competent authorities, will improve the quality and the implementation of policies for sustainable integrated water management.

6.5. River basin management planning

River basin management planning, including decision-support systems and the integration of land and water management (concerted action plans), comes when cooperation within a river basin has developed significantly. Among issues that should be prioritized at this stage of cooperation are:

- Joint targets for the standards and levels of performance that need to be achieved or maintained to ensure a high level of protection against transboundary impact and water-related disease;
- Joint or coordinated water-management plans to prevent, control and reduce any transboundary impact;
- Joint or coordinated systems for surveillance and early-warning systems, contingency plans and response capacities as part of, or to complement;
- The national systems to respond to outbreaks and incidents of water-related disease and significant threats of such outbreaks and incidents, especially as a result of water pollution or extreme weather;
- Agreed ways and means to jointly assess the environmental impact of different economic development strategies and sectoral policies, plans, programmes and legislative proposals that have an impact on the water environment in river basins.

6.6. Demonstration projects

In many cases, the most difficult step is initiating cooperation, establishing a transboundary relation and building trust. Useful tools to establish and strengthen cooperation are specific demonstration projects with clear terms of

reference, clear implementation responsibilities and deadlines. These projects should be designed to tackle specific common issues, such as flood prevention and flood protection or stress on small transboundary watercourses.

6.7. Recommendations for the development of projects co-funded by donors

In the present economic situation, funding from donors is very important to develop cooperation on transboundary waters. To improve the chances of attracting funding and to make sure that funding is used efficiently, recipient countries and donors should consider the following:

- Before initiating any projects to support transboundary cooperation in a river basin, a thorough analysis of the situation in the basin is recommended;
- Before starting projects, there should be political commitment, clear mandates for the project participants, access to data and a constructive approach towards interagency cooperation among project partners;
- If there are political difficulties, projects with a more technical focus might be the most efficient to initiate;
- External support is often best used to complement the technical work that the management institution requires to develop policy and provide guidance on specific issues;
- Donors must not take over responsibility for the cooperation, but restrict themselves to providing assistance for initiatives that promote it;
- The countries sharing the water basin should fund basic cooperation on transboundary waters. Outside funding should be focused on developing that cooperation;
- Building capacity is generally fundamental, in particular if there are capacity imbalances among the cooperating partners;
- National capacities should be used as much as possible in the implementation of projects;
- It could be useful to arrange a meeting of representatives of donors working in the NIS to coordinate their activities on transboundary water cooperation. If such a meeting takes place, the NIS should prepare their priorities in transboundary water cooperation.

7. Mechanisms for implementation and follow-up

This paper and additional material from the Workshop on Transboundary water cooperation in the newly independent States (Moscow, 31 March - 1 April 2003) will serve as background for the further work on transboundary waters within the EU Strategic Partnership on Water for Sustainable Development. Donors and NIS are invited to use this material in the development of future activities.

It is proposed that this document and its annexes 1 and 3 should be used to monitor progress in the development of cooperation on transboundary rivers. The UNECE and UNEP/ROE secretariats may update these annexes, in collaboration with the NIS, and report on progress at the fourth meeting of the Parties to the Water Convention and at the next Ministerial Conference "Environment for Europe" in Belgrade 2007.

Annex 1

TRANSBOUNDARY WATER BASINS AND RELEVANT AGREEMENTS IN THE NIS

No	Transboundary river / lake	Countries concerned	Length of river, km	Area of water basin / lake, 103 km²	Water discharge, m³/s	Reference to Agreements (Annex 3)
1	River Pasvik (Paatsojoki)	Russian Federation / Norway / Finland		18,3	172-195	4, 5, 7, 9, 11, 12
2	River Kemi	Russian Federation / Finland	191	27.7	275	7
3	River Vuoksa	Russian Federation / Finland	156	52.4	600	7, 10
4	River Tuloma	Russian Federation / Finland	64	6.25	241	7
5	River Narva	Russian Federation / Estonia	77	56.2	41.5	29
6	Lake Peipsi system Chudskoye/ Pskovskoye -	Russian Federation / Estonia		3.55		29
7	River Neman / Nemunas	Russian Federation / Lithuania Belarus / Lithuania	937	98.2	678	
8	River Dnepr	Russian Federation / Belarus Belarus / Ukraine Ukraine / Russian Federation	2200	504	1670	34, 39 38 19
9	River Daugava (Zapadnaya Dvina)	Russian Federation / Belarus Belarus / Latvia	1020	87.9	700	34, 39
10	River Pripyat	Belarus / Ukraine	775	11.4	460	38

No	Transboundary river / lake	Countries concerned	Length of river, km	Area of water basin / lake, 103 km ²	Water discharge, m ³ /s	Reference to Agreements (Annex 3)
11	River Bug	Belarus / Poland Ukraine / Poland	831	73.5		- 27
12	River Tisza	Ukraine / Slovakia Ukraine / Hungary	966	157	810	14, 21, 22, 11, 22, 33
13	River Prut	Ukraine / Romania Republic of Moldova / Romania Ukraine / Republic of Moldova	967	27.5	80	22, 31 13 21, 22
14	River Dniester	Ukraine / Republic of Moldova	1352	72.1	310	22, 23
15	River Danube	Ukraine / Hungary Ukraine / Republic of Moldova	2850	817	6430	22, 33 22, 23
16	River Seversky Donets	Ukraine / Russian Federation	1053	98.9	190	19
17	River Psou	Russian Federation / Georgia		0.42	17.3	
18	River Alazani	Georgia / Azerbaijan	351	10.8	98	
19	River Iori	Georgia / Azerbaijan	320	4.65		
20	River Kura	Georgia / Azerbaijan Georgia / Turkey	1364	188	575	30 ¹⁹
21	River Choloki	Georgia / Turkey	438	22	285	2, 36
22	River Samur	Azerbaijan / Russian Federation	213	7.33	75	
23	River Araks	Azerbaijan / Turkey Armenia / Turkey Azerbaijan / Iran	1072	102	285	2, 3 2, 3 6
24	River Bolshoy Uzen'	Russian Federation /	650	15.6		18

No	Transboundary river / lake	Countries concerned	Length of river, km	Area of water basin / lake, 103 km ²	Water discharge, m ³ /s	Reference to Agreements (Annex 3)
		Kazakhstan				
25	River Maliy Uzen'	Russian Federation / Kazakhstan	638	18.2		18
26	River Irtysh	Russian Federation / Kazakhstan	4248	1643	2830	18
27	River Ural	Russian Federation / Kazakhstan	248	231	400	18
28	River Tobol	Russian Federation / Kazakhstan	1591	426	805	18
29	River Ishim	Russian Federation / Kazakhstan	2450	177	56.3	18
30	River Volga ²⁰	Russian Federation / Kazakhstan				18
31	River Chu	Kazakhstan / Kyrgyzstan	1067	6265	70	35
32	River Talas	Kazakhstan / Kyrgyzstan	661	52.7		35
33	River Syr Darya	Kazakhstan / Kyrgyzstan / Uzbekistan / Tajikistan / Turkmenistan Kyrgyzstan / Uzbekistan	2212 (3019)	219	446-703	17 28
34	River Amu Darya	Kazakhstan / Kyrgyzstan / Uzbekistan / Tajikistan / Turkmenistan Uzbekistan / Turkmenistan	1415	309	2000 (?)	17 25

No	Transboundary river / lake	Countries concerned	Length of river, km	Area of water basin / lake, 103 km ²	Water discharge, m ³ /s	Reference to Agreements (Annex 3)
35	River Zeravshan	Uzbekistan / Tajikistan	877	1767	* ²¹	17
36	River Murgab	Turkmenistan / Afghanistan	978	46.9	52	
37	River Atrek	Turkmenistan / Iran	669	27.3		1
38	River Tedzhen (Geri-Rud)	Turkmenistan / Iran	1150	70.6	30 ²²	1
39	River Pjanj	Tajikistan / Afghanistan	971	114	1000	
40	River Black Irtish (Irtish)	Kazakhstan / China				37
41	River Ili	Kazakhstan / China	1001	140	329	37
42	River Selenga	Russian Federation / Mongolia	1024	447	> 900	24
43	River Amur	Russian Federation / China	2824 (4480) ²³	1855	10900	16, 20, 32
44	River Argun	Russian Federation / China	1620	164	340	16
45	River Ussuri	Russian Federation / China	897	193	1200	20
46	Lake Khanka	Russian Federation / China		4.19		26

Annex 2

MAP OF TRANSBOUNDARY RIVERS AND LAKES IN THE NIS



Annex 3

BILATERAL AND MULTILATERAL AGREEMENTS IN THE NIS ON TRANSBOUNDARY WATERS

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
1	Agreement between the USSR and Persia on the joint use of transboundary rivers and waters along the border from the river Geri-Rud to the Caspian sea	Water allocation, construction of water reservoirs	Geri-Rud (Tejen), Atrek	The rivers Geri-Rud (Tejen), Atrek and other transboundary waters	USSR, Persia	Signed 20 February 1926 in Poltoratsk (Ashgabat), when it also entered into force	Joint commission between the USSR and Persia.	SziR USSR ²⁵
2	Convention between the Republic of Turkey and the Union of Soviet Socialist Republics concerning water use of border rivers and streams	Irrigation, water supply, regulation	Araks, Choloki, Kura, Arpa-Chai and others	Surface waters which form or cross the frontiers between USSR and Turkey	USSR, Turkey	Signed 8 January 1927 in Kars; entered into force 26 June 1928 ²⁶	Joint Commission between USSR and Turkey.	SZ USSR ²⁷
3	Protocol to the Convention between the Republic of Turkey and the Union of Soviet Socialist Republics concerning water use of border rivers and streams	Construction of a dam and a water reservoir on the Araks river.	Araks	River Araks	USSR, Turkey	Signed 8 January 1927; Entered into force 26 June 1928.		SZ USSR ²⁸

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
4	Agreement between Norway and the Union of Soviet Socialist Republics on the utilization of water power on the Pasvik (Paatso) river	Hydropower production, construction of hydrotechnical installations	Pasvik	River Pasvik in the area of the state boundary	USSR, Norway	Signed 18 December 1957 in Oslo; Entered into force 27 June 1958		ECE/ENVWA/32
5	Agreement between the Government of the Union of Soviet Socialist Republics, the Government of Norway and the Government of Finland concerning the regulation of the lake Inari by the Kaitakoski hydro-electric power station and dam	Water regulation, water supply, hydropower production, damage compensation in connection with flooding, caused in connection with the construction of the hydropower station.	Paatsojoki (Pasvik)	Lake Inari, River Pasvik (Paatsojoki)	USSR, Norway, Finland	Signed 29 April 1959 in Moscow; Entered into force the same date	The Commission is appointed by the relevant ministries of the Contracting Parties	The Russian Federation
6	Agreement between the Government of the Union of Soviet Socialist Republics and the Shahinshan's government of Iran on economic and technical cooperation	Irrigation, water regulation, construction of hydropower station, construction of fish-breeding plant etc	raks	River Araks	USSR, Iran	Signed 27 July 1963 in Teheran; Entered into force 25 June 1965.	Meeting of Representatives of the Contracting Parties	Azerbaijan
7	Agreement between the Union of Soviet Socialist Republics and the Republic of Finland on border water systems	Protection of water resources, water supply, navigation	Pasvik (Paatsojoki), Tuloma, Kemi, Olanga, Oulu, Vuoksa	All borderwaters, including lakes, rivers and streams	USSR, Finland	Signed 24 April 1964 in Helsinki; Entered into force 6 May 1965	Joint Commission on the Utilization of Border Waters	Russian Federation

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
8	Agreement between the Government of the Polish People's Republic and the Government of the the Union of Soviet Socialist Republics concerning the management of water resources in border waters	Protection of water resources, water regulation, water installations, , water supply, flooding, irrigation, erosion control	Neman, Pregel, Wisla	All transboundary waters which form or cross the frontiers between USSR (Belarus, Lithuania, Russian Federation, Ukraine) and Poland	USSR, Poland	Signed 17 July 1964 in Warsaw; Entered into force 16 February1965	Each Party appoints a representative and his deputies, who conduct negotiations and may set up working groups	ECE/ENVWA/32
9	Agreement between the Government of the Union of Soviet Socialist Republics and the Government of Norway on the regulation of fishing and conservation of fish stocks in the Greense Jakob river (Voriema) and Pasvik river (Paatsojoki)	Fishery	Pasvik (Paatsojoki)	River Jakobs (Voriema), River Pasvik (Paatsojoki)	USSR, Norway	Signed 7 December 1971 in Oslo		Russian Federation
10	Agreement between the Government of the Union of Soviet Socialist Republics and the Government of Republic of Finland on the energy use in the section of the Vuoksa river between the Imatra and Svetlogorsk hydroelectric stations	Hydropower production	Vuoksa	The section of the River Vuoksa between the hydroelectric power stations of Imatra and Svetlogorsk	USSR, Finland	Signed 12 July 1972, in Helsinki; Entered into force 7 February1973	Joint Commission	Russian Federation

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
11	Agreement between the Government of the Kingdom of Norway and the Government of the Union of Soviet Socialist Republics concerning water abstraction by Norway from the upper reservoir of the Borisoglebsk hydropower plant at the transboundary river Pasvik	Water supply	Pasvik (Paatsojoki)	Water reservoir of the Borisoglebsk Hydropower Plant on the River Pasvik	Norway, USSR	Signed and entered into force 20 May 1976		ECE/ENVWA/32
12	Protocol between the Government of Finland and the Government of the Union of Soviet Socialist Republics on the participation of Soviet organizations in pisciculture measures to preserve the fish stocks in lake Inari	Fisheries	Pasvik (Paatsojoki)	Lake Inari	Finland, USSR	Signed 14 December 1983 in Moscow		ECE/ENVWA/32
13	Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the Socialist Republic of Romania concerning cooperation in the management of transboundary waters	Protection and use of water resources, water management measures	Danube	Transboundary watercourses	USSR, Romania	Signed 9 April 1986 in Moscow	Plenipotentiaries of the governments and their deputies	

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
14	Agreement on the protection of the river Tisza and its tributaries against pollution	Protection of water resources	Danube	River Tisza and its tributaries	Hungary, Romania, USSR, Czechoslovakia, Yugoslavia	Signed 28 May 1986 in Szeged	Meetings of representatives from official organizations of the Contracting Parties	ECE/ENWVA/32
15	Treaty between the Government of the Hungarian People's Republic and the Government of the Union of Soviet Socialist Republics on water management problems in the border region	Water regulation, management of transboundary waters	Danube	All surface waters which form or cross the borders between the two States	Hungary, USSR	Signed 22 June 1986; Entered into force 20 November 1986	Joint Commission	ECE/ENWVA/32
16	Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the People's Republic of China on the creation of the Soviet-Chinese commission for leading the development of plans for the complex use of border sections of the rivers of Argun and Amur	Management of transboundary water resources	Amur	Rivers Amur and Argun' upstream of Khabarovsk, where they form the border between the two States	USSR, People's Republic of China	Signed and entered into force 23 October 1986 in Moscow	Soviet-Chinese Joint Commission	Russian Federation
17	Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, Republic of Uzbekistan, Republic of Tajikistan and Turkmenistan on cooperation with regard to joint management of use and protection of water resources from interstate sources	Water regulation, protection of water resources, water supply, irrigation	Basins of the Rivers Amu Darya, Syr Darya, and the Aral Sea	All transboundary watercourses and lakes shared by the Contracting Parties in the Aral Sea basin	Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan	Signed 18 February 1992 in Almaty; Entered into force on the same date	Inter-State Commission for Water Coordination	Tajikistan

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
18	Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan concerning the joint use and protection of transboundary waters ²⁹	Protection of water resources, water supply, irrigation and floods water regulation	Ob, Ural, Volga	All surface waters and groundwaters which form or cross the frontier between the two States, including transboundary waters in the catchment areas of the Rivers Ishim, Irtysh, Ural, Tobol and Volga (eastern part of the delta)	Kazakhstan, Russian Federation	Signed 27 August 1992 in Orenburg; Entered into force the same date	Joint Russian-Kazakhstan - Commission on Transboundary Waters	ECE/ENVWA/32
19	Agreement between the Government of Ukraine and the Government of the Russian Federation concerning the joint use and protection of transboundary water objects	Protection of water resources, water regulation, water supply, floods and other aspects of water resources management	Dnepr, Don	Transboundary sections of all surface waters and groundwaters in the catchment area of the River Desna and the River Seversky Donets	Ukraine, Russian Federation	Signed 19 October 1992 in Kiev; Entered into force the same date	Government Plenipotentiaries	ECE/ENVWA/32/Add.1
20	Agreement between the Government of the Russian Federation and the Government of the People's Republic of China concerning cooperation on protection, regulation and reproduction of living water resources in the border rivers Amur and Ussury	Management of living water resources	Amur, Ussuri	River Amur (downstream to the confluence of Rivers Argun and Shilka), River Ussuri (downstream to the confluence with the River Sungacha) and nearby reservoirs	Russian Federation, People's Republic of China	Signed 27 May 1994 in Beijing	Joint Commission	SSPI Garant ³⁰

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
21	Agreement between the Government of Ukraine and the Government of Slovak Republic on water management issues in border waters	Water supply and regulation	Tisza	All transboundary waters which form or cross the border between the two States, including the rivers Uzh and Latoritsa	Ukraine, Slovakia	Signed 14 June 1994 in Bratislava	Joint Ukraine-Slovak Commission on Transboundary Water Issues	Ukraine
22	Convention on cooperation for the protection and sustainable use of the river Danube	Sustainable management of water resources, including the conservation, improvement, rational and equitable use of waters, reduction of accident hazards, water regulation, floods, hydropower production in hydropower stations, water transfer and withdrawal	Danube	Surface waters and groundwater in the catchment area of the Danube in those States that include at least 2000 km ² of its total hydrological catchment area	Austria, Bulgaria, Croatia, Germany, Hungary, Republic of Moldova, Romania, Slovakia, Ukraine, European Union	Signed 29 June 1994 in Sofia	International commission for the Protection of the Danube River	ECE/ENVWA/32/Add.1
23	Agreement between the Government of the Republic of Moldova and the Government of Ukraine on the joint use and protection of transboundary waters	Water improvement and regulation, water supply	Dnester, Danube	All surface waters, which form or cross the frontier between the two States	Republic of Moldova, Ukraine	Signed 23 November 1994 in Chisinau	Government Plenipotentiaries	ECE/ENVWA/32/Add.2
24	Agreement between the Government of the Russian federation and the Government of Mongolia on the protection and use of transboundary waters	Protection of water resources	Amur, Yenisey, Lake Baikal	All surface waters, which form or cross the border between the two States, including Rivers Onon, Selenga and waters draining into the River Yenisey	Russian Federation, Mongolia	Signed 11 February 1995 in Ulan-Bator	Government Plenipotentiaries	ECE/ENVWA/32/Add.2

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
25	Agreement between Turkmenistan and Republic of Uzbekistan on cooperation on water management issues	Regulation of water use	Amu Darya	Amu Darya river basin	Turkmenistan, Uzbekistan	Signed 16 January 1996, in Chardzhou	Water Basin Organization Amu Darya	Uzbekistan, Turkmenistan
26	Agreement between the Government of the Russian Federation and the Government of the people's Republic of China concerning the nature reserve "lake Khanka"	Establishment of the lake nature reserve, protection of flora, fauna and nature ecosystems, support of bilateral cooperation on nature management and monitoring of ecosystems, environmental education	Amur	Lake Khanka	Russian Federation, People's Republic of China	Signed 25 April 1996 in Beijing	Joint Commission	Russian Federation
27	Agreement between the Government of Ukraine and the Government of Poland on cooperation in the area of water management of transboundary waters	Irrigation, water supply, water regulation	(Zapadnyi) Bug, Wisla	All transboundary waters, forming or crossing the border between Ukraine and Poland	Poland, Ukraine	Signed 10 October 1996 in Kiev	Joint Ukraine-Polish Commission on transboundary water issues	Ukraine
28	Agreement between the Government of the Republic of Uzbekistan and the Government of Republic of Kyrgyzstan on the use of water-energy resources of Naryn-Syr Darya's hydropower stations cascade in 1997	Regulating of water use in Syr Darya providing for vegetation discharges	Syr Darya	Syr Darya river, Naryn-Syr Darya hydropower stations cascade	Uzbekistan, Kyrgyzstan	Signed 25 December 1996 in Tashkent	Water Basin Organization Syr Darya	Uzbekistan

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
29	Agreement between the Government of the Russian Federation and the Government of the Republic of Estonia concerning the cooperation on protection and rational use of transboundary waters	Organization of cooperation on the protection and rational use of transboundary waters and their ecosystems	Narva	Transboundary waters of basin the Narva river basin including Lake Peipsi (Lake Pskovsko-Chudskoje)	Russian Federation, Estonia	Signed 20 August 1997 in Moscow	Joint Commission	Russian Federation
30	Memorandum of understanding between the Ministry of Environmental Protection of Georgia and the State Committee for Ecology and Natural Resources of the Azerbaijan Republic on the collaboration on the development and implementation of the joint pilot project on monitoring and assessment in the Mtkvari / Kura river basin	Harmonization of water quality monitoring and assessment	Mtkvari-Kura	Basin of River Mtkvari / Kura	Georgia, Azerbaijan	Signed 16 September 1997	Regular meetings of representatives of Parties	Azerbaijan, Georgia
31	Agreement between the Government of Romania and the Government of Ukraine on cooperation in the field of transboundary water management	Irrigation, water supply, water regulation	Danube, Tisza, Prut, Siret	All surface waters which form or cross the border between Romania and Ukraine	Romania, Ukraine	Signed 30 September 1997 in Galati	Government representatives	Ukraine

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
32	Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on guiding principles for joint economic use of separate islands and adjoining water areas in border rivers	Regulation of economic activity on border areas	Amur	Islands in the Amur river and adjoining water areas	Russian Federation, People's Republic of China	Signed 10 November 1997 in Beijing		SS Garant ³¹
33	Agreement between the Government of Ukraine and the Government of Hungarian Republic on water management in transboundary waters	Water supply and regulation	Tisza	All transboundary waters, which form or cross the border between Ukraine and Hungary	Ukraine, Hungary	Signed 11.11.1977 at Budapest	Government plenipotentiaries	Ukraine
34	Agreement on basic principles of cooperation on the rational use and protection of transboundary water bodies of the CIS member states	Protection of surface waters and groundwaters, determination of joint principles for use and allocation of water resources	Transboundary water basins shared by the Contracting Parties	Transboundary water basins shared by the Contracting Parties	Belarus, Russian Federation, Tajikistan	Signed 11 September 1998 in Moscow; Entered into force 6 June 2002		SS Garant ³²
35	Agreement between the Government of the Republic Kazakhstan and the Government of Kyrgyz Republic on the use of interstate water management installations on the rivers Chu and Talas	Regulating of the use of water management installations	Chu, Talas	Rivers Chu, Talas and water reservoirs on these rivers	Kazakhstan. Kyrgyzstan	Signed 21 January 2000 in Astana; Entered into force 16 April 2002	Joint Commission	Kazakhstan

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
36	Memorandum between the Ministry of Environmental Protection of Georgia and the General Directorate of State Water Economy of the Ministry of Energy and Natural Resources of the Republic of Turkey	Observation of river sediment transport	Choloki	Choloki river basin	Georgia, Turkey	Signed 19 January 2002 in Ankara		Georgia
37	Agreement between the Government of the Republic Kazakhstan and the Government of Republic of China concerning cooperation on the use and protection of transboundary waters	Protection of water resources	Chernyi Irtysh - Irtysh, Ili	All surface waters which form or cross the border between the two States, including the rivers Chernyi Irtysh - Irtysh and Ili	Kazakhstan, China	Signed 12 September 2001 in Astana	Joint Commission	Kazakhstan
38	Agreement between the Government of the Republic Belarus and the Cabinet of Ministers of Ukraine on the joint use and protection of transboundary waters	Water resources research, Inter-basin water allocation, protection of surface and ground waters, water regulation, navigation	Dnepr, Pripyat	All transboundary waters forming or crossing the border between Belarus and Ukraine	Belarus, Ukraine	Signed 16 October 2001 in Kiev	Government Plenipotentiaries	Ukraine
39	Agreement between the Government of the Russian Federation and the Government of the Republic of Belarus on the cooperation on protection and rational use of transboundary water bodies	Protection of water bodies, hydro-technical installations, water research, public information, support to local cooperation	Dnepr, Zapadnaya Dvina	All transboundary waters, including Rivers Dnepr, Zapadnaya Dvina, Sozh	Russian Federation, Belarus	Signed 24 May 2002 in Minsk	Joint Commission	Russian Federation, Belarus

N°	Agreement	Field of application	River basin	Area of application	Signatories and/or Contracting Parties	Date and place of signature	Joint body	Source of information
40	Decision made by the heads of the Central Asian States on “Main directions of the programme for concrete actions to improve the ecological and socio-economic situation in the Aral sea basin for the period 2003-2010”	Measures on integrated management of water resources, hydro-technical installations, solving of socio-economic problems, development of the legal basis for interstate organisations	Rivers Amu Darya, Syr Darya, The Aral Sea	All watercourses and lakes of the Parties of the Decision in the Aral Sea basin	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	Signed 6 October 2002 in Dushanbe	Existing joint bodies: Inter-State Commission for Water Coordination, Inter-State Commission for Sustainable Development and International Fund for Saving the Aral Sea	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Annex 4**EXAMPLES OF ENVIRONMENTAL AGREEMENTS IN THE NIS WITH IMPLICATIONS FOR COOPERATION ON TRANSBOUNDARY WATERS**

No	Agreement	Signatories and/or Contracting Parties	Date and place of signature
1	Agreement on interaction in the field of ecology and environmental protection	Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan	8 February 1992, Moscow
2	Agreement on joint actions for solving problems of Aral Sea and near-Aral region, environmental normalization and ensuring of social-economic development of the Aral region	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	26 March 1993, Kzil Orda
3	Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on co-operation in the field of environmental protection	Russian Federation, China	27 May 1994, Beijing
4	Almaty Declaration	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	28 February 1997, Almaty
5	Agreement between the Government of the Republic of Kazakhstan, the Government of the Republic of Kyrgyzstan, the Government of the Republic of Tajikistan, the Government of Turkmenistan and the Government of the Republic of Uzbekistan concerning the status of the International Fund for Saving the Aral Sea (IFAS) and its organizations	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	29 May 1997, Tashkent
6	Agreement between the Government of the Republic of Kazakhstan, the Government of the Republic of Kyrgyzstan and the Government of the Republic of Uzbekistan on co-operation in the field of environmental protection and rational use of the nature	Kazakhstan, Kyrgyzstan, Republic of Uzbekistan	17 March 1998, Bishkek

No	Agreement	Signatories and/or Contracting Parties	Date and place of signature
7	Agreement on co-operation in the field of environmental monitoring	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Uzbekistan	13 January 1999, Saratov
8	Agreement between the Government of the Russian Federation and the Government of the Lithuanian Republic on co-operation in the field of environmental protection	Russian Federation, Lithuania	29 June 1999, Moscow

Annex 5

EXAMPLES OF DRAFT AGREEMENTS PROPOSED OR UNDER NEGOTIATION IN THE NIS

No	Agreement	River basin	Signatories and/or Contracting Parties
1	Agreement between the Government of the Russian Federation and the Government of the Azerbaijan Republic on co-operation in the field of rational use and protection of waters resources of the border river Samur	River Samur	Russian Federation, Azerbaijan
2	Agreement between the Government of the Russian Federation, the Government of Belarus and the Government of the Latvian Republic on co-operation on the use and protection of water resources of the Daugava (Zapadnaya Dvina) river basin	River Daugava (Zapadnaya Dvina)	Russian Federation, Belarus, Latvia
3	Agreement between the Government of the Russian Federation, the Government of Belarus and the Government of the Lithuanian Republic on co-operation in the field of use and protection of water resources of the Neman (Nemunas) river basin	River Neman (Nemunas)	Russian Federation, Belarus, Lithuania
4	Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on co-operation in the field of protection and rational use of transboundary waters	Rivers Amur, Ussury, Argun	Russian Federation, China
5	Convention between the Republic of Moldova, the Polish Republic and Ukraine concerning conservation of landscape and biological diversity and rational use of natural resources of the Dniester river basin	River Dniester	Moldova, Poland, Ukraine

Annex 6

PARTICIPATION OF NIS IN UNECE MULTILATERAL ENVIRONMENTAL AGREEMENTS

Country	Date of ratification, accession, acceptance or approval				
	Water Convention³²	Protocol on Water and Health	Transboundary EIA Convention 33	Industrial Accident Convention 34	Public participation Convention 35
Armenia			21 February 1997	21 February 1997	1 August 2001
Azerbaijan	3 August 2000	9 January 2003	25 March 1999		23 March 2000
Belarus	29 May 2003				9 March 2000
Georgia					11 April 2000
Kazakhstan	11 January 2001		11 January 2001	11 January 2001	11 January 2001
Kyrgyzstan			1 May 2001		1 May 2001
Moldova	4 January 1994		4 January 1994	4 January 1994	9 August 1999
Russian Federation	2 November 1993	31 December 1999		1 February 1994	
Tajikistan					17 July 2001
Turkmenistan					25 June 1999
Ukraine	8 October 1999		20 July 1999		18 November 1999
Uzbekistan					

PART II

***PROSPECTS FOR WATER COOPERATION
IN THE NIS REGION***

STATUS OF TRANSBOUNDARY WATERS AND IMPLEMENTATION OF INTERNATIONAL AGREEMENTS IN THE REPUBLIC OF AZERBAIJAN

M. Adigezalova

Azerbaijan's water resources are very limited (15% of the total water resources of the South Caucasus). The total surface-water resources of transit rivers constitute about 70 per cent, and only 30 per cent of surface waters originate in the territory of Azerbaijan. The Kura river supplies the drinking water of 75 per cent of the country's population. A fundamental problem of the Kura basin is its pollution. Owing to the country's geographical location - Azerbaijan is situated on the lower course of the Kura - all the pollution from the territory of Georgia and Armenia passes through Azerbaijan. Not only is transboundary pollution destroying the whole ecosystem of the Kura and its main tributary, the Araks, it is also inflicting enormous damage on the unique water system of the Caspian Sea, into which the Kura finally discharges.

