

TRANSBOUNDARY RIVER BASIN MANAGEMENT REGIMES: THE TISZA BASIN CASE STUDY

Background report to Deliverable 1.3.1

Status: Final
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Date: 18. 6. 2005



NeWater

New Approaches to
Adaptive Water Management
under Uncertainty



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1. Introduction

1.1. The Tisza River Basin

The Tisza river basin (TRB) originates in the Carpathian Mountains in the territories of Romania, Slovakia and Ukraine and is the largest catchments area (157 218 km²) among the 15 sub-basins of the Danube Basin (801 463 km²).

The Tisza flows (average discharge of 794 m³/sec) through the Pannonian flood plain of eastern Hungary and joins in Serbia-Montenegro the Danube.

The river can be divided into 3 main parts:

- the mountainous Upper Tisza in the Ukraine (including the tributaries of Romania)
- the Middle Tisza in Hungary, receiving the tributaries Bodrog and Sajo from the Carpathian mountains in Slovakia and Ukraine and the Szamos, Koros and Maros draining Transylvania in Romania
- the lower Tisza downstream of the Hungarian-Serbian border, where it receives the Begej and small tributaries through the Danube-Tisza Canal system and joins the Danube between Novi Sad and Belgrade.

The mean discharge at the confluence with the Danube is 766 m³/s, ranging from a low 371 m³/s to a 1% peak discharge of 3867 m³/s (Schnellmann 2002, ICPDR 2004).

The table below summarizes the key country splits.

Country	Length km	Area sq. km	% area of country	% area of Basin	Mean elevation m	Inhabitants Million
Ukraine UA		12 734	2	8	550	1,30
Romania RO		72 636	30	47	481	6,10
Slovakia SK		15 250	31	10	418	1,67
Hungary HU		46 222	50	29	131	4,13 (4,5)
Serbia and Montenegro S-M		10 376	10	6	91	0,81
Total	966	157 218		100	Altitude 88 – 2061 m	14,01 (14,4)

Source: Burnod-Requia, K. (2004), REC (2002)

The TRB is characterized by a high diversity of landscape, fauna and flora with a significant number of nature protected areas, wetlands and national parks (Burnod-Requia 2004).

During the late 19th, early 20th century, the former huge floodplain was drained, dikes were constructed with 84% loss of the floodplain (in Hungary from 2,59 million ha to 0,1 million ha) and 32% of the river length was regulated.

About 60% of the upper TRB gets more than 1 000 up to 1 600 mm precipitation annually. This means, that heavy flash floods are common in spring and summer, causing enormous inundation in the vast lowland areas. In recent years the sequence of major floods increased.

1.2. Economic developments

The total population living in the river basin is over 14 million people.

The TRB region (with exception of Serbia and Montenegro) is characterized by economic stagnation, creating a high pressure for economic development (REC 2004). The decline of the heavy industry, an agricultural crisis after decennia of intensive, exhausting large-scale farming resulted in a high level of unemployment, up to 30 % in the Slovak and Romanian territories (FAO 2003, Burnod-Requia 2004).

Poverty and increasing social and ethnic tension is becoming an increasingly important issue in the North-Eastern Tisza basin. Better integrated land use and water management could be important tools to avoid increasing inundation and soil degradation and therefore effective elements for sustainable development for the region.

Main economic sectors in the TRB are:

Ukraine (UA):	Timber processing, Food production, some mining
Romania (RO):	Energy, Industry, Agriculture, Mining, Tourism, Transport
Slovakia (SK):	Agriculture, Forestry, Industry
Hungary (HU):	Intensive agriculture, Industry, Tourism
Serbia-Montenegro (S-M):	Large cattle/pig farms, Intensive Agriculture, Fish ponds

The political transitions and the economic adjustments led to a wide split in the economic development of the TRB countries and thus to different capacity levels to address environmental issues and integrated river basin management (Bachmann, 2004):

GDP \$/capita: HU, SK : 12-13 000 UA,RO,S-M : 2-5 000

Triggered by the Baia Mare spill (see below), significant private investment happened, but public donor initiatives remained scarce.

1.3. Main transboundary issues

As a result of the political and economic changes during the last 20 years, agricultural and industrial production has significantly dropped resulting in a generally reduced environmental pressure. However, many industrial sites but also the lack of fully implemented municipal sewage treatment continue to be serious pollution and accidental risk spots.

In summary, there are significant environmental and social concerns in the basin related to

- excess and shortage of water, almost simultaneously in a given year
- frequent landslides in the upper part of the TRB due to deforestation
- hazards of diffuse and point source pollution and further pollution accidental industrial “hot spots”
- different phases of economic development and future sustainable agricultural and industrial potentials

Pollution

The surface water quality is mainly affected by industrial and municipal pollution, as well as agricultural run offs.

Serious temporary water quality problems are still caused in tributaries (mainly Hungary, Romania, Serbia-Montenegro) as a consequence of deficiencies in municipally sewage treatment system.

Mining, petrol-chemical, cellulose industry and crude oil and gas pipelines traversing the TRB are significant spot sources risks.

