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REGIONAL OFFICE FOR EUROPE



GOVERNMENT OF ROMANIA



**BACKGROUND PAPER ON
WATER AND HEALTH
For the Workshop on Water and Health
Bucharest, 14-16 May 2008**

Prepared by DHI Water Policy and WHO Collaborating Centre for Water and Health at DHI



Introduction

The present Background Document has been prepared to provide the participants of the *Workshop on Water and Health*, (Bucharest, 14-16 May 2008) with a general analytical framework for water/environment and health sector links in Eastern Europe, Caucasus and Central Asia (EECCA) and with detailed information about the provisions of the UNECE/WHO-EURO Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes. This Protocol is a legal treaty, designed to reduce water-related deaths and diseases. The Protocol entered into force in 2005 and by April 2008 has been ratified by 21 countries comprising both countries from the European Union (EU), South-Eastern Europe and EECCA. Ratifying the Protocol requires countries to translate a number of general provisions into national laws and regulations and create administrative and economic frameworks to secure its implementation.

The background document further presents preliminary country experience of target setting, monitoring and reporting according to the Protocol and the economic and financial considerations related to water and health in the context of the Protocol but also in the wider context like the Millennium Development Goals of increasing access to safe water and sanitation.

The document aims at providing a broader understanding of water and health being closely linked, not only in the sense that water is necessary for any life, but also in a much broader economic, social and environmental context.

According to WHO, in the European region, lack of safe water and adequate sanitation is recognized as a major cause of child mortality and morbidity, especially in EECCA countries. Safe water and adequate sanitation in combination with improved hygiene have shown to be a cost-effective means to reduce health burdens. The first UNECE Assessment of Transboundary Rivers, Lakes and Groundwater in the UNECE region¹ clearly show that the contamination of drinking water sources in EECCA is significant. Actions to decrease water pollution from point sources (e.g. municipal and old industrial installations) are of primary importance. Outbreaks of diseases related to contaminated drinking water continue to occur in EECCA, but also in economically developed Western European countries. Available data analysed by the Organisation for Economic Co-operation and Development (OECD) from EECCA suggests, that the overall situation in the water and sanitation sector has deteriorated further, since it was originally assessed as critical in 2000.

Addressing the above problems and issues in a national and transboundary context is not a simple task. It requires strong policies and legislation, implementation and enforcement of regulations, well planned actions, well-capacitated institutions and availability of financial resources for infrastructure investments and management, and the engagement of stakeholders, not least the civil society.

Addressing water and health not only requires actions in the water and environment sector, it also requires building better health systems, improving health surveys and building better systems of early warning to water users.

¹ See <http://www.unece.org/env/water/publications/pub76.htm>.

Water supply, sanitation, waste water treatment and water management involves health, water and environmental managers. These are working under different policies and legislation and under the responsibility of different institutions. Improving coordination and cooperation among health, water and environment practitioners and including other stakeholders, like civil society and private sector, have shown to be an effective way forward in gaining both health and environmental benefits.

Climate change is also expected to impact water resources in EECCA countries, which again will impact the occurrence of water-related diseases. Adapting to climate change should therefore be integrated into national and local strategies and plans.

In the Ministerial Declaration of the sixth Ministerial Conference Environment For Europe in Belgrade 10-12 October 2007,² the Ministers committed to strive together with citizens, civil society and the private sector to maintain or improve a healthy environment for present and future generations. The ministers further recommitted to the declarations of the World Summit for Sustainable Development to strive for a sustainable development.

This is the context in which this “Water and Health Workshop” has been organized. This background paper will focus on possible solutions and less on a description of the actual health situations and relations between health and water, although it is realized that the information on health, water and environment can be improved in EECCA. The aim is to promote the understanding of the public health consequences of the work carried out by those responsible for environment and water management, water supply and sanitation and, at the same time, promote an understanding of the basic principles of water and environment management, water supply and sanitation by those responsible for public health.

The background document will in particular focus on the Water and Health Protocol and how it could assist EECCA countries to address the water/environment/health related issues in their own country and in a transboundary context. Therefore benefits and challenges related to its implementation are presented as well as tools and good practices.

Chapter 1 of the background document introduces the provisions of the Protocol. Chapter 2 presents good practices in the UNECE region on water and health related strategies and practical application of the Protocol. Chapter 3 presents experiences with target setting and establishment of early warning and surveillance systems and the successes and shortfalls already experienced by those countries which have progressed furthest with the implementation of the provisions of the Protocol. Chapter 4 presents economic and financial considerations related to water and health, including the Ad Hoc Project Facilitation Mechanism of the Protocol and basic approaches to financing of water and sanitation infrastructures. Chapter 5 and 6 present issues related to monitoring, reporting and compliance with the Protocol. Finally Chapter 7 presents a list of recommendations to EECCA countries based on the findings in the document.

This workshop, organized in collaboration with the Eastern Europe, Caucasus and Central Asia (EECCA) component of the European Union Water Initiative (EUWI), is held under the auspices of the UNECE Water Convention and its Protocol on Water and Health within the framework of the Project Capacity for Water Cooperation (CWC) in Eastern Europe, Caucasus and Central Asia. The workshop will also be a UNDP annual Water Community of Practice (CoP) meeting.

² <http://www.unece.org/env/efe/Belgrade>

The event is jointly organised by UNECE, UNDP, OSCE, WHO-EURO, and is also supported through the Environment and Security Initiative (ENVSEC). The European Commission supports the workshop organization as part of the EUWI - EECCA component. The Ministry of Environment and Sustainable Development of Romania hosts and co-organizes the workshop.

Chapter 1: The Provisions of the Water and Health Protocol

The Protocol³ addresses “water-related disease” and actions to prevent, control and reduce these. It defines water-related diseases as: any significant adverse effect on human health, such as death, disability or disorder, caused directly or indirectly by the condition, or changes in the quantity or quality, of any waters.

Water-related diseases comprise the following main types: a) diseases related to lack of access to safe drinking water, poor sanitation and insufficient hygiene or situations related to use of water likely to result in outbreaks or incidents of disease b) diseases related to exposure during recreational use of water like bathing c) diseases related to ingestion of food (plants or fish, shellfish) which has been exposed to contaminated water d) vector borne diseases associated with water, where water is the breeding site for disease vectors that play a key role in the spread of disease causing organisms e) non-communicable water associated health issues of which the effects of long terms exposure to inorganic chemicals that occur naturally in groundwater (like Arsenic) and exposure of chemicals from industrial and agriculture are most important.

The Protocol has provisions aiming to protect human health and wellbeing. This comprises adequate supplies of safe drinking water and adequate sanitation as well as a health system to survey the general health situation and situations which are likely to result in outbreaks or incidents of water-related diseases, like in cases of malfunction of the water distribution networks.

Further provisions aim at an effective protection of water resources, used as resources for drinking water, food production and bathing. This implies that there should be an effective reduction and elimination of discharges and emissions of substances, which are judged to be hazardous to human health as well as to ecosystems.

The Protocol requires Parties to take appropriate actions to develop legislation and policies as well as administrative and economic frameworks in which public, private and voluntary sectors can contribute to improving water management. What this means in practical terms will vary from country to country, depending on legislation on health and water management, the administrative set-up, including the status of implementation of integrated water resources management and basin management, established monitoring systems, financial structures and economic situation etc.

The Protocol requires Parties to prevent, control and reduce water-related disease within a framework of integrated water management systems (IWRM) through basin management approaches (see chapter 2).

³ UNECE and WHO, Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Full text available at http://www.unece.org/env/water/text/text_protocol.htm.

Infrastructure development, new industrial installations etc, may impact the water and environment, and thus also health. The Protocol therefore includes provisions to assess these impacts and take actions to reduce these to an acceptable level.

In taking measures to implement the Protocol, Parties should be guided by

- The “precautionary principle”, meaning that actions should not be postponed on the ground that scientific research has not fully proven causal links with health.
- The “polluters pays principle” i.e. the cost of pollution should be borne by the polluter
- The principles of “integrated water resources management” as laid e.g. in Agenda 21 and the key outputs of the World Summit on Sustainable Development (Johannesburg, 26 August – 4 September 2002).
- Equitable access to water
- Access to information and public participation
- Efficient use of water should be promoted through economic instruments and awareness-building
- Special considerations to groups of people particularly vulnerable to water-related diseases.

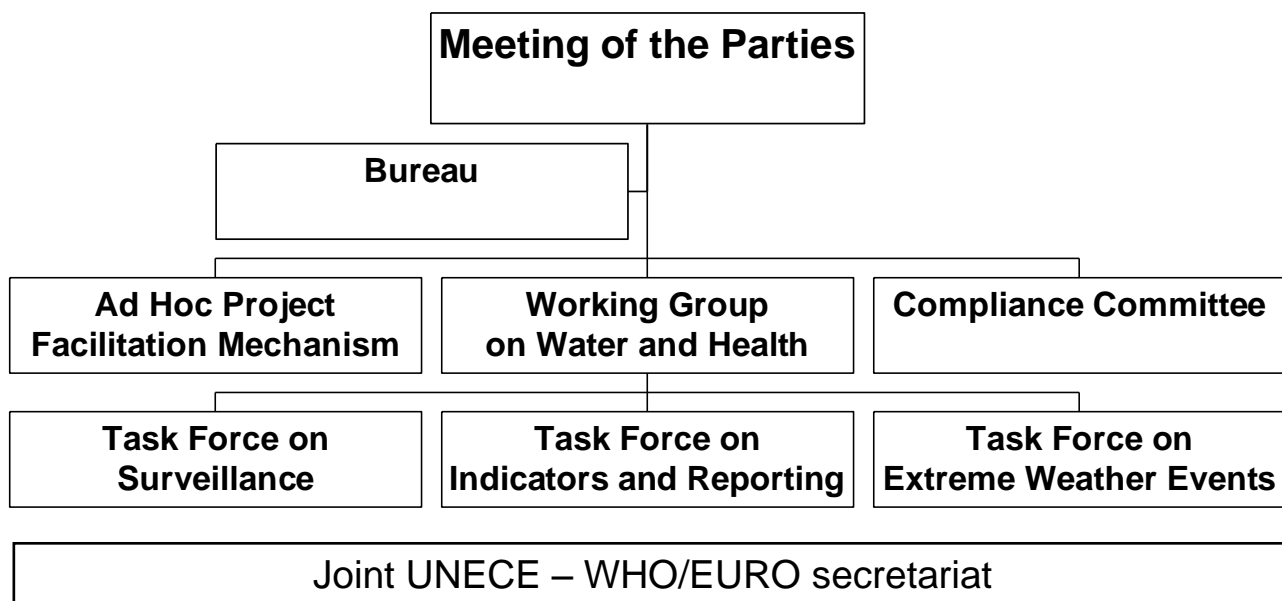
The two core obligations of the Protocol- which are the practical means to put into practice the above principles and objectives are: Setting targets and targets dates for water supply and sanitation, water management and health protection and establishing surveillance systems (see chapter 3).

