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Monitoring and Assessment and the duty of cooperation under the Water Convention: exchange of information among the riparian parties

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Introduction

A comprehensive assessment, comprising the whole transboundary water system - using consistent methods is necessary for reaching a good understanding of its status and the pressures exerted upon it. In transboundary basins, working towards a common understanding implies harmonizing methods of assessment and sharing of information between the riparian countries. This provides a solid basis for identifying appropriate management measures for sustainable management and protection of the whole transboundary water system.

One of the main objectives of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) is the prevention and control of significant adverse effects on the conditions of transboundary waters, namely the natural environment (flora, fauna, soil, landscape etc.), human health and safety or physical structures[2]. Monitoring and assessment systems set up according to the provisions of the Water Convention serve to verify that there are no such adverse effects caused by human activity. The UNECE Water Convention places a number of obligations upon Riparian Parties related to joint or coordinated monitoring and assessment of transboundary waters, and the exchange of information.

Since its adoption in 1992, the Water Convention has provided a framework for developing guidance for monitoring transboundary waters. A plethora of guidelines, model provisions and studies have been produced under its auspices. Various capacity building seminars and workshops, e.g. a series of so-called “Monitoring Tailor-made conferences”, have been organized to promote monitoring cooperation. The guidelines and the capacity building work have contributed significantly to the transboundary cooperation in assessing the status of the shared waters in the pan-European region. They have also helped in improvement of the monitoring of waters in Eastern and Central Europe which was a pre-requisite to meeting the EU requirements.

[1] The views expressed in this article are those of the authors and do not necessarily represent the views of the United Nations or its Member States.

[2] For the full definition, article 1 (2) of the UNECE Water Convention should be referred to.

This chapter offers an overview of obligations related to monitoring and assessment as well as to exchange of information contained in the UNECE Water Convention. It provides a reflection on the effectiveness of the various activities that have been put in place pursuant to the Convention in order to support its implementation.

Obligations related to monitoring and assessment, and exchange of information in the Convention

Article 2(6) of the UNECE Water Convention sets out a general obligation by which States must cooperate on the basis of equality and reciprocity. The provisions related to the exchange of data and information (Article 13 of the UNECE Water Convention), and joint monitoring (Article 11 of the Water Convention) can be viewed as more specific requirements pursuant this general obligation to cooperate. A key instrument in the implementation of Articles 11 and 13 of the UNECE Water Convention is the requirement that Riparian Parties enter into joint arrangements and establish joint bodies relating to their transboundary waters (Article 9). The collection and exchange of information, and joint monitoring are considered as key tasks of any joint body.

More specifically, these tasks involve the identification and inventorying of pollution sources (Article 9(2)(a)&(c); the elaboration of joint monitoring programmes concerning water quality and quantity (Article 9(2)(b), emission limits for waste water (Article 9(2)(d), and joint water quality objectives and criteria (Article 9(2)(e); the development of concerted action programmes (i.e. joint management) for the reduction of pollution loads (Article 9(2)(f); the establishment of warning and alarm procedures (Article 9(2)(g); to serve as a forum for the exchange of information on water uses (Article 9(2)(h); to participate in the implementation of environmental impact assessments relating to transboundary waters (Article 9(2)(j)); and to promote cooperation on the best available technology (BAT) as well as of research cooperation (Article 9(2)(i)).

Pursuant to Article 11 of the UNECE Water Convention, the above-mentioned joint monitoring programmes are to cover the conditions of transboundary waters, including floods and ice drifts, and transboundary impacts; and the Riparian Parties must agree on the relevant pollution parameters to be monitored (Article 11(1)&(2)). Article 11(4) also details the aspects of monitoring for which rules need to be harmonised amongst Riparian Parties. These include the rules for the setting up and operation of monitoring programmes, measurement systems, devices, analytical techniques, data processing and evaluation procedures, and methods for the registration of pollutants discharged.

It should also be noted that the elaboration of water quality objectives and criteria is the key to the concrete assessment of the "threshold" for determining "significant adverse effect" (UNECE 2013)[3]. Article 3 (3) of the UNECE Water Convention stipulates that each Party shall define, where appropriate, water-quality objectives and adopt water-quality criteria, and annex III provides general guidance to that end.

