The Emscher Region - the opportunities of economic transition for leapfrogging urban water management

A case study investigating the background of and the drivers for, sustainable urban water management in the Emscher Region

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SIXTH FRAMEWORK PROGRAMME

Executive summary

This study illustrates why the Emscher Region has been able to promote and implement sustainable solutions in its urban water management practices with such a high level of success. Based on a review of literature and expert interviews, the study describes the historic and current perspectives that have influenced the adoption of sustainable water management in the region.

The research concludes that seven factors have played a crucial role in establishing the Emscher Region as a unique example. These are: *(1) local demand for improved environmental conditions; (2) significant pressure from civil society; (3) political commitment at regional level; (4) readiness for major investments; (5) socio-economic and environmental benefits of using water as the central theme for large-scale restructuring; (6) the introduction of the European Union Water Framework Directive; (7) the Emschergenossenschaft as a central force for driving the process.*

The paper also includes lessons learned from the Emscher Region that can be transposed to other cities depending on the local context. These relate to: *(1) the restoration of an ecologically dead river; (2) the socio-economic restructuring of a region using water as a central theme; and (3) a regional mayors' convention on stormwater management.*

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1 Purpose of the study

This case study forms part of the SWITCH project's Work Package on 'Governance for Integrated Urban Water Management' (WP 6.1). It has been written to inform the deliverable D.6.1.5/6, a 'Comparative analysis of enabling factors of sustainable urban water management'.

The project 'SWITCH – Managing Water for the City of the Future' aims at developing sustainable urban water systems through a combination of research, technological development, demonstration activities and training within a Learning Alliance framework. Learning Alliances are stakeholder platforms designed to break down barriers to information sharing, thus speeding up the process of uptake and innovation.

SWITCH is part-financed by the Directorate-General for Research of the European Commission and is running from February 2006 to April 2011.

Achievements in the direction of sustainable urban water management have been investigated in this case study from two different perspectives: firstly, by looking at the city's broader approach to urban water management, secondly, by exploring more individual technical solutions that contribute to a more sustainable urban water system.

The Emscher Region has been chosen as a case study because it is an excellent example of how to take advantage of the opportunities arising in a major process of transition (from an economy based on coal mining and heavy industry to a modern service-oriented economy) for realising a long-term and region-wide transformation to more sustainable water management practices.

1 Introduction

For over a century, the Emscher Region[1] in the federal state of North Rhine-Westphalia has been the backbone of German industry. Its coal mines and steel plants have been instrumental in boosting the German economic miracle[2]. However, since the 1980s, the economy in the region has experienced a steady decline caused by global restructuring in the steel and coal industry, and the majority of mines and mills have closed down. Today, the region echoes its industrial past, with derelict factories, a degraded landscape and polluted waters. The towns in the region have earned the reputation of being settlements for labourers, with poor urban quality of life.

The intensive utilisation of its natural resources for economic development has caused widespread environmental degradation in the region. However, the Emscher Region is currently undergoing a socio-economic restructuring. The region is reinventing itself to become a model for sustainable development by compensating for its exploited environment. The redevelopment is mainly based on the improvement of its natural and urban environment, using water as a central theme. The Emscher Region showcases the introduction of sustainable water management practices within a region that is undergoing a major process of socio-economic restructuring.

The Emscher River has today turned into a symbol of the rise and fall of industrialisation in the region. Used as a wastewater canal for over a century, the Emscher is ecologically dead. The restoration of the Emscher has been promoted as a central theme to change the image of the region from an unattractive industrialised centre to a modern eco-friendly service-oriented area with an improved urban surrounding (Seiker, Becker & Raasch, 2006).

The Emscher Genossenschaft, a regional water board, plays a central role in driving the region's ecological reconstruction. The water board has taken up the enormous task of rehabilitating the 81 km long Emscher River. The Emschergenossenschaft is also well acknowledged for its pioneering efforts in introducing sustainable stormwater management practices in the cities of the region (Seltmann, 2007). It has also been

[1] The Emscher Region consists of the catchment of the Emscher River
[2] Economic development of Germany after the WW II

influential in initiating the 'Future Convention on Stormwater', which has been ratified by 17 municipalities in the region. By signing the convention, the 17 municipalities have voluntarily committed themselves to disconnect 15% of the region's impervious area from sewer connection within 15 years. This convention is unique since it is the first voluntary agreement introducing sustainable stormwater management on a regional scale.

The Emschergenossenschaft is also offering attractive financial incentives to industry, commercial enterprises and households for the disconnection of impervious areas from the sewer system. This is essentially aimed at reducing the hydraulic loads on the sewer network as well as reducing the cost of stormwater treatment.

The Emscher region has also set an example for civic participation in regional planning. The Emscher – Zukunft (future) is a strategic master plan for regional development that has been developed through an intensive dialogue process involving a wide range of stakeholders and effective public participation. This process has enabled many of the Emscher cities to conceptualise a family-friendly, multi-generational living environment (Seltmann, 2007).

