MINISTRY OF WATER & ENERGY, RESEARCH & DEVELOPMENT DIRECTORATE

Current Capacity Building initiatives in Ethiopia for
Water Resources Development and Management

Water Storage and Hydropower Development For Africa

Addis Ababa, Ethiopia  April 16 to 18, 2013
Structure of Presentation

- Introduction
- Resource Potentials
- Sector Development Programs
- Current Capacity Building Initiatives for Water Resources Development and Management
- Where are we now? and expectations
Located in the Horn of Africa, Ethiopia is a landlocked country of some 1,104,300km². The capital **Addis Ababa** lies in the central highlands at an altitude of 2,300m. (you may feel breathless). HQ for AU is also in Addis Ababa.
ETIOPIA- STATISTICS

- Ethiopia’s population: 83.5 million
- **Age structure**: 0-14 years: 44.6%, 15-24 years: 19.8%, 25-54 years: 28.9%
- Sex ratio: 0.97 male(s)/female (2011 est.)
- **Population growth rate**: 2.9% (2012 est)
- **Maternal mortality rate**: 350 death/100,000 live births (2010)
- **Birth rate**: 38.5 births/1,000 population (2012 est.)
- **Death rate**: 9.3 deaths/1,000 population (July 2012 est.)
- Infant mortality rate: 60.9 deaths/1,000 live births
- **Life expectancy at birth**: female: 59.21 years male: 53.99 years (2012 est)
- Urbanization: 17% of total population (2010)
ETHIOPIA HAS 12 RIVER BASINS

Annual runoff from the 9 river basins $122BM^3$

- (Abbay 53%, Baro Akobo 24%)
- (ABBAY and BARO-AKOBO CONTRIBUTE 77%)
- Omo-Ghibe 18%
- The Remaining other River Basins contributes <10%

Groundwater Potential of 36 $BM^3$
The Nile basin (including Abbay or Blue Nile, Baro-Akobo, Setit-Tekeze/Atbara and Mereb) covers 33 percent of the country and drains the northern and central parts westwards;

The Shebelli-Juba basin (including Wabi-Shebelle and Genale-Dawa) covers 33 percent of the country and drains the southeastern mountains towards Somalia and the Indian Ocean;

The Rift Valley (including Awash, Denakil, Omo-Gibe and Central Lakes) covers 28 percent of the country;

The North-East Coast (including the Ogaden and Gulf of Aden basins) covers 6 percent of the country.

Population Distribution Vs Water Resources Availability

Transboundary Nature of surface water resources
Map of basins and sub-basins

9 wet, 3 dry
<table>
<thead>
<tr>
<th>Basin Name</th>
<th>Type</th>
<th>Source</th>
<th>Area (km²)</th>
<th>Direction of Flow</th>
<th>Annual runoff (BM3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wabi shebelle</td>
<td>R</td>
<td>Bale Highland</td>
<td>202220</td>
<td>East</td>
<td>4.6</td>
</tr>
<tr>
<td>Abay</td>
<td>R</td>
<td>West, Southwest HL</td>
<td>199912</td>
<td>West (Nile)</td>
<td>52.6</td>
</tr>
<tr>
<td>Genale Dawa</td>
<td>R</td>
<td>Bale Highland</td>
<td>172259</td>
<td>East</td>
<td>5.8</td>
</tr>
<tr>
<td>Awash</td>
<td>R</td>
<td>Central Highland</td>
<td>110000</td>
<td>North-east</td>
<td>4.6</td>
</tr>
<tr>
<td>Tekeze</td>
<td>R</td>
<td>North Wollo Highland</td>
<td>82350</td>
<td>West Nile()</td>
<td>7.6</td>
</tr>
<tr>
<td>Denakil</td>
<td>D</td>
<td>North Wollo Highland</td>
<td>64380</td>
<td>NF</td>
<td>0.86</td>
</tr>
<tr>
<td>Ogaden</td>
<td>D</td>
<td>NF</td>
<td>77120</td>
<td>NF</td>
<td>-</td>
</tr>
<tr>
<td>Omo-Ghabe</td>
<td>R</td>
<td>Central, Western HL</td>
<td>79000</td>
<td>South</td>
<td>17.90</td>
</tr>
<tr>
<td>Baro-Akobo</td>
<td>R</td>
<td>Western Highland</td>
<td>75912</td>
<td>West (Nile)</td>
<td>23.6</td>
</tr>
<tr>
<td>Rift Valley Lakes</td>
<td>L</td>
<td>Arsi and Central HL</td>
<td>52000</td>
<td>South</td>
<td>-</td>
</tr>
<tr>
<td>Mereb</td>
<td>R</td>
<td>Adigirat HL</td>
<td>5900</td>
<td>West (Nile)</td>
<td>0.26</td>
</tr>
<tr>
<td>Aysha</td>
<td>D</td>
<td>NF</td>
<td>2223</td>
<td>NF</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: MoWR Respective Basin Master Plan Studies

