Research Focus for a Sustainable Water Security in the Philippines

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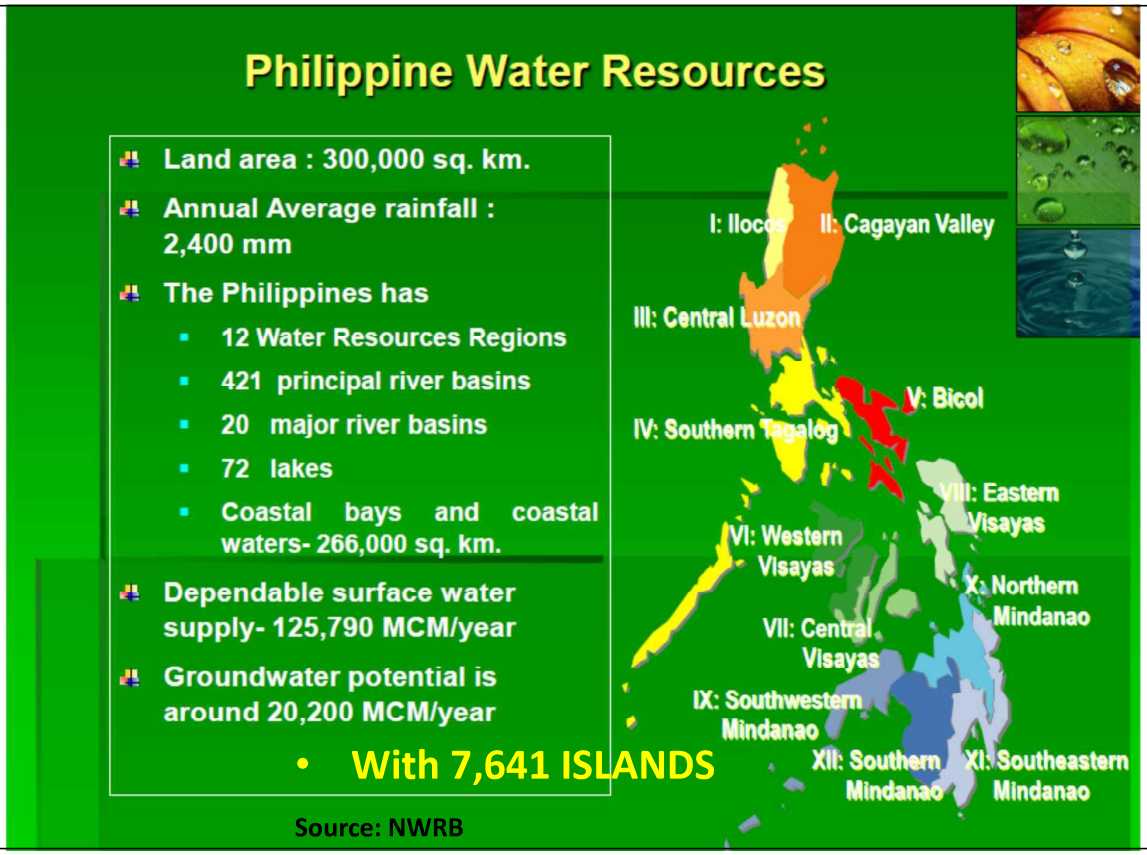


SURFACE WATER USE:

Agriculture – 77.3%

Industrial – 13%

- **The Philippines is considered as one of the most disaster-prone countries in the world.** (ranks 3rd in 2017 World Risk Index)
- It is frequently subjected to typhoons (ave 20 typhoons/year), earthquakes, volcanic eruptions and other natural hazards…Recently, TD Amang (Jan 20, 2019)
- **Increase RISK to Natural Hazards due to Climate Change** increase temperature; changing rainfall pattern (flooding or drought); sea level rise; landslides; etc
- **Phil Population: 100 M (2015); 120 M (2025);**
- 2015 – 20% potable water deficit areas; 2025 – up to 40%; affecting 20 to 40 M people