2 The Emscher Region – a brief overview on its main features

Introduction

The Emscher Region lies in the erstwhile industrial centre of western Germany, the Ruhr district (Ruhrgebiet) in the federal state of North Rhine-Westphalia (see Figure 1). Until the mid 19th century, the region was primarily a sparsely-populated agricultural area, but the discovery of large deposits of coal transformed its rural characteristics to an industrialised conurbation. With the rapid establishment of coal mines, steel factories and industry in the region, it soon turned into an important industrial zone.

The swift industrialisation of the region also resulted in a dramatic increase in population. The catchment consists of 17 urbanised municipalities and has an area of 865 km² with a population of 2.4 million inhabitants and a population density of 2,775 persons / km². With 40% of the entire region falling under an urban conglomeration of closely connected cities, it is Europe's most densely populated and industrialised area.

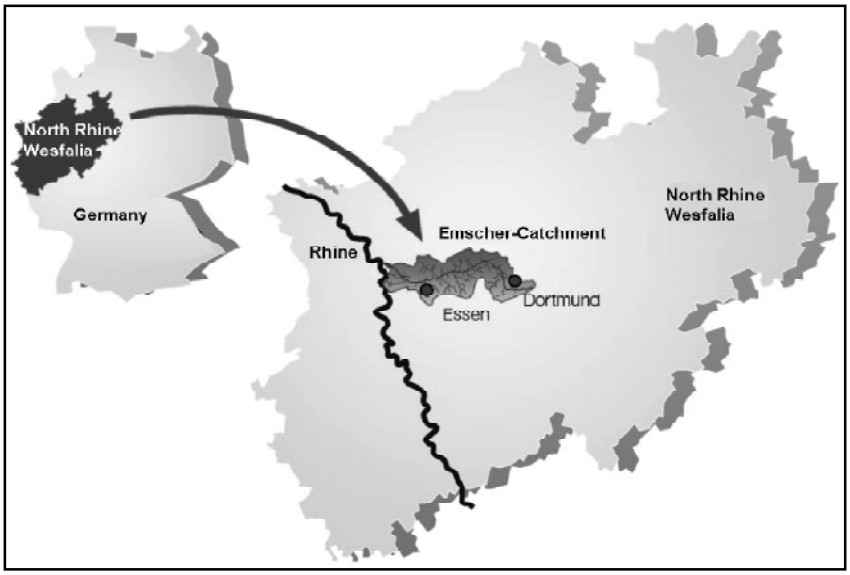

Figure 1: The Emscher catchment in the federal state of North Rhine Westphalia (source: Geretshauser & Wessels 2007)

Climate

The region is characterised by an average annual temperatures of 18 °C during the summer - with the warmest months being July and August - and 2.4 °C during winter, with the coldest month being January. The average annual precipitation in the region is 934 mm, which is relatively higher that national average annual precipitation of 600mm.

Economy

For more than a century, technological progress and economic success was driven by large industrial plants and coal mines in the region. The region is well known for its steel production, chemical industry and large power plants. The cities in the region are also home to 13 of the 50 largest corporations in Germany, and feature industries relating to light metal manufacturing, car production, electronics and health.

Since the 1970s, the region has experienced a steady slowdown in its economy, mostly influenced by the replacement of coal by cheaper imports and alternative fuels as well as by the crisis of iron and steel industries caused by global restructuring. These events caused large scale closures of mines and industries in the region (Shaw, 2002). The unemployment rate in the 1980s was a staggering 15%, and was still 9.3% in February 2010 (Labelle 2001 & Bundesagentur für Arbeit[3], 2010).

[3] Bundesagentur für Arbeit: Federal Employment Agency.

Today, the Emscher Region is undergoing a socio-economic restructuring, going from being a predominantly industrial region to one characterised more by service-oriented economic development. Recently, many research institutions and companies unrelated to manufacturing are being established in the region. Employment in the industrial sector has been reduced from 58% in 1970 to 28% in 2006, and service sector employment has increased from 40% in the 1970s to 70% in 2006 (Seltmann, 2007).

The Emscher River

The Ruhr region features four main rivers: the Rhine and its tributaries the Ruhr, Lippe and Emscher (see figure 2). In response to the heavy burden on water resources caused by rapid industrialisation in the region, a strategic decision was taken in 1904 to allocate specific purposes to the Ruhr, Lippe and Emscher Rivers.The Ruhr was allocated for drinking water supply, the Lippe for water supply to industry and the Emscher exclusively for wastewater discharge. Thus, the Emscher (81km) and its creeks (250km) were systematically transformed into open wastewater canals (see figure 3). The Emscher was straightened and lined with impervious concrete beds to convey wastewater from cities as well as industrial areas along the river's course, resulting in the river becoming ecologically dead (interview Raasch).

The Emscher River flows as an open drain from east to west through the major cities of Dortmund, Gelsenkirchen, Essen, Bottrop, Oberhausen and Duisburg (see Figure 2). An open drainage system for the transport of wastewater was preferred over an underground sewage network, because land subsidence caused by coal mining would have rendered an underground system unfeasible. Indeed, land subsidence results in frequent pipe fractures and bursts in the subterranean sewage system and requires constant repairs and maintenance. Thus, the choice of an open drainage system was chosen as the most economical and suitable measure to be adopted (interview Raasch).

