Report on

EU Mission to the Yellow River Basin

June 2011

Ministry of Water Resources
Yellow River Conservancy Commission
EU-China River Basin Management Programme

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1 Executive Summary

On invitation by the Ministry of Water Resources of China an EU study mission to the Yellow River basin took place from the 6th to the 16th of April, in the context of and supported by the EU China River Basin Management Programme (RBMP). The current report is based on the experts´ personal views collected during the mission, which brought together a group of 9 representatives from different European Union (EU) Member States (MS).

The European experts had a unique opportunity to learn about China's water management experience and noted ample opportunities for the development of further China-Europe collaboration on river basin management. The mission team has appreciated cooperation priorities expressed by Chinese hosts while focusing on common challenges and future mutual benefit.

Visions for future cooperation have been grouped into four specific areas of interest, namely those related to water quantity aspects; water quality aspects; soil and water conservation; and water governance. The last section highlights aspects that are transversally relevant to the other themes. It was emphasised that such thematic division has been made for analytical purposes and may contradict the concept of a river basin as a complex system in which water quantity; water quality; sediments; land-use and social institutions continuously interact to determine environmental status and provide socio-economic benefits. In each area of interest, the mission identified achievements, common challenges and future cooperation potential, in which joint research opportunities were included. In addition, views on sustaining cooperation in the long-term future, namely through the establishment of a "China Europe Water Platform", were also explored.

1.1 Water quantity

The MS representatives were impressed by the efforts of the Yellow River Conservancy Commission (YRCC) to maintain the continuous flow of the river, from source to sea, and to secure the basis for a healthy river. This development followed the introduction in 1999 of a system of water allocation across the 9 provinces in the basin. The team also noted a major infrastructure programme put in place to reduce flood risk, involving the construction of flood defences, the creation of new water retention structures and the development of flood warning and evacuation procedures.

Amongst the most noticeable challenges, the mission noted the need to meet an increasing demand for water, fuelled by the impressive pace of development of the country, whilst safeguarding environmental needs. In this respect, issues as ecological minimum flow, migration of fish population or environmental impacts on wetlands are seen as particularly relevant. Other important challenges include higher water use efficiency and the development of unconventional water resources; the management of groundwater abstraction; as well as the improvement of monitoring practices in support of decision-making processes. These are particularly pressing challenges given rapid growth of the economy and the large amount of irrigated land.

Great potential for future co-operation may lie in areas related to prediction and management of drought and water scarcity situations; exchange of knowledge on implementation of EU flood directive and Chinese flood control law; and joint development of technologies for efficient distribution and use of water.

1.2 Water quality

As to achievements noted in this respect, the mission participants highlighted major advances in domestic wastewater treatment and unprecedented landscape-scale sediment management and control.

A fundamental challenge relates to the extension of standards and monitoring from physio-chemical parameters to biological parameters aimed at enhanced protection of surface waters, soil and sediments, and ultimately public health. In addition, groundwater monitoring and trends´ analysis is required, especially in urban and agricultural areas.

China is committed to the development of a green economy. Nevertheless, as far as water resources' planning is concerned, water demand management constitutes the overarching priority while water quality aspects are given a less important position. The shift towards environmentally sensitive planning, involving the adoption of a holistic and sustainable approach to basin planning processes, is still to be realised.

Further cooperation may be particularly fruitful in the fields of research, innovation and technology development; exchange of experiences on the implementation of measures preventing pollution and on the effectiveness of different policy and economic instruments.

1.3 Water and soil conservation

Impressive achievements were made known to the European mission in this sphere of action. An integrated and comprehensive management plan for sediment management has succeeded in reducing sediment loads by 20%. The mission has especially appreciated the non-structural measures put in place, such as re-forestation, which also have positive impacts on climate change mitigation. Secondly, coordinated operation of Yellow River reservoirs has been used to create large scale artificial floods, which have successfully flushed sediments, lowered the river bed and reduced flood risk.

An important challenge seems to be the development policies on sediment and soil conservation that involve stakeholders and NGOs in the joint development and assessment of measures, forging collaboration in knowledge production.

Cooperation potential may naturally materialise on management solutions that balance the social, economic and environmental values and are set within the context of the whole river system. On the other hand, a common need may result in further cooperation to understand the relation between sediment contamination (hazard) and its actual impact to the functioning of ecosystems (ecological status).

1.4 Water governance

Persistent efforts in this field were noted by the mission. In 2009 the MWR announced the “three red lines” policy, which refers to optimised water resources allocation; enhanced water quality protection, and water saving targets. In December 2010, the State Council has approved the “nº1 document”, setting new policy to accelerate reform and development of water conservation work. Moreover, the recently approved 12th 5-year plan sets water issues as one of the main priorities of the nation.

Challenges to integrated management of water resources at basin level remain significant. Equal attention to both the river mainstream and its tributaries is often not found. Water use and water protection aspects need to be better balanced, focusing on existing and upcoming pressures of industry, agriculture, urbanisation and their impacts on surface and groundwater. On their turn, opportunities for cross-ministerial collaboration and synergy concerning water issues have not been fully utilized. The main findings of the EU missions to the Yellow River and the Yangtze River were comparable in respect to current difficulties in combining quantity and quality management aspects. In order to address problems across the sectors responsible for existing problems (e.g. agriculture, spatial planning or industry) a national approach, combined with a river-basin approach, may be more suitable.

