Prepared enabling change

PREPARED NEWSLETTER

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Cancún climate change talks: Moving forward…. slowly

In 2010 when the impact of climate change caused floods that killed hundreds of Pakistanis and made millions more homeless, and where Russia recorded very high climatic temperatures, and where fires devastated its forests, representatives of most of the countries in the world arrived in Cancún, Mexico for the United Nations Climate Change Conference. The delegates were more conscious than ever of the need to act on the causes of global warming and to mitigate its effects.

The conference began with modest expectations and ended with modest achievements. This is perhaps as a result of the obvious failure of the 2009 Copenhagen Climate Change Conference that helped to set the basic departure level for Cancún. After the Copenhagen failure, which fell far short of a global agreement and of the expectations of the world, it resulted in an 'accord' of twelve issues that the world had to think about and agree upon, until the next conference in Cancún.

The village of Peredeltsy (Ryazan region, Russia) in June 2010 consumed by flames Photo: Itar-Tass

Although the Cancún Agreement also fell well short of the broad changes scientists said were needed to avoid dangerous climate change in coming decades, it did lay the groundwork for stronger measures in the future: the package gave participating countries another year to decide whether to extend the Kyoto Protocol, the 1997 agreement that requires most wealthy nations to trim their emissions while providing assistance to developing countries to pursue a cleaner energy future.

The outcome of the conference was an agreement, not a binding treaty, which calls on rich countries to reduce their greenhouse gas emissions as pledged in the Copenhagen Accord, and for developing countries to plan to reduce their emissions and to limit global warming to less than 2°C above pre-industrial levels.

The agreement also includes a proposed new fund of $100 billion to help poor countries adapt to climate changes. This will create new mechanisms for transfer of clean energy technology, provide compensation for the preservation of tropical forests and strengthen the emissions reductions pledges that came out of the meeting in Copenhagen.

Island states and the least-developed countries warmly welcomed the decisions because it would potentially start the flow of billions of dollars to assist them to adopt cleaner energy systems and adapt to inevitable changes in the climate, like rising sea levels, floods and drought. However, where exactly the $100 billion in annual climate-related aid would come from, remains unresolved and has created a sense of scepticism about countries adhering to this promise.

Cancún did not achieve as much as was expected by climate change experts. It did, however, extract a more solid commitment from nations to take steps to reduce their greenhouse gas emissions and a more formalised international programme of reporting and verification of reductions. It also added needed specifics to the unclear promises of the 2009 Copenhagen Accord and built on the transparency element of the accord with substantial detail and content.

The process continues and the Cancún successes will allow the process to seek a more robust accord at next year's climate change conference in Durban, South Africa.

See Page 9 for a summary of the Copenhagen Accord.

Article based on newsclips from The New York Times, The Guardian and Montreal Gazette, December 2010 and www.Wikipedia.org

Upcoming event: Cities of the Future—Istanbul Water Climate and Energy Workshop

8-13 February 2011

Partners of PREPARED will be participating in a Cities of the Future workshop which focuses on three Turkish cities namely Istanbul, Kayseri, and Trabzon. PREPARED's Istanbul partner, the Istanbul Water and Sewerage Administration, will link the project with the larger Cities of the Future initiative. The workshop sets out to develop the Cities of the Futures Programme in Turkey and position Turkey as a regional leader in water services provision.

The outcomes of the Cities of the Future Programme in Turkey will include enhancing Turkey's competitive advantage as a water services provider in the region, drafting Strategic Water Management Plans and capacity building. The capacity building component will include empowering local officials and academics through the introduction of concepts and analyses. They will have the opportunity to participate in the Programme's international networks of experts who can assist in the successful implementation of infrastructure investment programmes.

Istanbul's existing water supply: Surface water with 1.5 years of reservoir storage

Upcoming event:

Dublin Water Climate and Energy Congress

13-18 May 2012

For THE PREPARED project, like the rest of the world, water and energy, are critical for our survival and will be of increasing importance in the future. Climate change is forcing us to reassess the way we have always worked. PREPARED will share its climate change adaptation experience for cities and utilities to Dublin in 2012 as a congress partner. The demonstration and practical nature of PREPARED will afford delegates the opportunity to hear first-hand what innovative solutions work and how they work.

Following on from conferences on Climate Change Adaptation and Water and Energy, the International Water Association will host its inaugural World Congress on Water, Climate and Energy in Dublin in 2012.

The congress will explore the topics of resilient and sustainable cities with a focus on climate change adaptation and mitigation. Climate change adaptation challenges and incorporating uncertainty into the city vision and infrastructure will be discussed together with the impacts and responses of climate change on water resources.

Solutions to these challenges, including the role of technologies and smart networks will also be a central theme. Recognising that technology is only part of the solution the conference will address the economic, political and regulatory aspects of water, climate and energy.

Submissions for oral and poster presentation are invited on the topics listed on the congress website.