Although the Protocol is a legally binding instrument, it also leaves much flexibility for action to the Parties. With its wide scope, the implementation of the Protocol will be a challenge for EECCA countries. It seems on the basis of reports from Parties which are EU members ⁴that the EU legislation makes it easier for these countries to implement the Protocol. However, many EU Member States do not have all elements of the Protocol in place either.

To assist Parties in the Protocol’s implementation and provide further guidance on the different Protocol’s provisions, the Meeting of the Parties – the Protocol governing body – adopts a triennial programme of work and establishes specific bodies to carry out the different activities.

The current organizational setting, established at the first meeting of the Parties in January 2007 is as follows:

⁴ National Reports on progress of Parties to implement the Protocol, reported to the First Meeting of the Parties, January 2007



In this context, the preparation of guidelines undertaken by the Task Forces set up by the Meeting of the Parties of the Protocol will be most helpful, but also the thematically oriented meetings organised by the joint UNECE/WHO-EURO secretariat of the Protocol and capacity building workshops like the present CWC workshop. The Secretariats of the Protocol – UNECE and WHO Euro - both have web- pages which can assist countries which are already a Party or countries which are considering becoming a Party (see table 1) with substantial information and guidance. The web-pages are: <http://www.unece.org/env/water/> and <http://www.euro.who.int/watsan>

Annex 1 show the list of Signatories and Parties to the Protocol.

Chapter 2: Good Practices in the UNECE Region

To address the water-related diseases it is important to understand the complex nexus between water/health/environment issues. While water pollution – as addressed in the UNECE Convention on the Protection and use of Transboundary Watercourses and International Lakes and in e.g. the Water Framework Directive- is an environmental problem, it is also a health problem.

Humans are directly or indirectly exposed to water through many routes, part of which are illustrated in figure 1, showing the freshwater cycle with a focus on water supplies connected to distribution networks.

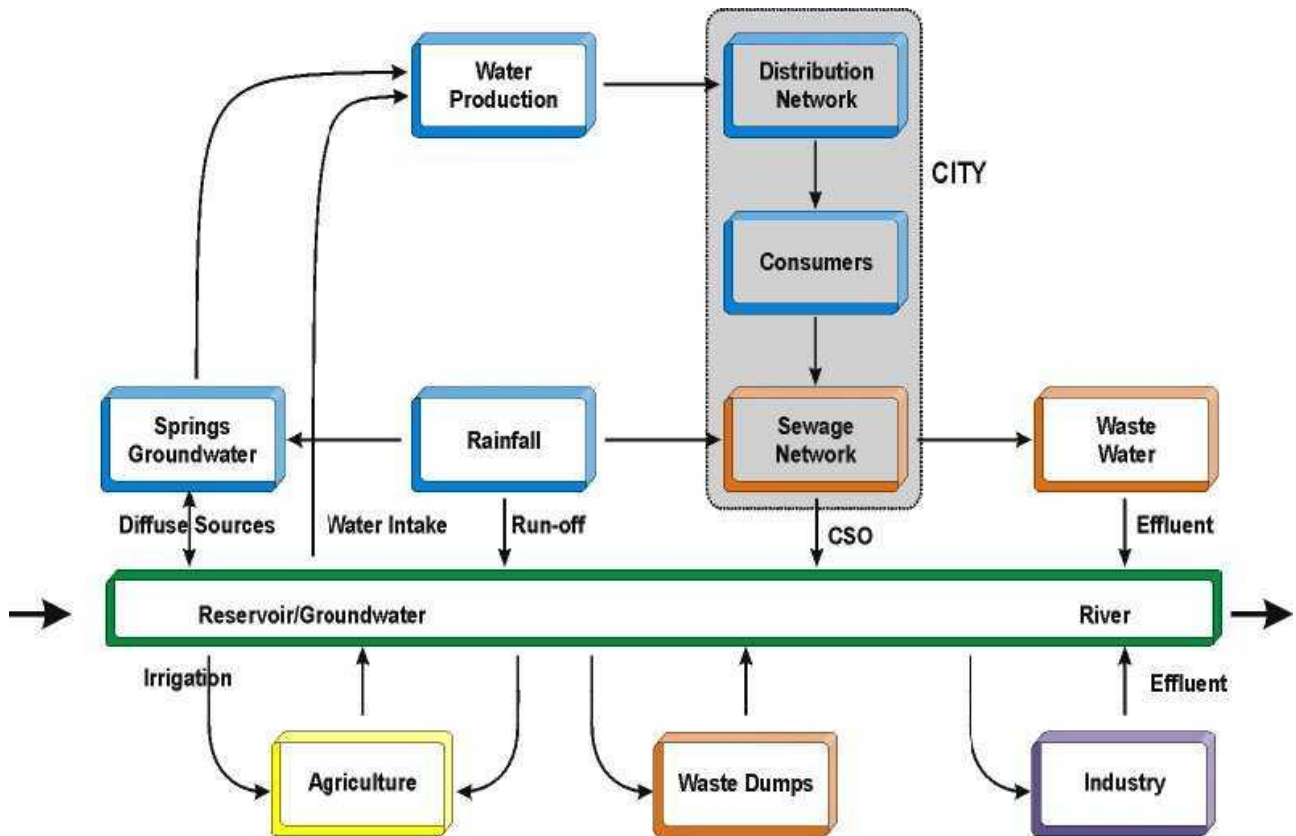


Figure 1: Freshwater cycle

The following part of this chapter presents examples of initiatives/tools/guidance on good practices of addressing water/environment/health relations in the UNECE region.

The examples below are organised in the following way. First an example of institutional arrangement is presented with focus on ways to coordinate and cooperate among key sectors. Then follow good practices of addressing health issues in drinking water systems and in freshwater resources planning and management. This is followed by examples of health issues in relation to use of recreational waters and reuse of waste water. Finally an example of a integrated water and health strategy is presented.

Forms and structures of institutional arrangements

To address water/environment and health sector issues, a solid institutional structure with broad representation from the most important sectors related to water/environment and health is fundamental.

In Hungary a Special Committee on Water and Health (SCWH) was initiated even before the first Meeting of Parties to the Protocol and formally transformed into an Inter ministerial Committee on Health on 24 January, 2007. The SCWH will act as a special sub-committee of the Inter Ministerial Committee on Health. Members of the SCWH are representatives of ministries for Health, Environment and Water, Local Government and Regional Development, Economy and Transport, Agriculture and Rural Development and several other agencies and organizations dealing with health and water.

The purpose of the SCWH is to coordinate the implementation of the Protocol as well as the implementation of legal instruments of inter-ministerial competence, to inform policy makers in water and health related matters and make informal arrangements to improve co-operation between the relevant ministerial departments. SCWH will also carry out activities to promote and assist public access to information in matters of water and health relevance such as setting up a website where to publish targets and target dates.

The Hungarian experiences show that coordination and cooperation between different sectors is very important in order to fulfil the vision of an integrated approach to improve prevention, control and reduction of water related diseases. It is also important to have representation of Ministries of Finance/Economy, as the Protocol implementation may imply additional investments. As implementation - in particular related to access to water and sanitation – will also take place at local level, the participation of local government representatives is crucial.

A major effort however is still needed to get „Environmental Health” issues higher on the national agenda, not only in EECCA but also in many other regions of the world. The traditional focus on „cure” rather than „prevention” in the health sector should be challenged. The Protocol with its holistic approach and focus on water-related diseases can be seen as a step in the right direction.

Water safety Planning⁵ - Managing drinking-water quality from catchment to consumer

Effective catchment management can decrease the contamination of the source water used for drinking water purposes. Management instruments for IWRM can, if water-related health and water quality issues are addressed, assist in making drinking water safer for consumers, in particular in cases where the capacity to treat source water for drinking water supply is low or non-existing.

Understanding the reasons for variation in source water quality is important as it will influence the requirements for treatment, treatment efficiency and the resulting health risks associated with the water to be supplied to consumers. Whether water is drawn from surface or underground sources, it is important to understand the characteristics of the local catchment or aquifer. The extent to which potentially polluting activities in the catchment can be reduced may, however, be limited by the pressures for increased development in the catchment. However, introducing good practice in reducing or eliminating microbial and chemical pollution through reductions of pollution at the

⁵ WHO (World Health Organization) (2004). Guidelines for Drinking-water Quality (third edition); Davison, A, Howard, G, Stevens, M, Callan, P., Fewtrell, L. Deere, D and Bartram, J (2005). Water Safety Plans. Managing drinking-water quality from catchment to consumer, Geneva, World Health Organization. WHO/SDE/WSH/05.06- http://www.who.int/water_sanitation_health/dwq/wsp0506/en/index.html; Stevens, M, Howard, G., Davison A, Bartram, J. and Deere, D (2004). Risk management for distribution systems. Chapter 7 in Safe Piped Water: Managing Microbial Water Quality in Piped Distribution Systems. Published by IWA Publishing, London, UK., Godfrey & Howard: Water Safety Plans (books 1 & 2). http://wedc.lboro.ac.uk/staff/staff_details.php?id=13; WSPortal hosted at WHO website: <http://www.who.int/wspportal>

source (cleaner technologies) or through waste water treatment is often possible without substantially restricting activities in the catchment.

Water Safety Planning

Water Safety Planning is a risk management tool - which is highly relevant for the Protocol and which can be made part of its implementation. Water Safety Plans can assist water suppliers and water managers in securing that safe water is provided to the consumers. Water Safety Plans should, by preference be developed for individual drinking-water systems. A Water Safety Plan has three key components:

- *System assessment* to determine whether the drinking-water supply chain (up to the point of consumption) as a whole can deliver water of a sufficient quality (meeting health-based targets). This also includes the assessment of design of new systems;
- *Identifying control measures* in a drinking-water system that will collectively control identified risks and ensure that the water has a sufficient quality.
- *Management plans* for the water supply system (from catchment to tap) describing actions to be taken during normal operation or incident condition and documenting plans and programmes.

Resource protection and source protection are the first steps in the protection of drinking water quality. Where catchment management is beyond the jurisdiction of the drinking water supplies - which is often the case - the identification of hazards, planning and implementation of control measures will require coordination with other agencies. These may include planning authorities, catchment boards, environmental and water resource regulators and land owners like agriculture and industry, whose activities have an impact on water quality.

Assessing the hazards in water abstracted for drinking water

Hazards and hazardous events that can have an impact on catchments and that should be taken into consideration as part of a hazard assessment include:

- rapid variation in raw water quality for drinking-water
- sewage and septic system discharges
- chemical use in catchment areas (e.g. use of fertilizers and agricultural pesticides)
- major spills, both accidental and deliberate
- human access through e.g recreational activities
- wildlife and livestock
- land use (e.g. animal husbandry, agriculture, forestry, industrial area, waste disposal, mining) and change in land use
- inadequate buffer zones and vegetation, soil erosion and failure of sediment traps
- stormwater flows and discharges
- waste disposal or mining sites/contaminated sites/hazardous wastes
- geology (naturally occurring chemicals)
- unconfined and shallow aquifers (including groundwater under direct influence of surface water)
- stratification
- algae and cyanobacterial blooms
- climatic and seasonal variations (e.g. heavy rainfalls, droughts) and natural disasters

Prioritizing hazards for control

Once potential hazards and their sources have been identified, the risks associated with each hazard and hazardous event should be compared so that priorities for risk management can be established and documented. Although there are numerous contaminants that can compromise drinking-water quality, not every hazard will require the same degree of attention. The risk associated with each hazard or hazardous event may be described by identifying the likelihood of occurrence (e.g. certain, possible or rare) and evaluating the consequences if the hazard occurred (e.g. insignificant, major, catastrophic). The aim is to distinguish between important and less important hazards and hazardous events. The likelihood of occurrence can be based on the result of the assessment as mentioned above. The consequence of the hazard can be based on information of the microbial, chemical and radiological contaminants. The WHO Guidelines for Drinking Water is a source of information which can be used for that purpose.

