River/Lake Basin Approaches to Water Resources Management:

A Review of Project Experiences: Focus on Management Issues and Policy Responses

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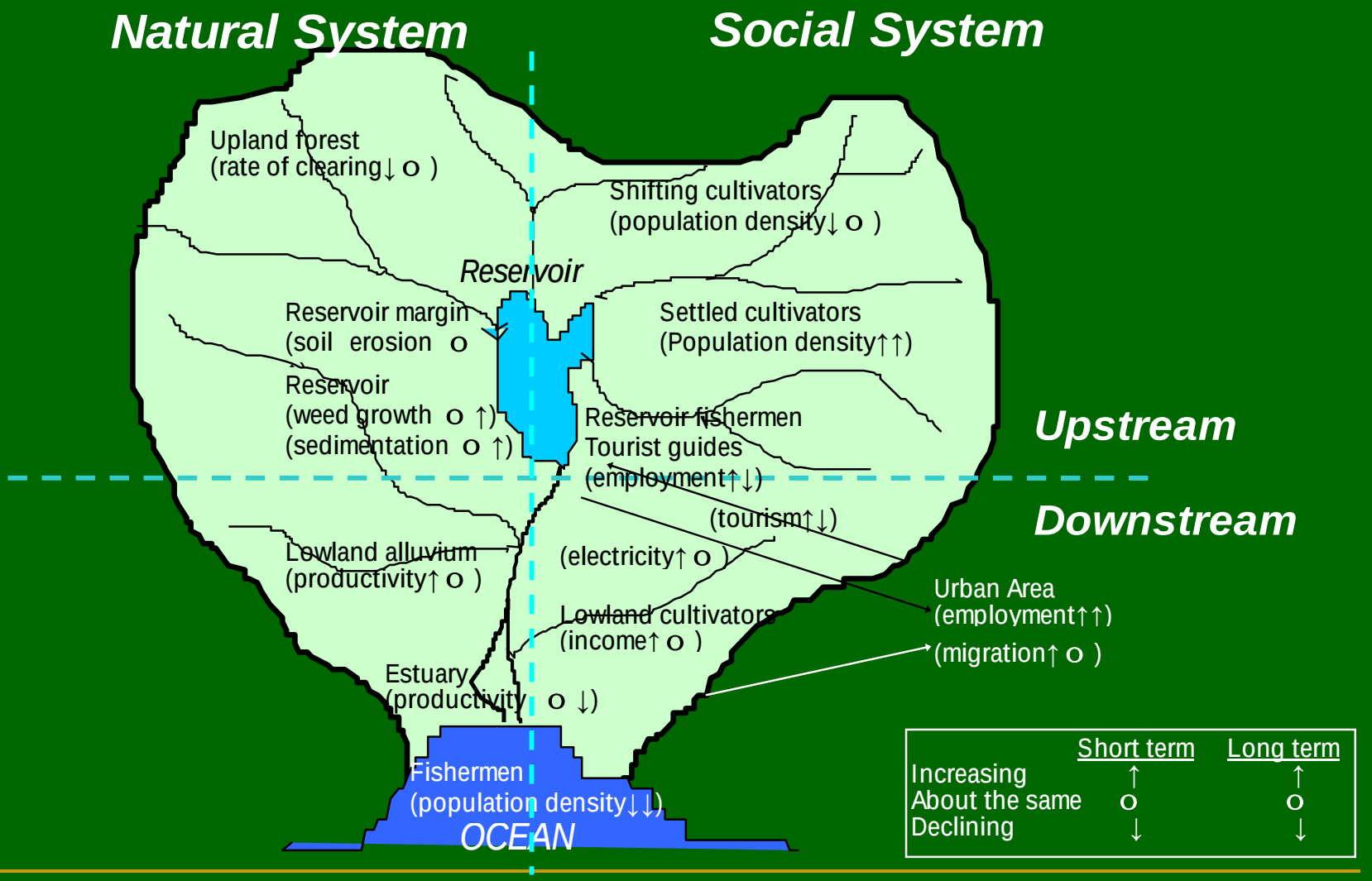
UNCRD/ILEC/UNEP Joint Project on River/Lake Basin Approaches to Water Resources Management

