In cooperation with

DWA
Deutsche Vereinigung
für Wasserwirtschaft,
Abwasser und Abfall e.V.

Sponsored by the
German Federal Environmental Foundation
DBU
Deutsche Bundesstiftung Umwelt

IPSWaT

Report on

Young Scientists' and Professionals' Programme 2007

Introduction into the German Water Sector

September 3 – 7, 2007

Young Scientists with the mayor of Hennef (3rd from the right) in front of the Hotel "Sonnenschein" in Blankenberg on 3rd Sept

Content

Programme Schedule

Sunday, September 2	Individual arrivals
	Welcome Meeting of all practipants with their guides and DWA-representatives
Monday, September 3	Seminar "Introduction into the German Water Sector"
	Welcome address by the Mayor of Hennef, Mr Pipke
Tuesday, September 4	Continuation "Introduction into the German Water Sector"
	IPSWaT at International Bureau of the BMBF, Bonn
Wednesday, September 5	Water reservoir "Wahnbachtalsperre"
	DAAD German Academic Exchange Service, Bonn
Thursday, September 6	Lower Water Authority, Siegburg
	Administrative offices of the City of Cologne – Dept. for High Flood Protection
Friday, September 7	Presentation of DBU
	Presentation of YSP´s results by the participants
Saturday, September 8	Individual returns

Participants were divided into 5 groups, each group reported on one or more of the programme topics.

Reports in chronological order follow:

Hennef, September 3

Introduction into the German Water Sector, 1st day

Reporters (YSP-Group 1):Hülya Bogacioglu, Beyza Doyduk, Burcu Yazgan, Dawit Nega Bekele, Ihtiyor Bobojanok, Ngoc Nhu Uyen Vo, Oxana Botalova, Öznur Alp, Ramchandra Bhandari, Tao Li

Profile of the German Water Industry Facts and Figures and Legal Structure

Presented by Dr. Jochen Hentschel

The first day was opened by the general introduction into the German water industry. The geographic and socio-economic profile was demonstrated. The general overview of the presentation is given below.

Germany is a water rich country with a population of more than 80 millions. Available water resources are allocated within public water supply, mining and manufacturing industry, thermal power stations and agriculture. The remaining 81% of the water resources are not used, whereas only 2.8% is provided for the public use.

Among the sources of public water supply in Germany, groundwater is the most important source of drinking water with a percentage of 65.

The quantity of water in Germany is sufficient however the quality of the water forms a significant problem. 62% of the rivers and 38% of the lakes in Germany are at risk of failing the requirements of European WFD (Water Framework Directive) objectives. As mentioned before, being the most important source of drinking water, 53% of the ground water is at risk of failing the WFD objectives or it is possible to be at risk in the future. "At risk" means that if one of the very critical criteria is not met, requirements as a whole are not met.

Wastewater treated in public sewage treatment plants are subjected to mechanical, biological and further treatment processes. Applying further treatment steps are becoming popular within the years with the aim of reaching 99%.

A Walk back into the Past History of the German Water Industry

Presented by Prof. Dr.-Ing. Wolfgang Merkel

Prof. Merkel made a presentation about progress in water supply systems of the cities in last 4000 years. Brief excursion into history was started from 2600 (B.C) and extended Roman Empire period. In addition Aquädukts at Wiesbaden and Eifel supplying water to Köln and Kastek were briefly summarized. Furthermore Prof. Merkel explained progress of water supply systems (from first ages to beginning of 20th century) giving examples from various European and German Cities. (Under) ground

water storage tanks, water pipes (historical development and materials) were also subjected to the presentation.

Household water supply systems, historical water treatment methods and hygienic problems were also summarized and presentation was concluded with history of technical-scientific consolidation which is basis for foundation of DWA.

As well as being a water rich country, Germany invests more than 5 billion euros each year into the public wastewater disposal systems. It is seen that the investment costs are higher until the year 2001 since the deficiency in the water treatment plants were substantial initially. Later, the need for the investments in the wastewater sector is mostly focused in operation, maintenance and improvements. Germany is the leader within EU countries in terms of investments made in the wastewater sector with a percent of 0.83.

Organisational Infrastructure and Bodies

Presented by Dipl.Ing. Rüdiger Heidebrecht

The day continued by the presentation entitled "Organizational Infrastructure and Bodies in Germany ". It included very interesting description discussed below.

Germany has a federal structure: the responsibilities of government are divided among the national, state, and municipal levels. The federal government, with its headquarters in Berlin, is responsible for promulgating national legislative and defining national tasks of water management.

There are several federal ministries for various specialized fields: the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit – BMU) is responsible for the protection of water bodies. UBA is Umwelt Bundesamt, which is responsible from the technical scientific research, works in cooperation with BMU.

The Federal Ministry of Education and Research (Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie– BMBF) is in charge of developing new technologies. BiBB (vocational training), DAAD (German Academic Exchange Service), and IPSWaT (international postgraduate studies in water Technologies) are financed by BMBF (Federal Ministry of Education and Research).

International cooperation is overseen by the Federal Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung – BMZ). BMZ coordinates KfW (Bank), GTZ (Gesellschaft für technische Zusammenarbeit), DED (German Development Corporation), InWent (Internationale Weiterbildung und Entwicklung GmbH).

The state governments of the 16 federal states are responsible for the regulation of water supply and wastewater disposal in their territories, within the framework of the federal laws. DWA (German Water Association) is one of the non governmental organizations (NGO) of Germany. DWA, which has approximately 14000 members, engaged in making rules and standards and at the same time they are giving training programs for these standards. They also inform public about their studies by some PR work like handing out brochures in schools. Their headquarters is located in Hennef and they have 7 Regional Offices. In the organizational infrastructure of Germany, DVGW German Technical and Scientific Association for Gas and Water deals with making standards and regulations in water and gas research and works.