Control Measures

Effective resource and source protection includes the following elements:

- developing and implementing a catchment management plan, which includes control measures to protect surface water and groundwater sources
- ensuring that planning regulations include the protection of water resources (land use planning and watershed/river basin management) from potentially polluting activities and that these are enforced
- promoting awareness in the community of the impact of human activity on water quality.

Examples of control measures for effective protection of source water and catchments include:

- control of wastewater discharges
- control of human activities within catchment boundaries
- land use planning procedures, use of planning and environmental regulations to regulate potential water-polluting developments
- specific protective requirements (e.g. containment) for chemical industry or refuelling stations
- run-off interception
- regular inspection of catchment areas.
- Retention of water in reservoirs can reduce the number of faecal microorganisms through settling and inactivation.

Control measures for groundwater sources should include protecting the aquifer and the local area around the well.

Water Safety Plans – added values identified⁶.

Tulln water works in Austria serves a mainly urban population of some 15,000 inhabitants from two water works through a distribution network of some 140 km. Both water works draw water from a depth of 10 m. The water protection zones, of the two water works are 10 ha and 80 ha respectively. Water is blended to reduce potential high concentrations of nitrates. Chlorine is used only for protection during transportation prior to mixing. The blended water is treated with UV.

The utility started planning for a water safety plan from 2002. The following elements were identified as added value resulting from the introduction of water safety plans:

- Improved control over the catchment areas, through improved sampling and measures to deal with extreme weather situations.
- Improved microbial control, through an updating and upgrade disinfection processes
- Improved consumer relations, through higher consumer trust
- Improved information management; through improved availability of data for process control
- Further chemical parameters analysed, through installation of modern monitoring equipment
- Increased system efficiency; though improved data management and automated alarm systems
- Increased worker efficiency

Water Safety Plans in schools⁷

Women in Europe for a Common Future (WECF) is using the Water Safety Plan approach in working with school children to improve safe drinking water, sanitation and health. The aim will be to develop a Water Safety Plan “ToolBox” which can be adapted to local circumstances and implemented at the schools. The workshop will present more details on the “ToolBox”.

As the example from Tulln shows Water Safety Plans is by the users considered to have considerable added values. As the example of WECF shows, the concept also has a wide applicability.

Guidance material from WHO (see footnote 5) comprises guidance to establish Water Safety Plans, not only for large or medium scale water supplies, but also for local small scale supplies, and is thus relevant both for urban and rural water supply. Preparing a Water Safety Plan could be one of the national targets under the Protocol.

⁶ Source: WHO Europe; Support to the Development of a Framework for the Implementation of Water Safety Plans in the European Union. Draft, 2007

⁷ WECF, Flyer on “Water Safety Plans in Pictures” 1803/2008.

Health Impact Assessment⁸

Health Impact Assessment (HIA) aims to identify how development includes unintended changes in health determinants and resulting changes in health outcomes. HIA provides a basis to pro-actively address any risks associated with health hazards. HIA also addresses health improvement opportunities in development. Health hazards, risks and opportunities also may be addressed explicitly in environmental assessment.

Development planning is typically conducted outside the health sector and is concerned with social and economic development, for example energy, agriculture, industry and transport. With a considerably larger proportion of resources at their disposal, and with a responsibility for action that may change environmental and social health determinants significantly, these other sectors outstrip the health sector in the potential to affect, protect and promote population health.

Development planning without adequate consideration of human health may pass hidden “costs” on to affected communities, in the form of an increased burden of disease and reduced well-being. From an equity point of view, it is often marginalized and disadvantaged groups who experience most of these adverse health effects. From an institutional point of view, it is the health sector that must cope with development-induced health problems and to which the costs are incurred of dealing with an increased disease burden.

HIA provides a systematic process through which health hazards, risks and opportunities can be identified and addressed upstream in the development planning process, to avoid the transfer of these hidden costs and to promote multi-sectoral responsibility for health and well-being. The production of public health management plans with safeguards, mitigating measures and health promotional activities in an integral part of HIA.

Water/environment/health addressed in IWRM planning processes

At WSSD in Johannesburg in 2002 it was decided that all countries should develop IWRM Plans by 2005. The IWRM plans aims at initiating a reform process in which countries start implement the IWRM principles.⁹ The IWRM plans are aimed at understanding and prioritising key water resources issues, including those related to health, and developing plans for improved water management.

An example is the IWRM 2005 Programme for Central Asia¹⁰ undertaken with support from UNEP and implemented in close collaboration with GWP and the heads of national water management bodies. The objective was to promote and build capacity on IWRM planning in the five Central Asian countries through a regional process involving all five countries and to assist in developing IWRM plans in Tajikistan, Kyrgyz Republic and Uzbekistan.

The development of the IWRM Roadmaps also engaged representatives of health authorities at national and local level. The analysis of national water resources issues addressed not only water

⁸ Health Impact Assessment, IAIA, Special Publication Series no 5, September 2006

⁹ GWP TEC 10, IWRM Plans, Why, What and How, 2004.

¹⁰ UNEP Collaborating Centre on Water and Environment and Global Water Partnership,

quantity but also the deteriorating quality of surface and groundwater, lack of access to safe water and prevention of emergency situations.

The consultation process of the IWRM Roadmap led to a prioritisation of actions. This comprised recommendations on improving water quality monitoring systems, decrease of water body contamination, establishment of waste water treatment systems. Such actions were prioritised as medium to long term actions, while establishment of basin irrigation systems, water efficiency, basin organisations and water user associations were considered as short term priorities.

Water and health issues addressed in a transboundary context

Parties to the Protocol bordering the same transboundary shall cooperate and assist each other to prevent, control and reduce transboundary effects of water related diseases. An example of the development of management goals, including health goals is the management of the Bug River as illustrated below:

The work on Bug River is shared by Belarus, Ukraine and Poland. The first step of the joint activities on the three riparian countries was to identify potential users of water management information. Apart from the joint Polish-Ukrainian commission, around 15-20 other stakeholders including ministries of health and NGO's were identified in each of the riparian countries.¹

Thereafter, a comprehensive examination of water users and issues was jointly undertaken. It revealed the following problems and issues, including some of specific relevance to water-related diseases and health: microbial pollution, accidental pollution, flood hazards, supply of drinking water and recreational use of the river. On the basis of the examination, seven major management goals were derived: good status of water ecosystems, securing supply of drinking water, water use for recreation, securing surface water abstraction for agriculture, securing water for fish breeding, securing water supply for industry and protection against floods.

Transboundary Water Management in South Caucasus– A Health Issue?

The South Caucasus region is dominated by the main Kura River Basin. The USAID funded South Caucasus Water Programme (SCWP) which was implemented in 2005-2008 focused on transboundary integrated management of the shared water resources in the Kura Basin as being critical to the social, economic, and ecological prosperity of Armenia, Azerbaijan, and Georgia – and a necessity to regional peace and cooperation. As a whole, the region enjoys relatively abundant water supplies, but pollution of the water, especially the surface water is quite serious especially in down-stream Azerbaijan. Pollution comes from industry and mining and from the agriculture. There are also problems with solid waste and lack of secure waste dumps.

The drinking water in the three countries is in most cases of good quality when leaving the utility, but when it reaches the consumers it is contaminated due to leakages, spill-over and interruptions in the supply and the quality is no longer sufficiently good.

The SCWP was meant to integrate water management in the region and recognized serious health related issues also of a transboundary nature, as municipal, industrial and agrochemical wastewater is discharged in the river without any treatment and there are high concentrations of heavy metals, phenols and nitrogen. Unfortunately no attempt was made to integrate health in the programme, which consisted of three components:

- *Institutional development*
- *Monitoring systems*
- *Public participation*

The program established monitoring structures which is meant to be in accordance with relevant international agreements such as the Protocol on Water and Health, signed by all three countries, but integration of health issues beyond clean drinking water supply did not take place. An indicator of this is that in the regional task force on monitoring and in the regional workshops no representatives of health agencies and ministries were present and there were no presentations or discussions about health – or regional experiences related to implementation of the Protocol at workshops in this project.

A very good opportunity to integrate health issues in development of integrated transboundary management and a transboundary monitoring system was not taken advantage of .

As the examples from Central Asia, Caucasus and Bug River show health ministries are engaged as a stakeholder in IWRM activities and health issues are taken into account both in the analysis of problems and issues as well as in the prioritisation of goals and actions. In EECCA it seems that arguments based on the reduction of water-related diseases, are often more convincing to decision makers than arguments based on environmental quality. There exist however a number of challenges in EECCA in relation to IWRM and health. First of all there is a relative high focus on quantitative aspects of water and water use in water resources management rather than qualitative aspects, and the water and health link is often seen narrowly as securing the necessary amount of water for water supply. Also except for floods, risk assessment is generally not an integral part of IWRM. And “health people” are not in “the driving seat” in IWRM, which are most often driven by prominent water users - to secure the important supply of water for economic development. It is thus still a major challenge to get water-related health into IWRM plans – a challenge which however can be better faced if more countries become Parties and implement the Protocol.

Water Framework Directive¹¹ and other relevant EU legislation – illustrating links between water, environment and health

The involvement of the European Union in water legislation and management started in 1975 with formulation of common standards later to be followed by directives, predominantly on water

¹¹ http://www.worldwaterforum4.org.mx/uploads/TBL_DOCS_108_14.pdf

quality. The formulation of the Water Framework Directive started in 1995 with an open consultation of relevant stakeholders. The Directive was finally adopted in 2000 and is a major innovation uniting all Member States in a commitment to jointly manage all their freshwater resources on a basin scale.

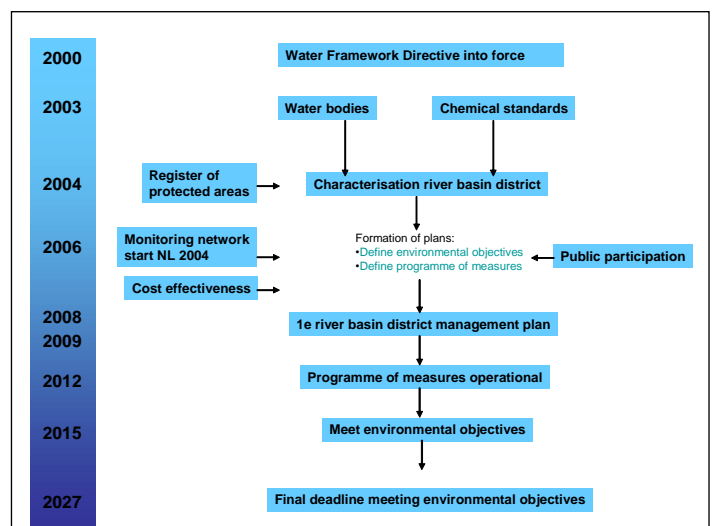
Main principles of the Water Framework Directive are:

- Integrated water policy;
- River basin approach;
- Principles of precaution and preventive action,
- Principle of remedial measures at the source of the threats to the environment;
- Polluter-pays principle and the principle of the recovery of costs linked to water
- Decision making at the lowest possible level,
- Combined approach setting emissions limit values and environmental quality standards.
- Involvement of the public as a condition for success.

