

***Training-Workshop on Climate Change Adaptation in Watersheds for
Water, Food and Environmental Security in Southeast Asia***

SEARCA

College, Laguna, PHILIPPINES 4031

October 15-18, 2013

**PROMOTING SUSTAINABILITY OF
WATERSHEDS IN A CHANGING CLIMATE**

Part 2:

Improved Management and Climate Change Adaptation

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Attaining Sustainability & Resilience thru Improved Management and CC Adaptation

Science-Based Governance

Decision Support Systems in Place	Good Policies & Enforcement & Monitoring	Capable Actors and Players	Improved Planning and Execution
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Robust Economy

Adequate Livelihood

Population Management

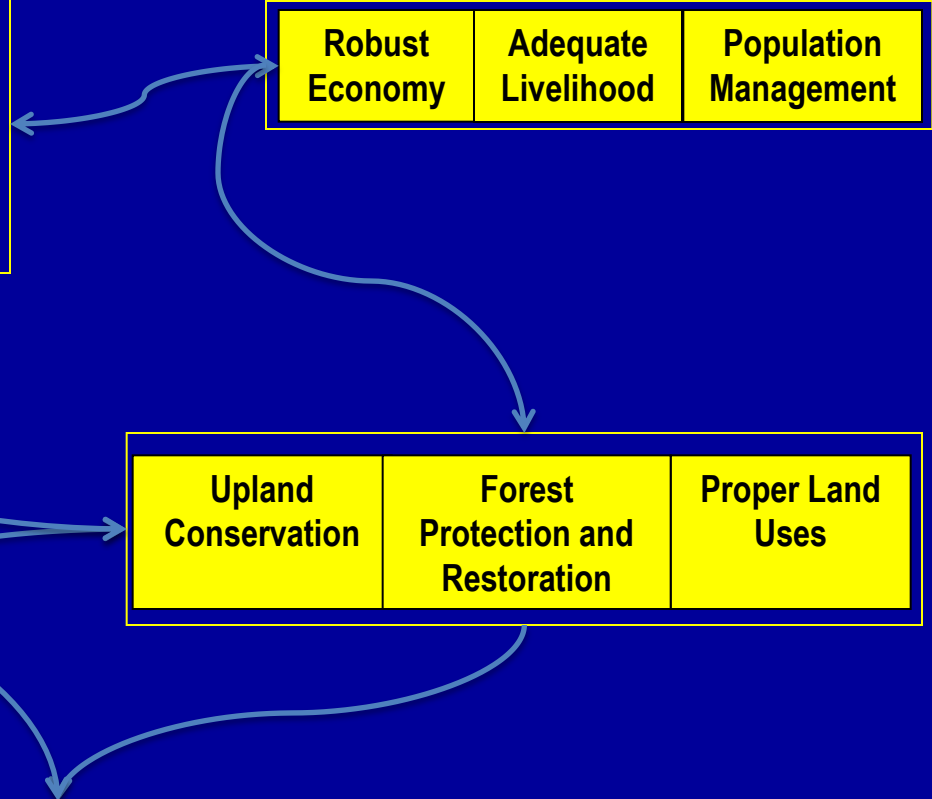
Climate Change Mitigation and Adaptation

Upland Conservation

Forest Protection and Restoration

Proper Land Uses

Healthy, Sustainable and Resilient Watershed



Strategy 1

Promote science-based management of watersheds and science-informed policies and programs



S1 – Key Feature

All management and policy decisions must consider sustainability and resiliency of water as the primary decision parameter



There are Tradeoffs between OPTIONS



PROTECTION FOREST



AGROFORESTRY



NATURAL VEGETATIVE
STRIP



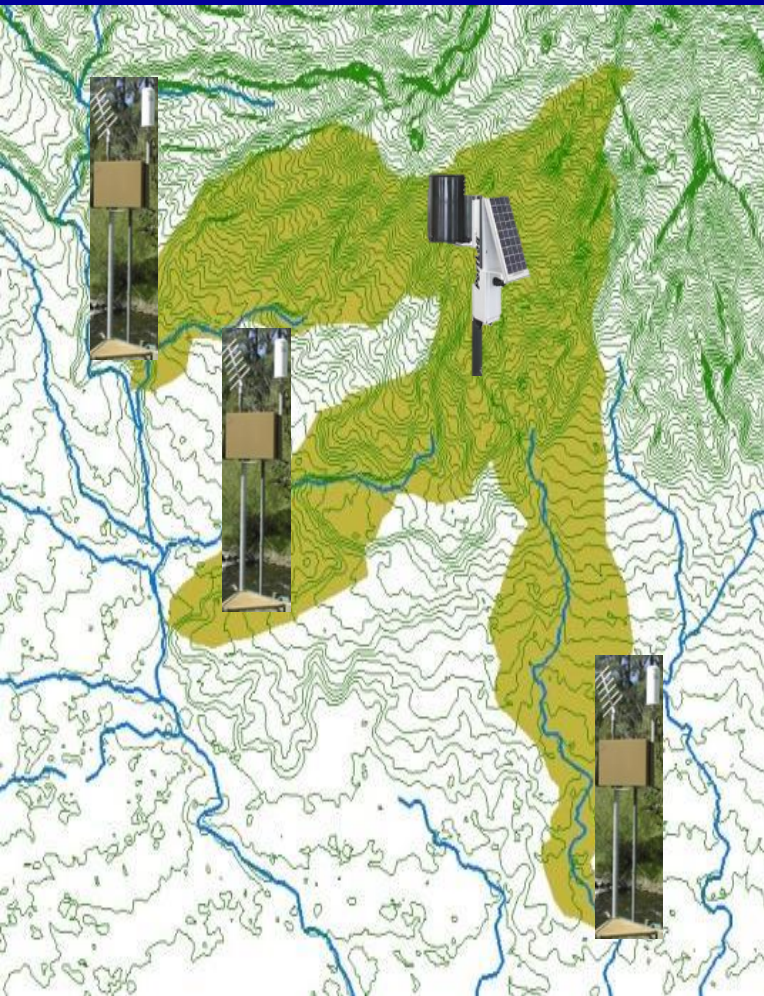
CONTOUR
FARMING

S1 - Intervention 1



Support long term research, development and technology transfer programs to strengthen foundation for better decisions

S1 – Intervention 2



Establish network of learning watersheds in strategic locations as regional focal venues for research and capability building programs

S1 – Intervention 3



Develop decision support system including long term monitoring, accounting and valuation of watershed resources and services

S1 – Intervention 4

LGUs must engage in environmental monitoring system



S1 – Intervention 5



Policy studies and development

- Clarify rules governing roles of various stakeholders
- State and non-state driven governance
- Decentralization

S1 – Intervention 6

Aggressive communication program to bring research outputs to policy makers and managers using multimedia and aiming to

- Inform and educate
- Transform mindset and values
- Provoke to take appropriate action

Strategy 2



Enhance the ability and transform mindset of watershed managers and planners ...