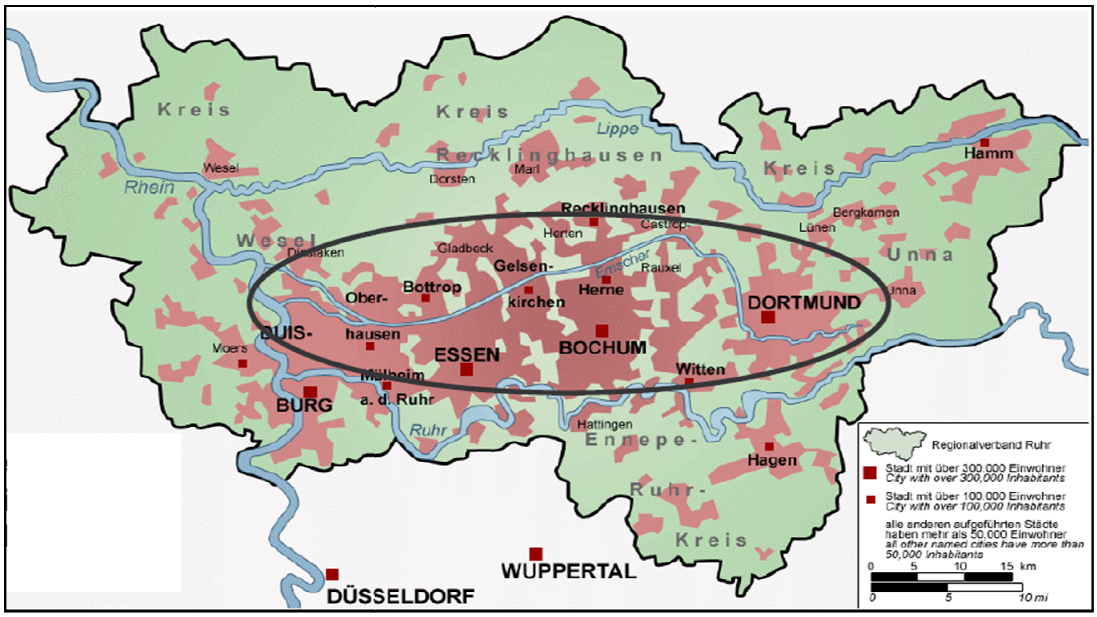

Figure 2: The Ruhr district along with the Emscher Region (source: Herbke et.al, 2006).

Due to the extensive hydraulic modification to the Emscher, the river has a low flow rate of 16 m^3 / sec at its mouth, when it reaches the Rhine. Three wastewater treatment plants are installed for sewage treatment. The largest treatment plant is located at the river's mouth and treats the entire river, thereby ensuring the water entering the Rhine is of an acceptable quality (Seltmann, 2007).

Figure 3: The straightened and channelized river Emscher carrying the sewage

3 Water resources and services in the Emscher Region

Because of the historic decision to convert the Emscher into a wastewater canal, potable water is imported to the region from external water sources. The Ruhr and Lippe Rivers and the dams of the Sauerland supply the region with drinking water. The water supply for the region is adequate, since water from external sources is abundant (Steinkohleportal, 2008).

Although there is adequate groundwater available in the region, it cannot be abstracted because of the high levels of contamination from pollutants released in the past from the coal mines and industries. These pollutants are mainly sulphates and polyaromatic hydrocarbons (Herbke et.al, 2006).

The Emscher and its tributaries are still heavily burdened with the discharge of domestic and industrial wastewater and mine water. This has a significant impact on the hydromorphology of the river. The high levels of urbanisation in the region have also caused a high degree of soil sealing by impervious areas. This leads to stormwater getting into the Emscher, often posing risks of flooding in low-lying areas of the region (interview Raasch).

4 Main players in urban water management in Emscher

The Emschergenossenschaft is Germany's first water resource management association. It was formed in 1899, to find a solution to the severe problems arising from the industrialisation and rapid urbanisation in the region (Geretshauser & Wessels 2007).

The Emschergenossenschaft is a self-managed public association and acts as a non-profit organisation. The organisation is controlled by members who represent industries, coal mines and municipalities. As of today, it has 151 members, of which 123 are from industry, 19 from municipalities and 9 from mining companies (Emschergenossenschaft, 2010).

The Federal Government has no influence on the selection of members. Government control is restricted to supervision and monitoring of the working of the Emschergenossenschaft in accordance with the Emscher Act. Nevertheless, the water

board has to act within the scope of governmental water policy and has to comply with all governmental laws as well as the EU Water Framework Directive (Annen, 1991).

