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IWRM-NET

Towards a European-wide exchange Network for integrating research efforts on Integrated Water Resources Management

Thematic priority: Integrated water resource management

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Proceedings of Sibiu Workshop

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PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services).	
CO	Confidential, only for members of the consortium (including the Commission Services).	

Regional Workshop for collaborating on IWRM Research: Eastern Europe and the Danube region

THE IWRM ERA-NET PROJECT

The strategic objective addressed by the project is developing long-term coordination among national / regional Integrated Water Resources Management (IWRM) related research programmes in Europe

The members of IWRM-net are a network of national/regional programme managers, wishing to enhance good practices, both by transfer of knowledge, and by developing new tools and expertise in IWRM and research management. The workshop was one of a series of four to identify short-term research needs for water management.

AIMS

To discuss the research needs within Romania, Hungary, Germany and Austria along with potential partner countries in the region and to include (but not exclusively) the following topics:

I: **SURFACE WATER** (ORGANIC AND NUTRIENT POLLUTION)
II: **SURFACE WATER** (HYDROMORPHOLOGICAL ALTERATION)
III: **SURFACE AND GROUNDWATER** (HAZARDOUS SUBSTANCES POLLUTION AND GROUNDWATER QUANTITY)

PRESENTATIONS

As listed above the first session was hydro-morphology, the second was pollution and the third was groundwater. Before each session there was a presentation to introduce the topic. The presentations were not focused but provided an overview of a range of issues. The presentations can be found at www.iwrm-net.eu

Adina Florea welcomed the group on behalf of Gheorghe CONSTANTIN, Director, MoESD Romania

Stephen Midgley from SNIFFER introduced the days proceedings and aims of the event. IWRM-Net is working towards trans-national collaborative research calls. The first call was launched in November last year and we have selected 3 trans-national projects for funding. The themes of the call were hydro-morphology and water governance. The next stage in the project is investigating in more detail the research needs for a second joint call. This will be towards the end of 2009 with the projects starting during 2010.

Opportunities for shorter timescale research may also present themselves to delegates through the IWRM-Network and the partners have agreed to provide information such as current research across Europe, joint call principles and draft legal agreements but IWRM-net is unlikely to be able to provide administrative support (i.e. a secretariat) for smaller calls due to resource constraints.

IWRM-Net has available a database of research related to integrated water resource management and a knowledge management tool for analysis of the database. For

more information visit the IWRM-Net website or contact Laurence Guedet of the International Office of Water. (l.guedet@oieau.fr)

IWRM-Net currently classifies research programmes in the database using two systems. The first uses thematics developed by the International Office for Water that relate to IWRM, such as socio-economics or water and land planning. The second is based on the various articles within the Water Framework Directive, such as programme of measures or sociology and public participation. SNIFFER has recently started to investigate the more detailed classifications created by the CIS working group in 2005 that looked at knowledge gaps the WFD. The three classification systems have been used for analysis of gaps in knowledge.

CORINA BOSCORNEA, from the NATIONAL ADMINISTRATION 'ROMANIAN WATERS', River Basin Management Plan Department introduced the subject of INTEGRATED WATER RESOURCE MANAGEMENT RESEARCH IN ROMANIA, establishing scientific priorities.

- Link between water management objectives for Danube and environmental objectives for Black Sea (especial for nutrients and priority substances).
- Looking at by-pass flow from peaks for effectiveness of different programmes of measures
- Develop methodologies to assess and prioritise the efficacy of measures for pressures - the impacts of measures identified in the river basin and the efficiency of the pollution reduction measures
- Financial analysis concerning implementation / financing of measures at the basin / national level – the impact of measures on economic sector
- Improving the operating tools for management and the utilisation of disproportionate cost.

Surface Water Bodies at risk:

- 224 (9,5 %) at risk; 128 (5,5 %) possibly at risk; 1995 (85 %) without risk from the point of view of organic substances;
- 290 (12,3 %) at risk; 171 (7,3 %) possibly at risk; 1886 (80,4 %) without risk from the point of view of nutrients;
- 56 (2,4 %) at risk; 77 (3,3 %) possibly at risk; 2214 (94,3 %) without risk from the point of view of priority substances/priority hazardous substances;
- 492 (20,9 %) at risk; 364 (15,5 %) possibly at risk; 1491 (63,6 %) without risk from the point of view of hydromorphological alterations;
- 639 (27,2 %) at risk, 370 (15,8 %) possibly at risk; 1338 (57 %) without risk from all risk categories point of view.