Background: 1986 Workshop

- Basin-wide perspective
- Ecosystem approach
- Policy analysis perspective
- Institutional capacity-building

A Natural and Social System Schematic of a River/Lake Basin

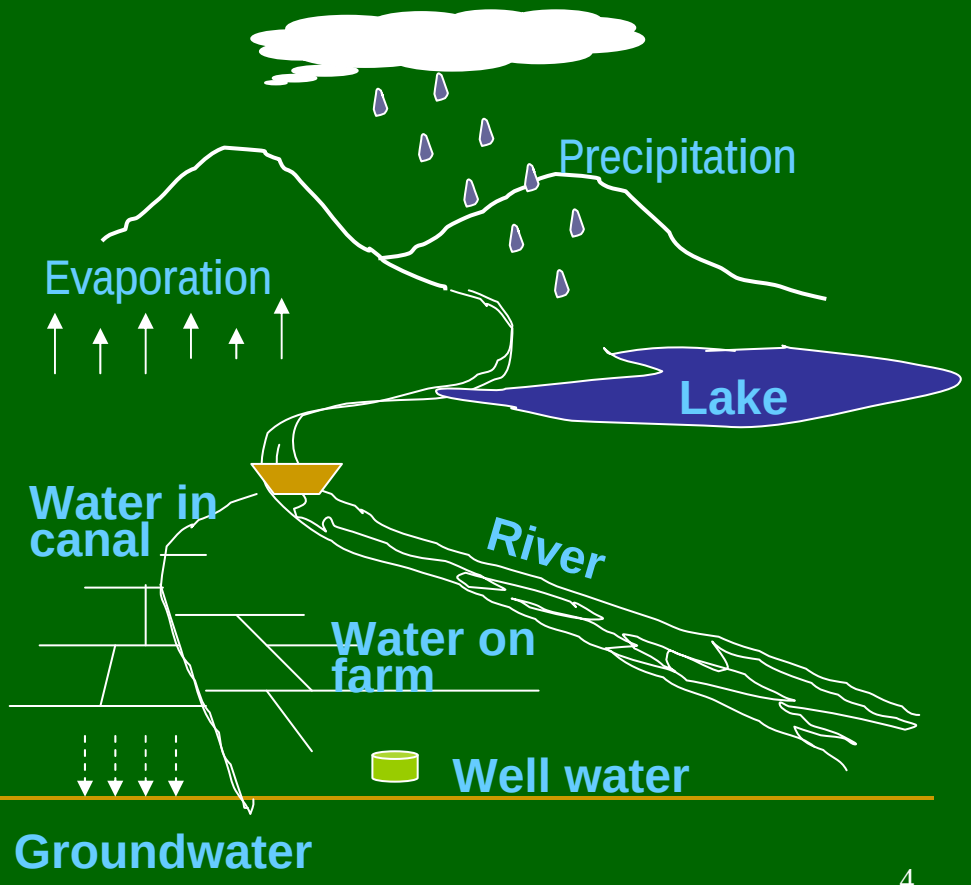


Source: M. M. Hufschmidt

Property Regimes of Environmental Resources: Policy implications for containing free-rider behaviors

- Open access resources: Air, ocean, space, ..
- State property: Forest, lakes, rivers, coastal zone, ..
- Private property: Farmland, apartments, factories, ..
- Communal/common property: Village forest and grazing land, village water supply facility, irrigation system

Unique Features of Water Resources



Water Resources Management Issues to be Addressed in a River/Lake Basin Context

- Linkages between upper watershed resource use decisions/practices and downstream water management
- Social conflicts over the use of water among competing uses and users
- Environmental and social consequences of water resources development schemes