Following the Directive all Member States have to achieve good status for water bodies before 2015, unless an exemption has been granted. Their status will be evaluated and the European Commission will be able to prosecute the failing Member States.

The Water Framework Directive is linked to other directives on issues like drinking water and bathing water and on setting environmental quality standards on substances that are hazardous to health and environment.

The Directive further sets out a precise timetable for its implementation and has established monitoring systems for all water bodies within the European Union. For EU Members a large proportion of the targets for the Protocol on Water and Health and the target dates for their implementation will derive from EU Directives. For instance the Bathing Water Directive sets a target on assignment of bathing profiles with description of pollution risks and proposals for measures for improvement in the quality. *Both non-members and applicant countries might find guidelines and targets from EU directives relevant for implementation of the Protocol.* A robust commitment to public participation in water management is also shared by the Water Framework Directive and the Protocol on Water and Health. The WFD however, has good ecological quality as its primary objective and not water-related diseases as the Protocol.



Safe recreational use of coastal and estuarine waters

A new Bathing Water Directive has become law in the EU Member States from March 2008 and will take effect from 2015. This will set even stricter water quality standards. The following example show the initiatives taken in UK to tackle problems related to bathing water¹².

Water quality of 494 bathing waters was measured in England and Wales. Almost all bathing waters (98 per cent) met the minimum standards and 394 (80 per cent) were clean enough to meet the much stricter European guideline standards (Indicator: Bathing water compliance).

Bathing water quality has improved significantly over recent years. Between 1997 and 2007 the number of bathing waters meeting the European guideline standards increased by more than a third. This is largely due to water companies investing to improve the quality of their sewage discharges.

In UK you may also find out how clean the water is at your local bathing water by typing your postcode or town name in the link to our 'What's in your Back Yard' website. During the bathing season (May to September) you can also see weekly bathing water sampling results.

The Environmental authorities play a significant role in deciding what environmental improvements the water industry should make. Further sewerage improvements are planned in the water companies' environment programs to 2010.

But there is also a challenge to tackle sources of diffuse pollution. Examples of this sort of pollution include water runoff from farmland contaminated by livestock manure, road water runoff in urban areas and discharges from storm water drainage systems where sewers have been illegally connected into them. UK is already starting to tackle these problems using initiatives such as catchment sensitive farming and sustainable urban drainage systems.

Blue Flag is an international campaign that aims to improve coastal areas. In 2007, 140 bathing waters in England and Wales were awarded a Blue Flag. They met the award scheme's strict criteria for a Blue Flag, as well as meeting the bathing water quality standards. The water quality criteria are similar to the European guidelines but include an additional bacteria standard.

Safe use of wastewater in agriculture and aquaculture¹³

Wastewater, excreta and grey water are increasingly used for the irrigation of agricultural crops and in aquaculture. In many countries, they have come to be important water resources. In addition, they provide an important mode of nutrient recycling.

As good-quality freshwater becomes increasingly scarce due to population growth, urbanization and climate change, the use of wastewater in agriculture will increase proportionally. At least 10% of the world's population is thought to consume foods produced by irrigation with wastewater

¹² http://www.environment-agency.gov.uk/yourenv/eff/1190084/water/213925/bathing/?version=1&lang=_e

¹³ WHO, 2006. *Guidelines for the Safe Use of Wastewater, Excreta and Greywater – volumes 1-4*. World Health Organization, Geneva

Principal driving forces, other than scarcity, for the increased use of wastewater are:

- population increase and related increased demand for food and fibre and deriving increase demand for irrigational water;
- a growing recognition of the resource value of wastewater and the nutrients it contains;

The use of wastewater and excreta in aquaculture is geographically more confined: it is of importance in Bangladesh, China, India, Indonesia and Viet Nam. The extent to which it is practiced in EECCA countries is not known. Aquaculture includes the production of fish and aquatic vegetables for direct consumption, as well as the production of fish seed (fingerlings) or of fish or aquatic plants that serve as feed for livestock or other fish. New concepts of sanitation (e.g. eco-sanitation with separation of urine and faeces) also open new avenues for the use of excreta and greywater in agriculture. Recycling and re-use practices imply a number of health hazards linked to disease-causing organisms: viruses, bacteria and parasites.

Links between work under the Protocol and the EU Water Initiative Policy Dialogues

National Policy Dialogues (NPDs) have been developed as the main operational instrument to implement the work program of the EUWI-EECCA Component.¹⁴ The overall objectives of NPDs are to initiate country-specific activities regarding Water Supply and Sanitation and Integrated Water Resources Management to improve regulatory and administrative frameworks, help setting country priorities, and identify projects and develop capacity in the EECCA region. This includes a dialogue, which among others involves public authorities and representatives of the civil society (see box below).

An example of a National Policy Dialogue in which water and health issues have been an element is the National Policy Dialogue in Armenia. The NPD which has OECD EAP Task Force as the strategic partner comprise a water supply pillar, with focus on a Financing Strategy for Rural Water supply and a new "minimal amount of water supply" standard. The IWRM pillar with UNECE as the strategic partner is under development, focussing on IWRM, Water Framework Directive and a pilot basin activity.

Another example is the NPD in Moldova on the Water Supply and Sanitation Pillar with OECD EAP Task Force as strategic partner. The focus is on establishing a National Financing Strategy for Urban and Rural WSS. On IWRM a roadmap for implementing the IWRM pillar with UNECE as the strategic partner has been prepared. The focus is on river basin management and activities include a new water strategy and new water quality standards. Furthermore it is under consideration to establish an activity on the implementation of the Water and Health Protocol in Moldova.

The examples show that a partnership model, like the one under the EUWI, can promote not only the overall objective of the EUWI, but at the same time also objectives of the Water Convention, its Protocol on Water and Health, the Environmental Strategy for EECCA etc.

¹⁴ EUWI EECCA Working Group Documents available at <http://www.euwi.net/>

An example of a holistic approach to environment, water and health management is the **Danish Environment and Health Strategy**¹⁵. Although Denmark has not ratified the Protocol, the health strategy implementation shows the importance Denmark is putting to a healthy environment.

In 2003 the Danish Government adopted an Environment and Health Strategy and a Ten-point Plan for its implementation. The aim was to limit negative environmental impacts and thereby prevent adverse effects on public health. With the strategy the Government wished to establish an overview of the effects of environmental factors on health and to set forth goals and initiatives for the coming years. Among other things the strategy is intended to create a common framework for enhanced cooperation between the authorities dealing with environment and health.

The strategy sets human health in focus and identifies environmental factors, that affect the Danish Population in their everyday lives, for example via the air, the water and the diet. The strategy realises that in many areas there is sound knowledge on how environmental factors affect health but are areas, in which there is not sufficient knowledge to take targeted action.

The strategy is based on four fundamental principles: Everyone must be ensured a high level of protection; the precautionary principle must be applied; the adverse effects of environmental factors on health must be prevented; information and involvement must be ensured so that everyone can take responsibility for a healthy life.

The Ten-point plan has two specific water goals: “groundwater and drinking water must be protected” and “beaches and lakes designated as bathing areas and swimming pools must have good, hygienic quality”, and other goals which indirectly address water: “Food must be safe and free from pollution”; “Research into the significance of environmental factors on health is to be enhanced” and “Cooperation between authorities must be strengthened”.

The actions in relation to groundwater includes regulations of the use of pesticides, fertilizers and the application of manure to agricultural land, a continuation of remediation of waste deposits and landfills, designation of areas with special drinking water interests including mapping and survey of pollutants. Protection of bathing water comprise investments in waste water treatment at point sources and open land and research on new health risk factors like endocrine disruptors.

The strategy continues to be a vehicle for an improved understanding of links between health, environment and water and has put health back into the agenda of environmental protection in Denmark.

Chapter 3: Experiences in setting targets on water and health and in establishing surveillance systems

In order to achieve its objective, the Parties of the Protocol, within two years from becoming a Party, shall each establish and publish time-bound targets at national and/or local level. Targets

¹⁵ <http://glwww.mst.dk/news/09520000.htm>

shall cover drinking water supply and sanitation, health systems and water and environmental management issues.

The process of setting targets shall be carried out with a participatory approach, consulting all relevant national and local authorities, and other stakeholders, including the general public. Targets shall be periodically revised.

A target can be many things and the Protocol leaves flexibility to adapt to country needs. Examples of targets are:

- Development of a law, monitoring programme water management plan, introduction of a new approach
- Institutional framework
- Capacity building or a study
- Social and economic issues
- Quantifiable targets like % of population with access to safe water supply
- National/local/pilot projects

When setting targets it is important that progress in fulfilling the targets can be monitored. Details on monitoring are presented in Chapter 5.

Hungarian experiences in setting targets and target dates for water and health

Hungary has 10 million inhabitants. Approximately 60% of them have access to safe drinking water. 94,1% of the drinking-water is taken from groundwater abstraction and only 5,9% comes from surface water. The quality of the public water supply is generally acceptable when it comes to both bacteriological quality and chemical quality. The overall figure is that the public water is acceptable for 83,55% of the households, objectionable for 14% and unacceptable for 2,45%. But outstanding issues remain. For instance only 34% of the dwellings have sewage treatment, lack of which is hazardous to human health and to the environment.

Hungary has taken the issues of water quality in relation to health seriously and had a well developed legal system concerning water and health even before entering the European Union in 2004 and is now in the process on implementing EU directives concerning water issues; drinking water, waste water, the Water Framework Directive, etc. Hungary monitors for a large number of chemical and microbiological parameters related to water quality and was one of the lead countries in the application of the European Environment and Health Indicator System (ENHIS) and has particular experiences with regard to water-related diseases, sewage coverage, bacteriologically and chemically unacceptable drinking water.