The PREPARED congress sessions will be announced through our website in February 2011.

www.iwa-wcedublin.org

News snippet: Experts warn of climate change affecting human health

The effects of climate change are already having direct and indirect consequences on human health. And with climate change proceeding at the current speed, experts are preparing for worse times to come. It is not just about people dying from drowning or accidents during the floods, it is also about the measures that we have to take to tackle water pollution afterwards or problems resulting from mould growing inside affected buildings.

Over the past 20 years, more than 650,000 people have died in around 14,000 extreme weather events - like storms, floods and heat waves - according to the latest Climate Risk Index published by GermanWatch in Cancún. The World Health Organisation estimates that the negative effect of climate change has both direct and indirect effects on health. They estimate that as many as 70,000 people have died in Europe during the heat wave of 2003. And with climate change proceeding at the current speed, that number is likely to increase.

Extreme climate events are on the rise, which means that there is, for instance, an increase in the number of hot days and warm nights, which is referred to as tropical, when the temperature does not sink below 20 degrees Celsius. This obviously has an effect on the human body. This summer's heat wave in Russia for instance, put the estimate number of extra deaths attributable to the heat wave at between 10,000 and 20,000 in just two weeks. The problem was compounded by the fires across Russia. In addition to the direct effects, the air pollution caused by smoke also represented a major health hazard. If the wind had blown in a different direction, other European countries would also have had to deal with the health problems caused by air pollution.

Experts are also concerned about invasive species of plants and animals bringing health problems to areas where they were not prevalent before. Allergies and other problems caused by new types of pollen is one such issue, such too, the arrival of insects previously native in tropical areas. The tiger mosquito which spreads dengue fever, for instance, has already moved into European countries like Italy, France, Spain and Switzerland.

Our societies have to adapt to changing climatic conditions to protect the population from health problems. Reliable forecasts, early warning systems and good communication are essential elements.

Tiger Mosquitoes are finding a new home in a warmer Europe

Adapted from an article by Irene Quaile, Deutsche Welle, Germany

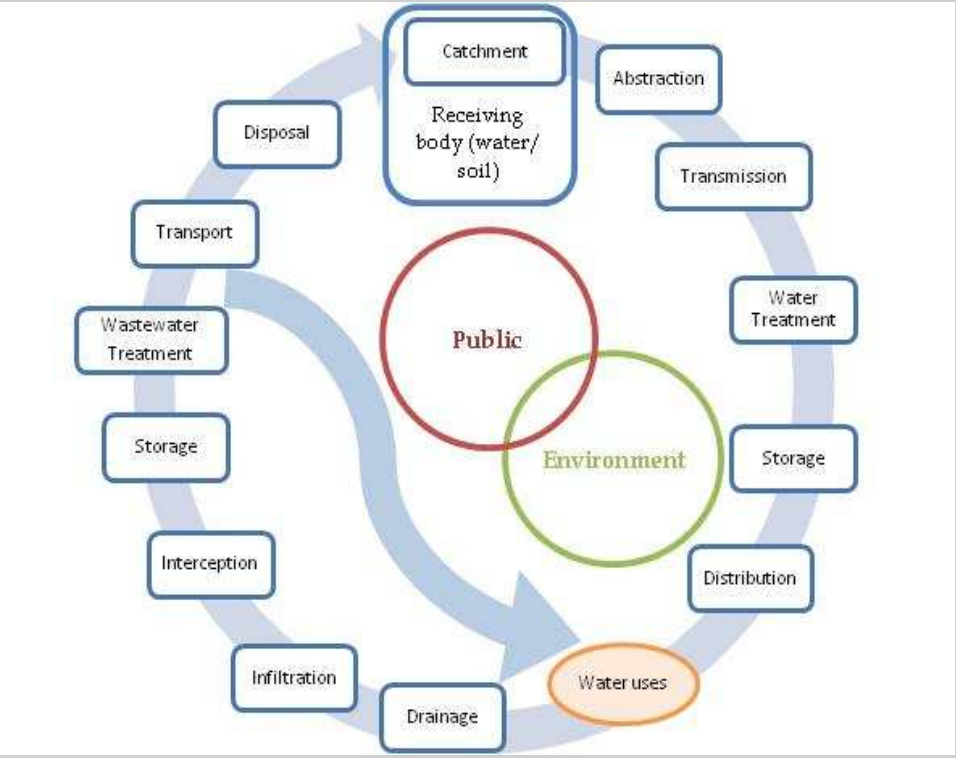
Scientific contribution—From Water Safety Plans to Water Cycle Safety Plans

By Patrick Smeets and Adriana Hulsmann, KWR, Netherlands

Water Safety Plans (WSPs) are currently being introduced in European drinking water supply and also in European Community legislation. A WSP is a tool that will give better understanding and improvement of the drinking water supply. In drinking water supply, a WSP can be summarised as 'good-house-keeping' based on 'spot the hazard, assess the risk and make the changes': a pro-active approach that complements and partly replaces the current practice of end-of-pipe quality check.