In general, the introduction to the history of water sector development and the current situation allows the participants to analyse the steps taken by German Water engineers to achieve the current level of development. It also allows the chance of comparing the development in the home countries to the development in Germany and get the knowledge on 'Best practice' and use it in other countries.

PPPs and other Management Structures in Germany – Aspects of Liberalization

Presented by *Prof. Dr. –Ing. Wolfgang Merkel*

1. Competence and organisation of German water sector

2. What does "privatization"actually mean?

3. Significance of „Services of general interest" (SGI) in Europe

4. The German point of view

5. Principles of sustainable water supply

6. Summary

1) Competence and organisation of German water sector

The State has the right to pass general rulings concerning the distribution of land, regional planning an water management. The Federal Lands are responsible for the die execution of federal laws, foundation of necessary authorities and administrative processes. The German Basic Constitutional Law guarantees the local communities that they can regulate their local issues within this framework (these interests are also called „services of general interest". Also after the federalism reform and the reform in the water sector, the Federal Lands became responsible for the water management system.

As an example, in the other countries (England, Wales, France and the Netherlands) the water sector was at least partially privatised.

We will now look at explanations on the goals and characterisation of the public water supply system.

2) What does "privatisation" actually mean?

In this paragraph different types of privatisation (formal and financial), their advantages and disadvantages, and the essential state control for the case of liberalisation and privatisation were described.

3) Significance of "Services of general interest" (SGI) in Europe

Some points on the decision of the European Communities and European Parliament are to be included into SGI. Here was pointed out that European Parliament considers water to be a common resource for mankind, and therefore the water management should belong to a domestic market. However, tendencies to the open water market exist.

4) German point of view

After a short explanation of the control mechanisms of the German water sectors, the regulation and competition in Germany were considered. Marketability can be measured not only with the price level, but also with the enterprise goals (such as safety and meeting the environmental conditions). Such competition areas also exist in Germany. The German regulating system is classified as "obviously effective". It is followed by the arguments against the liberalisation of the water sector, after which the problems of water transport in public supply systems were shortly mentioned. In the end of this part, the price-efficiency relation of the public water sector in Germany was presented.

5) and 6) Principles of permanent water supply and Summary

In these paragraphs the sell-out of the public water sector is covered with regards to the stress of competition the energy sector. The principles of permanent water supply are presented and finally the activities in water sector in Germany were evaluated as "very good".

Hennef, September 4

Introduction into the German Water Sector, 2nd day

Reporters (YSP-Group 2), Ratnaningtyas Budhi Lestari, Anant Niraula, Carolyne Kasisi, Felix Twinomucungzi, Inu Pradhan, Lestari Rachmawati, Quyet Van Nguyen, Shaochun Huang, Suman Salike

Rules and Standards

Presented by *Dipl.-Ing. Christian Berger*

The presentation focused on the introduction of standards, the need, the general development process and some examples. Dipl.-Ing. Berger explained that standardization is the systematic, standardization of material and immaterial objects carried out jointly by interested circles for the benefit of the general public. Standards are produced so that people utilize experiences from previous projects and do not repeat the same kind of work. As the knowledge of the world is increasing in each field and to cope up with the present situation standards are essential tools to mark minimum levels of service. The European standards, which are followed by all member countries are made to promote economic, rational work, ensure quality, substantial legal requirement, and serve for the breakdown of trade restrictions.

The general structure of operation of DWA follows from the Main Committee, which splits down into several Specialist Committees, which further subdivide into different working group in order to cover the wide scope of activities. The Standards generally go through six stages before they are published to the public, from description of the project, production of the draft in the specialist committee, public participation procedure, final agreement main committee, final agreement managing committee and publication. Advisory services are also provided to the sector through the 'Advisory Leaflets' The DWA Advisory Leaflets, which also includes six stages gives recommendation and assistance for technical and operational problem and represent supplements to the standard. The six stages start with description of the project, production of the draft in the specialist committee, simplified participation procedure, discussion of comments in the specialist committee, final agreement managing committee and publication.

International Activities of the German Water Sector

Presented by *Dipl.-Geol. Roland Knitschky*

The presentation covered four main aspects: water facts, German water policy and actors, international activities by DWA and some challenges. Facts presented on the global water conditions included the assessment of drinking water and sanitation, water flows and water scarcity in the different regions of the world, showing that 1.7billion people still lack access to drinking water, while over 2.4 billion are lack access to adequate sanitation. These figures and gave an objective impression on the severe water problems globally. In addition, Mr. Knitschky completed the water facts with a financial assessment of water related projects. From this, it was realized that many countries are paying more and more attention to water issues and that private operators will continue to play a significant role in the future water management. The second part focused on the German water policy and actors, which introduced the German water systems and the main actors.

The international act ivies by DWA formed the core of the presentation. DWA has four main targets or goals in its operations. The first being information and sensitization (on international forum), which is mainly accomplished through the internet platform, journals, forums and so on. The International Trade Fair for Water, Sewage, Refuse and Recycling (IFAT) was sighted as one such good example. The second goal is cooperation with other international groups and ex experts working in the sector. Training experts and young careers is another important goal, in order to complete the standardization which is the fourth goal of DWA. Finally, challenges facing experts both in Germany and on the international scene were deliberated upon, so that the young professional could get an impression of what lies beyond in their future careers.

