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Mission reference
2006 C3 T15 M

Date: 7 th December 2006
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Mission report

Expert Name and Function

Dr R Nawaz, Water Resources academic

Wording of missions: *In short, objective or content of mission*

Evaluate needs in terms of data, resources and education for IWRM

Identify climate change impacts and adaptation strategy

Action points for long-term sustenance of Twinning

1. CONTEXT

Place, location: *Country visited, Basin Organization concerned, other information about location*

Upper Indus River Basin (UIB)

Centre of Excellence in Water Resources Engineering (CEWRE), Lahore, Pakistan.

Mission duration:

13th - 25th Sept. 2006 (13 days)

OBJECTIVES

Initial objectives	Results	Results indicator <i>explain with some details how far the results have been achieved if compared to initial objectives</i>
Ns1 <i>Evaluate needs in terms of data, resources and education for IWRM</i>	Several important data, information and educational needs identified through discussions with CEWRE and other organizations.	A number of key data requirements were identified. Firstly, much of the upper Indus basin at higher altitudes remains unmonitored. This is a concern given that summer snowmelt is a significant source of freshwater in

			<p>the Indus river. Information was gathered on current monitoring sites in the UIB and compared to the extensively monitored Ouse river basin (ORB). It was noted spatial density of the UIB climatic network is far below WMO recommended levels. It was discovered that one reason for this lies in the reluctance of authorities to fund monitoring initiatives due to underestimation on the value of monitoring networks. It was agreed to bring this to the attention of the main governmental authority in Pakistan with monitoring responsibilities; the Water & Power Developmental Authority (WAPDA). Some water management issues common to both the ORB and UIB authorities were identified. It was noted that both basins are heavily reliant on surface water resources (especially storage reservoirs) to satisfy water demand; domestic water supply within the ORB and irrigation supply within the UIB. Significant data gaps include the lack of information on reservoir sedimentation.</p> <p>A new technology known as Multiple Beam Echo Sonar (MBES) will be tested on a reservoir within the ORB to</p>
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			<p>provide a detailed picture of sedimentation. If success is achieved then there are opportunities for its implementation within the UIB. It was agreed that information should be gathered on the likely costs involved in using MBES to determine sedimentation quantity in problematic reservoirs in the UIB. Information gaps include the uncertainty over future climate change. It was agreed that education was central to achieving effective water resource management in the UIB. In this regard, it was decided to initiate the supply of free water resource related literature by the International Association of Hydrological Sciences (IAHS: http://www.ciq.ensmp.fr/~iahs/) to the CEWRE library. The possibility of joint Leeds-CEWRE Masters (online) course delivery on water resource management was also discussed and it was decided to take this further at the next Twinning meeting.</p>
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<p>Ns2</p>	<p>Identify climate change impacts and adaptation strategy for the UIB</p>	<p>Climate change has significant implications for IWRM in the UIB. There is currently much uncertainty on the likely change in future climate and it was decided to investigate to what extent climate change is playing a role within IWRM of the UIB.</p>	<p>A significant source of the Upper Indus River during the summer is melt-water. The region has the highest concentration of high peaks anywhere on earth and is also where the largest glaciers outside the Polar regions are found. A change in climate could therefore have severe consequences for water resources.</p> <p>Within Pakistan, organizations dedicated to assessing the water resource vulnerability to climate change are very few. The Global Change Impacts Studies Centre (GCISC), Islamabad (www.gcisc.org.pk) was recently set up to fill this gap and have made some progress. It was noted however that expertise is still lacking and could be addressed via the educational linkages noted earlier.</p> <p>World Wildlife Fund Pakistan is another organization that has taken an interest in climate change issues and it was decided to visit their offices in Lahore. A meeting with the Director and other senior members was arranged to put forward a plan on how to take this further. Some sort of</p>
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			<p>collaboration with the European Union (under the framework 7 Programme) was deemed appropriate. A WWF small project grant provided to allow a regional climate change assessment was secured during meeting.</p>
Ns3	Action plans for ensuring long-term sustenance of Twinning	<p>The support of several key organizations was essential for ensuring the sustainability of the 'TwinBasins' project. Visits to a number of organizations to personally meet senior representatives were made.</p>	<p>WAPDA holds much of the information and data on the UIB whilst climatic records are held by the Met Office. It was therefore decided to approach WAPDA with request for information. After some initial difficulties, a meeting with a high ranking WAPDA official was arranged via the CEWRE. Also present at the meeting was the Director of the Snow and Ice Hydrology Project. Information was obtained on the extent of monitoring within the upper Indus Basin for water resource management purposes.</p> <p>On the advice of WWF-Pakistan, a visit was made to the European Commission Office in Islamabad to discuss potential project opportunities. The EC pointed out that opportunities may arise from the forthcoming Framework</p>