Stakeholder and public participation remains a fundamental challenge given its importance for the success of policy and legal implementation. The adoption of economic policy instruments also continues to be high in the agenda. Climate variability and change will further increase the pressure to address such challenges more effectively.

Future cooperation opportunities were identified in respect to data sharing, communication and transparency in processes of integrated water management. An important cooperation field could refer to sharing approaches and policy instruments to minimize environmental impacts of economic development. These and other cooperation aspects could be better explored through the twinning of European and Chinese water authorities, river commissions or NGOs.

1.5 Water platform

The sustainability of the EU China cooperation in the water sector has been considered an important objective given the presence of shared environmental challenges as well as of opportunities for mutual benefit. Positive results may accumulate and be multiplied through the development of a joint knowledge centre and the coordination of research and innovation efforts amongst government organisations, academic organisations and private firms.

The new status of China in the world economic and political spheres provides impetus for an update of the EU China water partnership based on the principles of added-value, mutual benefit, mutual commitment and equally active and sustained support. Possible financial and human resource constraints were considered while noting that existing resources may be more efficiently utilised. The China Europe Water Platform could benefit from synergies among interested partners within China and within the European Union. As to main cooperation priorities, and following panel of experts gathered in the Nanjing conference on the topic, future cooperation could devote special attention to further exchange of experience and knowledge on design and implementation of policies and laws.

2 Introduction

The EU mission to the Yellow River basin comprised nine experts appointed by member states (list of participants in Annex I). In China the mission was fully hosted by the Ministry of Water Resources (MWR) and received additional support from the EU-China RBMP.

The current report is based on the experts personal views collected during the mission. The messages conveyed are consensual and derive from a process of collaboration among all experts. However, the report does not represent the official position of the EU Delegation to China or the EU member states.

The group initiated the visit in the headquarters of the Yellow River Conservancy Commission (YRCC), located in Zhengzhou, capital of the province of Henan, in the middle reaches of the Yellow River. The participants in the mission had the opportunity to learn about the YRCC work on water allocation, flood control and sediment regulation. A specific visit to the Yellow River Water Allocation and Remote Control Centre took place. The mission went on to Xian in Shaanxi province where local hosts shared achievements and challenges in the field of water and soil conservation, primarily in the Loess Plateau, water saving, demand management as well as pollution control in the Wei River. The mission programme continued with a visit to the upper reaches of the Yellow River, namely to Ningxia autonomous region and Gansu province, where numerous field visits enlightened the mission about the valuable work carried out by local and provincial governments. The mission came to an end in Lanzhou where the MWR and the EU-China RBMP organized a wrap-up meeting at the local office of the YRCC. In all occasions, the group of experts was impressed by the warm hospitality of officials and people and found discussions with the Chinese partners always open and very stimulating.

The EU Mission Delegates Group meet YRCC leaders at the YRCC Consulting and Decision-Making Centre for Flood Protection and Drought Mitigation

Throughout the journey, the European experts gained a better understanding not only of the achievements of China´s water management, the structural and non-structural measures put in place, but also of current challenges. Furthermore, many of the river basin management challenges presented were identified as common issues by the European experts. This understanding paved the way for an exchange of views on the potential of future cooperation among European and Chinese counterparts, including opportunities for joint research and innovation.

Visions for cooperation have been grouped into four specific areas of interest, namely those related to water quantity aspects; water quality aspects; soil and water conservation; and water governance. It was emphasised that such thematic division has been made for analytical purposes and may contradict the concept of a river basin as a complex socio-ecological system in which water quantity; water quality; sediments; land-use and social institutions continuously interact.

Group photo of
the EU Delegation

3 On water quantity aspects

3.1 Achievements

The MS representatives were impressed by the efforts of the Yellow River Conservancy Commission (YRCC) to maintain the continuous flow of the river, from source to sea, and to secure the basis for a healthy river. This development followed the introduction in 1999 of a system of water allocation across the 9 provinces in the basin. The team also noted the major infrastructure programme for flood control, with the construction of flood defences and the development of flood warning and evacuation procedures. With a flood plain width of up to 24 km, up to 1.2 million residents have settled in the fertile farmland of flood retention areas. In respect to sediment regulation, artificial floods have been used to flush sediments, lower the river bed and reduce flood risk.

Such achievements at the river basin level have been the basis for fundamental efforts by provincial governments to increase water availability and improve livelihoods in the most inhospitable and impoverished areas of the river basin. An impressive and particularly innovative example came from the autonomous region of Ningxia where a Water Rights Transfer Scheme has been put into place to allow for greater water use for industrial development in exchange for investments in more efficient irrigation agriculture. This effectively results in the indirect promotion of water efficiency.

Top: The Yellow River Floodplain

Right: Infrastructure model for the Ningxia “lifting the yellow river” project

3.2 Common challenges

Amongst the most noticeable challenges, the mission noted the need to manage increasing demand for water whilst safeguarding environmental needs. More attention is needed to environmental aspects as ecological minimum flow and environmental impacts on depending ecosystems. Other important challenges include higher water use efficiency, particularly in irrigation agriculture; the development of unconventional water resources; the management of groundwater abstraction; addressing the shifting demand for water between the different sectors; as well as the improvement of monitoring practices in support of decision-making processes. In both the EU and China, there is a need to improve management of groundwater abstraction by public and private sectors.

