



# The WETwin Project: Enhancing the Role of Wetlands in Integrated Water Resources Management for Twinned River Basins in the EU, Africa and South-America in Support of EU Water Initiatives

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## Abstract

*An international project called 'WETwin' has been launched in June 2008 within the frame of the 7<sup>th</sup> Framework Programme of the European Commission (EC). The overall objective of the project is to enhance the role of wetlands in basin-scale integrated water resources management, with the aim of improving the community service functions while conserving good ecological status. Strategies will be identified for:*

- *utilizing the drinking water supply and sanitation potentials of wetlands for the benefit of people living in the basin, while maintaining the ecosystem functions*
- *adapting wetland management to changing environmental conditions*
- *integrating wetlands into river basin management*
- *improving stakeholder participation and capacity building with the aim of supporting sustainable wetland management.*

*The project will work on 'twinning' case study wetlands from Europe, Africa and South America. Management solutions will be worked out for these wetlands with the aim of supporting the achievement of the above objectives. Knowledge and experiences gained from these case studies will be summarized in general guidelines aiming to support integrated wetland management on global scale. Stakeholder participation, capacity building and dissemination will be essential components of the project.*

## Keywords

Wetlands; sanitation; drinking water; ecology; river basin management; Millennium Development Goals; European Union 7<sup>th</sup> Framework Programme

## I. Introduction

An international project has been launched in June 2008 within the 7<sup>th</sup> Framework Programme of the European Commission (EC) under the title: 'Enhancing the role of wetlands in integrated water resources management for twinned river basins in EU, Africa and South-America in support of EU Water Initiatives'. The acronym of the project is 'WETwin'. The project team consists of research, higher educational and governmental institutions from Africa, South-America and Europe. The project is dealing with wetlands and it aims at supporting the global efforts on improving drinking water supply and sanitation conditions by working out integrated strategies on how the relevant potentials of wetlands can be utilized for the purpose.

The aim of this paper is to introduce briefly the background, concepts, objectives and methodology of the WETwin project.

## II. Historical overview and current status of wetlands

The relationship between wetlands and mankind can be characterised as a close but often controversial affair. At the beginning of historical times wetlands played a decisive role in the development of humanity. The fertile riparian wetlands of the Nile, Euphrates, Tigris and Indus rivers formed the economic basis for the development of the very first civilizations on Earth (Junk, 2002). High

agricultural production with multiple annual harvesting was achieved on these wetlands thanks to the unrestricted amounts of water and nutrient provided by the river. High productivity has made wetlands attractive for humans at other locations of the Earth too. Many wetlands in Europe, Africa, Asia and America have been utilized for extensive agricultural and fishery purposes, thereby ensuring the survival of the population and forming the basis for subsequent development of civilization (Zsuffa, 2001; Tockner & Stanford 2002).

However, as population growth forced a transition towards more intensive agricultural production schemes, human society started looking at wetlands from a different perspective: the once beneficial periodic inundations were now seen as a severe limitation to more intensive, year-round production schemes. Especially in tropical areas, the presence of water-borne diseases in wetland ecosystems further contributed to the negative image wetlands acquired. Under this schedule of generalized depreciation, many natural wetlands have been artificially detached from the river system, in order to subsequently provide new areas for urban expansion, or to be turned into permanently arable lands.

Today most of the original wetlands in the EU simply do not exist anymore (EEA, 2005), while many wetlands have been and are being threatened in Africa and South America too (Abebe, 2003; Junk, 2002). Unfortunately the future augurs ill as well: according to demographic, political, economic, ecological and climate change trends serious deteriorations and destructions are expected on the remaining wetlands of Africa, Latin-America and Asia by the year of 2025 (Junk, 2002).

### **III. Functions of wetlands**

Currently, it is widely accepted that wetlands perform important hydrological and ecological functions and play an important role in local livelihood conditions. Wetlands can mitigate the impacts of floods, reduce erosion, recharge groundwater, maintain and improve water quality, store carbon dioxide and ameliorate micro-climate conditions. From an ecological point of view, wetlands are fundamentally important for maintaining biological diversity. Wetlands are excellent habitats where aquatic and terrestrial species find optimal conditions for reproduction and growth. This enables wetlands to provide 'food web support' within the basin-wide 'ecological network'. In fact wetlands function as 'generator areas' from where species could spread and populate other parts of the basin using the riverine 'corridors' of the ecological network as transport routes (de Groot et. al., 1990).

Wetlands are furthermore being re-discovered as means to improve local livelihood through agriculture and fisheries. Wetlands can also provide food, medicine, shelter, energy, tourism and recreation. Successful attempts have already been made in East Africa towards the integration of crop production and fisheries in wetlands by adapting to the natural hydrological regime and by not interfering significantly with the integrity of the environment (Denny et. al, 2004). A relevant project in this sense is the Fingerponds (Kaggwa, 2006) project in Uganda that aims to enhance fish production from East African papyrus swamps without causing damage to wetland integrity. Livelihood functions of wetlands have been rediscovered in Europe as well. For example plans have been devised in Hungary for the reintroduction of ancient adaptive fisheries methods on the riparian wetlands of the River Danube (Zsuffa, 2001).