Future Trends in the Regional and International Water Sector:

Presented by *Dipl.-Ing. Rüdiger Heidebrecht*

The presentation focused on the future trend of research and development activities within the water sector both for the German and international industries. Highly industrialised countries like Germany concentrated on new construction activities in the last 40 years, and at present there is limited opportunity for young Engineers in this aspect; which is contrary to the developing countries. The general areas recommended for research in the future trend were presented as:

River catchment management: Following the Water Framework Directive, management of the river systems is to be handled at catchment level for example, the river basin districts in the future. Research and development opportunities therefore exist in using better GIS tools for data management and monitoring.

Harmonisation of Standards: European industry is governed by EU standards hence all members have to adapt to these standards requiring translations and localisation to the respective 29 member countries.

Rehabilitation and optimisation of existing infrastructure: 99.1% of the German population has access to water supply while 95% are already connected to sewerage systems. Opportunities in new systems

are therefore limited and now reorienting to rehabilitation and optimisation of operations of the existing infrastructure. Developments in sewer rehabilitation include robots for blockage detection and automated control of sewer inspectors.

Benchmarking and liberalisation: Privatisation of systems has brought changes in management of operations hence benchmarking is required to identify efficient practices across countries and different operators.

Technical safety management: More developments are required in the technical, quality and legal aspects of water infrastructure.

New technologies and alternative processes: New technologies in water and wastewater treatment are being explored, especially with membrane technologies. Alongside, water saving approaches are being explored like dry toilets, recycling and rainwater harvesting.

DWA networking activities: More training activities including the fields of sewer inspection, membrane technology and introduction to the German water industry.

Climate change and flood protection: Climate change is posing unprecedented challenges to the sector including increased floods and there are opportunities to improve prediction, adaptation and mitigation measures.

September 4

The IPSWaT Programme

Presented by *Dr. Ulrike Schaub*
Hosted by the International Bureau of the BMBF (Bonn)

The International Bureau (IB) of the Federal Ministry of Education and Research (BMBF) is an institution that supports the ministry in designing and implementing international cooperation and building networks to exploit promising opportunities for cooperation worldwide. The goal of IB is to improve research development and action, in order to reach government goals and future innovation for the German science and economy. Therefore IB mainly contributes in:

- Strengthening Germany's position as a center for research and education
- Shaping the European Research Area, which represents German interests in the EU, bridges with Eastern Europe and expands cooperation to the third world
- Positioning German technologies and services in world markets, hence laying groundwork for economic success, and
- Building networks and strategic alliances, both within German and on the international scene

The IB tasks focus on stimulating new projects, quality and originality, mutual interests, multilateral networks, and special tasks and activities, like IPSWaT, in order to promote and support new innovation to enhance new impulses for a faster application of research results into reality: products, services, and procedures.
The activities of the IB generally focus on:

- Combining the advantages of science and economy
- Technology transfer and training
- Promoting the international roles of Germany
- Human resources development
- Building networks and strategic alliances, and
- It also focuses on innovation strategies, such as innovation for health and safe environment, and innovation for communication and mobility.

IPSWaT – International Postgraduate Studies in Water Technologies is a special project, supported by the International Bureau, to promote sustainable in the fields of sciences ranging from life sciences to engineering programs.

IPSWaT is striving to build an academic and vocational network nationally and internationally through cooperation with many other institutions such as BMZ, DAAD, BMU, DWA, UNESCO, CIM, InWent, Industry, Diplomatic Corps, and its own Alumni Network.

The network activities that are carried out by IPSWaT, include scholarships, community build-up, IPSWaT conferences, representing at International Fair (IFAT), sponsor and partner of the "Young Scientist and Professionals Programme" , Alumni network build-up, business internship and publication support.

Ulrike Schaub of the International Bureau of BMBF with some IPSWaT-students.

Hennef, September 5

Excursion to the Water Reservoir Wahnbachtalsperre

Reporters (YSP-Group 3): Lena Saptalena, Margarita Medellin, Nelson Alejandro Molina, Nina Novira, Reetu Shrestha, Shailesh Shrestha, Stephen Oyewale, Xuan You, Yuan Qian

The Young Scientist Program started activities at 8:30, the bus took us to the Wahnbachtalsperre, where we learnt about the organisation and tasks of a Public water management association, and we visited the reservoir as well.

In the conference room of Wahnbach water reservoir (in front: Dipl.-Ing. Oluf Hoyer)

The Wahnbachtalsperrenverband WTV, was established as public corporation in 1953 with the task to supply water to the region of Bonn. The dam and treatment plant was built from 1955 till 1957 and went in operation in the same year. In the late 90ies a new treatment plant was designed to reach a "state-of-the-art" in treatment technology; working to full capacity since June 2002. Together with the 2 groundwater plants this treatment plant provides a capacity to supply 780.000 people in 18 towns through 250 km length network with 45 Mm^3/year, coming from:

- -15% surface water (Wahnbach dam)
- -10% Groundwater Hennef
- -35% Groundwater Meindorf

The high quality of the water is obtained with three treatment plants, working with the energy supply of 12MW and backup power reliability. The treatment applied must be suitable for the raw water quality from the source, the main issues for Wahnbachtalsperre waters are:

- Phytoplankton and zooplankton
- Algae-borne and humic matter
- Dissolved manganese
- Clay, debris, bacteria and pathogens

In order to eliminate such pollutants, the treatment steps required are:
1.Oxidation with permanganate and adsorption to powdered activated carbon: is used to precipitate dissolved or colloidal manganese, oxidize organic compounds that may interfere with flocculation and diminishes taste and odour. This process absorbs toxic compounds of biogenic origin or from an accident.