These are particularly pressing challenges given rapid growth of the economy; fast urbanisation resulting in higher living standards; continued expansion of irrigation agriculture, climate change and water resource variability. Inadequate water conservancy infrastructure can compromise not only environmental objectives, but also a balanced socio-economic development. The impact of extreme weather conditions, such as floods, mudslides and drought, will be greater in the future. Difficulties in managing flood risk are likely to increase with climate change and economic development pressures.

Another important common challenge refers to the need for more adaptive approaches to existent water allocation arrangements, which may need to be re-evaluated according to changing socio-economic and climatic conditions. Groundwater allocation arrangements also need to be expanded in order to adequately regulate groundwater quantity and use.

Following links between water use efficiency, agriculture and food production, more collaboration between the water sector and the agricultural sector seems to be required, namely as far as the choice of crops and cattle and irrigation methods are concerned.

The issue of inter-basin water transfers, its use to satisfy water demand, was seen as entailing numerous challenges. The idea has been widely embraced in China through the South-North Water Transfer scheme and cases may also be found in the European context, in naturally smaller scales, such as in Spain, the UK and in the Upper Danube River basin.

Other challenges common to the Yellow River and to European basins may include the improvement of monitoring practices; data, information and knowledge management in support of decision-making processes; as well as the development of comprehensive conceptual models linking groundwater, surface water, transitional waters and coastal waters in the whole river basin.

3.3 Potential for future cooperation

Great potential for future co-operation may lie in areas related to prediction and management of drought and water scarcity situations, including the preparation of contingency plans and the definition of indicators for water scarcity and drought, especially in view of climate change and water variability.

Links between Chinese national provincial and local authorities and the European regional and local governments could be facilitated by links to existent networks financed by INTERREG initiatives such as WaterCore.[1]

Exchange of knowledge on implementation of EU flood risk management directive and Chinese flood control law may prove a fertile ground of collaboration, considering common needs to further develop risk zoning systems and mapping.

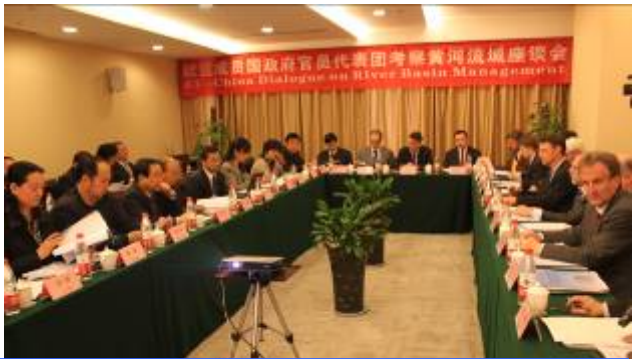
As to the related topic of flash floods, joint research on precipitation flow models could prove particularly beneficial with a view to improve prediction of flood levels and intensity, and ultimately advance the capacity to predict flash floods. Such knowledge could enable the development of improved flood forecasting systems.

On water demand management issues, cooperation could focus on exchange of experience concerning the application of different incentives and their effectiveness, considering needs for greater coherence between policy objectives and implementation tools. On the other hand, joint research and technological innovation could assist objectives of efficient distribution and use of water and prove mutually beneficial. Likewise, on the issue of desalination, collaboration could include tools to assess feasibility of osmosis for the treatment of brackish waters.

In both the EU and China there seems to be a common interest in enhancing reuse of treated wastewater in agriculture, in cooperation with organized stakeholders and the public. There may be opportunities for joint research and technological innovation related to the use of membranes that may decrease the treatment cost and allow greater reuse of wastewater. In addition, delocalized wastewater treatment opportunities could be jointly explored, approximating treatment plants to the potential point of use.

Joint analysis of and further research on challenges posed by inter-basin water transfers may be a particularly interesting point for future cooperation.

The twinning of EU-CN water authorities/river commissions/NGOs could help increasing cooperation between China and the EU on mentioned aspects.



The EU Mission Delegates with Chinese Hosts at Xian

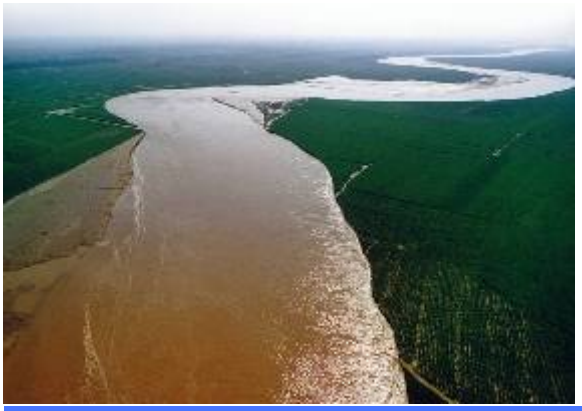
[1] http://www.watercore.eu/

4 On water quality aspects

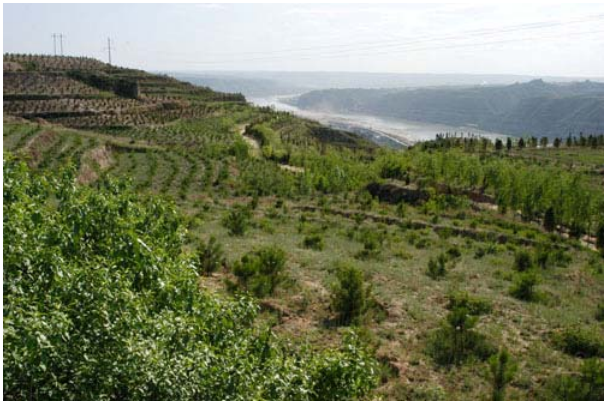
4.1 Achievements

As to achievements noted in this respect, the mission participants highlighted major advances in domestic wastewater treatment and unprecedented landscape-scale sediment management and control, involving a national programme for reforestation with positive results for water quality.