S2 – Intervention 1



Enhance information,
education and
communication directed
to multiple audience

S2 – Intervention 2



Strengthen formal education (i.e., institutions and programs) to produce more specialists

S2 – Intervention 3



Enhance capability and transform mindset of LGUs

- Providers of basic services to watershed dependent communities
- Providers of technical assistance thru MAOs and MENROs
- Comprehensive planners
- Local watershed law makers
- Law enforcers and monitors

S2 – Intervention 4



Enhance capability and transform mindset of local communities as

- Responsible watershed managers
 - Production/plantation forests
 - Protection forests
- Planners and implementors
- Entrepreneurs

S2 – Intervention 5



Enhance capability and transform mindset of private sector as

- Responsible watershed managers
 - Production/plantation forests
 - Protection forests/areas
- Comprehensive planners and implementors
- Co-managers with local communities and other stakeholders

S2 – Intervention 6



Enhance capability and transform mindset of policy makers as

- Science-based policy makers
- Science-based program advocates who believe it is good politics
- Policy makers who understand the value of investing on projects that yield outputs beyond their term

Strategy 3



Development and implementation of integrated watershed management plan

S3 – Intervention 1

- Unify Stakeholders

LGUs	POs Local Communities	NGOs	National Gov't Agencies	Industry
Farmers	Academe	Research	Fishers	Private

S3 – Intervention 2

Landscape Approach



S3 – Intervention 3

Harmonize functions of various agencies

Fishery

Agriculture, Agrarian Reform, Public Works, NWRB

Power, Energy, Irrigation

Environment and Natural Resources

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Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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S3 – Intervention 4

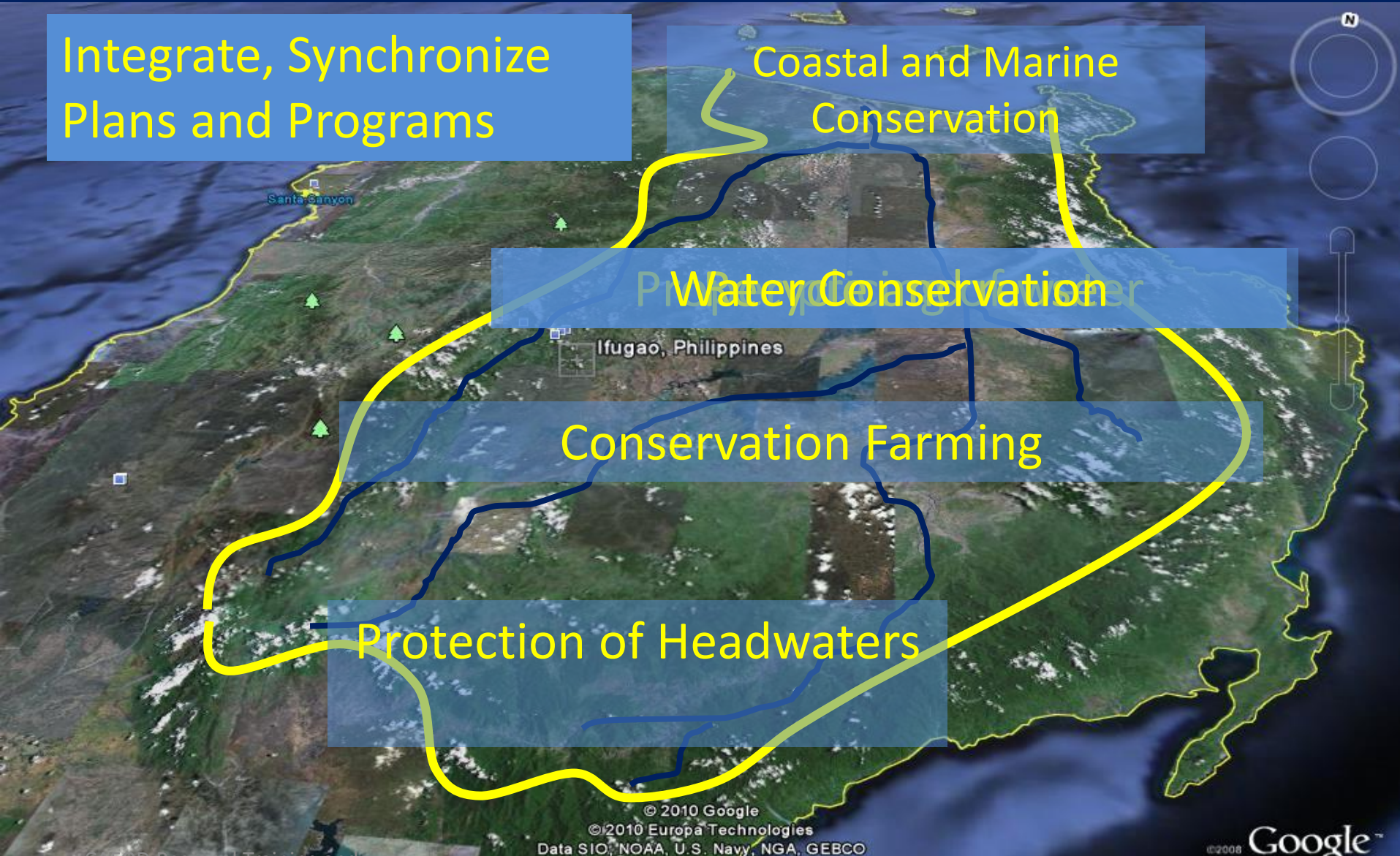
Integrate, Synchronize
Plans and Programs