The WSP approach is based on general risk management principles. However, a WSP for drinking water is a linear process: from source to tap, with a limited number of stakeholders sharing a common goal.

In the PREPARED project we will identify and address all possible water quality and quantity risks to health, the environment and public safety, in the water supply chain as well as in the whole urban water cycle. As a mitigation factor, the project will introduce Water Cycle Safety Plans (WCSP) to the cities as one area of assistance to cities and utilities to make their urban water systems resilient to climate change. The WCSP frameworks will help the city stakeholders identify risks in their water systems and help them to plan to improve resilience.



The water cycle hazard safety plan provides an integrated risk management approach for the total water cycle

PREPARED aims to contribute to the European Union's policy and legislative processes by introducing the WCSP approach. WCSPs will be supported by the development of a Water Cycle Hazard Database, consisting of climate change hazards that can affect the urban water cycle in the short term (extreme rainfall, drought), the long term (increased temperature) or indirectly (power failures due to flooding). Also, adaptations to climate change, such as aquifer storage and recovery (ASR) to overcome drought periods, may lead to new risks, such as arsenic contamination of the ASR systems. Questions such as 'what can happen, how likely is it to happen and what are the likely consequences' will be answered. In addition, GIS applications will be used for the assessment and management of risks associated with climate change hazards. Another innovative aspect is the application of Quantitative Risk Assessment models (QRA) for the assessment of social (including health), environmental and economic type risks. A database of validated and demonstrated risk reduction options will be produced by the PREPARED partners.

The challenge of WCSPs is to capture the cyclical nature and the inter-relatedness of water systems. This requires a common platform and language for the different stakeholders. However, a common language and understanding does not exist and the terminology depends on the stakeholders' background and on the viewpoint of the risk assessors. A short glossary of risk terminology and a common approach to discuss risk events will be drafted, taking into account, for instance, the ISO Guide 73:2009 on Risk Management - Vocabulary.

Because a WCSP aims to unite stakeholders it need a high level view of the whole water system. However, risks are inherent in the details of the subsystems and the WCSPs therefore need to apply a two-prong approach by defining the system and subsystems and assessing the risks for the total system. The risks assessment and management takes place for the subsystems and these are then integrated into the total system again in order to determine the actions and risk management.

The Laboratorio Nacional de Engenharia Civil (LNEC), PREPARED's research partner for the city of Lisbon, Portugal, produced a draft WCSP framework document which will be tested in Lisbon and Eindhoven with the aim to produce a second draft that will be demonstrated Oslo and Simferopol.

Be PREPARED……. Participating Cities

BARCELONA: Adaptation to water resource scarcity and extreme rainfall events

Southern Europe has been identified as an especially vulnerable area to climate change. In the Iberian peninsula, climate change will have the following effects at the end of the 21st century:

- Temperature increase of up to 6 ºC during the summer and 2-3 ºC in winter;
- Rainfall decrease, particularly during summer; and
- Increase of extreme events related both to rainfall and high temperatures (over 30ºC) during longer periods.

Some of the characteristics of the Mediterranean climate include intense rain that results in flash floods and debris flow events on the one hand, and water scarcity, on the other.

The current water management system is not robust enough to cope with climate change impacts and provide a reliable water supply. The sewer systems, the morphology of Barcelona, with high variability in slopes, make the transport and discharge of rain water difficult. When considering climate change, the expected increase of extreme rain events and the rise of sea level will also add more difficulties to the urban drainage performance and may increase the flooding risk.

PREPARED interventions:

- Decision support system (DSS) for planning complex urban water systems for regions under water stress;
- Conceptual scheme for catchment and conservation of water from high flow events;
- Methodologies for urban runoff risk assessment; and
- New methodologies for sediments monitoring in sewer networks.

BERLIN: Impact-based CSO control and substance flow modelling

Two major challenges have been identified for the future water supply of the city of Berlin. The city relies for 60% of its water needs on surface water abstracted via bank filtration or artificial groundwater recharge.

- Due to decreasing precipitation and increasing temperatures, leading to an increase in evaporation, the discharge in the Elbe catchment is predicted to decrease significantly. This will lead to a rise in treated effluent in the city's surface waters, especially during summer.
- As a result of the abandonment of open-pit lignite mines upstream of Berlin and their subsequent flooding and transition into large lakes, the concentration of mining-related substances (especially sulphate) are expected to increase in the next years.

Based on scenarios calculated, the city recommends that the inflow of sulphate concentration in the Spree is limited to 250 mg/L. Currently, it is not clear if this can be achieved by measures such as regulating the discharge from the flooded open-pit mines upstream of Berlin. In addition, in Berlin city centre, representing a quarter of the total Berlin area, waste water is drained by combining both sewage and storm water.

For rainfall events above 5mm, overflows from the combined sewer (CSO) impact on the city's water quality. In order to preserve the quality of the resource, large investments are being planned to limit the impact and contribute to the protection of surface water quality.