Over the years, the Emschergenossenschaft has been charged with the following responsibilities:

- Maintenance and development of water courses
- Wastewater discharge and disposal)
- Flood protection
- Stormwater management
- Planning and consultation services
- Groundwater management

Water supply to the Emscher Region is carried out by water utilities like the Ruhrverband and Gelsenwassser. These utilities supply the potable water from sources outside of the Emscher region, mainly from the Ruhr River. The Ruhrverband has the task to ensure that the water supply from the Ruhr is sufficient for the entire region. For this purpose, it operates more than 800 water management installations across the Ruhr river basin, including eight dams and reservoirs and five impounded lakes (Ruhrverband, 2011).

The District Governments (Bezirksregierungen) are mandated with dealing with the permissions and licences related to urban drainage, flood protection and the development of water bodies (interview Raasch).

5 Drivers of change for sustainable urban water management in Emscher

Since the 1980s the Emscher Region has been undergoing a structural socio-economic change from a predominantly industrial region to a more service-oriented economy. Such a shift in development has also meant that all unacceptable remnants of the industrialised past needed to be rectified, that the degraded natural environment had to be restored and that urban quality of life had to be improved in order to attract investment to the region (interview Raasch).

In the meantime there has also been a growing demand for better environmental conditions from the side of local NGOs and social groups. The NGOs have played a crucial role in raising awareness about environmental issues by conducting many discussion forums and campaigns in the region (interview Seltmann & Raasch).

The socio-economic restructuring was initiated in 1989 when regional development strategy was formulated by the Ministry of Urban Development, Housing and Transport in Nord Rhein- Westphalia. One of the key components of this strategy was to bring an International Building Exhibition (International Bauausstellung - IBA) to the region. The IBA initiative was designed to instigate integrated development and regeneration in the region, with architectural competitions playing an important role. Thus it implied that the re-development considered not only economic and job creation factors, but also criteria such as society, the environment and culture. This initiative was later termed as IBA Emscher Park (Shaw, 2002 & interview Seltmann).

Initiated in 1989, the IBA Emscher Park has had the overall goal of urban development, with social, cultural and ecological measures as the basis for economic change in an old industrial region (Shaw, 2002).The initiative focused on 17 municipalities with a population of 2.2 million and an area covering approximately 800 km^2. With a total investment of 5 billion DM (2.5 billion Euros), the IBA Emscher Park focused on five thematic areas (Seltmann, 2007):

- **The Emscher Park:** 320 km^2 allocated for the development of a large park area between and inside cities, thus creating an ecological corridor between cityscapes. This park is to be free from all settlements in the future.
- **The restoration of the Emscher River:** The Emscher River to be restored to near natural conditions, creating watercourses constituting aesthetic and natural amenity enriching the urban landscape. The regeneration of the Emscher River was considered very important as it was vital for improving the environment of the region and showed that it is possible to return lost habitats to nature.
- **Working in the park:** New industry or services to be attracted to areas which were formerly brownfields. The low cost of land combined with new infrastructure and close proximity to large cities provided added opportunities for new investments.
- **Housing and integrated urban development:** The project sought to take advantage of the abundance of traditional housing for workers which exist in the

region. Under this initiative, some 2500 new and 3000 refurbished dwellings were created, providing local employment and bring vacant dwellings back into use. Many of the buildings had an experimental character – featuring low energy use or rainwater harvesting techniques – and integrated the residents in the process of planning and construction.

- **New uses for old building:** Old and currently unused industrial sites to be turned into cultural heritage and will provide attractive recreational facilities in the region. The former coal mine "Zollverein" in Essen, for example, is now a world cultural heritage site.

Amongst these five themes, the restoration of the Emscher River played a lead role in facilitating the emergence of sustainable urban water management in the region. Identified as the core theme, it was supported by several projects that have become successful. In the following sections, some of the unique approaches and achievements in the region, all aimed at restoring the Emscher River, are described in detail. They refer to:

- improved wastewater management
- the 'Future Convention on Stormwater'; and
- financial incentives for rainwater disconnections.

5.1 Improved wastewater management

The decline of coal mining in the region by the 1980s had also diminished the frequent occurrence of land subsidence and with it the requirement for operating an open sewerage system. This initiated plans to construct a 400 km long trunk sewer along the Emscher and its tributaries. The plan also included the construction of eight state-of-the art wastewater treatment plants (Fig.4). In order to allow the natural regeneration of its ecology, the objective of the plan was to protect any wastewater from directly entering the river. The formerly straightened and channelled structure of the river would be systematically dismantled, improving its geomorphology, providing meanders and imitating the river's near-natural flow regime. The project also focused on flood protection measures as well as providing green space for recreational activities. This would also help improve the urban quality of life and thereby attract more investors into the region.

Several restoration projects have been completed, and the projects will continue until the year 2020. The first 20 km of the river have been completely re-naturalised, 140 km of trunk sewers out 400 km have been completed and the required eight wastewater treatment plants are fully operational.