2.Ultrasound inactivation: the cavitation generated by ultrasound, physically kills micro organisms.

3.Flocculation and filtration: the coagulants added form the flocks, which catch the remaining pollutants. The sand filtration process removes finally the flocks.

4.Disinfection and deacidification: are the final steps that eliminate eventual bacteria and viruses, and keep the pH close to the saturation point of calcite.

The surface water comes from the reservoir

The principal purpose of the Wahnbach Reservoir is the supply of water for the Region of Bonn. The Wahnbach Dam contains 41.3 Mm3 and the annual feed varies from 20 to 60 Mm3. The Dam was built with natural materials instead of concrete. The top of the dam is 8 m wide and 379 m long and it has a height of 52.5 m.

Several strategies are implemented to maintain the overall performance of the reservoir. These include:

The reservoir is located in a protection zone 1, and therefore the access to it is restricted. Licensed fishermen are allowed to enter, but they have to report the type and the size of the fishes in order to monitor the population of fish kind. The catchment's protection zone of the reservoir was modernized according to present knowledge and needs in 1993.

The Wahnbach Dam Association has a close cooperation with the farmers, who are encouraged to use manure injection into soil to avoid run off contamination with pathogens and plant underseeds with mais crops to prevent erosion.

Previously, there was eutrophication, which caused severe problems with the drinking water quality. In order to keep the reservoir in an oligotrophic state, a Phosphorous Elimination Plant – PEA was placed at reservoir inlet. The capacity of the PEA is 5 m3/s. Since 1977, the algal nutrient Phosphate is removed by flocculation and direct filtration and since 1980; no more blooms of algae were observed. Nevertheless, not all stormwater floods can be treated completely. About 10 to 20% enter the reservoir untreated, but never the highly contaminated front waves.

Oxygen is supplied to the hypolimnion (lower section of cold water under the upper warm epilimnion that covers the lake in summer like a lid and prevents contact to the atmosphere) by hypolimnetic aeration. Compressed air is fed through perforated pipes, released to the atmosphere after saturation of the water with oxygen. The oxygenized cold water is transferred back into the hypolimnion without disturbing the stratification. This technique inhibits the release of Iron and Manganese from the sediment of the reservoir.

September 5

DAAD German Academic Exchange Service

The program ended with the visit of the DAAD, (Deuschter Akademischer Austauschdienst) located at Kennedy Alle 50, Bonn.

Mr. Cay Etzold and Ms. Gudrun Chazotte from the Referat (group) 43 welcomed us. Mr. Cay Etzold explained to us glimpses about the DAAD, the self-governing organisation of German universities, which has 231 member universities and 127 student bodies. DAAD has sponsored so far about 55.000 students to pursue their studies. DAAD scholars come from around the world. Majority of scholars are from central and eastern Europe.

- DAAD funding goes to five different sectors, which are:
- Scholarship for foreigners
- Scholarship for Germans
- Internationalisation of German Universities
- Promoting German Studies and German Language Abroad
- Educational Cooperation with Developing Countries
- DAAD group 43 has high priority to establish cooperation with the developing countries. It has four main programmes:
- Scholarship for PhD and Master courses
- Subject related universities partnership-
- Alumni programme

- DIES higher education management program

The main target is to provide further education, training, and research for younger professional in the fields of trade, business, industry, administration, and science. Most of the previous DAAD scholarship holders are occupying higher position in decision making, spreading, and implementing the gained knowledge and expertise in various fields. DAAD maintains strong communication with former students in the form of Alumni Programme.

Mr. Cay Etzold has urged that in the near future, management of Water Resources will shape the development of world as the valuable water resources are getting scarcer and dearer. He has also pointed at the fact that the developing countries are focusing only in basic education only. Higher education at university levels are not receiving high importance that it should receives.

Hennef, September 6

Lower Water Authority, Siegburg

Reporters (YSP-Group 4): Louy Qoaider, Rabee Hamida, Manar Solh Darali, Rania Karakra, Awad Nasser, Emilienne Tingwey, Phi Vo Thi Yen, Katarzyna Zajac, Nathasith Chiarawatchai, Susanne Bodach

Offices of the Lower Water Authority in Siegburg

The head of the Department of Wastes and Water Resources Protection (Rhein Sieg-Kreis), Dr-Ing Helmut Hoffmann hold a presentation on the administrative functions and the tasks of the District, where 75 persons from all specialties work in this department.

The District of Rhein-Sieg is situated in the south of the state of North Rhine - Westfalia. In Germany, the administrative and political structure is divided into state and municipal authorities. Within the state authorities are regional governments, whereas in municipal authorities we distinguish between autonomous cities and districts (consortium of smaller
cities).

There are three main tasks of the District: inter-municipal tasks, complimentary tasks and tasks of compensation.

The administration of the District deals with a lot of tasks, which are the following:

- Audit
- District clerks office
- Traffic safety

- Education authority
- Social matters
- Youth welfare
- Health service and food control
- Protection of water and soil
- Protection on nature and landscape
- Collection and deposition of waste
- Authorization of construction
- Planning of roads and traffic
- Conflict management between cities
- Passenger service
- Administration of land register

The Rhein-Sieg participates in five main community services, which are:

- Education and culture
- Water supply and treatment
- Transport
- Transportation and economic promotion
- Urban development and habitation

This department also supervises the use of water, soil and management of wastewater and wastes. For example in the field of agricultural water protection, the department put regulations for the use of pesticides in cooperation with authority of agriculture. In industrial water protection, manufacturers were instructed to build their own wastewater treatment plants if needed.