The mission noted the existence of water quality standards and monitoring in place at basin level, coupled with emergency response protocols. On the other hand, principles of pollution prevention and control (PPC) and best available technology (BAT) have started to be applied to industrial discharges. The YRCC has also put in place protocols to respond to basin-wide emergencies.



The Weihe River



Reforestation projects in the Loess Plateau

4.2 Common challenges

A fundamental challenge relates to the extension of standards and monitoring to cover a wider suite of physio-chemical parameters as well as biological indicators to give a fuller picture of pressures across the river basin. The scope needs to include groundwater and surface waters, which will require supporting work to effectively characterise representative, component water bodies. Such an enhanced monitoring and management system is a critical step to enable greater water resource protection (for environmental and public health benefit) and judge the effectiveness of consequent action.

It seems important to reinforce the development of comprehensive conceptual models linking groundwater, surface water, transitional waters and coastal waters in the whole river basin, as essential steps towards the development of effective measures, more holistic systems to describe and assess water quality in water bodies.

China is committed to develop of a green economy. As far as water resources' planning is concerned, water supply/demand management seems to have an overarching priority, driven by socio-economic needs, while water quality aspects are currently given less attention. The shift towards economically and ecologically balanced planning, involving the adoption of a holistic sustainable approach to basin planning processes, is still to be realised. This may also require more integration between water quantity and quality management aspects. Looking forwards, it is recognised that current river basin management approaches need to evolve to better integrate quality, resource and flood risk aspects to support sustainable economic development.

There may be significant long-term costs for not taking measures at early stages of ecological deterioration. An important common challenge may be to conduct improved economic valuation of pollution prevention while reinforcing industrial discharge regulation. In addition, diffuse pollution control and prevention, including agriculture groundwater return flow quality, constitutes a key challenge in both the EU and China. Rural non-point source pollution, caused by fertilizers and pesticide-runoffs, might be a major environmental issue. However, additional data is required for proper assessment.

4.3 Potential for future cooperation

Further cooperation may be particularly fruitful in the fields of research and technology development, for instance further stimulating innovation in water quality monitoring technology and techniques, as well as clean production technologies. The improvement of monitoring systems, especially biological indicator systems, seems to represent a key opportunity for collaboration. In addition, cooperation on the development of geographic information systems to assemble monitoring data and collect geological information of aquifers, would assist joint research on exchange between surface and groundwater.

Research on new wastewater treatment methods that support effluent reuse and the recovery of important organic matter would benefit both China and the EU. For example, the reuse of substances such as phosphorous, an element rare in the soil of many regions of the globe, may gain importance in the near future.

A systematic exchange of experiences on the implementation of measures preventing point and non-point source pollution, and on the effectiveness of different policy and economic instruments, would prove mutually beneficial. In addition, early warning and emergency response, in particular considering the safety of groundwater and drinking water supply, would be of common interest.

Cross-sectoral management aspects linking land use practices, waste management and water quality as well as water management and spatial planning also received special attention as important themes for further cooperation between EU and China.

EU Mission Delegates with Chinese Hosts at Yinchuan

5 On water and soil conservation

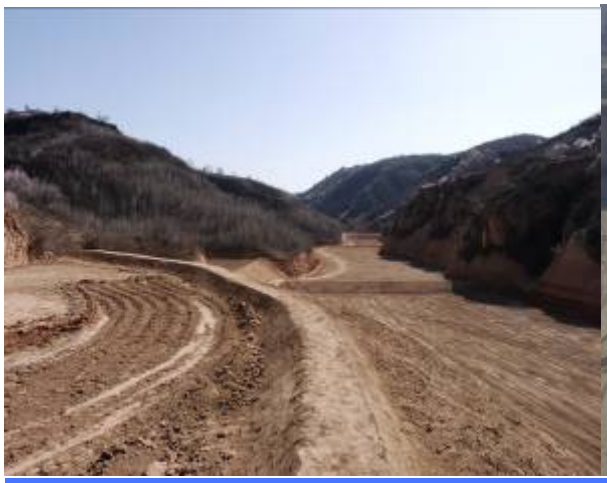
5.1 Achievements

Impressive achievements were made known to the European mission in this sphere of action. An integrated and comprehensive management plan for sediment management has succeeded in reducing sediment loads by 20%, or approximately by 450 million tons. The plan was mostly focused on the construction of thousands of small sediment dams, large scale reforestation and soil protection in gully areas of the Loess Plateau. This not only prevented further desertification, but also created new higher yield farmland in the soil trapped by dams, compensating loss of agricultural land in urban areas, and improving drastically livelihoods in isolated, impoverished areas. The mission has appreciated that non-structural measures such as reforestation also have a positive impact on climate change mitigation.