The most severe recent pollution accident occurred in 2000 at Baia Mare in Romania, when some 100 000 m³ toxic mining tailings (120 tons of Cyanide and 20 000 tons of sediments, containing heavy metals) were released from the Sasew waste pond into the environment.

The International Task Force for assessing the Baia Mare accident (BMTF 2000) concluded, that the accident was caused by inappropriately designed tailings facilities and inadequate monitoring and operation procedures as well as maintenance of the dams. Severe but not exceptional rainy weather conditions contributed to the accident.

No human health impacts were recorded due to positive circumstances and because the ICDPR warning system was put into action immediately. Still, the impacts on the environment and on the livelihoods in the fishing and tourism sectors were serious despite the (lucky) dispersing and wash away effect of a simultaneous severe flood. The accident had few lasting impacts and the river recovered surprisingly well.

The recommendations of the task force included the redesign of the process, strengthening of (EU) legislation, regulations and standards including closure of unsafe facilities. Also a more pronounced supervisory role (funding, decision making) of the ICPDR was advised as well as the general promotion of a safety culture.

As a first step, the ICPDR prepared an assessment of high risk facilities, identifying 42 hot spots, mostly mining activities (24 in Romania, 1 in Slovakia, 6 in the Ukraine, 11 in Hungaria).

In the meantime, most recommendations were put into practice and the industry worked hard to improve safety standards and emergency procedures (Balkau, 2004).

Flooding and Droughts

In the last 30 years, the Tisza region has been affected by some 115 flood events.

During that time, the strength and the number of floods has continuously increased, with two particularly severe events in 1998 and 2001.

In the Hungarian part of the Tisza, canalization of rivers for irrigation purposes led to repeated severe flood damage. 2,4 million people live in dike protected flood plain areas, constituting 23% of the Hungarian country (www.ovf.hu).

Increasing flood heights led to the “New Vasahelyi Flood Plan” with the aim to improve flood prevention and protection.

Although the Pannonian plain is very suitable for agriculture, the average precipitation is not sufficient for intensive cultivation, and water deficiencies and droughts occur regularly. The implementation program of retention areas is considered to provide a solution for both problems.

Summing up

The following table summarizes the key issues as expressed by Tisza country representatives in a multilateral seminar 2003 (FAO 2003):

Country	Key issues
HU	Flood management, International Cooperation Good Agricultural Practice, Implementation WFD
RO	TRB management with ICPDR (Coordination) Water supply and Sewage treatment, Water quality improvement Ecological reconstruction
SK	Flood management, water supply Ecology (Biodiversity), Agricultural potential
UA	Flood management, Reforestation in the Carpathians Water quality, reduction of contamination Industrial development, job diversification
S-M	Flood management Water supply , Water quality Biodiversity, Navigation

2. Description of the Regime

2.1. Transboundary Cooperation

There is a tradition of international and regional cooperation in the Danube and TRB covering flood protection, exchange of hydrological data and water quality control. This resulted in a large number of agreements, both on bilateral and multilateral levels, which are generally supervised by government commissioners (ICPDR 2005).

Many different partners are involved in numerous specific initiatives in the TRB (see table below)

Project, Program	AIM	WHO, WHEN
Towards a sub-river basin Management Plan (implementation of WFD)	Develop Management Plan by 2009 Under umbrella of ICPDR	ICPDR + TRB countries, 2004
Cooperation of TRB and the Initiative on Sustainable Spatial Development (SSP)	Sustainable Spatial development of the region	Council of Europe on SSP and the 5 TRB countries 2003
Tisza/EU project	Improvement of water quality in the region	EU research project including local actors launched 2002
Tisza Water Forum	Working groups of the 5 countries focus on flood mitigation	Tisza countries, started 2001
TRB Sustainable Development program	Improve life quality in the basin	UNDP + REC, 2001
Proposal for an Environmental program in TRB	Implement sustainable development principle	Joint action of Environmental Ministers of the TRB countries + EU + ICPDR
Transboundary Management of Water Quality and Quantity	Flood protection , water quality monitoring	Bilateral agreements

Source : Burnod-Requia 2004

A list of multi-lateral activities in the TRB is given as follows:

The Danube River Protection Convention (DRPC)

All Tisza countries are signatories of the Danube River Protection Convention (DRPC, signed 1994, enforced 1998), which aims to strengthen international cooperation in the Danube river basin (including the Tisza sub-basin), and to ensure

sustainable management and use of its waters. In 2000, the International Commission for the Protection of the Danube River (ICPDR), which is responsible for the convention implementation, adopted its first Joint Action Plan (including the Tisza River sub-basin), which addresses pollution, water quality standards and monitoring, prevention of accidental pollution, floodplain restoration and wetland conservation, flood protection and integrated river basin management.

The goals and objectives were confirmed at the Ministerial meeting December 2004 in a declaration, which emphasizes WFD implementation, flood protection and public participation.

TRB Memorandum 2004

On the occasion of the ministerial meeting of the ICPDR 2004 in Vienna, the Tisza countries signed a Memorandum of Understanding: “Towards a River basin Management Plan for the Tisza river supporting sustainable development of the region. The intention was to intensify the cooperation and to bundle the different efforts (economic, social, water related) and partners/supporters (UNDP GEF, ICPDR, the EU Commission, FAO).

