



CABRI-Volga

Report

Deliverable D3

CABRI - Cooperation along a Big River:
Institutional coordination among stakeholders
for environmental risk management in the
Volga Basin

**Environmental Risk Management in Large River Basins:
Overview of current practices in the EU and Russia**

EXECUTIVE SUMMARY

The Executive Summary of the CABRI-Volga D3 Report “Environmental risk management in large river basins: Overview of current practices in the EU and Russia” presents the synthesis and major findings from analytical part of the document.

It summarizes findings from present practices, problems and examples of problem-solving within water-related environmental risk management in large river basins of Europe with a major focus on the Volga Basin in the European Russia. Its focus is on registry of existing practices in institutional capacity building and coordination between stakeholders towards environmental risk reduction in large river basins. Coordination and stakeholders partnerships are regarded among innovative tools in good water governance.

The Executive Summary contains both the results of CABRI-Volga expert assessments and insights from particular cases of current practices in the EU and Russia compiled by the project partners. It assembles examples from a variety of existing practices in river basins, e.g. how things are done in environmental risk management – within research projects, R&D and modeling experiments, technical solutions, vulnerability assessments, decision-making frameworks, programming and actions plans, economic tools and incentives, legislative, administrative and other institutional and policy options.

The Executive Summary follows the structure of the D3 Report, and it consists of three sections:

- I. Integrated Water Management
- II. Flood Risk Reduction
- III. Institutional Coordination and Cooperation between Stakeholders

I. INTEGRATED WATER MANGEMENT

1. Integrated water management is a conceptual approach to water problems, planning and practice...

Integrated water management (IWM) is a conceptual approach to water problems, planning and practice in water resources use and water resources protection/conservation. Today there is a variety of perceptions and notions related to IVM. Typically this approach stresses three main interrelated components: 1) combination of economic, social and ecological uses of water, 2) cross sectoral water management, and 3) institutions at various levels. Institutional coordination and stakeholder partnerships being a tool in good water governance have a direct link and are heavily rooted into IWM.

From a very broad and complicated theme of integrated water management several topics had been in the core of CABRI-Volga discussion at the 1st Expert Group Meeting in Nizhny Novgorod¹. They include: 1) water quality regulation; 2) river basin management, 3) monitoring and data dissemination to stakeholders, 4) multi-stakeholder partnerships for rivers rehabilitation; 5) transport mobility and clean river navigation. All of them comprise structural elements of integrated water management approach in large river basins.

Current practices and problems encountered in application of integrated water management approach were discussed between the experts from the EU countries and Russia. The

¹ This chapter synthesises discussion held in three CABRI expert groups (EG): EG1: “River environmental rehabilitation”; EG3: “Sustainable use of water resources”; EG4: “Connecting goods and people”.

emphasis has been on experiences in integrated water management within large river basins in the European countries with a special focus on the Volga Basin. Comparisons of practices and lessons from domestic practices in these countries and in cooperation between them indicate at interesting results and allow learning from each other.

2. Water quality standards in Russia are very strict and, thus, sometimes difficult to comply with...

Regulation of water quality in the rivers, water quality standards and mechanisms used for their enforcement is a key element in integrated water management. Today, water quality standards in Russia are very high. As a result, they are difficult to comply with and often are ignored². In contrast, the EU and Brazilian standard setting focuses on 1) designing a system of standards which 'fits into particular purpose', 2) differentiating standards according to functional use of a water body, 3) ensuring coherence between standards applied to different water segments, and 4) having a vision of a long-term target, but setting realistic and attainable intermediate goals ('build upon success as success motivates'). It is important to move step-by-step from non-strict standards to more stringent ones.

Although, some institutional uncertainties remain in Russia regarding division of competences between various government bodies to set standards and to control their enforcement, the coordinating system is quite similar to the practices in the EU. In Russia, Gosstandart is responsible for setting water quality standards, while control organs of Sanedidemnadzor and the Ministry for Natural Resources and their territorial branches are responsible for their enforcement. In most EU countries, one organization has the task to develop and set standards, while water management authorities are responsible for control over meeting the targets set up by a standard. Russian system for standards setting is presently being further reformed, and it is necessary to ensure more effective control over the compliance with norms and standards, and also to define mechanisms to properly motivate the users to meet the standards.

3. Regulation and control over waste water discharges is an essential part in integrated water management...

Regulation of waste water discharges is among priority issues for many river basins, and it is particularly important for improving, or safeguarding water quality. Polluter pay principle (PPP) is one of the economic mechanisms applied today by many countries. In Russia, the system of payments by polluters for their sewage discharges (within and above the allowable limits) is fixed in the existing national environmental legislation. Recently, there have been some changes in this system – with a shift from previous special environmental funds accumulating the pollution charges, to direct transfer of generated finance into territorial and federal state budgets. Currently, 19 percent of collected payments go to the federal budget, while 81 percent is accumulated in the territorial consolidated budgets of the federation subjects (with about a half of this amount transferred to the local budgets). However, the PPP implementation in practice is not effective enough to provide incentives for polluters to change their behaviour, to make investments to modernise their technologies and to reduce the pollution level.