Drawing on the various guidelines developed pursuant to the UNECE Water Convention, some basic elements of joint monitoring and assessment programmes that should be jointly agreed

[3] Other legal frameworks may specify water-quality objectives more explicitly, as is the case with the European Union's Water Framework Directive(WFD): Council Directive (EU) 2000/60/EC establishing a framework for Community action in the field of water policy (23 October 2000).

upon by the Riparian Parties can be listed as minimum requirements to comply with the provisions of Article 11(3). These are as follows: (a) objectives to be achieved and information gaps, (b) identification of monitoring sites, (c) selection of determinands (for surface water, groundwater etc.), (d) sampling frequency, (e) sampling and analytical methods, control of laboratory performance, (f) data management, (g) method of data assessment, (h) presentation and publishing of results and (i) analytical quality control and inter-calibration.[4]

The obligation for the Riparian Parties to carry out, at regular intervals, joint or coordinated assessments of the conditions of transboundary waters and the effectiveness of measures taken for the prevention, control and reduction of transboundary impact (essentially water protection at large) is also the basis for the regional assessments carried out under the Convention.[5]

The scope of exchange of information between the Riparian Parties - referred to in Article 9(2) - is described (non-exhaustively) in Article 13(1-2) to include data on the conditions of transboundary waters, experience on BAT and research results, emission data, measures taken and planned to be taken to prevent, control and reduce transboundary impact, permits or regulations for wastewater discharges, and national regulations. These are the minimum requirements but the Convention generally encourages the Riparian Parties to continuously expand the range of information to be exchanged.

Article 13(3) also obliges a Riparian Party, when requested by another Riparian Party to 'endeavour' to provide data or information that is not available. The article mentions a possibility of setting as a condition reasonable charges that are incurred through the collection, and possible processing, of such information. In addition, although rarely applied, Article 8 of the Convention, provides that, in accordance with national legal systems and any supranational regulations, some information may be subject to protection on the grounds of industrial and commercial secrecy, including intellectual property or national security.

Development of guidelines

In order to support implementation of the aforementioned provisions on monitoring and assessment, guidelines on monitoring and assessment were prepared by the Task Force on monitoring and assessment, which was one of the bodies set up by the Working Party on Water Problems (entrusted with the implementation of the UNECE Water Convention when its entry into force was pending).[6] As a result of this work, the Guidelines on Water Quality Monitoring and Assessment of Transboundary Rivers were issued, together with supporting technical reports, in 1996.[7] These initial guidelines were complemented by the publication of the Guidelines on

[4] For example, UNECE, *Guidelines on water quality monitoring and assessment of transboundary rivers* (United Nations 1996);UNECE, Guide to Implementing the Water Convention (United Nations, 2013).

[5] UNECE, *First Assessment of Transboundary Rivers, Lakes and Groundwaters* (United Nations 2007); UNECE, *Second Assessment of Transboundary Rivers, Lakes and Groundwaters* (United Nations 2011).

[6] Document MP.WAT/1997/2 of the First meeting of the Parties to the Water Convention. UNECE, ''Water-related activities of ECE before the entry into force of the Convention' (27 March 1997); UNECE, Senior Advisers to ECE Governments on Environmental and Water Problems, 'Report of the resumed fifth session' (20 March 1992), ECE/ENVWA/24/Add.1.

[7] UNECE, *Guidelines on water quality monitoring and assessment of transboundary rivers* (United Nations 1996)

Monitoring and Assessment of Transboundary Groundwaters and four technical (background) reports on groundwaters in 2000. [8]

In the 1990s, the guidance work under the Convention focused on water quality. For example on biological assessment methods, the development of guidelines involved an international state-of-the-art review, a survey of practices in the ECE countries using a questionnaire and finally, the preparation of recommendations.[9] In the early 2000s, a strategy for the assessment of transboundary waters together with a set of revised, more comprehensive technical guidelines for different kinds of transboundary waters — rivers, lakes and groundwaters — were developed.[10]

The catchment area concept is among basic principles that are found in the UNECE Water Convention, which applies to surface waters and groundwaters alike and also makes a link to recipient seas. An integrated approach to managing surface waters and groundwaters is also explicit in the legally non-binding Model Provisions on Transboundary Groundwaters (2012)[11] which are meant for application by the Parties in developing their specific agreements.[12] Due to this integrated approach, the series of guidelines developed covers different types of waters (as illustrated by the list of guidelines below), taking into account their characteristics. According to the ecosystem approach to water management —an integral part of the Water Convention — which the guidelines have as basis, the various components of the aquatic and riparian ecosystems supported by the water system in the catchment area of a transboundary river are also taken into account.[13]

The revision of the guidelines for transboundary rivers in 1998-2000 was made in order to reflect the new strategic and scientific developments and to take into account the considerable experience gained in monitoring and assessment under the Convention[14]. The (revised)

[8] UN/ECE Task Force on Monitoring &Assessment *Guidelines on Monitoring and Assessment of Transboundary Groundwaters* (RIZA 2000).