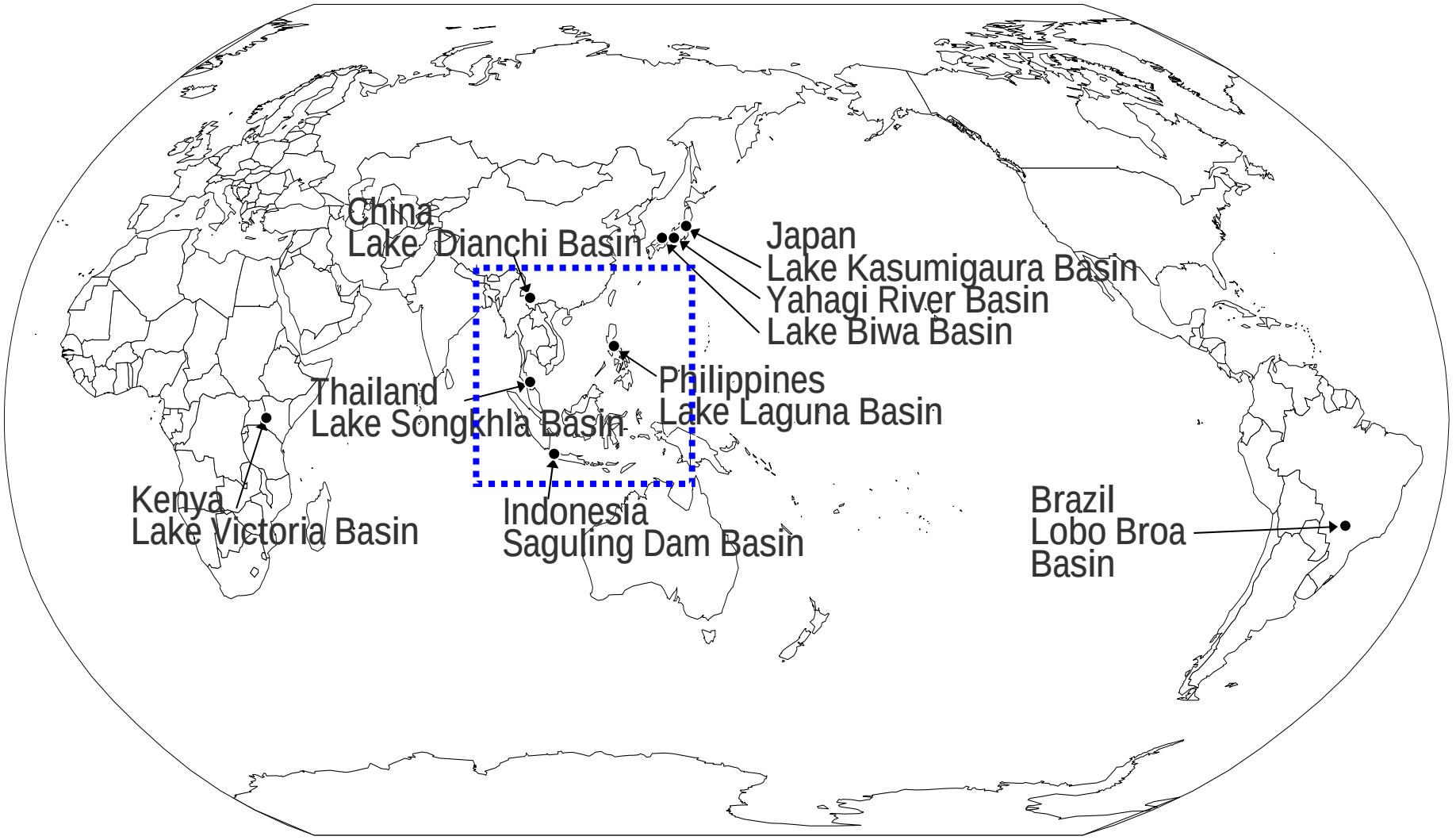
Focus of Analysis

- 1st Year Study: Problem structure
- 2nd Year Study: Policy responses
- 3rd Year Study: Proposed Action