			<p>7 Programme. It was found that the EC has funded many projects in Pakistan and there were opportunities for further funding on water issues. The Framework 7 Work Programmes have in fact recently been published and it has been decided to respond to Work Programme</p> <p><i>Env.2007.1.1.5.2. Climate change impacts on vulnerable mountain regions.</i></p>
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2. ACTIVITES DEVELOPED during the mission

Activity 1	Topic: Establish ties with relevant basin organisations
<p>Description <i>(Exchange of experience or practice, increasing of knowledge and learning, Development of methodology, Training...)</i></p>	<p>The first week involved attending several presentations on IWRM delivered at the CEWRE. Much of the week was devoted to visiting relevant basin organisations. This included the Flood Forecasting Division of the Met Office (where a guided tour of the Centre was provided), WAPDA and WWF-Pakistan. The issue of future project funding was discussed with an official from European Commission offices in Islamabad.</p>

Activity 2	Topic: River Basin Management Issues
<p>Description</p>	<p>The second week comprised largely of field visits; to the Mangla Dam site and the headwaters of the Jhelum River (a tributary of the Indus). Visits were arranged to allow first-hand experience on the sorts of issues relevant to IWRM in the UIB. At the Mangla site, it was noted that dam height is being raised by 10m to allow expansion of storage capacity lost due to sedimentation. By visiting the headwaters of the Jhelum, information was gathered from local on pressing water issues. Valuable information was gained on the extent of the 1992 flood. The locals also highlighted reduced stake-holder participation as a concern and pointed out water quality issues as a problem.</p>

3. LESSON LEARNT during the mission

(what could be shared with other partners and/or introduced in guidelines, as far as IWRM is concerted)

- **About methodology:**

Climatic change is not considered adequately within the IWRM procedure. For example, it is unclear whether glaciers within the UIB are shrinking or growing. It is often thought that shrinkage is taking place due to global warming but it has been suggested that the opposite might be true of glaciers within the UIB. This uncertainty could have severe implications for

future water resource development taking place within the basin – especially the construction of large dams. It is essential that IWRM plans consider this issue.

- **About Practice:**

Adequate data availability remains a problem. Extensive quality and quantity monitoring programmes need to be introduced. Some of the key issues include lack of availability of good quality hydro-climatic data at high elevation locations and accurate information such as the extent of sedimentation within the reservoirs such as Mangla and Tarbela, which are amongst some of the largest dams in the world.

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4. DISSEMINATION (opportunities and difficulties)

In what measure these learnt lessons are applicable to:

- **The basin Organization the expert belongs to:**

Climate change is an important issue currently posing challenges to Ouse River Basin (ORB) water resource managers. General Circulation Models (GCMs) are presently the best available tool for modelling the future climate. However, there is a lot of uncertainty with different GCMs providing different changes. This uncertainty poses a problem for decision-makers within the ORB.

- **National/Regional/Global IWRM practice:**

Climate change will impact water resources at the national/regional and global scale. It is essential that IWRM plans include the effects of climate change using the best currently available methodology. Impacts assessments require climate change scenarios which comprise projected changes in future climate (e.g. temperature and rainfall) from the current climate. The scenarios are based on output from GCMs and this output can differ even for the same region due to the differing GCM parameterisations. It is important that climate change scenarios based on as many GCMs as possible are adopted in water resources impacts assessments. This will provide a truer picture of uncertainty within the assessment.