At one point the District faced the problem of solvents in groundwater and had to deal with it and to fix it, the following measures were considered:

- Treatment the contaminated ground water by activated carbon (pump and treat)
- Treatment of used air to reduce the contamination in soil
- Injection of Nano-iron
- Water-proofing by synthetic material
- Use of groundwater for cooling an agricultural irrigation

After six years of treatment, the solvents were reduced from 5000µg/l to less than 1000µg/l.

Another problem solved, was the contamination of groundwater with arsenic. In this case, the contaminated arsenic groundwater was treated, and the gas and water-proved by synthetic material was collected. After the treatment, the surface was partially used e.g. constructing a tennis court.

September 6

Administrative Offices of the City of Cologne,

Dept. High flood protection

High flood protection in Cologne

The visit to the department was divided into three parts; running a flooding model for the city of Cologne, the holding introductory presentation on the authority functions, and visiting flood protection facilities.

- Model demonstration:

A 3-D model was run at the start of the group's visit to the authority. This was done in order to demonstrate different flooding scenarios to the audience. Three Scenarios of the river Rhine for the city of Cologne and its surrounding regions were presented; scenario 1: the situation 200 years ago (at that time, there was no flood protection plan or facilities installed. The city of Cologne was flooded while receiving high rainfall), scenario 2: the recent situation, without flood protection plan (as nowadays there were changes in the structure of the river basin, the flood situation was more severe than in scenario 1), and scenario 3: the recent situation, with flood protection plan (the facilities such as weir were installed so that when high amount of rainfalls occurred, the situation was not severe as in the previous two scenarios).

- Presentation: Flood management in Cologne

The content of the presentation was divided into several parts, namely the introduction, the history of flood in Cologne, the flood protection concept, and the conclusion.

Flood Model

Moreover, it was mentioned that a European Flood Protection Center is being built in order to exchange the knowledge between other European flood protection centers.

Later on, a movie depicting the extreme flooding of Small River in the South of France in September 1992 was shown. In which the entire city was flushed.

Cologne city has the most frequent number of floods in the German history. Measures to prevent the city from the flooding of the Rhine were first taken in 1982. In that plan the Rheingartens was built along the river. In 1984, a wall of 10 m water level was constructed along old city. Residents thought that the wall provided a sufficient protection from the flooding, since it could prevent the most frequent flooding of their city. In the 1993 and 1995 the floods this wasn't the case, where the city suffered severe floods above the wall level.

The department was active among the last years to protect the city and its surrounding from flooding. Many concepts were introduced; namely risk analysis and the Hochwasserkochbuch (a concrete manual with 5000 recommendations for the Center), the implementation of mobile water barrier and underground flood measure, the transfer of the technology and knowledge to other places (e.g helping Bodensee and East Germany to build the wall), and the implementation of Flood Tourism.

More information about the center can be found under the website www.hochwasserinfo-koeln.de.

In the end of the presentation session, a movie showing how to build a mobile wall was played for audience.

- Visiting flood protection facilities

Finally, the group visited the construction site of a new wall along the right bank of river Rhine. After that, the group moved to the storehouse and training facility of the department, which is located under the Deutz Bridge. The process of installing a mobile wall was demonstrated in that facility as well.

The excursion ended up after the group crossed to the other side of the river through a special huge duct constructed under the bridge to help fighting the floods.

The group of young scientists and professional made afterward individual visits to important site in the city of Cologne regarding water management and flood protection.

Warehouse for the construction elements of the mobile wall

Infrastructure for the mobile protection wall

On September 7, there were the final presentations of the participants on the introductory seminar topics and the visited institutions (see above). The Romanian and Bulgarian participants reported on the water management in their countries.

Water Management System in Romania

Reporters: Jeffrey Tuhan, Paul Sorin Alecu, Silvia Dragan, Stefan Duduman, Constantin Dumitru, Ciprian Fuior, Oana Nistor

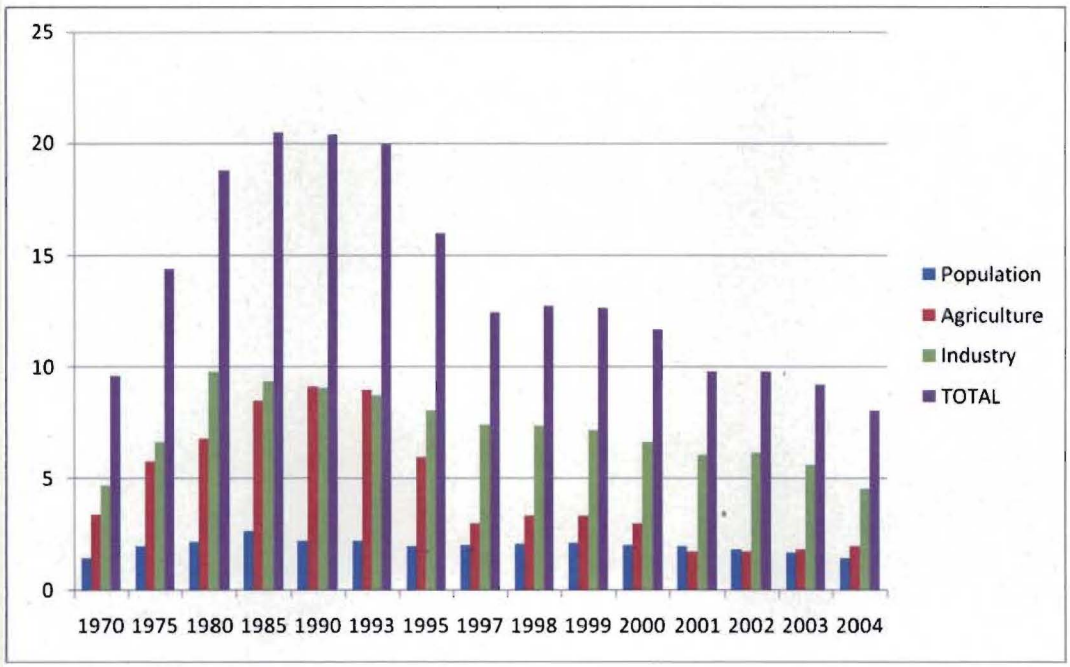
In Romania, due to the multiple functions of water, to the nonconformity between the distribution in time and space of the water resources and that of the requirements, also as a result of the phenomenon of water reusing in the long of the rivers, it is imposed to be more then necessary the coordination of the careful management and using water resources activities.