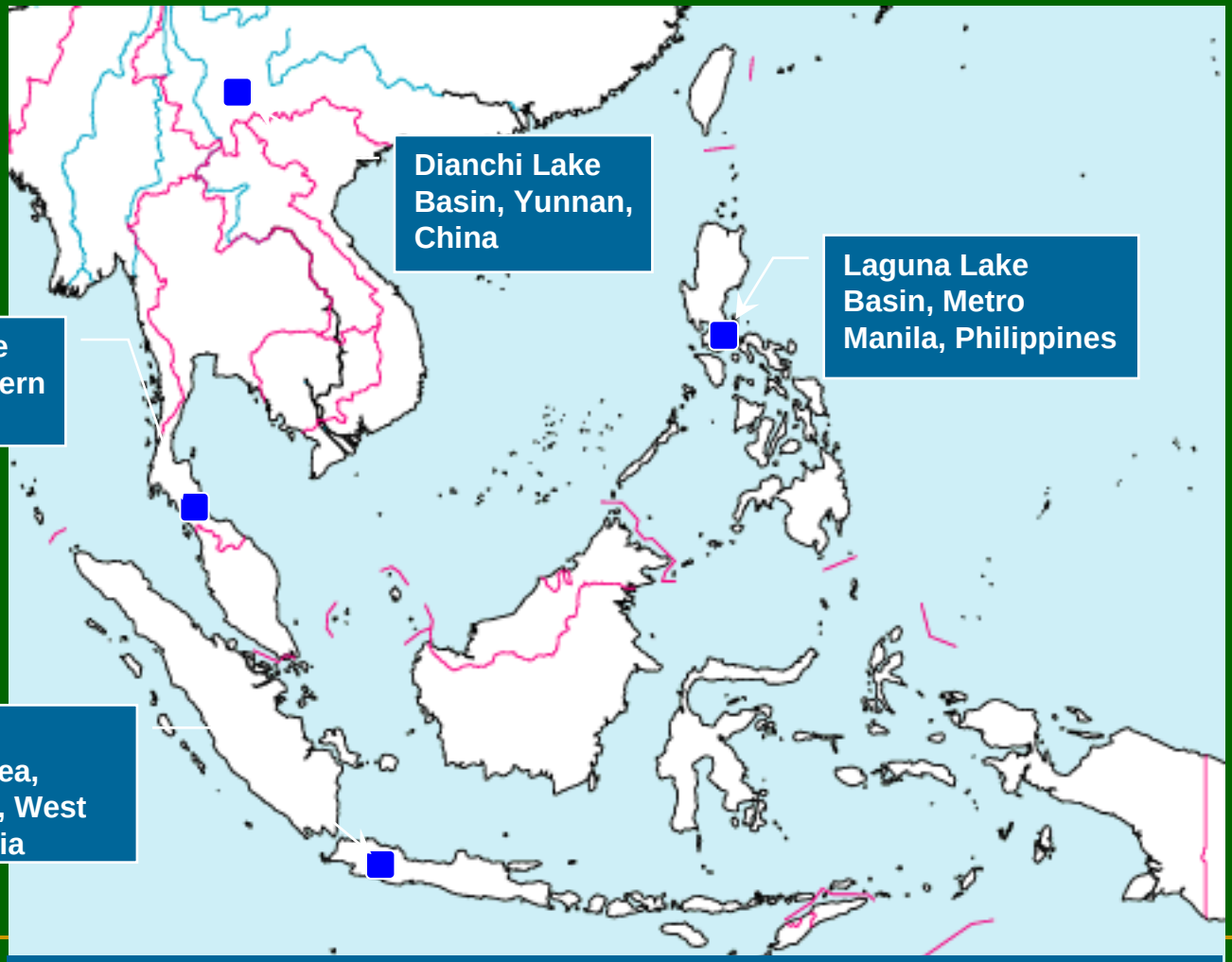
River/Lake Basins Covered by the Joint Project