5. IDENTIFIED TIPS

Identified tips which could be useful for colleagues

Access to data and information is a sensitive issue in developing countries. The process of obtaining information is slow and so the initial contacts are important. During these early stages, it is important to be patient. The requested information is usually provided but the response time is a lot slower than we are used to in the West.

6. PERSONAL COMMENTS

What does the missionary think about his mission?

The aim of the first Mission was very much about establishing contacts and I believe this was achieved. In the developing countries, sometimes contacts are everything where little can be achieved without 'knowing' the right people. All major players working on IWRM within the UIB were visited and some fruitful discussions were held. It is believed this is now a sound basis for exchange Mission 2.

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7. CONTACTS

Principal local contacts met

Name	Occupation	E-mail	Phone number
Dr Saeed Shah	Head of Hydrology Division, Centre for Excellence in Water Resources Engineering, Lahore, Pakistan.	center@xcess.net.pk	+92 42 6821100; 6822024; 6822558.
Dr Muhammad Siddique	General Manager, Planning and Design Division (Water) Water & Power Development Authority (WAPDA)	gmpdw@lhr.paknet.com.pk	+92 42 9202631
Mr Daniyal Hashmey	Director, Snow & Ice Hydrology Project, WAPDA	daniyal_hashmey@yahoo.com	+92 42 5301867; 5302454;5303582
Dr Shaukat Ali Awan	Chief Meteorologist, Pak Meteorological Department	Saliawan2002@yahoo.com	+92 42 9200208

8. BIBLIOGRAPHY

Main documents, manuals or supports used during the mission which could be useful for colleagues

Bibliography
<ul style="list-style-type: none"> <i>Name of the author; date of publishing. Full name of the document. Name of the structure, of the program and/or of the framework in which the document has been realized. Name of book (and volume) which contains the document. Name of editor. Number of sheets. Interesting sheets</i>
<p>Arnell, N.W. (2002) Hydrology and Global Environmental Change, Prentice Hall.</p> <p>Sustainable Development Policy Institute (2003) The politics of managing water, editor K. Bengali, Oxford University Press.</p> <p>Hewitt, K (2005) The Karakoram Anomaly? Glacier Expansion and the 'Elevation Effect,' Karakoram Himalaya, Mountain Research and Development, 25(4), 444.</p> <p>European Union (undated), Partners in Development, European Commission.</p> <p>European Union (2005), International Co-operation and Climate change, European Commission.</p>

Pakistan Development Forum (2003) Pakistan's vision of water resource development, presentation delivered by Minister of Water and Power, available online:

[http://Inweb18.worldbank.org/sar/sa.nsf/Attachments/PDF2003-W&P/\\$File/W&P.pdf](http://Inweb18.worldbank.org/sar/sa.nsf/Attachments/PDF2003-W&P/$File/W&P.pdf)

World Conservation Union (2005) Artificial recharge with IWRM approach, available online: <http://www.waterinfo.net.pk/pdf/IWRMFlyer.pdf>

Websites		
Name	Description/ Notice	Address
WAPDA		http://202.38.50.35/htmls/auth-index.html
Pakistan Water Gateway	Intended to enhance access to information related to water resources and issues in Pakistan available	www.waterinfo.net.pk
Pakistan Meteorological Department		http://www.pakmet.com.pk/

N.B. This framework provides necessary information for further capitalisation and dissemination, but should not prevent experts from making any other comments (as far as basins characterisation is concerned, for instance).

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Date: 7th January 2007
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Financial report

Expert Name: Dr Rizwan Nawaz

Start	Departure	days	days cost (€)	travel cost (€)	Total
13/9/06	25/9/06	13	910	860	1770

1.48euros=£1 ; 7 Jan 2006 (source : BBC)

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