Coastal and Marine
Conservation

Water Conservation

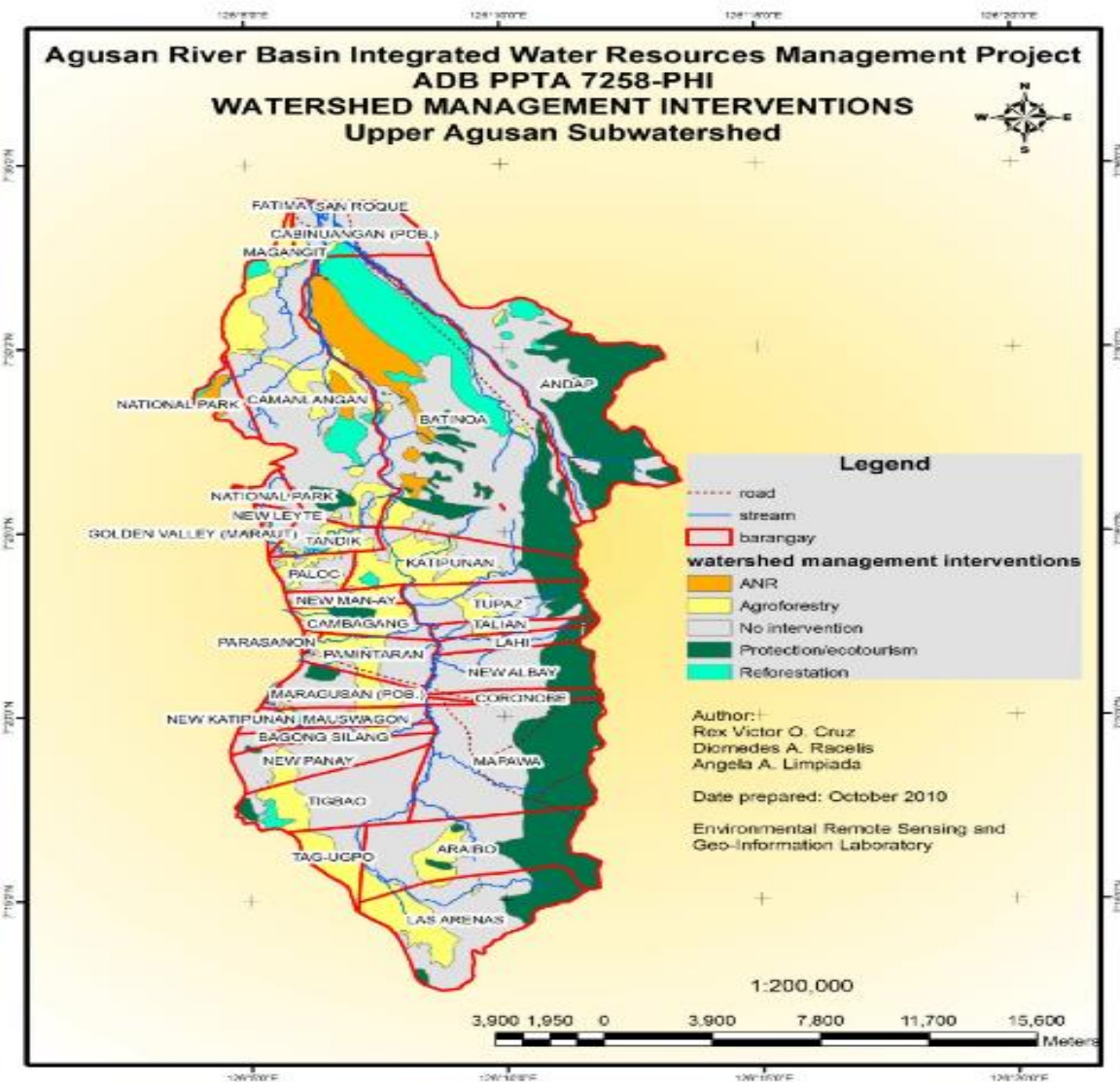
Conservation Farming

Protection of Headwaters



S3 – Intervention 2

Figure 1.26: Watershed intervention Map of Upper Agusan Watershed



Unify all local land use & management plans

- CLUP, zoning ordinances and development plans
- FLUP and FMP
- PAMP
- ADMP
- Watershed plans
- CCA and DRR

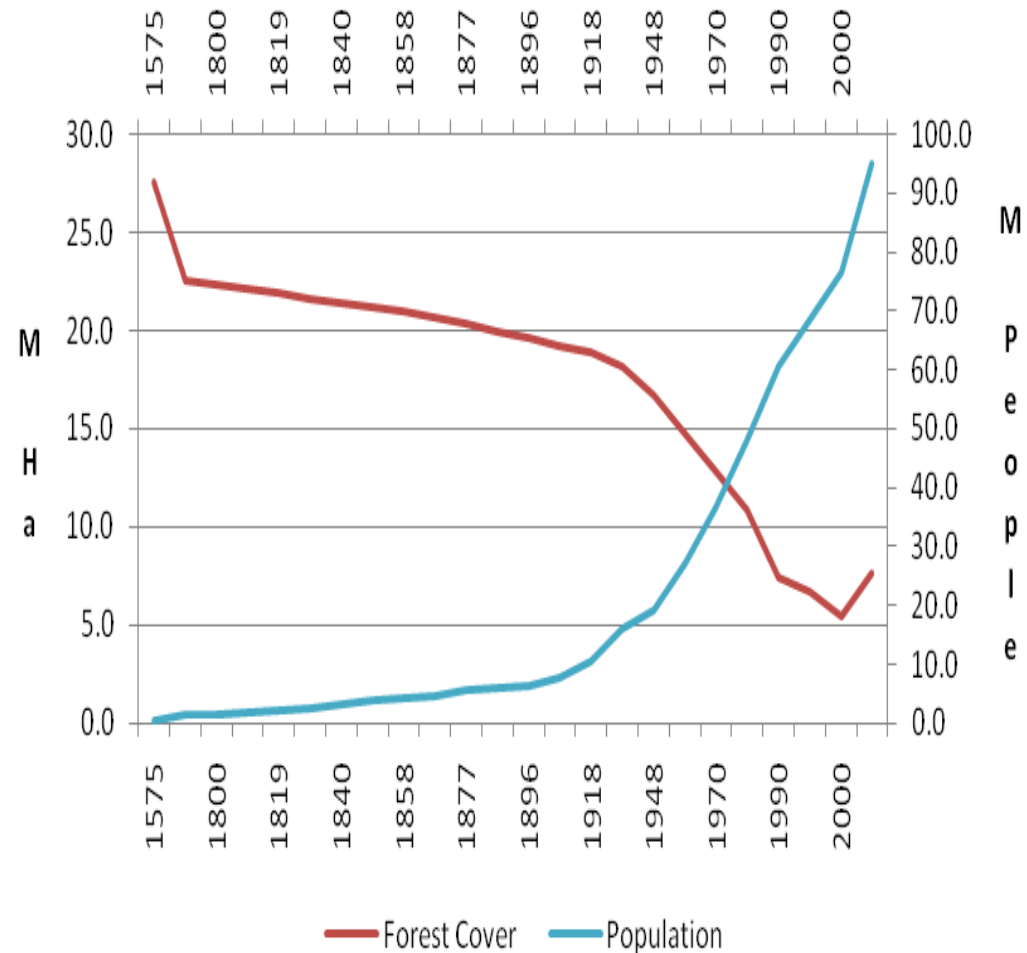
Strategy 4

Restoration of degraded forests



S4 – Key Features

- Science-based
 - Suitable species
 - Suitable sites
- Multiple outcomes
 - Resilient water
 - Poverty eradication
 - Biodiversity conservation
 - CCA and DRR