Dr. eng. Daniela RĂDULESCU, Director, National Institute of Hydrology and Water Management and Dr. eng. Andreea GĂLIE, National Administration "Apele Romane",

member in HYMO TG-ICPDR presented on hydro-morphology issues. The Romanian National Report 2004 on risk analysis showed that the hydro-morphological changes are one of the most important pressures resulting in a high percentage of SWBs probably failing the good ecological status.

- **Transversal river works: *Weirs , sills***
  - **Effect** : on hydrological regime, on sediment transport and migration of biota

- **Transversal river works: *Dams, reservoirs***
  - **Effect** : on the flow downstream reservoir and biota

- **Longitudinal river works*: Embankments, …***
  - **Effect** : on lateral connectivity, the foodplain vegetation and spawning habitat

- **Longitudinal river works: *Banks regulation / consolidation works***
  - **Effect** : on river longitudinal profile, on substrate structure and biota

- **Navigation channels**
  - **Effect** : on bed stability and biota

- **Water intakes, discharges, river derivation**
  - **Effect** : on the low flow, bed stability and biota

Liviu Popescu from National Research and Development Institute for Environment Protection, Romania presented issues related to activity of ICPDR including organic pollution, nutrient pollution and Priority substances.

Mr Harry Vermeulen talked about the SNOWMAN project and the soil and groundwater priorities from the partners in this project. the societal changes that will impact on soil and groundwater were listed as;

- **Energy and climate change,**
- **Sustainable water management,**
- **Sustainable agriculture,**
- **Sustainable urbanisation.**

From these main issues the presentation focused on sustainable water management. The issues listed below were presented as the sub-themes within sustainable water management;

- **Retention and flooding,**
  - Capacity, how to increase?
  - Effect of flooding on soil quality
- **Groundwater quality,**
  - Effects of land use, emissions, diffuse pollutants
- **Soil as a water filter,**
- **Water management strategies,**
- **Sediments.**

The presentation then listed the following issues as examples of specific issues within European countries.

- Pollution of groundwater from mining activities
- Pollution of groundwater from related chemical industries
- Redevelopment of old industrial sites in urban areas
- Redevelopment of abandoned army sites

Mihail Costache	**Stephen Midgley**
Natacha Amorsi	Harry Vermeulen
Andreea Galie	Carmen Hamchevia
Corina Boscornea	Christian Weisner
Gyorgy Istvan Toth	Laszlo Perger
Liviu Popescu	Gabriel Cliniac
Janos Szabo	
group1	**group 2**

Session 1: Hydro-morphological alteration

Group 1;

Knowledge on ecological status

- Definition of good ecological status (to set up the boundaries among the five classes);
- Good monitoring data to produce data through WFD compliance methods (confidence in data, access to data);
- Biological, chemical-physical and hydro-morphology – linkage to reach good ecological status;
- Ecological status for temporary streams (*agreement with the Valencia workshop priorities*);
- Links between sediments in the Danube river and coastal erosion;
- Linkage between discharges and status – link to environmental flow (related to points 1.2 and 1.3 from background document).

(1.2) Better understanding and knowledge of the processes by which we define good ecological status?

- What are the drivers behind the concept of GES as a process of dynamic interactions i.e. is good ecological status a definition of environmental science, social science or political science?
- Develop methodologies that identify good status that combine methods and understanding from natural, social and political science.
- How can we improve the incorporation of public worth and social values into the definition of ecological status

(1.3) To improve our understanding of the hydro-biological interaction

- Improve our understanding of the relationship between flow and ecology based on appropriate data and site specific studies
- Practical Ecological Flow Definition
- What are the drought effects in wetlands and the relationship with stream ecology (*agreement with Valencia workshop*)
- Fish migration facilities (for extreme heights);
- Interrelation between river ecosystem and other terrestrial ecosystems;
- Quantification of monetary benefits of hydro-morphological measures under WFD (*agreement with Germany, according to background documents*);
- Rehabilitation of navigation routes – ecological friendly solutions;
- Improve our understanding of how the Hydro-Morphology regulations of the WFD impact on flood risk management strategies.