At the same time because of the lack of uniformity of the rivers from Romania's perimeter and the use of the Danube river waters only in small proportions due to the outlying position, at the South limit of the territory, it was necessary achieving some works for arranging the hydrographic basin.

For this reason, a reservoir was constructed having a total volume over 13 billion m3, supplied with big construction works for the arranging of the waters, channels and deviation galleries for the transfer of the water resources from the rich basins to poor one or in the same hydrographic basin.

For combating the floods in hydrographic basins there were realized many works for barrage and regularize the water's flowed, also the arranging of the torrents and the forestations with protection role of the water resources.

In 1950 the total water request has increased from 1.4 billion m3 to 20 billion m3 in 1998, due to the population increase and the industry and agriculture development.



The principal bent recorded after 1989 was the considerable reduction in water usage. In 1989 water usage has been reduced from 20.4 billion m3 to 7.24 billion m3 in present due to: decrease of the economical activities, reduction of the water consumption in industry, loss reduction and the application of the waste water management.

On the ensemble of the hydrographic basins are over 1000 industrial objectives, agricultural zoo-technical units and places with a major impact over the water resources. Near half from these objectives have purifying stations with wrong working, 20% don't have purifying stations, that aren't only sources of pollution but also loss of substances that are evacuated together with the waste waters.

All these activities can have a devastating impact over the aquatic ecosystems, deteriorating the ecological cycle, wet zones of a good development for the economical activities in this ensemble, if these are wrong planed or managing.

The characteristics of water resources, from the entire quantity used in production processes where are effective, it makes that an important part is returned in sources, with bad quality parameters, who at their turn represent the water resources for the downstream users.

In Romania the management of industrial and town waste waters is far away from being satisfying, imposing the measures for development and rehabilitant under 50% from the population is connected to the public sewerage systems.

Near to 25% from the waste waters are directly discharge (without purifying) in receiving waters, 19% are mechanic purified, 56% are purified from secondary biological step, for the moment it doesn't exist an advanced biological purifying. More than 67% from the town's purifying stations are older than 15 years, that is no taking care of more sewerage systems in the last decades, who are necessity repairs and maintenance operations for avoiding the surface and underground water pollution.

The sludge resulted is stored in dry a way on available lands, that is in contradiction with Development of The Environmental Statistical System in Romania – that was developed in Tulcea 13 -14 May 2004, and presents modern methods for waste waters management.

- A priority must be given for improving the degree of the purifying for the actual level in the sewerage systems.
- The problems caused by the industrial waste waters must be solved from an integrate strategy to prevent the pollution, based on modern technology, nonpolluting.
- It must be used on large scale the principle of preventing for the control of pollutant substances, with high risk over the human health.
- The elaboration of the integrate strategy (quality and quantity) on hydrographic basins is very important, needing an efficient control over the pollution sources from agriculture.

In these conditions, the management of waste waters must resist to the new problems from adopting the good politics and options for taking the right decisions regarding the resources management due to the specific conditions of our country.

For the realization of the integrate management of the water resources, The Environment and Management Water Ministry, also and the National Administration "Romanian Waters " have undertaken technical economic measures, legislative, organizational and social, at central level of the hydrographic basins, indivisible geographic entity over it is developing the management of water resources.

It is mentioned the elaboration and the periodical making actual of the frame scheme for water arranging and managing in hydrographical basins, in line to establish the fundamental orientation regarding the durable management of waste water.

The juridical frame for the durable development necessary for the water resources is Water Law no. 107/1996.

As a downstream country in the Danube hydrographical basin, Romania is multilateral cooperating in frame of international accords and conventions, in order to apply the principles and reach the agree objectives as a signing of 21st International Conference from Rio de Janeiro.

Thus Romania is a part of two important international conventions, The Conference referring to water and international lacks frontier flow, from Helsinki in 1992 and The Conference referring to cooperation for the durable protection and using of the Danube river from Sofia in 1994, being one of the first states who gives in one's adhesion to these conventions.

In present, Romania is one of the European Union's member state who directs all it efforts to arrange itself in line with the standards of the states member.