The rivers flowing into Azerbaijan carry water whose pollutant content exceeds the established norms by five to 15 times according to various indicators. The use of the polluted waters of these rivers for irrigation and everyday needs has resulted in acute pollution of soils by copper and molybdenum and a decline in the productivity of farm crops and livestock, as well as slowing the development of young animals and causing a number of pathological changes and diseases. More than 40 per cent of the valley part of the area is now saline, and the main cause of salination is the use of polluted water and water with a high mineral content.

It is generally accepted that transboundary water resources are the common heritage of mankind, the basis of its well-being and guarantee of its survival and development. The waters of transboundary watercourses are not the property of

one State alone and may not be used for selfish purposes. Azerbaijan is currently pursuing a State policy for the rational use and protection of water resources, including transboundary rivers, based on the international water legislation.

The fundamental principles of the State's water policy are based on an analysis of positive international experience and the current situation:

- Basin planning and local administration of water management activities;
- Constant and consistent reduction of harmful impacts on bodies of water, and the need for more economical water use;
- Gradual transition to self-funding in the water sector of the economy;
- Transparency and widespread public involvement in the preparation and taking of decisions.

The clearly formulated State water policy is creating a platform for agreement on the reasonable and equitable solution of joint-use issues and the rehabilitation and protection of transboundary waters.

The State water policy is designed to ensure:

- Access by all population groups to safe drinking water which meets hygiene standards;
- Exercise of the rights of present and future generations with regard to environmentally sound use of the water-resource potential;
- Matching of economic requirements to the sustainability of environmentally sound water resources;
- Transparency and widespread public involvement in the preparation and taking of decisions.

The water resources of the Araks are distributed in accordance with a bilateral agreement with Iran, Azerbaijan's neighbour to the south. A Joint Iranian-Azerbaijani Commission on the use of the water and energy resources of the Araks has been established.

The Kura basin is covered by the following bilateral agreements:

- *The Protocol on the outcome of the negotiations between the governmental delegations of Georgia and the Azerbaijani Republic on the use of water resources (27 December 1997);*
- *The Memorandum of Understanding between the Ministry of the Environment of Georgia and the State Committee for Ecology and Natural Resources of the Azerbaijani Republic on collaboration in the development and implementation of pilot monitoring and assessment projects in the Kura basin (16 September 1997);*
- *The Agreement between the Government of Georgia and the Azerbaijani Republic on environmental protection (18 February 1997).*

In addition to the instruments mentioned above there a number of agreements on use of the international Lake Dzhandari.

Regulation of the use and protection of water resources shared with Armenia is impossible at present owing to the political situation.

To the north of the frontier between Azerbaijan and Russia flows the river Samur, which plays an important role in land irrigation and water supply for the cities of Baku and Sumgait. Since long ago the peoples of Azerbaijan and Dagestan (part of Russia) have been using the water resources of this river without any problems. A treaty is being drafted by the Governments of Russia and Azerbaijan on cooperation on the rational use and protection of the water resources of the transboundary river Samur in accordance with the *UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention, Helsinki, 17 March 1992) and other instruments.*

As things stand at present, Azerbaijan has ratified 15 important international conventions, including the *UNECE Water Convention and its Protocol on Water and Health (London, 17 June 1999)*. Unfortunately, Georgia and Armenia have not ratified this extremely important UNECE Convention, a circumstance which is impeding the development of international cooperation on transboundary rivers.

The sustainable economic development and environmental security of the South Caucasus region are making serious demands on the use of water resources and they dictate a need to produce a "Plan for the integrated use and protection of the water resources of the Kura basin" in the light of the situation in the river's lower reaches. In view of the complicated political situation in the region, such a plan must be formulated under the auspices of international organizations and attract foreign investment.

WATER RESOURCES OF THE REPUBLIC OF AZERBAIJAN AND THEIR USE

N. KAZIBEKOV

Azerbaijan has been a sovereign State since 1991. The Republic is located on the western shore of the Caspian Sea at the foot of the Bolshoi and Maly Kavkaz mountains. It borders on Russia to the north, Georgia to the north-west, Armenia to the west, and Turkey and Iran to the south. It has a population of 8.2 million and an area of 86,600 square kilometres. Azerbaijan is the largest State in the South Caucasus; its distinguishing features are its landscape, its captivating fauna and flora, its rugged relief and its varied climate. Nine of the planet's 11 natural climatic zones are found in Azerbaijan, and its relief ranges from a high point of 4,466 metres to a low of minus 27 metres. Eighteen per cent of its total territory is below sea level. Valleys and low-lying areas occupy 39 per cent, and 11 per cent of the land is forested.

Azerbaijan's fluvial network has a total of 8,530 rivers. Its main water artery is the Kura (an overall length of 1,515 km and a catchment basin of 188,000 km²). Azerbaijan's internal watercourses have their highest flow rates in the autumn months. Since the flows of most of the rivers are unregulated, they cannot be used effectively in the rainy season. In summer most of the rivers dry up. The country's water resources are limited. The volume of surface water totals 32.2 km³. In dry years this volume can fall to 23 km³. Groundwater stocks stand at 5.2 km³.

Seventy per cent of Azerbaijan's water resources come from transboundary rivers. Satisfaction of the demand for water will require the construction of regulatory installations on the rivers and the redistribution of their flows. From time immemorial agriculture in Azerbaijan has been based on irrigation.

Because of the dry climate and the variety of soil characteristics 90 per cent of the country's farm

crops are grown on irrigated land. Most of the arable land is located in the valleys, where large harvests of farm products depend on irrigation and continual land-improvement measures. Irrigated land accounts for 1.45 million ha out of a total land area suitable for agriculture of 4.2 million ha. Integrated land-improvement measures are carried out on 610,000 ha of this land, and a collection/drainage system has been built. Azerbaijan has constructed 135 reservoirs with a total volume of 21.5 billion m³, 49,100 km of irrigation channels, 30,400 km of collection/drainage channels, 110,000 water management facilities, 881 pumping stations, more than 7,000 subartesian boreholes, and 1,700 kilometres of defensive dams, as well as large irrigation complexes and other installations.

The resources available for longer-term agricultural development are not entirely exhausted. The soil and climatic conditions offer opportunities to increase the area of irrigated land to 3-3.5 million ha. But the scarcity of water resources impedes the implementation of such measures. At present the country's average annual water deficit amounts to 3.7 km³, or 4.7 km³ in dry years. Over a year the country consumes roughly 10-13 km³ of water, 60-70 per cent of which is used in agriculture, 20-25 per cent in industry, and 5-7 per cent for drinking-water and other everyday needs.

In recent years global climate changes and a lengthy drought have been sharply reflected in reduced flows of the Kura and Araks. Since 1989 it has been impossible to fill the Minchegaur reservoir to its capacity of 15.7 km³. As a result of the drop in the volume of water abstracted from natural sources, the area of irrigated land has declined by 300,000 ha.

Raising the level of the Caspian Sea by 2.5 metres had a serious impact on groundwater levels in coastal zones and over the last 20 years has damaged the country's economy to the tune of \$US 12 billion.

Apart from the water shortage, the main index of the increasing socio-economic pressures is the serious pollution of the transboundary rivers flowing out of Armenia and Georgia. Heavily polluted water flows into Azerbaijan in such rivers as the Kura, Araks, Okhchuchai and other transboundary watercourses. Since the pollution of the Okhchuchai has passed the critical levels, this river is designated "dead". The average annual pollutant load in the waters of these rivers (mainly phenol, copper and oil products) exceeds the permissible health limits by a factor of 15, and in summer months the excess becomes even greater. Every year the waters of these rivers carry into Azerbaijan 2,200 tons of suspended substances, 1,400 tons of oil products, 100 tons of phenol, and 1,300 tons of heavy metals. One of the basic causes of the pollution of the transboundary rivers is the enormous influx from the territory of Armenia and Georgia of over 430 million m³ of untreated household and other waste water.

One of the fundamental problems, one causing serious alarm, is the consumption by 75 per cent of the population of Azerbaijan of drinking water which falls very far short of the health and hygiene standards. Unless serious measures are taken in this area in the very near future it is difficult to imagine the scale of the potential adverse consequences. In order to solve these problems during the transition to a market economy, the Committee on Land Improvement and Water Management, which carries out the unified State policy, is reforming and reorganizing its structure and repairing, rehabilitating and rebuilding the water management systems with funds from the State budget and foreign investments.

The purpose and role of the reforms are also reflected in a new attitude towards the environment, characterized by the rational use and protection of water resources, a legal basis for which has been provided by the enactment of laws and 30 regulatory instruments. The effective use of water resources requires the introduction of modern and

economic irrigation techniques and technology, the formulation and implementation of efficient land-improvement and water-management measures, and the consolidation of management principles. But the existing difficulties of the transitional period make it impossible to translate all these ideas fully into realities. In accordance with the requirements of a market economy Azerbaijan has seen a gradual shift since 1997 to payment for water use. Users' initiatives have resulted in the formation of 550 water users' associations, which address questions of the rational use of water resources and their distribution among consumers.

Having chosen the option of establishing a democratic State, Azerbaijan has signed and ratified 14 international environmental conventions. Guided by the international water resource instruments Azerbaijan is now pursuing a State policy for the protection and use of the waters of transboundary rivers and is building its relations with neighbouring countries in strict compliance with the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (the Water Convention), adopted at Helsinki and ratified by Azerbaijan on 14 March 2000.

Use of the water resources of the transboundary rivers Kura and Khrami is currently regulated by bilateral agreements between Azerbaijan and Georgia. Close links have been established between Azerbaijan and Iran with regard to use of the water resources of the transboundary river Araks. Iran and Azerbaijan have created a Standing Commission on joint use of the water and energy resources of this river. The transboundary river Samur, which flows along the frontier between Azerbaijan and Russia, plays a leading part in supplying water to the cities of Baku and Sumgait and to the Apsheron peninsula, in addition to its use for irrigation purposes. Work is currently proceeding on the preparation of a draft convention on joint use of the water resources of the Samur, in accordance with the international conventions.

The comprehensive solution of problems of the protection of the water resources of transboundary rivers is virtually impossible owing to the years-long conflict with Armenia. For

example, as a result of inadequate technical maintenance Azerbaijan's highest dam (135 m), at the Sarsang reservoir, which lies in occupied territory, constitutes a real threat to 400,000 people living in the lower course of the river Terter.

In order to ensure that foreign investments are used effectively the Government has adopted a list of 11 building projects of vital significance for the economy where the work has not been completed. The listed water projects include construction of the main Milsk-Mugan collector, reconstruction of the Samur-Apsheron irrigation system, and completion of the Vaikhir reservoir. Of these projects, construction of the second stage of the Milsk-Mugan collector has been completed with the help of a loan from the Islamic Development Bank. This collector ensures that mineralized groundwater is discharged into the Caspian Sea and is creating good prospects for improvement of the state of the environment and the quality of the land over an area of 500,000 ha. The third stage of this collector, completion of which is scheduled for 2006, is being financed by a loan from the World Bank.

A start has been made on the reconstruction/rehabilitation work on a 50-km section of the Samur-Apsheron Canal with a World Bank loan. The ongoing construction of the 66-km Khanarkh Canal is funded by investments from the Islamic Development Bank; this work is part of the plan for reconstruction of the Samur-Apsheron irrigation system, scheduled for completion in 2005. Completion of the reconstruction of the Samur-Apsheron Canal, which has been in operation for some 50 years, will double by means of feeding from local rivers the volume of water available to meet the drinking-water and other everyday needs of Baku and Sumgait and the Apsheron peninsula.

Budgetary resources are being used to complete the work on the Vaikhir reservoir. This will improve the water supply to 16,000 ha of land in the Nakhichevan region. A loan of \$US 96 million from the World Bank and the European Bank for Reconstruction and Development is being used to carry out work on the first stage of the project "Rehabilitation of water-supply installations of Greater Baku"; it has also been used for

completing the reconstruction of the Kurinsk and Dzheirabatyan water-treatment plants and the partial renovation of the pumping station of the city's watermain system. The Islamic Development Bank, OPEC and the Saudi Arabian Development Fund have made available a loan of \$US 36 million for 2004-2007 for the project "Construction of the Velvelchai-Taktakerp Canal".

In addition to the problems stemming from the scarcity of water and its pollution, the harmful impact of rivers which are likely to produce sudden high water-levels and cause flood damage to the country's inhabitants and economy has become a serious problem. In 2004-2007 a loan of \$US 22 million from the Asian Development Bank is being used to carry out bank-reinforcement work in 12 regions of Azerbaijan.

The attention of international organizations working in the field of water resources must be drawn to the importance of providing assistance for the realization of the following measures, which are of special significance for the rational use and protection of the water resources, the stable development of the States of the South Caucasus and the protection of the ecosystems of the region's rivers and the Caspian Sea in the light of the water flows required by environmental considerations, in accordance with the principle of equitable and reasonable use of water resources by these States in their territory in order to satisfy their water needs as determined by their existing social, economic and environmental situations, taking into account as well their social infrastructure and population size and their water resources:

- Formulation under the supervision of international organizations of a scientifically sound plan for the integrated use and protection of the water resources of the Kura;
- Acceleration of the accession by the countries located in the Kura basin (Armenia and Georgia) to the UNECE Water Convention in order to ensure agreed use and protection of the water resources of transboundary rivers;
- Acceleration of the creation of a system for monitoring the quality indicators of the waters of the Kura and Araks in the territory of each of the riparian States;

Assessment of the damage caused to the ecosystems of the region's transboundary rivers in accordance with the international legal standards, introduction of damage-compensation arrangements and measures to prevent damage in the future;

Acceptance of the principle that measures affecting the natural regime and the condition of the water resources of transboundary rivers should not be carried out by States located in the upper courses of these rivers until agreement

has been reached with the States located in the lower courses;

Formulation of immediate measures to protect the water resources of the transboundary rivers of the South Caucasus against pollution and exhaustion and design of a mechanism for implementation of these measures.

* * *

ARMENIA'S COOPERATION WITH A NUMBER OF COUNTRIES ON TRANSBOUNDARY WATER RESOURCES

O. KIRAKOSYAN

Since Armenia's water resources are limited, they are of cardinal importance for meeting the population's needs and also of strategic significance for the region's environmental security. In 1999-2000 a draft "Programme for integrated management of water resources" was formulated in conjunction with the World Bank in order to improve the structure of the country's environmental policy and regulate water-resource protection activities.

Many of Armenia's surface waters are of international significance. Most of Armenia is located in the basin of the rivers Araks and Kura. The Araks flows along Armenia's frontier with Turkey and further downstream along its frontier with Iran before crossing the territory of Azerbaijan, where it discharges into the Kura. The Araks basin in Armenian territory covers 22,790 km² and drains less than 23 per cent of the area via the rivers Akhuryan, Kasakh, Metsamor, Razdan, Azat, Vedi, Arpa and Vorotan. Deep-lying groundwater in Armenian territory amounts to 988 million m³ per year. The main sources of this water are found in the Ararat artesian basin. Across its frontier with Eastern Turkey Armenia receives an annual inflow of about 1,190 million m³ and the outflow from Armenian territory (into Georgia, Azerbaijan and Iran) amounts to 1,068 million m³ a year.

Some 9,500 big and small rivers with a total length of about 25,000 km flow through Armenian territory; their average flow is 6.2 km³ per year, 3 km³ of which is contributed by groundwater. Up to 1990 Armenia's average demand for water amounted to 3.5-4 km³. Over the last 10 years this indicator has fallen, standing recently in the range of 1.5-2 km³ as a result of a reduction in the area of irrigated land and a cutback in production capacity.

The pollution of the basins by industrial wastes has also declined.

Owing to Armenia's location in high mountains all its rivers flow into neighbouring countries. Its average annual river flows total 6.25 million km³, 3.029 km³ of which is contributed by groundwater.

Armenia holds the right to use one half of the flows of the two transboundary rivers, the Araks and Kura, which add 0.94 km³ a year to its water resources. Accordingly, Armenia's replenishable surface water resources total 7.19 km³.

Since Armenia is landlocked and has transboundary rivers flowing into neighbouring countries, international cooperation on water resources is important, indeed essential. Some aspects of this cooperation on the protection and use of water resources require revision and harmonization with the current policy of sustainable use.

Armenia has taken on a number of obligations under international treaties on water policy; the following are the most important treaties:

- *Convention between the USSR and Turkey on use of the waters of frontier rivers, brooks and streams (under the Protocol to this Convention of 8 January 1927 and the additional Protocol of 26 October 1973);*
- *Agreement between the USSR and Iran on joint use of the river Araks for irrigation, energy production and other economic purposes of 11 November 1957;*
- *Protocol to the Agreement between the Georgian SSR and the Armenian SSR on*

abstraction of water from the river Debed of 5 November 1971.

In addition to these conventions and protocols there are also several agreements on transfer of water from the rivers Arpa and Vorotan in order to restore the environmental balance of Lake Sevan. It may thus be seen that Armenia's international cooperation on the use of transboundary waters is based on regulatory instruments from the Soviet era.

The formulation of the new national policy on Armenia's transboundary water resources is based on international principles and such policy is implemented in accordance with the Water Code of the Republic of Armenia adopted in 2002. This Code regulates the bases of general State policy for the use of water resources in the light of the principles of international cooperation in this sphere.

Under the new Water Code the *Commission of the Republic of Armenia on Transboundary Water Resources* was established in 2002 by a decision of the Prime Minister. The following are this Commission's basic functions:

- Formulation and submission to the Government of draft inter-State agreements;
- Formulation and submission to the Government of proposals for a standing

joint commission on the operation of transboundary water regulation installations;

- Notification to the relevant agencies of the Republic of Armenia of issues not regulated by inter-State agreements and requiring due resolution;
- Provision of information to such agencies in Armenia concerning the state of transboundary waters and transboundary impacts.

However, not all of Armenia's neighbours have corresponding legislation and a legal foundation for transboundary cooperation, a fact which complicates considerably the management of transboundary waters.

Nevertheless, basin management is already in place in the basins of the rivers Debed and Khrami. The Debed already has an agency for the basin management of its water resources, and a basin council is being established. Appropriate steps are also being taken to introduce basin management for the Khrami as well.

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TRANSBOUNDARY ASPECTS OF RESOURCE FORMATION AND SURFACE WATER QUALITY IN THE REPUBLIC OF BELARUS

A. RACHEVSKY

The Republic of Belarus is relatively well placed where water resources are concerned. Its existing resources of natural water are fully sufficient to meet both present and future demands for water.

In an average wet year the Republic's water resources amount to 57.3 km³, 34 km³ of which originate within the country (see table). Some 55 per cent of the annual flow comes from rivers of the

Black Sea basin and 45 per cent from the Baltic. In wet years the total annual river flow increases to 92.4 km³, while in dry years it can fall to 37.2 km³ (95% of the supply requirement).

The larger part of the river flow (59%) originates within the country. The inflow of water from neighbouring States (Russia and Ukraine) accounts for the remaining 41 per cent.

Table. The resources of river runoff basins of major rivers of Belarus

River basin	Water resources in the average water year, km ³ /year	
	Emerging in the country, km ³ /year	Overall, km ³ /year
Western Dvina (incl. Lovat river)	6,8	13,9
Neman (without Vilia river)	6,6	6,7
Vilia	2,3	2,3
Western Bug (incl. Narew river)	1,4	3,1
Dnipro	11,3	18,9
Pripyat	5,6	13,0
Total	34,0	57,9

Part of the river flow accumulates in lakes and reservoirs in Belarus itself (6.7 and 3.1 km³ respectively). The natural resource provided by groundwater amounts to 15.9 km³ a year and is estimated at 18.1 km³ a year. The volume of existing and estimated resources depends on the conditions of groundwater formation, which are more favourable in the central, north-east and western parts of the country. Belarus has 257 groundwater deposits and pockets with total exploitable reserves of 2.31 km³ a year or

13 per cent of total estimated resources.

The largest groundwater deposits, with known reserves of more than 40-50 thousand cubic metres a day, are located in the regions of the big industrial and population centres in the oblasts of Minsk, Gomel, Vitebsk and Grodno. It is generally the waterbearing horizons close to the surface (50-200 m) which are exploited.

According to data from the State water survey, the abstraction of water from natural bodies of water in Belarus declined slightly in 2002 in comparison with past years and stood at 1,865 million m³, including 789 million abstracted from surface bodies and 1,079 million from groundwater. Recent years have seen a slight decreasing trend in water use by industry and agriculture. For example, industry's water consumption fell by almost 10 per cent between 1997 and 2002.

Consumption for drinking-water and other everyday purposes remains fairly stable. A further reduction (from 168 to 164 million m³) in the demand for water of potable standard from the economic sectors was recorded in 2002. A total of 1,692 million m³ of fresh water was used to meet the demand from economic sectors, including: public supply - 794 million; production - 500 million; agriculture - 5 million; and pond fisheries - 254 million.

In 2002 1,169 million m³ of waste water was discharged into bodies of surface water, including: untreated and insufficiently treated - 20 million; treated up to standard - 884 million; and clean up to standard (without treatment) - 265 million. In comparison with the preceding year there was a further decline in the discharge of polluted waste water, from 23 to 20 million m³.

Losses of water during transport totalled 117 million m³. Irrecoverable losses from additional evaporation from the surface of fishery ponds amounted to 653 million m³. The per capita urban demand for potable water is 240-360 litres a day, a substantially higher level than in most of the other countries of Europe (120-150 litres). The total public-supply use for the whole country is 219 litres a day per inhabitant.

Sixty per cent of the abstraction of water from natural sources and 54 per cent of the discharge of waste water into natural bodies of water is measured by meters. In all, some 4,500 water users are metered, and there 280 installations abstracting water from surface bodies and 3,300 waste water outlets, including 422 discharging directly into surface water. There are more than 29,100 artesian boreholes.

The total capacity of treatment plants in each oblast exceeds the actual volume of waste water. However, many of the enterprises take into their installations waste water with concentration levels of individual ingredients above the standard values. There are also instances of overloading of treatment installations in terms of the volume of waste water taken in, while 96 per cent of polluted waste water is cleaned biologically.

The country's surface waters acquire their chemical load not only from the discharge of waste water but also as a result of the seepage of pollutants from agricultural and urban areas and from vehicle emissions and waste storage sites, as well as suffering fall-out pollution. The total impact of dispersed sources of pollution is comparable to that of the discharge of waste water, but it is for the moment difficult to measure these sources both for financial reasons and owing to the lack of adequate methods of measurement.

All of the country's big rivers are transboundary. They include the Dnepr, Pripyat, Zapadnaya Dvina, Viliya, Neman and Zapadny Bug. The Dnepr and Zapadnaya Dvina rise in Russia and, after passing through Belarus, carry their waters to Ukraine and Latvia, respectively. The sources of the Pripyat and its right-bank tributaries are located in Ukraine; having passed through Belarussian territory in its middle reaches the Pripyat then returns to Ukraine. The Zapadny Bug, which flows out of Ukraine, serves as the State frontier of Belarus and Poland. The Viliya and Neman flow from Belarus into Lithuania.

The heaviest anthropogenic impacts are borne by the Dnepr in the vicinity of the cities of Mogilev and Rechitsa and by its tributaries - the Svisloch, Berezina, Sozh and Uza; the Zapadnaya Dvina within the zone of influence of the city of Novopolotsk; the Pripyat below the town of Mozyr, together with its tributary the Yaselda; and the Neman in the Grodno area. These and other basins lack sufficient water resources to dilute waste water to the established standards for fishing, leisure and other everyday uses. Accordingly, in addition to the introduction of waterless and other advanced technology (designed to reduce or eliminate the discharge of waste water), enormous importance is attached to measures for the renovation of treatment

plants (in Minsk, Bereza, Rechitsa and elsewhere) and to economic incentives for environmental protection measures.

Pollution levels in surface waters are defined by the concentrations of ammonia nitrogen, nitrite nitrogen, oil products, zinc, phosphates, iron, copper, manganese, molybdenum and phenols. An average annual concentration of ammonium nitrate exceeding the maximum permissible concentration (MPC) by a factor of 1.3 to 1.7 has been found in the water of almost all the country's big rivers. Maximum concentrations were as high as 10 MPC in the Svisloch (Dnieper basin). Pollution of river water with nitrite nitrogen and oil products was less in evidence: the average annual concentrations did not exceed 0.2-4.4 and 0.6-3.4 MPC respectively. However, the highest one-off measurements of nitrite nitrogen in the waters of the rivers of the Dnieper basin were 10 MPC (Svisloch) and 20 MPC (Berezina). The amount of oil products in river water did not exceed 4-6 MPC (Zapadnaya Dvina and Pripyat basins). The average annual concentration of zinc in the waters of the country's main rivers was 1.8-4.2 MPC, while the maximum one-off measurements varied between 6 and 13.7 PC.

According to some indicators the water quality of the Zapadnaya Dvina and Dnieper is worse when they enter Belarus than when they leave its confines - evidence of transboundary pollution. It is not yet possible to make similar comparisons for the basins of the Pripyat and Zapadny Bug for want of regular monitoring posts.

Since 1987 Belarus has been conducting systematic monitoring of the radioactive pollution of surface waters and riverbed deposits in five of the country's rivers draining land polluted with radionuclides: the Dnepr (at Rechitsa), the Sozh (at Gomel), the Pripyat (at Mozyr), the Iput (at Dobrush) and the Besed (at Svetilovichi). An analysis of test data over 15 years showed that the concentrations of cesium-137 and strontium-90 in these rivers had declined significantly since 1987 but remain above the levels recorded before the accident at the Chernobyl nuclear power station. At present most of the cesium-137 in the water of the rivers is transported as suspended particles when

water levels are high, while the strontium-90 migrates chiefly in solution.

Since all of the country's big rivers are transboundary rivers, close attention is given to the development of bilateral and multilateral cooperation with adjoining States on water problems. It should be noted first of all that in 2003 the Republic of Belarus ratified the *Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (1992). Building on the provisions of this Convention, the Government concluded bilateral agreements with Ukraine and Russia on the protection and use of transboundary waters, and negotiations are proceeding with Poland on a draft bilateral agreement on transboundary waters. The governmental commissions which have been established are an important mechanism for the development of cooperation among countries on frontier matters.

One example of the development of cooperation among States located in the basin of a transboundary river is the work on the drafting of a *trilateral agreement on the management of the basin of the Zapadnaya Dvina (Daugava)*, one of the rivers of the Baltic Sea basin, which is 1,005 km long and has a basin area of 87,900 km². It passes through the territory of three States - Russia, Belarus and Latvia. A small part of the river basin (13.1%) is located in Lithuania and Estonia. The formation of the hydrological and hydrochemical regimes is determined largely by the physical and geographical conditions and by the nature of the general water use in the basin; accordingly, it is a matter of urgency to develop cooperation on basin management between Russia, Belarus and Latvia.

At present the water of the Zapadnaya Dvina (Daugava) is polluted with oil products, organic and suspended material, combinations of nitrogen, and salts of heavy metals (copper, chrome, nickel, etc.). Repeated instances have been recorded when levels of these substances have exceeded their MPC. It has been established that the river is polluted along the full extent of its course, resulting in a considerable transboundary transfer of pollutants and a perceptible impact on the waters of the Baltic Sea. This whole situation calls for the formulation of agreed inter-State measures designed gradually

to eliminate the sources of the pollution and reduce their impact. A further requirement is the exchange of environmental information among States and recourse to agreed (inter-linked) regulations, standards and criteria and specific environmental indicators.

Pooling of the efforts of the three States (Russia, Belarus and Latvia) in this field will facilitate the adoption of optimum decisions in the management of environmental protection activities in the basin of the Zapadnaya Dvina (Daugava). This work was initiated in 1997 by the vigorous stance taken by the Swedish Environmental Protection Agency, which led to the implementation of a project for the three countries mentioned above on cooperation on this transboundary basin.

The drafting of the text of the Agreement was preceded by training courses and periods of job experience for specialists, the production of a detailed overview of the hydrological/environmental status of the basin of the Zapadnaya Dvina (Daugava), the preparation in conjunction with GRID-ARENDAL (Norway) of a set of environmental maps, and the holding of tripartite expert meetings to draft the Agreement. In addition, study visits were organized to provide experience of the work of basin commissions in the European region. The project "*Water management in the basin of the Zapadnaya Dvina*" was carried out with the support of the TACIS Programme. The next step in this trilateral work will be the signature of the joint intergovernmental *Agreement on the management of the river basin of the Zapadnaya Dvina (Daugava)*, a draft text of which has already been produced at the working meetings of representatives of the three countries.

Similar work is under way with regard to the basin of the transboundary river Neman (Nemunas) with direct financial backing from Sweden, Germany and the TACIS Programme for Belarus, Lithuania and Russia. This river has a total length of 937 km and a catchment area of 98,000 km² (459 km and 35,000 km² respectively within Belarus).