To compare: licenses are given for sewage discharge in the Netherlands. Fees are paid depending on pollution level; a fine has to be paid when limits are exceeded, and in severe cases court action is taken, and an industry might be closed down. The taxes go into a fund which is used a) to give subsidies to enterprises to develop/implement improved technologies and b) to fund enforcement and monitoring. In the Netherlands a long-term perspective is taken: polluters know in advance that taxes will be increased in a period of, for example, 10 years. Responsibilities for enforcement are clearly allocated. The Ministry has an Inspection body, which assesses the agencies responsible for enforcement. The Dutch system has a stepwise approach with incentives to invest in technologies for pollution reduction

² Although according to some parameters the water quality in the Volga is improving and in general it is better than in some rivers in the EU (see, CABRI D2 Report), the drinking water quality is still poor.

4. Basin management approaches are becoming a common practice in the EU and in Russia...

It is becoming a common practice in the EU countries and in Russia that good water governance is based upon basin management approaches. They are started to be more actively applied in practice. In the EU the WFD prescribes the basin management approach for all countries and stakeholder groups, and also that their actions within a river basin district are coordinated. River basin district is regarded as a main unit for management of the river basins. Similar approach is consolidated in Russia by the new Water Code (for details, see CABRI D2 Report). In Russia, since recently basin management approach has been the basis for water-related programming activities. For example, it was applied by the Volga Revival Programme and the GEF Dnieper Project. These programmes were grounded upon a strong scientific basis; however, the implementation of these initiatives in practice was rather weak. One of the problems today is that despite some efforts to integrate the specific economic and social factors inherent to particular basin areas into the basin management, they are not sufficiently taken into account in water practices.

Improving the institutional context of the water management in the Volga Basin is essential. According to experts, an organization, i.e. a special basin agency, or a basin council with clear responsibilities in water management and clear mandate in coordination between various stakeholders and different administrative levels is needed. Lessons from current practices indicate that cross-scale administrative coordination is equally important for the Volga rehabilitation, and especially, involvement of the local level and municipalities is crucial. Currently, the national institutional framework is enacted to provide new broader competences to the Volga municipalities. Their taking part in basin partnerships would allow using similar models as in many other countries of Europe, as for example, in Germany where much greater responsibilities are given to municipalities: while the central government support exists, the municipalities have a chance to represent public opinion and address their concerns.

5. Regular basin-wide monitoring and data sharing are among preconditions for integrated water management ...

In the past, hydro-meteorological and environmental monitoring in Russia was well organized and coordinated ensuring high comparability of data. Unfortunately, this strong network has been dismantled during the nineties in a course of the transition period. It is necessary to restore and maintain multi-level monitoring infrastructure in the Volga Basin. Nowadays some companies (for example, LukOil, RAO UES) conduct their own environmental monitoring in the Volga Basin: they often possess updated environmental information, which is not made widely available to the general public and experts; also there are some doubts concerning its quality and reliability. State bodies are usually not too open to share the data. In many cases information exchange between various organisations in Russia is hampered by a variety of reasons, including charges for data by its producers. Not everyone can afford to buy data. Although Hydromet is a leading agency responsible for hydrological data compilation, only a fraction of all data collected in the Volga Basin reaches the Hydromet Data Centres. As a result, the information from different regions of the Volga is fragmented, and it is difficult to get a complete inventory. Integrated water management in the basin can be effective only if it is based on profound information, while water managers have to have unrestricted access to data. In addition, provisions have to be made to ensure an easy data exchange among all actors involved. Tighter links and coordination should be established between monitoring and application of its results in decision-making in the Volga.

In the Netherlands, a gap exists between policy/decision makers and scientists who design and implement monitoring programmes. Monitoring is essential, but often it is considered to be too expensive. Usually, it deals with different elements (water quality, ecology, chemistry), and different bodies are responsible for it. Almost each decision-maker considers that an amount of information supplied to him is excessive compared to what he needs. As a result, the impression is created that considerable resources are wasted (so-called, "data rich-information

poor” syndrome). Thus, it is essential that 1) decision-makers are involved in defining what particular data sets are required, and 2) compilation of data is to be user-friendly and presented to policy-makers in a clear and synthesised manner.

6. These days communication to the public is becoming a ‘must’ in integrated water management...

Communication of information to the public is essential for proper water management. Water related data and information about practices and problems should be clear and understandable for a layman, but this goal is very difficult to attain. A Dutch study where the public and experts were brought together is an example thereof. Both parties were asked to explain how they view water quality. The public and experts had a completely different perception of water quality terminology and therefore it was very difficult for them to understand each other.

Sharing and circulation of information is critical to mobilising public support for actions towards rivers rehabilitation. There is a lack of public awareness in the Volga Basin related to water quality, water related risks and management problems. This is also a result of a limited number of mechanisms applied in practice to promoting wide access to the required information. Information is often biased reflecting approaches of a particular interest group. Few people are interested in ecological information, although in general the public is not satisfied with the state of the environment. People are still rather inert and heavily rely on government action and protectionism. It is necessary to establish close links with mass media and make all water quality information easily accessible, understandable and transparent. Local NGOs can be a powerful driver towards problem-solving.