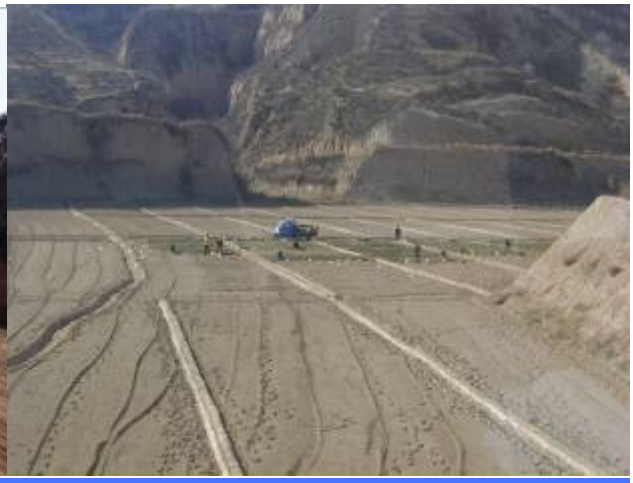
On the other hand, the mission has visited irrigation systems designed to have high efficiency of water use and observed the large scale use of contour agricultural techniques in side slope areas of gullies. Nevertheless, it seems important to reinforce the conservation measures in the main gully sides and smaller tributary banks, namely by using smaller dams for the retention of sediments that may be augmented in height as they are fully filled in (e.g. the soil retention dams used in the Portuguese island of Porto Santo).

There seems to be a strong relationship between research and policy on sediment management, with successful results for the improvement of flood control and human safety in the middle and lower reaches of the basin. In fact, an important achievement found was the coordinated operation by the YRCC of Yellow River reservoirs used to created large scale artificial floods. These have successfully flushed sediments, lowered the river bed and reduced flood risk, while bringing benefits to the delta of the river and to the wetland areas.

Human activities in areas prone to soil degradation and erosion processes have been addressed in some cases by projects for ecological rehabilitation and poverty reduction, involving large-scale resettlement of farmers to new irrigation areas, where housing, education and health is also made available.



Small sediment dams in the Loess Plateau



New agricultural land created by sediment dams in Shaanxi

Flower plantation in a greenhouse in Ningxia´s drylands

The EU mission delegates visit a resettled village in Ningxia

5.2 Common challenges

There seems to be a need to deepen knowledge on sediment transport processes (including erosion and sedimentation) at the river basin scale, as a function of land and water use as well as hydrological (climate) change. Building on such a scientific basis, policies could further develop on sediment and soil conservation that involve stakeholders and NGOs, facilitate adoption of measures, induce joint knowledge production and ultimately improve implementation effectiveness.

Common challenges were also identified in what concerns sediment management and ecosystem protection, given that sediments often act as sinks of hazardous substances.

5.3 Potential for future cooperation

Cooperation potential may naturally materialise on management solutions that balance the social, economic and environmental values and are set within the context of the whole river system. Furthermore, common needs may result in further cooperation to understand the relation between sediment contamination (hazard) and its actual impact to the functioning of ecosystems (ecological status). From the European side, such cooperation could be linked to existing EU research networks such as SEDNET, addressing links between sediment quality and water quality. Joint research on strategies to assess the problem and manage risks involved would meet needs from both China and Europe.

Further exchanges on water use efficiency in irrigation could also prove mutually beneficial, taking established European projects, such as IRRINET, into consideration.

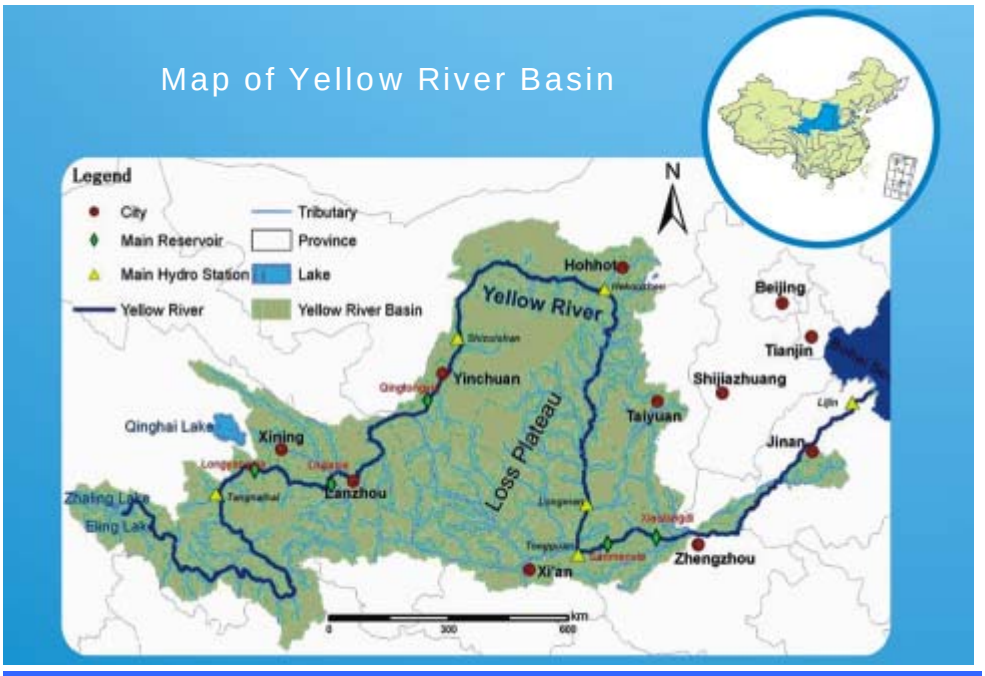
The EU Mission Delegates visiting sediment dams in Northern Shaanxi

6 Water governance

6.1 Achievements

Persistent efforts in this field were noted by the mission. In 2004, the YRCC introduced the programme "maintaining the healthy life of the Yellow River" with the objective to guarantee no embankment breaching; no dry-up of the river; no pollution exceeding the standards; and no riverbed silting up. In 2009 the MWR announced the "three red lines" policy, which refers to optimised water resources allocation; enhanced water quality protection, and water saving targets. In December 2010, the State Council has approved the "nº1 document", setting new policy to accelerate reform and development of water conservation work. Moreover, the recently approved 12th 5-year plan sets water issues as one of the main priorities in the political agenda of the nation.