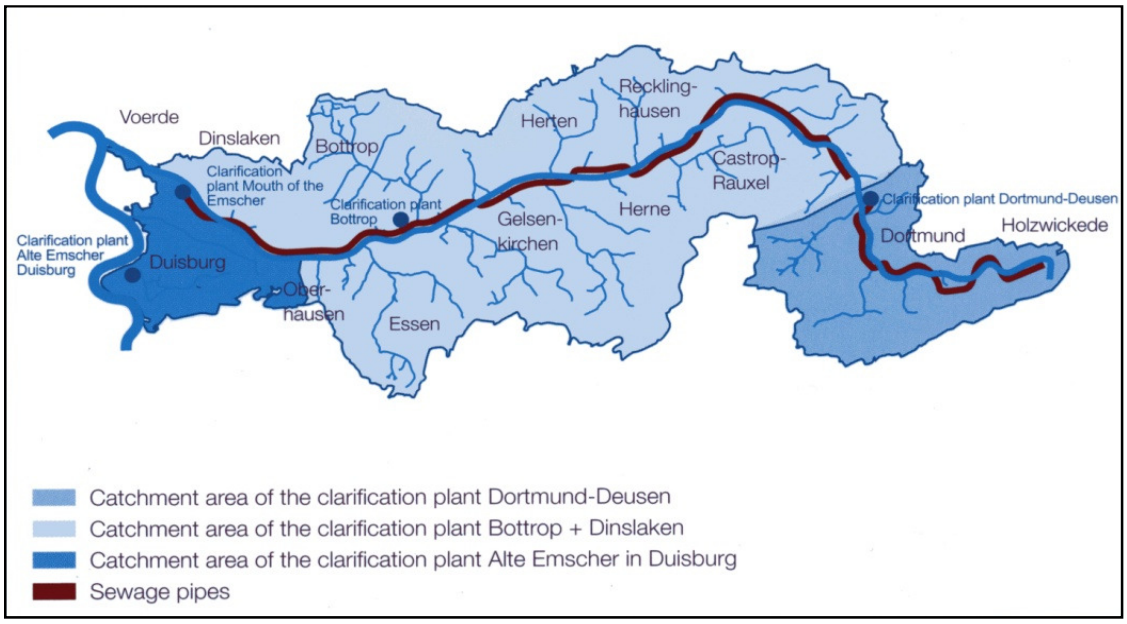

Figure 4: Trunk sewers along the river Emscher (Emscher Genossenschaft, 2007)

The restoration of the Emscher River was initiated by the Emscher Genossenschaft. As a river basin authority, it played a crucial role in the restoration of the Emscher River, but the introduction of the European Union Water Framework Directive (WFD) provided the legal basis for the implementation of the project. All natural water bodies in the region had to be upgraded to meet the water quality and hydro morphological standards set up by the European directive. In addition, the legal provision also influenced the increase in investment to 4 billion Euros. This investment – for the execution of a project that would last for twenty years – was sanctioned by the federal state of Nord Rhein-Westphalia (interview with Raasch).

5.2 Future Convention on Stormwater

Being densely populated and highly urbanised (30% of the total area = 266 km²), the Emscher Region has a high degree of soil sealing, i.e. ground covered with impervious areas. Run-off from sealed surfaces is discharged into municipal sewers. As a consequence, the impervious areas have a strong influence on the flow regime (quantity) as well as on the water quality of the Emscher. In addition, the wastewater treatment plants have to manage large quantities of stormwater to be treated and discharged into the Emscher, which also increases the cost of treatment (Seiker, Becker & Raasch, 2006).

The situation in the Emscher catchment is also unique in the sense that the entire drainage system needed to be reconstructed: there were no existing systems to be modernised to fit the demand – everything had to be newly built. This gave the authorities the chance to use more sustainable measures rather than having to fix old-fashioned end-of-pipe solutions (Seiker, Becker & Raasch, 2006).

On 31st October 2005, the mayors of all 17 towns and cities of the Emscher catchment, their departmental heads, the Emschergenossenschaft and the Minister of the Environment of North Rhine-Westphalia signed a "Future Convention for Stormwater in the Emscher Catchment". With this document, the partners committed themselves to disconnect 15 % of catchment run-off into their respective sewer systems within the next 15 years (Figure 5). The '15/15 convention' is not a binding contract but a voluntary declaration of intent which is based on three fundamental principles (Raasch & Schüler, 2007):

- Measures on-site should have priority over conventional discharge methods in new residential areas, existing built-up areas, as well as when modernising old houses.
- Disconnection potentials should be completely taken advantage of in areas where land use is changing e.g. where old and unused industrial sites are being converted to newer service-oriented industries, thus creating opportunities to apply natural methods of stormwater management.
- Using disconnection as a measure during planning or while remediating existing sewer systems should be done in consultation with relevant stakeholders.