7. River transport is among key water users and ensuring that rivers are navigable and facilitate mobility is among prior concerns within integrated water management in river basins....

The river transport is among key water users. Integrated water management in river basins presupposes cross-sectoral coordination of transport with other water users, promoting navigation and transport mobility for people and goods, ensuring that rivers are navigable and ecological considerations are met. The results of CABRI expert discussion on practices and problems in transport mobility in the Volga Basin present the following ranking of current needs: 1) improve the urban mobility situation, 2) develop a unified Volga Mobility Master Plan “2010”, 3) establish a coordination mechanism for passenger and freight transport, and 4) reduce water pollution. For example, according to expert opinion, among priority problems related to ecological impacts of river transport in the Volga Basin is control over pollution from vessels, including oil spills, improvements in hazardous goods transport over the waterways, stimulation of programmes for fleet modernisation, and control over pollution from small boats.

The Volga and other rivers in the Volga Basin are natural barriers to urban mobility, but also have the potential for being integrated as transport ways in the public transport system of a city. The water-taxi scheme currently implemented within the EU CIVITAS Initiative in Rotterdam serves as an innovative example. However, it needs to be considered that the rivers in the Volga Basin are frozen for about half of the year. The level of present coordination of transport mobility within the basin is low. There is neither any integrated mobility plan, nor the body that would be able to develop integrated Mobility Master Plan for the entire basin area. At the same time the coordination between water policy fields and territorial units is needed. Additional measures to facilitate its development include: overcoming segmentation of authority, setting clear targets, lobbying at the national level; “Matryoshka” master plans and increasing political weight. Coordination mechanism for passenger and freight transport is also necessary. Combined transport or more generally intermodal transport has enormous potential to extend the range of freight transport possibilities and to avoid congestion. There are numerous innovative projects of this kind in Europe. For example, the EU research project ALSO Danube aims at promoting the use of inland waterway as a key mode of intermodal door-to-door transport chain.

8. The Volga Revival federal programme has been a unique example of coordinating multiple efforts towards environmental amelioration in the basin...

The Volga Revival Programme, 1998-2004 has been among the most important national programmes aimed at environmental amelioration and sustainable development in the Volga Basin. It has been a success in practical action towards coordination and cooperation among stakeholders, especially in developing interaction between science and decision-making, and in joint action of the federation subjects located in the Volga Basin. Among its participants had been administrations of the 39 federation subjects, about 11 ministries and agencies and over 60 research institutes and organisation. Corresponding regional programmes had been introduced in the Volga regions. Its design was based on the use of integrated water management approaches, on cross-sectoral and multi-scale coordination within the entire basin area. It included ten major directions of practical activities organized into its sub-programmes, as well as a set of future quantitative targets for ecological amelioration in the Volga Basin. Despite early termination of the programme (against 2010 as initially planned), a number of its sub-programmes demonstrated good results in certain improvements of ecological situation and in environmental problem solving. For example, during 1995-2002 waste water discharges in the Volga Basin were reduced by 15 percent partly due to programme measures (about 54 water treatment plants were put into operation), but partly due to decline in industrial production as a result of economic crisis. This programme is assessed by the experts as a unique example of institutional coordination activity with a strong scientific basis, but facing a number of implementation problems caused by a mixture of financial and institutional reasons. Although its effectiveness is a combination of success and failures, at the same time it is regarded as a truly important lesson for future planning and coordination for ecological amelioration within the basin and for enhancing bottom-up initiatives in the field. Indeed, Volga Revival has contributed to creating common perceptions of existing problems and to finding means to solve them.

9. Eight years of interdisciplinary research within bilateral Volga-Rhine project generated important results for integrated water management in the Volga...

The Volga-Rhine project, 1998-2006 is a German-Russian cooperative research supported by the German Federal Ministry of Education and Research and the Ministry of Industry, Science and Technologies of the Russian Federation. Massive anthropogenic interference makes the Volga system extremely complex and vulnerable, and conflicts between stakeholders, ecology and economic development are unavoidable. The project focuses on the water quality and water quantity in the Volga Basin. Concepts for an integrated river basin management and a sustainable use of the natural resources of the Volga catchment are to be an important outcome, as well as technology transfer and capacity building. To check if the concept is suitable for different rivers, there are parallel studies conducted on the river Rhine. The project is divided into seven subprojects: 1) Impacts of congested areas and dams on water quality and drinking water supply in Nizhny Novgorod region, 2) Sediments quality and origins of pollutants accumulated in the sediments, 3) Quantification of erosive discharge of nutrients and development of land-use concepts, 4) GIS-supported hydrodynamic-numerical modeling for flow simulation of the Volga River, 5) Hydrological modeling of the catchment for the forecast of the flow and pollutant transport in the river channel, 6) Exploitation of Volga cascade: energy production and ecology, and 7) Development of concepts of hydraulic structures for the improvement of the operational safety. Exchange and use of experiences and results of the IKoNE and Elbe DSS discussed below is an integral part of this joint initiative.

10. Practices in Europe indicate that cross-sectoral coordination and stakeholders cooperation is essential for integrated water management...