[9] UN/ECE Task Force on Monitoring & Assessment, *Volume 3: Biological assessment methods for watercourses* (Ministry of Transport, Public Works and Water Management & RIZA Institute, 1995; RIZA report 95.066).

[10] UNECE Strategies for Monitoring and Assessment of Transboundary Rivers, Lakes and Groundwaters (United Nations 2006); The box can be referred to for the revised guidelines.

[11] Adopted by the sixth session of the Convention's Meeting of the Parties.as presented in document ECE/MP.WAT/2012/L.5: UNECE, 'Draft model provisions on transboundary groundwaters' (14 September 2012); published as UNECE, *Model Provisions on Transboundary Groundwaters* (United Nations 2014).

[12] By providing more details on the factors to be taken into account in monitoring groundwaters, the Model Provisions on Transboundary Groundwaters and the guidelines on groundwater illustrate how the "soft-law" instruments linked to the Convention reflect the specificity of different waters. The commentary to the Model Provisions drawing on, for example, the EU Water Framework Directive, specifies a number of parameters specific to groundwaters, such as aquifer geometry, aquifer vulnerability, the recharge rates, its interaction with surface waters and its hydrogeological characteristics.

[13] UNECE, 'Guidelines on the ecosystems approach in water management' In *Protection of Water Resources and Aquatic Ecosystems* (1993) ECE/ENVWA/31; UN/ECE Task Force on Monitoring & Assessment, 2000. *Guidelines on Monitoring and Assessment of Transboundary Rivers* (RIZA 2000) (First review of the 1996 Guidelines on Water-quality Monitoring and Assessment of Transboundary Rivers)

[14] UN/ECE Task Force on Monitoring and Assessment, Guidelines on Monitoring and Assessment of Transboundary Rivers (RIZA, 2000)

guidelines/the strategy recommended an approach where monitoring and assessment is seen as a chain of activities which form a logical sequence, starting from identifying the relevant water management issues to specifying the associated information needs.[15] This was promoted in the pilot projects.[16] As a further illustration of the attention paid to implementation, the Parties to the Water Convention decided already at their second meeting (The Hague, 23-25 March 2000) that Riparian Parties should "report jointly, preferably through their joint bodies… on their experience with the implementation of the guidelines [on monitoring and assessment of transboundary rivers and on transboundary groundwaters]".[17]

Pilot projects

Following the adoption of the guidelines on water quality monitoring and assessment of transboundary rivers in 1996, the Task Force on Monitoring and Assessment decided to set up a series of pilot projects.

The establishment of the pilot projects on transboundary rivers sought to support countries by demonstrating the application and implementation of the guidelines, as well as providing means to learn from the experience, and where necessary, subsequently review the guidelines. The pilot projects also had wider objectives, such as initiating or improving bilateral and multilateral cooperation, building capacity and preparing effective, efficient and sustainable monitoring and assessment programmes.[18] The pilots[19] had an important function in disseminating the guidelines, responding to needs highlighted by the pilot projects, and most guidelines were made available also in Russian to promote their wide adoption. The guidelines were also a way of transferring experience from the EU countries to other ECE countries. The Central and Eastern European countries preparing for EU accession in the early 2000s that were particularly keen to participate in the river pilot projects, had derived benefit from their implementation that proved particularly useful in the EU accession process. Therefore, a number of pilot projects had included among their objectives, supporting the approximation to European Union's environmental legislation or making the results comparable with water quality objectives under EU environmental legislation.[20]

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[15] UNECE, *Strategies for Monitoring and Assessment of Transboundary Rivers, Lakes and Groundwaters* (United Nations 2006)

[16] Working Group on Monitoring and Assessment under the UNECE Water Convention, *Mures/Maros, Report No. 3: Recommendations for Improvement of Monitoring and Assessment Activities* (RIZA 2003)

[17] UNECE, 'Report of the second meeting' [of the Parties to the Water Convention] (29 August 2000), ECE/MP.WAT/5

[18] For example, Working Group on Monitoring and Assessment under the UNECE Water Convention, *Mures/Maros, Report No. 3: Recommendations for Improvement of Monitoring and Assessment Activities (RIZA 2003)*

[19] The states involved in the first set of river basin pilot projects were Belarus, Czech Republic, Hungary, Poland, Romania, Slovakia and Ukraine.

