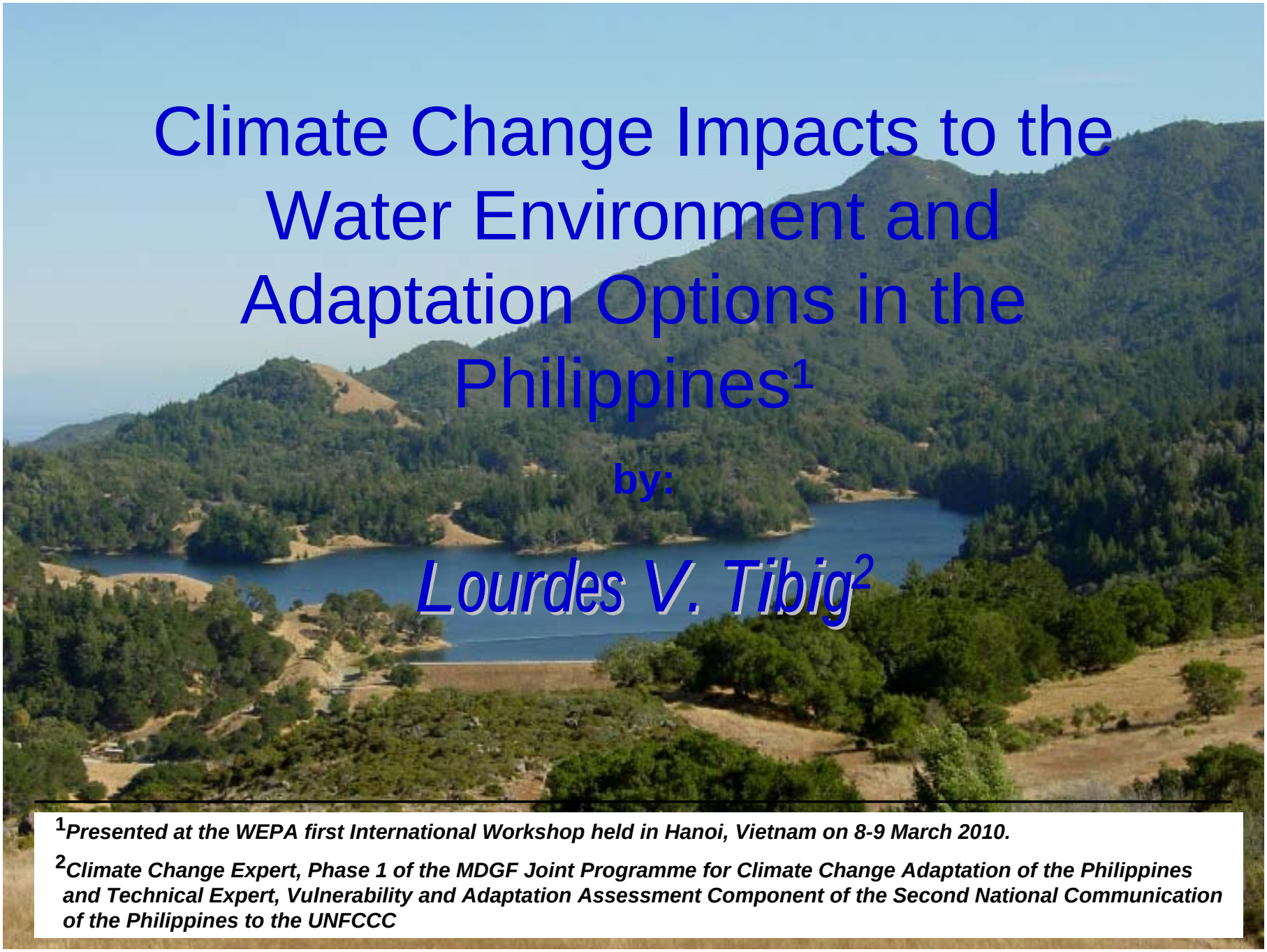


Climate Change Impacts to the Water Environment and Adaptation Options in the Philippines[1]

by:

Lourdes V. Tibig[2]

[1]*Presented at the WEPA first International Workshop held in Hanoi, Vietnam on 8-9 March 2010.*

[2]*Climate Change Expert, Phase 1 of the MDGF Joint Programme for Climate Change Adaptation of the Philippines and Technical Expert, Vulnerability and Adaptation Assessment Component of the Second National Communication of the Philippines to the UNFCCC*


N
Philippine Sea
South China Sea
Sulu Sea
Celebes Sea
Northern Luzon
Southern Luzon
Visayan Islands
Mindanao
Manila
Laoag
Vigan
Tuguegarao
Baguio
Angeles
Subic
Cavite
Tagaytay
Batangas
Puerto Galera
Mindoro
Busuanga Island
Coron Island
El Nido
Palawan
Puerto Princesa
Boracay
Romblon
Masbate
Kalibo
Aklan
Panay
Iloilo
Bacolod
Samar
Leyte
Cebu
Bohol
Negros
Dumaguete
Siquijor
Surigao
Butuan
Cagayan de Oro
Dapitan
Dipolog
Zamboanga
Cotabato
Davao
General Santos
Naga
Bicol
Legazpi
Sorsogon
Catanduanes Island

The Philippine Watersheds

- At least 70% of the total land area of the country is found in watersheds of varying sizes
- Watersheds with an area of at least 10^5 ha (river basins) which comprise 7.8 m ha of the watershed areas
- Watersheds continue to be the principal sources of water for domestic, agriculture, industrial and commercial uses in the country (around 975 MCM of water/day)

Causes of watershed degradation

Direct:

- Erosive upland agricultural practices
- Inappropriate forestry practices
- Overgrazing
- Poor water resource management
- Unplanned and unregulated conversion
- Increasing industrialization

Indirect:

- Excessive population growth
- Pervasive upland poverty and absence of viable livelihoods
- Lack of markets and other livelihood support systems
- Land tenure
- Inadequate knowledge about watershed management
- Inappropriate conservation technologies

Indirect:

- Lack of access to capital resources
- Absence of mechanisms to facilitate coordination of mandates of various agencies
- Absence of appropriate scheme for valuation and pricing of watershed resources
- Inadequate land use and management plans
- Inconsistent policy frameworks

Description of water resources in the Philippines

- 12 water resource regions (defined by hydrological boundaries, physiographic features and climate homogeneity)
- 343 independent principal river basins (of areas of at least 4,000 ha each) covering 66.5% of country's total land area

Description of water resources in the Philippines

- Most extensive rivers systems are the Rio Grande which flows into the Mindanao river, the Agusan, which flows into the Mindanao Sea, the Cagayan in Northern Luzon and the Pampanga which flows into Manila Bay

- 61 lakes with an aggregate area of 200,00 ha (Laguna de Bay is the largest in Philippines and second largest in Southeast Asia)

Description of water resources in the Philippines

- Extensive groundwater resource (aggregate area of 50,000 sq. km and storage of about 251,158 MCM, but safe yield is only 31,554 MCM)
- Dependable yield is an aggregate of 975 MCM/day (from surface runoff of 833 MCM/day and from groundwater safe yield of 142 MCM/day)

Description of water resources in the Philippines

- Per capita water availability is only 1,907cu.meters. Drinking water supply is distributed unevenly