In practice, application of such tools as coordination and partnerships is expanding at various administrative levels. For example, in Germany, the federal state governments and local authorities (cities, districts and municipalities) are responsible for enforcement of water

regulations. The Water Resource Administration of the federal state Baden-Württemberg³ implements in practice integrated approach to water management. IKoNE project “Integrating Conception of the Catchment Area of the Neckar River” adopted in 1999 is an example of current practices of this administration in integration and coordination between various directions of water management within a single river basin. IKoNE project coordinates the river-related measures, including: (1) quality of the waterway, (2) structure of the waterway, (3) flood protection, with other local development plans and integrates other sectors planning. It is performed in the Neckar River Basin – the biggest river⁴ of this state with about half of its population residing in its catchment area.

Its approach is based on promoting cooperation between various stakeholders of the basin and creating partnerships. It also suggests a river-basin action framework for water resources management within the entire catchment area of the Neckar River. The objective is to preserve and improve the rivers as living spaces and lifelines of the landscape as well as important natural factors for business locations. IKoNE addresses citizens, industry and business, associations and authorities. It defines and bundles the multiple tasks of river management into action programs. This includes measure-related action programs and action plans which are set up in order to compile basic data. Communication is of special importance within IKoNE and it aims at presenting the water resources management in a convincing way; creating confidence, influencing behavior and winning cooperation partners.

11. Among pressing current endeavors is how to communicate scientific knowledge to decision-makers in a user-friendly manner...

*The Elbe DSS: Development of a **Decision Support System** for the Elbe River Basin* initiative has exactly the above goals. Since the methodology and the instruments for integrated river basin management are quite scarce, the German Federal Institute of Hydrology (BfG) has initiated the project “Towards a Generic Tool for River Basin Management”. The goal is to develop a prototype decision-support system which helps the water managers to formulate an effective strategy for sustainable management of the Elbe Basin. It is to help to provide knowledge to administrators and decision-makers on interactions of natural and anthropogenic factors within a river basin. A key aspect of the design is the combination of process models and data from different scientific disciplines in an integrated systems network. Water management within a river basin is a complex task and it requires integration of a number of topics; the DSS format includes: 1) water quality and reducing pollutant loads, 2) flood control and flood risks, 3) ecological state of floodplains, 4) navigability. It also takes into account external scenarios such as climate change, agricultural policy and demographic developments. A pilot version of the DSS was completed in 2005 and its results were presented to the authorities. It is a useful tool for decision-making that allows the user to assess the impact of selected measures and alternative solutions. The system is user-friendly and practice-oriented because the development of DSS was based on a participative approach – the requirements of possible users such as local authorities, nature conservation organizations and others had been taken into account. The DSS has a modular structure so that individual elements can easily be exchanged or added. The format of this project is applied to the Volga Basin, and the Oka River DSS has been already developed.

12. Special water protection regimes in riverside areas are a part of integrated water basin management...

³ The state of Baden-Württemberg in Germany is one of its 16 federal states. It is subdivided into 4 Regional districts, each of them having a Regional District Authority. The city of Stuttgart is the legal seat of the State Government, the State Departments and one of the Regional District Authorities.

⁴ The Neckar is the biggest river flowing from its source to its mouth within the state of Baden-Württemberg, its catchment area of about 14,000 km²

In Russia, new water management practices suggest special regimes for the riverside areas that are especially attractive for residence, leisure and for economic development. Such practices promote water protection and water conservation in a river basin. The tools applied include, for example, the legal zoning of riverside areas, special water protection regulations and norms, including limitations and bans on certain types of activities, setting up strict territorial limits for water protection zones along the banks of water bodies, as well as land-use planning and flood protection. Special regimes for the riverside areas are established by the Water Code, by the Land Code and by the City Planning Code. A number of the cities in Russia, including those in the Volga Basin, e.g. Nizhny Novgorod, Kazan, Samara, Perm gained interesting experiences in development of building regulations, in re-profiling the land-use and in establishing special regimes for riversides within urbanized territories. Integrated water management approaches are applied for the riverside areas rehabilitation and development.

II. FLOOD RISK REDUCTION

13. CABRI-Volga favors the proactive approach with combination of flood prevention, emergency response and rehabilitation practices...

Floods are natural hazards that become disasters when they interact with human society. Natural factors are the main cause of catastrophic floods. However, anthropogenic interventions have modified the natural characteristics of extreme floods. Recent catastrophic floods in Europe and in the USA have shown that human activities and traditional river engineering works may result in an increase in the frequency of extreme floods and have negative economic consequences. Human activities, especially changes in land-use patterns and engineering works, are a key factor affecting the impact and magnitude of medium and small-scale flood events. Two different attitudes to flood management prevail. The first is to consider the flood as a random natural disaster and to only respond on an ad hoc basis through emergency programmes. The alternative, favoured within the CABRI-Volga project, is to recognize that floods are recurring phenomena and to adopt a proactive and strategic approach including combination of mitigation measures with emergency response and rehabilitation. Equally important is incorporation of disaster risk reduction into sustainable development strategies. Technical solutions alone, such as dams and dykes are not adequate to ensure human security in a long term. Structural and non-structural measures should be integrated and considered at the same time, instead of one after the other. Coordination, integration and packaging of a variety of response policies, measures and tools are essential for living with floods.