[20] For example, the Bug. Task Force on Monitoring and Assessment under the UN/ECE Water Convention, Bug: Report No. 1, Inception Report (1998)

River pilot projects were carried out in six river basins, the Bug, Morava, Mures/Maros, Ipel/Ipoly, Latorytsya/Latorica and Uzh/Uh.[21] Basic components of the river pilot projects were 1) an analysis of monitoring and assessment needs, including specifying information needs according to a basin inventory, water quality survey, pollution source inventory and management issues and 2) developing recommendations and monitoring and assessment strategies based on evaluating the existing monitoring[22]. Hence for example, by identification of river-basin management issues and evaluation of legislation the pilot projects had a much wider scope than what is normally understood by monitoring and assessment activities. Among the major concerns that several of these basins had in common were, the need to expand the monitoring to biological parameters, implementation of revised legislation, training of local experts and improving data exchange especially in the case of emergency situations. [23]

The development and entry into force of the WFD coincided with the implementation of the pilot projects and influenced them. Overall, there is a close relationship between the UNECE Water Convention and the WFD: The European Commission ratified the Water Convention in 1995 and in the WFD it is stated that the WFD must contribute to the implementation of the UNECE Water Convention.[24] A number of pilot projects had objectives related to WFD. For example, the project on the Aggtelek-Slovenský Kras aquifer shared between Hungary and Slovakia had objectives of its joint characterization as a groundwater body according to the WFD and carrying out its vulnerability mapping.[25]

Experience from the pilot projects demonstrated satisfaction of the countries/Parties with the guidelines, but also allowed them to identify constraints and obstacles for their implementation, such as limited resources and missing institutions, low levels of cooperation in places, and unsatisfactory development of joint monitoring programmes.[26] Among the key findings from the pilot projects, was the need for a tailor-made approach to the settings and issues in the basins and

[21] The work is documented in a series of reports of the Pilot Project Programme Transboundary Rivers, published between 1998 and 2003. Other pilot projects originally identified, on the Tobol, Kura and Severski Donets, had different execution and funding arrangements, and were initiated later.

[22] The scope of the river pilot projects and the lessons learned from them are briefly summarized in document MP.WAT/2003/11/ for the Third Meeting of the Parties to the Water Convention. UNECE, 'Evaluation of the rivers pilot projects: Recommendations for future projects and lessons learnt for monitoring and assessment' (5 September 2003).

[23] For example the basins of the Ipel/Ipoly, Mures/Maros and the Morava, referred to in: Task Force on Monitoring and Assessment under the UN/ECE Water Convention, Latorytsya/Latorica, Uzh/Uh, Report No. 1 Inception Report (RIZA 1998)

[24] WFD (35)

[25] 'Transboundary Groundwater Karst Aquifer Aggtelek – Slovenský Kras: Joint Report No 2 and 3/Final Report' (Slovak Hydrometeorological Institute and Hungarian Ministry of Environment and Water, 2006)

[26] Document MP.WAT/2003/9 of the Third meeting of the Parties to the Water Convention. 'Experience with the Implementation of the Guidelines on Monitoring and Assessment of Transboundary Rivers and Groundwaters' (UNECE 2003) .

the necessity of 'step-by-step' implementation of improved monitoring and assessment.[27] A step-wise implementation could entail a gradual progress or expansion of cooperation/information exchange 1) from general appraisal to more precise assessment, 2) from exchanging information on methodologies to actually agreeing on a harmonized approach, 3) from assessment of status to pressures, impacts and measures needed and 4) extending sampling from border stations to the whole basin/aquifer.[28] In some pilot projects, the data exchange revealed the incomparability of the data, which underlined the necessity of exchanging information on methods. The pilot projects also encouraged looking upstream from the border stations for understanding the reasons for the observed changes.

A recent example of building on the water quality monitoring guidelines (UNECE 2000) is the project Water Quality in Central Asia, where guidelines targeted to Central Asia were developed.[29] In the framework of the project, joint assessments of transboundary waters were made and a monitoring pilot on the basis of the guidelines, approved by the countries, was implemented.