The three States are giving particular attention to the creation of a joint early-warning system for emergencies, the establishment of monitoring posts

to take measurements, and the design of agreed methods of sample collection and analysis and exchange of information. They have agreed to draft a tripartite *agreement on the management of the basin of the transboundary river Neman (Nemunas)*.

The big transboundary river Zapadny Bug passes through the territory of three countries - Ukraine, Belarus and Poland; it is 772 km long with a catchment area of 40,000 km². The river flows along the south-west borders of Belarus for 154 km with a catchment area of 10,400 km². The work done by the three countries was focused on strengthening the monitoring system on this river and developing transboundary cooperation. The project "*Development of transboundary cooperation on monitoring and assessment of water quality in the Bug basin on the frontier of Belarus and Poland*" was carried out in 2000-2002 with support from the TACIS Programme.

The Dnepr is Europe's third largest river, after the Volga and the Danube, and the second largest river discharging into the Black Sea. The Dnepr basin has a total area of 511,000 km². It constitutes a transboundary system: 20 per cent of the basin's total area is located within the Russian Federation, 23 per cent in Belarus, and 57 per cent (the largest part of the basin) in Ukraine.

The Dnepr basin is a complicated system with many branches and has great natural and socio-economic value. Apart from the fact that socially significant natural resources are located in the basin (water, land and forest resources, for example), it also constitutes a valuable resource base for a large number of stakeholders. The Dnepr basin may be regarded as a classic example of sustainable regional development - a result of the attempts to transform the Dnepr region from a traditional farming to an industrial region in just a few decades. The situation there is further complicated by the extremely acute social and economic difficulties encountered by the basin's three countries in the course of their transition to a market economy.

An awareness of the fact that the environmental problems of the river Dnepr cannot be solved by the efforts of any single State

prompted the basin's three countries to produce a joint *Programme for the environmental upgrading of the Dnepr basin*. This work was done under the UNDP/GEF project "Preparation of a strategic programme of action for the Dnepr basin and design of mechanisms for its implementation".

Among the intensive schedule of measures carried out by the three countries in recent years attention may be drawn to the production of a transboundary diagnostic analysis of the Dnepr basin, a strategic plan of action on biodiversity, joint ecosystem research missions, identification of "hot spots", and the establishment of an environmental database for the basin. The drafting of a *strategic plan of action and of national plans for the improvement of the Dnepr basin* occupy a special place, for they spell out the fundamental problems and propose a set of corrective measures,

as well as assessing the expenditure needed for the implementation of the plans.

Confirmation of the *strategic plan of action* will be the main goal of the cooperation policy of the three countries and constitute the realization of the joint *Statement of Environmental Ministers* signed at the fifth all-European Ministerial Conference in Kiev in 2003. In this Statement the parties expressed their readiness to draft an *international treaty (convention)* to serve as the organizational mechanism for cooperation on the Dnepr basin.

These documents reflect to the full the hopes and aspirations of the citizens of the three countries, whose fate is closely interwoven with the fate of the Dnepr.

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BRIEF REVIEW OF THE STATUS OF GEORGIA'S COOPERATION WITH A NUMBER OF COUNTRIES ON ENVIRONMENTAL PROTECTION AND THE PROTECTION OF TRANSBOUNDARY WATERS IN PARTICULAR

I. MTSKHVETADZE

Pursuant to the Constitution of Georgia adopted by the country's Parliament in 1995, agreements concluded before 1995 remain in force only if they were harmonized with the Constitution and laws of Georgia within the two years following the Constitution's adoption.

On this basis, none of the international agreements concluded before the adoption of the Constitution is in force.

At present the Agreement between the *Government of Georgia and the Government of the Republic of Kazakhstan on cooperation in the field of environmental protection (signed on 17 September 1996; entered into force on the date of signature)* is in force, together with a number of other agreements, including the agreements between the Government of Georgia and Governments of the States bordering directly on Georgian territory, specifically with the Republics of Azerbaijan, Armenia and Turkey. These agreements will be considered in greater detail.

The Agreement between the Government of Georgia and the Government of the Republic of Azerbaijan on cooperation in the field of environmental protection (signed on 18 February 1997; entered into force on 8 May 1997):

This Agreement contains a separate article 6, which reads: "The Parties, recognizing the importance of the river Kura and Lake Dzhandari (Dzhadargel) for the national economies and populations of the two States, shall work together to

protect their basins against pollution and to ensure the rational use of the water resources."

The following bodies are responsible for implementing the Agreement: for Georgia - the Ministry for the Protection of the Environment and Natural Resources; for Azerbaijan - the State Committee on the Environment and Monitoring of the Use of Natural Resources.

It must be pointed out that the Lake Dzhandari referred to in this Agreement is actually an off-stream reservoir and constitutes, as does the river Kura, a transboundary body of water, receiving water from Georgian territory from the Kura via the Gardaban arterial canal. Early in 1993 the Committee on Land Improvement and Water Management of Azerbaijan and the Department for the Management of Land-Improvement Systems of the Ministry of Agriculture and Agricultural Output of Georgia concluded an agreement under which the Department delivers an annual volume of 70 million m³ of water into Lake Dzhandari, consisting of 50 million for the irrigation of 8,500 ha of land in the Akstafa region of Azerbaijan and 20 million to maintain the Lake's ecological balance.

The following instruments have also been concluded:

Memorandum of Understanding between the Ministry for the Protection of the Environment and Natural Resources of Georgia and the State Committee on the Environment and Monitoring of the Use of Natural Resources of Azerbaijan on

cooperation on the design and implementation of a joint pilot project on monitoring and assessment in the basin of the river Kura/Mtkvari, dated 16 September 1997;

Agreement between the Government of Georgia and the Government of Armenia on cooperation in the field of environmental protection (signed on 19 May 1997; entered into force on 30 November 1999):

Pursuant to this Agreement the Parties undertake to:

- Endeavour to utilize unified approaches, criteria, methods and procedures for quality testing and monitoring of the state of the environment;
- Cooperate in the efforts to solve global and regional problems of environmental protection;
- Cooperate on questions of the protection and regulation of frontier ecosystems in sectors subject to harmful anthropogenic impacts and take action to rehabilitate them and ensure their viability;
- Coordinate their activities and exchange information with each other with regard to environmental protection, etc.

The following bodies are responsible for implementing the Agreement: for Armenia - the Ministry for Protection of the Environment; for Georgia - the Ministry for Protection of the Environment and Natural Resources.

Agreement between the Government of Georgia and the Government of Turkey on cooperation in the field of environmental protection (signed on 14 July 1997; entered into force on 28 March 1998):

Pursuant to this Agreement the Parties undertake to cooperate in the following fields:

- Analysis and monitoring of pollution entering the sea from the land and creation of systems for exchange of information with each other;
- Improvement of the quality of surface and coastal waters and drinking water, and safe disposal of industrial and domestic waste water;
- Cooperation to combat pollution caused by

the disposal (dumping) of waste water in the Black Sea;

- Exchange of information concerning the river Chorokhi, etc.

Memorandum of Understanding between the Ministry for Protection of the Environment and Natural Resources of Georgia and the General Directorate for State Water Management of the Ministry of Energy and Natural Resources of Turkey, signed on 19 January 2002 in Ankara. This Memorandum provides inter alia for the monitoring of alluvial deposits in the Chorokhi in Georgian territory.

In 2003 Georgia began to implement two international programmes of cooperation on transboundary waters:

1. Under the auspices of the United States Agency for International Development (USAID):

Management of water resources for the South Caucasus, in particular the water resources of the Kura and Araks basins. This region embraces three States - Armenia, Azerbaijan, and Georgia.

The aim of this programme is to broaden the dialogue with a view to sustainable management of water resources in the South Caucasus. The following tasks have been set with a view to attainment of this aim:

- Improvement of cooperation in the management of the region's water resources;
- Planning of integrated river basin management in the territory of the three countries;
- Analysis of legislation affecting the management of the region's water resources.

The following targets have been set for accomplishment of the objectives:

- Establishment of monitoring of water quality and volumes in the Kura-Araks basin;
- Development of regional cooperation in the field of geographical information systems;

- Introduction of a programme for exchange of information in order to improve water resource management;
- Expansion of the possibilities for planning integrated management of the water resources of the two river basins;
- Development of the legal framework for management of water resources.

The programme is continuing at the present time.

2. The project “*Joint programme on water resource management*” was carried out (completed in 2003) under the TACIS Programme of the European Union. The project covered four river

basins in the territory of seven countries. One of the rivers studied was the Kura, whose basin embraces parts of Georgia, Armenia and Azerbaijan. The aim of the project was to make a contribution to the formulation of UNECE guidelines for the effective monitoring and assessment of the quality of transboundary waters by means of four pilot projects, including one in the Kura basin.

A similar project in the Kura basin was started in 2004 under the auspices of the United Nations Development Programme.

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COOPERATION OF THE REPUBLIC OF KAZAKHSTAN WITH ADJOINING STATES ON TRANSBOUNDARY WATER ISSUES

N. KIPSHAKBAEV

1. Regional cooperation on water problems among the States of Central Asia

The increasing demand for water from economic sectors and the consequent water deficit, the virtually universal pollution of water sources as a result of economic activities, and the failure to devote due attention to issues of sensible management, rational use and protection of water resources in the Aral Sea basin have produced serious social and economic tensions and augmented the urgency and intensity of water problems. The increasing water deficit is due not only to growing demands and a shortage of water but also to inefficient approaches to water use and inefficient management of the basin's water installations.

Immediately after the break-up of the USSR in 1992 the ministers responsible for the water-management agencies of the new sovereign States signed on the instructions of their Governments (they were all members of Government) the "*Agreement between the Republic of Kazakhstan, the Republic of Kyrgyzstan, the Republic of Uzbekistan, the Republic of Tajikistan and Turkmenistan on cooperation in the joint management of the use and protection of the water resources of inter-State sources*". The Parties adopted a historic decision unprecedented in the age-long practice of inter-State relations - to create the *Inter-State Coordination and Water Management Commission (ICWC)* to deal with problems of the regulation, rational use and protection of the water resources of transboundary rivers.

The ICWC is now successfully maintaining the situation in the region and preventing the emergence of possible conflicts over the distribution of water among the States; its basic function is to maintain the sustainable management of the basin's water resources while at the same time tackling problems of longer-term development. Much was done in a short time (especially at the outset): the main achievements were to formulate the basic guidelines of the joint management of water resources in the light of the interests of each of the States and to establish regional institutions to carry out the agreed decisions, such as the Amu Darya and Syr Darya basin management organizations.

While highly assessing the merits of the achievements of this period, attention may be drawn to a certain slackening-off of the work and downgrading of the role of the members of the ICWC, and to a withdrawal from confrontation of the main urgent water tasks and problems. Today there is no alternative to the ICWC; as mentioned above, it is this Commission which determines and carries out strategy for the management of transboundary water resources in the Aral Sea basin, and over the years it has proved not only its own necessity but also its effectiveness. However, an analysis of the existing inter-State structure for water resources management indicates the following shortcomings:

- Despite the complexity of the region's water problems, in recent years the water management agencies of Kazakhstan, Kyrgyzstan and Uzbekistan have lost their independent status and have been incorporated in the agriculture ministries. The heads of the water agencies are no longer lead managers of branches of the

State's business. This is having an adverse effect on the adoption of independent and effective decisions on urgent water issues;

- Within each State the water management bodies do not function as inter-agency coordination bodies for regulation of the use and protection of water resources;
- The attitudes and habits of the centrally managed system of past years persist among today's State, oblast and district authorities (*akimy* and *khakimy*), preventing the regional and inter-agency bodies from carrying out agreed measures for the distribution of water resources among consumers and States.

Regional cooperation must be developed in the following basic areas: improvement of the organizational structure of water resource management; development of regional and national information systems for the Aral Sea basin; modelling of procedures for managing the water resources of the transboundary rivers Amu Darya and Syr Darya; and mechanisation of procedures for distributing, protecting and monitoring water resources. These areas of cooperation will be considered in greater detail.

A. Improvement of the organizational structure of water resource management

- The water management and environmental problem of the Aral Sea basin demands an integrated approach and an integrated solution. The adverse economic and social consequences of the environmental disaster of the Aral Sea compel everyone to adopt a more responsible attitude to the solution of the problems of *joint use and protection of the water resources of the Aral Sea basin, which must be recognized as a single common resource for all the countries, and to regulate them in the light of the interests of all the peoples of the region*. Since water supports life, effective management of the whole water system calls for an integral approach, one which embraces the interests of social and economic development and protection of natural ecosystems. Such an approach will reduce to a minimum inter-State conflicts

resulting from self-interest. Water resources must be distributed and used on the basis of maximum possible benefit not only for oneself but for one's neighbours as well;

- Each State must be set a volume of water earmarked for maintenance of the Aral Sea and the surrounding area (or the State's parts thereof) and surrounding area within environmentally acceptable parameters, and it must be mandatory for this volume of water to be delivered to the Sea;
- Over the coming years it will be necessary to draft and bring in legal and standard-setting instruments to regulate water relations among the States of Central Asia and eliminate self-interest from their decisions and actions;
- The responsibilities and powers of the ICWC and its agencies must be upgraded to the status of those of important international bodies for the management of the basin's water resources, and the heads of regional bodies must be appointed by rotation from among the representatives of States;
- It is essential to upgrade the legal and financial status of regional bodies to enable them to fulfil their functions in the territory of the States of the region without interference in respect either of customs, visa, frontier and other restrictions or of funding for the technical maintenance of the water-regulation and water-transfer facilities operated by inter-State bodies;
- The water balance of the Aral Sea basin is in a very critical state, its water resources are fully exploited, and there is no free flow. It is therefore necessary to introduce stringent rules and limits on water use for all consumers without exception. Every effort must be made to advance the work of rebuilding and improving the existing irrigation and collection/drainage systems and upgrading the irrigation techniques in order to save water and water resources;
- Everything possible must be done to maintain a high level of regional cooperation and integration of agricultural production;

- It will be useful to create in the ICWC Scientific Information Centre a unit for coordination of national hydrometeorological services. Without reliable forecasts the ICWC will be unable to take effective action to solve operational and long-term water problems.

B. Development of regional and national information systems for the Aral Sea basin

The main task is to create, using modern computer and communications technology, a single unified information system to document the formation and use of water resources, including assessments of the different aspects of their effective use, forecasts and measures to help to attain their potential level of exploitation, and the capacity, from the lowest administrative units to the State and inter-State levels, to maintain the sustainable management and monitoring of the use of water resources of all kinds.

Such an information system will facilitate the accomplishment of the following tasks:

- Consolidation of the existing water-use structure;
- Establishment of the limits of the distribution of water resources and the requirements dictated by such distribution;
- Production of basic information for the economic analysis of regional issues;
- Production of analytical information as the basis for regional agreements;
- Establishment of regular channels of communication and the exchange of information among participating organizations;
- Production of monthly, annual and multi-annual databases on water resource management;
- Establishment of institutional arrangements for data collection and exchange among regional and national database networks.

C. Modelling of procedures for managing the water resources of the transboundary rivers Amu Darya and Syr Darya

The effort to improve the existing management of the water resources of the transboundary rivers of Central Asia must address the prevention of potential conflicts between States and seek to satisfy as fully as possible the water requirements of all users in the light of the available natural resources both in the existing situation and in the future. The following are the basic tasks of water resource management in the Aral Sea basin: forecasting, planning and distribution of the river flows, reduction of losses due to poor organizational arrangements and losses from the river channels, and management of the quality of natural water.

The unreliability of forecasts and assessments of available water resources, as well as of possible damage due to low water-levels, information on actual river discharge and water abstraction and the current deficit in the basin, results in inappropriate decisions which destabilize the situation in the basin and provoke excessive water abstraction. Today such excessive abstraction is the fundamental means of the illegal supply of water to consumers, which has disastrous consequences for the lower courses of the rivers. The array of models will focus on the design and justification of management practices and facilitate the elimination of the basic causes of the existing water management problems of the Aral Sea basin, including the elimination of sectoral conflicts and prevention of potential disputes between States and the adverse effects of low water-levels.

Today and in the future the following problems will remain the priorities, for their solution will make it possible to reduce the region's water deficit to a minimum and free the water resource to support the ecosystem of the Aral Sea and the river deltas:

- Improvement of water quality;
- More economical use of water;
- Rational regulation;
- Optimum water distribution.

Basin modelling used as a decision-making tool by the ICWC and the basin management organizations will facilitate:

- Rational (optimum) management of the volume and quality of river water throughout the basin and in its individual sectors;
- Elimination of possible flow losses due to poor organization stemming from ineffective management of water resources;
- Speedy reaction to changes in the water management situation (low water-levels, unbalanced distribution of the water deficit between the river channels and the users, and sudden alterations in the operating schedules of reservoirs and hydroelectric stations having a consequential impact on the river regimes);
- Decision-making for the longer term on the sustainable development of the basin in the light of various scenarios at the national and regional levels;
- Justification and demonstration of the advantages of water-saving approaches and effective use of the existing water and land potential (to counteract the tendency to bring new land into use);
- Use of progressive (advanced) computer technology to facilitate the correct formulation of tasks and participation by users (decision-makers) in the modelling process, with great cost-savings.

D. Mechanization of the procedures for distributing, protecting and monitoring water resources

Under the existing organizational structure of management and with the present state of the technical and technological equipment of water facilities in the Aral Sea basin, the level and quality of the annual and daily operational management of the region's transboundary water resources remain rather low at the present time. It is therefore a matter of importance to improve the system for management of the basin's water resources, including the distribution among States and the protection and monitoring of the resources by equipping the Amu Darya and Syr Darya basin

management organizations with modern technical systems.

This management system must embrace:

- Extension of managerial control to all the surface transboundary waters of the Amu Darya and Syr Darya and their tributaries;
- Attention to the question of discharge of water back into the rivers after use, which affects the quality of the water resources of the river basins;
- Extension of managerial control to the river deltas and the whole area around the Aral Sea;
- Establishment of monitoring of the water resources of the Amu Darya and Syr Darya basins;
- Linkage of the management of the quality of water resources to maintenance of the environmental sustainability of the water and other natural resources of the river basins;
- Involvement of water users and non-governmental community organizations in the water management arrangements.

Mechanization of the processes of distribution, protection and management of water resources will make it possible to attain the following targets:

- Satisfaction of the demand from water consumers in the States of Central Asia and the Aral Sea and its surrounding area in both volume and quality, taking into account the need for coordination and for resolution of the contradictions arising from official requirements;
- Reduction to a minimum of the damage caused by the failure to coordinate the activities of States and agencies;
- More economical use of water resources and, on that basis, a gradual increase of releases of water into the Aral Sea and the surrounding area;
- Correct operation of the entire water management system of the Aral Sea basin.

Only partnership and joint coordination of the activities of the States of Central Asia in the Aral Sea basin can deliver effective solutions to the region's water problems in a situation of increasing environmental pressures in the 21st century.

2. Cooperation between the Government of the Republic of Kazakhstan and the Government of the Russian Federation on the joint use and protection of transboundary waters

The State frontier between Kazakhstan and the Russian Federation is a total of 7,500 km in length. It crosses more than 70 rivers and lakes. The biggest rivers are the Ural, Ishim, Tobol, Irtysh and Bolshoi and Maly Uzen.

Inter-State rivers play an extremely important role for the populations and economies of the frontier areas of Kazakhstan and the Russian Federation. With a view to the joint management of the water resources of the transboundary watercourses the Governments of the two States signed in Orenburg on 27 August 1992 the *Agreement on joint use and protection of transboundary waters*.

Under this Agreement the two Governments,

“Desiring to strengthen and develop their relations of cooperation in the field of water management and with the intention of creating a qualitatively new legal and economic basis for their bilateral relations in the sphere of joint use, protection and restoration of transboundary watercourses”,

“Guided by the necessity of pursuing an agreed policy on questions of the joint management of the water resources of transboundary bodies of water in the interests of economic development and improvement of their peoples’ standard of living”,

“Considering that only a common approach and coordination of activities will permit the creation of favourable conditions for the solution of social and economic problems”,

“Have agreed as follows:

- Recognizing the common ownership and the unity of the water resources of transboundary waters, the Parties have the same rights to their use and equal responsibility for their rational use and protection (art. 2);
- Each Party undertakes to take the necessary steps to protect and preserve transboundary waters against pollution and to refrain from any action in the basin of a

transboundary body of water which may result in alteration of the agreed volumes of water abstraction in frontier areas and from the discharge of pollutants which may damage the interests of the other Party (art. 3);

- The Parties recognize the instruments drafted and adopted earlier on the distribution between their States of the water resources of transboundary bodies of water, including irrigation systems, canals and channels, and the continuing validity of the principles contained in such instruments together with the water distribution structure and shall amend them as necessary by common accord (art. 4);
- Projects on water management and protection measures in the basins of transboundary bodies of water which may have a transboundary impact shall be agreed between the Parties (art. 5);
- For the purposes of implementation of this Agreement the Parties shall create on equal terms a joint Kazakh-Russian commission on joint use and protection of transboundary waters, to be presided over by the Chairman of the State Committee for Water Resources of the Republic of Kazakhstan and the Chairman of the Committee for Water Resources of the Ministry of the Environment and Natural Resources of the Russian Federation. The Commission shall meet at least once a year, alternately in the territory of each Party. Decisions taken at its meetings shall be set down in official records. The Commission shall appoint working groups and expert groups to deal with specific issues (art.11);
- The Commission’s decisions on joint use and protection of transboundary waters relating to matters of water distribution and the rational use and protection of water resources shall have binding force in respect of their implementation by consumers of water in all branches of the Parties’ economies (art. 15).”

The Commission’s effective work over 10 years has demonstrated the strategic correctness of the step taken in 1992. Meetings of the Commission

and its working groups have formulated the policy for the management of the water resources of transboundary rivers and addressed a number of important issues of water management and natural resource protection.

Over the past period of joint work the Commission has achieved the following results:

- Adoption of the basin principle for the management of water resources;
- Adoption of basin agreements on the rational use and protection of water;
- Joint and agreed confirmation of the operating schedules of reservoirs on transboundary rivers;
- Agreement of the list of posts along the frontier for recording the quantitative and qualitative water indicators on transboundary rivers;
- Organization of repair and rehabilitation work at water regulation installations of joint interest on the basis of shared participation by the Parties;
- Attraction of funding from donor countries for the formulation of joint projects on monitoring of the water quality and management of the water resources of transboundary rivers;
- Production of statements of water balances, etc.

The following have become the main areas of the Commission's work:

- Monitoring of compliance with the agreed volumes of water abstraction in frontier areas, and implementation of measures for the rational use of water resources and protection of transboundary waters against pollution;
- Regular exchanges of hydrological forecasts and information on water quality and the status of water management in the basins of transboundary bodies of water;
- Negotiation and adoption of projects on water management and protection measures for transboundary waters;
- Joint research and development on the rational use and protection of water resources of transboundary bodies of water

and the development of water management in their basins;

- Production of legal instruments regulating the inter-State use of transboundary waters and water-quality requirements;
- Coordination of anti-flood measures and measures to prevent the passage of ice.

The successful work of the Joint Commission has strengthened and developed the relations of cooperation and created a qualitatively new legal and economic basis for bilateral relations in the sphere of joint use of transboundary waters.

3. Cooperation on the use and protection of transboundary rivers between the Government of the Republic of Kazakhstan and the Government of the People's Republic of China

Inter-State cooperation with China on the joint use and protection of the water resources of transboundary rivers is of enormous importance to Kazakhstan. The extensive basins of such rivers as the Irtysh and the Ili are transboundary basins.

The Irtysh is a large transboundary river; its basin embraces territory of China, Kazakhstan and the Russian Federation. This river is the main artery of the north-eastern areas of Kazakhstan and the principal source of water for hydroelectric energy production, water transport, industry, agriculture and other branches of the national economy. The Irtysh's biggest tributaries are the Buchtarma, Ulba, Uba, Kurchum, Kalzhir and Narym.

Examination of water flow along the whole length of the Irtysh over many years shows that the average annual abstraction under natural conditions ranged from 312 m³ a day at the village of Buran (on the frontier with China) to 917 m³ a day at the village of Semyarsk (former oblast of Semipalatinsk). Further on, it declined at the town of Pavlodar to 880 m³ a day and at the village of Charlak (frontier with the Russian Federation) to 884 m³ a day. The Irtysh carries about 9.8 km³ of water a year from Chinese territory into Kazakhstan.

For the purposes of integrated use and protection of the water resources of the Irtysh basin

a number of reservoirs and water regulation installations have been built in Kazakh territory. The three biggest reservoirs - the Buchtarmin, Ust-Kamenogorsk and Shulbin - are integrated installations. The operating schedules of these reservoirs were established in the light of the requirements of all the consumers, including water for environmental purposes and for the Russian Federation.

The *Ili basin* occupies 75 per cent of the catchment area of Lake Balkhash. This river discharges most of its water into the lake. It has up to 10 mountain tributaries in Kazakh territory, including as its primary tributaries the rivers Khorgos, Sharyn, Shilik, Turgen, Talgar and Kaskelen.

Not counting its shallow mountain watercourses, the *Lake Balkhash* basin has three transboundary rivers - the Ili, Khorgos and Tekes - which cross or form the frontier with China.

The second largest basin is the Lake Alakol basin, which includes a few shallow lakes: Sasykkol, Koshkakol, Zhalanashkol, etc. The basin has 10 or so watercourses, most of them small, which are also transboundary. The biggest of these watercourses include the Emel, Tasty, Akoshky, Kara-Kitat and Chagan-Togai.

No specific research or assessments have been produced on the volume of the transboundary waters. Each of the neighbouring countries has watercourses, which do not discharge into the main transboundary rivers, and the flow of these watercourses has been used since ancient times. There is no information on the flow volume of these rivers in Kazakh territory; accordingly, the exact volume of the transboundary water resources has not yet been determined. A rough estimate would be in the order of 12-13 km³ a year.

A number of reservoirs and water regulation installations have been built within Kazakhstan. They include the following reservoirs: Bartogai, Kurtin and Kyzylagash. The basin's biggest reservoir is the multi-purpose Kapshagai reservoir on the river Ili. There are fairly big water management complexes on mountain rivers: upper

and lower Aksus, Tentek, Karatal, Koksus, Talgar, Usek, etc.

The inter-State cooperation between Kazakhstan and China began in 1965 with the signature of the *Agreement on distribution and use of the water of the river Khorgos*. This instrument was amended and supplemented in later years (1975 and 1983). The *Temporary Agreement on distribution and use of the waters of the transboundary river Sumbe* was signed in 1989. Protocols on the joint construction of a unified water abstraction complex on the Khorgos were signed in 1992-1993.

Following the break-up of the USSR and Kazakhstan's accession to sovereignty in February 1992 a draft *inter-State agreement between Kazakhstan and China on cooperation on the joint use and protection of transboundary waters* was submitted to China. During the visit of a Kazakh governmental delegation to China in 1992 a working meeting took place between the Minister for Water Resources of China and the Chairman of Kazakhstan's State Committee for Water Resources (Mr. Kipshakbaev) to discuss the question of cooperation on the use and protection of the waters of transboundary rivers.

The visit to Kazakhstan by the President of China's State Council on 12 September 2001 was the occasion for the signature for the first time of an *Agreement between the Government of Kazakhstan and the Government of China on cooperation on the use and protection of transboundary rivers*. This Agreement was approved by Governmental Order No. 989 dated 10 September 2002. It opens up broad possibilities for cooperation between the two countries on the protection and use of the water resources of transboundary watercourses.

With a view to the further development and strengthening of the friendly and good-neighbourly relations between the two States and to cooperation on the protection and use of their transboundary rivers the Governments of Kazakhstan and China agreed as follows:

- The Parties shall adhere to the principles of justice and rationality and of close cooperation in a spirit of good faith, good-neighbourliness and friendship in the use and protection of transboundary rivers;

- The Parties shall create a *Joint Commission on the use and protection of transboundary rivers*; it will be responsible for the drafting of its own rules of procedure and the resolution of issues relating to the implementation of the Agreement. The Joint Commission shall consist of one chairman and two deputies appointed by each of the Parties;
- The Joint Commission shall meet alternately in the territory of the Parties once a year. It shall discuss at these meetings matters connected with the implementation of the Agreement and with the use and protection of transboundary rivers. The meetings shall be convened by the representative of the host Party and conducted under his chairmanship. The representatives of the Parties may use the assistance of experts and bring such experts to the meetings;

- By common accord the Parties may adopt amendments and additions to the Agreement, which shall be set out in separate protocols which are parts of the Agreement.

This Agreement will facilitate closer cooperation between the two countries in the cause of highly efficient use of natural resources and maintenance of a sustainable environmental situation in the basins of the transboundary rivers.

The Joint Commission's first meeting was held in Beijing from 27 to 31 October 2003. The main items on the Commission's agenda were the drafting and adoption of its rules of procedure and the consideration of questions relating to the implementation of the Agreement between the two States on *cooperation on the use and protection of transboundary rivers* dated 12 October 2001. The Parties produced and signed an official record of the Joint Commission's meeting setting out details of all the matters discussed.

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KYRGYZSTAN - OUTLINE OF WATER POLICY IN THE LIGHT OF INTERNAL PROBLEMS

K. VALENTINI

In the early 1990s Kyrgyzstan, a small mountain republic with fewer than five million inhabitants, had a very modest role in the planning of the water management projects of the USSR in comparison with its more powerful neighbours in the Central Asian region. In these plans the priorities for Kyrgyzstan were limited to an increase in the generating capacity of the Naryn cascade hydroelectric power station, with clearly unbalanced development of the other water-consuming sectors of the economy.