14. Local population needs to be prepared, but not scared of a coming flood...

There is a growing understanding today that it is important to raise awareness, particularly among people living in flood prone areas. Local population needs to be prepared how to act during disastrous events and how to prepare for them. It is to be an active force involved in real actions at all stages of flood mitigation. Practice shows that information exchange at all levels, cooperation between local authorities and the public in development strategies for integrated flood management is essential. Public participation is especially well developed in the Netherlands, where the way of life and the perception of risk have been addressed within integrated flood risk reduction approaches. In contrast, in Russia, although traditional knowledge of local population is very rich, the interactions in practice between the government authorities and the local public are at initial stage of their formation. Prevention of flood damages requires an organized, well-aimed and integrated cooperation of many different partners of administration and society. Besides early warning of population and raising its awareness about floods, the regular maintenance of infrastructure is a key element in enhancing security in local livelihoods against floods.

15. Usually major cities are better protected from floods than small towns...

Current practice worldwide shows that major cities are often better protected against floods than small settlements, and special focus should be made on problems the rural communities and small towns are facing. The case study from Greece on flood protection of small towns illustrates methodology for flood management based on multi-objective planning under risk. Coordination of a variety of possible decision-making options is becoming of a particular importance. Alternative remedial structural and non-structural solutions are analysed to protect the inhabited area and important public buildings from possible extreme floods in a small town of Heraklion, Crete Island where a devastating flood occurred in 1994. After this extreme event the Organization for Eastern Crete Development (OANAK) financed a research project carried out by the Aristotle University of Thessaloniki. The use of engineering risk analysis and multi-objective decision-making under risk are considered as tools for (1) protection from extreme floods at small scale, and (2) floodplain management at the catchments scale. Distinction is made between the local scale of protection from floods and the catchments scale planning. On the local scale, protection measures are based on traditional techniques involving hydrological and hydraulic modelling of two-dimensional unsteady flows. On the catchments scale, a multi-criteria trade-off approach is used for choosing between different alternatives. By combining three structural solutions, five major alternatives are investigated. The main objectives for ranking these alternatives are a) costs and benefits, b) risk of failure, c) environmental impact and d) social effects. Alternative with 'regulation of the downstream part of the river + storm detention basin tributaries network of T=30yr floods' appeared to be the most appropriate for satisfying the multiple objectives. The methodology can be applied to different water basins.

16. Reliable flood forecasting systems is an important component in flood risk reduction practices...

Recent large floods in Europe have emphasized the need for reliable flood forecasting systems. They are an integral element of flood risk reduction and they are extremely important for enhancing human security in the areas prone to floods. The example of the European Flood Forecasting System (EFFS) is presented. It is aimed at improving capacities of national water services with 4-10 day flood forecast, whereas warning time is generally between 0 and 3 days. Thus, it allows preventive measures to be undertaken, exposed population to be informed, water retention reservoirs to be emptied and additional emergency services to be prepared. The output of EFFS is a probabilistic assessment of the n-day ahead risk of river discharge accident ($n < 10$) for the whole of Europe at 5 km resolution. This output may be updated as the forecast lead-time is reduced. EFAS is a research project led by the EC's Joint Research Centre ISPRA, Italy and it is in a prototype phase of development. The model was applied to the 1995 Meuse River flood; the simulation of the event was developed in two steps. Cumulative distribution of the ensemble forecasts allows obtaining a good degree of precision for a lead time of up to 5 days, and then gives an idea of the probability of occurrence of an extreme event. The system is modular and allows adaptation in different river catchments. Other hydrological models describing the local hydrological conditions may be integrated into this system.

17. Indicators for assessment of global and local vulnerability and coping capacity of societies to floods are necessary for effective flood risk reduction...

Development, testing and application of indicators that assess vulnerability and coping capacity of societies to floods are important for effective disaster risk reduction measures. Some insights into theoretical fundamentals of vulnerability indicators are presented and they are combined with illustration of recent applications and results. Vulnerability indicator can be defined as an operational representation of a characteristic or quality of a system able to provide information regarding the susceptibility, coping capacity and resilience of an element at risk to an impact of an albeit ill defined event (flood) linked with hazard of natural origin. The usefulness of indicators in practice is determined by their success in identification, understanding the vulnerabilities to flood risks and their underlining factors. They are needed by decision-makers to enhance "knowledge for action". Practice shows that one of the most difficult issues relating to measuring vulnerability is collection of appropriate data. Development of vulnerability

indicators is a long process composed of several phases - from defining its goals, scope, selection criteria, set of necessary indicators to analysis of indicator results and performance.