Based on previous experience, Hungary has developed targets and set target dates on most of the subjects covered by the Protocol on Water and Health, article 6. A few examples are given here:

Targets and target dates – drinking water	
Reference to the Protocol on Water and Health	Art. 6 (2) a
Subject matter	The quality of the drinking water supplied
Targets set	1. 96 percent of the population supplied with public drinking water comply with the health relevant chemical limit values (interim target: 80 percent) 2. Targets to be set for microbiological compliance
Target dates	1. End of 2015 (interim target date: end of 2010) 2. To be set by the end of 2008
Main driving forces	1. Environment and Energy Operative Programme 3.1.0 to fund the Drinking Water Improvement Programme 1. & 2. Govt. ordinance implementing the Dir. 98/83/EC
Adopted or draft indicators	Proportion of the population supplied with drinking water complying the legal quality requirements; WatSan_S2
Reporting context	Reporting obligation to the COM acc. CD 92/446/EC (new reporting format under development)

Targets and target dates – levels of performance of collective systems	
Reference to the Protocol on Water and Health	Art. 6 (2) e
Subject matter	The levels of performance to be achieved by collective systems
Targets set	Targets to be set with the involvement of the relevant suppliers' association
Target dates	End of 2008
Main driving forces	Requirement set by Protocol on Water and Health
Adopted or draft indicators	Several performance related indicators (e.g. unaccounted for water; pipe-breakage; non-compliance with chlorination requirements, etc.)
Reporting context	None

Water and Health Protocol implementation- the example of Moldova¹⁶

In order to implement the requirements of the Protocol, Moldova established the **Programme “Environment and Health”** under the responsibility of the Ministry of Ecology and Natural Resources.

¹⁶ Moldova’s report to the First Meeting of the Protocol on Water and Health, January, 2007 available at UNECE website on the Protocol.

The programme outlined the following tasks:

- *Reinforcement of quality control of surface waters*
- *Study impact of water consumption for human health*
- *Development of information system for drinking water control*
- *Elaborate methods for risk determination for human health, resulting from low quality drinking water*
- *Improve continuous access to drinking water through renovation of water supply networks.*

In 2005 a National Program for Water and Sewerage systems in human settlements was established, to increase access to drinking water.

Moldova ratified the Protocol in September 2005 and in order to follow the Protocol requirements, the Ministry of Ecology and Natural Resources initiated the elaboration of the National Strategy for Water Supply and Sewerage in Human Settlements in Moldova.

The strategy includes activities directed to: reduction of the number of persons without access to drinking water, number of water illnesses, building of sewage treatment, community access to information on drinking water, harmonisation of national legislation to EU Directives, implementation of water management systems following the EU Water Framework Directive.

Moldova considers using the National programme as a basis for setting the targets under the Protocol, as this programme has the same overall objective as the Protocol itself.

The examples from Hungary and Moldova underline, that it is the responsibility of each of the Party to set targets according to national priorities. They further illustrate the flexibility left to the Parties and that targets can be many things.

It is that most EECCA countries will find it challenging to improve the data on water-related diseases and establish cause-effect relationships between water/environment factors and health impact. Assessing costs and benefits of reaching the targets will be an additional challenge, however the result of this will be important as a means of securing national political and the financial commitments. Establishing coordination and cooperation mechanics and engaging stakeholders in water/environment/health sectors, and developing the necessary implementation and monitoring capacity to follow the progress towards reaching the targets will be further challenges.

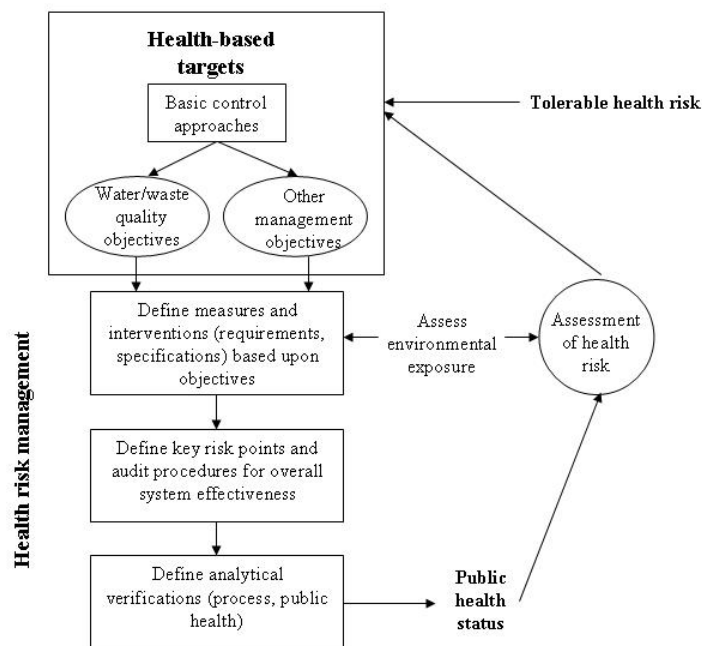
Health Risk Based Target Setting

Health based risk assessment considers the risk of disease, not just the presence of pathogens or chemicals in the water. WHO is promoting an approach based on assessment of water-related disease burden and the relative effectiveness of water interventions as key criteria for decision making in water/health interventions.¹⁷ The Burden of Disease is calculated through an indicator of population health, the DALY: a DALY represents a lost year of healthy life and is the gap between the current health of a population and an ideal situation in which everyone in that population would

¹⁷ Murray and Lopez. The global burden of disease, 1996. Boston, Harvard University Press.

live into old age in full health. Data on Burden of Disease is available for Europe¹⁸, however data are not broken down into national data. Such national data would enable EECCA countries to make risk based targets.

Health risk assessment and management are carried out within the Stockholm Framework, which provides a harmonized approach for health-based guidelines and standards for water- and sanitation-related microbial hazards, involves the assessment of health risks prior to the setting of health-based targets and the development of guideline values. The figure below illustrates the approach.



An example of the use of health risk assessment used in Water Safety Planning (see footnote 5) not at the national level but at the river basin level is shown below:

Surface water from rivers, lakes and reservoirs provide a significant part of the volume of source-water for drinking water. Provision of safe drinking water requires **protection** of the **source** water, **treatment** of the source water and **prevention of recontamination** during storage, distribution and handling

An assessment of the land and water based activities in the basin will leads to an identification of the potential hazards for water-related diseases – and at the same time identify ways to control these.

¹⁸ ENHIS, Public Water Supply and access to improved water sources, Fact Sheet No. 1.2. May 2007

Activity	Potential hazard	Control issues
Agricultural activities	Animal faecal contamination	Grazing activities
	Pesticide/herbicide run-off	Crop growing
	Algae blooms from nutrient run-off	Nutrient application
Urban and Industrial activities	Stormwater/chemical pollution	Monitoring/modelling of sources
Human activities/recreation	Sabotage	
Natural events	Erosion	Land use inspection
Dam walls	Wall failure	Wall condition inspect.

Whether a hazard is actually also a risk depends on the likelihood (from e.g. almost certain rated as 5 to once in every 100 years (rated as 1) and the severity of the hazard (from insignificant rated as 1 to severe rated as 5). The application of this risk assessment is shown below:

Hazard	Hazardous event	Likelihood	Severity	Risk rating
Microbial, turbidity/col.	Animals in catchment	5	2	Medium
Microbial, turbidity/col	Storms in cathment	5	3	High
Turbidity, col. Taste odour	Bush fire in catchment	2	5	Very high
Microbial, chemical, taste	Algae blooms	2	4	High
Microbial, turbidity, chem.	Human access to catchment	5	2	Medium
Microbial, turbidity, col	Reservoir short circuiting	4	4	Very high

Based on a combination of likelihood and severity, the risks can be rated and key risks be identified. Based on this river basin plans addressing the risks with the highest risk rating can be developed.

Surveillance and early-warning systems

The Parties of the Protocol shall ensure that a comprehensive national and/or local surveillance and early-warning system is established within three years after the Protocol is ratified.

The aim of such a system is to identify outbreaks and incidences of water-related diseases. In practice this means a system covering outbreaks and incidences in relation to supply of water for human consumption as well as water pollution incidents and extreme weather events.

WHO defines surveillance¹⁹ as a “process of systematic collection, collation and analysis of data, with prompt dissemination to those who need to know, for relevant action to be taken”. WHO through its Lyon office has issued guidelines footnote 17) which can assist health and other relevant

¹⁹ WHO, Communicable disease surveillance and response systems, Guide to monitoring and evaluating, WHO, 2006

authorities in establishing surveillance systems. An example of a surveillance system in Estonia is presented below.

Surveillance system, the example of Estonia²⁰

The Health Protection Inspectorate conducts nationwide surveillance and provides national enforcement as specified by law. The Inspectorate has the following responsibilities:

- 1. to conduct nationwide surveillance and to provide legal enforcement to the extent provided by law;*
- 2. to issue licences as provided by law: to make decisions regarding issuing the license or certificate or refusing the licence application;*
- 3. to organise and conduct surveillance over drinking water;*
- 4. to perform laboratory testing;*
- 5. to register cases of infectious and parasitic diseases; to investigate the circumstances of infection and devise methods for diminishing and controlling transmission of infectious diseases;*
- 6. to assess and estimate physical, chemical, and biological hazards that constitute health risks; risk reduction;*
- 7. to gather and interpret information regarding environmental hazards;*
- 8. to gather and interpret statistical data;*
- 9. to inform the public regarding environmental factors, their deterioration or possibility of deterioration;*
- 10. to resolve problems related to complaints regarding drinking water quality;*
- 11. to consult on questions of water safety that arise during routine surveillance or complaint investigation;*
- 12. to offer assistance and exchange information regarding health protection with other institutions and persons;*
- 13. to the extent of its competence to work with other government agencies and international organisations;*
- 14. to organise continuing education in their various specialities to its personnel;*
- 15. to devise strategies for carrying out its responsibilities and refine its own organisational structure;*
- 16. to perform other duties as set by law, decision of the Parliament, regulations and orders of the Government of the Republic, or regulations and orders of the Ministry of Social Affairs.*

To carry out its responsibilities, the Health Protection Inspectorate is authorised:

- 1. to receive information from physical or legal persons who are required to fulfil health protection requirements or from persons delegated to fulfil these requirements; to require documents from them and clarifications; to receive document copies free of charge;*
- 2. to monitor enterprises, establishments, or other places where physical or legal persons conduct activities which are subject to surveillance, upon presentation of identification which specifies the right to surveillance; the Inspectorate need not provide advance notice and may not be hindered in entering premises;*
- 3. to issue citations for violations which require correction of these, to set penalties, and to employ other means of enforcement;*
- 4. to require limiting, suspension, or cessation of an activity which endangers human health or the human environment;*
- 5. to monitor performance of its own employees.*

As the example from Estonia shows, drinking water quality, water safety, assessment of hazards including environmental hazards is an integral part of the surveillance system. The example also shows that the establishment of surveillance and early warning systems requires political backing, a

²⁰ Estonia's report to the First Meeting of the Parties, January 2007, on progress in implementing the Protocol.

legal base, building of institutions or integration of new responsibilities into existing institutions, capacity building, equipment for inspections – and the necessary financial means to operate the system. In this context it is important to assess not only the costs of the survey system but also benefits, which could comprise: avoided costs of providing alternative sources of water, avoided costs from diseases etc.

Water Safety Plans (as mentioned in Chapter 2) provide guidance on the establishment of early warning systems and contingency planning at the local level for response to outbreaks, incidents and risks.

Chapter 4: Economic and financial considerations related to water and health

International support to projects

The Protocol calls on Parties to improve the quality of their water supplies, their sanitation services and their management of water resources, and to address future health risks and ensure safe recreational water environments.