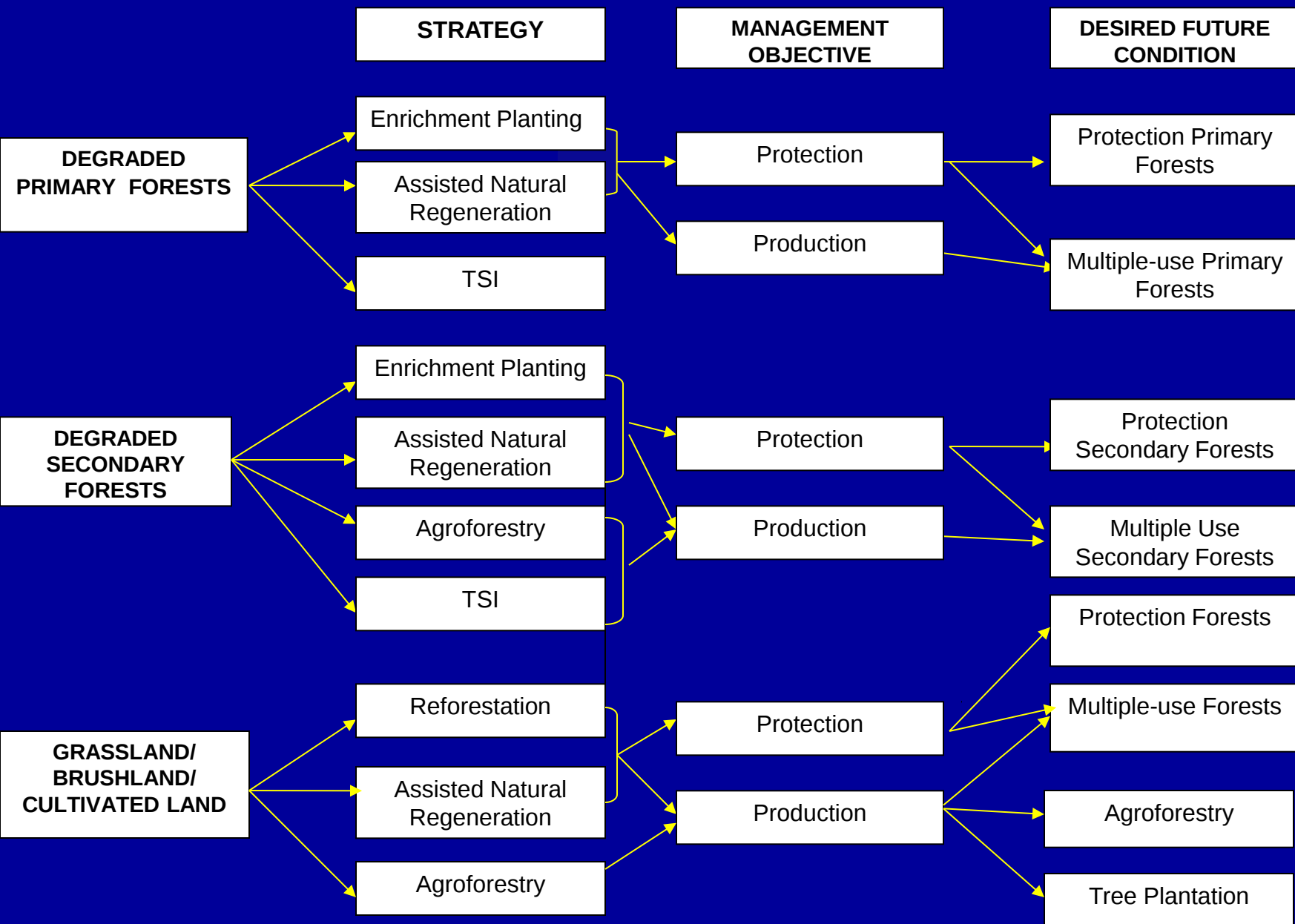


Forest cover and population trend
(Revised MFDP 2005, NCSB 2004, Cruz et al., 2011)

S4 – Intervention 1

Classification of degraded forests for restoration





Different modes of forest restoration

S4 – Intervention 2



Production of adequate quality planting materials

- Assessment of ecophysiological and silvical behaviors of indigenous and exotic species to facilitate selection of species suitable to specific areas and restoration objectives
- Tree selection program must be set in place
- Implement a system for inspection and certification of quality seeds and other planting materials

Strategy 5

LGU-led upland conservation



S5 – Intervention 1



CONSERVATION FARMING

S5 – Intervention 2

LGU-led enforcement of environmental laws

~~Waste Management~~
Forest Management



Strategy 6



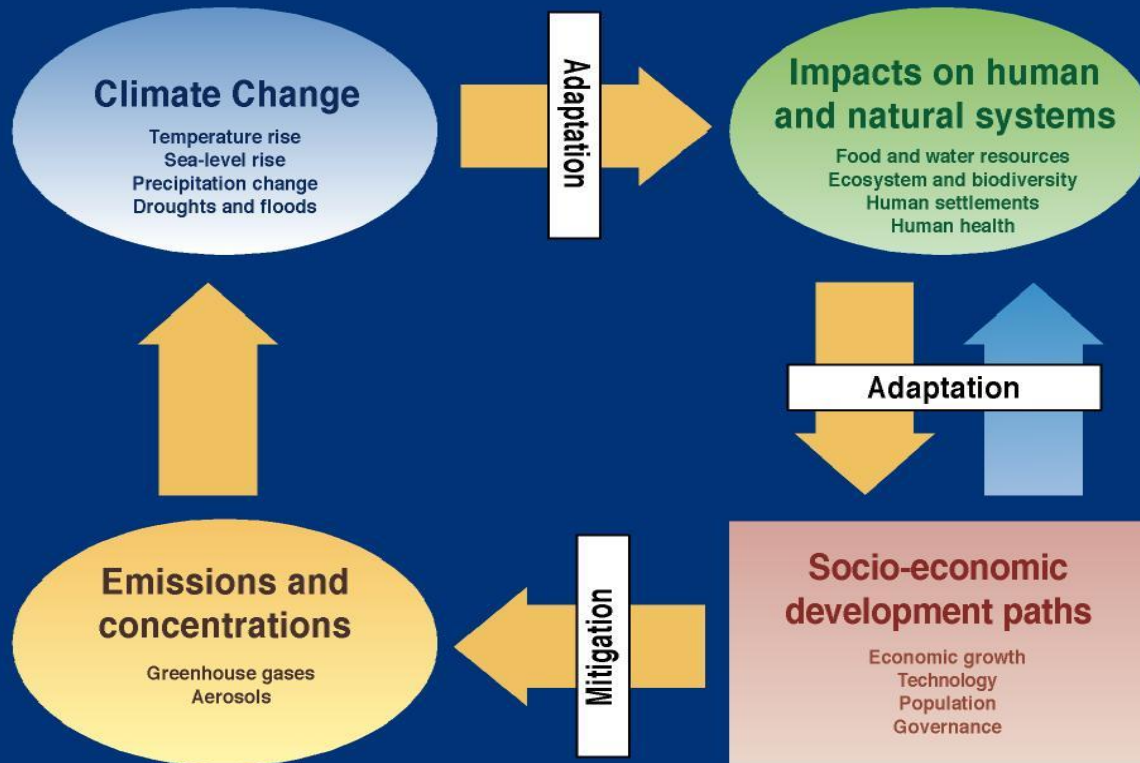
Climate Change Adaptation

S6 – Intervention 1

Assessment of watershed vulnerabilities and adaptation to climate change as influenced by other natural and human stressors