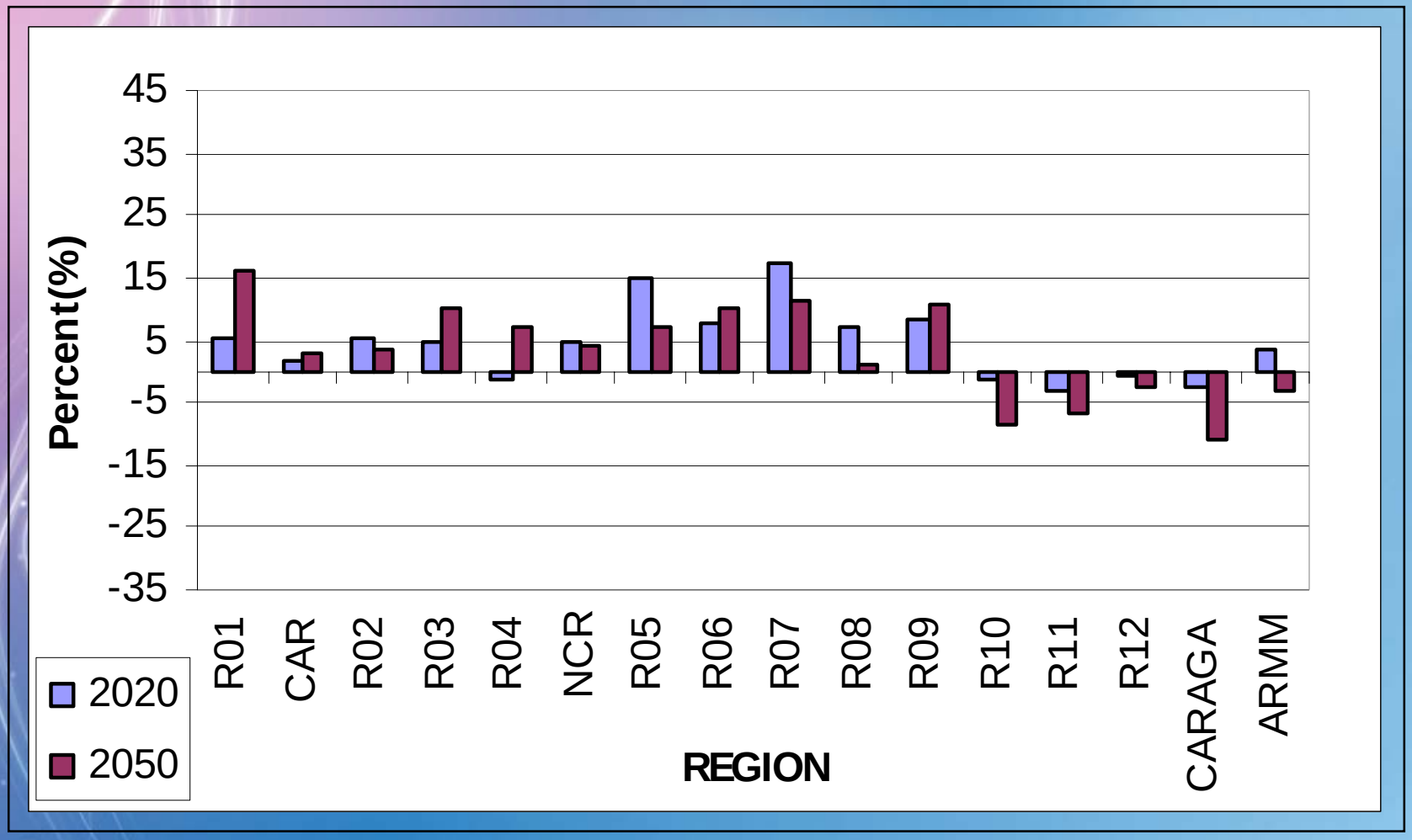
- Current water demand is divided among:
  - * Agricultural 80%
  - * Commercial and industrial 16%
  - * Domestic 4%

