WATER RESOURCES IN THE PHILIPPINES: Status, Challenges and Opportunities

SCPW
Joy Nostalgia Hotel Manila
March 20, 2019

DR. SEVILLO D. DAVID, JR., Executive Director
ENGR. SUSAN P. ABAÑO, OIC, Policy and Program Division
National Water Resources Board
Presentation

- NWRB Functions
- Water Resources Status
- Water Resources Management: Issues and Challenges
- Water Resources Management: Initiatives and Opportunities
1. Policy Formulation and Coordination

Formulate policies and plans within the framework of Integrated Water Resources Management (IWRM)

**Plans**
- 2007 Philippine IWRM Plan Framework
- IWRM Plan in Pampanga RB (completed)
- Groundwater Management Plan in Water Constraint Cities (on-going)
- Comprehensive Water Resources Assessment of Major River Basins (on-going)

**Policies**
- Groundwater Allocation for Metro Manila and surrounding areas
- Groundwater Allocation for Metro Cebu
- Granting of Water Rights over Surface Water for Hydropower Projects requiring more than 80% dependable flow

Amendment to the 1976 Water Code of the Philippines (on-going)
2. Resource Regulation

- Conserves and protects all water resources
- Regulates water utilization and allocation based on policies consistent with beneficial use and sustainable development.
- Regulation of water use through the water rights system
3. Economic Regulation

- Protects consumers and safeguard the economic viability of water utilities by:
  - determining service standards and targets
  - tariff levels and schemes
  - monitoring and measuring company performance
  - enforcing compliance
  - imposing sanctions

- Authorize the operation of private water service providers by granting Certificate of Public Convenience (CPC)
Water Resources Status
Consumptive Use

- Irrigation: 72.804%
- Industrial: 17.508%
- Municipal: 7.797%
- Fisheries: 0.818%
- Recreation: 0.290%
- Livestock: 0.021%
- Others: 0.762%

Legend:
- Municipal
- Industrial
- Irrigation
- Fisheries
- Recreation
- Livestock
- Others
Water Resources Status
Non-Consumptive Use

- Power: 57.08%
- Irrigation: 31.25%
- Municipal: 3.35%
- Industrial: 7.52%
- Fisheries: 0.35%
- Recreation: 0.12%
- Livestock: 0.01%
- Others: 0.33%
- Municipal
- Industrial: 7.52%
## Water Resources Status

<table>
<thead>
<tr>
<th>Water Resources Region</th>
<th>Groundwater (80% dependable flow)</th>
<th>Surface Water</th>
<th>Total Water Potential</th>
<th>Water Demand December 2018</th>
<th>Estimated Available Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1248</td>
<td>3250</td>
<td>4498</td>
<td>4021.122</td>
<td>476.878</td>
</tr>
<tr>
<td>II</td>
<td>2825</td>
<td>8510</td>
<td>11335</td>
<td>9492.305</td>
<td>1842.695</td>
</tr>
<tr>
<td>III</td>
<td>1721</td>
<td>7890</td>
<td>9611</td>
<td>24117.785</td>
<td>-14506.785</td>
</tr>
<tr>
<td>IV</td>
<td>1410</td>
<td>6370</td>
<td>7780</td>
<td>16162.36</td>
<td>-8382.36</td>
</tr>
<tr>
<td>V</td>
<td>1085</td>
<td>3060</td>
<td>4145</td>
<td>3289.04</td>
<td>855.96</td>
</tr>
<tr>
<td>VI</td>
<td>1141</td>
<td>14200</td>
<td>15341</td>
<td>6274.32</td>
<td>9066.68</td>
</tr>
<tr>
<td>VII</td>
<td>879</td>
<td>2060</td>
<td>2939</td>
<td>3656.45</td>
<td>-717.45</td>
</tr>
<tr>
<td>VIII</td>
<td>2557</td>
<td>9350</td>
<td>11907</td>
<td>2876.2</td>
<td>9030.8</td>
</tr>
<tr>
<td>IX</td>
<td>1082</td>
<td>12100</td>
<td>13182</td>
<td>1515.27</td>
<td>11666.73</td>
</tr>
<tr>
<td>X</td>
<td>2116</td>
<td>29000</td>
<td>31116</td>
<td>6740.972</td>
<td>24375.028</td>
</tr>
<tr>
<td>XI</td>
<td>2375</td>
<td>11300</td>
<td>13675</td>
<td>5953.967</td>
<td>7721.033</td>
</tr>
<tr>
<td>XII</td>
<td>1758</td>
<td>18700</td>
<td>20458</td>
<td>7332.06</td>
<td>13125.94</td>
</tr>
<tr>
<td>Total</td>
<td>20197</td>
<td>125790</td>
<td>145987</td>
<td>91431.851</td>
<td>54555.149</td>
</tr>
</tbody>
</table>
Groundwater in Nine (9) Cities are stressed

- Metro Cebu
- Bacolod City
- Iloilo City
- Davao City
- Cagayan de Oro City
- Zamboanga City
- Metro Manila
- Baguio City
- Angeles City
Water Quality and Quantity

- Unabated extraction of groundwater due to rapid urbanization and industrialization
- Inadequate Sewerage and Sanitation facilities
- Watershed degradation
- Deteriorating health of river and coastal systems
- Indiscriminate land use development
Extreme Events:

Increasing incidence and intensity of water related risks such as Typhoons, Floods, Droughts and Landslides.
Increasing water demand together with insufficient water infrastructure threatens to outstrip sustainable levels of supply.
Groundwater Contamination

Leaching of industrial, agrochemicals and animal wastes in agro-industrial areas

Sub-surface discharges from latrines and septic systems and infiltration of polluted urban run-off
Direct dumping of domestic solid waste in rivers and lakes created adverse impact on water quality and availability.