- Linkage between watershed resource use decisions/ practices and water resources management
  - Dianchi Lake Basin, Yunnan, China
  - Kenya's Lake Victoria Basin
  - Yahagi River Basin, Japan
- Social conflicts over the use of water resources among competing uses and users
  - Laguna Lake Basin, Philippines
  - Songkhla Lake Basin, Thailand
  - Lake Kasumigaura Basin, Japan
- Environmental and social consequences of water resources development schemes
  - Broa reservoir and Porteria hydroelectric project, Brazil
  - Saguling dam project, Citarum River Basin, Indonesia
  - Lake Biwa Basin, Japan

Case Study Locations



Water Resources Management in a Basin Context: A Case Study of East and Southeast Asia



Source: http://www.abysse.co.jp/world/map/southeast_asia1_map.html

Dianchi Lake, Yunnan, China

- Lake basin area: 2,924 km2
- Lake surface area: 307 km2
- Population: 2,035 x 10^3
- Urban population: 1,064 x 10^3

- Key WRM Issues
  - ★ Water quality deterioration
  - ★ Increased siltation
  - ★ Water shortages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人与自然 和谐发展


时代 epoch 名店
全力支持北京申奥
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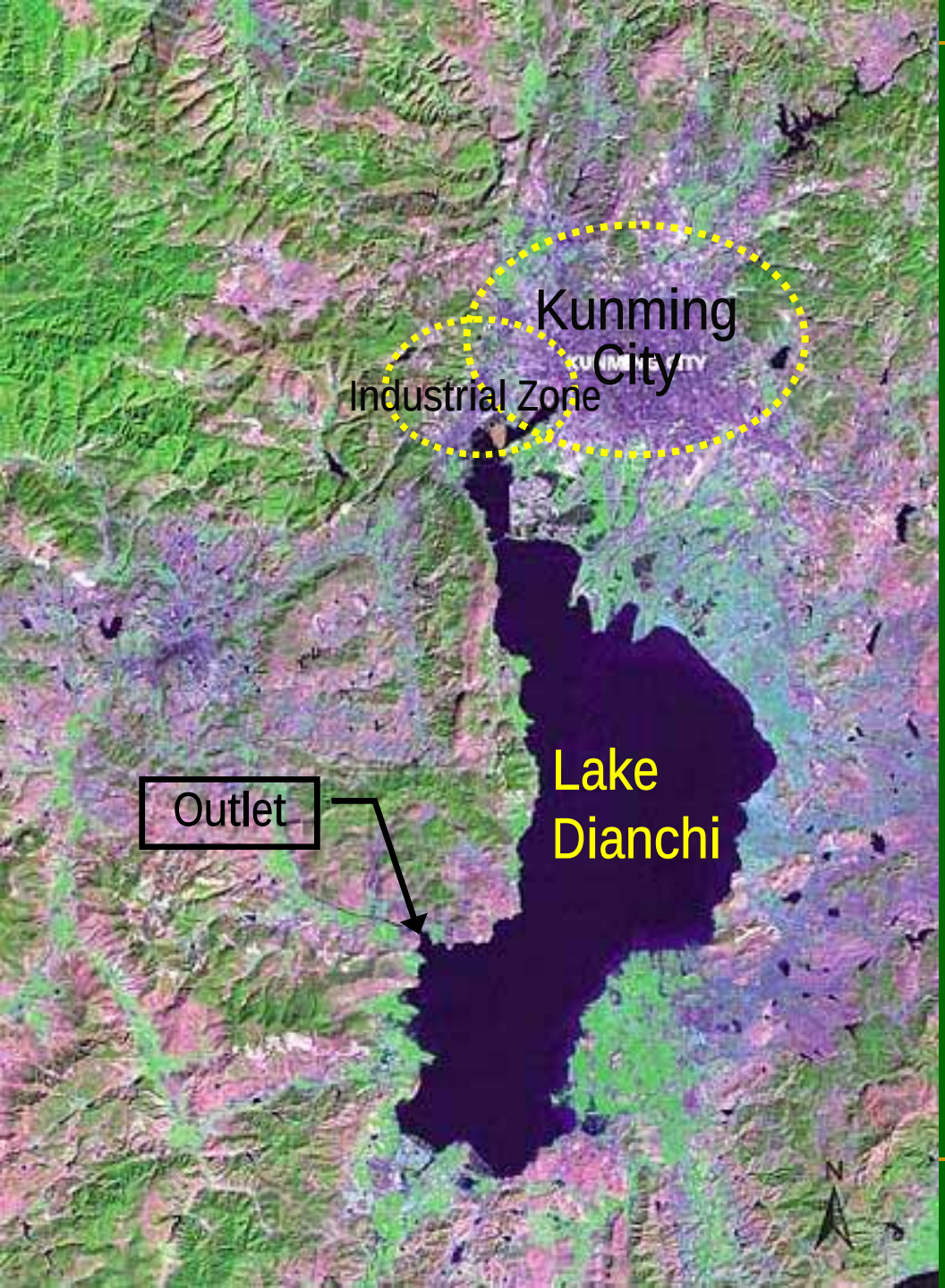
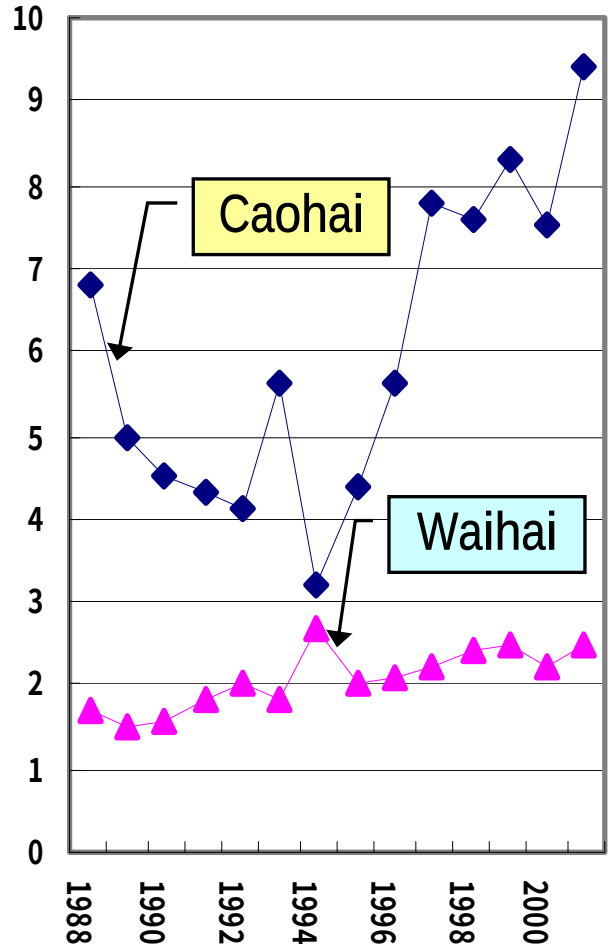