Nowadays, the capacity of wetlands to purify water is of particular interest to policy makers around the world. The effectiveness of nutrient removal in wetlands can significantly improve water quality in the entire river basin. The Horizontal Guidance document on wetlands of the European Union Water Framework Directive, further abbreviated as WFD (EC, 2003) stresses the impact wetlands have on achieving the WFD's environmental target in the whole basin. Research on the nutrient removal

capacity of wetlands in the temperate zone has revealed that the maximum potential rate of nitrogen and phosphorous removal typically ranges from 1000 to 3000 kgNha<sup>-1</sup>y<sup>-1</sup> and from 60 to 100 kgPha<sup>-1</sup>y<sup>-1</sup> (Kadlec & Knight, 1996; Groffman & Crawford, 2003; Kadlec & Reddy, 2001). According to Verhoeven et al. (2006) these values are order of magnitude higher than fertilizer applications in intensively farmed areas. In Uganda the cost-effectiveness of using wetlands for waste water treatment has been long recognised and several wetlands of the country are now utilized for this purpose (Kansiime & Nalubega, 1999). The purification value of the Nakivubo wetland bordering Kampala for example has been estimated as high as US\$ 1.3 million per year (Emerton et. al., 1999). This has led to a growing interest, especially in Africa, towards utilizing the water purification capacities of wetlands for drinking water supply and sanitation purposes (Abebe, 2003; Bakema & Mafabi, 2003). Wetlands have proven to be cost efficient solutions for water purification and need less maintenance compared to artificial waterworks, which make them attractive for developing countries.

The importance of the ecological and hydrological functions that wetlands perform, as well as their potential to support and improve livelihood conditions, have urged researchers, NGOs, and government institutions to recognise the need for the preservation, sustainable management and basin-wide integration of wetlands for the benefit of people and ecosystems hosted by the river basin.

#### **IV. Focusing on drinking water and sanitation**

The WETwin project furthermore aims to improve our understanding on how integrated wetland management can contribute to the water supply and sanitation target of the 7<sup>th</sup> UN Millennium Development Goals (MDG) and its European variant, the EU Water Initiative (EUWI). The objective of the 7<sup>th</sup> MDG is to halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

According to the MDG 2006 report (UN, 2006), the share of people using drinking water from improved sources has continued to rise in the developing world, reaching 80% in 2004, up from 71% in 1990. This means that the world is on track to reach the drinking water target. Sanitation coverage in the developing world, increased between 1990 and 2004 from 35 to 50 percent. Hence, 1.2 billion people gained access to sanitation during this period. Yet, still half of the population of developing countries lacks basic sanitation. In addition, the MDG targets for sanitation will also be missed with half a billion people worldwide (UN, 2006).

Growing populations pose a challenge, however, and wide disparities among countries and between rural and urban areas persist. The largest urban-rural disparities are found in parts of sub-Saharan Africa, where city dwellers are twice as likely to have safe water as their rural counterparts.

Estimates of the potential gains for human development from progress in water and sanitation (as given in the 2006 Human Development Report (UNDP, 2006)) suggest that the benefits heavily outweigh the costs. The additional costs of achieving the Millennium Development Goal on the basis of the lowest-cost, sustainable technology option amount to about \$10 billion a year. Closing the gap between current trends and target trends for achieving the Millennium Development Goal for water and sanitation would result in:

- Some 203,000 fewer child deaths in 2015 and more than 1 million children's lives saved over the next decade.
- An additional 272 million days gained in school attendance as a result of reduced episodes of diarrhoea alone.

- Total economic benefits of about \$38 billion annually. The benefits for Sub-Saharan Africa - about \$15 billion - would represent 60% of its 2003 aid flows.

The WETwin project intends to support the strong ongoing engagement of the international community to realise such improvements through the 7th millennium goal supported by the EU Water Initiative. Key questions we hereby have to ask ourselves are how do natural and manmade pressures in the wetland and the river basin impact upon the water supply and nutrient retention functions of the wetland, and how are these pressures impacting upon the integrity of the wetlands' ecosystem?

## **V. Focusing on basin-wide integration of wetlands**

Wetlands play important roles in basin wide processes. Degradation or destruction of wetlands has considerable negative impacts on the river basin. In the Upper Midwestern region of the US three ecosystem services (flood abatement, water quality improvement, and biodiversity support) declined when about 60% of the region's wetland area was drained for agriculture (Zedlera, 2003). In the Czech Republic it became apparent that wetland destruction negatively affected the heat distribution in the catchment, which was reflected through markedly larger daily temperature differences in those parts where drainage and deforestation had taken place (Pokorny, 2001). In terms of impact on water quality, a review by Verhoeven et al. (2006) showed that when wetlands comprise 2-7% of a catchment, they have a significant role in improving water quality in the whole catchment. All these observations form the important basis of the WETwin project.