Responses to Climate Change

Climate Change - an integrated framework



SYR FIGURE 1-1

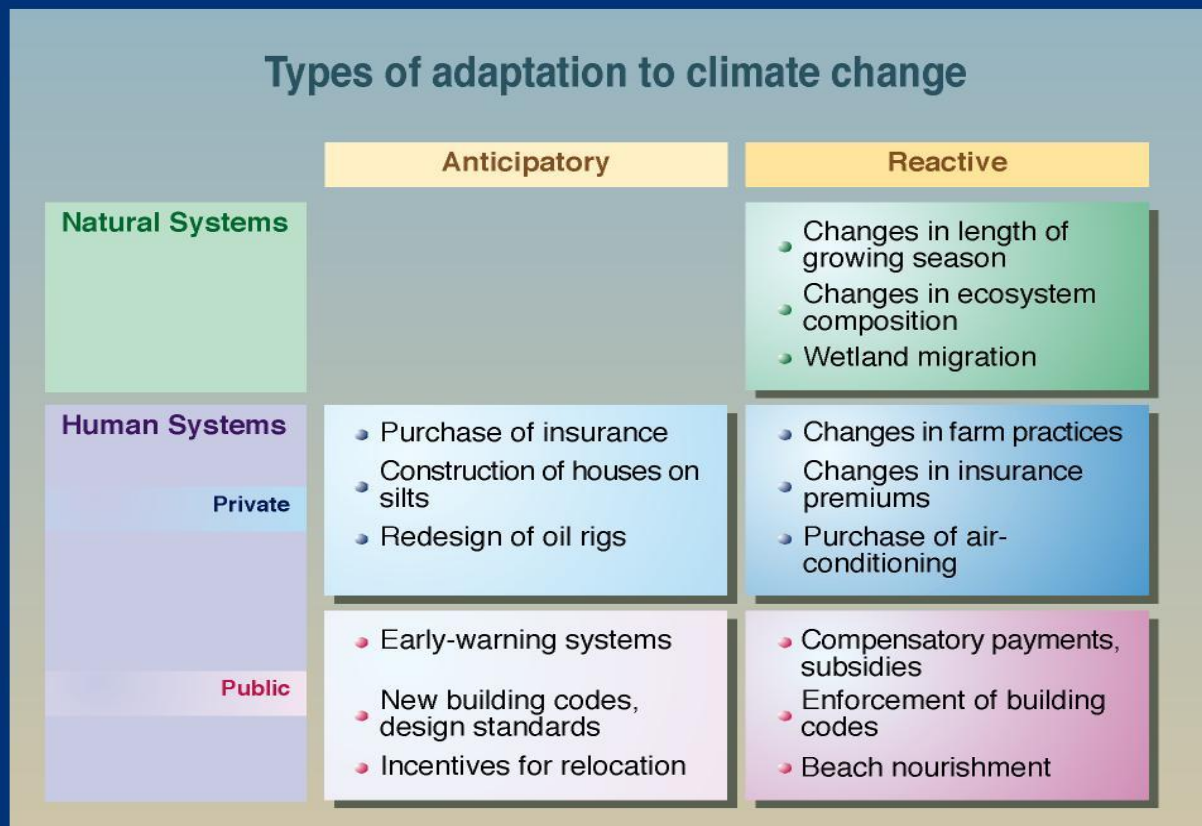
Responding to Climate Change

Adaptation

- increases resilience and capacity to cope with current and future changes in climate
- reduces adverse effects of CC and capitalize on opportunities
- Maladaptation exacerbates adverse impacts and compound vulnerability