In the last 5 years important initiatives and research projects were initiated to assess risk and vulnerability at global, national, sub-national and local levels. Two approaches are discussed to provide an overview of the current concepts: the first is the Disaster Risk Index (DRI) developed by UNDP for the global scale. In contrast, the second approach targets vulnerability and risk identification at the local scale adopted by the German Technical Cooperation (GTZ). DRI is based on a quantitative approach that allows comparisons between countries by building an index based on mortality; it has global coverage and a national scale of resolution. DRI is applied to cases of flooding, earthquakes and cyclones. GTZ shows a local disaster risk index approach using various variables. The Community-Based Risk Index developed by GTZ aims at identifying the vulnerability and the capacities of households and local communities to manage and overcome disasters, including floods. The BBC-framework ((Bogardi\Birkman\Cardona) addresses various vulnerabilities in the social, economic and environmental sphere. It is at the initial stage of application in Europe and Russia, including the Volga Basin rural households.

18. Flood protection and flood damage control requires high coordination and it is an essential part of integrated water management...

Present practices in flood protection and flood mitigation of Water Resources Administration of the Baden-Wurttemberg, Germany are discussed. This case illustrates the need for (1) tight institutional coordination and stakeholder cooperation in floods risk reduction, and (2) dealing with floods as a component of integrated water basin management. Approach and strategies of this German regional water management administration are based on the lessons learned from recent disastrous floods. They suggest that the priority objective is to reduce the damaging effects of floods, but not influencing the natural disaster. The former is far more complicated than tasks of hydraulic engineering, which are to provide technical flood protection. Prevention of flood damages requires an organized, well-aimed and integrated cooperation of many different partners at administration and society. Three coordinated sub-strategies are applied: 1) management of flood prone areas (land-use control and water retention), 2) technical flood protection (dams, dykes, river flood proofing, etc) 3) flood damage prevention (adaptation of constructions and buildings, flood preparedness and risk prevention through insurance).

In 2000, the German Ministry for the Environment and Transport formed a interdisciplinary working group (representatives of disaster control, municipalities, spatial planning associations, chambers of industry, water management authorities, insurance industry), which activities were very successful in Baden-Wurttemberg. It was quickly determined that flood hazard maps for all relevant areas were urgently needed. They serve as a basis to draw up precautionary and flood damage mitigation regional and municipal plans for the protection of humans and property, public and industrial facilities located in flood prone areas. Data is to be presented in an easy-to-understand form by the general public. This group also elaborated the "11-Point programme for flood damage mitigation" and "Guidelines for flood hazards and strategies for damage mitigation". In 2003, the Water Management Association of Baden-Wurttemberg together with the federal authorities started the Flood Partnerships in order to establish an exchange of experiences on "Preventive Flood Damage Protection" between cities, municipalities and water associations with a focus on developing flood danger awareness among decision-makers and public. The Action Plans on Flood Defense are to be prepared jointly by municipalities and civil defense authorities in order to coordinate actions of all stakeholders in flood protection and prevention within a catchment area.

III. INSTITUTIONAL COORDINATION AND COOPERATION BETWEEN STAKEHOLDERS

19. In practice, the river basin management in the Volga is a 'multilayered institutional pie' compounding water governance...

So far, basin management approaches are not effectively applied in the Volga. *Technical and scientific* questions within river basin management (RBM) are mingled with *governance* issues. Moreover, the RBM application needs to be coordinated within broader socio-economic context in the Volga regions. Existing 'situational' economic, political and social factors significantly affect RBM performance turning it into a complex multidisciplinary problem. It is also a difficult *multilayered institutional* problem which is deeply embedded into national institutional context.

The existing structure of government authority and dissemination/coordination of functions vertically and horizontally between bodies involved in environmental risk reduction in the Volga Basin overlaps with RBM application. Current system of four basin management administrations 'overlaps' with existing administrative system, and particularly with the system of environmental bodies in federal districts (Volga, Central, South, North-West). It also overlaps with another 'layer' of administration, i.e. within the 39 federation subjects in the Volga Basin with respective environmental and disaster risk reduction authorities responsible for certain segments of the River. The lack of effective vertical coordination between local-regional-federal levels negatively affects integrated water management. Existing uncertainties in division of responsibilities between authorities of various scales are perfect means to avoid responsibilities in practice. The approach "one river basin – one governing body – one programme" is indicated as important for effective water management. New expectations for problem solving are connected with the new Water Code entry into force in 2007. However, the newly introduced system of basin councils is combined with the existing system of government basin authorities. The shortcoming is that within this new institutional design the *basin management* still overlaps with *administrative management* approaches within the same basin.

20. Many environmental programmes with good design and 'progressive' goals had been suspended during the 1990s in Russia because their performance had been poor...

Not only the Volga Revival (closed in 2004), but many other important federal environmental programs have been recently suspended in Russia. Most of them had progressive goals, but they were facing implementation failures. The core reason for shortcomings is usually not in the programmes' design, but is rooted within implementation stage. It is associated with programme management and coordination mechanisms applied in practice. Although the design of the Volga Revival programme was based on an integrated river basin management principle it did not produce the expected results. Practice showed that various coordination problems emerged. Vertical coordination between levels indicated at significant problems. Loopholes in mechanisms for coordination of resource allocations are considerable, while insufficient funding for programmes implementation has been in the core. Corruption and misuse of funds had been a significant barrier towards the success; in that context control of resource flows is crucial as well as transparency and accountability in every-day life. Mobilisation of regional and local capacities and resources is equally important; broad perspectives are opened with development and testing the new schemes and mechanisms of vertical coordination within the so-called 'priority national projects'. At the same time financing and resource allocation problems are common to many countries in Europe, and quite often they appear to be not just a technical problem, but a political one. Weaknesses of environmental programmes in Russia resulted from serious economic and social problems of the transition period in the nineties. Combination of recent results of national socio-economic reforms with innovations in legal framework in environmental management are expected to help significantly to solving implementation and coordination problems in the Volga Basin.