As a first step, a Tisza Analysis Report will be prepared to be presented 2006.

The recent flood disasters with extreme flood in the period 1998-2001, increasing pollution with frequent accidental pollution events in the 1980s and the Baia Mare Cyanide accident 2000 resulted in a number of initiatives particularly in the TRB to promote cross-border cooperation.

TRB Forum on flood control/Tisza Water Forum:

In 2001, the Budapest Declaration was signed and the Tisza Water Forum (TWF) was established. The TWF covers the review and harmonization of national flood policies and measures. In 2003, an action program for sustainable flood protection in the TRB was adopted. 8 working groups were established, which cover natural characteristics of the TRB, Environmental Assessment of measures, the legal framework and the different aspects of flood control and protection. Meetings of the National coordinators, yearly deciding Ministerial meetings and the Technical Secretariat VITUKI make the Tisza Forum a main coordinating actor in the TRB.

Tisza Environmental program

Shocked by the Cyanide accident in 2000, the Tisza country Environmental ministers followed an initiative from Hungary and held a multilateral (including EU and ICPDR) workshop in Budapest 2001, to launch a TRB Environmental plan. The main aim is to reduce the pollution risks and to prevent transboundary pollution. The plan includes the development of the legal and administrative frame work of cooperation and public involvement and is based on the short term on bi- and multilateral projects that can be financed from local sources, on the long term on projects which require international financial support.

TRB Sustainable Development program

This initiative was started in 2001 by UNDP and REC. The main goals are to improve the well-being of people living in the TRB, to minimise the risk of accidents and natural disasters and to create a participatory framework for cooperation between countries and stakeholders (REC 2004). A first step was to bring the TRB countries

together to formulate a concept for sustainable development and to build up a network (Initiation phase, final report). Next steps would focus on gathering information on sustainable water management regimes in the TRB countries. The recent report assesses the legal, policy and institutional frameworks (REC 2004)

Tisza River Project

This is a EU research project launched in January 2002 under the 5th Framework program of the EC. It investigates options for the improvement of water quality in the TRB. 11 partners from institutes and universities from Hungary, Slovakia, Romania, UK, Germany, Belgium and Austria are involved. (www.tiszariver.com)

Sustainable Spatial Development

In 2003, the Tisza countries signed a declaration on an initiative of the Council of Europe to cooperate in sustainable spatial development of the Tisza river region. This program integrates regional land use planning and water management.

In summary

At the FAO seminar (FAO 2003) questions were raised about the effectiveness and harmonisation of the different programs and disappointment about the coordinating role of the International Commission for the Protection of the Danube River (ICPDR) was expressed. Even the establishment of an “own committee for the TRB” was discussed.

This agrees also with the general view (Burnod-Requia 2004), that - despite numerous initiatives and programs (see below) - there have been only few improvements in the environmental situation of the TRB, and that major obstacles to solve the issues - on national and international level - are the lack of political commitment and coordination as summarized below:

- Lack of Inter-Ministerial (sector) coordination and lack of information exchange. No clear definition and boundaries between national and regional responsibilities. Lack of sufficient funds
- The multitude of agreements, projects and actions require better, more coordination. There is not sufficient harmony in bi-and multi-lateral agreements, no enforcement mechanisms and a lack of work plans with agreed monitoring mechanisms.
- The role of the ICPDR is not recognized equally important in the Tisza countries.

The Greencross survey (2003) also notice insufficient emphasis on, or institutional facilities for, direct cooperation or information and experience sharing between the countries. This is made even more complicated by the different systems of water governance from those which are highly centralised (Ukraine) to nations where regional prime responsibility has been granted (Hungary).

It seems, that the critics have been taken on board in the 2004 Memorandum of the Tisza country ministers.

2.2. Legal framework

The set of EU legislation related to water management, particularly the EU Water Framework Directive (WFD), provides the CEE countries with an integrating legal

and policy framework. In 2002, the ICPDR started with the implementation of the WFD.

The five TRB countries are required to implement the directive and to prepare a sub-river basin management plan by 2009.

Slovakia, Hungary and Romania are in the process of transposing, Serbia-Montenegro has started the process and Ukraine (as beneficiary of the EU Water Initiative) use the EU legislation as a model for their own legislation.

In Slovakia, the WFD is already reflected in Water act and law 184/2002 on water, defining the river basins according to hydrological borders.

Hungary and Slovakia have already established new water authorities for the TRB.

The administration of Romania was already based on sub-basin districts.

The Ukraine water code covers most of the elements of the WFD, however the current institutional set up will require further harmonisation and supplementary regulations to comply with the WFD principles and clarify institutional responsibilities and budgets (REC 2004).

In Serbia-Montenegro the legal system still differs from those of the other countries due to the political circumstances: It does not reflect a basin management approach and existing, obsolete laws are not compatible with the intended framework water act. Reform is needed in terms of organisational and financial structures (REC 2004).

As most relevant legislation has only been adapted recently, to date there is little information available on the status of practical implementation. Hungary, Romania and Slovakia are drafting management master plans and strategies for implementing the WFD (REC 2004).