Water allocation for the 9 provinces in the Yellow River, following a regulation enacted by the State Council in 1999, was noted as a crucial achievement of the Ministry of Water Resources and the Yellow River Conservancy Commission. Similarly, flood protection infrastructure and measures seem to be equally successful.



Water resources in the Yellow River Basin must meet the different social, economic and environmental needs in a total of 9 provinces.

6.2 Common challenges

Common challenges to integrated management of water resources at basin level remain significant. Equal attention is often not given to both the river mainstream and its tributaries. In view of the developing status of China a traditional engineering-focused approach is predominant. Recently the EU has adopted a more holistic and integrated approach, where water use and water protection aspects may be better balanced, devoting more attention to existing and upcoming pressures of industry, agriculture and urban centres.

While all agree that it is fundamental to fully grasp opportunities of cross-ministerial collaboration in regard to water issues, these have not been sufficiently utilized. In order to address problems in the sectors mostly responsible for existing problems (e.g. agriculture, spatial planning or industry) a national approach, combined with a river-basin approach, may be more suitable and conducive to solutions. Coordination across sectors is seen as fundamental at every administrative level from central to regional and local. However, river basin governance systems in both China and the EU still seem to be somewhat disjointed. The existence of different, uncoordinated incentives in the various sectors is translated into mixed signals to users, and often bears perverse impacts on, for example, water quality.

Furthermore, economic policy instruments continue to be high on the policy agenda of both the EU and China. Governments at all levels should consider alternative mechanism to operate and maintain water projects. They should explore cost recovery mechanisms to decide how much of the costs needs to be recovered, what subsidies should be given, and how much users, including farmers, should pay. Climate variability and change will further increase the pressure to address such challenges more effectively.

Finally, stakeholder and public participation, also representing interests from the environment itself, remains a fundamental challenge given its importance for the success of policy and legal implementation. The implementation of sustainable water resource management tools will require the participation of people from all walks of life, including government agencies at central and local levels, researchers, private sector, farmer associations and non-governmental organisations such as the WWF. It has been demonstrated that full engagement of relevant stakeholders is important to identify alternative management solutions and gain support for a long-term solution. Engaging stakeholders seems to play a crucial part in guaranteeing that solutions adopted are in fact implemented with good results in the long-term. The success of stakeholder engagement efforts naturally depends on adequate environmental education for current and future generations.

6.3 Potential for future cooperation

Future cooperation opportunities were identified in respect to data sharing, communication and transparency in processes of integrated water management. An important cooperation field could refer to sharing approaches and policy instruments to minimize environmental impacts of economic development. These and other cooperation aspects could be better explored through the twinning of European and Chinese water authorities, river commissions or NGOs. Such twinning exercises could be instrumental to processes of accumulation of knowledge concerning the development of integrated management solutions within water and river basin institutions, taking into account historical processes and contextual factors.

Government action based on scientific knowledge, seen in China under the concept of scientific development, could be the basis for further exchanges on mechanisms enhancing the policy-science nexus. The following thematic areas could be further explored in this context: a) economics, valuation of ecosystem services, and the use of charges, subsidies and compensation mechanisms; b) joint cross-disciplinary analysis of legal implementation and regulatory effectiveness in relation to different incentives and discentives, embarking not only legal studies but also economics, political science and sociology at different levels of administration; c) joint research on alternative policy instruments and implementation mechanisms based on market mechanisms and engagement of local communities; d) future proofing and construction of scenarios involving climate change, economic and demographic trends.