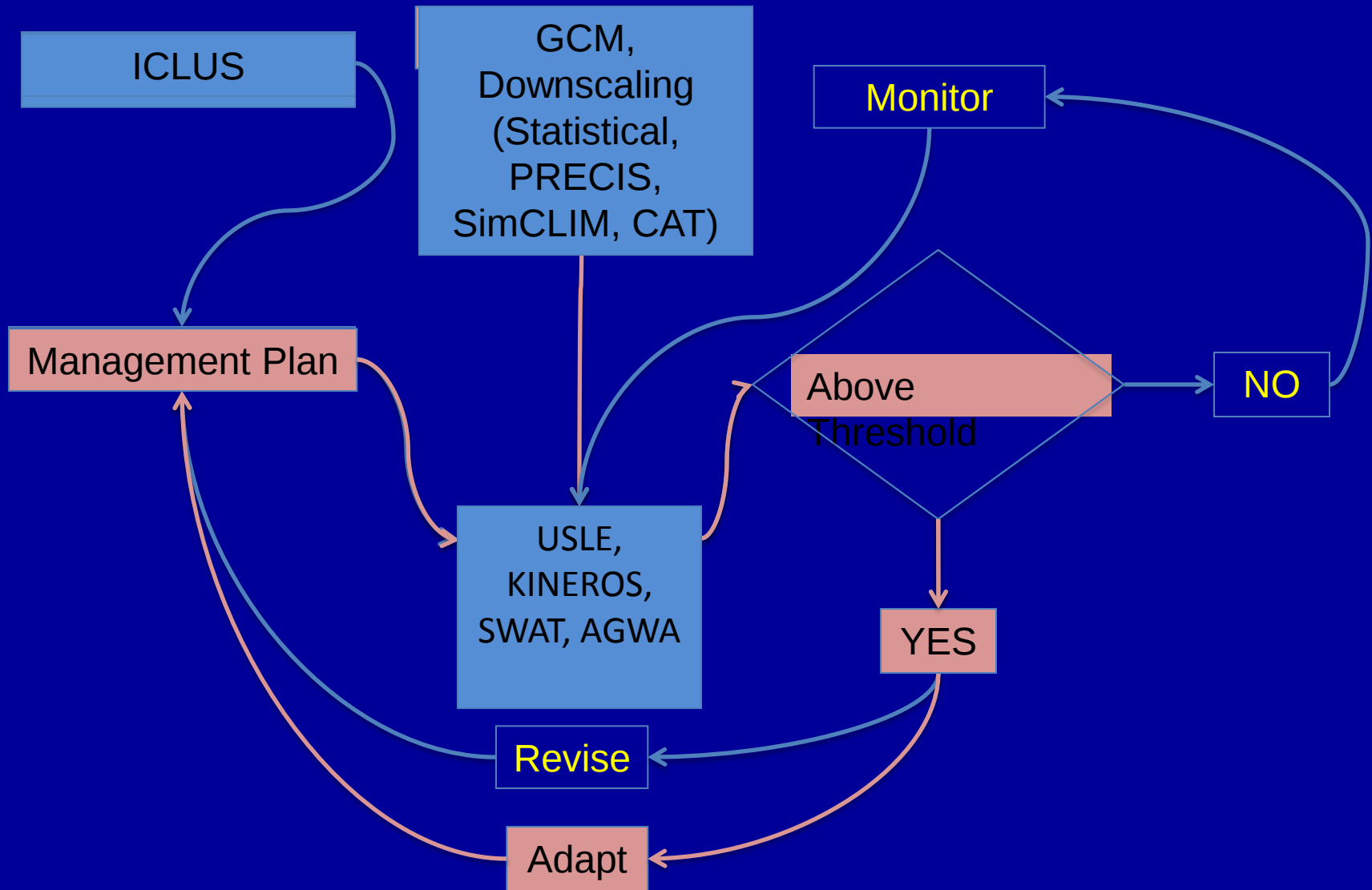


Responding to Climate Change

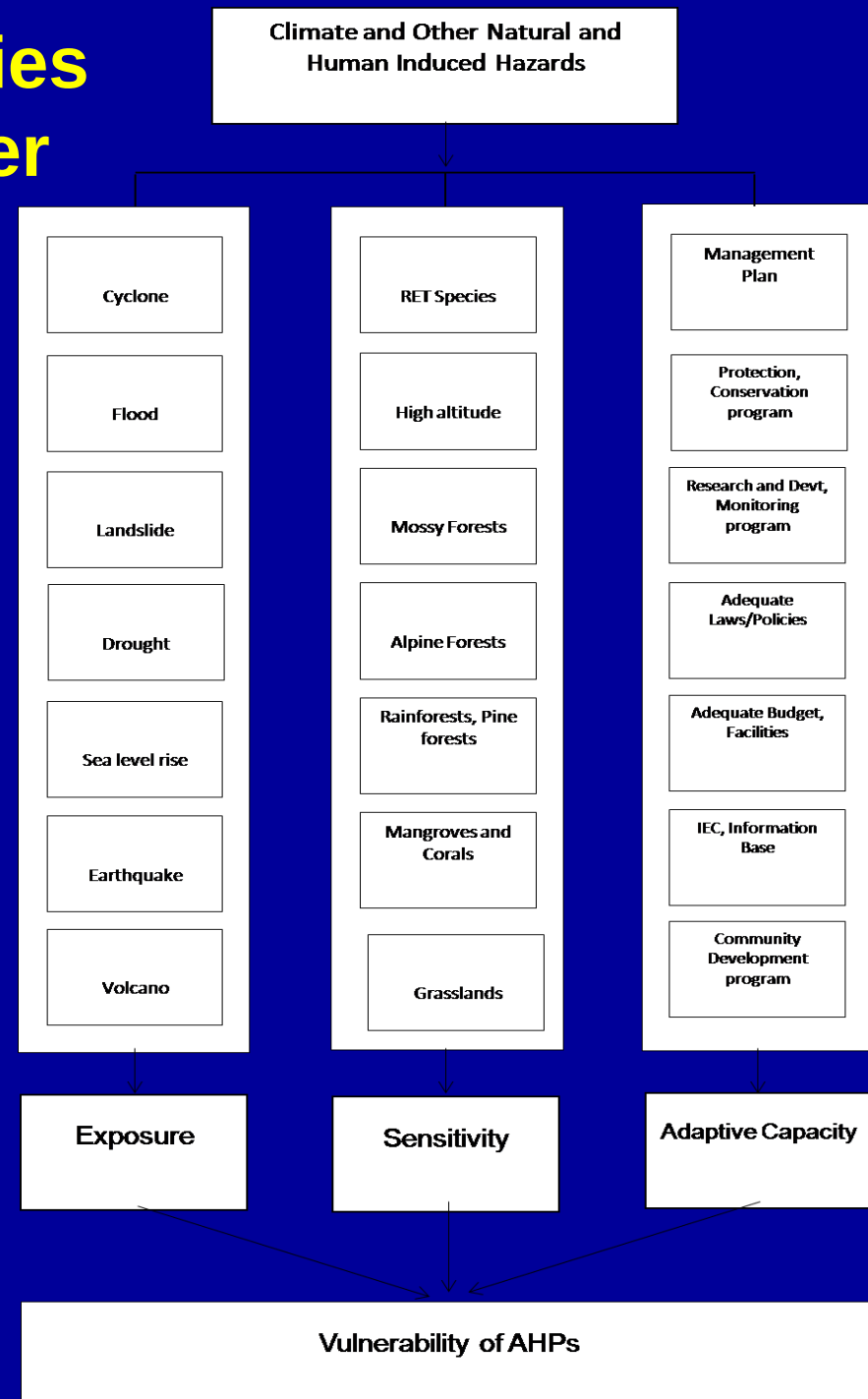
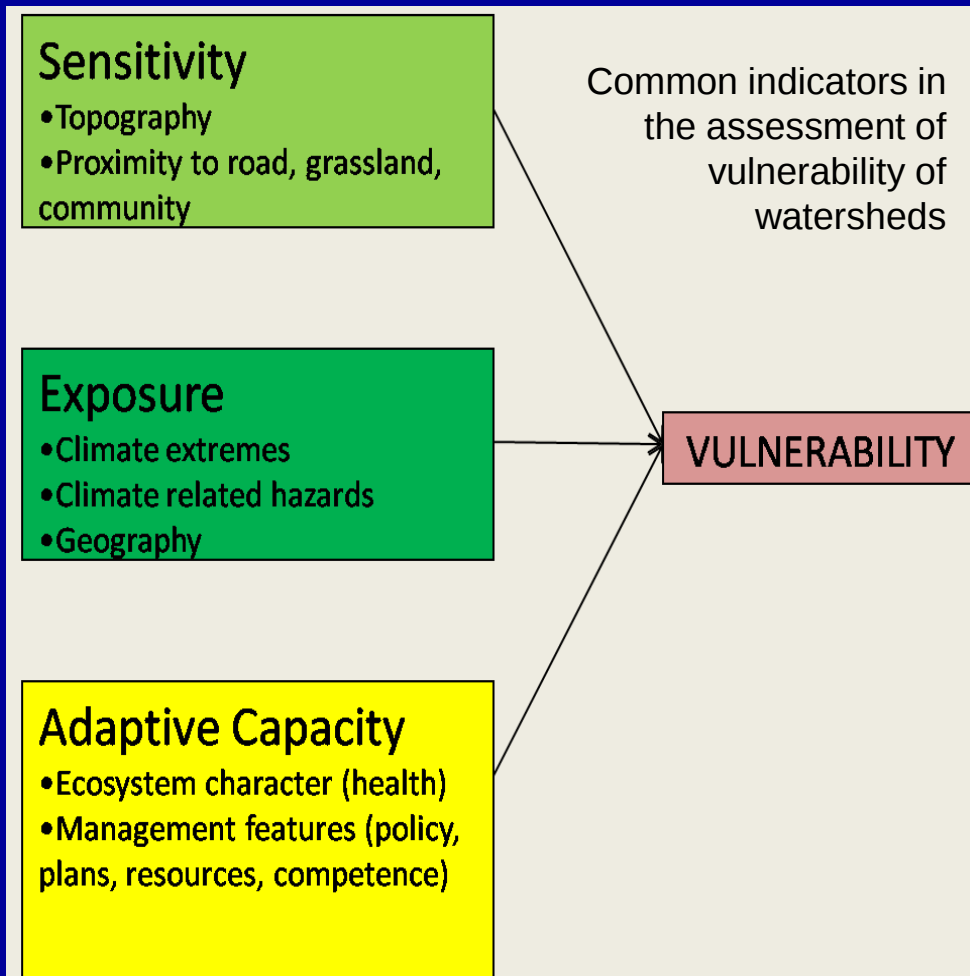