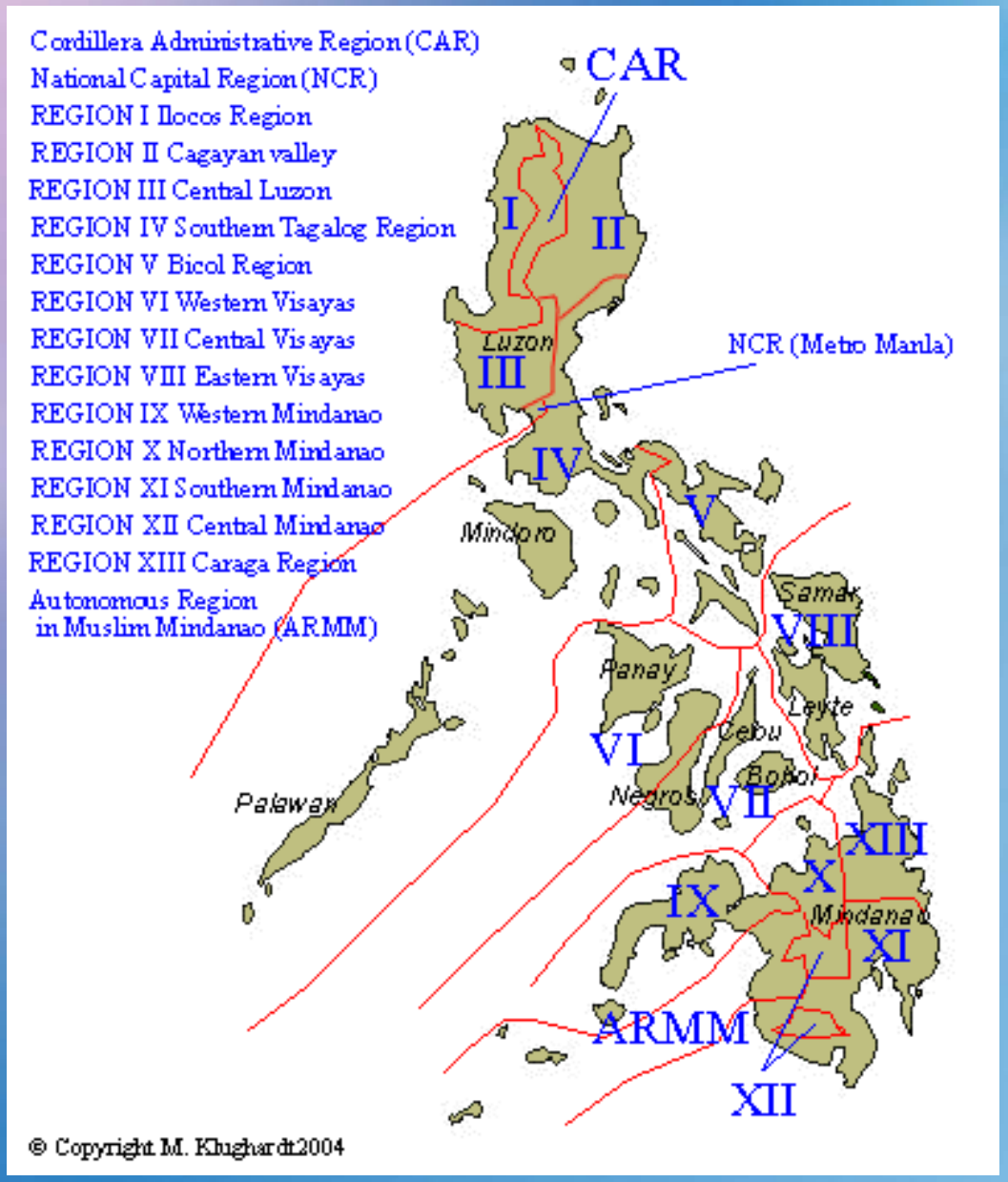
Climate change scenarios for 2020 and 2050*

- Mean seasonal temperatures are expected to rise by about 0.8ºC to 1.2ºC for 2020 and 1.7ºC to 2.4ºC by 2050;
- Projection of seasonal temporal rainfall variation is largest (-35% to 40%) during MAM and JJA

*** IACCC/EMB 2009; enabling activities for the preparation of the SNC on climate change to the UNFCC, UNDP GEF project No. 00037339**