However, following the “parade of sovereignties” Kyrgyzstan found itself unwillingly at the centre of the conflicts over the Syr Darya basin which had arisen in the region - and between countries - and even the principal target of the critical attacks. The reasons for this are well known within the region but they will be briefly outlined here for the benefit of readers far from the scene of events.

The unbalanced socio-economic development mentioned above had very little impact as long as the single system of industrial cooperation and reciprocal supply of raw materials and goods was operating in the context of a unitary State. But following its accession to independence Kyrgyzstan had to grapple with a lengthy economic crisis caused by the disruption of stable links and the difficulty of establishing unfamiliar market-economy mechanisms and new forms of management.

The consequences of these processes were particularly painful for Kyrgyzstan, for it has very limited deposits of mineral resources (chiefly hydrocarbons) and moreover lacks a sufficiently developed infrastructure of irrigated agriculture. As a result, the country's population has suffered repeated interruptions of power supplies and a

shortages of basic foodstuffs. In turn, the national authorities were faced with a dilemma: whether to comply scrupulously with the country's obligations, undertaken in the 1980s, to supply water to neighbouring countries or to give priority to satisfying the urgent energy needs of their own citizens.

For example, the releases of water from the key regulation installation of the entire Syr Darya basin - the Toktogul reservoir - have been increasingly determined not according to the traditional schedule but instead by the need to meet the country's peak winter demands for power. This has displeased the neighbouring countries not only because of the disruption of a stable water supply for their agro-industrial complexes but also because of other harmful consequences.

It is common knowledge that the volume of the flash discharges of water from the cascade of the Nizhne-Naryn hydroelectric power station in winter cannot be accumulated in the reservoirs located below the Kairakum and Chardarin reservoirs, nor can they pass along the very constricted channel of the Syr Darya in Kazakhstan. As a result, part of the river's flow, which is invaluable for irrigation and environmental purposes, has to be discharged into the Arnasai depression in order to prevent disastrous flooding of land downstream from the over-full bowl of the Chardarin water management complex. Other water management complexes in Kyrgyzstan constitute a similar potential danger, although on a lesser scale. In 2003, for example, infrastructure facilities in the vicinity of the town of Taraz, Kazakhstan, were severely affected as a result of exceptional discharges from the brimming Kirov reservoir on the river Talas.

Accordingly, the position of Kyrgyzstan, as a country located in the area of the sources of transboundary rivers, is objectively extremely vulnerable. This is because any adverse impacts of water flows of a natural or artificial kind may directly or indirectly damage adjoining States and generate consequent claims for compensation.

The list of possible legal actions is far from limited to violation of the agreed operating schedules of water management complexes of inter-State importance. Kyrgyzstan inherited from the USSR an incalculable volume of radioactive and toxic wastes, usually stored near to the sources of transboundary rivers. The technical status of these accumulations of waste materials (waste storage sites) has long been close to the limit of their physical life. Any routine flash torrent or freshet may destroy the ramshackle dams, and there is clearly no need to describe the effect on the huge areas of low-lying land of the distribution along river channels of thousands of tons of deadly mining wastes.

In addition to this threat of continental proportions attention must be drawn to the possible diffuse or one-off pollution of transboundary waters by untreated waste water from human and livestock sources, oil products, and a whole array of agricultural pollutants distributed through the collection/drainage network. The likelihood of the occurrence of these phenomena is constantly rising as a result of the increasing degradation of the country's whole water management infrastructure, including the waste-water treatment systems.

Even a superficial analysis of the circumstances described above can lead to paradoxical conclusions. Given the limited reserves of other natural resources, the development of Kyrgyzstan's economy may be based in principle on the impressive hydroelectric and agro-industrial potential resulting from the annual formation within its territory of up to 45-50 km³ of water. Development of the provision of water services to neighbouring countries would bring a considerable additional benefit, for the present domestic demand for water is less than 20 per cent of the average annual stocks.

However, even 13 years after acquiring sovereignty Kyrgyzstan is not in a position to make due use of this factor. The hydroelectric power stations, water collection installations, reservoirs and arterial canals within the national jurisdiction, which were impressive by the standards of the Soviet era but are now in a state of dilapidation, were intended from the outset as installations for inter-republic use. They are still playing that former role today. In this sense their efficient operation for the benefit of neighbouring countries could provide considerable additional funds for the State exchequer. Nevertheless, for a very long time now these installations, owing to their condition, have not only failed to deliver any perceptible profits but have constituted a heavy burden on the State budget.

It cannot be denied, by the way, that in recent times the fundamental principle of international water law - the necessity of just and rational use of the resources of international watercourses - is gaining increasing acceptance in Central Asia. In any event, under the plans for water and energy exchanges provided for in the multilateral agreement of 1998 on the Syr Darya basin and also under the terms of the agreement between Kazakhstan and Kyrgyzstan on bilateral water relations in the basins of the rivers Chu and Talas, Kyrgyzstan has begun to receive some compensation for the provision of water services to its neighbours.

It will be readily understood that for the moment the scale of this compensation does not cover all the country's expenditure on the implementation of measures affecting the whole region. Such measures include, for instance, work on the maintenance of the environmental balance of the flow-formation zones, which involves monitoring of stocks of water, dealing with the consequences of flash torrents and freshets, regulating the flows of transboundary rivers, etc.

It should be noted that the compensation procedures have not yet been firmly established. In 2003, a very wet year, the demand for water from Kazakhstan and Uzbekistan was lower than the preliminary orders and as a result the reciprocal deliveries of energy to Kyrgyzstan were smaller. Merely a routine twist in the spiral of consequences

- an increase in the volume of winter releases from the Toktogul water management complex, the over-charging of the downstream reservoirs, and the flooding of land in Kazakhstan in accordance with the scenario familiar to the region - was a sufficient reminder to the parties concerned of the need to comply with the agreed arrangements.

The combined effect of circumstances of this kind shows that Kyrgyzstan, no less than its neighbours, needs the sustainable development of regional cooperation over the whole spectrum of water relations. However, where water is concerned, the country's official foreign policy has not yet been finally formulated, for the familiar contradictions in the existing water legislation have still not been removed, and at the time of publication of this article the draft texts of a new water code and national water strategy remain locked in protracted negotiation. It is no secret that even on a number of cardinal issues of the legal basis of water relations no agreement has yet been reached among the various political movements and State agencies. Nevertheless, some of the directions of foreign policy for water may be described here.

Of course, the main objective of this policy is to guarantee satisfaction of the national demand for water resources over the long term. Hence Kyrgyzstan's interest in modernizing the machinery for the regional distribution of water. This does not mean that Kyrgyzstan intends immediately to call for revision of the water consumption quotas in its own favour. But the need to dispel the forced stagnation in the irrigated agriculture sector in the light of the country's forecast demographic dynamics must clearly be properly addressed in the process of improving the arrangements for the integrated use of transboundary waters. Incidentally, the positions of Kyrgyzstan and Tajikistan evidently coincide in this regard.

It is no less important to reach agreement on the economic aspects of regional water relations for the foreseeable future. This means, first of all, adjustment of the procedures for compensating Kyrgyzstan for its expenditures and the damage suffered as a result of fulfilment of its obligations to adjoining countries. At the same time it is a matter of extreme urgency to strengthen the partnership for the rehabilitation and development of the water

management infrastructure, cooperation on water protection and limitation of water's harmful impacts, monitoring, economies in water use, exchange of information, etc. When considering the array of such joint projects most analysts single out the problem of attracting investments for the construction of the two Kambarata hydroelectric power stations on the river Naryn.

The implementation of these major projects could immediately ease to a considerable extent the tensions in water relations between the four States of Central Asia. Unfortunately, for some of the potential foreign partners such topics remain victim of mistaken ideas about Kyrgyzstan's intention to attend to its own welfare, primarily by selling water to its neighbours.

Reference must be made in conclusion to one other topic of debate - the role of inter-State bodies in the development of cooperation. There is no shortage of proposals on the subject - from reform and the creation of new coordination agencies all the way to the assignment of broad executive powers to water/energy consortiums as alternatives to the former basin management organizations.

Kyrgyzstan's attitude to such proposals is unambiguous: approval may be given only to projects for the joint construction and subsequent operation of new water management and energy complexes in its territory which have attracted substantial foreign investment. At the same time, the management of existing water management facilities, including the inter-State ones, will remain in the future exclusively in the hands of national agencies, albeit with due attention given to the interests of neighbouring countries.

It is still to be hoped that the forthcoming official publication of the bases of Kyrgyzstan's water policy will leave no room for the various interpretations currently offered from outside. The country's declarations of its dedication to the spirit of good-neighbourliness and mutually advantageous cooperation imply that its water policy must be a fairly flexible one, but that of course will require reciprocity on the part of the leaders of the other peoples of Central Asia as well.

MANAGEMENT AND PREVENTION OF POLLUTION OF THE WATER RESOURCES OF THE REPUBLIC OF MOLDOVA - PROBLEMS AND SOLUTIONS

T. GUVIR

The Republic of Moldova was established as an independent State in 1991. It is a small country (33,900 km²) with a population of about 4.3 million. Moldova has borders with Ukraine and Romania. The transboundary river Prut (a tributary of the Danube) separates Moldova from Romania over a distance of 695 km, and the Dniester separates the country from Ukraine on its northern and south-eastern flanks over a distance of 630 km. The annual flow of these two rivers amounts to some 13 km³. Moldova's hydrographic system is made up of 3,621 rivers and streams, including seven with lengths of over 100 km and 247 of over 10 km, as well as 57 lakes with a total surface area of 62.2 km² and 3,000 or so man-made reservoirs. The biggest natural lakes are located on the courses of the Prut (Beleu, Drachele, Rotunda, Fontan) and the Dniester (Byk, Rosh, Stary Dniester). The biggest man-made reservoirs are Kostesht-Stynka on the Prut and Dubesar on the Dniester.

The main sources of water supply for the country's population are the transboundary rivers Dniester (54%) and Prut (16%), groundwater (23%) and other sources (7%). The surface waters of the Dniester and Prut are considered to be moderately polluted. The quality of the water environment of these two rivers has deteriorated somewhat in recent years as a result both of the scant integrated management of water resources and of the failure to conduct joint research with neighbouring States on the quality of water resources or introduce measures to prevent pollution of the hydrosphere. The main factors having an adverse impact on the rivers' water environment are the irrigation techniques used in the past, the irrational use of pesticides in agriculture, the uncontrolled (and not agreed by the stakeholders) discharge of untreated

waste water, the paucity of systematic research (monitoring and systematic data analysis), and the lack of forecasting programmes.

The quality of the groundwater used for the public water supply is generally not consistent with the requirements of State standard GOST 2874-82 on drinking water. The high concentrations of nitrates, chlorides, sulphates, hydrocarbons and other substances found in the groundwater have a serious impact on the people's health. The water quality depends on the situation in various branches of industry and agriculture, the level of development of the engineering infrastructure and the water treatment methods used. The following are regarded as the main sources of pollution of water resources: waste water, waste water treatment installations, run-off of heavy rainfall, dumping of waste, livestock-raising enterprises, etc. These sources are present because of disregard of the legislation and regulations on the protection of natural resources and as a result of ill-considered human economic activity.

The monitoring of the quality and number of the country's main sources of water supply is in the hands of the Ministry of Health, the Hydrometeorological Service ("Gidrometeo"), the State Environmental Inspectorate of the Ministry of the Environment, Construction and Land Development, and the "Apele Moldovei" corporation of the Ministry of Agriculture and Food Production. Recent years have seen an increase in pollution levels in the surface sources of the Prut and Dniester.

Provision of a good-quality public drinking water supply in sufficient quantities has become

one of the priority areas of the policies for State action on the environment and health. But it is very difficult in the present economic circumstances to guarantee a supply of water which does not constitute a threat to public health from groundwater sources and surface reservoirs and rivers.

With a view to protection and rational use of transboundary waters Moldova ratified by Parliamentary Order No. 1546-XII (1993) the UNECE *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (the Water Convention). In order to secure application of the Water Convention Moldova set up a working group of representatives of the ministries and departments whose terms of reference include the implementation of provisions of the Convention. In 2000 Moldova signed the Protocol on Water and Health to the Water Convention.

A *National Plan of Action entitled "Health and Environment"* was drafted as a mechanism for application of the Water Convention. For the purposes of implementation of the Protocol and the European Union's Water Initiative ("Water for Life - Health, livelihoods, economic development and security") adopted at the World Summit on Sustainable Development in Johannesburg, Moldova successfully introduced its *National programme on water supply for urban areas up to 2006 together with the Integrated plan for water supply and sewerage for urban areas up to 2020*.

The *Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters*, drafted within the framework of the Water Convention, is another important instrument for applying the Convention and solving transboundary problems connected with the prevention of water pollution. Moldova signed this important instrument at the meeting of environment ministers under the "Environment for Europe" process (Kiev, May 2003).

In view of the importance of resolving issues of the protection and rational use of water and fish resources in a transboundary context (on the Prut and Dniester) and of the need to achieve practical

results in this field with the neighbouring countries which are Parties to the Convention, Moldova cooperates with these countries on the basis of bilateral agreements.

A bilateral agreement of this kind is a document setting out the basic requirements and areas of action for securing the protection and rational use of transboundary waters. Appended to it is a joint programme of action specifying the principal measures, the time-frames for their implementation, and the competent officials of each Party. Moldova is currently cooperating successfully under such agreements with Romania and Ukraine.

Cooperation is also proceeding successfully with Romania under the Water Convention on a programme for monitoring water quality in the Prut. The monitoring work on both sides involves the local environmental agencies, which make regular measurements along a specific agreed section of the river. Monitoring information and systematic quarterly data are exchanged under this programme. Specialists from the relevant hydrometeorological services from both sides participate in the programme, and the local environmental agencies are also involved in the monitoring work; for example, the local environmental agency in the town of Beltsy (Moldova) cooperates with its counterpart in the town of Botoşani (Romania). Both these agencies monitor water quality below the Kotesht-Stynka water management complex. The cooperation includes the holding of seminars and the formulation of monitoring standards. Working meetings are held every year for the adoption and implementation of measures for the protection of water resources and fish stocks.

The two States cooperate on the joint use of the transboundary river Dniester under the Agreement and the *Protocol on cooperation between the Ministry of the Environment of Ukraine and the Department for the Protection of the Environment and Natural Resources of Moldova*.

Working meetings and international seminars are held every year for the purpose of implementing measures and solving problems of water use and joint operation of reservoirs, and correspondence is conducted on the major emerging problems.

Operational meetings are held every month on the water regime of the Dniester. Two meetings were convened in 2002 to discuss issues connected with the operation of the Novodnestrovsky water management complex, chiefly because of the need to solve some environmental problems which emerged following the construction and commissioning of the complex and were having a considerable adverse impact on the river's living resources. Research had been carried earlier on this question to investigate the influence of the water's thermal regime on the river's flora and fauna. International experts took part in this research. A Moldovan-Ukrainian commission was set up to deal with these problems, with authorization to consider and take decisions in accordance with the requirements of the *Protocol* signed by the Parties on 14 June 2002.

Moldova and Ukraine have many problems, but they are all solvable and they must be solved by a joint effort to overcome temporary difficulties in a context of bilateral cooperation. The full solution of the problems of the Novodnestrovsky water management complex will require a shared determination and mutual understanding. In 2003 Moldova proposed to its neighbours the renewal of the Agreement and a new programme of environmental protection work for 2003. This programme includes measures to secure the application of the Water Convention and concrete proposals for improvement of the cooperation on protection of the environment by means of the drafting and signature by the Parties at the governmental level of an *agreement on joint water management and an agreement on cooperation for the protection of fish stocks*. The programme provides for regular exchanges of information in all the areas of cooperation, in particular where monitoring is concerned.

The deterioration in the condition of the Dniester as a result of the introduction of joint water management not based on the principles of rational use of living resources has created a need to coordinate the work within the framework of a basin approach. To this end Moldova has produced a draft convention on conservation of the diversity of the landscape and biological resources and maintenance of the rational use of the natural resources of the Dniester basin. This draft

instrument is designed to secure compliance with the requirements of the existing conventions, including the Water Convention, and is based on the principles of sustainable water management. It provides for cooperation between Moldova and Ukraine on problems of the management and improvement of the waters of the Dniester. The President of Moldova issued a decree dated 6 February 2003 concerning the initiation of negotiations with Ukraine on the signature of a bilateral river convention on the Dniester. This idea was supported by the two countries and was given a sympathetic reception by UNECE, OSCE and the secretariat of the Water Convention, which are ready to consider furnishing assistance for the realization of the proposed convention. This instrument was discussed at a round table convened by the Ministry of the Environment of Moldova and the Eco-TIRAS International Environmental Association of River Keepers in the context of the all-European conference "Environment for Europe" held in Kiev in May 2003.

The signature of such a convention will enhance the status of the efforts to solve the problems of the Dniester basin, guarantee an integrated approach to the use of its resources and involve all the stakeholders and the public in the decision-making process, as well as solving a number of the region's major problems of managing the resources of the Dniester and preserving the region's environment. The convention is intended to become the legal basis for the drafting of new programmes for the effective solution of problems relating to improvement of the environment of the Dniester basin and prevention of any further pollution of the Black Sea. The conclusion of such a convention by Moldova and Ukraine would be a consistent step towards resolution of environmental issues at the international level.

In the context of its bilateral cooperation with neighbouring countries and in the light of its experience of cooperation in applying the Water Convention, Moldova considers it appropriate to continue to work with its neighbours to solve the major problems and has called on them to cooperate in the following areas:

- Harmonization of water-protection legislation with the European legislation;

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- Formulation of unified standards for maximum permissible discharges of waste water into bodies of water;
 - Production of an inventory of sources of pollution located on both banks in the rivers' water-protection zones with a view to removing them from these zones, bearing in mind as well their potential to cause industrial accidents having an impact on transboundary waters;
 - Restriction of economic activity on both banks in the rivers' water-protection zones;
 - Introduction of clean technology with a view to reducing discharges of pollutants into the rivers;
 - Formulation of standard methods of calculating the damage done to water resources by economic activities;
 - Joint operation of water regulation installations;
 - Monitoring and assessment of biological resources (limitation of fish catches to volumes which do not threaten the reproductive potential, establishment of common limits on catches and imposition of fishing bans);
 - Compliance with the requirements of the Convention on Environmental Impact Assessment in a Transboundary Context as a means of preventing water pollution;
 - Equal distribution of water resources and management of water in accordance with the basin principle via comprehensive and integrated approaches;
 - Development of close cooperation with non-governmental environmental organizations and their associations and with the local and regional authorities in the river basins.

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STATUS OF INTERNATIONAL COOPERATION ON THE PROTECTION AND USE OF TRANSBOUNDARY WATERS IN THE RUSSIAN FEDERATION

E. ZYBIN

The Russian Federation has land frontiers with 14 States; 7,141 km of the total length of its frontiers (60,933 km) run along rivers, 475 km across lakes, and 38,807 km across seas. It has over 1,000 transboundary bodies of water; 70 of the rivers are in the large and medium-sized categories.

The Russian Federation signed the UNECE *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* in 1992.

The Russian Federation currently has agreements with seven adjoining States on the use and protection of transboundary waters, including one trilateral agreement (with Norway and Finland) and six bilateral ones (with Finland, Estonia, Ukraine, Belarus, Kazakhstan and Mongolia). Joint commissions have been created or official representatives appointed by decision of the Governments of the parties in order to organize the business of implementing the agreements.

Working groups composed of representatives of water management and environmental protection bodies, hydrometeorological services, frontier services and fisheries organizations have been established to organize the field activities. These working groups are headed by senior members of the basin and other local offices of the Ministry of Natural Resources of the Russian Federation.

The water regime of Lake Inari and the Paatsojoki river is regulated in accordance with the intergovernmental *Agreement between the USSR,*

Finland and Norway of 1959¹⁹ and the rules for its application.

The 1964 *Agreement with Finland*²⁰ on frontier water systems covers virtually all aspects of water management and the environment: regulation of the use and protection of water, fishing and Russia's water transport. Experience of cooperation over more than 30 years has demonstrated its effectiveness. The Joint Commission was to hold its 42nd session in 2004. Representatives of environmental and fisheries agencies, the frontier service, the Ministry of Foreign Affairs, the Ministry of Energy and local authorities of the Republic of Karelia and Leningrad oblast participate in the Commission's work.

Under the *Agreement with Finland*²¹ on use of part of the river Vuoksa decisions are taken on the regulation of the operating schedules of the

¹⁹Agreement between the Government of the Union of Soviet Socialist Republics, the Government of Norway and the Government of Finland concerning the Regulation of Lake Inari by means of the Kaitakoski Hydroelectric Power Station and Dam. Signed on 29 April 1959; entered into force on the same date.

²⁰Agreement between the Union of Soviet Socialist Republics and the Republic of Finland concerning Frontier Water Systems. Signed on 24 April 1964 at Helsinki; entered into force on 6 May 1965.

²¹Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the Republic of Finland concerning the Production of Electric Power in the Part of the Vuoksa River bounded by the Imatra and Svetogorsk Hydroelectric Stations. Signed on 12 July 1972 at Helsinki; entered into force on 7 February 1973.

Svetogorsk and Imatra hydroelectric stations in the light of the water level patterns.

Under the 1992 Agreement with *Ukraine*²² the two countries cooperate on the protection and use of the water resources of the basins of the rivers Dnepr and Seversky Donets. This cooperation is focused on monitoring, regulation of the water use schedules, and water protection and anti-flood measures. Over the period since the Agreement's adoption there have been 10 conferences of representatives of the Parties, and procedures have been established for exchange of information, cooperation in emergencies, management of the use and protection of water resources, and joint control of water quality in the frontier areas. Arrangements have been made for coordination of the cooperation activities in the frontier oblasts of Russia and Ukraine. The oblast environmental and water management agencies play an active part in the cooperation. All difficult issues are successfully resolved under the Agreement.

Pursuant to the 1992 Agreement between *Russia and Kazakhstan*²³ a Joint Commission addresses issues of the regulation and protection of water resources in the basins of the rivers Ural, Ishim, Tobol and Irtysh, which have water deficits, monitoring of water quality, and anti-flood and water protection measures. Since all the transboundary rivers in this region are regulated by reservoirs, great importance is attached to the determination and maintenance of the water balances, adjustment of the rules governing the use of water resources, and regulation of releases from the reservoirs. The Commission has held 12 meetings during the period in question.

The Commission gives constant attention to questions of the distribution of the water resources of the rivers Maly Uzen and Bolshoi Uzen between

Saratov oblast and West Kazakhstan oblast. A special working group was set up for this purpose.

The Agreement with *Mongolia*²⁴ on the protection and use of transboundary waters was signed in 1995. There have been five meetings on implementation of this Agreement attended by representatives of the Parties, who adopted a programme of cooperation focused on the task of protecting transboundary rivers against pollution, especially the rivers discharging into Lake Baikal.

The Agreement with *Estonia*²⁵ was signed in 1997; its scope covers the basin of the river Narva, including Chudovskoye-Pskovskoye Ozero. An inventory has been made of all the transboundary bodies of water and sources of pollution, a joint monitoring programme has been established, including standard calibration of methods of water sample analysis, and calculations have been made of the pollution of water by aerosols transported from the Baltic and Estonian hydroelectric power stations, etc. An international competition entitled "The world of water through children's eyes" is held every year to enhance the public's environmental education, in particular that of children.

Complications have arisen in connection with the preparation for signature of an agreement with *Azerbaijan* on the transboundary river Samur. This single transboundary river forms 96 per cent of its flow in Russia but its water resources are used predominantly by Azerbaijan, in a ratio of 3:1, while the southern parts of Russian Dagestan suffer a water deficit. This water is distributed by Azerbaijan via a regulation/distribution installation under its management. The people of southern Dagestan want to speed up the resolution of the issue and alter the water distribution arrangements, which were put in place during the Soviet era.

²²Agreement between the Government of Ukraine and the Government of the Russian Federation concerning the Joint Use and Protection of Transboundary Waters. Signed on 19 October 1992 at Kiev; entered into force on the same date.

²³Agreement between the Government of the Russian Federation and the Republic of Kazakhstan concerning the Use and Protection of Transboundary Waters. Signed on 27 August 1992 at Orenburg; entered into force on the same date.

²⁴Agreement between the Government of the Russian Federation and the Government of Mongolia on the Protection and Use of Transboundary Waters. Signed on 11 February 1995 at Ulan Bator.

²⁵Agreement between the Government of the Russian Federation and the Government of the Republic of Estonia concerning Cooperation in the Protection and Rational Use of Transboundary Waters. Signed on 20 August 1997 at Moscow.

Under the 1986 Agreement with *China*²⁶ the Parties produced a plan for the integrated use of the water resources of the transboundary sections of the Arun and Amur; this plan was approved in 2000 by the Joint Commission. The plan provided for the subsequent signature with China of an agreement on the protection and use of transboundary waters. A draft of such an agreement had been submitted to the Chinese side as early as 1997. However, China is not showing any eagerness to sign this instrument. The task for the Russian side is constantly to strive to secure the agreement's signature, using all available contacts, for the problems connected with the pollution of the transboundary rivers flowing out of China are quite acute and require joint action.

Russia's Ministry of Natural Resources is currently carrying out agreed projects under trilateral intergovernmental agreements with *Belarus and Latvia* and *Belarus and Lithuania* on cooperation on the use and protection of the water resources of the basins of the transboundary rivers Zapadnaya Dvina (Daugava) and Neman.

Here the combined efforts of the four States (Russia, Belarus, Latvia and Lithuania) will facilitate the adoption of the best possible decisions on the management of environmental protection activities in the basins of these two rivers.

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²⁶Agreement between the Government of the Union of Soviet Socialist Republics and the Government of the People's Republic of China on the Establishment of a Soviet-Chinese Commission to Oversee the Production of a Plan for Integrated Use of the Water Resources of the Transboundary Sections of the Rivers Arun and Amur. Signed on 23 October 1996 at Moscow; entered into force on the same date.

PROBLEMS OF THE PROTECTION AND USE OF OF THE PROTECTION AND USE OF RUSSIA'S TRANSBOUNDARY WATERCOURSES HAVING REGULATED WATER REGIMES

V. DEBOLSKY

The formation of independent States out of the former republics of the Soviet Union meant that the Russian Federation acquired a large number of transboundary watercourses as a result of the drawing of the boundaries of the new States. The legal and environmental aspects of the joint use of these watercourses are becoming increasingly important.²⁷

In a study on the problems of water-resource use by adjoining States in Central Asia²⁸ it was noted that, when it comes to solving this kind of problem the main thing is for each party to state its demands as determined by the national conception of the use of the resources of a given transboundary watercourse. This statement must have at least three components:

- The optimum schedule for the use of the water resource of the transboundary watercourse for the State in question without regard to the upstream and downstream users;
- A schedule for maximum use of the water resource of the transboundary watercourse by upstream and downstream users;
- A compromise schedule for the use of the water resource of the transboundary watercourse, including the determination of economic and environmental damage and consequent compensation as part of the agreed requirements of downstream users.

It is possible for each State to formulate such demands on the basis of its own or even its region's priorities for the use of the water resource of the transboundary watercourse. Certainly, as the work of V. Danilov-Danilyan has shown, the focus should be not so much on the watercourse itself as on the water resource of its basin.²⁹

In the *Convention on the Protection and Use of Transboundary Watercourses and International Rivers* (Helsinki, 1992) and its *Protocol on Water and Health* (London, 1999) the United Nations set out the fundamental principles of the use and protection of transboundary watercourses.³⁰ Nevertheless, the practice of the agreed use and protection of transboundary watercourses shows that substantial problems can arise in this area, including new problems connected with the ways in which the various possible scenarios of climate change may work out.

One of the first problems is to determine the maximum and minimum possible volumes of flow and discharges of water, taking climatic changes into account.

The second is to ensure releases of the maximum volumes without causing any damage.

²⁷ N. Grishin, *Legal and environmental aspects of transboundary water problems*. Moscow, Ecoterra, 2003.

²⁸ V. Debolsky and D. Osmonbetova, "Outline of the use of the water resources of adjoining States in Central Asia". *Izvestiya Akademii Nauk, Geographic Series*, 1999, No. 6

²⁹ V. Danilov-Danilyan, "Water resources and sustainable water supply for Russia's towns". In *Russia's Natural Resources: Management, Ecology, Funding*. Moscow, 2003.

³⁰ *International Watercourses*. United Nations/World Bank. New York and Geneva, 2000.

The third is how to use the water resources of a transboundary watercourse when the flow is at its minimum volume.

The fourth is to agree on the quantitative characteristics determining water quality following use of the water resources.

The fifth is to agree on measures to prevent and eliminate the effects of exceptional environmental situations resulting from either man-made or natural disasters.

The present discussion will be limited to just these problems, for they are the most typical problems of transboundary watercourses whose water regimes are regulated by a single regulation installation or a cascade of such installations.

It should be noted that the accuracy of long-term weather forecasts plays a substantial role in the determination of the strategy for regulating a water regime.