The TRB countries have introduced two types of liability for breach of water legislation obligations: criminal and administrative. In most of the countries, only natural persons can be liable for criminal offences, Hungary introduced criminal liability also for legal entities. Violations that might trigger criminal or administrative sanctions include illegal discharge of wastewater, damaging river beds or failing to report accidents. The level of enforcement, however, remains questionable (REC 2004).

All TRB countries have legislation in place that guarantees public participation and access to information in environmental matters. However, there is still a lot to be done to streamline procedures and implement regulations, particularly in Ukraine and Serbia-Montenegro.

The TRB countries have ratified most of the multilateral global agreements providing for shared water resource management and cooperation. These include the Convention on Protection and use of Transboundary water courses (Helsinki 1992), Wetlands (Ramsar Convention), the Danube River Protection convention, on Transboundary Effects of Industrial Accidents, on Conservation of European Wildlife and Natural Habitat (Bern), on Environmental Impact Assessment in a transboundary context (Espoo, 1991), on Biological Diversity, on Access to information, Public Participation in Decision making in Environmental matters, on Protection and Sustainable Development of the Carpathians.

Also several other EU policies are relevant and – when implemented - will contribute to the sustainable development of the TRB: EU directives on Pollution control, Wastewater treatment, Seveso II, Mine waste, the EU Flood Communication and the Water Initiative.

The practical implementation of agreements and conventions but also remaining gaps in the ratification of international conventions must still be considered as a key issue as the legal discussion of the Baia Mare spill has shown (REC 2001).

However, the fact of the WFD implementation will support integrated water management, strengthen cooperation and will help to overcome the obstacles, which still exist at present.

2.3. Water policies

More recent economic and political developments have led to rather independent developments of water management of the TRB countries.

The new EU countries and Romania have in place water management institutions and a governance system, which mirror those in EU countries as well as a number of environment and water policy documents and strategies of sustainable development. Ukraine and Serbia and Montenegro are somewhat lagging behind.

A general issue in the TRB countries is the lack of experience to make the system and procedures fully operational (REC 2004).

The common priorities of water management policies relate to flood management, control and development of a water infrastructure. The aim is to implement the concepts by 2006 (Tisza River Forum, Gabor 2003).

Joint policies also have to take into account different development pressures and priorities in the countries leading to different interests of water use: in Ukraine and Romania with numerous outdated industrial facilities economic and social issues still dominate, whereas the downstream countries, particularly Hungary value the Tisza also as resource for tourism and fishing.

The REC report (REC 2004) assessed the institutional framework of the TRB countries and concluded:

- that roles and responsibilities are still unclear: in the Ukraine, basic water management tasks are allocated simultaneously to the Cabinet of Ministers, the Minister of Environment and the State Committee of water management, in Slovakia, water quality monitoring is carried out by the water management enterprise and by the Hydrological Institute)
- although inter-ministerial commissions exist, different aspects of water management are not addressed together – for example agriculture and environment- but handled separately with different policies, plans and actions, with negative effects on information management and impact analysis.
- that there is a general problem of insufficient funds and professional capacity

However, the implementation of the WFD will require to address the environmental and social aspects of water management in a uniform way and to reflect this in the institutional set up.

Hungary and Slovakia transferred already responsibilities for water management and environmental protection to a single ministry (2002), Romania kept both together, in Serbia, the republican Minister of Agriculture and Water Management is responsible for water management overall.

An interesting step towards a more comprehensive approach is the Water, Food, Environment Dialogue (CEE WFE), where officials, experts and NGOs of the CEE region (Global water Partnership, WWF, International Commission on Irrigation and Drainage) discuss ways and procedures to implement the WFD (and other EU Directives) leading to a more integrated, inter-sectional manner to approach the different agricultural, environmental and water related aspects (Ijjas 2005)

2.4. Formal Actors

A number of international Cross-border organizations are busy in the region to promote and support sustainable development.

International Commission for the Protection of the Danube River (ICPDR)	Management of integrated water management in the TRB
Carpathian Foundation (CF) (Hungary, Poland, Romania, Slovakia, Ukraine)	Cross-border, regional foundation that provides grants and technical assistance to NGOs and local authorities, focused on economic development
Regional Environmental centre for Eastern and Central Europe (REC)	Mission to assist in solving environmental problems through cooperation amongst governments and stakeholders (NGOs, Business, experts etc) Focused on promoting public participation and access to information
European Conference of Ministers responsible for regional planning (CEMAT) of the Council of Europe	Draft initiative on sustainable spatial planning of Tisza RB Setting up of a Joint Commission to establish a work and action program for the TRB. Phase 1: 2005-2008

Flood prevention and mitigation is seen as a main priority by all TRB countries. The five countries involved have 7 bilateral commissions, each covering water quality and pollution, flood prevention and hydrometeorology. Governmental commissionaires are supervising. To this inventory, the multilateral Tisza Forum is added (FAO 2003).

In the countries, the responsible leading institutions are (for more details see the table below):

- HU: Ministry of Environment and Water (General Directorate)
- RO: Ministry of Waters and Environment Protection (NA “Romanian Water”)
- S-M: Ministry of Agriculture and Water (Serbia). Prime responsibility for water management has been transferred to the republics. The federal level is responsible for international matters including monitoring transboundary pollution (REC 2004)
(Vode Vojvodine Public Water Company)
- SK: Ministry of Environment (Slovak Water Management Enterprise)
- UA: State Committee for Water Management

Until the early 1990s, the states were centralized social republics (Warsaw pact), which had a huge influence on the way the water resources were managed. This regime greatly reduced the degree to which members of the public and regional authorities or administrators were involved in the decision process.