WG2 - FIGURE TS-9

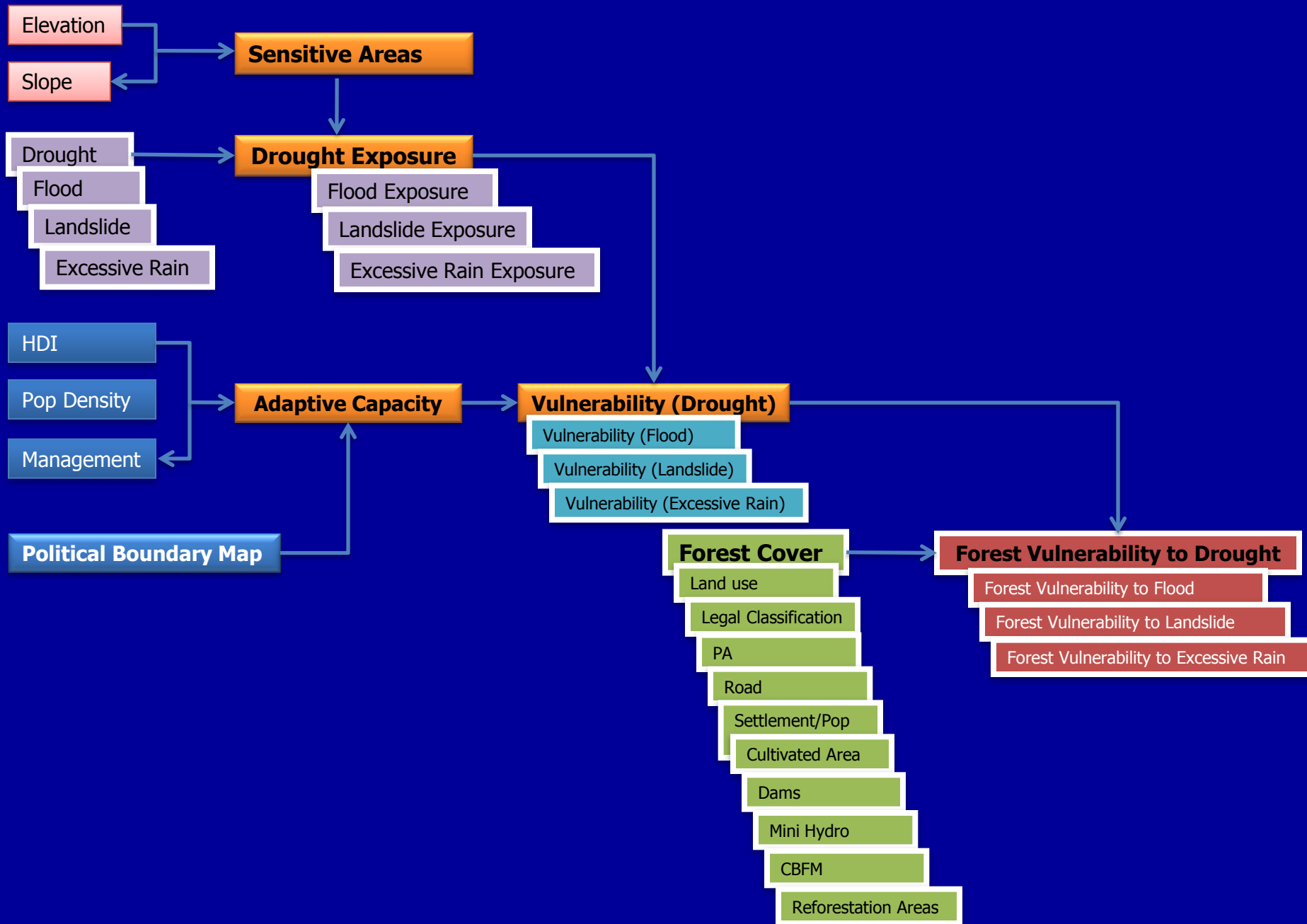
Assessing Impacts of Climate and Human Stressors on PA



Assessment of vulnerabilities of Watersheds to CC & other stressors



Factors that determine the vulnerability of watershed



Adapting to Climate Change

ISSUE #1 Adaptation can be spontaneous or planned

- Enhance capacity of human and natural systems to adapt spontaneously
- Apply proactively traditional and new measures



Adapting to Climate Change

ISSUE #2 Adaptation can be individual, sectoral, integrated

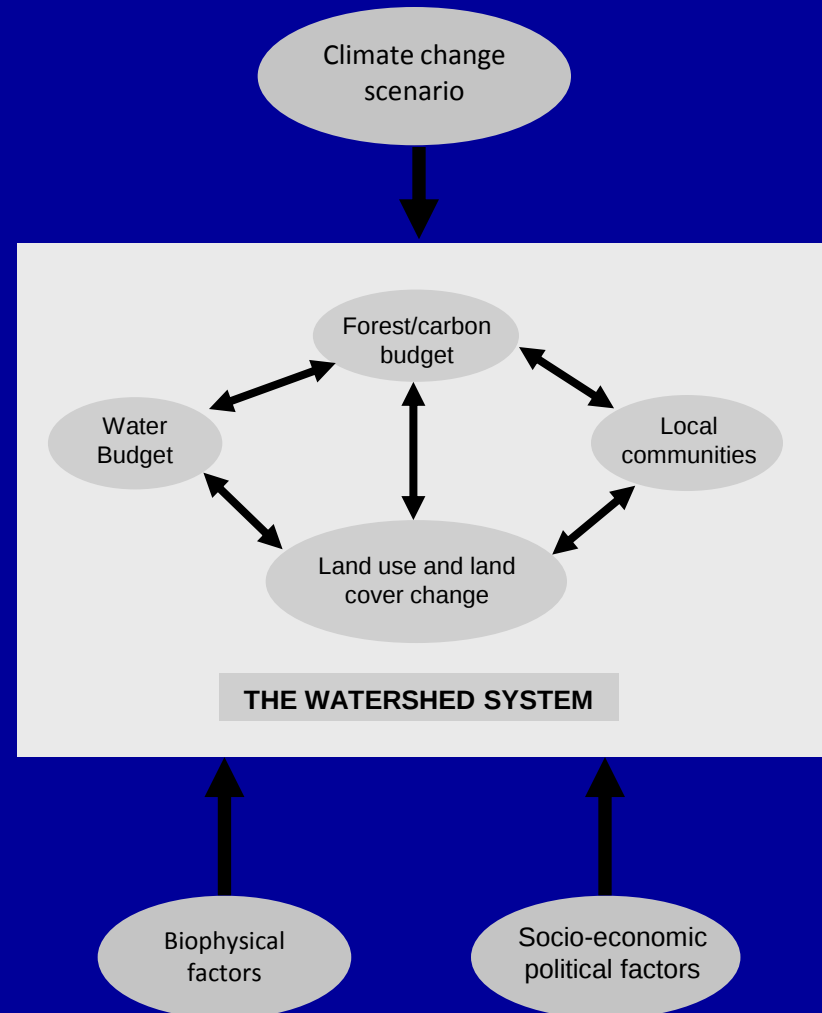
- **CC will impact organisms and resources with systemic implications**
- **Multilevel and multisectoral adaptation more robust than sectoral adaptation**
- **Challenge in determining suitable unit for integration – Watershed, ecosystem, landscape, community**