<table>
<thead>
<tr>
<th>Type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>River</td>
</tr>
<tr>
<td>D</td>
<td>Dry</td>
</tr>
<tr>
<td>L</td>
<td>Lake</td>
</tr>
<tr>
<td>NF</td>
<td>No flow</td>
</tr>
</tbody>
</table>

HL-Highland, R-River, D-Dry, L-Lake, NF-No flow
Water Sector
Policies and Strategy

- Develop the countries water resources on equitable and sustainable way to assure highest economic and social benefits;
- Bring about efficient utilization, and equitable water allocation and distribution embracing sustainability of water resources through all inclusive and integrated water resource management plan with effective water sharing principles;
- Mitigation and prevention of drought effects by efficiently and suitably developing and use of the water resources in accordance with the countries strategic plan;
- Prevent and control flood disaster by taking sustainable, preventive, rehabilitative and other similar measures;
- Sustainable prevention, conservation and development of water resources and its general environment;
Irrigation and Drainage Sub Sector

- Irrigation development works beneficial for long time and sustainability;

- Develop and distribute standards, manuals and systems assuring that irrigation farms and systems sustainable operation and maintenance are satisfactorily monitored and improved;

- Create appropriate conditions to adopt low cost technologies; amide in increasing irrigation efficiency

- Give priority for multipurpose irrigation development projects;

- Draw and implement working procedures and systems for sustainability of finance sources and feasibility of medium and large scale projects;
Hydropower Sub Sector

• Integrated and successive assurance of study of hydro power generation projects whose feasibility is assured to implement them as soon as fund is secured;

• Consider hydropower development projects inseparable and part to other multi sector development projects so as to minimize the unit cost of production;

• Identify hydropower potential

• Encourage local consultants and contractors to participate in the design, construction and management of hydropower generation;

• Study and design of medium and large scale hydropower development;
  • License those who like to involve in hydropower development projects;
  • Control water related constructions.
Current Capacity Building Initiatives for Water Resources Development and Management
Ethiopian Water

Sector Development Programs

- GTP1 & 2
- Hydropower
- National Potential
  - Current development and future development Planned
- Irrigation
  - Estimates show that irrigable land potential of the country is around 5.3 million ha
  - 3.7Mha from gravity-fed surface water
  - 1.1Mha from groundwater and 0.5Mha from rainwater
- Current and future development programs
- Water-centered development of pastoralist areas
- Water supply, hygiene and sanitation (UAP II & MDG).
Hydropower Development
Man Power Requirement

- Irrigation development
  - Feasibility Study & Detailed design
  - Infrastructure development
  - Water Administration
- Hydropower Development
  - Feasibility Study & Detailed design
  - Infrastructure development
  - Planning & Distributions
- Groundwater Resources Development
  - Feasibility Study & Detailed design
  - Infrastructure development
  - Monitoring & Administration
- Generally on all Water resources Development
  - Dam Construction Feasibility Study and Design
  - Dam Construction Monitoring & Administration
  - Geotechnical and Geophysical investigations (Studies)
  - Grouting
  - Dam Break Analysis
Areas of Specialization

- Irrigation and Drainage engineering
- Hydraulic and Dam Engineering
- Hydrology and Hydro system engineering
- Hydropower Engineering
- Electric Power and Energy Engineering
- Mechanical Engineering (Hydraulic Turbines)
- Power & Energy Economics
- Electromechanical Engineering
- Drilling Engineering
Identified Higher Learning Institutes

- Addis Ababa University /Institute of Technology
- ArbaMinch University
- Adama University
- Bahir Dar University
- Hawassa University
- Haromaya University
- Jimma University
- Mekelle University
- Twining Arrangements
Support of the Industries to Universities

- Twinning Arrangement
- Curriculum Development
- Practical Attachment of the trainees
- Support on Research
Water Resources Development input Supplies
(Industrial outputs)

- Supplies required for Irrigation Developments
- Supplies required for Hydropower Developments
- Supplies required for Groundwater Development
- Supplies required for Dam Construction
METALS AND ENGINEERING CORPORATION (METEC), ETHIOPIA METEC

- Engaged in the design, manufacture, upgrading and maintenance of different products and services of the Defense Industry including upgrading.

- It is also engaged in fabrication and erection of: - electric power transmission towers, television towers, telecommunication towers, electric power cables and wires, transformers and generators.

  Manufacture electro and hydro mechanical equipment.

- MetEC is mandated to undertake the design, manufacture, development, and supply for projects for both state owned enterprises and the private sector
Thank you Merci