One example of a series of projects which have successfully supported cooperation in transboundary water management spanning over a broad range of topics, where monitoring and assessment and information management have been important components is the Dniester process. The cooperation between Ukraine and the Republic of Moldova — both parties to the Convention —reached an important milestone in November 2012 when the Treaty on Cooperation on the Conservation and Sustainable Development of the Dniester River Basin was signed. This experience demonstrates many challenges in collecting and handling monitoring data e.g. shortcomings in centralized data collection nationally, a territorial conflict hampering data sharing between some authorities. On the other hand, the Dniester projects also illustrate the value of tools such as joint sampling exercises and annual reports for exchanging information and data. (ENVSEC 2010)

Compared with the projects implemented in the 1990s and early 2000s, devoted to application of the monitoring and assessment guidelines in specific basins, the guidelines have in recent years been promoted by applying them as part of thematically broader projects on the ground.

[27] UNECE 'Evaluation of the rivers pilot projects: Recommendations for future projects and lessons learnt for monitoring and assessment' (5 September 2003) MP.WAT/2003/11

[28] UNECE. *Strengthening Water Management and Transboundary Water Cooperation in Central Asia: the Role of UNECE Environmental Conventions* (United Nations 2011), ; UN/ECE Working Group on Monitoring and Assessment, An inventory of transboundary estuaries and their current monitoring practices (Finnish Environment Institute, 2003)

[29] UNECE & CAREC, 'Development of regional cooperation to ensure water quality in Central Asia: Diagnostic Report and Cooperation Development Plan' (UNECE and Regional Environmental Centre for Central Asia, 2011), annex II.

The following guidelines have been developed under the Water Convention:

- Recommendations to ECE Governments on water quality criteria and objectives (March 1993)
- Guidelines on water-quality monitoring and assessment of transboundary rivers (May 1996)
- Guidelines on Monitoring and Assessment of Transboundary Groundwater, 2000 (March 2000)
- Guidelines on Monitoring and Assessment of Transboundary rivers (March 2001)
- Guidelines on Monitoring and Assessment of Transboundary and International Lakes: UNECE Working Group on Monitoring and Assessment (January 2002)
- Guidance to operation of water quality laboratories, UNECE Task Force on Laboratory Quality Management and Accreditation (September 2002)
- Strategies for monitoring and assessment of transboundary rivers, lakes and groundwaters (October 2006)
- Good Practice for Monitoring and Assessment of Transboundary Rivers, Lakes and Groundwaters (December 2006)

Joint monitoring, data and information exchange in the basin agreements modeled on the Convention or influenced by it

The provisions concerning joint monitoring and the exchange of data contained in agreements on transboundary waters that were signed, subsequent to the establishment of the Convention have commonly been modeled on it or have at least been influenced by it.

Supporting Riparian Parties in establishing such arrangements specific to their transboundary waters has been an important task of the Working Group on Monitoring and Assessment, and has also been an area where positive impacts can be seen. On the basis of their respective agreements, the Riparian Parties have developed different institutional settings for facilitating exchange of data. If appropriate bilateral or multilateral agreements are not in place yet, transboundary cooperation on data exchange can start e.g. through memorandum of understanding (MoU) between government agencies in the riparian countries. The Second Assessment lists a number of such inter-agency agreements from Central and Eastern Europe, between Romania and the Republic of Moldova, Belarus and Ukraine as well as Poland and Ukraine.[30] River commissions in the UNECE/pan-European region have worked out diverse arrangements and technical solutions for data exchange and information management, in some cases with projects supported under the Convention or e.g. through EU funding instruments.

Finland and the Russian Federation revised the monitoring of their shared waters in 1994, after both countries had ratified the UNECE Water Convention. The revision involved increasing the sampling frequency, modernizing the list of variables and adding some variables to it. Thanks to the

[30] UNECE, Second Assessment of Transboundary Rivers, Lakes and Groundwaters (UNECE 2011)

attention paid to inter-calibration, the comparability of water quality data has improved continuously since the initiation of the joint monitoring in the 1960s. [31]

The 1997 agreement between Estonia and the Russian Federation covering the Narva River Basin, was signed after the Water Convention entered into force. [32] The agreement provides for the creation of a Joint Estonian-Russian Commission on Protection and Sustainable Use of Transboundary Waters[33] Among the tasks of the Commission relevant to the Articles of the UNECE Water Convention discussed in this paper are the following: coordination of plans, projects and other programmes of research, monitoring and other activities that concern transboundary waters (Articles 5 and 7), development and co-ordination of water quality norms (Articles 5 and 9), methods of analysis (Article 9), exchange of current and operative information about transboundary waters (Articles 5 and 7). According to the agreement, the Riparian Parties exchange monitoring data obtained in the framework of the joint monitoring programme (Article 7).