APR 10 2003

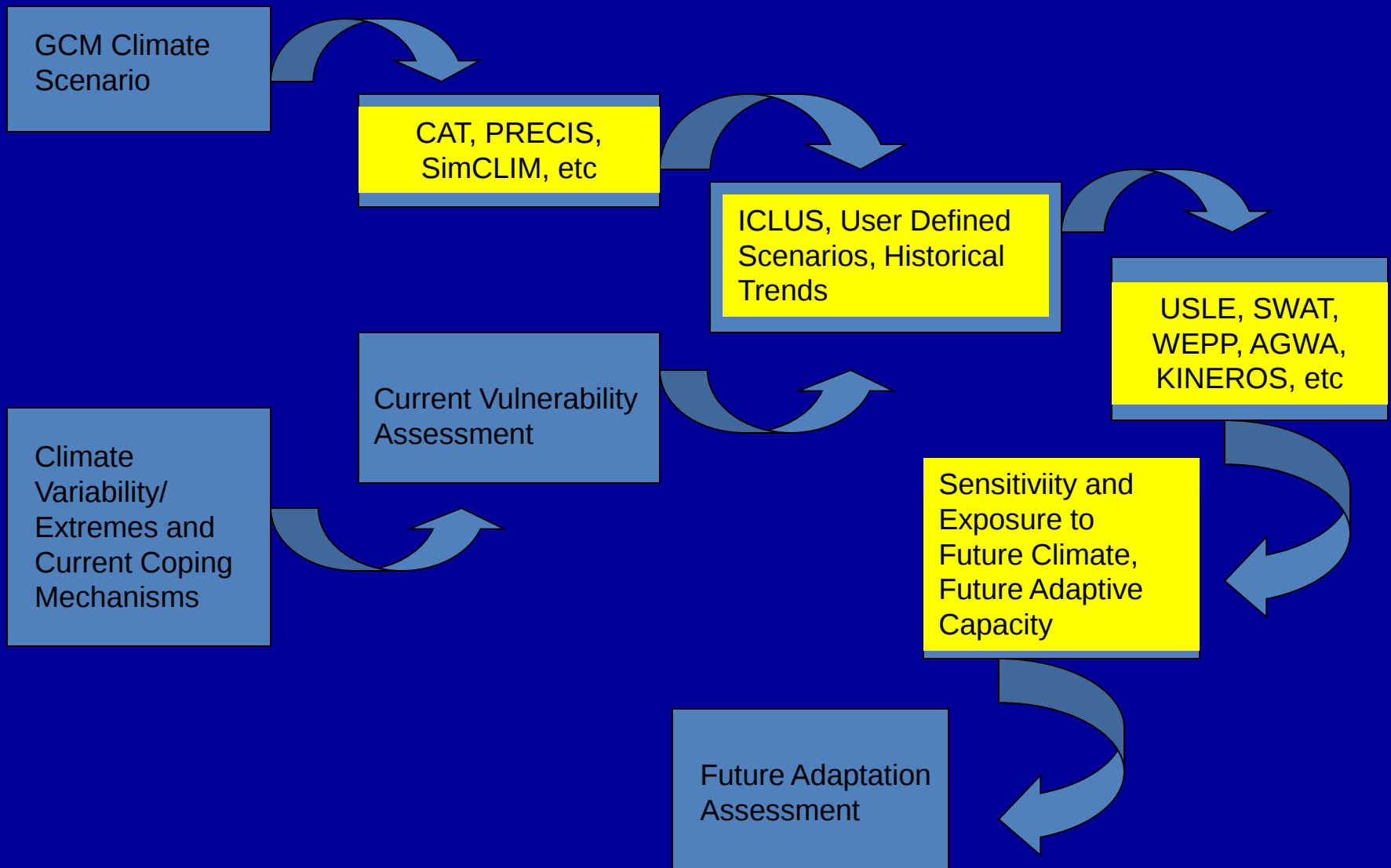
Adapting to Climate Change

ISSUE #3 Involves key processes

- Climate change/risk assessment
- Vulnerability assessment
- Adaptation assessment and implementation
- Capacity building



General Methodology of the study AIACC - Philippines



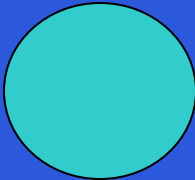
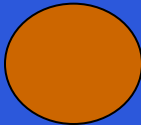
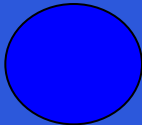
Adapting to Climate Change

ISSUE #4 Stakeholder participation enhances adaptation

- Because risks are context specific
- Participatory assessment of impacts, vulnerability and adaptation enhances awareness and capacity to adapt



Adapting to Climate Change

Groups	Impacts	Degree of (-) Impacts	Vulnerability
Better-off farmers	↓ production & income; ↔ food, livelihood, health		Better coping mechanism - low vulnerability
“Little” farmers	↓ production, food, livelihood, health; more debt		Poor coping mechanism – high vulnerability
Employees	↑ price of commodities		“Average” coping mechanism – moderately vul.
Business- persons (small-scale)	↓ in sales		“Average” coping mechanism – moderately vul.

Adapting to Climate Change

ISSUE # 5 Adaptive capacity uneven across and within countries or watershed

- Poor are more vulnerable with less capacity to adapt

„Champagne Glass“ Metaphor of Global Disparity

Population

20%

20%

20%

20%

20%

Income

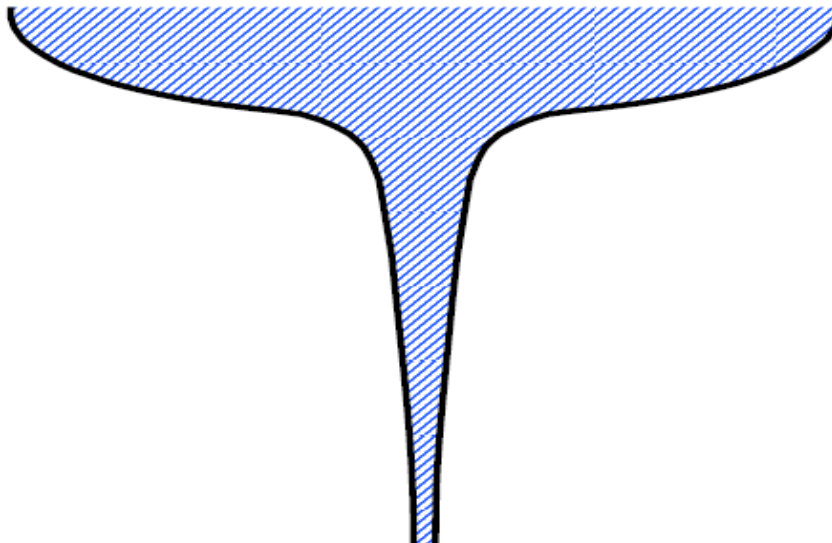
82.7%

11.7%

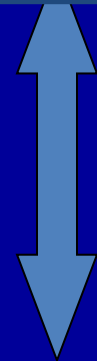
2.3%

1.9%

1.4%



Low Adaptive Capacity



High Adaptive Capacity

Adapting to Climate Change

ISSUE # 6 Can be multifunctional

- Biodiversity conservation
- Soil and water conservation
- Livelihood development and poverty reduction
- Food security



Adapting to Climate Change

ISSUE # 7 Some adaptation are better than others

- Most adaptation have other benefits
- There are adaptation with negative effects
- Helpful to weigh benefits and costs of options
- Multi-criteria analytical tools useful
- Tradeoff analysis (quantitative, qualitative)

Adapting to Climate Change

Adaptation for Forests and Agriculture	Effect on Water Resources	Effect on Institutions	Effect on Local Communities
Use of early maturing crops	+ Lower water demand	0	+ Higher income
Use of drought resistant crops	+ Lower water demand	0	+ Higher income
Supplemental watering	- Higher demand for water	- Increase cost of developing alternative sources of water	- Greater labor demand + Higher income

Adapting to Climate Change

ISSUE # 8 Enhancing adaptive capacity critical

- Current adaptive capacity at most is sufficient for current climate but unlikely to meet future climate risks
- Need to address adaptation deficit



Adapting to Climate Change

ISSUE # 9 Generation and dissemination of information and knowledge, foundation of effective adaptation



Adapting to Climate Change

ISSUE # 10 Mainstreaming adaptation to planning systems

- CC with population growth, poverty, urbanization, industrialization will impinge on well-being of society and environment
- Adaptation should be framed within comprehensive development agenda
- Consciousness on climate change in local and national planning and policy formulation

Adapting to Climate Change

ISSUE # 11 Barriers and limitations to adaptation

- Inadequate awareness and appreciation
- Lack of capacity for assessment of impacts, vulnerability and adaptation
- CC concerns are usually masked by poverty, poor economy, natural disasters
- Adaptation is limited by natural, economic and technological constraints
- Governance and policy issues

Protection & Conservation Program
R&D and Monitoring Program
Community Development Program

Right Policies and Institutions
Adequate Budget, Facilities, Equip
Capable Human Resources

Comprehensive Watershed Management and Land Use Plan

Increase adaptive
capacity

Increase resilience
of watersheds

Reduce impacts of climate and human
stressors