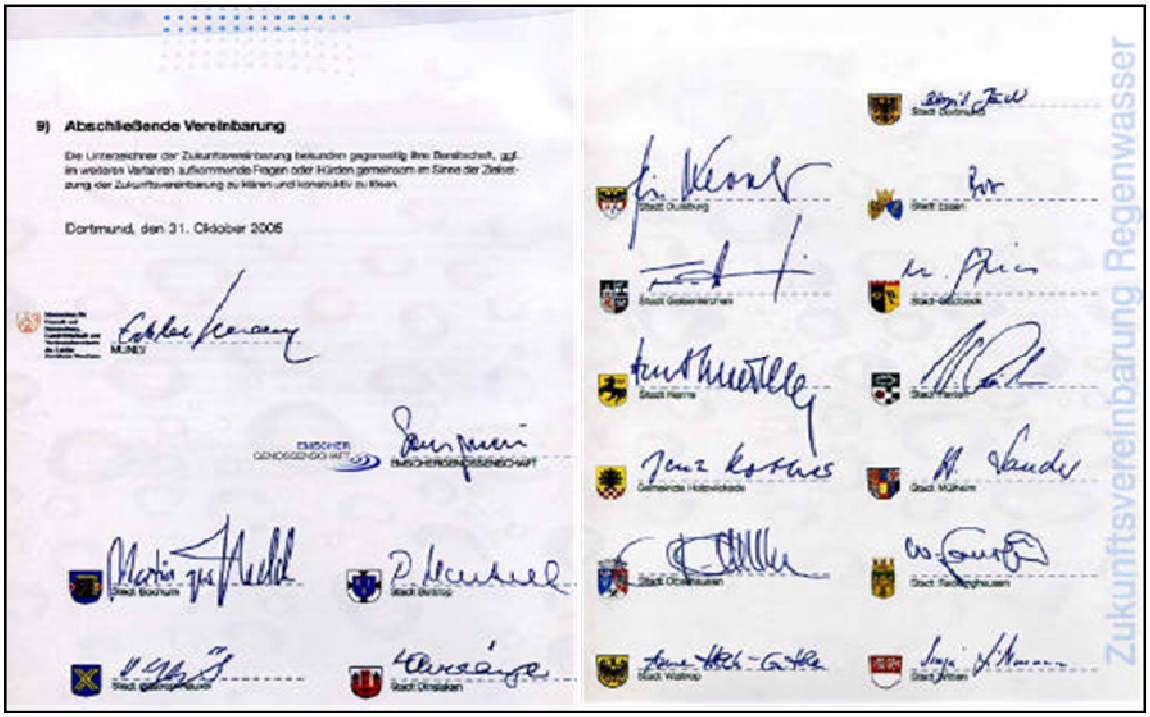

Figure 5 Future Convention for Stormwater in the Emscher catchment (Seiker, Becker & Raasch, 2006)

The Emschergenossenschaft was the lead organisation that initiated the 15/15 project, and as of today is still the authority supporting the initiative in terms of administrative, technical and financial measures. Although the convention was officially signed in 2005, the Emschergenossenschaft had promoted the disconnection of households and commercial buildings as demonstration projects to raise awareness of sustainable urban drainage in the region since the 1990s (interview Raasch).

Since 2005, 150 projects have been successfully implemented and as of 2010, 1.3 sq km - out of 40 sq km - of impervious area has been successfully disconnected. Although this might not seem like a large area, the disconnections will lead to multiple benefits. Among these, the costs for the treatment of wastewater will be reduced, as will the financial burden of constructing larger trunk sewers. Also, groundwater infiltration will be improved, thus increasing the flow regime of the Emscher River (interview Raasch).

The 15/15 convention has also gained a certain symbolic “green weight” in terms of marketing the region as a trendsetter in sustainable urban water management practices. The region is now being portrayed as evolving from a highly industrialised

region with low urban quality of life to an ecologically-sensitive region with attractive living conditions (interview Seltmann).

5.3 Financial incentives to promote stormwater disconnections

Since the 1990s many pilot projects for urban stormwater management have been implemented with the help of subsidies from the Emschergenossenschaft and the federal Ministry of Environment (Raasch & Schüler, 2007). A five-year competition was initiated in 1992 to promote disconnections in the region and resulted in more than 50 projects; since the end of the competition, the number of projects has doubled.
Among these pilot projects were also scientific studies looking at design, performance, operation and economic aspects. “The Rainwater Route” was set up, connecting 17 of the pilot projects in different cities that exhibited best practices in urban stormwater management. Until 1999, the Emschergenossenschaft and the Ministry of Environment provided subsidies of 4.5 million Euro for the implementation of these projects. These subsidies amounted to 10 DM (5 Euro)/m² of impervious area disconnected from the drainage system (Raasch, 1999).

By 2006, the identification of nearly 4000 potential sites for disconnection from sewer networks prompted the local administration to come to an agreement about future drainage strategies. However, this would not have had any major impact. Indeed, the Emschergenossenschaft did not have any direct authority on the existing drains in urban areas located on private properties, e.g. those belonging to land owners and industry, which accounted for two thirds of the entire area under consideration.

To involve the private owners in the process, effective public communication and information strategies were initiated, emphasising the benefits of stormwater management at source. Along with the campaigns, financial incentives were offered when impervious surfaces were disconnected (see above). As per German law, every property owner has to pay a stormwater fee of 0.80 €/m² of impervious area/year; disconnecting from the sewers means this amount is converted to profit for the owner.

Furthermore, 70% of the cost for the infrastructure required for disconnection – such as for swales, retention ponds and infiltration trenches – is provided by the Emscher Genossenschaft; the remaining 30% is to be invested by the owner. Depending on the motivation for disconnection, various categories of land ownership were targeted by

the Emscher Genossenschaft, namely owners of industrial and commercial business sites, housing companies, private house owners and public bodies.