Attention may be drawn as an example to the situation in winter/spring 2002-2003 in the Volga basin. Since snowfall had been heavy that winter, large volumes of water were expected to flow into the big reservoirs at Rybinsk and Gorkov during the spring thaw. Accordingly, during February and March intensive preparations were made at the reservoirs. However, the spring proved to be a fairly cold one so that the snow did not melt very quickly and a significant amount of the flow formed in the basin did not reach the reservoirs but charged the basin's groundwater instead. As a result, by the end of the spring floods the level of the Rybinsk reservoir, for example, was 140 cm lower than required by the operating rules, with all the consequent implications for the summer period.

The consequences of this kind of inaccurate forecasting may cause serious conflicts between the users of a transboundary watercourse.

Now - the regulation process itself.

It was demonstrated recently³¹ that, at the initial moment of release of water into the tail race

of an installation operating under a weekly regulation schedule, the hydrochemical properties of the water may change substantially for the worse. The reason for this is that during a period when no water is released into the installation's tail race pollution accumulates in the bottom deposits and finds its way into the watercourse. This pollution is washed out of the bottom deposits in the first moments of the release. Since the fish, as a rule, swim close to the part of the tail race nearest to the dam before the release and just as it begins there is a danger that they will receive critical doses of toxins or other material damaging to the organism.

Accordingly, the rules governing the flow regime of a watercourse which has become transboundary adopted earlier by its previous users may also give rise to conflicts of interest with succeeding users. It is thus quite probable that in the new situation these rules will have to be revised to take account of the interests of all the users of the water.

The negotiation and adoption of measures for preventing and eliminating the consequences of exceptional environmental situations arising as a result of man-made or natural disasters play an important role in the use and protection of the water resources of a transboundary watercourse subject to a regulated water regime. Leaving man-made disasters out of consideration, it must be noted that an exceptional environmental situation may arise for reasons other than the occurrence of disastrous natural phenomena. During the spring floods certain sections of practically all of Russia's watercourses experience ice jams which cause a significant rise in water levels. Ice jams cause flooding over very large areas, comparable in size to the areas of land inundated during flood disasters.

As was shown in a work by K. Rossinsky,³² where regulated watercourses are concerned it is precisely by regulating their water regime that it is possible, if not to prevent entirely, then at least to restrict the density of ice jams and thus reduce the high water levels which they cause and the area of land flooded. On the other hand, however, if it is

³¹N. Grishin and V. Debolsky. "On the question of the environmental impact of releases from water regulation installations". Expert environmental report and environmental impact assessment, 2002, No. 4.

³²K. Rossinsky. The Thermal Regime of Reservoirs. Moscow, Nauka, 1976.

possible to prevent an ice jam from forming, then clearly it is possible to form one artificially. All that needs to be done is to release into the tail race a certain volume of water at a certain time determined by the condition of the ice cover in the race. It is obvious that in such a case there will be a conflict of interest between the subsequent users of the water resource of the transboundary watercourse located in its upstream and downstream sections.

Even this brief discussion of the problems described above is sufficient to demonstrate the crucial importance of the principles governing the procedure for taking decisions on the various problems of the use and protection of the water resources of transboundary watercourses and how vital it is for basin studies to include the question of flow-formation.

Clearly, it is mandatory for these principles to be formulated jointly by all the users of the water resource of a transboundary watercourse and for such users to take each other's interests into account. The principles must be founded on agreed forecasting methods and on rules governing the regulation of the water regime formulated by experts on the subject.

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PARTNERSHIP – THE BASIS OF THE JOINT MANAGEMENT OF THE WATER RESOURCES OF THE ARAL SEA BASIN

A. KHOLMATOV

The history of the joint use of water by States and the universal experience of water cooperation have many different facets and trace their roots to the distant past. The world has 263 water basins, a third of them shared by two or more countries and 19 by five or more. More than half of the water supply requirements of many countries is dependent on water from another country.

Increased demand for water resources may lead in turn to increased tensions in the relations between individual countries. Conflicts generally arise when there are no, or only inadequate, agreements or international (bilateral or multilateral) arrangements for the management of transboundary watercourses.

In Soviet times the river Syr Darya was an entirely internal river, while the Amu Darya and its main tributary the Pyandzh were shared by two States - the USSR and Afghanistan. The basin of these two rivers has now become "internationalized". The resolution of issues of water distribution and management in the Aral Sea basin is in the hands of six States: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan and Afghanistan. Afghanistan is not yet a party to the International Fund for Saving the Aral Sea, but at the Dushanbe International Freshwater Forum the representatives of Afghanistan showed an interest in joining this regional organization.

The statement by the heads of State of Central Asia (Almaty, 6 July 2003) expressed the view that it would be useful for Afghanistan to participate in the regional organizations of Central Asia, for no water distribution agreements have yet been concluded with Afghanistan in the post-Soviet period. The use of global experience of the

development of cooperation and establishment of partnerships is of enormous importance for the solution of the problems of the Aral Sea basin.

An analysis of the process of negotiation and implementation of the existing international agreements on water problems shows that:

- A common will on the part of States is essential to the solution of these problems;
- It must be established with certainty that all the parties wish to and are capable of taking action on the basis of the principles of good-neighbourliness, mutual benefit, non-discrimination and good faith.

This lays the foundations of cooperation. It is also necessary to develop funding and negotiating skills:

- Where possible, centrally planned and managed approaches should be replaced by joint actions by partners at all levels: governmental, local, business, economic, financial and community;
- Flexibility is essential in the work on emerging problems;
- The parties must delegate certain powers to joint bodies.

The following are the principles underpinning virtually all forms of water cooperation between States:

- Water resources are the common heritage of mankind and the foundation of its future; water resources are extremely limited;
- Water resources are independent of State frontiers;
- The main goal of water resource management is the common welfare of peoples and States;

- There is an obligation to comply with the principles of optimum multipurpose use of water resources.

Inter-State management bodies have various functions, ranging from coordination of the activities of the different sectors of adjoining States to management of the whole basin in conjunction with all the sectors located therein; this means that in such cases part of the management activity may have a “supra-sovereign” integrated character.

In a 1993 decision the United Nations International Law Commission classified the following functions of international organizations as mandatory:

- Constant exchange of information and consultations on all issues of common interest;
- Joint monitoring of water and other natural resources on a permanent basis;
- Creation of a single information system;
- Formulation of proposals and conduct of research and programmes with a view to improvement of the use, management and development of water resources;
- Formulation of joint projects for reorganization of the management of rivers and development of their potential.

The following are the most important forms of water cooperation between States:

- Joint operational management of water resources;
- Joint measures to improve water quality;
- Joint long-term development and improvement of water resources;
- Coordination and cooperation in all areas of the integrated use of water and other natural resources and economic potentials.

The other conditions for successful cooperation include:

- Attention to the different political systems and levels of social and cultural development, the variety of natural resource situations, and demographic changes;
- Agreed methods of planning;
- Compliance with the established principles of water distribution.

It is very important for the cooperation among States having different levels of development to proceed on the basis of mutual assistance and respect. The more developed, richer and stronger countries must take a sympathetic attitude to the problems of their less developed neighbours along the river: it is sometimes better to disregard a direct advantage and to make some concessions in order to maintain fruitful cooperation and peaceful and good-neighbourly relations, for usefulness and advantage will accrue in any event even if they are not always immediately and directly apparent.

UNESCO statistics show that over the most recent 50 years there have been 507 disputes over water, 37 of them involving the use of force and 21 military action. It thus appears that a shortage of water does not always lead necessarily to disaster or conflict. It is indeed possible to avoid and prevent “water” disputes, and the means to that end is to create partnerships. The water resources crisis encountered by many regions of the world towards the beginning of the 21st century is due to inefficient management and irrational distribution of the resources. This has had a tragic impact on the everyday lives of poor population groups which have to use poor-quality water. This is also a crisis of the natural habitat due basically to the internal arrangements of States and to human behaviour. The survival and maintenance of life on planet Earth depend on the resolution of the crisis of water resources.

The environmental crisis of the Aral Sea has proved extremely acute and painful. Before the eyes of a single generation a whole sea has virtually disappeared, desertification has increased, and the tragedy has affected the whole planet. This was why in the most difficult first two years of their independence Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan concluded an agreement on the joint management and protection of their shared water resources. They inaugurated the International Fund for Saving the Aral Sea (IFAS) and under its aegis the Inter-State Coordination and Water Management Commission (ICWC), as well as the Inter-State Commission on Sustainable Development.

IFAS promotes dialogue and mutual understanding in the Central Asian region, helps to

solve practical problems of water and energy exchanges, and supports project development and partnerships within the framework of the World Water Forum and other international organizations.

The creation and operation of such organizations as the Central Asian Cooperation Agency and the Eurasian Economic Community testify to the fact that the economies of the countries of Central Asia with the existing water, energy, transport and other infrastructure are being drawn into the international division of labour and integrated in the world economy. There is a manifest desire on the part of the States of Central Asia to overcome their regional problems and make a contribution to the solution of global water problems. This is borne out by the proclamation by the United Nations on the initiative of Tajikistan of the International Year of Freshwater and the convening in Dushanbe (30 August to 1 December 2003) of the International Freshwater Forum. The United Nations has acknowledged that the Millennium Development Goals are unattainable without protection of the environment and appropriate and equitable access to resources, the most important of which are water and energy.

Water and energy are indeed of enormous significance for the sustainable development of the Central Asian region. It is appropriate to note here the words of President Rachmonov of Tajikistan to the effect that everyone must understand that where the sustainable future of the countries and the region is concerned just as much value attaches to water as to oil, gas, coal and other kinds of fuel and energy sources.

Tajikistan possesses unique and environmentally sound conditions for the accumulation of 68 km³ of water, or 56 per cent of the average annual flow of the rivers of the Aral Sea basin. The hydroelectric potential is equivalent to 527 billion kilowatt hours a year at a cost-price of \$US 0.4 per kilowatt. At present, 23 per cent of Tajikistan's water resources are regulated and five per cent of the hydroelectric potential has been tapped. Tajikistan, which possesses four per cent of world hydropower stocks, needs support and partnerships to remove by common efforts the obstacles to the exploitation of renewable energy sources and energy-efficient technology. If the

countries of Central Asia and other countries make due contributions it will be possible to establish joint management of Tajikistan's colossal water and energy resources. The necessary conditions, preferences and advantages for attracting investments in Tajikistan's water/energy complex must be established on a reliable basis. Tajikistan's own demand for water - minimal in regional terms even for the distant future (no more than 20 per cent of the basin indicator) - is a guarantee of its true commitment to the interests of the countries of the region where water resources are concerned.

Reduction of water expenditure per unit of production is a strategic key to the development of water management to solve the problems of the volume and quality of water resources. Accordingly, the specifically national character of water-saving measures has a clearly visible regional trait. For example, a 10 per cent saving in the region will deliver 12 km³ of water resources - virtually as much as Tajikistan's annual water consumption.

Improvement of the management of water resources will make it possible to produce a sufficient quantity of food. Solution of this global problem will require a considerable injection of funds into the water management infrastructure.

The question of the rational and socially just use of water must be addressed on the scale of the entire river basin. A good example of partnership is provided by the project on integrated management of the water resources of the Fergana valley, embracing Tajikistan, Uzbekistan and Kyrgyzstan. Wider use must be made of such pilot projects. There is also the existing 1998 *Agreement between Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan on the joint use of the water and energy resources of the Syr Darya basin*, which regulates the flows of electric power, water, and other resources.

The time has come to draft a similar agreement on the Amu Darya basin as well. Such action represents merely the region's first steps towards integrated water resource management. The decision of the heads of State of the Central Asian Cooperation Organization to create an international water/energy consortium, set out in their joint statement of 6 July 2003, is regarded as a new step towards integrated water resource management.

Support is needed from international organizations in the areas of technical cooperation and documentation to prepare the ground for an agreement on this issue among the countries of Central Asia.

The new initiative of the heads of State of Central Asia dated 6 October 2002 confirming the priorities of the programme of concrete activities to improve the social, economic and environmental conditions in the Aral Sea basin in the period 2003-2010 (ASBM-2) is generally consistent with the Millennium Development Goals and aims at the adoption of additional mechanisms of water resource management to provide for clean public drinking-water supplies, repair and joint maintenance of water management facilities, sustainable water regulation installations on an inter-State scale, forecasting, monitoring and improved use of water resources, measures to combat desertification and natural disasters, implementation of water protection measures and other measures for the protection of natural resources, and consolidation of the legal basis of cooperation in a context of sustainable development.

The efforts made by the five Central Asian States have already resulted in the formulation of a programme and determination of specific objectives embracing the biggest problems, ranging from the flow-formation area right down to the Aral Sea itself. Future agreements have been outlined, including first of all the prolongation of the 1998 *Agreement on the Syr Darya basin*, drafting of a similar agreement on the Amu Darya basin, and increase of the available flow volumes as a result of the construction of the Kambarata water regulation installation in Kyrgyzstan and completion of the 13.5 km³ Rogun reservoir in Tajikistan, which will provide the region with reliable supplies of irrigation water, especially in dry years.

Some \$US 800 million was invested earlier in the Rogun hydroelectric power station on the river Vakhsh. A total of \$US 120 million is needed for the construction of the reservoir, and the cost of the first start-up installation of the power station complex is \$US 300 million. This reservoir, together with the 10.5 km³ Nurek reservoir, will supply water to over three million hectares of land

in the Amu Darya basin, mainly in Uzbekistan and Turkmenistan. The seasonally regulated Kairakum reservoir in Tajikistan (volume of 4.1 km³) requires rehabilitation on the basis of cost-sharing by the States concerned: owing to the unsatisfactory condition of the dams and the build-up of silt, in a few years' time it will no longer be possible to fill the reservoir to its design volume, with a consequent water deficit of up to 1 km³. All these issues are addressed in ASBM-2, which was approved at a meeting of the governing body of the International Fund for Saving the Aral Sea (IFAS) on 28 August 2003. This programme needs the support of the international financial institutions.

Tajikistan and the other States of Central Asia have formulated *national "clean water and sanitation" programmes* with backing from IFAS. More than 50 per cent of the population of these States consumes water from sources which are not safe from the health and hygiene standpoint. It is absolutely essential to mobilize international and domestic resources to tackle this problem.

The development of integration processes among States, regional cooperation, and specialization on the basis of economic advantage are of enormous importance and will have a positive impact on the rational use of water resources for the region's sustainable development. This process will be promoted by food and transport consortiums, whose creation was proposed by the heads of State in their joint statement of 6 July 2003. The distribution among the States of responsibility for the conservation of water resources in the interests of future generations is of decisive importance. Unfortunately, Central Asia still lacks a unified water strategy.

The formulation of a *cooperation strategy to promote the rational and efficient use of water and energy resources in Central Asia* is currently being completed under the auspices of the United Nations Special Programme for Economies in Central Asia (SPECA). It is very important for the region to have a legitimate strategy which could actually be put into practice. The regional interest lies in the sustainable development of its States, for it must be determined by a calculation of national interests. The regional basin management bodies must reflect

the mutually agreed interests of the individual States.

It is important for the interests of the public at large to be represented at the basin level and for the public to be involved in the implementation of accessible projects and programmes for the establishment of environmentally sustainable water use. It is for this reason that the heads of State of Central Asia attach great importance to strengthening the executive board of IFAS, ICWC and the Amu-Darya and Syr Darya basin management organizations, investing IFAS with the status of specialized agency of the United Nations, and creating a special United Nations commission on coordination of the activities of international organizations and donor countries in the Aral Sea basin. These initiatives also merit universal backing.

Support for farmers, development of the farming system, improvement of varieties, seed-production, farm services and agribusiness will certainly enhance the effectiveness of water use. Such measures must be included in the national development plans and programmes of each State: together they will lay the foundations for regional

food security. States will have to provide guarantees and display political will in order to attain these goals. The water-partnership arrangement will ensure success at the regional, transboundary and national levels.

The heart of a partnership must consist of an economic mechanism for water use; such a mechanism has yet to be designed and implemented by the countries of Central Asia. This process will be facilitated by recourse to global experience and assistance from international organizations. This economic mechanism must be sensitive to the needs of the poor, include a new pricing policy, and take into account the cost of environmental services in order to attract as large a volume of public funds as possible, keep the risks to a minimum and secure the more active involvement of the private sector and private investments.

The consolidation of regional and global partnerships will certainly have a beneficial effect on the International Decade for Action "Water for Life" initiated by President Rachmonov of Tajikistan at the third World Water Forum in Kyoto (March, 2003) and supported at the Dushanbe Freshwater Forum.

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THE WATER RESOURCES OF TURKMENISTAN AND THEIR TRANSBOUNDARY ASPECTS

M. NEPESOV

Water resources are a key issue in Turkmenistan, as indeed in a number of other countries of Central Asia. The water deficit and the poor quality of water, together with the management of water resources, are the most acute problems. The annual per capita stock of domestic water resources (232 m³) is the lowest in the Central Asian region.³³

The flows of the rivers of Turkmenistan are formed in the Kopetdag and Paropamize mountains and the Pamir-Alai mountain range. The natural hydrographic network is represented by the big transboundary rivers Amu-Darya, Murgab, Tedzhen and Etrek, and 20 small rivers flowing down from the northern slopes of the Kopetdag mountains and a large number of dry ravines (over 350) of the Bolshoi and Maly Balkhanov and Koitendag.³⁴

In periods of heavy rainfall flash torrents of destructive force carry mud and stones down along the dry ravines. In some of them (Artyk, Adzhider, Arvaz, Oboichai) the temporary discharge of water can be as high as 1,000 m³ a day. However, the average annual flow of such torrents does not exceed 100 million m³. Part of this water quickly

evaporates and rest goes to recharge the stocks of fresh groundwater.

It must be borne in mind when assessing Turkmenistan's surface-water resources that they are formed almost entirely (95%) outside the country. The volume of the flow entering Turkmenistan is determined not only by natural factors but also to a significant extent by human economic activity. For example, most of the flow of the rivers Tedzhen and Etrek and part of the flow of the Murgab and the small rivers of the eastern part of the Kopetdag mountains is distributed for irrigation in neighbouring countries.

The waters of the Amu Darya are used by five States: Afghanistan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

The length of the Amu Darya from the confluence of its tributaries the Vakhsh and Pyandzh to its mouth is 1,408 km, of which 744 km lie in Turkmenistan; within Turkmenistan (Atamurat hydrological station) the river's average annual flow measured over many years totals 56.57 km³.

The volumes of water abstracted from the Amu Darya by the countries of Central Asia under their Agreement are set at the following levels (km³): Uzbekistan - 29.6 or 48.2%; Tajikistan - 9.5 or 15.4%; Kyrgyzstan - 0.4 or 0.6%; and Turkmenistan - 22.0 or 35.8%. In addition, below the Atamurat station (Kerki): Uzbekistan and Turkmenistan - 22.0 or 50% each.

When water levels in the Amu Darya are higher than forecast the excess water must first be accumulated in reservoirs and then allowed to pass down to the river's lower reaches (to improve the health and hygiene situation in the areas around the

³³"Natural resources management strategy: European and Central Asian region." Compiled by M-A Bronkhead and S. Abdulin. World Bank, 19 December 2000. Technical paper No. 485. Department of Environmentally and Socially Sustainable Development.

³⁴State Water Survey. Multi-year data on the regime and resources of land surface waters. Gidrometizdat, 1987, vol. 14: Turkmen SSR; M. A. Nepesov, A. A. Avanesov, V.V. Zharkov, "Water resources and their assessment", in Status of the Environment of Turkmenistan. Ministry for Protection of Natural Resources/UNEP, Ashkhabad, 1999. World Bank, *op. cit.*

Aral Sea) and discharge into the Aral Sea itself. The Amu Darya provides 88 per cent of Turkmenistan's total surface water resources. With the addition of the water resources of other rivers, large springs, streams and other watercourses the volume of Turkmenistan's surface water resources totals 25 km³.

The following are the most important factors in Turkmenistan's water resources deficit:³⁵

- The country's geographical location and the aridity of its land;
- A large area of fairly fertile land suitable for use but lacking a source of irrigation;
- Considerable losses of water by evaporation and filtration as it is delivered over large distances (from oasis to oasis);
- Population growth and the consequent need to increase farm output on irrigated land;
- Limited flow of the Amu Darya and other water sources.

As a result of human economic activity Turkmenistan's rivers are polluted to a greater or lesser extent over virtually their entire courses. Accordingly, the water taken from them, especially in their polluted sections, can be used only after treatment.

Water quality

The human factor has an extremely powerful impact on the state of the waters of Turkmenistan's rivers, and although concentrations of man-made pollution have not yet reached threatening levels the increase in the volume of such pollutants (in particular phenols and nitrates) is prompting concern.

Amu Darya. The chemical composition of the river's water is formed in the mountains of Tajikistan and Afghanistan. Pollutants from man-made sources are first detected at the town of Termez. The water enters Turkmen territory in a moderately polluted state. Within the country more

than 4.3 billion m³ of waste water are discharged into the river, one half of it from irrigated land in Turkmenistan (average mineral content 2.3 g/l) and the other half (6.5-8.5 g/l) from the Karshi steppe and Bukhara oblast in Uzbekistan. Discharges into the Amu Darya from the left bank have declined somewhat in recent years as a result of the diversion of part of the waste water deep into the sands along the course of the future principal collector of Lake Turkmen.

The total mineral content in the river's lower reaches is increasing and at certain times of the year attains its highest level in the vicinity of Darganat (2,200 mg/l). It declines when the river is in flood (430-1,380 mg/l) but increases when its levels are at their lowest (630-2,200 mg/l). Where the principal ions are concerned, in all phases of the hydrological cycle the river's water falls in the hydrocarbonate-sulphate-chloride category of the calcium group. The concentrations of diluted oxygen vary within the standard limits.

Murgab. The river basin with its tributaries the Kashan and Gushgy may be regarded from the environmental standpoint as in a fairly satisfactory condition, but already higher levels of pollution are being detected on individual sections between the towns of Iolotan and Mary; this situation calls for immediate water protection measures.

Tedzhen. The water quality is worse than in the Murgab. Significant quantities of the basic pollutants enter the river, sometimes from the Khauzkhan reservoir.

Small rivers. The waters of the small rivers of the central Kopetdag mountains have excellent qualities for use as drinking water. Part of these waters is used for the municipal supply of Ashkhabad.

Transboundary aspects

Virtually all of Turkmenistan's water resources (98%) are formed from transboundary watercourses (Amu Darya, Murgab, Tedzhen, Etrek and small rivers).

Amu Darya. The most important transboundary aspects of the environmental

³⁵National Plan of Action for Environmental Protection of Turkmenistan's President, Saparmurat Turkmenbashi. Ministry of the Environment of Turkmenistan/UNEP/World Bank, Ashkhabad, 2002.

problems of the use of Turkmenistan's water resources relate to this river. Its waters are fully distributed among the riparian countries. The basic principles of the water distribution are set out in a number of agreements among the States of Central Asia, to which Afghanistan has not yet acceded. In accordance with the water-abstraction schedule established under these agreements Turkmenistan is allocated an annual maximum of 22 billion m³ of water (for the growing season and intervening periods). In the driest years reduced levels of water abstraction are determined by decision of the Inter-State Commission for Water Coordination, of which the ministers of the Central Asian countries responsible for water management are members.

In confirmation of their commitment and entitlement to rational and equal participation in the use of the waters of the Amu Darya, on 16 January 1996 at Turkmenabad (formerly Chardzhou) Turkmenistan and Uzbekistan signed a bilateral *Agreement on cooperation on water management issues*. Specifically, the heads of the two States confirmed the agreement reached earlier on the principles of water distribution in the vicinity of the Atamurat hydrological station (i.e. 50% each). As a rule, at the beginning of each operational year a preliminary volume of water abstraction from Amu Darya is fixed for all the States of Central Asia. The final figure is established on completion of the calculations in the light of the year's wetness. The flow of the Amu Darya is regulated by reservoirs along its course: the Nurek (Tajikistan) and Tuyamuyun (Uzbekistan).reservoirs. Part of the flow is discharged into the Aral Sea.

Murgab. The Murgab basin is located in the territory of two States. The upper reaches are in Afghanistan and the lower in Turkmenistan. There is no formal agreement between the two States on the use of the river's flow. The hydrological forecasts of the river's water volumes are made on the basis of its flow characteristics. Its flow in Turkmen territory is regulated by a cascade of reservoirs on the river itself and by seasonally charged reservoirs. The Murgab can currently provide irrigation water for a little over 100,000 ha.

Tedzhen. The river basin is located in the territory of three State. The upper part is in Afghanistan and the Islamic Republic of Iran and

the lower in Turkmenistan. A bilateral Agreement on the sharing of the river's flow between Iran (Persia) and Turkmenistan (USSR) was signed in 1926 and remains in force today. The water was distributed in the proportion of 30% to 70% under the Agreement of 20 February 1926 and 50% each under the Protocol to that Agreement dated 5 May 1958. The hydrological forecasts of water volumes are calculated on the basis of the river's flow characteristics. The river's seasonal flow in Turkmen territory is regulated by three reservoirs.

The reservoirs are partially or entirely silted up, so that in the event of very high spring water levels they are incapable of regulating the flow, and a considerable part of the water runs off into the desert. Every year in summer the river dries up for several months and its flow, regulated by the reservoirs, can irrigate no more than 10,000 to 20,000 ha.

The Dostluk dam is being built under an agreement of 20 October 1999 between the Governments of Iran and Turkmenistan. The construction cost of the dam and its reservoir totals \$US 41,795,350. On completion of the construction of this reservoir's water regulation installations the flow will be shared equally between Turkmenistan and Iran and will provide irrigation water for 50,000 to 60,000 ha of arable land.

An operational staff made up of equal numbers of Iranian and Turkmen workers is appointed to manage the outflow from the Pulikhatun reservoir and the disposal of the excess flood waters. This service is headed by two heads of installation who coordinate their work in accordance with the agreements between the USSR and Persia³⁶ and between the USSR and Iran,³⁷ which are still in force and are operated pursuant to the Memorandum of Understanding of 6 January 1994.

³⁶Agreement between the USSR and Persia on the joint use of the transboundary rivers and other waters along their frontier from the river Geri-Rud to the Caspian Sea. Signed on 20 August 1926.

³⁷Treaty between the Government of the USSR and the Government of Iran on regulations governing the Soviet-Iranian frontier and on the procedure for settlement of frontier disputes and incidents. Signed on 14 May 1957.

Etrek and small rivers of the Kopetdag mountains. Most of Turkmenistan's small rivers (between the Tedzhen and the Caspian Sea) are also transboundary, and their waters are distributed in accordance with the bilateral agreement with Iran mentioned above. The low-water flow is distributed between the two countries in the proportion of 50 per cent each. The excess flood waters enter Turkmen territory and are regulated only on the Etrek by three off-stream reservoirs, each having a volume of under 10 million m³.

According to measurements taken over many years the total flow of the transboundary rivers, with the exclusion of the Amu Darya, is subject to considerable variation, for they are not regulated in the adjoining territory. The Amu Darya has been regulated by reservoirs for many years, with the

result that its hydrograph is evened out somewhat within the operational year.

Questions of the regulation of the flow of transboundary rivers, construction of new water-abstraction installations, water consumption, and redistribution of the maximum levels of water abstraction within the operational year can be resolved only on the basis of bilateral or multilateral agreement with the neighbouring States in whose territory the basins of these rivers are located. The consequent concerted action helps to reduce the man-made environmental impact and facilitates the efficient use of the available surface water resources.

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ASSESSMENT OF THE TRANSBOUNDARY ASPECTS OF THE WATER RESOURCES OF THE REPUBLIC OF UZBEKISTAN

L. FRANK AND P. ABDURAKHMANOV

Almost all the rivers of the Aral Sea basin are transboundary. The following principal watercourses flow through Uzbek territory:

Amu Darya: the chemical composition of the river's water is formed to a significant extent by the effects of pollution entering the river from agricultural (collection/drainage) run-off from Turkmen and Uzbek territory.

Zeravshan: the main source of the drinking-water supply of three oblasts of Uzbekistan and subject to serious transboundary impacts. Installations of a Tajik ore-enrichment plant located in the river's flow-formation zone pollute the river with toxic metals, antimony and mercury. Antimony has been detected in groundwater and abstraction installations in Uzbek territory.

The *Syr Darya* basin is formed by many rivers; the main ones are the *Syr Darya* itself and the *Naryn*, *Kara Darya*, *Chirchik* and *Akhangaran*.

The small rivers of the Fergana valley, tributaries of the *Chirchik*, have their sources in the territory of adjoining States.

Two sections of the *Syr Darya* run through Uzbekistan: in the upper reaches the merged rivers *Naryn* and *Kara Darya* (Fergana valley) and in the middle reaches the outfalls of the *Akhangaran* and *Chirchik*. The small rivers of the Fergana valley are subject to transboundary influences. The geographical location of the Fergana valley exposes it to threats from a broad spectrum of natural and man-made emergency situations.

Hazardous waste dumps from the mining industry accumulated over 40 to 50 years constitute a serious threat on the transboundary rivers, for these waste dumps have no anti-filtration covers and are located in a zone of considerable seismic activity, frequent flash torrents and landslips which cause leaching of toxic substances during periods of precipitation.

Emergencies of a natural origin manifest themselves primarily in unpredictable spring and autumn flash torrents and freshets, often formed in the mountains of Kyrgyzstan and constituting a danger to the people and infrastructure of the Fergana valley. Man-made emergencies are caused by transboundary pollution of the environment. The *Syr Darya* is exposed to the risk of pollution by toxic radioactive wastes via the river *Mailisu* in Kyrgyz territory, where tailing heaps and dumps from the mining of uranium ore are located. The *Kadamzhai* antimony plant and the *Khaidarkan* ore-enrichment complex are the true sources of the pollution of the rivers *Shakimardan*, *Alty-Aryksai*, *Sokh*, etc.