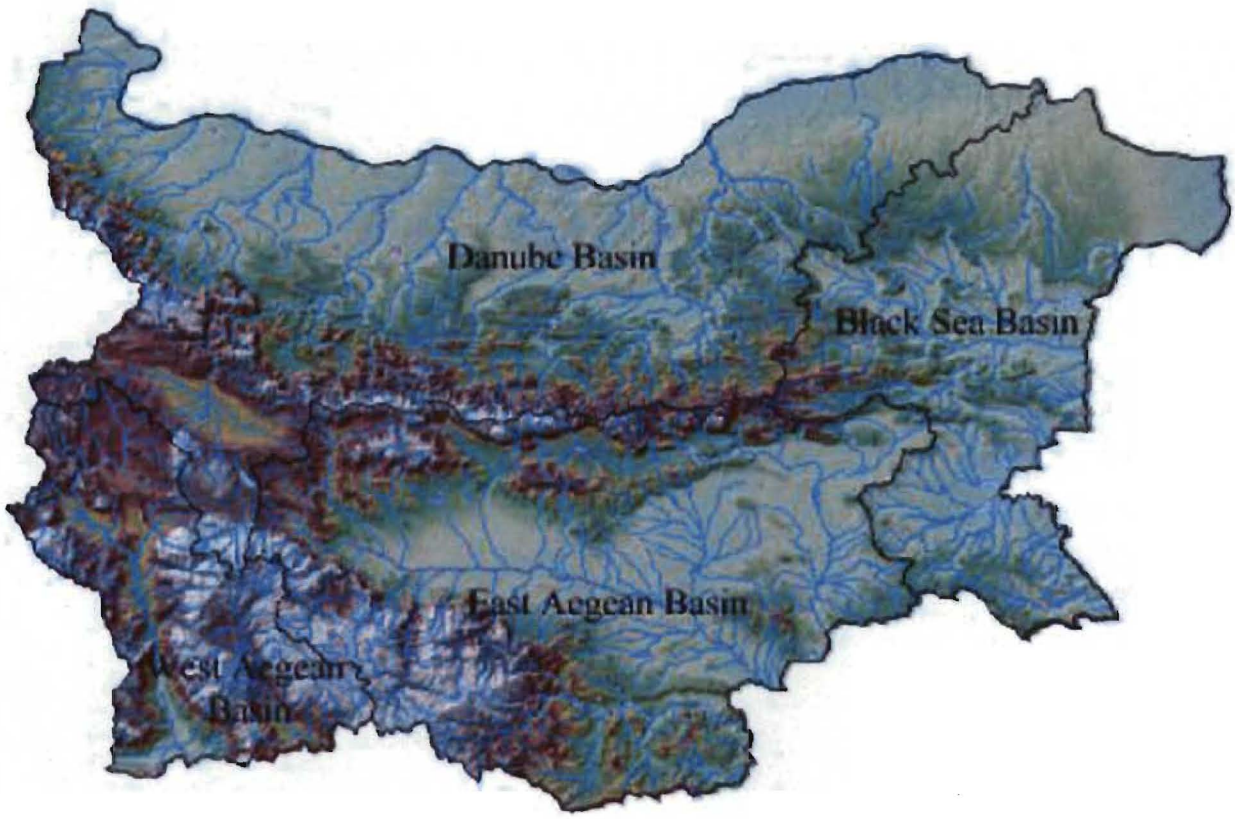
In this context, the environmental policy and in particular the management of waste waters has become an interdepartmental policy that must be applied, especially, in all departments) as agriculture, industry and transport.

Water Management in Bulgaria

The EU Water Framework Directive

Reporters: Miglena Arshineva, Mariana Koleva, Milena Nikolova (all from Bulgaria)

The Water Framework Directive (WFD) is a fundamental document of the European Union with respect to the water sector and its management policies. Due to the integrated approach for sustainable water management based river basins, it has proved to be challenging, as most member nations have previously existing management systems using political boundaries in place. The WFD aims to cover all water types and aiming at protection, preservation and improvement of water quality. This Directive requires an enormous coordination of the efforts of the EU member-states, as well as the preaccession countries, such as Bulgaria, Romania, etc.



Within the above described borders the territory of Bulgaria is 110 912 square kilometres.

The country is characterized by rich diversity in morphological, geological, geomorphological, hydro-climatic and soil-biogenic aspect. To the north, the River Danube separates Bulgaria from Romania, to the east our borders is washed by the Black Sea, to the south are Turkey and Greece, to the west are Macedonia, Serbia and Montenegro.

The relief of the country is deeply indented in a vertical direction. There are six autonomous zones (lowland, plain, hill, low mountain, middle mountain and high mountain) as each of them has typical phisico-geographical characteristics. Over two thirds of the country's territory is situated in the zones of up to 600 metres above the sea level, i.e., predominant are plains and hilly lands. The average altitude of the country is 470 meters above sea level.

The climate of the country is mostly defined by its geographical position in the southern part of the temperate continental climatic zone and occupies a transitory position to the

Mediterranean climate. The climate distinctive features are formed under the influence of a series of factors, amongst which the most important are the position of the country in relation to the general atmospheric circulation and the exceptionally diversified relief.

Black Sea River Basin District

Bulgaria has no big transboundary river basins in the Black Sea Basin District (the only exceptions being Veleka and Rezovska rivers – transboundary with Turkey.) As Turkey currently has not taken any commitments for the implementation of the WFD, coordination on these rivers was not possible. Although Bulgaria has not designated coastal waters to the Danube River Basin District coordination was carried out with Romanian competent authorities regarding coastal water types and coastal water bodies at the boundaries of the DRBD and the Bulgarian Black Sea District.

East Aegean Sea River Basin District

The East Aegean Sea River Basin District comprises 3 large international river basins – Arda (transboundary with Greece), Marista (transboundary with Greece and Turkey) and Tundja (transboundary with Turkey). As Turkey so far has not taken any commitments for the implementation of the WFD, coordination on transboundary rivers with this neighbour country was not possible.