Substantial progress has been made in the last 10 years: inter-ministerial or inter-institutional committees have been installed.

At the national level, the responsibility for water issues lies generally with the environmental authorities and the “water authorities” (bold in the following table). Exceptions are Serbia, where water is under the agricultural authority and Ukraine, where the responsibilities are divided between 3 governmental institutions.

At regional level, water management is carried out by agencies subordinated to the national institutions, in Hungary, Slovakia and Romania already at river basin level. These agencies focus in all countries on maintenance of water bodies, flood protection, water quality monitoring and licensing. In all countries, there are a number of supporting agencies, like environmental and health inspectorates, hydrological and research institutes.

At the local level, there is a general trend towards decentralisation in all TRB countries. Local governments are responsible and legally liable for water supply and wastewater treatment. Municipalities contract companies to manage the service and in Romania, Slovakia and Hungary private participation starts to develop.

The political transition and decentralization of governmental authorities has given local and regional authorities greater autonomy to manage natural resources and water services. However, in a survey on territorial authorities, Romania and Hungary signalled that in the absence of sufficient institutional, technical and financial capacity progress in regional water management will remain difficult (Greencross 2003).

Country	Authority	Responsibilities
HU www.ovf.hu	Ministry of Environment and Water -National General Directorate for Environment, Nature and Water with 12 regional Directorates for Environment and Water basin level - National Water Research Centre -General Inspectorate of Environment Protection and Water with 12 regional water inspectorates Minister Commissioner under the Prime Minister and the National Agency for Development, Vati Ministry of Agriculture and Rural Development	Policy elaboration, preparing legislation Coordination with other sectors, countries Flood control , water resource management and monitoring, water supply, sewage treatment, investments, WFD transposition, Internat. Cooperation Scientific issues Licensing, Supervision Coordination of all types of development, spatial planning <u>Rural development, irrigation, drainage</u>
RO www.fao.org www.rec.org	Ministry of Waters and Environment Protection -National Administration ”Romanian Water” with 11 Regional Directorates, river basin level 42 county level environmental inspectorates - Research and Development Institutes Ministry of European Integration	Responsible for all issues of integrated water management, from development of the strategy to sectoral policies International Cooperation, ICDPR Quantitative and Qualitative management of water, including flood protection and hydrological and quality monitoring Regional development policies and preparing the institutional framework to comply with EU

<p>SK</p> <p>www.fao.org</p>	<p>Ministry of Environment</p> <p>- Department of Water courses and River Basin Administration Water Management Enterprise (4 branches, river basin level)</p> <p>- Hydro-meteorological Institute, Research Institute of Water Management</p> <p>Ministry of Agriculture Ministry of Development</p>	<p>Overall management responsibility for the Water sector</p> <p>Governmental level Regional level</p> <p>Scientific issues</p> <p>Development of agricultural aspects in the TRB Overall rural development activities in the TRB</p>
<p>UA</p> <p>www.rec.org</p>	<p>Ministry of Environment and Nature Protection Cabinet of Ministers, State Committee on Water Management -Department of Ecology and Natural Resources</p> <p>State Committee of the Ukraine on Water Management</p> <p>4 Water management Directorate (Trans-Carpathian region)</p> <p>Uzhgorod University</p>	<p>Environmental protection, quality control and nature conservation Supervision in the Trans- Carpathian region</p> <p>National level: Water quantity and flood control Authoritative and implementation role</p> <p>Regional level: Development of flood control, land drainage, water supply and sewage treatment (Supervised by the Department)</p> <p>Scientific issues, including river basin development issues</p>
<p>S-M</p> <p>www.rec.org</p>	<p>Ministry of Agriculture and Water</p> <p>Ministry for Protection of Nature Resources and Environment</p> <p>-National Water Directorate</p> <p>-Srbijevode Public Water authority</p> <p>-Vode Vojvodine Public Water Company with 36 water resource districts -Provincial Secretariat for Environmental Protection and Sustainable Development</p> <p>Water management Institute "Jaroslav Cerni" University of Novi Sad (Civil Engineering)</p>	<p>Water management and agriculture on governmental level Nature conversation at national level</p> <p>Water resource management, water quantity and quality control, Water management in the Serbian part</p> <p>Tisza RB falls under the autonomous province of Vojvodina.</p> <p>All water developments and operations: irrigation, drainage, wastewater All environmental protection issues</p> <p>Scientific issues on national level Scientific issues on local level</p>

2.5. Informal actors

There are a number of international NGOs such as Greenpeace, WWF, Wetlands International, and the Tisza Club active in most TRB countries. Many local NGOs with environmental focus exist at local level, most with a lack of financing and capacity to have a major political impact, but with an important role in raising awareness of citizens on environmental issues.

The Danube Environmental Forum (DEF) was established in 1999. It is a NGO platform with combined local and regional structure to promote NGO participation in governmental fora. At present, 154 NGOs are actively engaged.