Projected Changes in Annual Mean Rainfall Relative to the Period 1971-2000 (based on SRES A1B)




Cordillera Administrative Region (CAR)
National Capital Region (NCR)
REGION I Ilocos Region
REGION II Cagayan valley
REGION III Central Luzon
REGION IV Southern Tagalog Region
REGION V Bicol Region
REGION VI Western Visayas
REGION VII Central Visayas
REGION VIII Eastern Visayas
REGION IX Western Mindanao
REGION X Northern Mindanao
REGION XI Southern Mindanao
REGION XII Central Mindanao
REGION XIII Caraga Region
Autonomous Region in Muslim Mindanao (ARMM)
CAR
I
II
Luzon
III
NCR (Metro Manla)
IV
V
Mindoro
Samar
VIII
Panay
Leyte
Cebu
VI
Bohol
Negros
VII
Palawan
XIII
X
IX
Mindanao
XI
ARMM
XII
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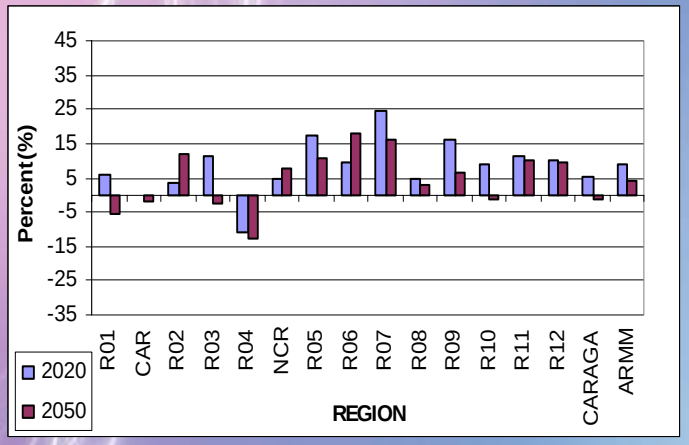
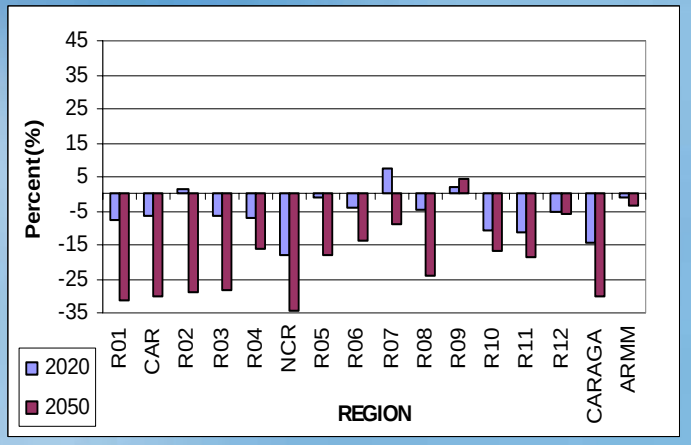
Projected Change in Seasonal Mean Rainfall Relative to the Period 1971-2000 (based on SRES A1B)

