HRI Background

- HRI is one of twelve research institutes within the NWRC.
- HRI was established in 1975 to take over and extend the work of the Hydraulics Research Experimental Station, founded in 1947.
- HRI is the oldest hydraulic institute in the region.
Areas of Specialization

- River hydraulics & morphology
- Irrigation systems & hydraulic structures
- River navigation (including locks)
- Industrial hydraulics (water hammer & pipe networks)
- Coastal hydraulics & marine structures
- Design & testing of cooling systems of power plants
Physical Modeling Dept.

- River Hydraulics & Morphology
- Hydraulic Structures
- Industrial Hydraulics
- Coastal Hydraulics

**Experimental Halls**

There are three experimental halls used for the construction of physical models.
Physical Modeling Dept. (Cont.)

Workshops

5 Experimental Flumes
Mathematical Modeling Dept.

- **Areas Covered**
  - River Morphology
  - Costal Morphology
  - Hydraulic Structures
  - Hydraulic Control Systems
  - Environmental Aspects in River Eng.
  - Water Hammer & Pipe Networks

- **Available Software Packages**
  - WENDY: 1D numerical model for the simulation of water flow
  - TRISULA (Delft 3D) 2D model which is extended to simulate 3D flows
  - SOBEK 1D 2D overland flow to simulate flood propagation and dam break.
  - WANDA advanced model to simulate the dynamic behavior of fluid in pipeline systems
  - UNIBEST 1D model for shore line simulations
Sedimentation and Field Measurements Dept.

- Topographic & bathymetric survey
- Flow and sediment transport field measurements
- Laboratory for the analysis of sediment samples.
Sedimentation and Field Measurements Dept. (cont.)

Field Equipments and Instruments:

- Survey boats
- Echo-sounding instruments
- DGPS
- Sediment sampling facilities

Besides different supporting devices & facilities
Calibration and Instrumentation Dept.

- Calibration of Pumps.
- Calibration of Current meters

150 m long, 2 m deep and 2 m wide flume is used to calibrate current-meters. The flume is equipped with a computerized carriage which can move with a speed ranging from 0.03 to 5 m/s.

There is also a circular tank of 2 m diameter to calibrate miniature current-meters.
El-Salam Syphon under Suez Canal in Egypt

- To test and modify the design of the syphon for minimizing the losses and guarantee the Performance
- Consultant: Halcrow
Submerged Vanes in De Waal River of the Netherlands

- To solve the navigation problems at river bends, using submerged vanes
- Consultant: Delft Hydraulics
Ghezlan Power Plant of Saudi Arabia at Arabian Gulf

- Hydraulic design of the outlet structure
- Hydraulic tests of the pumping station intake basin
- Consultant: Bechtel
International Co-operation

International organizations and consultants, such as:

- **ROYAL HASKONING & DELFT HYDRAULICS** The Netherlands
- **LAHMEYER** Germany
- **BECHTEL** USA
- **HALCROW** England
- **SOGREAH** France

And many others of well known organizations, are currently our partners in solving problems related to water resources development in the eastern part of Africa and the Middle East.
HUMAN RESOURCES & CAPACITY BUILDING AT HRI
Regional Training Center (RTC)
Background

• Regional Training Center (RTC) established in 1995 for training in the field of Hydraulic and River Engineering.

• Initiative and support taken by the Egyptian Government (Represented by HRI) and the Netherlands Government (Represented by UNESCO-IHE, Delft)

• Main objective to transfer HRI’s scientific and technical expertise in hydraulic engineering and related subjects to African and Arab countries.
Annual 3-Month Diploma Course

• The annual course on “Hydraulic Engineering in River Basins” was first organized in 1996.

• The main objective of this course is to increase the understanding of natural river processes and the consequences of the human interventions.

• The main topics in the course curriculum are:
  - Hydraulics and related subjects
  - River Processes
  - Engineering works in River Basins
  - Water Resources

*Under these main titles a number of sub-topics are included as well as seminars and group work exercises*
Tailored Made Short Courses

- Environmental Hydrology, 1999, 2005
Participants are from...
Hydraulic Engineering in River Basin 1996-2005

Total No. of Participants: 164
101 African & Arabs + 53 Egyptians

Female: 39
Short Courses 1996-2005

Total No. of Participants
277
150 African & Arabs + 127 Egyptians

Female
73

Ethiopia
Sudan
Uganda
Tanzania
Kenya
Burundi
Rwanda
D.R.Congo
Eritrea
Egypt
S. Africa
Ghana
Palestine
Algeria
Sultan Oman
Yemen
Jordan
U.A. Emirates
Tunisia
Syria
Muretania
Iraq
Libya
Training Facilities

Social Room

Inside View of the Room

Lecture Room

Meeting Room
Training Facilities

Computer Laboratory

Library
Accommodation Facilities

View of the First Floor

Accommodation Building Entrance
The Nile Basin Capacity Building Network for River Engineering (NBCBN-RE) : An Initiative for Cooperation

• At the end of the year 2000, the initiative on “Establishing the Nile Basin Capacity Building Network for River Engineering (NBCBN-RE)” was Launched by the Hydraulics Research Institute, Egypt and the UNESCO-IHE, The Netherlands, with the support of the Dutch government.

• This initiative was aimed at building and strengthening the human resources and institutional capacity in the ten Nilotic countries towards a sound development of Water Resources in the Nile Basin.

• This has been achieved through establishing a network (NBCBN-RE) which creates opportunities for the riparian countries to have equal access to information and knowledge through research, training and sharing of experiences.
NILE BASIN CAPACITY BUILDING NETWORK IN RIVER ENGINEERING (NBCBN)

A Model for Capacity Building Networks
The main concept on which the project is based is to:

Create an environment in which professionals from the water sector sharing the same river basin would have the possibility to exchange ideas, their best practices and lessons learned.