An example of PP on regional and sub-basin level is the Tisza Club with 16 environmental organizations, established and activated by WWF Hungary after the Baia Mare spill.

WWF is an important driver of environmental improvement in the region: Since 1988 the WWF-Carpathian program promotes conservation, restoration and sustainable

management in the Danube-Carpathian region. In the 2001 summit, the 9 countries confirmed their commitment to nature conservation in the area (www.carpathians.org , www.panda.org).

A report of the TRB Integrated Sustainable Development Program (REC 2002) summarized the different stakeholders (see the following table, the main governmental actors were summarized above). Some of the Serbia and Montenegro figures have to be taken with caution.

Institutions	HU	SK	RO	UA	S-M
Regional/local authorities	8 Regional, 250 municipalities	To be identified	Regional Develop. Agencies(3), 14County Councils	Councils of the region	20 Local authorities
Business	no info	no info	no info	no info	23(?)
NGOs	2 major , many others	2 major	11 major (?)	2 major	35(?)
Others	3 Academia Foreign donors Parliament Commit. Experts Regional Develop. Agencies Consultants and experts	Slovak Water Enterprise Bodro/Hornad River Enterprise Hydromet Institute	National Waters Co.	Uzhgorod University	3 Academia 2public enterprises

The report indicates that official authorities have a still leading role in policy development and implementation, despite a lack of resource and an often inefficient flow of information. Major NGOs have an advisory and to a certain degree supportive role.

The report also concludes that two segments are under-represented: Business in the region and local municipalities. The later was confirmed by Greencross survey in Romania. On the other hand, the role of private water suppliers and wastewater companies is increasing (Hall 2003).

The “informal sector”, organized and non-organized, is comparably strong in Hungary with a number of consultants, experts, academia, NGOs and even Civil initiatives. In Slovakia, Public Bodrog/Hornad River manage water resources, i.e. deal with water works, flood protection and are involved in general water management. NGOs and Research institutes participate in the planning and management of river basins (FAO 2003).

In Romania and Ukraine on the other hand, planning of environmental and water management projects are often planned and executed by governmental representatives at country and local level with the help of scientific bodies, but rarely including other stakeholders (example GEF, letter 2005).

In Romania, over 400 NGOs are registered and Community based Organisations (CBO) have started to develop, both with different capacities and lack of funds, which come always from external, international sources (GEF 2004).

Despite enabling legislation, communication and cooperation between NGOs and government remains difficult. NGOs developed more effective cooperation with local authorities and other stakeholder groups (academia, media).

With the recent political changes, the developments and the learning process are numerous and fast, so that a continuous update, certainly in the new and in the associated EU countries, would be necessary.

3. Property rights, Markets, Prices

Legal property reforms have moved control over land and productive resources towards private actors, including the connected obligations. At the same time, most states have also retained public property on key natural resources with water resources as the prime example (Sikor 2002).

In all formerly socialist CEE countries, national governments take primary responsibility for protecting the public from floods in all respects. This includes flood management and investment, prevention and repair, but also taking full liability for private damages and compensating victims generously in the case of dikes break or groundwater inundation (Linnerooth-Bayer 2003).

After the severe floods in 2001, the Hungarian government started a study to introduce more private responsibility for reduction and response to flood disasters.

All TRB countries have problems to provide well-functioning water utility services at adequate costs. Considerable investments are required to upgrade and update current facilities to comply with EU environmental and health requirements. An investment volume of almost 50 billion Euro is estimated over the next 15 years, which would mean huge tariff increases of several hundred percents (www.aquamedia.at), of tariffs, which are already very high as % of income in CEE countries when compared to EU countries, for example in Hungary people pay an average of 2% of their income compared to 0,5% - 1% in EU countries (Greencross 2003)

In addition, insufficient regulations and lack of capacity impede sound financial management (REC 2004):

- in Hungary, water tariffs are not allowed to cover capital costs of infrastructure development
- in Serbia, fines for non-compliance with wastewater discharge are too low and poorly enforced

Efforts to increase private participation have to fight an unfavourable legal and policy framework (Serbia, Ukraine), but also negative experience of the past (Greencross 2003).

4. Stakeholder/Citizen Participation

Considering the different political and economic status and the different traditions in civil society involvement, public participation is quite a challenge in the Tisza countries. Levels of public participation vary greatly across the region and between

countries, and are generally not sufficiently structured and transparent (Greencross 2003).

This means, that public participation is weak and awareness of reasons and background of environmental and water management issues are low.

Apart from a few large international NGOs, the local active but inexperienced NGO sector is hampered by inadequate funding.

Powerful water associations with experience and a historical pedigree as for example in the Rhine basin are missing (to some degree and only recently in Hungary) and strong, organised professional stakeholder groups still have to develop.

The CEE WFD Dialogue recognises the issue and advocates the stronger and more directly involvement of farmers in the WFD implementation process without knowing how to do it in practice. Many organisations ask for more partnership and involvement in consultation. However, the experience shows that this has not yet been translated into river basin management and planning (Ijjas 2005).