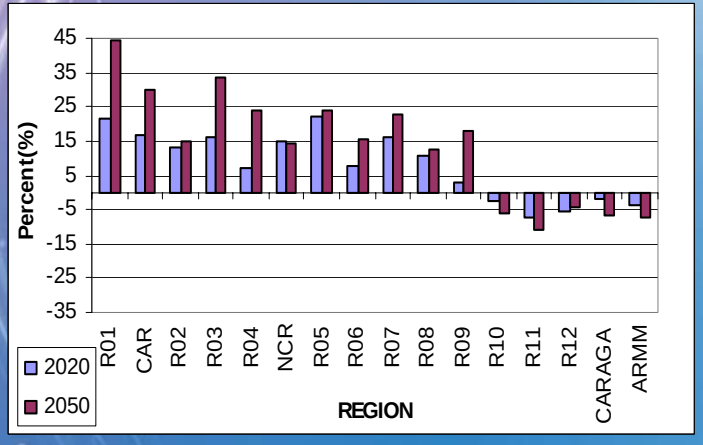
DJF



MAM



JJA



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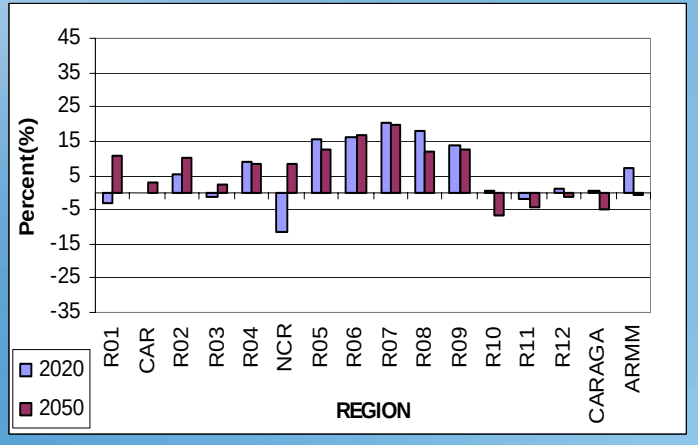
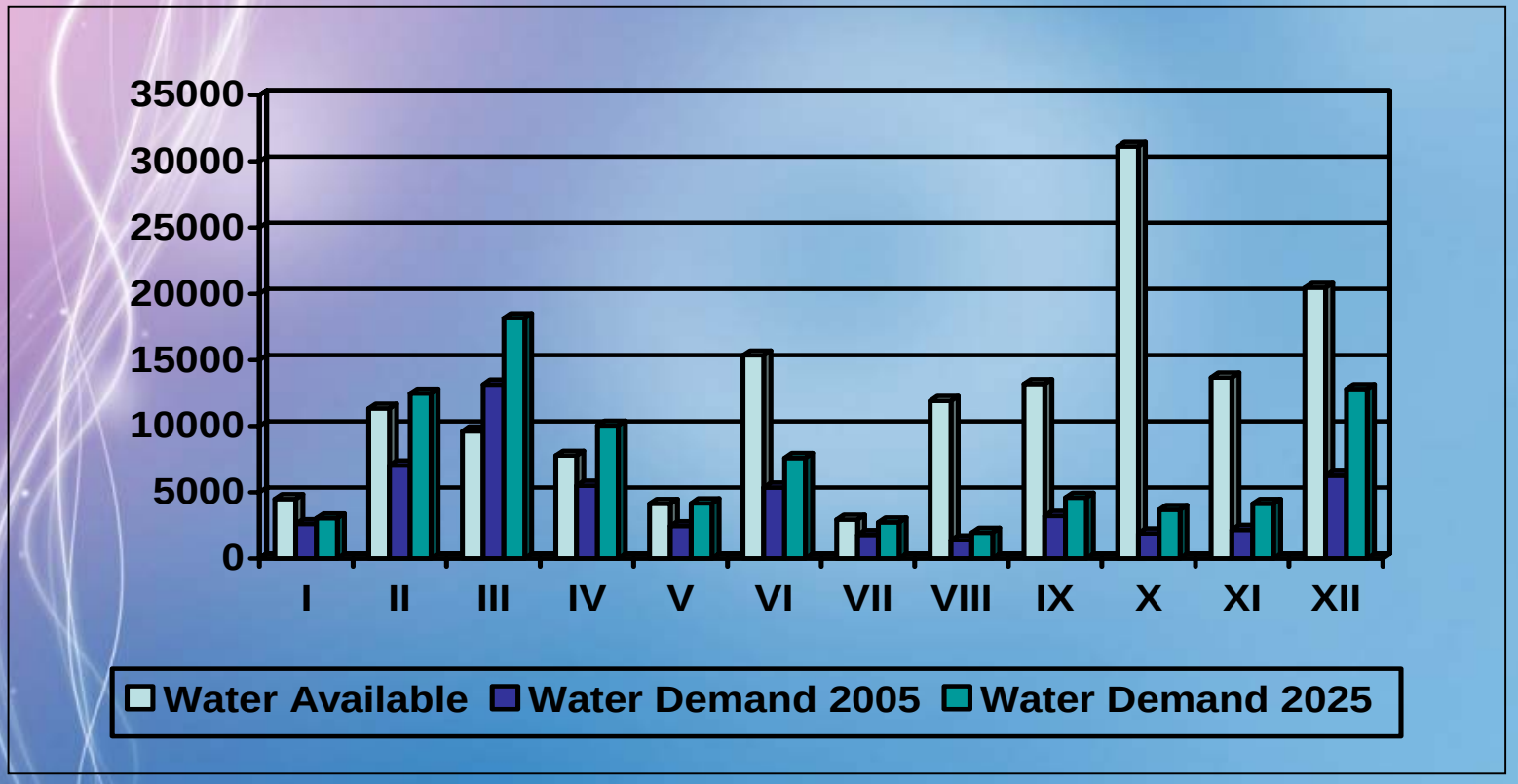