PREPARED interventions:

- Substance flow model and decision support tool for managing drinking water supply from varying sources under climate change conditions.
- Planning instrument for an integrated and recipient/impact based CSO control under conditions of climate change

EINDHOVEN: Water Cycle Safety Planning for Integrated Risk Management

Over the last 50 years, Eindhoven developed from a settlement on the banks of rivers and streams into a densely populated area of over 200,000 inhabitants. Although once a city of heavy industry, Eindhoven is now a city of innovation and Research and Development (R&D), being one of the strongest economic regions in Europe. During this economic shift, water infrastructure has not kept up with the fluctuating demands. As a result, Eindhoven is confronted with various shortcomings in the urban water system:

- Old drainage systems have been removed;
- Mixed sewerage was connected to surface water;
- Waste water treatment plant (WWTP) and sewage capacity became insufficient.

Geologically, the city is located in a bowl with rivers running through causes several problems such as high groundwater levels in the lower parts and drought in the higher areas. Groundwater levels are also impacted on through local industrial and water supply abstraction.

The effects of climate change are likely to worsen the adverse effects of this geological situation and the shortcomings of the urban water system. Intense rainfall will increase the occurrence of water on the streets which may leads to health risks and a reduction in public safety. Intense rainfall will also affect surface water quality through combined sewer overflows and poor waste water treatment performance (WWTP).

The various stakeholders, including the Municipality of Eindhoven, the water supply company Brabant Water and the water board De Dommel need to work closely together to deal with this increased risk. All elements of the Eindhoven urban water cycle are closely connected, both in quantity and in quality. The city of Eindhoven therefore needs tools to rethink the urban water system, solve current issues and make the system resilient to climate change.

PREPARED interventions:

- Water Cycle Safety Planning; and
- Infrastructure improvements to cope with the demands on the system.

Full city descriptions can be found at http://prepared-fp7.eu/viewer/file.aspx?fileinfoID=139

GENOA: Climate change effects and water supply and sanitation system adaptation

Genoa is the major city of the Ligurian Region in Italy. It is a vulnerable area because of its physical landscape, being between high mountains, the sea and a few landplanes. The high urbanisation along the coastline and the critical use of natural resources have impacted on the equilibrium between man and nature.

Climate change effects play a significant role in establishing the limits of this equilibrium and the city has to be prepared mainly to face the following challenges:

- Long period of drought, with the consequence that there is no available water from water intakes with the concomitant decrease in aquifer and reservoirs levels.
- The rainfall variations—fluctuations between drought and heavy rainfall—are leading to difficulty with water resources access and to a higher complexity of water resources planning.

PREPARED interventions:

- A decision support system for immediate management to be built and tested at the Genoa pilot site by integrating book keeping and rule-based priority tools with an improved monitoring system.
- Models simulating the effect of alternative price systems and regulatory schemes on the demand of water in urban areas to support water resource planning.

ISTANBUL: Rainwater harvesting and greywater management for regions under water stress

Istanbul is one of the largest cities in Europe with a population of 12.6 million inhabitants and the expectation that it will grow to 20 million by 2032. Istanbul houses some of the region's major industrial sectors, exerting significant water demand.

The Istanbul region historically depended on surface water resources both geologically formed and manmade. The region is currently experiencing extreme climatic events, fluctuating between drought and short but severe periods of rainfall resulting floods. Precipitation trends in Istanbul shows fluctuations between dry and wet years from 400 to 800 mm/m².

In Turkey the amount of water available per capita is expected to be reduced from a current 4,000 to 1,430 m³ cap/year within 20 years. The new and changing climate patterns and variability will impact on rainfall patterns and extreme events of floods and droughts. In addition, in terms of land usage trends, it is predicted that natural areas are being reduced due to the urbanisation with concomitant and negative impact on water collection capacity. Thus, considering the increasing population, industrial developments, and fluctuating climatic conditions, sustainable innovations are needed to develop adaptation plans and achieve efficient urban water management.

PREPARED interventions:

- Rainwater harvesting (RWH) may constitute a reliable, ecological and economic alternative for provision of water.
- Grey water treatment
- Planning for alternative water resource to achieve sustainable water management (SWM).

GLIWICE: Enhanced real-time measuring and forecasting technologies for combined sewer systems

The sanitation infrastructure in Gliwice is managed by the Water Supply and Sanitation Company (PWiK). It consists of three wastewater treatment plants and over 450 km of sewage system network (including combined and separate sewage systems). Gliwice with a population of 229,000 has a central wastewater treatment plant modernised in 2002 with the capacity of 51,000 m³/d. The plant was constructed as an enhanced nutrients removal plant. It is thus a very sensitive technology prone to failure in cases of drastic flow and quality changes of discharged wastewaters.

The PREPARED projects plans to introduce an effective real-time monitoring and forecasting techniques systems to support the integrated operation of the sewerage network and wastewater treatment plants.