On the Danube River Basin level, the ICPDR is promoting public participation in the planning process via the ICPDR Information System and Danube watch leaflets, as well as through operating networks as the Danube Environmental Forum (DEF) and systems as the Monitoring Information management (MLIM) and Accident emergency warning (AEWS).

10 organizations have become observers to the ICPDR and participate at decision-making and experts meetings. These organizations include NGOs, organizations representing private industry, and intergovernmental organizations (ICPDR 2005). Examples at the regional, sub-basin level include the Tisza platform with 16 organisations and the Lower Danube Green corridor between RO, UA, and Bulgaria (Dissing 2002)

The ICPDR also developed a network of national PP focal points to ensure a concerted approach throughout all countries.

5. Information management: goals, needs, and strategies

It is obvious that the information goals and needs of the various groups from politics, science and public are different. The EU legislation and the Aarhus convention provide a legal basis to ensure access to information in decision making on water issues and directives and conventions specify the needs and design.

However, according to the REC assessment (REC 2004), free flow and access of information is limited not least due to financial constraints.

Being part of the Danube River Basin, the ICPDR is a main producer and communicator of information to all different groups. The recent Danube Basin analysis (ICPDR 2005) responds to the reporting obligations of the WFD and provides an overview of main pressures in the basin and related impacts based on data from past and ongoing programs. It is addressed to EU and country officials, water managers, interested parties as well as the public.

In the Tisza River project (see project portal) scientific Institutes and numerous working groups collect specific information (flooding, hydrological, spatial, environmental) and promote meta-bases available via internet. A summary with regard to the implementation of the WFD is provided by Ijjas (2002).

In the TRB Integrated Sustainable Development Report (REC 2002), key components of databases and ongoing projects and programmes are summarised. A TRB information centre is being proposed.

The FAO seminar discussions indicate not a lack of data but rather a lack of appropriate use (flood warning system) and analysis (economic) and dissemination.

The ICPDR has a significant communication role. The 2004 PP Plan aims at:

- raising awareness about water management in general and informing the public (including stakeholders, NGOs) about WFD and the possibilities to participate in the implementation
- ensuring that appropriate mechanisms for PP are in place and appropriate stakeholder groups are involved
- developing a network of experts throughout the basin.

To ensure meaningful inputs, the ICPDR organized PP at various levels

- international or “roof” level (Danube River Basin)
- national level (the key implementing and managing level)
- sub-basin level (transboundary or/and national)
- local level

A media network is being developed as well to provide transparent and direct information for the public. All countries participate and contribute to the yearly “Danube Day”.

How coordinated, user-friendly and available the data are, particularly on the TRB sub-basin level, covering decision-makers as well as general public, remains to be seen. At least, there is some concern in view of the limited capacities of NGOs and other institutions.

6. Networks

Within TRB countries, comprehensive networks of water management institutions exist, which recently have (or are in the process of) adopted EU and international standards. However, there are still a number of deficiencies in all vertical, horizontal, and inter-institutional aspects of cooperation, communication and coordination. Major causes of the weakness are

- the speed of recent change and the lack of experience – the establishment of many institutions as well as the laws and policies which support them are very recent - and there was not yet the time to develop the required trust and confidence
- factors typical of developing economies: scarcity of resources and priority of politics
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Vertical: The specific set up of national-regional-local authorities differ in the individual countries, the management style is generally very much top down. The distribution of responsibilities and “power” is still in the establishing/confirmation stage. Serbia-Montenegro has a special situation: water resource districts have been defined which are managed by public, quasi-independent management companies (Vojvodine Public Company in the TRB).

Horizontal: Slovakia established a council for integrated utilisation of water bodies comprised of authorities, academia and NGOs. All water authorities have supportive, governmental agencies (inspectorates, scientific agencies).

These internal-country issues are transferred to networking across the basin: Apart from the mentioned general capacity and financial issues the need for an improved steering mechanism (within the ICPDR) and more intensive public participation was highlighted.

Inter-institutional: All countries have representatives in the ICPDR, and a number of bi-lateral committees have been established, focused on monitoring, flood protection and control, information exchange and planning of joint programs (for example the Commission for transboundary waters between SK,HU,UA).

The Danube Environmental Forum (DEF) acts as a Danube basin wide platform of environmental NGOs in order to establish a common approach for environmental protection of the Danube river.

Bi-lateral committees have been set up to handle flood prevention and management (Tisza River Forum, HU, RO, SK, S-M).

In the TRB countries exists an active NGO sector which mainly focus on public information and awareness raising rather than technical work in the water sector (REC 2004), although the WWF is a major contributor in the Carpathian and DRB program.

The more holistic handling of water management – Water+Agro+Environment_ - is still at the beginning (Sustainable Spatial Development Program, WFD implementation, ICPDR Flood action program).

7. Scale dimensions

Main drivers of water policies in the TRB counties are the national context (with different levels of value, i.e. priorities placed on water resources depending on their economic status), the WFD and EU legislation and the international cooperation mechanisms (Danube River Protection, Carpathian and UN/ECE conventions, Sustainable Spatial Development).

At the national and the TRB level, the economic implication of flood management and pollution – triggered by recent events - play a major role, both in public awareness and institutional set up. This is shown by good transboundary cooperation and the establishment of a pragmatic coordination outside existing multilateral agreements (Tisza River Forum).