The following reported achievements are underpinned by the UNECE Water Convention, namely systematic exchange of information on water management and water quality, convergence of principles and criteria for the status of water bodies as well as joint monitoring of Lake Peipsi/Chudskoe and the Narva reservoir on the basis of a monitoring programme. The first monitoring programme was agreed by the joint commission in 2001.[34] When hydrochemical monitoring activities started in 2001 — with Article 11 of the Water Convention as the foundation — the Riparian Parties carried out the monitoring of surface and groundwater using their own methods. Since 2011, a common guidance for sampling and analyses has been used. Even though a satisfactory consistency in results on most indicators has been reached, the harmonization of monitoring programmes between the riparian countries and with international guidelines, agreeing on the criteria to be used for assessing status of water bodies and ensuring the analytical comparability of laboratories are still areas on which work should be continued.[35]

The Convention on Cooperation for the Protection and Sustainable Use of the Danube River, which is modeled on the UNECE Water Convention and builds upon it, specifies that the Contracting Parties shall 'harmonise or make comparable their monitoring and assessment methods as applied on their domestic levels, in particular in the field of river quality, emission control, flood forecast and

[31] Mitikka S., Wirkkala R.-S. and Räike A. 2004. 'Transboundary waters between Finland and Russia – key issues in water protection' In: Timmerman, J.G., Behrens H.W.A., Bernardini F., Daler D., Ross Ph., van Ruiten C.J.M. (eds). *Proceedings of Monitoring Tailor Made IV. International workshop on information on sustainable water management: from local to global levels*. pp. 317-326. RIZA.

[32] The Agreement between the Government of the Estonian Republic and the Government of the Russian Federation on Cooperation in Protection and Sustainable Use of Transboundary Waters (adopted 20 August 1997, in force the same date)

[33] Article 5 of the 1997 agreement.

[34] UNECE, Second Assessment of Transboundary Rivers, Lakes and Groundwaters (UNECE 2011) More recent information was provided in a presentation made by Harry Liiv, Estonian Ministry of the Environment at the First Workshop on River Basin Commissions and other Joint Bodies For Transboundary Cooperation: Legal and Institutional Aspects, Geneva, 23-24 September 2013. http://www.unece.org/fileadmin/DAM/env/water/meetings/joint_bodies/presentations/4.2.Liiv_Geneva_24-09-2013.pdf (accessed 26 May 2014)

[35] Ibid

water balance'.[36] Other provisions of the Danube Protection Convention reflect well on the obligations of the UNECE Water Convention regarding joint monitoring and assessment, and the exchange of data and information.[37] The Danube Protection Convention and the work of the International Commission for the Protection of the Danube River (ICPDR) illustrate the practical application and implementation of the Water Convention's provisions, built on and taken further by the establishment of common databases and regular joint surveys, for example.[38] The political diversity and heterogeneity of approaches in the countries of the Danube Basin makes the work done all the more important.

The International Sava River Basin Commission (ISRBC) has established a platform for the exchange and use of the hydrological and meteorological information in cooperation with the national environment and/or water authorities and hydrometeorological services of the Parties. This platform involves compilation of a Hydrological Yearbook providing an annual summary of the water regime as well as automatically uploading from the databases of the hydrometeorological services and displaying continuously on the ISRBC web-site the agreed hydrological parameters (ISRBC 2013). Notably Montenegro, a riparian country with a part of the headwaters of one of the tributaries, also participates in this cooperation although it is not a Party to ISRBC.

Despite their differences, these examples highlight the importance of regular monitoring and information exchange in the work of joint bodies. They also demonstrate gradual progress and broadening of the related transboundary cooperation over time, in tandem with the opportunities provided by modern technology.

Regional assessments

Accurate assessments of the status of water resources and the magnitude of water problems are essential for preparing proper policy actions not only on local and national but also on transboundary levels. Already in the late 1990s and the early 2000s, work was carried out under the Task Force on Monitoring and Assessment to compile information on transboundary waters at a regional (pan-European) scale, resulting in the publication of the inventory of transboundary groundwaters in Europe (1999) and the inventory of transboundary estuaries and their current monitoring practices (2003).[39]

Based on the decision made by the Parties at their third meeting (Madrid, 26-28 November 2003), the First Assessment of Transboundary Rivers, Lakes and Groundwaters was compiled with the aim of evaluating implementation of the Convention and assessing progress achieved in improving the status of transboundary waters in the pan-European region, including the EU, South-