6 Conclusions and lessons learned

6.1 Conclusions

To answer the question "why" the Emscher Region was so successful in implementing sustainable solutions in water management, seven main factors can be identified. These are: *(1) the local demand for improved environmental conditions; (2) significant pressure from civil society; (3) political commitment at regional level; (4) readiness for major investments; (5) socio-economic and environmental benefits of using water as the central theme for large-scale restructuring; (6) the introduction of the European Union Water Framework Directive; (7) the Emschergenossenschaft as a central force for driving the process.*

1. *Local demand for improved environmental conditions:* The rise and fall of the coal and steel industry had left most of the cities in the Emscher Region facing similar problems: a severely degraded landscape, enormous brownfield sites and the Emscher River used as an open sewer. These issues were a visible testament of the period of heavy industry, negatively affecting everyone living in the region.

2. *Significant pressure from civil society:* In this context, the pressure from social groups and NGOs at local level to take adequate action to address the vast array of environmental concerns increased steadily. NGOs played a crucial role in keeping the environmental issues in focus by conducting many discussion forums and public consultations which further raised awareness about the challenges in water management in the region.

3. *Local political commitment at regional level:* The fact that the problems in the Emscher Region were common to all cities led to a collective search for solutions at the regional level; dialogues took place between cities. This helped create a certain 'political harmony', making it easier for local leaders to deal with these common issues while not having to expect any major resistance. All being in the same boat also facilitated the cities' political commitment to the Future

Convention on Stormwater – also referred to as 15/15 convention - which was signed by 17 mayors of the region (see further below).

4. *Readiness for major investments*: One of the key strategies to boost regional transformation was to organise a so-called Internationale Bauausstellung (IBA - International Building Exhibition) coined IBA Emscher Park, which was carried out from 1989 to 1999. With a total investment of 5 billion DM (2.5 billion Euro), a total of 120 projects were carried out. These projects ranged from regional garden exhibitions and landscape parks to the restoration of rivers and the development of new living spaces in the region. In addition, the federal state government of North Rhine-Westphalia sanctioned the provision of 4 billion Euro for the Emscher River restoration that would span for twenty years. These important financial resources allocated for the projects clearly played an key role in the implementation of sustainable water management practices in the Emscher Region.

5. *Socio-economic and environmental benefits of using water as the central theme for large-scale restructuring:* The introduction of the IBA triggered numerous new initiatives for the socio-economic restructuring in the region, among which the rehabilitation of the Emscher River was seen as an important element to improve and transform the region's image as one with better living conditions. It was one of the unique examples where water was used as a central theme for socio-economic restructuring. The Emscher restoration projects involved many aspects of sustainable water management, such as creating new green spaces and green corridors. These projects would in turn prove beneficial to improve the local environment as well as the living conditions and thus increase investments for a service-based economic zone, as well as increase the value of real estate in the region.

6. *The introduction of the European Union Water Framework Directive (WFD) in the year 2000* provided the legislative support for the rehabilitation of the Emscher River. It thus became mandatory for the federal state government to improve the river's ecological and hydromorphological status by the year 2015. The WFD also provided new funding opportunities from the European

Commission for the restoration of the Emscher River and proved to be a crucial factor in the adoption of sustainable practices in the region.

7. *The Emschergenossenschaft as a central force for driving the process*: The Emschergenossenschaft is an association consisting of members from municipalities, industries and coal mines. This water board has proved to be an important organisation in promoting sustainable water management practices independent from the federal state government. The association was responsible, for example, for initiating the 15/15 convention on stormwater management in the region and has been at the forefront of the restoration of the Emscher River system. The water board has also played a significant role in raising awareness of water-related issues in the region by involving local NGOs and social groups. It has implemented several pilot projects that showcase best practice examples in decentralised stormwater management at source.

   The Emschergenossenschaft sets an example of how an independent association with democratically-elected members can take the lead in initiating, promoting and implementing sustainable practices in urban water management.

6.2 Lessons learned

The following section illustrates some of the lessons learned from the Emscher Region that can be transcribed into effective strategies promoting sustainable water management in other cities

1. Restoration of an ecologically dead river.

The case of the Emscher Region shows how an ecologically dead river can be revived following sustainable water management practices. Once called 'the sewage of the Ruhr', today 20 km of the Escher's river system have been completely rehabilitated. The redevelopment has provided for the re-introduction of flora and fauna in their natural habitats. Although not complete, the rehabilitation of the Emscher is a promising example for promoting sustainable water management practices for other cities. However, it must also be noted that this process of restoration has turned out to be extremely capital-intensive and involves great amounts of financial commitment from the state government.