The non-participation of Ukraine and Serbia-Montenegro in the UN/ECE convention on Transboundary effects of Industrial accidents indicates different priorities of environmental versus economic values, and resources, respectively.

The 2004 memorandum of the TRB countries tries to give multilateral cooperation a new momentum. It has to be accepted, however, that harmonisation of political regimes and the build up of capacity and common trust will require time .

Time scale: The new philosophy of flood protection (the Action program for sustainable Flood protection in the Danube River Basin (2004), The new Vazarhelyi Plan (accepted 2003 by the Hungarian government) and the Tisza Flood plan imply

significant planning periods (2009) and implementation and monitoring horizons will cover the best part of the century.

8. In Summary

The following summarizes some key changes and differences in the region (Greencross 2003):

Shifting responsibilities	Change from state domination towards a more regional/local autonomy. Building of new networks and trust (in progress)
Incoherence of legislation/policies	Many new actors increase risk of conflicts New legal/political framework/guidance (WFD) needs to settle. Multi-sector and new ownerships, privatization
Different governance systems	New basin wide approach: interregional coordination, information exchange between countries which are highly centralized (UA), and which have a set up with local prime responsibilities (HU)
Lack of resources, capacities	particularly local authorities, demonstrated by poor information and data handling
Public participation	in development, promoted by WFD Transparency (also of funds) to keep (re-gain) consumer trust
Economic, holistic approach	in progress, but at different speed in the countries

There is a growing recognition for an integrated River Basin Management and the Tisza countries are committed to a joint approach and closer cooperation in the TRB. However, the question is the practical functioning of the transboundary work, in capacity and resource terms and the degree of possible institutional and administrative harmonization (also in terms of EU obligations per country).

There are 5 political systems with a different speed of development and with national institutions, which are not necessarily compatible across borders.

The relative status of bi-lateral and multi-lateral agreements is still emerging (FAO 2003) and the necessary level of trust has still to be established.

Although the ICPDR has been accepted as the umbrella for IRBM, it has to be seen whether it has the capacity to go in sufficient detail at sub-basin level or whether supportive sub-basin constructions have to be installed.

9. Scoring Card : Tisza River Basin

<p>Formal Actors</p> <p>1. Cross-sectoral cooperation (national)</p> <p>2. Cooperation between administrative levels (national)</p>	<p>Overall: National: centralized</p> <p>Basin wide: decentralized</p> <p>National cross-sectoral and administrative cooperation country related, SK and HU, RO more developed, S-M regionally organised.</p> <p>Regional/local responsibilities increase</p> <p>Water/Agro/Environment: still inter-ministerial competition,</p>
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3. Cooperation international/transboundary	<p>WFD and CAP need more harmonisation and down-delegation of responsibilities</p> <p>Many bi-lateral agreements, supervised and run by different levels, thus limited efficiency ICPDR but negative scale effect (Tisza only sub-basin) Tisza water forum mainly flood oriented Sustainable development programs CEE-WFE dialogue a begin for a more holistic approach</p>
<p>Informal Actors</p> <p>4. Water is a key political issue</p> <p>5. Legal provision concerning access to information, Decision making</p> <p>6. Non-governmental Stakeholders undertake parts of RBM themselves</p>	<p>Only if it has direct economic relation</p> <p>WFD, but implementation of PP weak, due to weak informal actor sector No broad stakeholder participation , observer status</p> <p>No info (unlikely)</p>
<p>Policy development/implementation</p> <p>7. Flexible measures, keeping options open</p> <p>8. Experimentation, Alternatives are discussed</p> <p>9. Actual implementation of measures</p>	<p>Tisza Flood plan considers new concepts (more space for water, conservation of environment) But still relative short term, long way to go Models and small scale experiments (Ekenberg 2003) Anticipation, uncertainty weak Very much at the beginning, disappointing results</p>
<p>Information Management</p> <p>10. Joint/participative information production</p> <p>11. Interdisciplinary production</p> <p>12. Free access and exchange</p> <p>13. Joint modelling and self-reflection</p> <p>14. Considering of uncertainty</p> <p>15. Broad communication</p> <p>16. Utilization</p>	<p>Coordinated (for example by international commissions or programs, Tisza Forum) but relative individual/national information production</p> <p>To some extend, but a lack of joint analysis</p> <p>Restricted due to financial and retrievability constraints</p> <p>ICPDR, Tisza Forum, Tisza river project, CEE-WFE, REC and others: all do something in that direction Question: how much processed and directed toward decision makers</p> <p>Flood related information to a certain degree Spatial planning and land use still to be integrated</p>
<p>Financial</p> <p>17. Use of public and private money</p> <p>18. Damage costs</p>	<p>Costs are mainly covered by the government High fees for drinking water and sewage Some privatisation particularly in Hungary Basically no public money available for investments</p> <p>Covered by the local government Transboundary liability still in discussion</p>
<p>Scale</p> <p>19. Timescale</p> <p>20. Problem scale</p>	<p>10 year horizons, short term solution oriented</p> <p>reactive (event) and national oriented</p>

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Tisza River Basin : Key programs