The irrigation of land in mountain foothills also creates a risk of pollution of surface water and groundwater along transboundary rivers with agro-chemicals and leached salts and toxic elements, as well as a risk of the flooding of downstream land and settlements. The intensive development of the foothill areas of the *Burgandin* mountain range in Kyrgyzstan and the uncontrolled and intensive irrigation of the land (mainly for rice and onions) are causing a critical increase in groundwater levels and groundwater pollution on farm land in several districts of Fergana oblast.

Up to 2000 an intergovernmental commission of Uzbekistan and Kyrgyzstan monitored the status of environmentally hazardous installations and the implementation of measures to prevent emergencies in the villages of Kadamzhai and Khaidarkan. Following the creation of Batken oblast in Kyrgyzstan difficulties arose in the exchange of information and the conduct of joint monitoring of installations in adjoining territory. The cooperation with the environmental protection agencies of Kyrgyzstan and Tajikistan on the solution of environmental problems could be improved, especially as the necessary legal and regulatory basis already exists.

As a result of economic difficulties the system for monitoring water quality in Uzbekistan and its adjoining States is tending to break down, observations at many of the stations are made only episodically, and some of the stations have in fact ceased to operate. The lack of modern equipment and shortage of chemical reagents have caused problems in determining the specific admixtures of pollutants from waste water sources. There is an acute shortage of detailed and reliable information on pollutants, the volumes in which they are entering the water ecosystems, the magnitude of their concentrations in the water, and the degree of danger which they represent for humankind and the water habitat. The existing differences in monitoring methods and standards (at the national and regional levels) impair data reliability and usefulness in the work with adjoining States on transboundary watercourses.

The extension of the scope of environmental problems has now produced a need for integrated and regular measurements, under a set programme, of the pollution of the natural environment as a result of anthropogenic activities. For example, monitoring of water pollution and sources of pollution in the Zeravshan basin was established by a special order of the Government of Uzbekistan, and measures were devised to ameliorate the environmental and health and hygiene situations in Uzbek territory.

Cooperation on the Aral Sea basin produced a number of special regional obligations of a political nature. For example, the system for the integrated management of natural resources was taken as the

principal tool of sustainable development. A proposal was also made to strengthen the regional cooperation to save the Aral Sea by drafting and adopting an international convention on the basin's sustainable development, in which issues of joint use of water and unification of environmental standards and related legislation would occupy a prominent position. The necessity of enhancing the effectiveness of the application of the existing agreements between the States of Central Asia has also been acknowledged (*the 1995 Nukus Declaration by the States of Central Asia and international organizations on problems of the sustainable development of the Aral Sea basin; the 1997 Almaty Declaration by the Presidents of the States of Central Asia; and the 1999 Ashkhabad Declaration by the Presidents of the States of Central Asia*).

The first experience of cooperation among the States of Central Asia was the creation of special organizations in the shape of the *International Fund for Saving the Aral Sea* (IFAS) with its corresponding system of agencies. The main arena of the cooperation is the Aral Sea and its surrounding area. The *Aral Sea basin programme* (ASBM) has been operating since 1994; the aim is to secure effective use of water resources, including the design and application of national and regional strategies for rational use of water resources, to combat salination of the land, and to constitute national stocks of water resources to promote the development of the Central Asian countries and the solution of the problems connected with the Aral Sea crisis and the monitoring of the waters of the Amu Darya and Syr Darya basin. Work is proceeding to these ends on the equipment of a number of hydrological stations with means of calculating water discharge and quality and on the implementation of a pilot model of the restoration of the natural biological diversity.

In addition to acceding to the treaties of the Commonwealth of Independent States (through the Inter-State Environmental Council) the countries of Central Asia have taken active steps to create ad hoc subregional bodies and to formulate rules on environmental protection and sustainable use of resources.

For example, the *Agreement between Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan on cooperation in the joint management of the use and protection of the water resources of transboundary watercourses* (1992) posited the need for agreed and systematic resolution of issues of the joint management of the water resources of transboundary rivers. The *Inter-State Commission for Water Coordination* was created to attend to the organization of this cooperation.

The *Agreement between the Governments of Kazakhstan, Kyrgyzstan and Uzbekistan on cooperation in environmental protection and the rational use of natural resources* was concluded in 1998. However, no arrangements were made for organizing the cooperation, and this instrument is virtually a dead letter. In 1998 the States of the region signed the *Agreement on the use of the water and energy resources of the Syr Darya basin*, which is renewed every year.

In 2002 the heads of State of Central Asia adopted a decision on the main directions of the Programme of Concrete Action to improve the environmental and socio-economic situation in the Aral Sea basin for the period 2003-2010, which provides for the drafting of a package of agreements on the principal transboundary watercourses. In view of the coincidence of fundamental principles in the sphere of protection of the environment, including transboundary watercourses, it is considered appropriate to strengthen the organizational and legal frameworks of the cooperation among all agencies in the Central Asian region.

The time has come to determine the status of the work of Uzbekistan and the other Central Asian States on global climate change and to specify the priorities of the problem-targeted research on capacity-building, at both national and regional levels, as well as identifying specific priorities and interests, extending international cooperation on scientific research, and studying the global aspects of environmental problems.

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COOPERATION ON THE TRANSBOUNDARY WATERS OF UKRAINE

N. NAGULA

On the instructions of the Government of Ukraine (dated 18 April 1992) the State Water Management Committee prepared and signed, on the basis of the Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (March 1992), agreements on the use and protection of transboundary waters with all its adjoining States: Russian Federation³⁸ (1992); Hungary,³⁹ Moldova⁴⁰ and Slovakia⁴¹ (1994); Poland⁴² (1996); Romania⁴³ (1997); and Belarus⁴⁴ (2001).

Ukraine's *Helsinki Convention (Accession) Act*, which regulates means of cooperation in the formulation of international policy on the protection and use of water resources, was adopted by the Supreme Council of Ukraine on 1 July 1999.

These instruments set out the fundamental principles of joint water use, operation of water regulation installations, implementation of measures of rehabilitation and protection of natural resources, conservation and rehabilitation of biological resources, monitoring the condition of surface waters, regular exchanges of information and forecasts, etc.

Official representatives were appointed by the Government of each country, together with their deputies, and joint working groups were set up. These groups were constituted (in terms of their number, membership and functional duties) in light both of the basin development of the river system and of the situation of the man-made environment in a given region.

Thus, from the moment of their signature all further cooperation among the parties has been regulated by the agreements and by protocols adopted at conferences of the official representatives and agreed and adopted by the Governments in legal acts.

The earlier conferences considered the following organizational and technical matters:

- The principles governing the establishment and membership of working groups;
- The rules of procedure governing joint working groups;

³⁸Agreement between the Government of Ukraine and the Government of the Russian Federation concerning the Joint Use and Protection of Transboundary Waters. Signed on 19 October 1992 at Kiev.

³⁹Agreement between the Government of Ukraine and the Government of the Hungarian Republic on Questions of Water Management in Frontier Waters. A treaty of 1994 prolonged and re-signed on 11 November 1997 at Budapest.

⁴⁰Agreement between the Government of Ukraine and the Government of the Republic of Moldova on the Joint Use and Protection of Frontier Waters.

⁴¹Agreement between the Government of Ukraine and the Government of the Slovak Republic on Questions of Water Management in Frontier Waters. Signed on 14 June 1994 at Bratislava.

⁴²Agreement between the Government of Ukraine and the Government of the Republic of Poland on Cooperation in the Field of Water Management in Frontier Waters. Signed on 10 October 1996 at Kiev.

⁴³Agreement between the Government of Ukraine and the Government of Romania on Cooperation in the Field of Water Management in Frontier Waters. Signed on 30 September 1997 at Galați.

⁴⁴Agreement between the Cabinet of Ministers of Ukraine and the Government of the Republic of Belarus concerning the Joint Use and Protection of Transboundary Waters. Signed on 16 October 2001 at Kiev.

- Determination of the number, siting and operational ranges of hydrological and hydrochemical stations;
- Adoption of programmes and the methodology for conducting hydrological and hydrochemical research.

All subsequent conferences have been devoted to consideration of the results produced by the working groups, with attention focused primarily on water resource management in periods of high and low water-levels, exchange of information and, in particular, monitoring of water quality in transboundary rivers.

The Ukrainian-Russian *Agreement concerning the Joint Use and Protection of Transboundary Waters* occupies a special position owing to the large number of watercourses of common interest to the Parties.

As of now the joint working group on the Dnepr basin has identified 27 main transboundary watercourses, and the working group on the basin of the Seversky Donets has identified 28. For the moment the water quality of frontier rivers is being monitored on nine rivers over 10 sections in the Dnepr basin and on three rivers and 10 sections in the basin of the Seversky Donets (eight sections on the Seversky Donets itself). In view of the environmental priorities of the countries' regional development, there is an obvious need to develop the monitoring network in the near future.

Furthermore, the activity of working groups in the regions promotes the growth of public awareness and recognition of the need to improve the regional environment, primarily in the river basins.

One distinguishing feature of the cooperation among the countries members of the Commonwealth of Independent States (Moldova, Russia and Ukraine) is their legacy either of common ownership of water regulation installations or of their location (partly or totally) in the territory of an adjoining State. The resolution of water management issues in such cases requires the participation of a broad range of experts in various disciplines and

the allocation of considerable amounts of time for their work. To this end the Parties usually create ad hoc joint working groups.

The disastrous flooding in 1998 in Transcarpathia (Ukraine, river Tisza basin) pointed to the need to create a unified system of monitoring and data processing and transmission in order to forecast and prevent floods, as well as to formulate an agreed conceptual outline of collective flood defence in the region.

On completion of preliminary negotiations the representatives of the water management agencies of Hungary, Romania, Slovakia and Ukraine convened in Budapest in May 2001 a *Tisza Basin Water Forum*, at which delegates of those four countries and Yugoslavia addressed flood-prevention problems and ways of solving them. The Forum resulted in the signature of the *Budapest Declaration*, which established the *Tisza Basin Water Forum* as a standing body for the coordination of cooperation on questions of flood control. Pursuant to the decision contained in the Budapest Declaration to draft an *Outline of flood defence in the Tisza basin* the Parties established a Coordination Council and eight working groups and appointed coordinators of the various topics.

At the second session of the Water Forum (Hungary, 30 November 2002) the Parties noted that the Forum's principal outcome was the joint Outline of flood defence in the Tisza basin, setting out the relevant national programmes, and the programme of work for its implementation.

All the conferences and meetings, in the format both of representatives of the Parties and their deputies and of expert working groups, have been conducted at a high professional level and in a spirit of constructive cooperation, friendship and mutual understanding.

Ukraine's State Water Management Committee is participating in the following international projects:

- *Upgrading of the system of management of the water resources of the Lower Dnepr and the Kakhov reservoir* (funded by the Swedish International Development Agency);

- *Reconstruction and construction of three dams in Zakarpatskaya oblast* (funded by the Swiss Government);
- *Technical and economic justification of the international flood-control system in the Tisza basin* (financed under a TACIS project and with the technical assistance of German experts);
- *Flood-prevention management in Slovakia and Ukraine* (funded by Danish Cooperation for Environment in Eastern Europe (DANCEE));
- *Monitoring and assessment of the quality of transboundary rivers - Seversky Donets basin* (TACIS project);
- *Assessment and management of flood risks in Zakarpatskaya oblast* (TACIS project);
- *Memorandum of Understanding between the Government of Ukraine and the*

Government of the United States of America and cooperation on early warning of floods in Zakarpatskaya oblast by establishing automated satellite-linked hydrometeorological stations.

The total cost of these technical assistance projects is in excess of \$US 6 million.

To revert in conclusion to issues of bilateral cooperation on transboundary waters: in view of the admission of the countries to the European Union, first Slovakia, Hungary and Poland, and the recommended European Union water directives, Ukraine intends in the near future to make the necessary changes in the existing legislation on a bilateral basis.

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EXPERIENCE OF TRANSBOUNDARY COOPERATION IN THE SEVERSKY DONETS BASIN

V. ANTONENKO

The Seversky Donets is the largest river constituting the left-bank frontier of Ukraine; it rises in Russia and discharges into the Don, also in Russian territory; in its middle reaches it crosses Ukrainian territory. The river basin is located in the territory of two States - Russia and Ukraine. The river is 1,053 km long and has a catchment area of 98,900 km²; 723 km of the river's course and 54,540 km² (55%) of its catchment area are located within Ukraine: Kharkov oblast has 375 km and 22,030 km² (40%); Donets oblast 95 km and 7,950 km² (15%); and Lugansk oblast 253 km and 24,560 km² (45%). The Seversky Donets rises in a treeless locality on the southern slopes of the Central Russian Uplands near the village of Liski in Russia's Belgorod oblast. The larger part of the river's upper and middle reaches from the border with Belgorod oblast are located in Ukraine's Kharkov, Donets and Lugansk oblasts; the average annual volume of its natural flow on the frontier stretch separating Ukraine from Russia's Rostov oblast is 4.76 km³.

Disputes have arisen between water users and, following the formation of the Commonwealth of Independent States (CIS), between States themselves as a result of the growth of water consumption in the basin, a higher rate of non-returnable water use, regulation of a considerable amount of the river's flow, and pollution of its water. These disputes have taken many different forms and relate to water use schedules, discrepancies in the volume and quality indices of the water in the frontier (inter-State, inter-oblast) stretches of the river, etc. In these circumstances the adoption of qualitative decisions on the management of the basin's water resources in the interests of the two States has of course

meant that ad hoc decisions have to be taken by the Governments of Russia and Ukraine.

Experience of cooperation in the Seversky Donets Basin Water Resource Management Board (BUVR) and the Don Basin Water Management Board (BVU) has been accumulated over a lengthy period beginning in 1980, i.e. before the signature of the Ukrainian-Russian Agreement, on the basis of actual developments on transboundary bodies of waters. One of the first stages in the formulation of the principles of this cooperation was the acquisition of experience even in Soviet times of the release of flood waters and the evacuation of the waste water tanks of the industrial chemical plants located in Ukrainian territory.

In order to provide stable conditions for industrial operations it was necessary every year to create reserves of free capacity in the tanks; this meant that in periods of high water-levels on the Seversky Donets waste water with a high content of minerals and phenols was discharged in volumes calculated in the light of the expected volumes of flood water needed to ensure the dilution of the pollutants in compliance with the maximum permissible concentrations (MPC) on the frontier stretches between Ukraine and Russia.

The functional duties of the Seversky Donets BUVR, a water management agency of Ukraine's State Water Management Committee, require it to attend to the State management of the water resources of the basins of the Seversky Donets and the Aral Sea area within Kharkov, Donets and Lugansk oblasts. The BUVR applies the basin principle of flow regulation in order to satisfy the water requirements of all stakeholders in the water management area.

The Agreement between the Governments of Russia and Ukraine concerning the Joint Use and Protection of Transboundary Waters, including the Seversky Donets basin, was signed on 19 October 1992 at Kiev. This Agreement sets out the fundamental principles of joint water use, the maintenance of water regulation and protection facilities, the implementation of measures of natural resource rehabilitation and protection, the conservation and restoration of biological resources, monitoring of the condition of surface waters, regular exchanges of information and forecasts concerning the development of high water-levels, and the expected low water-levels. For the purposes of application of the Agreement the Governments of Russia and Ukraine appointed official representatives and their deputies, who in turn appointed V. E. Antonenko (for the Ukrainian Party) as head of the Seversky Donets BUVR and A. I. Khorunzhenko (for the Russian Party) as head of the Don BVU. Thus, from the moment of its signature the cooperation between the two Parties has been determined by the provisions of the Agreement, the decisions taken at meetings of the governmental representatives and their deputies, and other regulatory instruments.

Pursuant to the Agreement the two Parties are required to coordinate:

- The implementation of water management measures and measures to protect bodies of water against pollution;
- Work on the maintenance of water regulation and protection facilities in good technical order;
- Schedules for the operation of water regulation facilities and releases of water, and planned water management and protection measures;
- The formulation of plans for the integrated use and protection of water resources and maintenance of water balances in the light of the volume and quality indices of the water in frontier stretches;
- The implementation of joint water management and protection measures when necessary;
- Cooperation on the conservation of the biological resources of reservoirs and maintenance of the biological diversity of ecological systems.

Through the arrangements for application of the Agreement the two Parties have been able to agree on the procedures for organizing the management of water resources in the Seversky Donets basin, they are carrying out a programme of joint analytical monitoring of the hydrochemical condition of bodies of water; and they have established the requirements for compliance with hydrological and hydrochemical indices in frontier waters. Measures to solve such problems as the determination of the schedules for running down and recharging reservoirs during high water periods and during the low water-levels of summer and autumn and the discharge of accumulated waste water, setting the water balance indices, construction of water management installations, etc., are implemented only after bilateral negotiations when the measures in question affect the interests of the neighbouring State.

Over the period of more than 10 years which has elapsed since the signature of the Agreement there have been 25 meetings of deputy representatives, held at least twice a year; these meetings included two working conferences of experts on the introduction of a decision-making support system and two meetings of expert working groups.

These meetings have been devoted primarily to discussion of the following matters: water resource management during the periods of high and low water-levels; conduct of joint analytical monitoring of the quality of water resources in the frontier stretches in accordance with the established programme; compliance with the agreed volume and quality requirements in the frontier stretches; the status of and plans for the work of the joint working group; emergency and rescue services; arrangements for early warning of emergencies; approval of the activities of the Seversky Donets BUVR and the Don BVU during releases of spring flood waters and high water-levels due to heavy rainfall; procedures for the provision of operational and current information on the water management situation; status of the introduction of the decision-making support system for the management of water quality and water resources in the Seversky Donets basin, etc.

The deputy representatives have organized the Ukrainian and Russian participation in a working group on the Seversky Donets basin. Working group meetings are attended by experts from State environmental services, State health monitoring centres, geology and mining bodies, State hydrometeorological services, and technical and design organizations.

As a means of developing the cooperation on transboundary rivers the Russian side proposed the conclusion of an *agreement on the river Kundryuche*, the need for which was dictated by the location of a drinking-water reservoir on this river in Russian territory. Such an Agreement was duly signed by representatives of the local authorities of Lugansk and Rostov oblasts in 1999. Pursuant to the Agreement, for the Ukrainian side the Seversky Donets BUVR and for the Russian side the Don BVU are responsible for the monitoring work on the frontier stretch of the Kundryuche.

The Agreement makes provision for monitoring of water quality along the frontier stretch with reference to its condition at the time of signature. There have been no instances of deterioration of the water quality while the Agreement has been in force, although the Parties have not yet taken steps to improve the existing state of this transboundary river. The application of the Agreement will offer an opportunity to decide whether the adoption of similar agreements on the transboundary rivers Mius and Krynka would be justified, for the solution of the water management problems of these rivers calls for joint efforts by the two States.

To facilitate the work done under the Agreement the Parties drafted a regulatory instrument entitled "*Procedures for the organization of the management of the water resources of the Seversky Donets basin*", in which was included a programme on the joint analytical monitoring of the quality of transboundary waters; this programme specified the locations and periodicity of sampling, a list of indicators to be defined, and methods for formulating these definitions. In principle, this programme is compiled for periods of five years, after which it is reviewed; following such reviews the Parties take

turns to reconstitute the programme in the light of the comments and proposals made.

Information is exchanged every quarter between the Seversky Donets BUVR and the Don BVU, including information on the findings of the monitoring of the water quality in the frontier stretches of the transboundary rivers conducted under the established programme. In the run-up to the release of flood waters and in the event of very low water-levels the frontier requirements are considered in the light of the water discharge and quality indices. Proposals of the Don BVU are reflected in the decisions of the inter-agency commission responsible for establishing the operational schedules of the water management systems for different times of the year.

In periods of high water-levels and when the waste water accumulated in Ukrainian territory is released, the data are transmitted weekly or daily depending on the emerging water management situation in the basin. Pursuant to the Agreement the Parties drafted *procedures for cooperation in emergencies affecting transboundary waters*. The procedures document was approved by the representatives of the Governments of the two States. It specifies the possible accidents which may occur in bodies of water, the elimination of effects of which would require joint efforts by the two Parties in the event of a possible transboundary impact, the introduction of measures by the Parties to prevent and deal with emergencies, and the establishment of a notification system. The Parties have exchanged details of staff members of their services and of their experts, together with the telephone numbers and other means of communication of the Don BVU and the Seversky Donets BUVR.

The cooperation between the Seversky Donets BUVR and the Don BVU when an emergency threatens or occurs on a transboundary body of water in the Seversky Donets basin is based on the existing emergency warning and response systems in operation in Ukraine and the Russian Federation. The basin management bodies, including the Seversky Donets BUVR, have services whose task is to collect data on the state of the water regulation installations, the water management situation, and

the occurrence of accidents in the management body's area of operations.

Under the auspices of the Seversky Donets BUVR and the Don BVU standing emergency commissions carry out measures pursuant to intergovernmental agreements to prevent and deal with accidents which may result in water pollution. These commissions may collaborate with the local emergency organizations depending on the scale and nature of the emergency. The decision to terminate any joint action is taken by common accord once the effects of the accident have been dealt with and the water in question has been restored to full cleanliness; the representatives of the Parties are immediately notified of such decisions.

The vigorous joint action taken during the very high water-levels in 1994 made it possible both to flood the low-lying riparian areas of the Seversky Donets in Donets and Lugansk oblasts in districts where groundwater is abstracted for the drinking-water supply and to reduce the damage from flooding of riparian areas in the Don basin by fixing appropriate schedules for charging reservoirs and restraining the peak movement of the flood surge in the Don's lower reaches. Another graphic example of joint emergency action by the Parties is provided by the accident at the Dikanev treatment plant in June 1995. Such situations have offered a singular proof of the readiness of the two basin management organizations of the Ukrainian and Russian Parties to take action to deal with emergencies affecting bodies of water.

The laboratory service of the Seversky Donets BUVR had been required to devote some time to the organization of laboratory testing on 24 stretches of the Seversky Donets and its tributaries; this facilitated the monitoring of the development of the situation in the basin so that management decisions could be taken in good time. Regular sampling and research were facilitated by the fact that the basin laboratory and its field services are quite well equipped with modern instruments. The work done by the Seversky Donets BUVR and the Don BVU in dealing with the aftermath of the Dikanev accident included joint sampling and testing in the transboundary stretches and the exchange of information on the hydrochemical and

bacteriological condition of the water. The procedures for provision by the Parties of information about natural disasters and accidents occurring in the territory of neighbouring States and the coordination of the measures for dealing with their impact have been set out in intergovernmental agreements.

Joint action reduced the pollution of the Seversky Donets following a major accident at the Kharkov treatment plant in 1995 and prevented impairment of the water quality in Rostov oblast, as well as enabling the water extraction facilities of the towns of Donetsk, Kamensk and Belaya Kalitva to continue operating without disruption.

One typical example of cooperation was the resolution of a difficult situation on the transboundary river Mius, where even very small increases in the releases into the river result in higher water levels and flooding of towns and villages in Russian territory. On receipt of information from the Don BVU on situations of this kind the Seversky Donets BUVR takes operational steps to reduce the flow from the reservoirs located in Ukraine, and when about to release flood waters it ensures additional reduction of the water levels in the Shterov, Yanov, Grabov and other reservoirs on the Mius in order to prevent any possible flooding of towns and villages in Russia's Rostov oblast. For example, storms occurred on the shores of the Sea of Azov in the period 11-14 April 1997, destroying buildings and installations and causing the flooding of large areas both at the coast and along the rivers of the Azov region, including the Mius, where there was a substantial rise in the water level.

The Seversky Donets BUVR took emergency action to reduce the flow from the reservoirs located in the Mius basin in Donets oblast in order to prevent any worsening of the situation in Rostov oblast and on the Mius.

In April 2002 the Parties organized a joint training exercise to improve the joint response to emergency situations. The exercise was based on a possible accident at the pumping station of a storage facility for waste water containing phenols at the company Rubezhansky Krasitel LLC. It was assumed that samples had been taken from the stretch of the Seversky Donets below the point of

release of the polluted waste water containing concentrations of phenols which would have reached the Russian frontier in levels exceeding the MPCs tens of times over, so that the Don BVU would have to deal with the situation with the aid of the decision-making support system in the light of the forecast movement of the pollution front through Rostov oblast. There are five large reservoirs in Ukrainian territory within the possible pollution stain, one of them - the Svetlichansk - supplying drinking water, another supplying a fishing enterprise - the Lugansk oblast fisheries combine - and the other three delivering irrigation water for the irrigation system of the Lugansk oblast water authority.

An analysis of probable developments in the event of such an accident showed that it was impossible effectively to influence the passage of the pollution stain along the Seversky Donets by diluting the polluted water in order to prevent the contamination from reaching the reservoirs in Ukrainian territory, for there are no reservoirs or ponds on this stretch of the river. The possible option of increasing releases from the reservoirs on the rivers Lugan (Uglegorsk and Mironov) and Derkul (Belovodsk) was considered as a means of preventing the probable inflow of phenols or at least reducing their concentrations in the river in the monitored frontier stretch. However, the time calculated for the journey of these increased releases along the tributary rivers at their existing flow speeds was considerably longer than the time allowed by the developments on the Seversky Donets.

The information/advice decision-making support system established by the two countries for the Seversky Donets basin serves as the *technical information basis of the Agreement*. Joint use of this system enhances the information available to the Parties, renders the activities of one Party transparent and predictable to the other, and facilitates the coordination of the efforts to devise solutions, thus making the management of the water resources as efficient as possible.

In the Seversky Donets BUVR the possibility of managing water resources in accordance with the basin principle has been available since the start of the cooperation with experts of the North Caucasus

Scientific Research Institute for Water Management authorities in 1987, i.e. even before the signature of the Ukrainian-Russian Agreement. The creation of the Seversky Donets BUVR marked the initiation in Ukraine's water management apparatus of the development of an automated system for management of the water network in the interests of all the stakeholders. An enormous amount of work was done on the compilation of the initial data available to the organization at that time, making use both of statistics and of the personal experience of the water experts of the existing water inspectorate. The introduction and development of the programme outputs formulated by the experts of the North Caucasus Scientific Research Institute for Water Management opened up new possibilities, bringing the staff's work up to date and making it more creative. This period may also be regarded as marking the initiation of the active cooperation between the Don BVU and the Seversky Donets BUVR.

Thanks to the intergovernmental cooperation on water management and the understanding attitude and support of the official representatives of the Russian and Ukrainian Governments, Mr. N.N. Mikheev and Mr. K. A. Aliev, the sixth conference of representatives (Konakovo, 28-30 June 1999) adopted a decision to extend to the Seversky Donets BUVR the benefits of the development of the decision-making support system for the management of water quality and water resources; this system had been formulated by a working party headed by Professor A. E. Kosopalov under the auspices of the Centre for the Design and Implementation of International Cooperation Projects.

A decade of experience of cooperation with the Don BVU under the intergovernmental agreement on the solution of problems in the Seversky Donets basin has been accumulated through the implementation of agreed joint measures for the regulation of the river's flow, joint monitoring on the frontier stretches of the transboundary rivers, and the adoption of agreed decisions on the exchange of information on the condition of the bodies of water at different times of the year. The cooperation with the Don BVU over many years, both under the existing Agreement and before its conclusion, has facilitated

the establishment of equitable good-neighbourly relations with the organizations of the adjoining State in the resolution of issues of the joint use and protection of transboundary waters.

It should be stressed in particular that the two States made no claims against each other concerning the quality or volume of water resources in the frontier sections of the rivers of transboundary basins either in 2002-2003 or in preceding years. But during the extremely low summer water-levels experienced in the year just past, which gave rise to a critical situation including the significant depletion of the Pechenezh reservoir, on which a stable water supply for Kharkov depends, the Russian side (the Don BVU) acceded to a request by the Government of Ukraine to increase releases from the Belgorod reservoir; this action succeeded in stabilizing the situation in the region.

In addition, the Seversky Donets BUVR is also cooperating actively with the executive board of the Council of Heads of the Frontier Oblasts of Russia, Belarus and Ukraine on the formulation of an *inter-regional programme to upgrade the environment of the Seversky Donets basin*. In 2002 representatives of the Seversky Donets BUVR took part in the meetings of this programme's coordination committee in Rostov in May and in Belgorod in September. These meetings considered questions of the handling of wastes in Russia and Ukraine and the influence of waste disposal sites on the catchment area of the Seversky Donets basin and on the quality of the water resources, as well as questions of the river's environmental security.

In addition to its work under the intergovernmental agreement on the joint use and protection of the basin's transboundary waters, the Seversky Donets BUVR, as an agency of Ukraine's State Water Management Committee, engages in international cooperation with the water management and environmental protection

organizations of Ukraine's Russian neighbour under the auspices of the Council of Heads of the Frontier Oblasts of Russia, Belarus and Ukraine. In 2000 the Council's executive board initiated work on the formulation of an *inter-regional programme to upgrade the environment of the Seversky Donets basin*. The outcome so far has been the production of an outline of the environmental upgrading of the basin, and the coordination committee is doing intensive work on the realization of the programme, including consideration of the question whether it should be invested with the status of a State programme. The programme was approved in 2004.

A *memorandum of understanding* has been signed on the *joint efforts of Ukraine and Russia to solve environmental problems* in the basin, and a draft agreement has been produced and submitted to the foreign ministries of the two countries for study and approval. Arrangements are being devised for creating and operating a special environmental fund for implementation of the programme.