[36] The Convention on Cooperation for the Protection and Sustainable Use of the Danube River (1994) 9(1).
[37] The Danube Protection Convention's article 9, 'Monitoring programmes'.
[38] Joint Danube Surveys to sample water, sediment and aquatic life along the Danube River and many of its tributaries have been undertaken under the ICPDR in 2001, 2007 and 2013. The main goal has been to produce comparable and reliable information on water quality and pollution. For example, I. Liška, F. Wagner, J. Slobodník (eds), *Joint Danube Survey 2: Final Scientific Report* (ICPDR, 2008)
[39] UN/ECE Task Force on Monitoring &Assessment, *Inventory of Transboundary Groundwaters* (RIZA 1999)

Eastern Europe, Eastern Europe, the Caucasus and Central Asia.[40] The first Assessment was firmly rooted in the work on previous assessments as well as monitoring and assessment activities under the Convention.[41]

The more comprehensive Second Assessment consolidated this regular regional assessment process by covering more than 140 transboundary rivers, 25 transboundary lakes, about 200 transboundary groundwaters and additionally, 25 Ramsar Sites or other wetlands of transboundary importance. [42] This broad assessment covered the quantity and quality status of waters, pressure factors, transboundary impacts as well as management responses and future trends. Water quality notably is an area where the assessment approaches vary significantly across the region, complicating forming of a consistent picture across the region[43].

The thematic "special edition" assessment of transboundary waters which is being prepared for 2015 focuses on the water-food-energy-ecosystems nexus — i.e. inter-sectoral impacts, synergies and trade-offs — in selected transboundary basins. Energy and agricultural policies influence strongly water use as well as the availability and quality of water resources. Consequently effective protection of water resources requires close inter-sectoral coordination. Integrated assessments such as those carried out under the Water Convention promote transboundary and inter-sectoral dialogue, improve knowledge base, highlight opportunities for cooperation, facilitate exchange of good practices and strengthen capacities of the participating countries.

Support to cooperation in monitoring and assessment under the Convention: the institutional set-up and partnerships

A central role in the provision of assistance to the Parties and non-Parties in improving their monitoring and assessment, as well as data exchange through guidance, capacity building and projects on the ground has been played by several bodies established under the Meeting of the Parties. This institutional structure has evolved according to the emerging needs and the expanding scope of work.

[40] UNECE, 'Decisions taken at the third Meeting of the Parties on the Implementation of the Convention in the period 2004-2006 and beyond', Addendum to the Report of the third Meeting of the Parties (8 April 2004), ECE/MP.WAT/15/Add. 1; UNECE, *First Assessment of Transboundary Rivers, Lakes and Groundwaters* (United Nations 2007)

[41] UNECE, 'Draft work plan on monitoring and assessment' (MP.WAT/2003/6/Add.1), Addendum to 'Draft work plan for the period 2004-2006' , third Meeting of the Parties (9 October 2003)

[42] UNECE, *Second Assessment of Transboundary Rivers, Lakes and Groundwaters* (United Nations 2011)

[43] The EU member States use classifications in accordance with the WFD, which involve use of biological quality whereas many countries in Eastern Europe, the Caucasus and Central Asia, the quality status of waters is described using a Water Pollution Index, which is defined on the basis of the ratios of measured values and the "maximum allowable concentration of pollutants for a specific water use" (MAC). The Second Assessment can be referred to for more details.

The Task Force on Monitoring and Assessment, transformed into the Working Group on Monitoring and Assessment in 2000[44], is responsible for this area of work under the Convention. Over the years specific Task Forces such as the Task Force on Groundwaters have been assigned responsibility for certain tasks. Initially the Chair of the Working Group was The Netherlands, and from 2001 onwards Finland. During the active period of implementing the pilot projects, this work was supported by the Core Group on River Pilot Projects and the Core Group on Groundwater. [45]

The International Water Assessment Centre (IWAC) was established as a collaborative centre of the Convention at the second meeting of the Parties[46] (March, 2000). At the outset, IWAC has operated as a joint endeavour of the Parties under the leadership of Netherlands. IWAC has been in a way an operational arm of the Convention and its Protocols, which helped to implement the obligations of these instruments on the ground.

Initially IWAC was led and hosted by the Institute for Inland Water Management and Waste Water Treatment (RIZA) with Dutch financial support constituting a core group of water institutions. IWAC's activities include work to support the development of guidelines, organizing workshops and training courses, and implementing pilot projects, which contributed to exchange of concepts, research findings and best practices in monitoring but also on other water management issues[47]. From 2009 to 2012, IWAC was hosted by the Slovak Hydrometeorological Institute and funded by the Government of Slovakia.