The recipient of rainwater and treated sewage in Gliwice is the Klodnica River passing through the centre of the city. PWiK together with the Institute for Ecology of Industrial Areas (IETU), the city authorities and other stakeholders, including the Regional Board of Water Management (RZGW) is working on maintaining an acceptable quality of the Klodnica River through the storage of storm water surface run-off and combined sewers overflows. The intention is to integrate land depression reservoirs in the overall water management system keeping in mind the effects of expected climate changes.

PREPARED interventions:

- Integration of output from improved rainfall monitoring with existing models to the common platform
- Development of 'now casting / short term forecasting' capabilities using virtual sensors and data assimilation tools on existing monitoring to estimate flows, levels and the degree of dilution of raw sewage / rainwater throughout a combined sewer system

Incomplete industrial development site in Gliwice, Poland

LISBON: Adaptation to climate change

Climate changes and its predicted impacts will potentially aggravate the already existing constraints on southern European water infrastructure. In the particular case of Lisbon, a considerable increase in temperature and average annual reduction in precipitation is expected.

The water supply system: The first issue to address is the reduction of the primary water inflows to the Castelo do Bode reservoir, the main Lisbon water source. The second main water source is the Tagus river, which comes from Spain. This system is vulnerable and depends on both climate conditions in the Iberian Peninsula and on Spain's water management policies, particularly in times of drought. There is concern for the general deterioration of the water quality occurring in all water sources, due to temperature increase and the reduction of flows. Furthermore, in the surrounding areas of the Castelo do Bode reservoir and Tagus River, higher temperatures can provoke an increase in the number and intensity of forest fires, as well as in the erosion capacity of the soil, which then also negatively impact on the raw water quality. In addition, some of the aquifers, as well as the Tagus River in the Valada abstraction area, may be affected by saline intrusion resulting from the sea level rising and from the reduction of the aquifer recharges and surface flows.

The wastewater system: The expected increase in both rainfall intensity and sea level can result in the following impacts at system level:

- Increase of frequency of flooding events,
- Increase in combined sewer overflows to the receiving water body (the Tagus river),
- Increase in the average temperature, augmenting the potential for anaerobic conditions in sewers and increasing the likelihood of odour and corrosion problems. These changes can have important effects on wastewater treatment plant efficiency.

PREPARED interventions:

- Water Cycle Safety Plan (WCSP);
- System for distributed real time disinfection control;
- System for early warning of health risks from faecal contamination in recreational waters; and
- Adaptation of operation and maintenance of water supply systems and wastewater systems

LYON: Improving the measurement of rainfall

In the mid 1980s, the Greater Lyon area started to install a network of tipping bucket rain gauges to measure rainfall events, aiming to better design, operate and model its sewer systems. Currently, the network comprises approximately 30 rain gauges over 51, 500 ha.

A database has been developed, with rainfall events recorded with a 6-minute time step over the past 25 years. This data base is used with the Canoe sewer modelling software tool, with a specific application estimating spatially distributed rainfall over the whole Greater Lyon territory for long-term simulations. The main modelling objectives are the estimation of floods and CSO discharges.

It appeared that the improvement of the modelling results depend mainly on two conditions:

- Field monitoring to calibrate and verify the model outputs, and
- A dense spatially distributed rainfall information.
- The second condition cannot be easily satisfied with the existing network of rain gauges, despite its density.
- This is why, from 2007, C-band radar images from Meteo France are in use by the Greater Lyon to improve the knowledge on spatial rainfall distribution and to better account for its heterogeneity in models.

PREPARED Interventions

- To improve rainfall measurement, a small X-band radar will be tested and evaluated. The information will be analysed to assess how the high resolution rainfall information will improve the estimation and modelling of discharges and water levels at the small-scale urban sub-catchments. The improved rainfall measurement will be a key element for the implementation of a real-time control system.

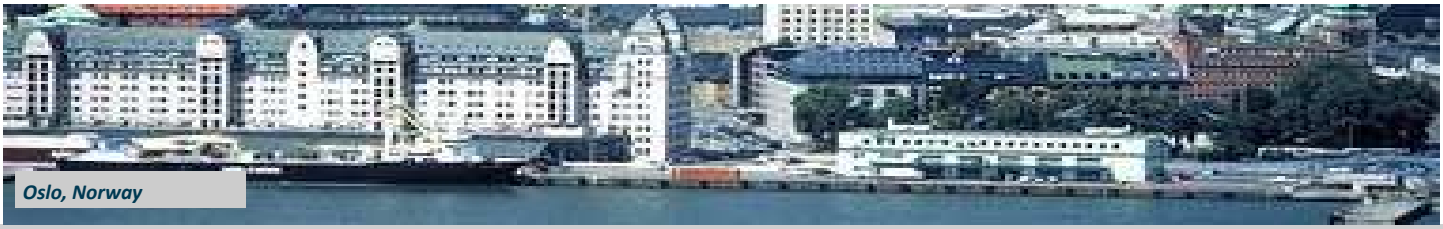
OSLO: Real-time control of sanitation systems, adapted operation of wastewater treatment and adapting water supply to enhanced NOM levels