But the most important achievement is the success in securing consideration of the issue and involving the administrations of the frontier oblasts of Russia and Ukraine in its resolution. For over 10 years the cooperation between the Seversky Don BUVR and the Don BVU has been successful in attaining the main objective of the Parties' joint activities - *to guarantee conditions for the stable operation of the water management facilities in the basin of the Seversky Donets and the rivers of the Aral Sea area in the territory of both States*.

The absence of any claims concerning water quality or volume in the frontier stretches and the effectiveness of the joint action taken to prevent emergencies on the rivers are the result of the cooperation between the basin management organizations of Ukraine and Russia.

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EXPERIENCE DRAWN FROM THE SWEDISH ENVIRONMENTAL PROTECTION AGENCY'S COOPERATION PROGRAMME ON TRANSBOUNDARY WATERS

N. MUNTHE AND S. LUNDBERG

With over half of the world's population living in transboundary river basins, successful management of these shared basins is a great challenge for politicians, administrators and others. There is a growing understanding of the importance of cooperation between different actors and across borders in shared water basins.

One major basis for developing cooperation in European transboundary waters is the EC Framework Directive on Water (2000/60)⁴⁵. It governs water management in member States and also has an impact on the new members of the Union in their efforts to harmonize with various EC directives. The overall purpose of the Directive is to attain a sustainable use of water resources and ensure that good water quality is achieved in all waters by the year 2015. The directive states that the basin is to be the management unit, and further stipulates that agreements should be negotiated for internationally shared water basins.

In addition, the Council of the Baltic Sea States has stressed that all countries in the Baltic Sea region should ratify and implement the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes⁴⁶, and develop action programmes for their transboundary waters, based on the principles of the Convention. The management of transboundary waters in the Baltic Sea region is also mandated by the Convention on the Protection of the Marine Environment of the Baltic Sea Area (1974, 1992). The environmental problems of the Baltic Sea

cannot be solved without consideration of all the activities within the entire catchment area. Thus improved cooperation in the river basins of the Baltic Sea is needed to minimize the pollution load entering this Sea.

In 1997 the Swedish Environmental Protection Agency (EPA)⁴⁷ initiated the Programme on Transboundary Waters to promote cooperation among countries sharing a joint water basin. Prior to 1997 the Swedish EPA had funded several projects in the Lake Peipus area focused on the capacity of the Russian and Estonian regional authorities to conduct harmonized environmental monitoring. The ultimate goal of the Programme is to arrive at a better environment in the basin and, in the longer term, also in our common Baltic Sea.

The Central and Eastern European Programme of the Swedish EPA is an important part in the Swedish development assistance to Central and Eastern Europe. Swedish development assistance is coordinated by the Swedish International Development Cooperation Agency (Sida)⁴⁸, which also provides support to environmental investments, such as waste-water treatment plants.

The overall objective of the Central and Eastern European Programme⁴⁹ of the Swedish EPA is to support the environmental authorities in the adjacent area, i.e. Estonia, Latvia, Lithuania,

⁴⁵Directive 2000/60 of 23 Oct. 2000, published in the Official Journal L 327, 22 Dec. 2000.

⁴⁶Posted on www.unece.org/env/water.

⁴⁷Web site: www.naturvardsverket.se.

⁴⁸Web site: www.sida.se.

⁴⁹Additional information in English on the Central and Eastern European Programme is found on the web site of the Swedish EPA: www.naturvardsverket.se.

north-western Russian Federation, Ukraine and Belarus. This support is aimed at developing and making their environmental work more effective and strengthening their ability to comply with international commitments. During the period 1993-2002 some 200 projects were initiated on administration, legislation and cooperation on issues such as water management, nature conservation, waste management and environmental information. The annual turnover of the Programme is about SKr 20 million (US\$ 2.4 million).

At present, the priority is to develop projects on three major issues:

- Approximation by candidate countries to the regulatory framework of the European Union (EU);
- Transboundary watercourses and lakes, and the Baltic Sea;
- Environmental work in the north-western Russian Federation.

The overall aim of the Programme on Transboundary Waters is to support cooperation among countries bordering lakes or rivers East of the Baltic Sea so that these waters can be used in a sustainable way.

Its specific objectives are to promote:

- The development of bilateral and trilateral agreements for each basin;
- The establishment of river basin management plans;
- The establishment of joint water commissions;
- The coordination of environmental monitoring and management of environmental information;
- A common, integrated approach to water management in each river basin.

The aims and objectives described above are all quite general, so all the projects have more concrete and specific objectives, which are measurable and have deadlines.

In this report the expression 'river basin' is used, the same conclusions are, however, applicable to 'lake basins'. The discussion and conclusions in

this report are based on some general assumptions concerning river or lake basin management:

1. The basin is the logical level for management

A river basin comprises both water and land. The interactions between parts of the river basins (upstream-downstream, land-water, groundwater-surface water, population, biotope, etc.) are so strong that the system as a whole is the only logical level for management. There is today a strong consensus that the administrative entity should be the river or lake basin.

2. The interests of various stakeholders must be taken into account

Water is a social, environmental and economic resource. The importance of safe drinking-water supply, the role of water for farmers and fishermen, various economic activities dependent on water, as well as its significance for different ecosystems, must be recognized. The prevailing opinion today is that the management of water resources must take an integrated approach, and that all sectors of society that influence, or are influenced by, water resource management have to be considered in the management of the basin.

3. Each basin is unique

The hydrological, environmental, social and economic circumstances vary considerably in different regions, and every river or lake basin will therefore need its own specific policies, plans and activities. The management of transboundary water basins is particularly complicated since there is not one government to manage international waters and bordering States may have different languages and cultures as well as different legislation and institutional structures.

The major part of the funding to the Programme on Transboundary Waters of the Swedish EPA comes from Sida following a grant agreement signed in 1999. The Programme has also received funds from a Swedish governmental fund, Baltic Billion I. During the period 1997-2002 the Programme received about SKr 8 million (approximately US\$ 900,000).

Its primary partners are the national and regional environmental authorities of the countries concerned. However, other actors, such as universities, NGOs and private sector organizations within the drainage basin, are at times encouraged to actively participate in the work. As in all Swedish development support, the cooperating partners are expected to co-fund all projects. The different States' ability to co-fund joint projects must be taken into consideration.

Some of the cooperating partners in the region are:

- The Intergovernmental Estonian-Russian Joint Commission on Transboundary Waters and its working groups;
 - The Ministry of Environment of Estonia;
 - The Ministry of Natural Resources of the Russian Federation;
 - The Federal Service for Hydro-Meteorology and Environmental Monitoring of the Russian Federation (Roshydromet);
 - The Center for Transboundary Cooperation, Pskov (Russian Federation) and Tartu (Estonia);
 - The Ministry of Natural Resources and Environmental Protection of Belarus;
 - The Ministry of the Environment of Lithuania;
 - The Ministry of Environment of Latvia;
 - The Centre for Environmental Policy (Lithuania);
 - The Central Research Institute of Integrated Use of Water Resources (Belarus).

Cooperation on a common water resource is complex. Experience from Central Europe and elsewhere has shown that cooperation takes time to establish and develop and that successful cooperation must build on confidence, commitment and a common understanding of the situation. The Swedish EPA can, as an external programme partner, act as a catalyst in the process to establish and develop cooperation. This implies support to a political process, driven by the riparian States, with difficulties in foreseeing the pace of development of the cooperation. It is also important to enhance collaboration with other actors, such as the Helsinki Commission, the EU and the World Bank, to facilitate future investments.

The Programme on Transboundary Waters covers three transboundary basins (fig.):

- Lake Peipus – river Narva (shared by Estonia and Russian Federation);
- The river Daugava-Zapadnaya Dvina (shared by the Russian Federation, Belarus and Latvia);
- The river Neman (shared by the Russian Federation, Belarus and Lithuania).

In total these areas constitute about 15% of the drainage basin of the Baltic Sea. These rivers also contribute approximately the same percentage to the total load of water-borne nitrogen to the Baltic Sea. The river Narva is the least and river Neman the most polluted of the three.

The Swedish EPA has also initiated bilateral projects, which are complementary to the projects involving the transboundary cooperation on water resources. The Dvina project (a river basin management plan, Latvia), the Kola River Environmental Programme (Russian Federation), Environmental information in the north-western Russian Federation, are some examples of projects which have synergies with the activities of the transboundary waters programme.



Figure: The Baltic Sea drainage basin and the three

transboundary waters included in the Programme on Transboundary Waters of the Swedish EPA: Peipus-Narva, Dvina and Neman.

All three basins of the programme have one thing in common: they involve one new EU member country as well as the Russian Federation, and therefore constitute the border between the EU and the Russian Federation. Two of the basins include Belarussian territory. The Russian Federation and Belarus belong to the Commonwealth of Independent States and have formed their own union. Thus the countries are not only single actors, they also represent different political unions with different aims. It is of the utmost importance to understand the political context and framework for cooperation as well as the driving forces to develop the cooperation in the basins.

Russian legislation has a basin approach outlined in the Water Code and the Law on Environmental Protection and at present the Russian Federation has 17 basin authorities and a long experience in river basin management. Full cost recovery is, however, not a part of the Russian water legislation. The Belarussian Administration does not have a basin approach, but approves of its principles.

The old and new members of the European Union are governed by the EC Water Framework Directive. A directive is legally binding and thus has to be implemented in each member State's national legislation. The objective of the Water Framework Directive is that all waters should reach a "good status" by 2015 and that water use should be sustainable throughout Europe. The Directive represents an ambitious approach to water management. Its key elements are:

- The protection of all waters – rivers, lakes, coastal waters and groundwater;
- The setting of ambitious objectives to ensure that all waters meet "good status" by 2015;
- The requirements for cross-border cooperation between countries and all the parties involved;
- Ensuring the active participation of all stakeholders, including NGOs and local communities, in water management activities;
- Requiring water pricing policies and

ensuring that the polluter pays;

- Balancing the interests of the environment with those who depend on it.

The Directive requires river basin districts to be defined and all actions in the river basin districts to be coordinated in a river basin management plan, drawn up by a river basin management authority. To conclude, the Water Framework Directive is a tool and an important driving force towards sustainable river basin management.

In the following sections the situation in each of the three river basins included in the Swedish EPA Programme on Transboundary Waters is described separately, including:

- A general description of the river basin;
- The economy;
- The environment;
- The transboundary environmental cooperation;
- A description of the Swedish EPA activities;
- General conclusions;
- Comments on future activities.

The conclusions and recommendations in this article are based on the experiences gained with the Swedish EPA-funded projects and various recommendations developed by experts on transboundary water management⁵⁰.

In many regions of the world conflicts between water uses and between upstream and downstream uses are increasing. Also, vulnerability of river basins to extreme events has increased. To preserve our precious water resources for present and future generations sustainable river basin management is a prerequisite. We must find ways to manage our basins and take social, economic as well as environmental dimensions into account. The management of transboundary basins is particularly complicated since there is not one government to manage the basin and riparian States may have different languages and cultures, as well as different legislation and institutional structures.

Although conflicts over water uses may be

⁵⁰The list of references includes some of the publications from the various Swedish EPA projects and some external reports.

frequent, water is also an opportunity for regional cooperation. Joint integrated management does make coordination efforts and analytical work more complex. The outcome, however, is likely to be less conflict between different user groups and lower long-term costs, making a more sustainable use of the resources possible.

There is no blueprint for river basin management that can be applied to all basins. The conclusions and recommendations in this report are, however, generalized and described as different phases in the development of transboundary water management, with a focus on institutional and legal aspects.

The process of developing the joint management of a transboundary basin

Let us assume that the ultimate goal is a complete management and control system for achieving sustainable water management at the river basin scale. The process of developing integrated joint management could then be described as five phases:

1. Assessing the national institutional and legal framework and resources and needs;
2. Developing the relevant legal and institutional framework;
3. Drawing up a basin management plan;
4. Implementing the management plan;
5. Compliance monitoring and evaluation.

In practice this is rather a cyclic process, where the phases will need to be run through several times. The outcome of compliance monitoring and evaluation, for example, may lead to revisions of the management plan. Experience will be gained through trial and error.

Assessing the national institutional and legal framework and resources and needs

Institutions and legal provisions are needed to set up management systems for river basins. There should be a clear allocation of duties and responsibilities at all levels. In addition, a basis is needed for issuing emission licences, setting quality standards, checking compliance and enforcement. Institutions and legal regimes should furthermore reflect local conditions, and be flexible and

responsive to current and future needs. Strategic tasks with many interfaces between sectors should primarily be the responsibility of national/regional/local governments and not of a specific functional institution. River basin authorities, with autonomous decision-making powers, may be a good option for operational tasks with a narrow scope. River basin commissions should be established for transboundary river basins, in order to provide the necessary intergovernmental coordination and offer a platform for negotiation.

The assessment of resources and needs is also of paramount importance. Knowledge about the strategic assets of the basin, and about the uses, the needs and the pressures exerted on it, constitutes the starting point for formulating objectives and developing plans. Much effort must be made to develop joint visions and common approaches to the situation to make joint management possible.

To achieve effective river basin management sound data, information and knowledge are needed. This includes both data on surface and groundwater (quality and quantity), and social and economic data. Collecting and processing of relevant data, easy accessibility and broad dissemination are prominent tasks of river basin management. Data often need to be aggregated into meaningful information, for example in the form of indicators.

It is worth mentioning here that surface and groundwater may be characterized by an almost infinite number of biological, chemical, geological, hydrological, morphological and ecological parameters. Funds for monitoring and assessment are, however, limited and it is, therefore, necessary to restrict the number of parameters used. The topics that should be covered depend on the specific basin and on the capacity available. Which information is actually necessary to manage the basin? Experience has proven that it is usually sufficient to work with a limited number of parameters in practical water management, although there will always be individuals who will complain about a lack of information.

Developing relevant legal and institutional framework

A possible first step towards developing the confidence and political commitment necessary for transboundary water management, is cooperation on technical matters. Thereafter, States should try to draw up an international agreement or other arrangement for cooperation in the river basin, and establish a joint or coordinated body for organizing and supervising this cooperation.

Legal instruments

Legal instruments are essential, but the process of developing them is as important as their substantive content. Building confidence and nurturing cooperative actions will lead to the security that a legal agreement will provide. River basin agreements should reflect the relevant principles of international law, such as the principles of equitable and reasonable use, the obligation not to cause significant harm, and the duty to notify and exchange information. Framework agreements are often based on the principles of the United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (1997). This Convention defines the broad commitment to cooperation. The framework agreement model has great relevance for transboundary waters, where early commitment to cooperation is essential, but details of cooperative arrangements need time and dialogue. 'Subsidiary' agreements can be developed later, as information becomes available and confidence grows, to address specific needs such as quality standards, cost allocation, etc.

Riparian States should be encouraged to sign and ratify relevant international and regional conventions. Apart from the above-mentioned United Nations Convention, there are a number of other conventions relevant for transboundary water management, such as:

- The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, its Protocols on Water and Health and on Civil Liability;
- The UNECE Convention on Environmental Impact Assessment in a Transboundary Context;

- The UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters;
- The UNECE Convention on the Transboundary Effects of Industrial Accidents.

In addition, some global conventions are relevant such as the 1971 Ramsar Convention on wetlands and the 1992 Convention on Biological Diversity. The concepts, principles and rules laid down in various international legal documents need to be further developed. In most river basins they are not yet fully implemented. As mentioned earlier, the old and new members of the European Union are governed by the EC Water Framework Directive. The principles of basin management described in this report correlate well with the Directive.

Institutional framework

Experience with transboundary river management illustrates the importance of working at three complementary levels - international, national and subnational - to achieve successful and sustainable management programmes. At the international level a commission provides a basis for joint approaches and actions among the cooperating parties. At the national level, different ministries integrate the actions of the commission into national policies, strategies and programmes. At the subnational level, the participation of local governments, the private sector, NGOs, civil society institutions and various stakeholders is needed to translate these policies and programmes into action and provide feedback. In transboundary river basins, commissions are almost indispensable. They can perform many useful tasks such as coordination of research and monitoring, coordination of river basin management among the participating basin States, planning, compliance monitoring and conflict resolution. Conventions and other related agreements provide the framework for the operation of commissions. They must be able to meet changing conditions and address emerging issues relevant for the basin in question. Commissions are therefore not static.

International river basin authorities with decision-making and enforcement powers may be a

good option for specific operational tasks, such as the restoration of water quality, shipping and the joint operation and management of infrastructure. Policy and strategy should be separated from execution and implementation. Joint water commissions should formulate policy, while river basin authorities should execute, operate and manage specific projects.

There is no single model or approach to cooperation which is appropriate for all situations. The range of institutional examples and experiences should be reviewed when establishing the framework for any new organization. The management structure should provide for effective planning and management, allow managers and technical staff to operate efficiently and be affordable for the cooperating parties. Transboundary water management organizations do not need to be large. They can rely on national technical support from their cooperating parties in joint committee structures to avoid competing for scarce human and financial resources. The structures that succeed are often based on joint fact-finding and sharing of information, which create a climate of trust among parties. Institutional sustainability of commissions ultimately rests on high-level political commitment in each country. It is often wise to develop institutions and management structures step by step.

The financial capacity of commissions to undertake activities must be guaranteed by the cooperating parties if they are to fulfil their mission. High-level political commitment, trust among parties, and stakeholders and civil society support are necessary elements in order to ensure continued financing. The scope of commissions' programmes and the size of their staff and structure should be commensurate with available financial resources.

Drawing up a basin management plan

A river basin management plan covering the entire basin should be developed and focus on the basin's specific conditions and problems. The plan should furthermore be in proportion to the resources available for its implementation. The plan has to be approved by the governments, preferably through a joint or coordinated body, e.g. a commission.

An integrated approach to developing the plan is needed so that the viewpoints and interests of the various participants are balanced from the start. This implies having a cross-sector approach, which in many cases is not part of the administrative culture. The principle of sustainability means developing balanced objectives, preventing a single use from dominating and respecting the ecosystem - the basic resource for economic and social development.

Knowledge about the ecosystem and its functions is of great importance. It is a good rule of thumb to adhere closely to the original, natural conditions of the ecosystem. Extreme deviations from the natural state often lead to unexpected and unwanted effects, not only on the ecosystem, but also on economic interests. Fisheries may be impaired by the construction of dams, regulating the river flow may lead to flooding, etc. Another example is the vital role of wetlands, which in many regions have been destroyed by dyking. Wetlands act as nature's own purification plant, decreasing the nutrient load reaching the water. In addition, wetlands also help even out flooding.

Also keep in mind the link between the river basin and the coastal zone. The coastal zone is an area of intense human activity and often has outstanding biodiversity. Unlike river basins, coastal zone management has long combined two facets: marine resources management and land-use planning. In addition, the use of land greatly influences the quality of water, hydrological regimes and vulnerability to extreme events. Water management and spatial planning must therefore be coordinated. River basin management is also greatly influenced by other policy areas such as nature protection, air and soil pollution control, and chemicals management.

The river basin management plan should preferably cover a period of 5-10 years. Its contents may vary, as may its level of detail, but it usually includes the following elements:

- A description of the river basin (assessment of resources and needs);
- An outlook on probable economic, demographic and ecological developments;
- A formulation of objectives taking account

of the balancing of human uses and ecosystems; and

- A set of measures needed to attain each of those objectives.

For EU member States the structure of the management plan should be in line with the Water Framework Directive.

Implementing the management plan

During implementation national, regional, local and river basin authorities and others will have their respective responsibilities. Attaining the objectives of the plan will be the result of cooperation.

The operational management of the river basin plays a key role. Part of the task at this stage may include routine registering by authorities of water-relevant activities (such as discharges of waste water), checking compliance mechanisms, issuing licences and carrying out measurements. Regulatory and economic incentives are essential. To prevent pollution, a mix of regulation and compliance instruments can be used. Charges are an effective means of financing river basin management (cost recovery) and reducing water use as well as pollution.

Physical tasks such as building waste-water treatment plants, installing new technology, constructing irrigation works or restoring the natural environments may also be part of the implementation of the management plan.

Some critical issues during implementation are:

- Promoting efficient water use;
- Using incentives for cost-efficiency;
- Sharing benefits rather than water;
- Moving from supply-side to demand management;
 - Using rational economic instruments to achieve cost recovery in water pricing;
 - Using relevant management tools such as environmental impact assessment, evaluation of water quantity and quality, actions for maintaining ecosystems and conserving biological diversity.

Compliance monitoring and evaluation

To follow up the results achieved during the implementation of the river basin management plan evaluations are needed. Based on the evaluation, the plan may be revised. Compliance monitoring – reporting, reviewing and evaluating – is very important in order to promote successful implementation of the plan.

Challenges

A major challenge in transboundary water management is to provide open access to basic information and data sets to the public to support informed decision-making and foster a frank discussion of key transboundary water management issues. To ensure effective participation of the public, rights of access to information, active participation in decision-making processes and access to justice need to be legally established.

Knowledge is power. Without knowledge, riparian States will be nervous about threats to sovereignty, especially when another riparian State is deemed to have that knowledge and is therefore powerful. In this situation any attempt at rational negotiations is seriously hampered.

Other challenges include the willingness to deal with emerging problems, developing political commitment and public support, as well as promoting efficient water use and the use of incentives for cost-efficiency.

The possible role of donors

Before initiating any projects to support the transboundary cooperation in a river basin a thorough analysis of the situation in the basin is recommended. It is of the utmost importance to understand the political context in the basin: what are the forces driving transboundary cooperation in the basin? Also analyse the legal situation (are there any agreements?) and the institutional set-up.

If there are political difficulties, projects with a more technical focus might be the most efficient to initiate. It might be fruitful to discuss harmonized monitoring, evaluation of data, etc. with a donor as one external part. Technical cooperation involving

the collection and dissemination of information promotes the acceptance of this information by all basin States and stimulates mutual understanding and trust.

External support is often best directed to complementing the technical work that the management institution requires to develop policy and provide guidance on issues of common interest. It should be designed with a view to phasing out donor support for institutions once their management, administrative and human resource capacities are adequately developed. The preparation of strategic action programmes has proven to be a useful tool for developing experience and expertise within new commissions and for the cooperating parties to reach a shared vision concerning the management priorities.

The process of developing transboundary water management is very complex, involving a wide range of participants and including an extensive variety of activities. The experience of the Swedish EPA Programme on Transboundary Waters shows the importance of carefully considering the role of the donor. The riparian countries must have a long-term commitment to developing their cooperation. The donor must not take over responsibility but provide assistance for initiatives that promote cooperation. It is often difficult to foresee the pace and direction of the development of cooperation, so a certain flexibility from the donor is recommended.

Building capacity is generally of fundamental importance. Consider any possible capacity imbalances among the cooperating partners in the basin. Such imbalances can greatly constrain negotiations and cooperative action, therefore efforts to correct these imbalances need to be taken. If one of the participants has access to greater resources (funding, competence, access to information, etc.), cooperation may become one-sided, and the larger partner may be able to dictate the conditions for cooperation.

Before initiating any projects donors are recommended to ensure that there is:

- Political commitment to ensure that project results will be sustainable;
- A clear mandate for the project's participants;

- Access to data;
- A constructive approach towards inter-agency cooperation among the project's partners.

In the future Swedish development support will to a greater extent focus on the Russian Federation, Ukraine and Belarus as well as other newly independent States⁵¹. Support to Estonia, Lithuania, Latvia and other new EU countries will be phased out. Projects promoting cooperation in transboundary basins involving also the Baltic States will, however, most likely receive additional future support.

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⁵¹The newly independent States (NIS) (i.e. the former Soviet Union excluding the Baltic States) are: Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

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REGULATION BY THE UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE OF ENVIRONMENTAL ASSESSMENTS FOR WATER RESOURCE MANAGEMENT

N. GRISHIN

This paper considers the regulation of such types of assessment as environmental impact assessment (EIA) and strategic environmental assessment (SEA) in the management of water resources using the basic legal instruments produced by the United Nations Economic Commission for Europe (UNECE). The fundamental UNECE document in the field of international cooperation to prevent, limit and reduce the pollution of transboundary waters and to ensure their sustainable use is the Convention on the Protection and Use of Transboundary Watercourses and International Lakes,⁵² which was signed at Helsinki on 17 March 1992 and entered into force on 6 October 1996.

The use of EIAs and other assessment methods are mentioned among the measures which Parties to the Convention must formulate, adopt and implement in order to attain the goals of the Convention (art. 3, para. 1(h)).

The conduct of EIAs in a transboundary context is regulated by the UNECE *Convention on Environmental Impact Assessment in a Transboundary Context*, which was signed at Espoo (a suburb of Helsinki) on 25 January 1991 and entered into force on 10 September 1997. In this Convention (hereinafter “the Transboundary EIA Convention”) the term *environmental impact assessment* means a national procedure for evaluating the likely impact of a proposed activity

on the environment (art.1, para. (iv)). Pursuant to article 2, paragraph 2, the scope of the EIA procedure must cover the 17 types of planned activity listed in Appendix I to the Convention. Among these kinds of activity the following can have a direct bearing on water resource management:

- Trading ports and also inland waterways and ports for inland waterway traffic which permit the passage of vessels of over 1,350 metric tons;
- Large dams and reservoirs;
- Groundwater abstraction activities or artificial groundwater recharge schemes where the annual volume of water to be abstracted or recharged amounts to 10 million cubic metres or more;
- Offshore hydrocarbon production.

The need to conduct EIAs for water resource management is not limited to these types of activity. Pursuant to article 2, paragraph 5, of the Convention concerned Parties shall, at the initiative of either Party, enter into discussions on whether one or more proposed activities not listed in Appendix I is or are likely to cause a significant adverse transboundary impact and thus should be treated as if it or they were so listed. Where those Parties so agree, the activity or activities shall be so treated. The general principles for determining the criteria to assist in the determination of a significant harmful impact are set out in appendix III to the Convention.

The latest legal instrument produced by UNECE having a bearing on the regulation of the conduct of environmental assessments in the management of water resources is the *Protocol on*

⁵² Convention on the Protection and Use of Transboundary Watercourse and International Lakes. United Nations. New York and Geneva. ECE/ENHS/NONE/1. 1994.

*Strategic Environmental Assessment*⁵³ to the Transboundary EIA Convention, which was signed at Kiev on 21 May 2003 by representatives of the European Union and 36 States members of UNECE under the auspices of the Fifth Ministerial Conference “Environment for Europe”.

For the purposes of this *Protocol on Strategic Environmental Assessment* means the evaluation of the likely environmental, including health, effects, which comprises the determination of the scope of an environmental report and its preparation, the carrying-out of public participation and consultations, and the taking into account of the environmental report and the results of the public participation and consultations in a plan or programme (art. 2, para. 6).

The Protocol stipulates the necessity of an EIA with regard, inter alia, to water management plans and programmes which set the framework for future development consent for projects listed in annex I of the EIA Protocol which require an EIA under national legislation (art. 4, para. 2).

Annex I of the EIA Protocol mentions the same 17 types of activity as are found in appendix I of the Transboundary EIA Convention. However, the list contained in annex II of the EIA Protocol is more extensive. It includes inter alia the following activities having a bearing on water resource management:⁵⁴

- Water management projects for agriculture, including irrigation and land drainage projects;
- Intensive fish farming;
- Installations for hydroelectric energy production;
- Extracting of minerals by marine or fluvial dredging;
- Construction of harbours and port installations, including fishing harbours, as far as not included in annex I;

- Construction of inland waterways and ports for inland-waterway traffic, so far as not included in annex I;
- Trading ports, piers for loading and unloading connected to land and outside ports, as far as not included in annex I;
- Canalization and flood-relief works;
- Sludge deposition sites;
- Groundwater abstraction or artificial groundwater recharge, as far as not included in annex I;
- Works for the transfer of water resources between river basins;
- Waste-water treatment plants;
- Dams and other installations designed for the holding-back of or for the long-term or permanent storage of water, as far as not included in annex I;
- Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works;
- Installations of long-distance aqueducts;
- Marinas;
- Reclamation of land from the sea.

Leaving aside the terminology and considering only the essence of the EIA process - evaluation of the effects on the environment of various versions of plans and programmes for a given activity before a decision is taken to initiate implementation - it may be said that both in practice and in accordance with legislation SEAs existed earlier in Russia (USSR) in some form or other and still exist today.

It is common knowledge that, when designing plans for the development and location of a country's forces of production, from the beginning of the 1980s national experts had to examine various versions of such plans.⁵⁵ As part of the

⁵³Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context. United Nations, New York and Geneva. ECE/MP.EIA/2003/3. 2003.

⁵⁴Listed in the order in which they appear in the EIA Protocol.

⁵⁵*Methodological instructions on the content, drafting procedure, negotiation, approval and amendment of plans for the development and location of branches of the national economy and branches of industry and plans for the development and location of forces of production in the economic regions and union republics.* Adopted by Order No. 290 of the State Planning Ministry of the USSR dated 31 December 1981.

examination of the various versions a forecast had to be made of possible consequent changes in the state of the environment. Then, in the light of this forecast and an evaluation of the effects of the environmental changes, any additional environmental protection measures or alterations to the established system of such measures had to be spelled out.

Accordingly, virtually since the beginning of the 1980s certain types of activity have been carried out in Russia (USSR) which would today be called strategic environmental assessments. The most striking example of the conduct of a large-scale SEA in national water management was the body of work produced on the evaluation of the various versions of plans for diversion of part of the flow of a number of northern rivers, when an attempt was made to assess the different environmental, social, economic and other effects both of the various diversion options and of the various water volumes involved.⁵⁶

In the late 1970s and early 1980s more than 100 scientific bodies of the USSR Academy of Sciences, the State Hydrometeorology Committee, the Water and Energy Ministries, and other ministries and agencies participated in the work on the scientific problems of diverting part of the flow of northern and Siberian rivers into Central Asia, Kazakhstan and the Volga basin.