In order to meet these goals, article 14 in the Protocol calls for “International support for National Action” on preparation of water management plans, formulation of projects and execution of them, on establishment of surveillance systems, development of legislation, education, research and monitoring the activities.

Implementation of article 14 was introduced at the first Meeting of the Parties in 2007, when the Parties decided to establish a mechanism for international support to EECCA and SEEE countries. The purpose of the mechanism is to promote the coordination of international aid to implement the Protocol and to enhance the capacity of recipient countries to access sources of finance by helping them formulate projects.

This support mechanism called “Ad Hoc Project Facilitation Mechanism” comprises two elements: the Facilitator and the Ad Hoc Project Clearing House.

The objective of the Ad Hoc Project Clearing House is to identify priority activities of non-infrastructure intervention for countries in transition in the following areas:

- Health-related aspects of integrated water resources management;
- Safe drinking-water supply and adequate sanitation;
- Reduction of childhood morbidity and mortality;
- Meeting the water needs of vulnerable groups;
- Gender issues related to water supply and sanitation.

To facilitate increased funding of water and health related projects the Ad Hoc Project Clearing House will assess the relevance of project proposals submitted through the Facilitator and make suggestions for matching donors’ assistance with proposals. The Ad Hoc Project Clearing House will further advocate funding of the proposals, but the actual financing of proposals will be on a voluntary basis.

As with any new initiative EECCA countries will need assistance to implement the Protocol. The “Ad Hoc Project Facilitation Mechanism” does not itself – at least not at present- have funding which can be spent on projects in EECCA countries. However, through the activities of the Facilitator it can assist EECCA countries in formulating good projects, which may be of interest for a donor or other institution which support project activities within the priority areas given above.. EECCA countries on their side, can secure that the project has a high priority in the country and has a broad support from all relevant stakeholders. If the project can get national co-financing (in kind or in cash) this will often by e.g. donors be seen as an indication of national commitment to the project. With a well formulated project, strong national backing and engagement of relevant stakeholders, the “Ad Hoc Project Clearing house” can assist in advocating for funding through their networks.. EECCA countries may also wish to present projects developed with assistance from the “Ad Hoc Project Facilitation Mechanism” to their development cooperation partners. Some donors have decentralised the decision power on development assistance to embassies and representations in EECCA countries.

Cost assessments of access to safe drinking water

Improving access to safe water and adequate sanitation is a core provision of the Protocol and the Protocol requires Parties to assess its costs and benefits. OECD EAP Task Force²¹, based on data collection from about 400 utilities in EECCA, assessed that there is a need not only to invest in improved access but also in renovation of existing supplies in particular to decrease leakage, improve continuity of water supply and improve water quality at consumers. It is estimated by OECD EAP Task Force that there is a need to double the investment in EECCA in water supply to secure access to safe drinking water.

²¹ OECD EAP Task Force, Financing water supply and sanitation in EECCA countries and progress in achieving the Millennium Development Goals (MDGs). Available at <http://www.oecd.org/dataoecd/36/10/39174956.pdf>

Financing strategies to support policy decisions and planning

Financing strategies in Water Supply and Sanitation (WSS) can be used:

- To assess total investment needs of alternative policy targets.
- To bring about practical implementation programmes taking into considerations what the economy and households can afford.
- To identify investment projects and build short- to medium-term project list of projects.
- To identify the policies and measures which are necessary to ensure effective financing of the project pipelines.
- To support claims of environment and other ministries responsible for municipal services on the public budget.
- To support country requests for donor and IFI financing.
- To measure and report on the progress in the implementation of programmes and policies.
- To improve financial planning and budgeting.
- To provide guidance to decentralised water section actions.
- To improve legal and regulatory framework - e.g. for Public Private Partnerships (PPPs).
- To improve accountability.
- To improve monitoring.

Consequently, it is possible to define a financing strategy in the water supply and sanitation as:

A time-bound plan for sustainable financing of capital investments and Operation and management costs in the WSS adopted by a national, regional or local government and embraced by major stakeholders involved in WSS management and operation in the country, region or municipality in question with a view to achieving a set of targets that are able to monitor.

"Sustainable financing" implies that expenditures (investment expenditure and operation and maintenance expenditure) are balanced with revenues (from public budgets, user charges and loans/grants from domestic and international sources).

Process of preparation, development and implementation of financing strategies

The process consists of three phases - dealing with strategy preparation, development and implementation, respectively - and each phase consists of various stages. The phases and stages together constitute the cornerstone in the process. However, it is important that a toolbox exists. Selected tools within the toolbox are used at different stages to produce certain outputs, thereby facilitating the whole process. The number of tools in the toolbox is steadily increasing. Figure 1 provides an overview of the phases, stages and toolbox.

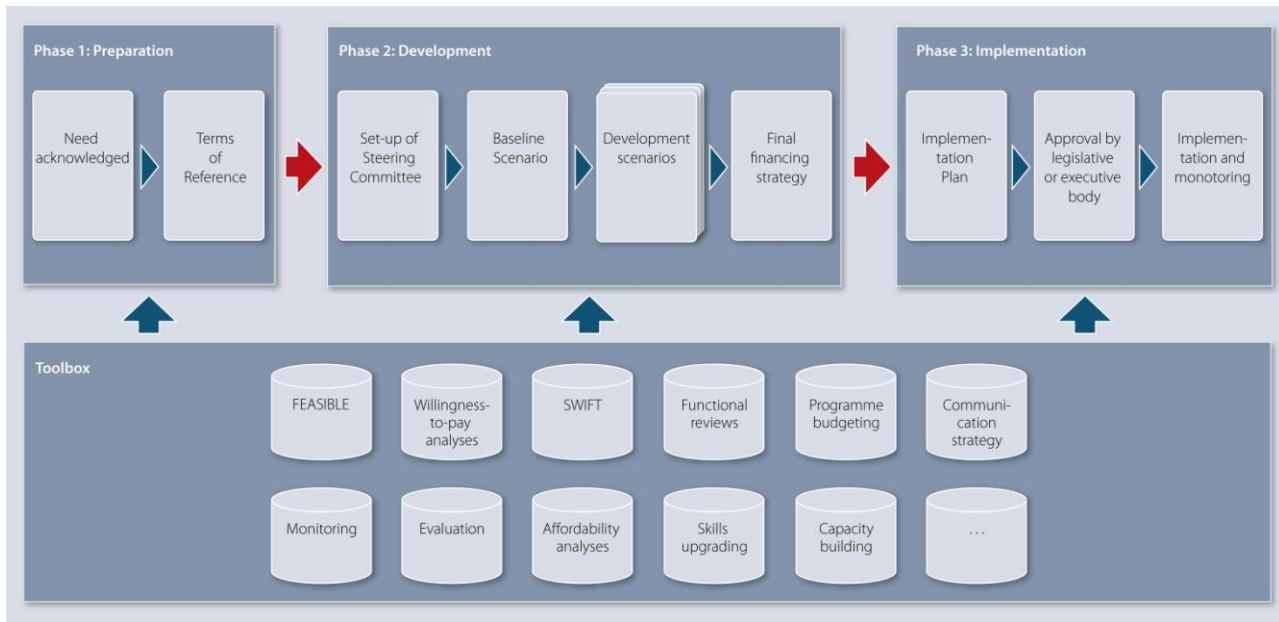


Figure 1: Financing strategy in WSS - phases, stages and toolbox

The following example from Georgia²² illustrates the application of a Financing Strategy in the urban water sector:

*In 2005 Georgia, with the help of the OECD/EAP Task Force has developed a financing strategy (FS) for **urban water supply and sanitation (WSS)** (hereafter called FS 2005). The result of the FS 2005 is shown in the table below comprising of three Scenarios:*

Scenario 1:

Scenario 1 “all in-house tap connection”: This would involve rehabilitation of the existing water mains and sewerage in the 20 cities and towns; construction of new infrastructure (water intake, distribution and treatment facilities) to provide sustainable access to safe water via in-house water taps to all urban consumers, including those who do not have such access at the moment; reducing losses and unaccounted for water in Tbilisi;

Scenario 2:

Scenario 2 “in-house tap connections plus stand-pipes” shares the objectives of scenario 1, albeit using another technology: safe water to be delivered by standpipes located within 200 metres of households that do not currently have sustainable access to water (i.e. where water quality or continuity of supply is insufficient). This would involve approx. 5% of the urban population in Georgia receiving water through stand-pipes, and

Scenario 3:

Scenario 3 “all in-house tap connection plus wastewater treatment in coastal zones” is a variant of scenario 1, which also entails the rehabilitation of mechanical treatment of wastewater in the Black Sea coastal area. This would be a first step towards a complete rehabilitation of the treatment of wastewater in Georgia, and towards abating pollution in a region which hosts an important part of the Georgian tourism industry – a potential driver of economic growth in the country.

²² COWI, Financing Strategy for urban water supply and sanitation in Georgia, 2005.

	Scenario 1	Scenario 2	Scenario 3
Capital investment over 2006-2015 (Mill. GEL)	417.5	170.8	445.0
Capital investment, annual basis (Mill. GEL)	47.5	15.9	49.7
Capital investment per head per year unit (USD)	7.0	2.3	7.5
Year of elimination of the accumulated financial gap	2015-2018	2013-2014	2016-2019
Funding for WSS as proportion of the public expenditure budget (%)	4.7-3.9	3.0-2.7	4.7-3.9

The table above shows that scenarios 1 and 3 would require much more capital investment than scenario 2 and could only be sustained if the State devotes more than 4% of public budgets to water supply and sanitation for the next 15 years. Considering all the other demands on public budgets (e.g. rural water and sanitation, education, transport, health, etc.), this seems unrealistic. Even implementing scenario 2 – much less demanding from the financial point of view but requiring some difficult choices and an effective policy dialogue with the population – would be a challenge for Georgia. As a follow up to the financing strategy, the Steering Committee of the Financing Strategy Project will assess the scenarios and decide which one to pursue. This is expected to happen in June 2008. Secondly, the responsible government bodies- probably with assistance from the OECD/EAP task Force or another international organisation- will draw up and implement an action plan to integrate the financing strategy into the budgeting process at national and local level. Furthermore, a monitoring system will be developed in second half of 2008.

The development of the scenarios above used a model, called Feasible²³. The key features of this model are described below.

The basic approach underlying the FEASIBLE method is to collect detailed technical data on existing infrastructure, select public policy targets in water supply and sanitation – usually the Millennium Development Goals –, determine costs and timetables for achieving them, and compare the schedule and volume of expenditure needs with available sources of finance. This reveals any financial deficits likely to arise along the way. FEASIBLE can be used to develop various scenarios to determine how the gaps might be closed, such as identifying ways to help achieve the targets at lower cost or to mobilize additional finance; setting less ambitious targets, or rescheduling the programme.

An important feature of FEASIBLE is the emphasis on realism and affordability. FEASIBLE can be used to assess the levels of finance (public, private, domestic, foreign) that might be available under different macro-economic and fiscal conditions. This provides a check on what public budgets might realistically be expected to contribute. FEASIBLE is usually used to support a process of dialogue and consensus-building among stakeholders and to build bridges between policy development and implementation.