The major challenges for Oslo are related to the combined sewer operation, increased hydraulic peak loads on the wastewater treatment plants and the deterioration of raw water quality for water supply:

- Increased intensity of rain combined with frequent snow melting in what until now has been stale winter conditions, will give increased discharge to the combined sewers, with increased combined sewer overflow and possible reduced efficiency of the wastewater treatment. In order to handle the increased peak flows and rapid changes in flow from combined sewers a new 50,000 m³ storm water retention basin just upstream the wastewater treatment plant are under construction.
- Increased intensity of rain combined with frequent snow melting during winter time will give increased NOM and reduced ice coverage in the raw water sources. Increased NOM will be a challenge for water treatment and may increase the biofilm formation potential in the distribution network, while reduced ice coverage will reduce the natural hygienic barriers in the lakes during wintertime.

PREPARED Interventions:

- Integrated real-time control of sanitation systems;
- Models and knowledge for operation and maintenance of wastewater networks exposed to rapid changes in flow;
- Remedial actions to prevent adverse effects of re-growth in networks at higher temperatures.



Oslo, Norway

Full city descriptions can be found at http://prepared-fp7.eu/viewer/file.aspx?fileinfoID=139

SIMFEROPOL: Modelling of usage of limited surface water resources—optimisation or alternatives

Simferopol's main challenge relates to the fact that 100% of potable water comes from surface sources – three reservoirs use local water and one reservoir filled from Dniper River.

- Due to the increase of the mean daily temperature, particularly in summer, water quality in the reservoirs is expected to change significantly and particularly in the Mezhgornoe reservoir which is filled after the water flowed 300km in open canals. Increased evaporation combined with the duration of the drought periods affect the catchment areas and decrease the water flow in the Crimean rivers. This then leads to increased water consumption of potable water for non-potable purposes. It changes the balances between local and external water resources.
- Considering the trend of increased probability of extreme rainfall events, special attention should be placed on decreasing the risks, related with overloading of wastewater treatment plants (WWTP), and increasing the pressure on drinking water treatment facilities. Because flooding in certain parts of the territory where sewerage system is absent, it results in water contamination with dangerous substances.

After the collapse of Soviet Union, the rehabilitation of water infrastructure slowed significantly due to insufficient financial resources and as a result, the water quality to the city suffered.
The technical components to adapt to climate changes requires additional investments. However, systems can be optimised without large financial investments. This includes the development of a Water Cycle Safety Plan and a Hazard Database for the risk reduction options. These tools will provide food for thought for decision makers to consider modernising the current water resources and look for alternatives.

PREPARED Interventions:

- The DSS for optimal using of limited local surface water resources and management of water quality and quantity under competitive using.
- Risk reduction options under conditions of climate change: Hazard Database and GIS application for risk assessment will be developed on the base of Water Cycle Safety Plan protocol.

ÅRHUS : Improved rainfall monitoring, integrated control of sewers and wastewater treatment plants and early warning of water quality in receiving waters

Lake Brabrand serves as a recreational area close to the city centre of Århus and the lake drains through the small Århus River to Århus Harbour. Along parts of the Århus River and at Århus Harbour urban development is rapid and will continue to be so in the coming years. The Århus River was previously cased, but is being uncovered and will be established as a recreational element of the city. The part of the harbour close to Århus will be converted from an industrial harbour to a new city area. Here, too, water and canals will be important recreational elements. To support the opportunities for the recreational use of Lake Brabrand, Århus River and Århus Harbour, the mmunicipality will improve the hygiene and water quality in the receiving waters.

The top 3 challenges for the planning and design of new infrastructure can be summarised as:

Sufficient basin volume (cost/space limitations)
Sufficient water quality (increased hydraulic capacity and disinfection at WWTP)
Climate change (rain intensity, sea level)

PREPARED Interventions:

Integrated Control and Early Warning System

PRINCIPALITY OF WALES: Transitioning to an adaptive and water sensitive city

Dry Cymru Welsh Water (DCWW) are unique in the UK in the way in which they deliver water and wastewater services. Although they are one of the private water utilities, they are owned by Glas Cymru, a single purpose company with no shareholders. DCWW is run solely for the benefit of customers, reinvesting profits and redistributing rebates each year to the people of Wales. DCWW are still, however, subject to the same regulatory framework as the other companies in England and Wales, with the Water Services Regulation Authority (Ofwat) acting as overall economic regulator, administrating five yearly business plans.

DCWW have been concerned to ensure that the water services related welfare and security of the people of Wales are not compromised in future by climate change and other pressures from a growing population and lifestyle expectations. Delivering, for example, on the requirements of the European Union's Water Framework Directive may substantially increase the use of energy and raise the carbon footprint for the business. Even today, there are areas of Wales potentially vulnerable to periods of water stress. Dealing with these, and other pressures will require mitigation and adaptation measures.