Group 2;

Climate change –

- How will climate change affect hydrology (high/low flow amplitude, frequency, and seasonal / annual variability)?
- How will rising sea levels, altered flow regimes and sediment transport affect coastal areas (deposition or erosion, management) and ecosystems (changing salinity)
- Erratic Flows –
- How can seasonal changes in erratic flow be managed (e.g. storage capacity, aquifer recharge)?

Hydropower –

- How do size and character of reservoirs effect water quality (e.g. temperature, oxygen saturation), sediment transport (e.g. reservoir flushing) and aquatic organisms?
- How can impacts of residual flows be assessed, how do they affect river restoration programmes?
- How can impacts of hydro-peaking (quick fluctuating flow levels) be assessed, how do they affect river restoration programmes?
- How can trans-boundary management issues be solved (e.g. residual flow, hydro-peaking)?
- How does river bed degradation affect the management (e.g. restoration) of hydro-morphological issues (e.g. floodplain connectivity)?
- What solutions can be applied for up- and downstream migration of fish, especially at large obstacles (e.g. sturgeon passage at the Iron Gate)?

Management of River basin/flood plain

- How can priorities be defined in river basin / flood management (e.g. priority habitats, priority economic drivers)?
- How can impacts on ecosystems from economical drivers (e.g. improved navigation routes) be avoided or limited?

What are the benefits of re-establishing functional aquatic ecosystems, how can they be evaluated financially (e.g. tourism and nature benefits for communities)?
HMWB

- What are the impacts of HMWB on GEP?
- What are the links between social benefits and ecological improvements?
- How do you undertake a catchment-based approach for HMWB (e.g. transboundary issues)?
- How can be the decision-making on HMWB or not be supported (e.g. designation process)?

Reference Conditions

- How can the WFD and assessment tools keep up with changing knowledge (e.g. taxonomical or bio-geographical issues)
- Not specific to pollution topic but of value in group
- How can/may new pollutants or species (native, non-native) be integrated into reference conditions and assessment tools?
- What timelines shall/may be applied for defining reference conditions when historical data are lacking – basin-wide comparability?

Session 2 - Organic pollution, Nutrient pollution:

Group 1

Identify origin of the organic and nutrient pollution (diffuse, point sources or others) – based on measures – and than based on that to apply cost effectiveness measures;

Scenarios of organic and nutrient pollution reduction – models to size the effect of the measures of the programme of measures (in PoM);

How to evaluate the cost effectiveness of the measures – to evaluate the financial impact of the measures on social and economical sectors (which economical indicators related to environmental indicators are appropriate to assess the impact of the measures on social and economical activities); -i.e. economical indicators/cost effectiveness/ cost recovery/investment affordability

Methodologies for cost benefit analysis – for nutrient pollution from agricultural sources (buffer capacity of soil, content of nitrate in soil, linkage with groundwater, how measures affect the environment;

Tools for improving of technologies - free of phosphates detergents (research in production process, research and development in wastewater treatment); tools for improving of the best available technologies in industry generating organic pollution;

Scientific research for linkage, impact between environmental objectives for pollution for Danube River and for Black Sea.

Group 2

Integrated Management of nutrient pollution

- How do you integrate management of nutrient pollution with biology, chemistry, physical aspects
- Integration with other disciplines

Waste Water Treatment Directive

- Development of next programme of investment for organic/nutrient pollution
- Costs to deal with these issues?

PREVENTION BETTER THAN CURE

- How can we change industry/agricultural practice to reduce the input of pollutants into the environment, improving management and efficiency of use of nitrates.

MANAGING EUTROPHICATION

- Specifically for lakes and coastal waters there is a need to improve the ability to specify the cause and develop new techniques and technologies to manage eutrophication.

GUIDELINES for NUTRIENT POLLUTON

- Specific to typology e.g upper and lower reaches of a river
- Support of intercalibration process

GROUNDWATER

Groundwater should not be separate from surface water for management purposes and there were a number of aspects that require short-term research;

- Dealing with contamination (modelling and planning)
- Soil buffer capacity against contamination (filtration capacity)

Session 3, Groundwater, soils and Hazardous Pollution

Group 1

- Aquifer recharge and aquifer discharge – tool for identification, tool for pollution migration (dispersion);
- Methods for estimation of the background content (metals, oil, hazardous substances, nitrate) and of the anthropogenic input;
- Research for establishing soil buffer capacity for pollutants (*agreed on Valencia priorities);*
- Tools for better estimation of soil buffer capacity on priority pollutants in the recharge areas of the groundwaters
- Creation of an integrative database for unsaturated and saturated soil zone (cover soil) including pF (retention), porosity, structure