Conflicting water uses

Right: industry

Bottom left: agriculture

Bottom right: urban

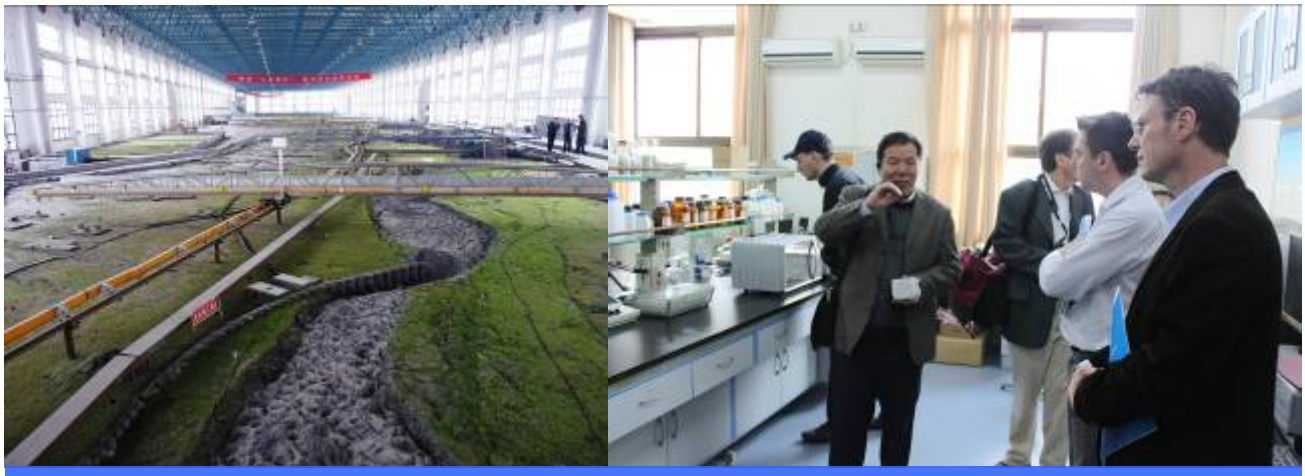
7 Research and development

7.1 Achievements

Throughout the mission, visits to large research organisations, such as the Yellow River Hydraulic Laboratory, the Institute of Soil and Water Conservancy (Chinese Academy of Sciences and MWR), and the Cold and Arid Regions Environmental and Engineering Research Institute (Chinese Academy of Sciences), has shown important results from a large amount of projects exploring many of the issues referred to above.

The large effort made by the academic community at the national level (institutes of the Chinese Academy of Sciences and Chinese Academy of Social Sciences) is passed on directly to the State Council, which distributes relevant results to the different ministries. There is also a variety of state research organisations attached to river basin commissions, provincial governments and their different departments.

The mission noted that links between science, policy and managers seems to have brought important benefits to the struggle against soil erosion and desertification in the Loess Plateau, and in the struggle to increase water use efficiency of irrigation agriculture.



The Mission Delegates visiting the Yellow River Physical Model
and a research laboratory at the Institute of Soil and Water Conservancy

7.2 Common challenges

Finding adequate financial and human resources to meet needs of applied research remains an important challenge both in China and in European countries. This should encourage the search for new synergies among partners with common interests.

A specific challenge that may gain importance in view of faster changes and greater pressures from anthropogenic and climatic factors is a more systematic communication between the scientific community at national and provincial levels, and a closer link between state research apparatus and managers, particularly those at the lower levels of administration. Common data, information and knowledge platforms should be available.

7.3 Potential for future cooperation

A large number of common interests in different fields may pave the way for an extensive and fruitful partnership in regard to research and innovation. In respect to water quantity aspects, combined efforts could focus on research on flash flood forecasting and early warning based on enhanced precipitation flow models; water scarcity, drought indicators, forecasting and contingency planning. In regard to efficient distribution and use of water, exchange of experience could be linked to systems such as IRRINET[2] developed to advise farmers about how much water to use according to hydrological, soil and crop conditions. Common interest exists also in the development of non-conventional water resources, in increasing domestic water use efficiency, as well as wastewater reuse. These objectives could be assisted by the development of technological applications that improve quality of wastewater and reduce treatment costs. Finally, cooperation on assessment of inter-basin transfer projects and their impact on all river basin systems involved would be of mutual interest and benefit.

As to water quality aspects, cooperation could further stimulate innovation in clean production technologies; in geographic information systems to gather monitoring data from different sources; in methods to collect geological information of aquifers; and in new waste treatment methods that enable the re-use important organic matter, such as phosphorous.

As far as water and soil conservation is concerned, the prospect of joint research on interactions between sediment quality and water quality, with links to European research networks such as SEDNET[3], seems to be particularly promising as it corresponds to mutual needs identified.

In the field of water governance, a vast potential for joint research actions exists, with a view to perform comparative analysis and build a knowledge basis that may be useful for decision-makers and managers in the field.

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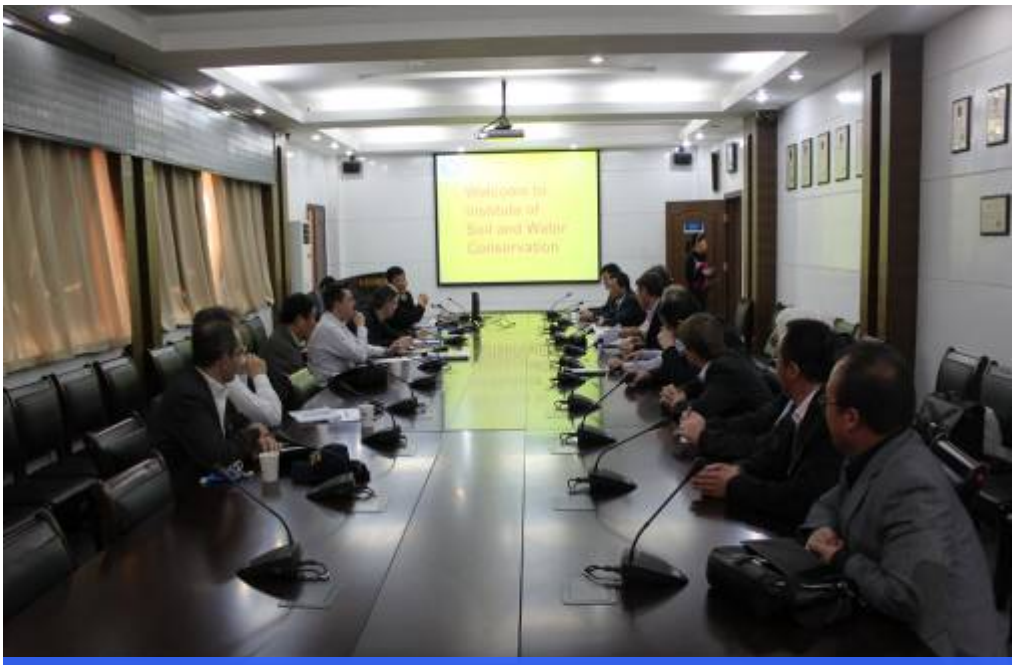
[2] More information may be found at
http://ec.europa.eu/environment/water/quantity/pdf/2007_01_09_forum_meeting/emilia_romagna_irrinet.pdf