PREPARED Interventions:

- The aim of the Pennine Water Group (PWG) is to deliver the tools, knowledge and learning material to enable all stakeholders to manage their water supply and sanitation systems using an adaptive approach.

Salgir Park, Simferopol, Ukraine

Young PREPARED profile

Interview with a young PREPARED student, Ielizaveta Dunaieva. Ielizaveta is sitting for her PhD while working as a Junior Scientist at the Institute of Hydraulic Engineering and Land Reclamation of the National Academy of Agricultural Science of Ukraine's Crimean Scientific Research Center (CSRC).

Ielizaveta Dunaieva, Junior Scientist atCSRC

What is the topic of your PhD?

My theses title is '*Ecological evaluation of water resources formation on rural territories'* and the subject of my research is the catchment area of Simferopol reservoir which is used for drinking water supply to the city.

My survey is based on the different types of economic activity and types of land use which influence the ecology of the water resources. This identification is done using remote sensing and in this specific case, the analytical modelling is done with the help of agro-hydrological models. These models enable one to make a prognosis of the effect of anthropogenic loadings and technologies of irrigation management on the quality of water resources in watersheds that have different types of soils and different types of land use.

The objective of my research is to evaluate how differentt types of land use influences water quality and quantity in the Simferopol watershed reservoir.

How does your research relate to PREPARED?

Simferopol city is one of the pilot cities in the EU-funded project PREPARED and the project focuses on the impact of climate change on water supply and sanitation to the city. Due to the effects of climate change, the amount of available drinking water may decrease.

Simferopol city receives water from four reservoirs: three from local water resources and one from the North Crimean Canal. The Simferopol reservoir is the biggest of the four and receives water from natural sources. Originally, it was constructed for irrigation purposes, but with population growth and water scarcity, this reservoir is now also used for drinking water supply to the city.

The situation upstream of the Simferopol reservoir, in the Dobroe Valley, is very difficult. It is complex because of the development of large number of private buildings that will service the repatriated Tatar population. There is no centralised sewerage system in Dobroe Valley and new developments place severe strain on the system. An increased population in the catchment area requires more water and it is for this reason that the city management decided to switch one of the water supply reservoirs to the Dobroe Valley to release some of the water stress of Simferopol city.

The Decision Support System, which will be developed during the PREPARED project, will address this problem. In addition, the Hazard Database and GIS application for risk assessment will be developed to identify 'hot spots' in the urban water cycle affected by climate change.

What do you expect of PREPARED ?

I expect that my involvement in the PREPARED project will broaden my knowledge about the impact and effects brought about by climate change, particularly the GIS possibilities to help solving water-related problems.

It is exciting to meet new and open-minded people with different points of view with whom I can exchange professional experience and get some tips to work on big European Union projects.

How will PREPARED relate to the problems in Simferopol?

Simferopol city is one of the pilot cities of the PREPARED project. So, the impact of climate change on the drinking water supply and sanitation systems will be dealt with during the project life-cycle. The issue of water scarcity will be dealt with as well.

What are the main water issues in Crimea?

The main problems in the Crimea related to water are the lack of local water resources and the deterioration of the existing water infrastructure.

What do you expect or how do you see European projects and Crimea?

Crimea is an autonomous republic of the Ukraine, and the Ukraine sees its future as being a member of the European Union or a close and friendly neighbour. The Ukraine would like to be involved in all European activities, including scientific projects.

Personal ambitions with respect to Europe and European research e.g. do you like EU cooperation: are you looking forward to work in or together with other countries?

Of course, I would like to cooperate and work together with other European Union experts and gain experience during the support of Dutch – Ukrainian water related twining projects. Participation in such projects provides the possibility for personal development and to be at the coalface of scientific research.

European Union supports PREPARED

By Dr Panagiotis Balabanis Project Officer European Commission, Brussels

Promoting water research has been an important element of the European Commission's research programmes. Within this context particular attention is given to the development of innovative water technologies and the development of practical solutions for protecting our water resources and reverse the trend of their deterioration in Europe and worldwide. This is necessary in order to strengthen the synergies between the public and the private research sectors with a view of providing safe drinking water to the people, sustaining our environment and achieving Europe's sustainable growth and competiveness.

Dr Panagiotis Balabanis Project Officer European Commission

Nowadays, it becomes evident that within the expected impacts of climate change on water resources, it is crucial to develop appropriate strategies, technologies and tools to adapt to climate change and to enhance water use and energy efficiency.

The PREPARED research project has the potential to address many of the above-mentioned water challenges and become one of the European Commission's flagship projects on managing and adapting urban water resources in a changing climate. The project has an integrated approach addressing the whole urban water cycle and dealing with both quantitative and qualitative aspects of the urban water cycle; it works on adaptation strategies while at the same time considering and weighting the mitigation side of solutions. It focuses on risk assessment and risk management issues, addressing uncertainties and concomitant misperceptions between different groups and cultures.