2. Socio-economic restructuring of a region using water as a central theme

The IBA, drawing on the symbolic appeal of rehabilitating the degraded and polluted Emscher River, used the theme to portray the restructuring of the region's socio-economic situation. The fact that water management was considered to be the central theme in the transformation of the region's identity from a low urban-life quality to that of a renewed, ecologically-conscious urban settlement, is perhaps the most striking and innovative idea that can be learned from the Emscher Region. The case of Emscher illustrates how urban planning with an environmentally-friendly focus can significantly increase the potential to transform a region's negative identity and attract investments in different sectors.

3. Regional mayors' convention on stormwater management

The Future Convention on Stormwater – also referred to as the 15/15 convention - is a unique example of a political commitment to sustainable urban drainage at a regional level. By signing this convention, the mayors of 17 municipalities committed themselves to disconnect 15% of the area with impervious surfaces from their respective drainage network in 15 years. In doing so, the convention has promoted (1) the strengthening of natural flow conditions in the Emscher River; (2) the optimisation of costs for the reconstruction of sewers with smaller diameters and the reduction of the storage volume; and (3) improved environmental conditions for the citizens in the region.

This example also illustrates the importance of a political consensus and political commitment to promote sustainable water management practices at a regional or catchment level.

7 List of interviewees

- Ms. Ulrike Raasch, Technical officer, Emschergenossenschaft, Essen, Germany.
- Mr Gerhard Seltmann, Senior advisor, Office for Regional Development, GSE Project, Flechtingen, Germany.
- Mr. Stefan Beckmann, Head Department of Planning, City of Bottrop, Germany.

8 References

Annen. G. (1991). Hydrological Processes and Water Management in Urban Areas (Proceedings of the Duisberg Symposium, April 1988). IAHS Publ. no. 198, 1990.

Bundesagentur für Arbeit.2010. Arbeitslosenquoten in Janresdurchschitt 2010, Lander und Kreise (Average Unemployment rates in 2010/ Federal States and Regions). Retreived on 12.02.2011, from: http://www.pub.arbeitsamt.de/hst/services/statistik/000000/html/start/karten/aloq_kreis_jahr.html

Emschergenossenschaft. (2007): A journey through the New Emscher Valley. Emscher. Zukunft, Emscher Genossenschaft, Essen, Germany.

Geretshauser, G., & Wessels, K. (2007): The stormwater management information system - A GIS portal for the close-to-nature management of stormwater in the Emscher Region. Emscher Genossenschaft, Essen. Retrieved on 10th July 2010, from http://documents.irevues.inist.fr/bitstream/handle/2042/25175/0407_060geretshauser.pdf?sequence=1

Herbke,N., Pielen, B., Ward, J., & Kraemer, R. (2006). Urban Water Management Case Study: Emscher Region. Ecologic - Institute for International and European Environmental Policy. Berlin. Retrieved on 10 July 2010 from: http://ecologic.eu/download/vortrag/2006/herbke_milan_emscher.pdf http://www.riss.osaka-u.ac.jp/jp/events/point/P.Seltmann.pdf

LaBelle. J.M. (2001). Emscher Park, Germany – Expanding the Definition of a “Park”. The George Wright Society Forum, Volume 18, Number 3. Michigan, USA. Retrieved on 10th July 2010, from: http://www.georgewright.org/37labell.pdf

Raasch, U. (1999): Sustainable rain water management in the Emscher River Catchment. Emscher Genossenschaft, Essen.

Raasch, U., & Schüler, A. (2007). European approaches towards urban water management: Regional agreement for sustainable stormwater management. International Symposium on New Directions in Urban Water Management. UNESCO, Paris. Retrieved on 15th of July 2010 from: http://www.switchurbanwater.eu/outputs/pdfs/CEMS_PAP_Urban_stormwater_management_demo_projects_Emscher.pdf

Ruhrverband. (2010). The Ruhr - a small river with a big task. In *Rivers & Lakes*. Retrieved September 18, 2010, from http://www.ruhrverband.de/en/fluesse-seen/

Shaw, Robert. (2002). 'The International Building Exhibition (IBA) Emscher Park, Germany: A Model for Sustainable Restructuring?', European Planning Studies, 10: 1, 77 — 97. Retrieved on 25 July 2010 from: http://web.mit.edu/bdr/Public/Chapter%20Five%20references/Shaw_Emscher%20Park.pdf

Seiker, H., Becker, M., & Raasch, U. (2006). Urban Stormwater Management Demonstration Projects in the Emscher Region. First SWITCH Scientific Meeting, University of Birmingham, UK. Retrieved on 25th August 2010. From http://www.switchurbanwater.eu/outputs/pdfs/CEMS_PAP_Urban_stormwater_management_demo_projects_Emscher.pdf

Seltmann, G. (2007). Renaissance of an Industrial Region: “Internationale Bauausstellung Emscher Park”- achievements and future model for others. Gse Project for regional development, Flechtingen. Germany. Retrieved on 14 July 2010 from. http://www.riss.osaka-u.ac.jp/jp/events/point/P.Seltmann.pdf

Steinkohleportal. (2008). The main source: the river Ruhr. In The Ruhr, Emscher, Lippe rivers: water resource management in the Ruhr conurbation. Retrieved 18 August 2010 from http://www.steinkohle-portal.de/en_content.php?id=658