The assumption underlying the FEASIBLE methodology is that governments should not be expected to finance all or even most of the expenditure required. The main role of government in relation to financing is to establish the policy, regulatory and institutional framework as well as the

²³ OECD Policy Brief on Feasible.

incentive structure, within which resources from users, financial markets, capital markets, local budgets and enterprises can be mobilised in a complementary way, and be applied as cost-effectively as possible to achieve agreed goals.

Developing a finance strategy using FEASIBLE takes about 12-18 months. The project usually involves setting up a steering group consisting of senior policy makers from relevant institutions, who meet at least five times to discuss different financing scenarios and the policies and assumptions that underpin them.

Free software to support development of Financing Strategies

A computerized decision support tool, FEASIBLE helps develop financing strategies for environmentally related sectors involving costly public infrastructure. It currently may be applied in the water supply, wastewater and solid waste management sectors. FEASIBLE is available free of charge from the OECD by registering on line at www.oecd.org/env/finance, or through COWI, the Danish consulting firm that developed the model, at:

www.cowi.com/cowi/en/menu/projects/nature/environmentalpolicyandregulation/feasiblemodel.htm.

Health aspects of cost-benefit analysis in water supply and sanitation

The Protocol request Parties to assess costs but also benefits of actions to health, water resources and sustainable development. To analyse direct and indirect health benefits of investing in water supply in EECCA, WHO has adapted a model used for assessment of disease burden which is based on population data; data on access to water supply and sanitation and information on diarrhoea incidence rates by aged group.²⁴

Economic benefits resulting from the reduction of diarrhoeal disease were assessed at three levels:

- health sector benefits: direct expenditures avoided, due to reduced morbidity
- patient benefits
- savings in convenience time, including water collection time saved, sanitation access time saved, opportunity cost of lost time.

The analysis showed that the economic value of the health benefits resulting from improvements in water supply and sanitation showed significant health benefits ranging from USD 1 billion to nearly 6.5 billion USD depending on the level of access. The annual cost of achieving the Millennium Development Goals in EECCA is in the same range of magnitude as the health gains. WHO concludes on the basis of the analysis that health benefits should be seen as an important component in any cost-benefit analysis, when improvements in urban and rural water supply and sanitation are being considered.

²⁴ Document presented by WHO at the Conference of EECCA Ministers of Economy/Finance, Environment and Water and their partners from the OECD. Yerevan, 17-18 November 2005 further information on benefit analysis can be found in http://www.who.int/water_sanitation_health/diseases/burden/en/

Feasible and other similar tools and benefit analysis as shown in the above example can be used to support Target setting under the Protocol of access to safe drinking water and adequate sanitation is available. Methods to assess health benefits need further refinement to enable a direct comparison on the results of the FEASIBLE model. It may also be relevant to include assessments of social and environmental benefits as the overall aim of the Protocol has this wide scope.

Chapter 5: Monitoring and reporting progress under the Protocol

The monitoring and reporting of progress is an essential element of the Protocol as it enables the Parties of the Protocol to review progress on the national implementation of the Protocol and to engage the public and other interested national stakeholders in the work done under the Protocol at national level. As the Protocol concerns the public health, the results of monitoring of water and effluent sampling shall be made available to the public. The monitoring will further be used as a basis for preparing a national assessment report which will aim at reviewing the targets (see Chapter 3) in order to assess if the targets are met in agreements with the target dates set.

Based on the monitoring and reporting at **national level** the Parties of the Protocol, will prepare a summary report showing the key aspects of progress in implementing the Protocol but not presenting actual monitoring data will be used to assess the **compliance** with the Protocol by a Compliance Committee (see Chapter 6).

Policy decisions need to be informed by good data, which are transformed into relevant information for decision makers. With respect to the Protocol monitoring data and information will first be used to inform the process of target setting as described in chapter 3. This involves analyses of the present status of water-related diseases and how these can be prevented, reduced and controlled.. When country specific targets are set the present monitoring system can be analysed to assess if it fulfils the monitoring needs and complemented where gaps are identified. The aim will be to establish an effective data collection system, which enables an assessment of the progress towards meeting the targets.

Indicators- to monitor progress

The example from Hungary presented in Chapter 3 illustrates the role of indicators as the concrete measure to monitor the quality of drinking water supplied.

Subject matter	The quality of the drinking water supplied
Targets set	1. 96 percent of the population supplied with public drinking water comply with the health relevant chemical limit values (interim target: 80 percent) 2. Targets to be set for microbiological compliance
Target dates	1. End of 2015 (interim target date: end of 2010) 2. To be set by the end of 2008
Adopted or draft indicators	Proportion of the population supplied with drinking water complying the legal quality requirements; WatSan_S2

The targets and the dates for meeting the targets are set through national processes, but based on an ambition to seek harmonization and convergence between the targets. The indicators on the other hand are developed jointly and some of them will be alike for all Parties to the Protocol.

Guideline material on indicators will be developed and adopted by the second Meeting of the Parties in 2010. The box below illustrates the development of an indicator.

**Application of recognized good practice to the management of water supply
– An example on indicator development¹**

At the first meeting of the Task Force on Indicators and Reporting, development of the different indicators was discussed. This is an example of the proposed indicators for good practice of management of water supply developed on the basis of WHO guidelines for improving water quality through the use of a comprehensive risk assessment and risk management approach such as Water Safety Plans. This target subject is set in Protocol article 6 (f). A survey undertaken by the World Health Organization's Regional Office for Europe in cooperation with the European Commission demonstrated that in many countries water safety plans or elements thereof are already being applied. A possible approach could therefore be to select indicators which would highlight the move towards full water safety plans throughout the water utility.

Recommended approach to setting targets and identifying indicators for management of water supply - options available in growing order of ambition

1. Percentage of utilities with approved protection zones, or with advanced water treatment to compensate for lack of protection, weighted by volume or population size, established as a component of an integrated water resource management plan.
2. Percentage of utilities with a certification to universally accepted standards which are independently verified, such as the ISO 9,000 or ISO 14,000, weighted by volume or population size
3. Percentage of utilities with a certification of components to universal standards, for example laboratory accreditation by national accreditation bodies weighted by volume or population size.
4. Percentage of water utilities that are implementing an independently verified water safety plan or ISO 22,000 certification.

Another approach can be based on the compliance with the licensing of the water abstractions, namely regarding the existence of approved protection zones (m³) / total water abstraction (m³)

Likewise indicators will be developed for: reduction of the scale of outbreaks and incidents of water-related diseases; populations served by water supply and sanitation; levels of performance and service provision; waste water discharge quality; storm water overflow; disposal and reuse of waste; management of enclosed waters used for bathing; remediation of contaminated sites; good

practices for water management; frequencies of publication of information. A list of indicators will be agreed by the Meeting of the Parties in 2010.

Data collection systems

To determine the indicator value, data has to be collected, stored and analysed. The following example from Czech Republic presents a data collection and storage system for data which are of high relevance for the Protocol.

As it can be seen, the Czech Republic does have a significant number of relevant data which can be used to assess the value of an indicator for the Protocol. However, also some data are missing and required additional efforts in data collection and storage. Further it can be seen that data collection has to involve several institutions both at national and local level in the sectors of health, water, environment, water supply and sanitation service (both public and private). Monitoring and reporting in EECCA is still to a wide extent done by each sector. Establishing joint monitoring and sharing of data among sectors will be one of the challenges of implementing the Protocol.

Another challenge in view of limited public resources and staff will be to establish and maintain a data collection and storage system. However, some data are already collected and reported as part of national, regional and international legislation and agreements. Before initiating new data collection it is therefore important to get an overview of already existing reporting requirements and to analyse to which extent these can fulfil the requirements of the Protocol. In general it seems that Parties of the Protocol which are also EU members have many data available which are relevant for the monitoring and reporting under the Protocol.

Czech Republic – data collection and management

The Czech Republic supplies 9 180 000 people out of a total of 10 200 000 million people (89.8%) with water from public supplies (2003 data). Public sewerage systems served 7 930 000 people (77.7%) (2003 data). In all, 3 791 water supply zones (266 of which served more than 5 000 people and 3 525 of which served less than 5 000 people) are designated. 1,243 companies (legal persons) are operating water supply systems and sewerage systems.

Suppliers of drinking-water to the public shall meet the following obligations:

- a. assure compliance with the legal quality requirements on water supplied,
- b. monitor drinking-water to the extent and at a frequency dictated by law,
- c. at least 25% (from 2008 at least 50%) of sampling points at tap need to be changed each year and selected at random.

The regional public health authorities (RPHA) have the first responsibility for enforcing the legislation; the Ministry of Health maintains supreme authority if any supplier challenges a decision of a RPHA in court.

Water quality can be tested only in an authorized or accredited laboratory. Results of the control testing shall be sent in a legally defined electronic format to the RPHA (i.e. by internet through the central database), which has to confirm the result.

Data on drinking-water quality

- a. A central database with all primary results, plus other information such as the origin of the samples and the water supply systems is in operation since 2004.
- b. For example, data on 30 880 samples and 714 185 single analyses of all parameters included in the EU DWD and the Czech Decree were collected in the database in 2004.
- c. Various kinds of data processing are available.

Data on wastewater quality

- a. Annual data are available on waste water quality (BOD5 20, COD-Cr, N-NH4+, Nanorg, Ntot, Ptot, Hg, Cd, absorbable halogenated organic compounds (AOX), dissolved inorganic salts, non-dissolved solids) both before and after treatment from all public sewerage systems.
- b. Additional data are available on total and treated wastewater discharges (incl. and without storm water).

Data on public supply/sanitation coverage

Annually updated information on population coverage is available for both drinking-water and sewerage coverage.

Data on environmental performance

Information on certification to EMAS or ISO is available. However, such certification is not mandatory in the Czech Republic. **While certification is informative, lack of certification is not informative.** Some of the bigger companies passed this certification on a voluntary basis. However, no central national database on the status of certification is available, neither is such system currently being planned – compliance with national environmental rules is necessary and sufficient for State authorities.

Data on financial performance:

- a. Revenue collecting efficiency: not reported, assumed high
- b. Billing efficiency: total accounted potable water (detailed by household use and other use); unaccounted potable water (of which losses in piping, water company own needs, public service needs like fire brigades etc), water supply and sewerage charge.
- c. Operating costs: operating costs (methodology unclear), number of connections, water supply and sewerage charges.
- d. Revenue per connection: accounted potable water, water supply and sewerage charges, number of connections
- e. Cost-recovery ratio: operating costs, accounted potable water, water supply and sewerage charges, subsidies (known, but probably not centrally reported).

Data on service performance

- a. Reliability: number of accidents (breakdowns) in the water supply network.
- b. Number of accidents (breakdowns) in sewerage systems.
- c. Continuity: not directly reported, considered covered by reliability indicator.
- d. Integrity: not directly reported, considered covered by reliability indicator.