Projections: 2025

Water availability vs. water demand [using 2005 water demand baseline]



Source: NWRB, 2008

Adaptation Options

Water supply side management

- Maximize the potential water resources availability

  * Improve watershed management including the adoption of integrated watershed and ecosystem management
  * Build capacity to capture excess water during the rainy/wet season (to have enough stored water for use during dry months) e.g. small water-impounding projects or SWIPs for irrigation

A Small Water Impounding Project

A SWIP in Villa Boado, Talugtug, Nueva Ecija showing the embankment (15 meters high) and the dominantly grassland watershed. Fish is raised in fish cages

(Source:http://www.fao.org/wocat)

✓ Practice of water augmentation and water harvesting techniques (e.g. rain harvesting, surface water collection and storage, stream flow diversion, ponding, etc.)

Water demand side management

- Maximize the use of water and minimize wastes of water

  * Practice of soil and water conservation techniques (e.g. contour farming, mulching and terracing, hedgerows planting and zero tillage, etc.)

  * Regular maintenance of irrigation facilities

Adaptation policies / policy framework

- Institutional efforts in both agriculture and water requirements of the sectors

  * SWIPs and shallow tube wells;
  * Promotion of soil and water conservation
  * Inclusion of a directional plan in the implementation of integrated water resource management (IWRM) at all levels of the government

The Elements of Integrated Water Management in the Philippines

Sustainable Outcome No. 1 - Effective protection and regulation for water security and ecosystem health

Strategic Themes

- ✓ Ensuring rational, efficient and ecologically sustainable allocation of water
- ✓ Enhancing effectiveness in groundwater management and aquifer protection
- ✓ Achieving clean and healthy water
- ✓ Managing and mitigating risks from water related disasters and climate change

Sustainable Outcome No. 2 - Sustainable Water Resources and Responsive Services for Present and Future Needs

Strategic Themes

- ✓ Promoting water conservation/stewardship
- ✓ Improving water use efficiency expanding access
- ✓ Ensuring availability of affordable and responsive water supply and sanitation services

Sustainable Outcome No. 3 - Improved effectiveness, accountability, and synergy among water related institutions and stakeholders

Strategic Themes

- ✓ Promoting participatory water governance and supportive enabling environment
- ✓ Strengthening knowledge management and building capacity for IWRM

Sustainable Outcome No. 4 - Adaptive and Proactive Response to Future Challenges

Strategic Themes

- ✓ Exploring innovative pathways to water resource management:
  - o Water sensitive design: ensuring sustainable and environmentally-sound development and water management practices
  - o Water trading: towards a more efficient allocation of water

The IWRM

- Need for changing an economic price for water
- Need for cost recovery in the case of all water services (no final implementation mechanisms yet)

Thank you

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