Such an environment can best be established by fostering a network through which education, training, research and exchange of information for and by professionals can take place.
Developmental Objectives

• To strengthen the human resources development and research capacity in the area of river engineering

• To increase the cooperation among the training and research institutions in the Nile basin countries
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The Approach for Building the NBCBN-RE

- The approach is to let the network develop gradually.
- To create a number of focal centres “Nodes” located in different countries within the region focusing on different aspects of River Engineering.
- The project could well serve as a pilot project for similar activities in other specialised fields of water resources management.
The activities of the nodes required to develop and sustain a local capacity for river engineering within their country.
The Node As Part of The Research Cluster Network

The activities of the nodes required to develop and sustain regional research capacity in respect to one research domain in the field of river engineering. (As a leading node and / or member node).
The Node As Part of The Regional Network

The activities of the nodes required to participate in the overall network development.
The Network Development Process

- A kick-off workshop in January 2002;
- Cairo Declaration
  - Develop the concepts and principles of the NBCBN-RE.
  - Shape and set the operation rules of the Network.
  - Develop a mechanism for the sustainability of NBCBN-RE.
- Output Cairo workshop:
  - Enhancing regional cooperation.
  - Network nodes in all the ten Nile basin countries.
  - Five research clusters for carrying out the joint regional research activities.
  - NBCBN-RE under the umbrella of NBI.
  - Call upon the International organisations to support the NBCBN
## Hosting Institutions and Focal Persons

<table>
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<tr>
<th>Country</th>
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<th>Focal Person</th>
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<tr>
<td>Burundi</td>
<td>Geographical Institute of Burundi</td>
<td>Mr. Nduwayo Manasse</td>
</tr>
<tr>
<td>D.R.Congo</td>
<td>Ministry of Environment</td>
<td>Mr. Delphin Tshimena</td>
</tr>
<tr>
<td>Egypt</td>
<td>Hydraulics Research Institute</td>
<td>Mr. Ibrahim El-Desouki</td>
</tr>
<tr>
<td>Eritrea</td>
<td>Water Resources Department</td>
<td>Mr. Michael Nagash</td>
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<tr>
<td>Ethiopia</td>
<td>Addis Ababa University</td>
<td>Dr. Bayou Chane</td>
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<tr>
<td>Kenya</td>
<td>Nairobi University</td>
<td>Dr. Pattts Odira</td>
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<tr>
<td>Rwanda</td>
<td>Kigali Institute for Science, Technology and Management</td>
<td>Dr. Museruka Casimir</td>
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<tr>
<td>Sudan</td>
<td>UNESCO Chair in Water Resources</td>
<td>Prof. Abdalla Abdel-Salaam</td>
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<td>Uganda</td>
<td>Makerere University</td>
<td>Dr. Gaddi Nigrane</td>
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Nodes and Research Clusters Establishments
River Morphology Research Cluster
OBJECTIVES

- To give a room for the researchers to present and discuss the research work
- To exchange views and open scientific discussions on the research work
- To identify the problems and bottlenecks faced by the researchers to take remedy actions
- To reschedule the remaining part of the research work
- To develop ideas for future research activities
Regional Workshops
Regional Workshops
OBJECTIVES

- Present the achievements of the research clusters
- Develop the future vision of the project
- Identify the links with the regional ongoing initiatives in IWRD
- Develop a mechanism for the sustainability of the NBCBN
- Benefit from the lessons learned
OUTPUTS

- NBCBN-RE Declaration
- Dissemination of the research outputs
- Clear Strategic vision for the next phase of the project (future)
- Clear technical/scientific directions
- Framework for cooperation with external agencies
- Strengthened link with NBI
Achievements

- NBCBN
- Six in-country (national) networks
- Six regional research clusters
- Research:
  - 13 research groups
  - 13 research activities & reports
- Education: M.Sc at UNESCO-IHE
- Training courses
  - 3 month diploma course in RE
  - Water harvesting course
  - IHE refresher course
  - Six regional specialized courses
  - IWRM, with Sudan node
Achievements

- NBCBN Platform
- NBCBN brochure & newsletter
- Staff exchange program
- Participation in conferences & workshops
- Assessment of available facilities in NBC
- Development of knowledge map
Community of Practice (Professionals)

The members of NBCBN-RE from different Nile Basin Countries, are forming the main core forming the communities of practice in the field of River Engineering selected research topics.

GIS and Modeling
River Morphology
Environmental Aspects
Hydropower
River Structures
Flood Management

For more information on NBCBN-RE Members, visit www.nbcbn.com/networkmap.asp
Needs

- Completion of the Network
- Further development of the regional clusters
- Organizing specialized training courses
- Development of E-learning modules for RB
- Improving the connectivity among the professionals
- Initiating new communities of practice (professionals) in water related topics (water/climate).
- Enhancing the link with the other on-going initiatives
- Developing a scientific journal
- Improving the access to information and knowledge
Complete the network (by formalizing and launching nodes in Rwanda, Eritrea, D.R. Congo and Burundi).

Stimulate the further development of CoP’s (different stages) till a sustainable level has been reached.

Improved facilitation by improving the I&C support environment and infrastructure. Functionalities like:

- Document management
- Community management
- Project tracking
- Push services (Newsletters, publications, meetings)
Further Development of the Network (2)

• Support the development of national water research communities

• Support the development of regional Centers of Excellence

• Support the involvement of researchers in concrete R&D projects
Finally

Thank You