²⁶ Report prepared by Czech Republic to the consultation on target setting and reporting, Copenhagen 2005,

Chapter 6: Legal dimension of the Protocol on Water and Health: compliance procedure and functions of the Compliance Committee

As the Protocol on Water and Health is a legally binding instrument, provisions to ensure compliance with the Protocol have been seen as a necessity by the countries that negotiated it, in order to ensure maximum benefits from the Protocol in terms of safeguarding the right to healthy water for all UNECE citizens

Decision I/2 on review of compliance by the first Meeting of the Parties

The Meeting of the Parties,

Determined to promote and improve compliance with the Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, and recalling its article 15,

Recognizing the necessity for rigorous reporting by the Parties on their compliance with the Protocol,

Seeking to promote the identification, as early as possible, of compliance difficulties encountered by Parties and the adoption of the most appropriate and effective solutions for resolving those difficulties,

(...)

- 1. Establishes the Compliance Committee for the review of compliance by the Parties with their obligations under the Protocol.*
- 2. Decides that the structure and functions of the Compliance Committee and the procedures for the review of compliance shall be those set out in the annex to this decision.*
- 3. Encourages Parties to bring issues concerning their own compliance before the Committee.*

(...)

As described in Chapter 5, the Parties of the Protocol will prepare summary reports on their progress to meet targets and target dates set by each Party. The summary reports will be sent to the Secretariats of the Protocol (UNECE and WHO) and forwarded to the Compliance Committee for analysis as well as the Meeting of the Parties.

The first Meeting of the Parties (Geneva 17-19 January 2007) adopted a Decision I/2 on review of compliance establishing a compliance review procedure of non-confrontational, non-judicial and consultative nature which includes the establishment of a Compliance Committee.

The objective of the Compliance Committee is to secure compliance with the obligations under the Protocol, with a view to preventing disputes, by:

- (a) Addressing cases of non-compliance by Parties; and
- (b) Providing advice or assistance to Parties, where appropriate.

Activities of the Compliance Committee

The Committee performs general tasks in relation to the monitoring of compliance and considers individual cases of non-compliance. More generally, the Committee has a very broad power to examine compliance issues and make recommendations if and as appropriate. It reports on its work at each ordinary Meeting of the Parties (MOP).

The Committee shall monitor, assess and facilitate the implementation of and compliance with the Protocol reporting requirements and prepare, at the request of the MOP, a report on compliance with or implementation of the provisions of the Convention.

The main function of the Committee is to consider issues of non compliance by a Party with any conventional provision that has been brought to its attention, to decide upon certain facilitative response measures and to make recommendations to the MOP on response measures.

Potential cases of non-compliance can be brought to the Committee attention through three mechanisms: submissions, referrals and communications.

a) Submissions by a Party

“Submission” refers to an issue of compliance brought before the Committee by a Party having reservations on another Party’s compliance (party-to-party trigger) or concluding that, despite its efforts, is itself unable to comply with the Protocol (self-trigger). Submissions must be supported by corroborating information.

b) Referrals by the Secretariat

“Referral” refers to the issue of compliance brought to the Committee’s attention by the secretariat when it becomes aware of possible non-compliance by a Party, when the matter is not settled through consultation with the Party concerned, but only upon consideration of the reports submitted by the Parties in accordance with the Protocol.

c) Communications from the public

“Communication” refers to the trigger by “members of the public”, e.g. individuals or organizations, without a particular interest to be stated. To be admissible, communications must not be (a) anonymous communications, (b) an abuse of the right to make such communications, (c) manifestly unreasonable, and (d) incompatible with the provisions of the compliance procedure or with the Protocol. Communications by the public are an important tool to safeguard the interests of population and their rights to safe drinking water and health.

The Compliance Committee is consisting of 9 members serving in their personal capacity and not as representatives of Parties, but geographic and sectoral distribution of the members are taken into consideration.

PROTOCOL'S ARTICLE 15

REVIEW OF COMPLIANCE

The Parties shall review the compliance of the Parties with the provisions of this Protocol on the basis of the reviews and assessments referred to in article 7. Multilateral arrangements of a non-confrontational, non-judicial and consultative nature for reviewing compliance shall be established by the Parties at their first meeting. These arrangements shall allow for appropriate public involvement.

Highly developed countries – any benefits from compliance with the Protocol on water and health?

Switzerland has a population of 7.2 million. 100% of the population have access to drinking water of good quality and 100% have access to safe sanitation. The situation is quite good in terms of controlling water related diseases. An indicator of this is that only 0.2% of children under 5 die due to diarrhoeal diseases and that the maternal mortality ration to 100,000 births is 7. Meeting the MDG's is not an issue in a prosperous country like Switzerland.

Even despite these relatively few problems Switzerland has chosen to sign the Protocol on Water and Health and ratified it in 2006. Switzerland is a confederation of 26 cantons (States) that are highly independent. Implementation of the Protocol has a number of consequences regarding the institutional structure of the confederation. Targets will no longer be set by the different cantons, but must be set on a national level. Monitoring of the water resources, reporting and coordination of the water and health related activities also has to be carried out on a national basis and the Swiss legislation has to be revised to reflect this new situation. Several agencies from the health, water, environment, agriculture and other sectors, at both national and regional levels, took part in the development of a vision and of a strategy for its fulfilment. Coordination is established in water management and specific quality and quantity goals are set for water and health, in the field of environment and health and with regard to international cooperation.

In 2008 the country is in the process of setting up institutional structures for defining the goals and securing coordination among concerned agencies with regard to implementation of the Protocol. The coordination is also of help to ensure a common understanding among partners from different agencies about the main water and health issues and how to integrate these issues in strategies and policies to ensure good quality water to the population. Another task for Switzerland is to develop the actual targets and the linked indicators for water supply, sanitation, treatment of waste water etc. and coordination with other Parties to the Protocol can facilitate this process.

The added values for Switzerland to implement the Protocol are:

- *The promotion of a consequent „drinking water policy“ at the level of the confederation*
- *The proper coordination of decentralised activities*

Chapter 7: Conclusions and recommendations for future actions

It is well justified to conclude that there are considerable benefits for EECCA countries in provision of access to safe water and adequate sanitation and in an effective protection of surface and groundwater resources. Combined with an effective system for detection, contingency planning and response to outbreaks and incidents of water-related diseases, EECCA countries can make considerable progress in preventing, reducing, and controlling water related diseases for the benefit of its populations..

At present four out of 12 EECCA countries: Azerbaijan, Moldova, Russian Federation and Ukraine have ratified the Protocol on Water and Health and are now taking steps in implementing the

Protocol. Although the situation in EECCA countries differs, there seems to be no reason to believe that the benefits are less in the 8 EECCA countries, which have not ratified the Protocol.

Further a number of good practices are available in the European region on provision of safe drinking water, adequate sanitation, water management and systems for detection, contingency planning and response to outbreaks of water-related diseases which EECCA countries can use and adapt to their national conditions.

Experiences with implementation of the Protocol are gradually developing in the countries which have advanced most with the Protocol. Further guidance material on establishment of surveillance systems, target setting, monitoring and reporting is developed by the two relevant Task Forces established by the Meeting of the Parties.

It can further be concluded there will also be challenges for EECCA countries in the implementation of the Protocol. Developing the coordination and cooperation mechanisms and engaging all relevant stakeholders, providing the necessary data and information to set targets and to develop surveillance systems and early warnings and to monitor and report progress on meeting targets seem to be areas which will be most challenging. The inputs from participants from EECCA countries to the workshop will be able to detail this further, and to make the conclusion on challenges more specific.

On the basis of this analysis, the following future actions are recommended:

- To analyse the burden of disease of water-related diseases and the costs and benefits of improving access to safe water and sanitation and improved water management and health survey systems. This information will provide an input to the political decision process.
- To analyse the efficiency of existing national water, environment and water legislation and regional/international agreements and programmes to prevent, reduce and control water-related diseases. The good practices presented in the background document can be used as a benchmark for EECCA countries.
- The result of the analysis may be used as a basis for preparing a plan for improving efficiency of existing legislation and programmes and the basis for a decision to develop new legislation and to ratify the Protocol.
- EECCA countries which have already ratified the Protocol shall develop a national roadmap to set national targets and target dates, development of a surveillance system and establish the national institutional structures to implement, monitor and report the progress in the implementation of the Protocol. The roadmap could be developed through an analysis of based on
- Additional specific recommendation will be developed and included in the Final Report from the workshop Participants of the workshop are invited to contribute to this.
- EECCA countries which have already ratified the Protocol shall develop a national roadmap to set national targets and target dates, development of a surveillance system and establish the national institutional structures to implement, monitor and report the progress in the implementation of the Protocol. The roadmap could be developed through 1) setting up an intergovernmental group to develop the roadmap; 2) undertaking an analysis of existing policies and plans; 3) assessing key problems and potential solutions in relation to prevention, reduction and controlling water-related diseases; 4) setting targets and target dates and plans for developing surveillance and early warning systems; 5) consult targets

and target dates with the public and relevant stakeholders; 6) develop a plan for setting up monitoring and reporting system to follow progress

- Additional specific recommendation will be developed and included in the Final Report from the workshop. Participants of the workshop are invited to contribute to this.

Annex 1

Country/regional economic integration organization	Date of signature	Date of ratification, acceptance, approval or accession
Albania	17-Jun-1999	8-Mar-2002
Andorra		
Armenia	17-Jun-1999	
Austria		
Azerbaijan		9-Jan-2003
Belarus		
Belgium	17-Jun-1999	29-Jun-2004
Bosnia and Herzegovina		
Bulgaria	17-Jun-1999	
Canada		
Croatia	17-Jun-1999	28-Jul-2006
Cyprus	17-Jun-1999	
Czech Republic	17-Jun-1999	15-Nov-2001
Denmark	17-Jun-1999	
Estonia	17-Jun-1999	9-Sept-2003
Finland	17-Jun-1999	3-Mar-2005
France	17-Jun-1999	6-May-2005
Georgia	17-Jun-1999	
Germany	17-Jun-1999	15-Jan-2007
Greece	17-Jun-1999	
Hungary	17-Jun-1999	7-Dec-2001
Iceland	17-Jun-1999	
Ireland		
Israel		
Italy	17-Jun-1999	
Kazakhstan		
Kyrgyzstan		
Latvia	17-Jun-1999	24-Nov-2004
Liechtenstein		
Lithuania	17-Jun-1999	17-Mar-2004
Luxembourg	17-Jun-1999	4-Oct-2001
Malta	17-Jun-1999	
Moldova	10-Mar-2000	16-Sep-2005
Monaco	17-Jun-1999	
Montenegro		
Netherlands	17-Jun-1999	
Norway	17-Jun-1999	6-Jan-2004
Poland	17-Jun-1999	
Portugal	17-Jun-1999	6-Sep-2006
Romania	17-Jun-1999	5-Jan-2001
Russian Federation	17-Jun-1999	31-Dec-1999
San Marino		
Serbia		
Slovakia	17-Jun-1999	2-Oct-2001
Slovenia	17-Jun-1999	
Spain	17-Jun-1999	
Sweden	17-Jun-1999	
Switzerland	17-Jun-1999	27-Oct-2006
Tajikistan		
The Former Yugoslav Republic of Macedonia		
Turkey		
Turkmenistan		
Ukraine	17-Jun-1999	26-Sept-2003
United Kingdom	17-Jun-1999	
United States		
Uzbekistan		
European Community		