(10.1) Integration of groundwater with related fields

- Some people looking at crops, others the unsaturated areas, and others groundwater.
- Better understanding of the processes and interactions across the eco-hydrology surface-GW interface to better quantify GES

(10.2) Improve our understanding of the processes involved in the transfer/residence times of agro-chemicals in basins. Non-point sources pollution

(10.3) Improve our understanding of carbon plus in soils, how to influence it with water effects on extremes on low flows in different landscapes/land-use, climate change on infrastructure, water supply and groundwater

(10.4) Groundwater Quantity

- Drought and drying out of areas for a variety of reasons can cause ecological problems and the oxidation of peats and soil-setting. Finding cost-effective measures to deal with this problem requires further research.
- In mitigating the drought water can be used to flood dry areas, but the ecological consequences of using water from outwith the region are little understood.
- Also there are currently no clear definitions for arid/parched/drought areas and thus little effective mapping of these areas.

Group 2

The discussion started with a discussion on development of storage capacity for erratic flows, for example low flows in summer and the use of aquifers as a means of storage.

Shallow Aquifers and stagnant water

- How to delineate territory for leaving stagnant waters for the ecological benefits
- Improve understanding of how decisions are integrated into planning system

Natural Contamination of Aquifers

- Drinking water directive
- How to achieve the European standards

- Managing over abstraction (by industry and agriculture etc domestic?)

Highly polluted areas (Groundwater)

- Movement of pollutants through soil and groundwater
- Assessing the effectiveness of measures
- How do you stimulate chemical/physical changes
- Developing new management strategies

ARSENIC removal from groundwater relating to the Drinking Water Directive

- Research needed on techniques and the improvement of the cost effectiveness of these techniques - how much money can you afford to spend on removal?

HAZARDOUS pollutants

- Improve our modelling of hazardous substances in time and space integrating both surface and groundwater combined.

SUMMARY OF THE PLENARY SESSION

One issue raised that was not part of the themes presented was the management of non-native species, for example under which circumstances should non-native species be considered as substitute for native species (e.g. biodiversity, biomass) and thus be integrated into WFD assessment tools? and how do invasive non-native species affect native bio-coenosis and thus prevent from achieving a good ecological status?

The plenary session combined the two groups research needs listed where there was an agreed overlap.

The final list of research needs presented to the INBO delegates is within annex 1. The prioritised list was then summarised into the format seen below.

In the responses from the EURO INBO delegates the needs were prioritised and also again where overlap was present the issues were brought together.

PRIORITISATION OF THE SUMMARY RESEARCH NEEDS

The delegates came up with the following prioritisation of issues that were listed from the working groups. The subjects were taken as the areas where there were common issues within the three groups and provide a summary of the research needs.

Headline research themes	Votes
Integrated Pollution management *(incl)* • Hazardous Pollution • Aresenic in Groundwater	9
Management of River basins and floodplains	9
Good Ecological Status	7

Hydro-power	6
Reference Conditions	6
Integration of Socio-economic and environmental evaluation	5
Groundwater Management	5

NEXT STEPS

These conclusions will be integrated into a summary of European IWRM research needs which is being prepared by SNIFFER. This will be published through the IWRM-Net website. http://www.iwrm-net.eu/

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ANNEX 1: Questionnaire presented to EURO-INBO delegates.

Identified Research Needs from IWRM-Net Sibiu research workshop

The topics listed below represent the priority subjects proposed by the delegates at the IWRM-Net workshop on the 1st October.

These subjects will be taken forward and considered by the IWRM-Net partners for subjects within the second call to be launched in late 2009.

We are now inviting INBO delegates to review the topics listed and vote of the three main topics they believe are of high importance. If you wish to place your three votes (ticks √) for one subject this is OK, but you are requested to use just three votes per person.