Because of the multi-functional character of wetlands and their sensitivity towards changes in water allocation, nutrient loading and land-use developments within the entire river basin, the only meaningful way to come to effective management planning is to integrate wetlands into the river basin management planning process.

Specific steps towards the integration of wetlands into river basin management have already been taken. In 1996, the Ramsar Scientific and Technical Review Panel (STRP) decided to concentrate on the role of wetlands in the basin-wide hydrological cycle, as well as on the integration of wetlands into river basin management (Ramsar resolutions VII.18 and IX.1 Annex Ci). Since then, specific guidelines have been and are being developed by the Panel. In the European Community, the Wetlands Working Group (EC, 2003) supports the integration of wetlands in River Basin Management Plans (RBMP), by providing guidance on the role of wetlands in the context of the implementation of the Water Framework Directive (WFD).

Stopping wetland destruction, promoting their rehabilitation and integrating them into river basin management are thus very actual and pressing issues all over the World. It is the intention of the WETwin project to provide support to these endeavours.

## **VI. Objectives and the WETwin Project**

The WETwin project is expected to support the implementation of the EU Water Initiative (EUWI) in the context of international cooperation. The main objective of the EUWI is to contribute to meeting the UN Millennium Development Goals (MDGs) for drinking water and sanitation, within the context of an integrated approach to water resources management. Halting and reversing the current loss of natural resources and biodiversity are envisaged as challenges that EUWI should cope with. The EUWI is designed as a 'catalyst and a foundation on which action can be built to contribute to meeting the MDGs'. It is the explicit intention of the WETwin project to become such an action. The WETwin

project is also expected to place particular attention on constructive engagement with the entire spectrum of societal actors as well as on communicating the research process and its results to all societal actors to make the research policy relevant and enhance its impact.

By taking all these aspects into consideration the objectives of WETwin have been formulated as follows:

The overall objective of the WETwin project is to enhance the role of wetlands in basin-scale integrated water resources management (IWRM), with the aim of improving the community service functions while conserving good ecological status.

The overall objective is broken down into the following specific objectives:

1. Identify community based technical and institutional solutions for the management of wetlands and river basins with the aim of utilizing the drinking water supply and sanitation potentials of wetlands for the benefit of people living in the basin. This concerns solutions for improving the relevant capacities of wetlands.
2. Account for ecosystem functions and values of wetlands. The proposed management solutions should also take care of preserving (and also for improving as much as possible) the ecological values of wetlands.
3. Identify strategies for adapting the management of wetlands to the changing environmental conditions.
4. Identify solutions and strategies for integrating wetlands into river basin management and planning, by taking relevant national and international policies/guidelines into consideration, and also by accounting for the envisaged community service functions of wetlands.
5. Ensure that stakeholders and decision makers will benefit from the project, also after the end of the project.
6. Increase the exchange of expertise on wetland management and on IWRM; increase the transferability of results and achieve better international networking; enhancing North-South, South-North and South-South (Inter-African, African – South American) cooperation.
7. Increase the capacity of relevant organisations to manage wetlands and river basins in an integrated way.

## **VII. Methodology of the WETwin Project**

The project will work on 'twinned' case study wetlands from Europe, Africa and South America. Management solutions will be worked out for these wetlands with the aim of supporting the achievement of the above objectives. Evaluation of potential management solutions and identification of the 'best compromise' solutions will be carried out. Evaluations will also account for the impacts of potential changes in environmental conditions. To facilitate this, climate, land use and population change scenarios will be worked out for the case study sites.

The planning process will be supported by the active involvement of local stakeholders and decision makers. For this purpose, stakeholder platforms will be established at the case study sites. Intensive stakeholder participation will help to break the 'paradigm lock' that still separates scientists from water stakeholder groups in most parts of the World. Through the involvement of stakeholders, this project will produce science-based outcomes with direct benefits for the needs of society. A comprehensive methodological framework will be worked out for stakeholder involvement, which will be unique and innovative on the field of wetland management.

Knowledge and experiences gained from the case studies will be summarized in general guidelines aiming to support achieving project objectives on global scale. It is the intention to make these guidelines compatible with existing guidelines on wetland and river basin management (e.g.: guidelines of Ramsar and of the WFD).

The global exchange of expertise on wetland management will be facilitated by intensive networking activities. Special ‘twinning’ workshops will be organised where specific topics of the project will be discussed. External experts and representatives from relevant projects will be invited to these workshops. Conferences, websites and printed materials will be utilized for disseminating project results. At the end, a unique, ‘triangular’ cooperation between 3 continents will be established on the field of wetland management.

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