Coordination with Greece in the extent required by the WFD has not been carried out due to difficulties in identifying the competent authorities in Greece which should be partners in such an exercise. The Bulgarian Ministry of Environment and Water has initiated such cooperation and we are hopeful that an agreement on cooperation between the competent authorities for the WFD in Bulgaria and Greece could be signed in the near future. So far cooperation for the implementation of the WFD with Greece is carried out on the basis of joint projects. Establishing proper coordination mechanisms for WFD implementation with Turkey is also envisaged in a longer time frame of 2-3 years, when Turkey will have started the negotiation process for EU accession.

West Aegean Sea River Basin District

The West Aegean Sea River Basin District comprises 2 important international river basins Struma (transboundary with the Republic of Macedonia and Greece) and Mesta (transboundary with Greece). Coordination with Greece in the extent required by the WFD has not been carried out due to difficulties in identifying the competent authorities in Greece which should be partners in such an exercise. The Bulgarian Ministry of Environment and Water has initiated such cooperation and we are

hopeful that an agreement on cooperation between the competent authorities for the WFD in Bulgaria and Greece could be signed in the near future. So far cooperation for the implementation of the WFD with Greece is carried out on the basis of joint projects.

As the Republic of Macedonia so far has not taken particular commitments for the implementation of the WFD, coordination on transboundary rivers with this country was not possible. Establishing proper coordination mechanisms for WFD implementation with Macedonia is envisaged in a longer time frame of 2-3 years depending on their priorities in the field of environment and in particular water management.

Conclusions

Bulgaria, practically, made its first steps in the implementation of the Water Framework Directive with the adoption and enforcement of the Water Act from January 2000. The present report indicates the first results of the real steps of the implementation of the provisions of the Directive, as well as the first obtained results, on the basis of the available data, having been at that stage either harmonized or twinned to the requirements of the Directive. This report indicates that there is an advancement and understanding in the compliance of the Directive, while the new framework for management, use, protection and conservation of surface water and groundwater within the river basin districts, as well as, the transitional and coastal waters has been completely realized. The great comprehensiveness of the Water Framework Directive and the short terms for its implementation induce great challenges on the way of its implementation. The developed at European level Common Strategy and 13 guidances for its implementation are a sound foundation, but they have to take into account the available information, the used methods and, mostly, the traditions in the respective country, related to the use and protection of the resource.

From the accumulated for the last year's experience, as a consequence of the various activities on studying and applying the Water Framework Directive, we can summarize in brief that we are facing a lot of work in future, and the issues can be recapitulated in the following way:

- Internal exchange and coordination of the available information between the individual basin districts in the country leading to twinned approaches and mechanisms on the implementation of the Water Framework Directive;
- Cooperation on international level with the neighboring countries in respect of transboundary surface water and groundwater and compliance with the requirements of the Directive for future joint characterization of water bodies, programs of measures, monitoring programs, elaboration and application of the River Basin Management Plans;
- Participation of the country and the individual river basin districts in international projects on the specific elements of the Directive, as to build up capacity, personnel training, adequate understanding and implementation of the Directive;
- Consultations and exchange of experience with the EU member states on the compliance of the requirements of the Water Framework Directive;
- Participation in the process of intercalibration of the classification systems for quality assessment of waters.

Participants

Name	First name		Land/Nat.
1. Alecu	Paul Sorin	M	Romania
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3. Arshineva	Miglena	F	Bulgaria
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6. Bodach	Susanne	F	Germany
7. Botalova	Oxana	F	Russia
8. Boyacioglu	Hülya	F	Turkey
9. Chiarawatchai	Nathasith	M	Thai
10. Doyduk	Beyza	F	Turkey
11. Dragan	Silvia	F	Romania
12. Duduman	Stefan-Gabriel	M	Romania
13. Dumitru	Constantin	M	Romania
14. Fuior	Ciprian Alexandru	M	Romania
15. Hamida	Rabee	M	Palestine
16. Huang	Shaochun	F	China
17. Karakra	Rania	F	Palestine
18. Kasisi	Carolyne Nanyama	F	Kenya
19. Koleva	Mariana	F	Bulgaria
20. Lestari	Ratnaningtyas	F	Indonesia
21. Li	Tao	M	China
22. Medellin Govea	Margarita	F	Mexico
23. Molina Giraldo	NelsonAlejandro	M	Kolumbia

24. Nasser	Awad	M	Palestine
25. Nega Bekele	Dawit	M	Ethiopia
26. Nikolova	Mihaylova Milena	F	Bulgaria
27. Niraula	Anant	M	Nepal
28. Nistor	Oana	F	Romania
29. Nguyen van	Quvet	M	Vietnam
30. Novira	Nina	F	Indonesia
31. Oyewale	Stephen	M	Ghana
32. Qian	Yuan	M	China
33. Qoaider	Louy	M	Palestine
34. Rachmawati	Lestari	F	Indonesia
35. Salike	Inu Pradhan	F	Nepal
36. Salike	Suman	M	Nepal
37. Saptalena	Lena	F	Indonesia
38. Shrestha	Reeta	F	Nepal
39. Shrestha	Shailesh	M	Nepal
40. Solh Darali	Manar	F	Palestine
41. Tingwey	Emilienne Ingie	F	Cameroon
42. Tuhtan	Jeffrey	M	USA
43. Twinomucunguzi	Felix	M	Uganda
44. Vo	Ngoc Nhu Uyen	F	Vietnam
45. Vo Thie Yen	Phi	F	Vietnam
46. Yazgan	Burcu	F	Turkey
47. You	Xuan	F	China
48. Zajac	Katarzyna	F	Poland

Snapshots *of the presentations*