IWRM-net would like you to vote for the headline issues and the bullets below are for guidance on the issues associated. The debate will continue at www.iwrm-net.eu

Research Topic	tick
Definition of good ecological status • How does the Biological, chemical-physical and hydro-morphology interact to define good ecological status;	
Hydro-morphology • How will climate change affect hydrology (high/low flow amplitude, frequency, seasonal/annual variability)? • How will rising sea levels, altered flow regimes and sediment transport affect coastal areas (deposition or erosion, management) and ecosystems (changing salinity) • Links between sediments in the Danube river and coastal erosion;	
ERRATIC STREAMS • the storage capacity, managing seasonal change and aquifer recharge • Ecological status for temporary streams	
Hydropower • How do size and character of reservoirs effect water quality (e.g. temperature, oxygen saturation), sediment transport (e.g. reservoir flushing) and aquatic organisms? • How can impacts of residual flows be assessed, how do they affect river restoration programmes? • How can impacts of hydro-peaking (quick fluctuating flow levels) be assessed, how do they affect river restoration programmes? • How can transboundary management issues be solved (e.g. residual flow, hydro-peaking)? • How does river bed degradation affect the management (e.g. restoration) of hydro-morphological issues (e.g. floodplain connectivity)? • What solutions can be applied for up- and downstream migration of fish, especially at large obstacles (e.g. sturgeon passage at the Iron Gate)?	
Management of River basin/flood plain • How can priorities be defined in river basin / flood management (e.g. priority habitats, priority economic drivers)? • How can impacts on ecosystems from economical drivers (e.g. improved navigation routes) be avoided or limited? • What are the benefits of re-establishing functional aquatic ecosystems, how can they be evaluated financially (e.g. tourism and nature benefits for communities)?	

HMWB • What are the impacts of HMWB on GEP? • What are the links between social benefits and ecological improvements? • How do you undertake a catchment-based approach for HMWB (e.g. transboundary issues)? • How can be the decision-making on HMWB or not be supported (e.g. designation process)?	
Reference CONDITIONS • How can you develop reference conditions that can adapt to new pollutants and invasive species, that also take into account lack of historical data	
Integrated Pollution Management • Development of scenarios and models to understand the effectiveness of programmes of measures. • Link the above to financial impacts and socio-economic indicators and investment programmes for Waste water treatment • Methodologies for cost benefit analysis – for nutrient pollution from agricultural sources	
GUIDELINES for managing NUTRIENT POLLUTON & Eutrophication • Make them specific to typology e.g upper and lower reaches of a river • Scientific research for linkage, impact between environmental objectives for pollution for Danube River and for Black Sea. • Specifically for Lakes and coastal waters we need to improve our ability to specifying the cause • Develop new technologies and techniques for dealing with eutrophication	
Aquifers recharge and aquifer discharge • Develop a tool for identification, tool for pollution migration (dispersion); • Relating to the drinking water directive, how can members states achieve the European standards if well below natural contamination levels	
Improve our groundwater management capabilities • Improve Modeling and planning methods • Develop methods for estimating background pollutant content • Creation of an integrative database for unsaturated and saturated soil zone (cover soil) including pF (retention), porosity, structure • Improve our knowledge of the movement of pollutants through soil and groundwater • Assessing the effectiveness of measures to reduce pollution • How do you stimulate chemical/physical changes to reduce pollution • Developing new management strategies to deal with the above issues	
ARSENIC removal from groundwater • Relates to DWD, Research needed on techniques, how much money can you afford o spend on removal?	
HAZARDOUS pollutants • Improve our modeling of hazardous substances in time and space, integrating both surface and groundwater	

Comments from INBO delegates: Sibiu workshop

"Water pricing, fairness, transparency and acceptance (focus on pre-access – Turkey)
Governance and stakeholder platforms, from practical to political"

William Oliemans

"Structural Measures to reduce floodrisk & how these measures can be implemented in the conditions of a very strict WFD?"

Altan Abdulamit, MESD, Romania (altan.adbulamit@mmediu.ro)

"The European Water Technology Platform (WSSTP) spent 2 years going through this process. The strategic research agenda can be found on the website www.wsstp.eu. You are welcome to contact WSSTP to identify possible collaborations."

"River morphology (medium and long-term reaction) generated by management function of the uses of the river & integrate sediment quality-water quality"

"To have a special time in the project for transfer of knowledge to non-EU countries"

Dumitru Drumea, Moldova.

"Hazardous pollutants - how to stop the production and use of the those chemicals so that wastewater resuse can be safe, recharge of aquifers safe etc and to include in this the sociological aspects"

"hazardous pollutants – possibilities of limiting the hazardous pollutants from the surface water and sediments by means of specialized bacteria or other microbiological elements.