21. Building effective interactions within the triangle "government–business–civil society" is a challenge for effective water use and water protection in Russia...

The domain of establishing effective interaction between the authorities, business and civil society is still a *terra incognita* for Russia, and a lot should be urgently accomplished as existing coordination mechanisms are really weak. It relates to developing institutional settings, including legislation, incentive mechanisms, coordination of resource allocations, tools and methods for support of partnerships between stakeholders, etc. Nowadays, the RF government makes a

special focus on constructing new framework for interaction with the business community. Consolidating environmental responsibilities of business is of a particular importance for the Volga Basin. Among the important goals is the modification of existing environmental mechanisms in order to overcome the problem that only modern and rapidly developing enterprises are interested in compliance with existing environmental regulations and in adherence to the “polluter-pays” principle (PPP), installation of new environment friendly technologies, in their products’ standardization, in building the ‘green image’. At the same time many problems are associated today with small firms-polluters, municipal facilities and water services providers. The problem is how to encourage and integrate small and medium size enterprises into water conservation and water protection. In Russia, unfortunately, businesses do not get yet many incentives from the government either for environmental activities or for developing interaction with the environmental NGOs. As a result, the aggressive image of business is a benchmark of nowadays, and this situation will prevail until new institutional frameworks are introduced by the state.

22. Importance of business-public partnerships in the Volga is growing...

Today, growing attention is paid to establishing partnerships between civil society and business. Some, especially large companies in the Volga Basin perform the function of ‘social responsibilities’ that are coupled with ‘ecological responsibilities’. They are involved in partial coverage of costs for dwellings for their staff, healthcare, education; Ammophos, for example, besides other social responsibilities supports the non-governmental centre “Drozd: Russian children are healthy”. Such practice of social support is widely spread in the West. Unfortunately, ‘charity’ funds recently established in Russia by some large companies tend not to include ‘environment’ in their agenda (exception – Fund of Vernadsky supported by Gazprom) and some of them are directly involved in political issues. Building regular and stable partnerships between civil society groups with business is a promising avenue for the Volga Basin. Some environmental NGOs that are active in the Volga area (for example, “Dront” from N.Novgorod) are seeking their niches to establish cooperation and identify common interests with the business community in the Basin. Such approaches are based on the perception that “business is able to improve the environment” and develop its environmentally responsible image, while environmental NGOs can help businesses to change their behaviour to become environment friendly.

23. Local public awareness and action really matters for the Volga revival...

Although higher public awareness has been among the priority directions of environmental reforms initiated in Russia during the nineties, the public participation is still weak, and ecology has been receding to the bottom of priorities of the local public agenda. Although some environmental NGOs are active in the Volga regions, they are much less developed than in the EU. Under these conditions, mobilization of the public and problem pressure groups for water protection and conservation is a promising tool for the nearest future. New patterns of interactions between environmental NGOs and authorities are being gradually developed. For example, although Dront is sometimes regarded as oppositional to the government, it develops cooperation with authorities, and particularly with the regional environmental agency. Particularly important is establishing the dialogue between the public and authorities in the Volga regions and locales as there are many examples from current practices that public participation is very far from desired (see, CABRI-Volga D2 Report). Among the burning problems is establishing the accountability and transparency of local authorities before the local public in environmental problem solving. Building institutional capacities for regular interaction of authorities with the public, finding means for expanding public involvement in decision-making and in environmental action are the avenues for urgent actions of government officials.

24. Road Maps in the EU-Russia cooperation envisage twinning partnerships and learning from each other...

The EU is regarded among important stakeholders that can have an impact on the decision-making process in environmental risk reduction in the Volga Basin. Cooperation of the Volga regions with their counterparts in Europe and twinning partnerships are of a growing importance as proved, for example, by the Volga Vision and the Volga-Rhine project. The latter contributed to particular aspects of problem solving during the freshet floods on the Volga and its tributaries, to Volga hydraulic modelling, and assessing bottom sediments. Starting from spring 2005, the Road Maps in cooperation between EU and Russia were initiated. There is an opinion that common environmental space should be in the focus of a special Road Map. It should not be diffused within common economic space, although there are close and integral links between them within sustainable development pathways. Specific project proposals for building common environmental space and development of international twinning might be a backbone for common environmental space formation. Good practices and tools for coordination between stakeholders in environmental risk management in river basins can be exchanged and transferred between Russia and the EU countries. However, national conditions, cultural, economic, social, political peculiarities are to be carefully taken into account. There is also an opinion that 'packaging and transfer' of practices across river basins, or across national borders might be misleading. In that respect, the alternative possible option might be learning from each other in creating capacities and building preconditions that promote equal access, effectiveness, transparency, openness in water protection and conservation within river basins.