[3] http://www.sednet.org/

This is seen as an important opportunity to accumulate knowledge on the development of integrated management solutions within water and river basin institutions, taking into account historical processes and contextual factors. This would enhance common understandings on the effectiveness of different drivers and constrains when promoting and experimenting with more integrated and adaptive forms of river basin management. In this context, governance mechanisms and policy instruments that enhance legal implementation, minimize environmental impacts of economic development and promote social equity in river basin systems could be explored.

This work could build upon current efforts of a network of European and Chinese universities and research organizations dedicated to river basin governance issues (RIBAGO)[4]. The network has been supported by the Co-Reach Programme for EU China Research Coordination on Social Sciences, the British Academy, the German Research Foundation and the Chinese Academy of Social Sciences (CASS). It is led by the Department of Geography, University of Cambridge and by the Institute for Urban Development and Environment, CASS.

Finally, exchange of experiences on mechanisms linking between policy-makers, managers and the research community at different stages of the policy cycle could prove fruitful.



The EU mission delegates learning about research in Chinese host organisations

[4] The EU China RBMP has also participated and been involved in the activities of the RIBAGO network.

8 Sustaining cooperation in the long-term: the China Europe Water Platform (CEWP)

The sustainability of the EU China cooperation in the water sector has been considered an important objective given the presence of shared environmental challenges as well as of opportunities for mutual benefit. Positive results may accumulate, be sustained and multiplied through the development of a joint knowledge centre, where coordination of research and innovation efforts may take place with the involvement of government organisations, academic institutions, non-government organisations and private firms. On the 17th of April, a conference was organised in Nanjing to discuss the China Europe Water Platform among an eminent group of government representatives, experts and business men.

The new status of China in the world economic and political spheres provides impetus for an update of the EU China water partnership based on the principles of added-value, mutual benefit, mutual commitment and equally active and sustained support.

In respect to possible priorities for the platform´s work, and according to the panel of experts gathered in Nanjing, future cooperation could focus on further exchange of experience and knowledge on the design and implementation of policy and laws. In this context, Chinese partners would favour linking future cooperation with the implementation of the three red lines policy and the main water related laws (water law, water pollution control and prevention, water and soil conservation and flood control). Joint research in this regard should thus focus on the integration between administrative management and river basin management; on the coherence between different water-related laws and regulations; on the effectiveness of laws and regulations, and how these may include more measurable, assessable and verifiable requirements.

Trans-boundary management is necessary both in the EU, across Member States, and in China, across provinces. Further collaboration may have a strong focus on trans-boundary water management and related challenges in the field of pollution prevention, operation of early-warning systems, abstraction management and conflict management.

For the implementation of stricter water policies in China and test new approaches, such as that used in the European Union and its Directives, further expansion of monitoring parameters and their articulation with tailor-made modelling, will be fundamental. This has also been singled out as an important cooperation field.

Lastly, the panel of experts emphasised the importance of the involvement of the private sector, which was represented in the discussion and expressed its enthusiasm for the initiative. Further trade and investment both from the EU in China and from China in the EU could be realised in this field. The different experiences and modalities of public private partnerships for water services and technology could also represent a useful area for joint research and exchange of experience.

In what concerns future financial and human resources constraints for the operation of the Platform, it was noted that future cooperation will need to make use of existing resources. The China Europe Water Platform could benefit from the creation of synergies among interested partners within China (e.g. MWR and Ministry of Science and Technology) and within the European Union (e.g. DG Environment, MS water-related ministries, DG Research and MS research-related ministries), where linkages to EU Research Framework Programme projects could be developed.

A possible modality for its practical implementation could include the development of a multi-year rolling work plan with links to research organisations for systematic follow up and knowledge accumulation. An annual meeting could be organised in China or Europe to deepen a specific theme previously researched on both sides. Research themes would be selected according to the needs of the partners and its results could be linked with the private sector whenever interest arises.

In addition, an important role of the platform would be to channel an expanding array of dispersed contacts towards one focal point in both sides.

The creation of the CEWP would represent an important element of cooperation and development of bilateral relations between two large political entities with increasing roles and responsibilities in the international community and in efforts to manage global environmental change.

Appendix 1 Study tour guide and list of participants

Please refer to the enclosed CD or the RBMP website at www.euchinarivers.org

Appendix 2 Meetings Memoranda

Please refer to the enclosed CD or the RBMP website at www.euchinarivers.org

Appendix 3 Powerpoints presented in meetings

Please refer to the enclosed CD or the RBMP website at www.euchinarivers.org

Appendix 4 List of Chinese Participants and Host Organisations

Please refer to the enclosed CD or the RBMP website at www.euchinarivers.org