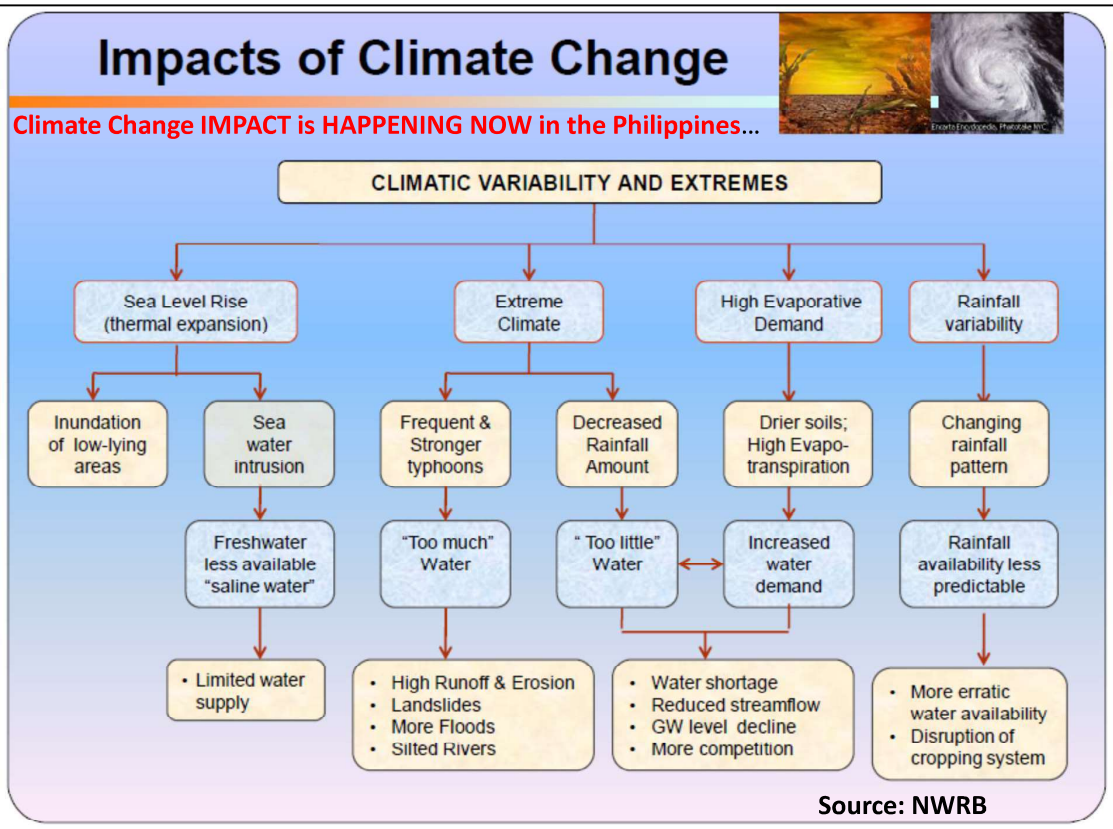
Impacts on Water Resources

- Variation in streamflow and groundwater recharge affecting water quality and seasonal water availability

- Nine key urban centers were identified with water constraint
- 50 rivers (12%) of the 421 rivers in the country are considered biologically dead
- Only one third (36%) of our river systems/surface water areas are potential sources for drinking water
- 58% of groundwater intended for drinking water supplies are contaminated with total coliform

- DUE TO: Water Pollution; Forest Degradation; Improper Solid waste Disposal; Climate Change; etc.