Wastewater discharges from domestic and industries to bodies of water contaminate water bodies.
Threats of Climate Change

- Increased intensity and frequency of storm (La Niña) and drought (El Niño)
- Variation in streamflow and groundwater recharge affecting water quality and seasonal water availability
- Higher temperatures affecting water quality (such as eutrophication)
- Sea Level rise causing saltwater intrusion into surface and groundwater, affecting the amount and quality of water supplies

Seven extreme tropical cyclone/southwest monsoon induced extreme events occurred in 1991 to late 2004

The worst drought occurred in 1997-1998 El Niño, resulted in severe water shortage in M.Mla
Numerous and Conflicting laws and policies at the national and local levels

Absence of updated and reliable data/information to fully conduct a water resources assessment (supply and demand analysis, water balance, etc.)
Water Resources Management: Issues and Challenges

Regulation of the Angat Reservoir (Angat Water Allocation)

Water supply to Metro Manila, with 15 million population

Irrigation to 27,000 has. of farm lands in Bulacan and Pampanga Provinces

Flood control to Bulacan Province

Power generation for Luzon Power Grid
Water Resources Management: Issues and Challenges

Management of Angat Reservoir

INPUT

- Climate Forecast (PAGASA)
- Status of Dam and Reservoir (NPC)
- Water Supply Requirement (MWSS)
- Irrigation Requirement (NIA)
- Power Requirement (AHC)

Reservoir Yield Optimization (NWRB)

Discussion on the result of the simulation and agreement among users on water allocation

- Technical Working Group
- Top Level Management

Decision and Approval by NWRB Board

Domestic use has the priority of all other uses

Water Release from Reservoir

AHC

PAGASA - Philippine Atmospheric, Geophysical and Astronomical Services Administration (meteorological agency)
NPC - National Power Corporation (owner of dam)
AHC - Angat Hydropower Corporation (operator and user)
MWSS - Metropolitan Waterworks and Sewerage System (user)
NIA - National Irrigation System (user)
NWRB - National Water Resources Board (regulator)

The inflow design is the percentage of historical mean of the inflow data depending on the climate forecast.

Domestic use has the priority of all other uses.

INPUT

Status of Dam and Reservoir

Reservoir Yield Optimization

The inflow design is the percentage of historical mean of the inflow data depending on the climate forecast.

Discussion on the result of the simulation and agreement among users on water allocation

Decision and Approval by NWRB Board

Water Release from Reservoir

AHC

PAGASA - Philippine Atmospheric, Geophysical and Astronomical Services Administration (meteorological agency)
NPC - National Power Corporation (owner of dam)
AHC - Angat Hydropower Corporation (operator and user)
MWSS - Metropolitan Waterworks and Sewerage System (user)
NIA - National Irrigation System (user)
NWRB - National Water Resources Board (regulator)
Water Resources Management: Initiatives and Opportunities

* Develop Groundwater Management Plan for the nine water stressed areas and other key cities

* Conduct of Comprehensive Water Resources Assessment in all Major River Basins

* Construction of Groundwater Monitoring Wells in the nine water stressed
Water Resources Management: Initiatives and Opportunities

Integrated 3D GIS-Based Water Resources Management Information System in the Provinces of Pampanga and Bulacan (KOICA funded projects)
Water Resources Management: Initiatives and Opportunities

Foreign funded Project (Technical Assistance)

- International Atomic Energy Agency (IAEA)-Water Availability Enhancement (IWAVE) Project; determining recharge and age of groundwater; piloted in Regions 2 and 10 and nine water stressed areas

Aug 2010 to present
Water Resources Management: Initiatives and Opportunities

❖ Presence of the Water Utilization Units (WRUs) - DENR to assist NWRB in terms of inventory of water users in different areas nationwide and other selected functions related to water permit inspection and monitoring and assisting water permit applicants.

❖ Established regional offices in Metro Cebu and Metro Iloilo in 2018.

❖ Partnership with DOST PCIEERD (R and D projects) to develop capabilities in increasing the resiliency of water resources through proper management and planning for appropriate infrastructure as well as growing challenges and uncertainties brought upon by climate change.
Water Resources Management is a Shared Responsibility

NATIONAL WATER RESOURCES BOARD
8th Floor, NIA Building, EDSA, Quezon City, Philippines
Telefax Nos. 02-9202641 /02- 9202365 /02-9202724
Website:  www.nwrb.gov.ph
Email add: nwrbphil@gmail.com