The major contribution of PREPARED project is the particular focus on the practical demonstration of various results in representative cities within and outside Europe, in close cooperation between, research, water utilities and decision makers. This is facilitated by the creation of a Cities/Utilities Alliances Forums which is based on similar experiences developed in previous European Commission funded research projects. This knowledge consolidation and transfer provides an opportunity for water and sewerage companies to demonstrate their capacity for incorporating the latest technological solutions and play a key role in stimulating innovation, which has been recently recognised in the Europe 2020 strategy as a key element to create employment and help the European Unions consolidate its economic recovery.

The Copenhagen Accord

The Copenhagen Accord is seen by many as a compromise for international indecision on how to deal with the anticipated impact of climate change. The follow-up climate change conference in Cancun, builds on the points agreed upon in Copenhagen. The Accord outputs can be summarised to:

1. Endorse the continuation of the Kyoto Protocol;
2. Underline that climate change poses one of the greatest challenges of our time and emphasise a strong political will to urgently combat climate change;
3. Prevent dangerous anthropogenic interference with the climate system, recognise the scientific view that the increase in global temperature should be below 2°C;
4. Recognise the critical impacts of climate change and the potential impacts of response measures on countries;
5. Recognise that deep cuts in global emissions are required according to science and agree cooperation in peaking;
6. Reduce climate change vulnerability and build resilience in developing countries, especially in the Least Developed Countries (LDCs), small islands (SIDS);
7. Developed countries would commit to economy-wide emissions targets for 2020 and agrees that they would strengthen their existing targets.
8. Agree that developing nations would implement mitigation actions (Nationally Appropriate Mitigation Actions) to slow growth in their carbon emissions;
9. Agree that developing countries would report those actions once every two years via the UN climate change secretariat, subjected to their domestic situation.
10. Recognise the crucial role of reducing emission from deforestation and forest;
11. Pursue opportunities to use markets to enhance the cost-effectiveness of, and to promote mitigation actions;
12. Developing countries, especially these with low-emitting economies should be provided with incentives to continue to develop on a low-emission pathway.

Becoming a PREPARED City ...

A message from Adriana Hulsmann, Coordinator of the PREPARED project:

Members active in PREPARED are often asked to present the project, which is great as dissemination is key to the success of the project. Presentations on PREPARED often result in requests from not-PREPARED cities to become involved in the project and for cities to get ready to be a 'climate change PREPARED city' and some city managers are enquiring about city branding and to be a 'PREPARED-city'.

Even though we are very pleased with the interest in PREPARED, it is too early to increase the number of pilot cities in the project. We therefore suggest that interested cities take the following actions:

1. Register on our website for our free newsletter and

2. Join our national and regional platforms when these are announced through the website. This way we can extend the project discussions beyond our existing partners and the cities already involved.

Within the next 2 years the PREPARED project will have the tools to assess the preparedness of cities and develop how the branding of PREPARED cities can continue.

Adriana Hulsmann

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1. KWR Water b.v. - The Netherlands
2. DHI - Denmark
3. SINTEF - Norway
4. Kompetenzzentrum Wasser Berlin gGmbH - Germany
5. Institut National des Sciences Appliquées - France
6. International Water Association (IWA)
7. University of Exeter - United Kingdom
8. University of Bradford - United Kingdom
9. Cetaqua Water Technology Center - Spain
10. Iride Acqua Gas SpA - Italy
11. Tubitak Marmara Research Center - Turkey
12. The Institute for Ecology of Industrial Areas - Poland
13. Laboratorio Nacional de Engenharia Civil - Portugal
14. University of Innsbruck - Austria
15. Crimean Scientific and Research Centre - Ukraine
16. NIVUS - Germany
18. S::can Messtechnik - Austria
19. Krüger - Denmark
20. Aquateam Norwegian Water Technology Centre - Norway
21. IWW Rheinisch-Westfaelisches Institut - Germany
22. Clavequeram de Barcelona - Spain
23. Berliner Wasserbetriebe - Germany
24. Municipality of Eindhoven - The Netherlands
25. Mediterranea delle Acque S.p.a. a Iride ACQUA Gas - Italy
26. Istanbul Water and Sewerage Administration - Turkey
27. Utility of city of Gliwice - Poland
28. Empresa Portuguesa das Aquas Livers, SA - Portugal
29. Water Department of Greater Lyon - France
30. Municipality of Oslo Water and Sewerage works - Norway
31. Simferopol Drinking Water Supply & sewerage Company - Ukraine
32. Aarhus Water and Wastewater - Denmark
33. DWR Cymru Welsh Water - United Kingdom
34. Seattle Public Utilities - United States
35. Melbourne Water Corporation - Australia
36. Monash University - Australia