These scientific bodies were set the following tasks:

- Evaluation of the likely impact of the proposed measures for diversion of river flows on the climate of the USSR and neighbouring territories;
- Production of long-term forecasts (over several decades) of the environmental changes over an area of several million

square kilometres resulting from removing water from the north of the country and transferring it for use in southern areas;

- Justification of measures to prevent any possible adverse impacts from the diversion of part of the river flow from northern to southern areas;
- Justification of permissible volumes of water abstraction from the north up to the end of the century.

Attention is drawn to one consideration relating to the justification of measures to prevent any possible adverse impacts of the diversion, a consideration which today is one of the basic conditions for the conduct both of EIAs in a transboundary context and of SEAs. It must be pointed out that under the Soviet system there was no tradition of public participation in the discussion or adoption of such decisions in general or of environmentally significant decisions in particular. This is probably the fundamental distinction between the work on the environmental justification of the diversion of part of the flow of northern rivers and today's international principles for the conduct of SEAs.

As noted in the first preambular paragraph of the EU Framework Water Directive,⁵⁷ water is different from other commercial goods and is a legacy requiring protection and appropriate management. The conduct of environmental assessments for the evaluation, first and foremost, of the likely adverse effects of a proposed activity on the environment and the formulation of measures to reduce these effects is gradually becoming one of the most effective means of water resource management and protection.

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⁵⁶N. Grishin, "The problem of the territorial redistribution of water resources as a problem of strategic environmental assessment". Expert environmental report and environmental impact assessment, 2001, No.3.

⁵⁷Directive 2000/60/EC of the European Parliament and Council of 23 October 2000 establishing the bases for EU activities in the field of water policy. Official Journal of the European Communities, L327/1, 22 December 2000.

PROBLEMS OF THE USE OF INTEGRAL AND INTEGRATED APPROACHES IN THE MANAGEMENT OF TRANSBOUNDARY RIVER BASINS IN THE CIS (ON THE EXAMPLE OF THE DNIESTER)

I. TROMBITSKY

Following the break-up of the Soviet Union a vast number of rivers and reservoirs spread over an enormous area acquired transboundary status, while the newly formed States, lacking experience of independence and the traditional responsibilities, found themselves confronted at that moment by countless problems of a financial, economic, social, cultural, religious and environmental kind. In view of the established practice inherited from the USSR of placing problems of environmental conservation towards the bottom of the list of governmental priorities, it is not surprising that over the past 13 years virtually the entire CIS region has lagged far behind the other regions of the world in the resolution of issues connected with the determination of approaches, adoption of legislation, and provision of institutional support for the sustainable use of the resources of transboundary watercourses and other waters.

The traditional priority of the use of the waters of the post-Soviet space is to guarantee the supply of water for industrial and household purposes, farm irrigation, and hydroelectric power production. All other uses (supporting the functioning of water and water-related ecosystems, maintaining biological and landscape diversity, fisheries, etc.) are generally disregarded or considered to an absolutely insignificant degree. However, such an approach is far more demanding than it may appear for the economy of each of the riparian States if one adds up the values of revenues not received in full from the expenditure of biological and landscape resources when water resources are used without regard to environmental requirements.⁵⁸

In the overwhelming majority of cases such an approach is consistent with the agreements on transboundary rivers and other waters already concluded between the newly independent States (NIS). In most cases these agreements do not cover a whole river and its basin but only those sections which serve as a frontier or are directly adjacent to a frontier. Very often they relate to two or more rivers or bodies of water at once and regulate water use on those sections which are contiguous with a frontier. The inter-State body responsible for applying a transboundary agreement may take the shape either of a commission or some other forum of the representatives of the Governments concerned. In either case, commissions and working groups do not as a rule include representatives of all the stakeholders and very rarely representatives of the public at large. Not a single transboundary body of water or watercourse in the NIS region is regulated today in accordance with an agreement ratified by the parliaments of the States concerned; the present degree of priority assigned to this problem may accordingly be described as low.⁵⁹

Rivers Wisely: Lessons from WWF's work for integral river basin management". WWF International, 2003; A. Lambert. "Economic valuation of wetlands: an important component of wetland management strategies at the river basin scale. 2003. www.ramsar.org/features_econ_val1.htm.

⁵⁹Proceedings of the meeting on transboundary water cooperation in International Lakes. UNECE, Madrid, 26-28 November 2003. MP.WAT/2003/7. <http://www.unece.org/env/documents/2003/wat/mp.wat.2003.7r.pdf>; N. Grishin, "Legal and environmental aspects of transboundary problems". Ecoterra, 2003. the newly independent States. Document of the third

⁵⁸Jones T., B. Phillips and C. Williams. "Managing

Since in the Soviet Union the water ministries and agencies were traditionally powerful and commanded very substantial budgetary resources, it was fairly usual practice, even in new situations, for them to be entrusted with the basic coordination of transboundary water cooperation, without regard to changed economic circumstances or to the functions of these ministries and agencies.

The nature of the training received by decision-makers must be acknowledged as quite an important reason for the lack of progress in the development of methods of efficient management of transboundary watercourses and other waters. As a rule, managerial training at all levels has disregarded the integral environmental component of the solution of environmental problems as an independent component for the purposes of the adoption and implementation of the Government's programmatic instruments. On the other hand, the ecologists in the post-Soviet space are usually biologists and forestry experts who have not had very much training in economics. This is often the explanation for the lightweight and to a significant degree primitive attitude of decision-makers to problems of the use of the water and other resources of rivers and bodies of water, including those which have acquired transboundary status.

Using the experience of groups of countries and of regions the international community has moved far ahead in devising effective means of managing the whole complex of the natural resources of rivers and bodies of water (*1992 Helsinki Convention and 1997 New York Convention*, to which the *Ramsar Convention of 1971* is closely related). Since most of the countries of the NIS region are parties to the Helsinki and Ramsar Conventions, there is an obvious need to intensify and institutionalize the cooperation among the national agencies charged with the application of these two instruments within their countries and at the international level, for the situation today is far from satisfactory in this respect as well. These agencies are often dispersed and dispute-riven - a situation which complicates the harmonious resolution of issues of water use and basin

management of rivers and bodies of water. The international instruments, which set out the basic principles of the sustainable management of transboundary watercourses and bodies of water, have generally remained dead letters in the NIS region and have been applied only rarely and spasmodically.

However, the desire to perpetuate the existing state of affairs without making a situation analysis in order to identify the reasons for the general deterioration in the condition of a river or body of water as a result of increased water use and for the degradation of ecosystems and the decline in the living standards of local communities and to adopt and apply effective legal and institutional mechanisms for cooperation between both agencies and States can lead and is already leading to social and inter-State conflicts whose consequences in terms of the damage done can far exceed the cost of agreed and efficient watercourse management.⁶⁰ On the other hand, the sooner the acknowledged international instruments on sustainable water use and water resource management and the relevant methodology are studied and applied over the vast expanse of the NIS region, the bigger than expected will be the direct and indirect impacts in the social, economic and environmental spheres.

The river Dniester may be regarded as a typical example of a watercourse in the NIS region: it is 1,352 km in length and has an annual discharge of 8-10 km³; it rises in the Ukrainian Carpathians (Lvov oblast) and flows through Moldova before returning to Ukraine in its lower reaches to the west of Odessa. The river basin has an area of 72,100 km² and is home to more than eight million people, while over a million inhabitants of Odessa take their entire drinking water supply from the river. Thus nature and history have created a generally favourable situation for even-handed cooperation within the river basin, for none of the parties has an interest solely in the lower or solely in the upper part of the river, and the small size of the lower Ukrainian section is offset by the importance of its role.

Conference of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and Internationals ILakes

⁶⁰Wolf A. T., S. B. Joffe and M. Giordano, "International waters: identifying basins at risk". Water Policy, 2003, Vol. 5.

The Helsinki Convention stipulates the obligation of the Parties to conclude bilateral and multilateral agreements and set up joint bodies to regulate their shared watercourses (art. 9). Accordingly, while the confirmation in the international law of the non-navigational uses of transboundary watercourses of the principle of concluding ad hoc agreements on regulation of the regimes of individual watercourses may indeed be open to doubt, for Moldova and Ukraine such an obligation stems directly from the Helsinki Convention, to which they are parties (Moldova since 1994 and Ukraine since 1999).

Moldova and Ukraine signed their intergovernmental *Agreement on the joint use and protection of cross-border waters* in 1994. This instrument establishes the principle of representation by Plenipotentiaries, who were appointed by the heads of the State water management agencies. Pursuant to article 15 each Party must also appoint two deputy Plenipotentiaries (in Moldova they also represent the water agency). The Agreement regulates frontier waters, i.e. the parts of rivers and other surface watercourses along which the State frontier passes, and surface water and groundwater in places crossed by the State frontier (art. 1). Thus from the outset the Agreement does not use a basin approach to each watercourse.

It does stipulate that the Parties must not engage without prior agreement in water management applications which may result in alteration of the state of bodies of water (their depth, water levels, volume and water quality) or cause damage to reservoirs, fisheries, land, buildings or other objects of material value or precipitate a sudden change in a water regime or principal channel or give rise to difficulties in the use of a shared channel for navigation, or in other violations having similar consequences for the common interests. This applies equally to measures for protection bodies of water against pollution or for monitoring of the water, which means the prevention, limitation and control of the discharge into them, either directly or indirectly, of solid, liquid or gaseous substances, radionuclides or energy which may impair the composition or quality of frontier waters as determined by the

indices approved by the Parties (art. 2).

In pursuit of these goals the competent bodies of the Parties have an obligation under article 3 of their Agreement to:

- Ensure the appropriate technical maintenance of the water regulation and protection facilities and the flood prevention installations of frontier water systems;
- Conclude agreements on the operation of water regulation facilities and plans for water protection and water management measures and provide priority funding for them;
- Inform each other of the implementation of measures having an impact on the composition or properties of frontier waters, give notification of accidents, and hold consultations on these matters;
- Ensure the systematic conduct of hydrometeorological observations on frontier waters;
- Formulate joint plans for the integrated use and exploitation of water resources or water balances in the light of the quality of frontier waters;
- Carry out, when necessary, water protection and water management measures;
- Cooperate on the design of methods and technology for the prevention of water pollution and its harmful effects and for the rational use of water resources;
- Take steps to maintain reservoir levels in order to guarantee optimum schedules for drinking-water and fisheries supply and for maintenance of the biological diversity of ecological systems;
- Assess the status of biological resources and fix catch locations and quantities for the bodies of water under the jurisdiction of the Contracting Parties.

The Agreement stipulates the necessity of joint monitoring, to be achieved through the drafting and adoption of a single programme of measurements and unified analytical techniques, together with methods of situation analysis and monitoring of changes in water quality. In exceptional cases of frontier-water pollution the Parties must immediately notify each other and take steps to

eliminate the source of the pollution and reduce the harm caused by the incident. Each Party must independently prepare draft measures for the protection and economic exploitation of frontier waters in its territory and then submit them for agreement by the other Party.

The competent bodies of the Contracting Parties must systematically, in accordance with established procedures and in agreed quantities, attend to the exchange of hydrometeorological data and hydrological forecasts and notify each other in good time of the formation of ice, sharp rises in the level of frontier waters above the current level, and the shutdown of water management installations. The competent bodies must carry out agreed fishery protection measures on frontier waters, each in its own territory (art. 12). For the purpose of examining problems connected with the application of the Agreement the Plenipotentiaries must hold meetings, once a year as a rule; but extraordinary meetings may be convened when necessary.

Each Plenipotentiary must have a secretary, who will have the following duties:

- Preparation of documents and other materials for the meetings of the Plenipotentiaries;
- Reporting on and supervision of execution of the work and implementation of decisions;
- Production of draft records of the meetings of the Plenipotentiaries;
- Performance of other tasks assigned by the Plenipotentiaries.

Judicial disputes relating to the interpretation or application of the Agreement which cannot be resolved by the Plenipotentiaries must be submitted for consideration to the competent bodies of the Contracting Parties (art. 18). It appears that the existing Agreement has a number of shortcomings which are responsible to a significant extent for the stagnation of the efforts to make effective and sustainable progress towards stable management of the Dniester's natural resources. As a minimum, the following omissions from the text of the Ukrainian-Moldovan Agreement, which were by the way permitted even after the arrival of the Helsinki Agreement, must be ranked among those shortcomings:

- The Agreement fails to take a basin approach to the regulated watercourses, and the work of the inter-State agencies responsible for each watercourse (meetings of commissioners) has not made tangible progress or has achieved only agreements in principle;
- Other governmental agencies, in particular the environment and hydroelectric power ministries, regional and local authorities, and representatives of the public have not been invited to participate with the right to vote; the result is the absence of an integrated approach and a failure to take the interests of all water users into account. The natural outcome of this situation is that no progress has been made towards improvement of the Dniester's environmental status over the nine years since the signature of the Agreement;
- The decision-making structure - the annual meetings of the Plenipotentiaries and in the intersessional periods the work of each country's Plenipotentiary and his secretary (in practice all of them represent one agency) - is ineffective, for none of these persons is a free agent; instead they represent the interests of their own agency, if not of the State as a whole;
- The need to consider environmental requirements and the preservation of ecosystems occupies a subsidiary position in the Agreement: it is barely stipulated and in fact almost nothing is done about it; for example, in both States poaching has assumed industrial proportions and fish resources have become more seriously undermined than ever;
- There is no reflection in the Agreement of the need to extend protection to wetlands, which perform a multitude of important functions, including their role as providers of an inexpensive means of treatment of the water flowing into the sea. Both States find it difficult to take decisions to extend protection to stretches of the lower Dniester;
- The vagueness and mildness of the judicial proceedings available if one Party fails to fulfil its obligations are a disincentive to

prosecution by the other Party.

The ineffectiveness of the chosen approach, which was apparent even by the late 1990s, and the continuing degradation of the Dniester's ecosystem⁶¹ pointed to the need, on the one hand, to pool stakeholders' forces in the quest for the best possible solutions and approaches and, on the other hand, to improve the legal and institutional arrangements for the management of the river's resources. The principal movers were the region's scientific community and non-governmental environmental organizations. For example, international conferences on the topic "Environmental and economic problems of the Dniester"⁶² were held in Odessa in 1997 and 2000, while meetings on the topic "Conservation of the biological diversity of the Dniester basin"⁶³ were held in Chisinau in 1998 and 1999. In 1999 the basin's non-governmental organizations formed the International Environmental Association of River Keepers (Eco-TIRAS). A *draft convention on the conservation of landscape and biological diversity and the rational use of the natural resources of the Dniester basin* was produced and submitted for discussion; it takes account of the experience of transboundary cooperation in the European countries and other regions of the world.⁶⁴ The purpose of this instrument is to establish the principles of basin and integrated approaches in decision-making by all the stakeholders through the creation of a Dniester commission and convention secretariat.

⁶¹ T. Sharapanovskaya, "Ecological problems of the middle Dniester". Kishinev. BIOTICA, 1999.

⁶² "Environmental and economic problems of the Dniester." Papers presented at the International Scientific and Technical Seminar, Odessa, 18-19 September 1997. Odessa, 1997; "Environmental and economic problems of the Dniester." Papers presented at the International Scientific and Technical Seminar, Odessa, 25-28 September 2000. Odessa, 2000.

⁶³ "Problems of the conservation of the biological diversity of the middle and lower Dniester." Papers presented at the International Conference, Kishinev, 6-7 November 1998. Kishinev, BIOTICA, 1998; "Conservation of the biological diversity of the Dniester basin." Proceedings of the International Conference, Kishinev, 7-9 October 1999. Kishinev, BIOTICA, 1999.

⁶⁴ Iu. Trombitcaia, "Transboundary cooperation of Moldova and Ukraine on the Dniester Draft Convention". Journal of Environmental Law and Litigation, University of Oregon, 2002, Vol. 17.

The draft Dniester convention provides for the creation of a commission as the technical body; its membership will consist of highly qualified experts from the two countries and it will be empowered to adopt conclusions and decisions of a recommendatory nature. It also provides for the establishment of a conference of the parties, at which senior officials would be able to make the commission's recommendations binding, and for a secretariat to coordinate the work of the commission and the conference. Given a sensible approach and provided that account is taken of the experience of the operation of similar bodies in Europe, these arrangements will not create a bureaucracy, for all the members of the commission will continue to perform their duties as institution or laboratory heads and in the commission they will merely have an additional forum, lacking at present, for the coordination of activities.

A further mechanism provided for in the draft convention is a procedure for notification and consultation on planned activities which may have a substantial impact on the status of a watercourse in the territory of the other State. The inclusion of such a procedure in the convention will guarantee its effectiveness, especially as it also addresses many of the details of the notification and consultation arrangements which Moldova and Ukraine are required to make under the *UNECE Convention on the Protection and Use of Transboundary Watercourses and International Rivers* (1992) and the *Convention on Environmental Impact Assessment in a Transboundary Context* (1991).

The draft convention includes a dispute settlement procedure. As one possible option for today it posits the institution of proceedings before the United Nations International Court of Justice by either party, following the exhaustion of all other means of dispute settlement, as well as the option of unilateral submission of the dispute to arbitration. The draft text was analysed in detail at the international conference organized in Odessa by the Ukrainian non-governmental organization MAMA-86-Odessa and the International Environmental Association of River Keepers (Eco-TIRAS), in which an active part was played both by representatives of the environmental

protection agencies of Moldova, Ukraine and the Trans-dniester region and by Ukrainian and Moldovan NGOs. Further work was then done on the draft text by Moldova's Environment Ministry before it was submitted to Ukraine for approval.

In February 2003 the President of Moldova issued a decree on the initiation of negotiations with Ukraine on the question of concluding the convention. At the same time, a start was made on the conservation of the wetlands of the lower Dniester, where the proposal is to establish national parks on both sides of the river, with the possibility of their merger into a "Lower Dniester" transboundary biosphere reserve. Unfortunately, both processes are proving difficult despite their evident associated benefits for the region's population and environment; this situation is typical of the whole NIS region. However, it is considered that on the whole Russia's successful experience of establishing cooperation on transboundary watercourses and bodies of water is due to a significant degree to the transfer of the management of water and other natural resources to the Environment Ministry.

Such a move is not apparent in Moldova or Ukraine; on the contrary, the tendency is to strengthen the positions of the water management agencies in each country. For example, in 2003 the Moldovan Parliament approved an *Outline of national policy in the field of water resources* which, while referring to the need for a basin approach and the involvement of water-user bodies in decision-making, together with the need for pragmatic transboundary cooperation, still singles out the monopolization of the management of water resources and the associated funding as its principal purpose.⁶⁵

It should be noted that the defects of the Moldovan-Ukrainian Agreement, concluded nine years ago, have continued to be reproduced in recent years in the agreements concluded among the countries of the NIS region. It is therefore

thought that the international monitoring of the situation in the region, including monitoring under the "Environment for Europe" process and the EU Water Initiative should not be confined merely to the listing and reporting of the agreements concluded but should also analyse their quality and effectiveness in the light of their compliance with the principles of integrated river basin management. It is important to incorporate in the instruments under preparation the provisions of the *Guidelines for allocation and management of water for maintaining the ecological functions of wetlands*, adopted at the eighth Conference of the Parties to the Ramsar Convention (resolution VIII-1, Valencia, 2002).

It is also seen as useful to upgrade such instruments to the status of instruments requiring ratification by the parliaments of the signatory countries in order to secure due respect for them and parliamentary monitoring of their application.

Thus, it is still a long road to the practical realization of a basin and integrated approach to water and associated resources in the NIS region. Of course, what is needed in addition to the revision of the institutional approach is a demonstration of the political will for effective cooperation among all the basin States, which might be facilitated by a more principled and concerned attitude on the part of international donors. What is happening in the countries along its borders should not be a matter of indifference to the European Union: having an existing instrument - the Water Framework Directive - and the necessary experience it could exercise an influence on the conduct of a distinct water policy, at least in the States adjoining the EU, in order to prevent possible conflicts over transboundary watercourses. Both the involvement of the public in issues of water use and management of transboundary watercourses, including through the establishment and consolidation of NGO basin associations, and the enhancement of the role and influence of local authorities and their associations must also play a part as major determinants of progress.

This paper was written under a project supported by the John D. and Catherine T. MacArthur Foundation; grant No. 03-77829-000-GSS.

⁶⁵Decision of the Parliament of the Republic of Moldova "On approval of the Outline of national policy in the field of water resources", No. 325-XV dated 18 July 2003. Official Journal of the Republic of Moldova, No. 191-195, 5 September 2003.

ISSUES OF INTERNATIONAL COOPERATION ON THE PROTECTION AND USE OF TRANSBOUNDARY WATERS IN THE WORK OF THE CIS INTER-STATE ECOLOGICAL COUNCIL

S. TIKHONOV, T. BUTYLINA AND B. MOROZOV

One of the first international instruments produced by the Commonwealth of Independent States (CIS) was the Agreement on cooperation in the field of ecology and environmental protection, adopted by the heads of Government of the CIS member States on 8 February 1992. This Agreement led to the establishment *inter alia* of the Inter-State Ecological Council (IEC), of which most of the CIS States are members. For the purpose of addressing the tasks assigned to it the IEC established working groups on its basic areas of activity, including coordination of its cooperation with international organizations and the problems of water resource use and protection.

It must be pointed out that, in terms of its environmental problems, the CIS region has a degree of uniformity, and not just as a result of its common history and the similar or related first causes of a number of these problems and the similarity of the approaches taken to their solution. Such problems are present in the region to a lesser degree or to the same degree as in neighbouring States. The CIS member States, in particular the Russian Federation, possess up to a quarter of the world's total area of natural land ecosystems, which play a very important role in maintaining the stability of the global environment. They also possess up to a quarter of the world's forested land and almost one half of its marshes and swamps.

Most of the region's environmental problems were inherited from Soviet times and they have been aggravated by processes of radical social, economic and political change occurring in the era of the newly independent States. It is typical that two of the five most serious disruptions of natural

ecosystems⁶⁶ in the territory of the present CIS are connected with the use of water resources; in today's circumstances the aftermath of these disruptions may be considered in a transboundary context. The first example is the construction of the Volga-Kama cascade of reservoirs, which turned the Volga into an artificial reservoir, facilitated the accumulation of pollutants in the bottom deposits of the reservoirs, and sharply reduced stocks of sturgeon and other living resources. The second example is the construction of large-scale irrigation works under the project to establish a proper basis for the cultivation of cotton in Central Asia, which caused the Aral Sea environmental disaster: the virtual elimination of the river flow into the Aral Sea, the creation of an extensive area in which the surface water and groundwater are polluted with pesticides and fertilisers, and the disruption of the natural ecosystems.

Furthermore, the Global Environment Outlook produced in 2002 by the United Nations Environment Programme included among the world's environmental problems the over-exploitation of a large part of the resources of the its surface water and groundwater, which serve as the main sources of water for irrigation of farmland and for public and industrial uses, as well as providing a means of disposing of wastes and pollutants. As a result, an increasing number of countries are confronted with the problem of water deficits or shortages. Up to 20 per cent of the

⁶⁶The other adverse consequences of a similar scale include the development of virgin land, the exploitation of the oil deposits of western Siberia, and the Chernobyl disaster.

planet's population suffers a deficit of potable water and some 40 per cent live in unhealthy and unhygienic conditions, while three to five million people die every year from diseases related to water quality. A deficit of fresh water and a deterioration in its quality are also singled out as fundamental regional environmental problems, together with an increasing incidence of drought on the one hand and of flooding on the other. This points to the necessity of widespread international cooperation on the problems of the protection and use of water resources, including the transboundary aspects.

The *Agreement on Cooperation between the Inter-State Ecological Council (IEC) and the United Nations Environment Programme (UNEP)*, which sets out the fundamental principles of cooperation for protection and improvement of the environment was signed as long ago as August 1994. This Agreement specified the following matters as the basic cooperation issues:

- Methodology and the legal basis of environmental management;
- Assessment of the state of the environment;
- Formulation of an integrated approach to planning the management and use of natural resources;
- Rational use and protection of transboundary waters. Particular attention was given to the ecosystems of the Caspian Sea with the Volga delta and the Black Sea with the Danube delta.

The IEC took steps to implement the 1991 Convention on Environmental Impact Assessment in a Transboundary Context and the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (the Water Convention), which had been drafted with the active collaboration of UNECE. It produced guidelines on the regulation and use of transboundary watercourses and bodies of water and the Agreement on the fundamental principles of cooperation on the rational use and protection of transboundary waters (adopted at the ninth session of the IEC in December 1998), which has entered into force.

Transboundary watercourses and bodies of water are natural "canals" for spreading the effects

of the implementation of economic projects. Transboundary river basins are becoming accumulation systems for such effects. There is thus an obvious interrelationship between the provisions of the Water Convention, the Environmental Impact Convention and the Convention on Persistent Organic Pollutants (POPS), article 11 of which provides in fact for appropriate action at the national and international levels to research and monitor POPS in the environment, and the other conventions on the protection of natural resources. The existence of these instruments provides a specific basis in international law for the development of the integral management of transboundary water resources and river basins, international lakes and regional seas.

The importance of the development of international cooperation for the protection and rational management of transboundary waters in the work of the IEC was confirmed by the adoption at its tenth session in 1999 of a statement on the declaration of 2003 as the International Year of Freshwater and on its support for the initiative of the President of the Republic of Tajikistan proposed at the fifty-fourth session of the United Nations General Assembly.

This work was reinforced by the implementation by the International Projects Centre of IEC-backed UNEP projects in this field. They include the project "Developing a harmonized approach to environmental legislation in the CIS countries", under which proposals were made in 1998-2000 for the improvement of environmental protection legislation, including water legislation, and methods were agreed for incorporating an environmental component in other areas of the legislation of Armenia, Belarus and the Russian Federation.

The aim of the project "Formulation of proposals for improvement of the environmental impact assessment process in the adoption of environmentally oriented decisions applicable to the CIS countries" (1999-2002) was to draft "Guidelines on environmental impact assessment for the CIS member States". These Guidelines contain agreed recommendations on the special features of the environmental impact assessment of

installations having a transboundary impact, including installations located on the banks or close to the banks of transboundary rivers. A study was made of the transmission of pollutants by water (river currents, sea tides, groundwater flows) and changes in hydrological and hydrogeological regimes and hydrographic systems (within the affected transboundary basins). Further work was done on this problem, with a focus on the particular features of the Caspian Sea, at the seminar on "Capacity-building and the conduct of EIAs in a transboundary context in the Caspian Sea region" organized by UNEP in Moscow in November 2002.

Questions of the improvement of the integrated management of the water ecosystems of the Volga-Caspian region through the use of modern information technology in decision-making are among the main components of the UNEP project "Integrated environmental management in the Volga-Caspian region". This project was the context for the convening of a number of meetings of experts of the riparian States of the Caspian Sea, the conduct of specific case studies in the region, the drafting of agreed proposals and recommendations on the use of geo-information systems and remote-sensing data to improve the management of the marine and coastal ecosystems of the Volga-Caspian region, and the production of other documents.

Pursuant to decisions XII and XIII of the IEC sessions held in Yerevan in 2001 and St Petersburg in 2002 an international conference entitled "Thirty years with UNEP: results and prospects" was held in Moscow in December 2002. The purpose of this meeting was to discuss the results of international cooperation and determine common approaches to the development of international environmental protection cooperation among the IEC member States in the light of the decisions of the World Summit on Sustainable Development held in Johannesburg in 2002 and in the context of the preparations for the European conference of environment ministers held in Kiev in 2003. The Moscow conference recommended that the CIS member States should support the European East-West environmental partnership for sustainable development and the EU Water Initiative adopted at the World Summit on Sustainable Development. It also noted the need to

bolster the coordination of international environmental protection cooperation within the framework of the projects and programmes being carried out in the regions, including the ones on transboundary waters.

It seems obvious that in the course of its implementation the EU Water Initiative should use the regional experience gained by the IEC in the organization of cooperation and in the execution by the IEC member States of joint projects on the rational use and protection of transboundary waters, the integral management of water ecosystems, and the production of EIAs in a transboundary context.

The CIS member States are still faced with the important task of guaranteeing the high quality of stocks of drinking water and sound health and hygiene conditions. In this connection the implementation of the Water Convention and the other international agreements addressing this problem depends to a large extent on national legislation and standards on the protection and use of water resources.

In the context of this paper it is considered appropriate inter alia:

- To study the special features of the EIA procedure in its application to the transboundary basins of the CIS region and to prepare corresponding recommendations (on the basis of the Environmental Impact Convention);
- To analyse the application (implementation experience) of the provisions of the principal global and regional environmental protection conventions in the transboundary basins of the CIS region and to draft proposals for improving the legal basis of the integral management of the waters in question;
- And - in the longer term - to examine these problems in the context of the interrelationship between transboundary basins and regional seas such as the Baltic, Black and Caspian seas.

The conduct of the proposed research and discussions under the aegis of UNECE, with the support of the CIS Inter-State Environmental Council and with appropriate international cooperation, would facilitate the formulation of an

effective legal basis for the integrated management of the region's transboundary water resources and ecosystems within the context of the

implementation of water resource projects of the European East-West environmental partnership for sustainable development.

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