25. Water management authority in the Po River Basin, Italy is among the most concerned about involvement of stakeholders and local public in a dialogue, consultations and consensus-building...

Interesting evidence from domestic practices in Europe in coordination and stakeholder participation in river basin management is presented by activities of the Po Basin Water Board (PBWB), Italy. Among existing river basin authorities in Italy it is probably the most concerned about involving the stakeholders and the public residing in the river basin in consultations, dialogue, defining plans and selection of programming instruments for the river basin governance. It was established in 1990 and since then it has performed several initiatives to involve into decision-making both local public and private entities from the basin area that are characterized, of course, by a variety of interests relating to the river. In order to improve the quality and effectiveness of management plans for the basin it seeks to: a) coordinate and make optimal use of knowledge, experience and initiative of different actors; b) obtain public support, consensus and mandate for decision-making; c) reduce conflict and misunderstanding of interests; d) provide transparency of PBWB decisions; e) promote constructive dialogue between all stakeholders. Its membership includes representatives of local authority associations, agricultural and industrial producers' groups, trade unions, conservation organizations and natural parks, cooperatives, etc. The scope of its competence relating to environmental risk reduction in the basin includes a combination of regulatory and management activities to maintain the hydrographic network on the river, to protect water quality and rationalize water use, to reduce risk of floods and to regulate land use practices. Its experiences and lessons learned from practical actions can be taken into account Europe-wide and in the Volga Basin while developing the coordination mechanisms towards good water governance.

26. River Basin Councils – is an innovative tool for coordination and partnerships between stakeholders which has been introduced in Russia in 2006 by the new national Water Code...

Among the possible tools for the coordination of interest of multiple stakeholders, for the establishment of a dialogue between them, for the enhancement of their cooperation and for the solution of possible conflicts between water users, the *river basin authorities* such as *committees* or *councils* have gained an increased and worldwide recognition. River Basin Council type organizations are today common to different parts of the world following different institutional models. The above example of good practices in coordination between

stakeholders from Italy is “twinning” with an example from Russia. The system of River Basin Councils (RBC) recently introduced by the new RF Water Code is an institutional innovation for this country. RBC has similar goals, i.e. to promote coordination of interests, consensus and dialogue between stakeholders, and to involve them into decision-making related to water protection and conservation within a river basin. It also has a broad representation from various water-users, local NGOs, indigenous people and government of various levels. In contrast to a variety of regulatory functions of PBWB in Italy it has a consultative status within existing national administrative system of river basin management. Among important items on RBC agenda is how to promote in practice the local public participation in a dialogue and decision-making, which is still a weak segment in environmental institutional framework throughout the country. Among the problems related to formation of RBC in Russia is that there is no culture when the public or water users have influence on how water is managed. The RBC could be the first step in developing such attitude to water management. They are to provide an opportunity to overcome one of the biggest barriers in the country: by establishing a dialogue between local public and government officials. How the RBC system will actually be implemented in practice according to a framework established by the RF Water Code is still a considerable challenge to river basin management in the country, in general, and in the Volga Basin, in particular.

27. Coordination institutions in the Scheldt Estuary managed to promote a shift from a long standing bilateral water-related conflict between Belgium and the Netherlands to cooperation and joint policy-making...

Interesting bilateral coordination water-related practices between the Netherlands and Belgium are illustrated by the ‘Scheldt Estuary⁵ case: from conflict to cooperation’. This region is a dynamic agricultural and industrial area, while estuary itself is important for navigation, fisheries and recreation activities. The Scheldt estuary has long been a source of conflict between the southern Netherlands and Flanders, Belgium as various conflicting interests of various actors in these countries relating to water-use and water protection exist. During several centuries a number of agreements had been signed between Belgium and the Netherlands and joint organs had been established to regulate and coordinate problem-solving. Among them has been the joint Technical Scheldt Committee (TSC) set up in 1948 to provide recommendations on water management and infrastructure and it is regarded as a turning point from bilateral conflict to cooperation and joint policy-making. Since 2001 the Netherlands and Flanders has been developing a joint long-term vision for the Scheldt estuary. They established the ProSes, the operational body for its implementation which successfully acts in coordination with TSC and the ‘multi-stakeholder platform’ (Consultative Committee of Advisory Parties). Among its initial tasks has been the elaboration of the development programme for the Scheldt estuary up to 2010 with wide participation of interested parties and local public. This development outline has three major foci: 1) flood protection, 2) optimum transport accessibility to the Scheldt harbors, 3) healthy natural environment. It does not address all water related problems: water quality issues are covered by the International Commission for the Protection of the Scheldt (The Netherlands, France, Belgium).

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⁵ The Scheldt Estuary is the downstream part of the Scheldt River Basin and it is situated in the northwest Flanders(Belgium) and the southwest of the Netherlands. The total area of the Scheldt Basin accounting for 21.8 thousand sq.km is divided between France, Belgium and the Netherlands; the length of the Scheldt river with its mouth in the North Sea is 355 km.