Overall, national institutes have contributed significantly to the development of the monitoring and assessment work as well as related capacity building and outreach. The implementation of activities on the ground has been carried out in cooperation with different international organizations both within and outside the UN System, with regional organizations and joint bodies - The Water Convention also functions as a platform for sharing experience. While institutes of different Parties, having taken an active or even a leading role has allowed for sharing the work and responsibilities, the continuity has turned out to be a challenge. Under today's resource constraints countries have less financial flexibility and it is mainly extra-budgetary projects that allow for provision of substantive assistance.

Discussion and conclusions

Since the beginning, the objective was to develop joint monitoring under the UNECE Water Convention in a holistic way. Pilot projects have had an important role in disseminating the

[44] Document ECE/MP.WAT/5: *Report of the Second Meeting* of the Parties to the Water Convention. (UNECE, 2000)

[45] UNECE, 'Achievements under the Convention's Work Plan 2000-2003' (5 September 2003), MP.WAT/2003/5; UNECE, 'Progress report on groundwater pilots and activities under ISARM, etc.', Working Group on Monitoring and Assessment, Core Group Groundwater (2 September 2003), WGMA/2003/2

[46] UNECE, 'Report of the second meeting' [of the Parties to the Water Convention] (29 August 2000), ECE/MP.WAT/5

[47] For details, document MP.WAT/2003/12, 'IWAC's activities since its establishment in 2000 and priorities for its future work' can be referred to.

guidelines and acquiring practical experience of their application. With the Central European countries joining the EU, the emphasis in the monitoring and assessment work shifted increasingly to the east. Information exchange and monitoring cooperation continue to be relevant areas of development in the countries of Eastern Europe, the Caucasus and Central Asia. At present most of the projects involving such a component are implemented in Central Asia. Partnerships with river commissions and other actors help to disseminate and apply the guidelines in projects on the ground.

Exchanging information on the status of transboundary waters and the pressures exerted upon them is an essential first step that builds ground for other forms of cooperation. The step-by-step approach adopted, i.e. starting off with modest objectives, taking into account the local setting has allowed for implementation of the Convention in countries of Eastern Europe, the Caucasus and Central Asia that have limited financial resources.

Monitoring and assessment is an area of technical cooperation that allows riparian countries to establish contacts and to gradually build trust. This creates in many cases considerable potential for cooperation with stronger political dimension. Monitoring and assessment has yielded very concrete results, helping the Parties to develop cooperation in other areas as well. However, development of a joint monitoring system takes time as the methods and monitoring practices need to be harmonized or made at least comparable. For sustainability of results, projects should always be developed in close cooperation with national authorities.

Also in terms of monitoring and assessment, the Water Convention has in a way built ground for later developments related to the WFD. Despite the progress in the assessment and monitoring of transboundary waters in the pan-European region, even in the EU, there are still issues to be addressed: Inter-calibration for assessing the status of waters using quality elements[48] is still extremely relevant and important and the share of groundwater bodies designated as transboundary is low.[49] Despite the developments in monitoring technology and methods, the guidelines developed under the Convention still remain relevant.

The application of the guidelines continues in projects on the ground in SEE, Eastern Europe, the Caucasus and Central Asia. Even if specific 'pilot' projects focused on monitoring and assessment under the Convention have become few in number, these activities have been increasingly integrated into projects having a broader scope.

The Convention's provisions on information exchange and monitoring as well as the related guidelines have had impacts both through leading to revision of existing practices (e.g. in cooperation between Finland and the Russian Federation) as well as by initiating monitoring. Overall, the Convention has played an important role particularly in areas where resources have been more limited. The various projects on the ground implemented under the Convention have supported the application of the guidelines as tailored to the setting of the particular basin and the riparian countries sharing it. Large river commissions with a strong mandate and resources at their

[48] The quality elements for the WFD include biological, physico-chemical and hydromorphological elements.
[49] UNECE, *Second Assessment of Transboundary Rivers, Lakes and Groundwaters* (United Nations 2011)

disposal have built on the experience acquired under the Convention and have advanced the practice far on the basis of the respective basin agreements; as illustrated for example by the Danube.

The gradual development of monitoring and assessment over the past decades and the remaining challenges demonstrate that it is a long-term process to establish sustainable transboundary cooperation.

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