Source: NWRB



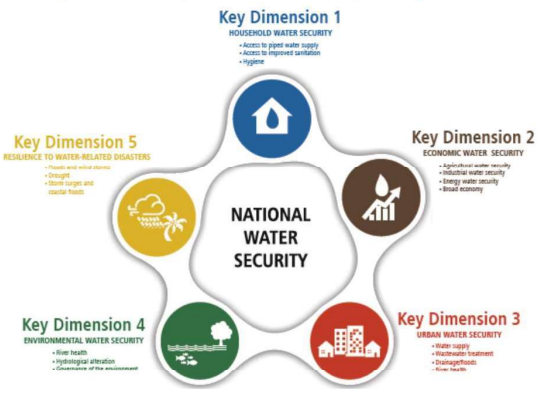
- **DEPLETION OF WATER RESOURCES** primarily due to: **Increased Population**; Socio-economic development; and CLIMATE CHANGE EFFECTS greatly affect the sustainability of the **Food, Energy and Water Nexus** balance (Law of Supply and Demand)
- **Water next to Air,** is the most essential element needed for Man's survival
- **You DIE**: approx. 5 min w/o Air; or 5 days w/o Water; or 5 weeks w/o Food
- **"WATER IS LIFE"…**King Bhumibol Adulyadej
- **WATER is needed for FOOD and ENERGY production**

- **15 years from now, the 8 BILLION population in the world will need 50% more Food, 40% more Energy and 30% more WATER…**

Source: ADB 2016 Annual Report

- **It will affect the SOCIAL, ECONOMIC and ENVIRONMENTAL dimensions of each Country and the Global system as well…**

Figure 1: Water Security Framework of Five Interdependent Key Dimensions



Source: ADB.

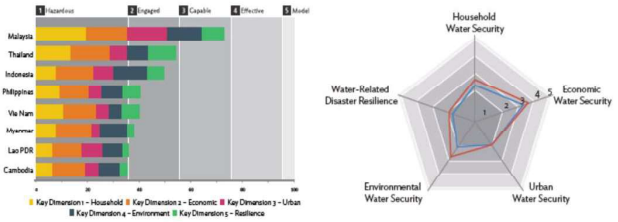
Philippines NWS index = 40.4%
ranks 38 out of 48 Asian countries;
ranks 6 in Southeast Asian countries

Table A1.7: Southeast Asia

	Population (million)	NWS Score	
		2013	2016
Cambodia	15.4	31.6	37.5
Indonesia	252.8	40.9	49.8
Lao People's Democratic Republic	6.9	35.0	38.0
Malaysia	30.2	60.6	73.4
Myanmar	53.7	35.0	40.8
Philippines	100.1	35.0	40.4
Thailand	67.2	47.9	54.4
Viet Nam	92.5	33.9	40.2
Average (population weighted)		39.9	47.3

NWS = National Water Security.
Source: ADB.

Figure A1.6: Southeast Asia



AWDO = Asian Water Development Outlook.
Source: ADB.

CHALLENGES, ISSUES AND CONCERNS
(Water Security Management)

1. Competing use among water users (domestic, agricultural, industrial, energy, etc.)
2. Lack of climate-based decision support tools (more researches and use of science-based technology such as using GIS and Remote Sensing derived Data for a more precised Resource Inventory Mapping)
3. **Lack of infrastructure** to capture excess water (ex. Temporary catchment areas/Dams along the river basins to handle flood water)
4. Climate change (extreme weather variations, drought, flooding, etc) – Its IMPACT is happening NOW…

In addition:

1. Increase in Population (ave 1.7%/year) – more DEMAND, with less SUPPLY

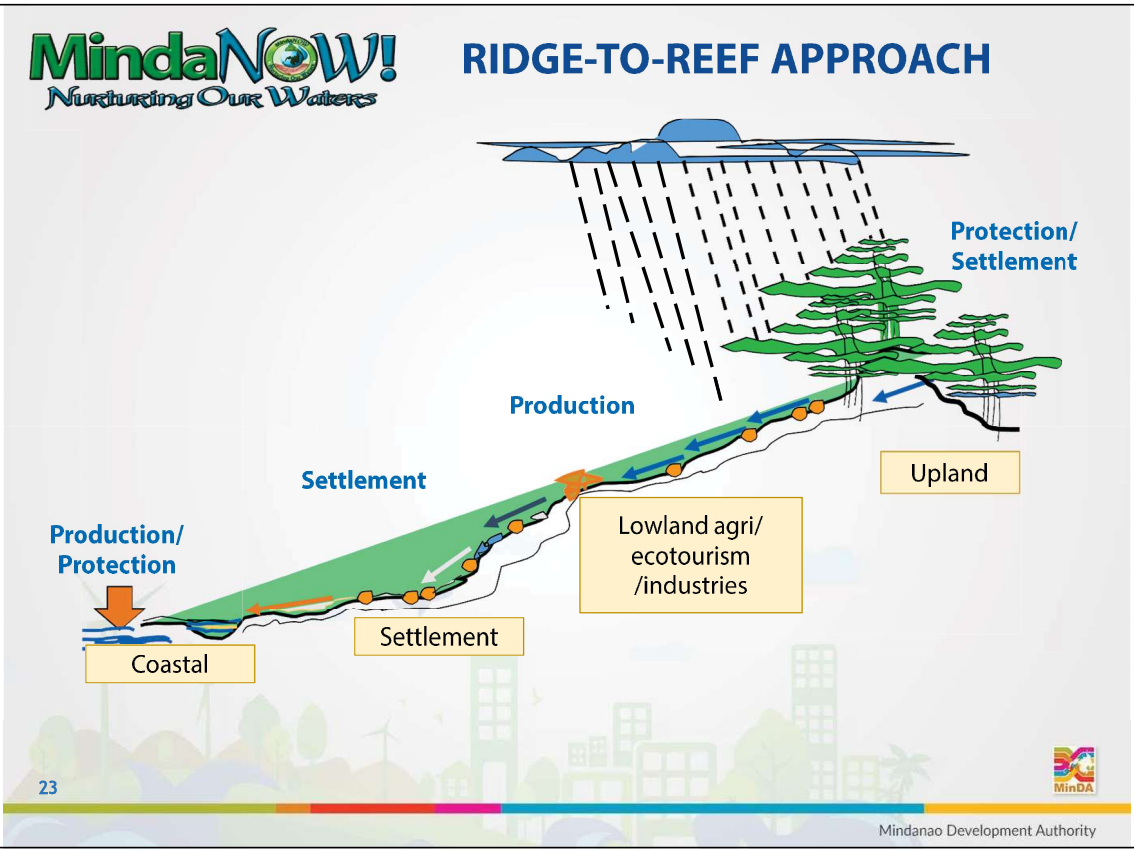
Source: NWRB (National Water Resources Board)

SHORT TERM PLANS:
On-going Research Activities for Water Management

- **Establish science-based water resources information and Inventory(using GIS/remote sensing-** EX. DOST/PCIEERD funded projects LIDAR 1 & 2, GeoSAFER– LIDAR 1 (Flood Hazard Mapping of RBs); LIDAR 2 (Resources Inventory Mapping such as water, agricultural, aquatic, energy, etc.), Water Catchment; GeoSAFER (FH mapping, river sedimentation and erosion, river water quality, urban darainage Sources, Water Quality etc.
- **Adopt Community-based Water Conservation -** by implementing IWRM Plan of NWRB (National Water Resources Board)
- **The Academe stakeholder must do RESEARCHES** to find solutions on WATER CONSERVATION, WATER PRESERVATION, WATER PROTECTION and WATER MANAGEMENT measures. (In MSU-IIT, we are doing researches on ceramics filter for drinking water and for septic tank wastewater filtration and Partner in the LIDAR and GeoSAFER projects)

LONG-TERM SOLUTION

- **SOUND LAND USE MANAGEMENT definitely reduce runoff that will control FLOODING**
- FOCUS on **Forest protection and Reforestation to increase forest land cover and improve the watershed**
- Forest vegetation improves **soil infiltration (water storage)**



ACKNOWLEDGEMENT

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- MSU-Iligan Institute of Technology

ASEAN'S Challenge: **"THINK ABOUT THE NEEDS OF YOUR NEIGHBORS, NOT ONLY OF YOURSELF. LET US WORK TOGETHER TO ENSURE MAN'S CONTINUING SURVIVAL" …..** **Prof. ALAN MILANO**

THANK YOU