The Tragedy of Lake Dianchi

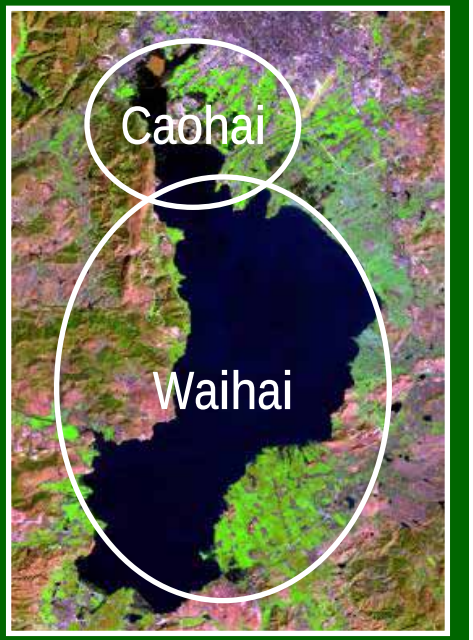
- As both the built-up area of Kunming and its industrial zone are situated upstream, all domestic and industrial wastewater is discharged into the lake.
- Wastewater from the lakeshore wet rice fields is also discharged into the lake.

Eutrophication of Lake Dianchi,1988-2002

N (mg/l)



Kunming City and Lake Dianchi



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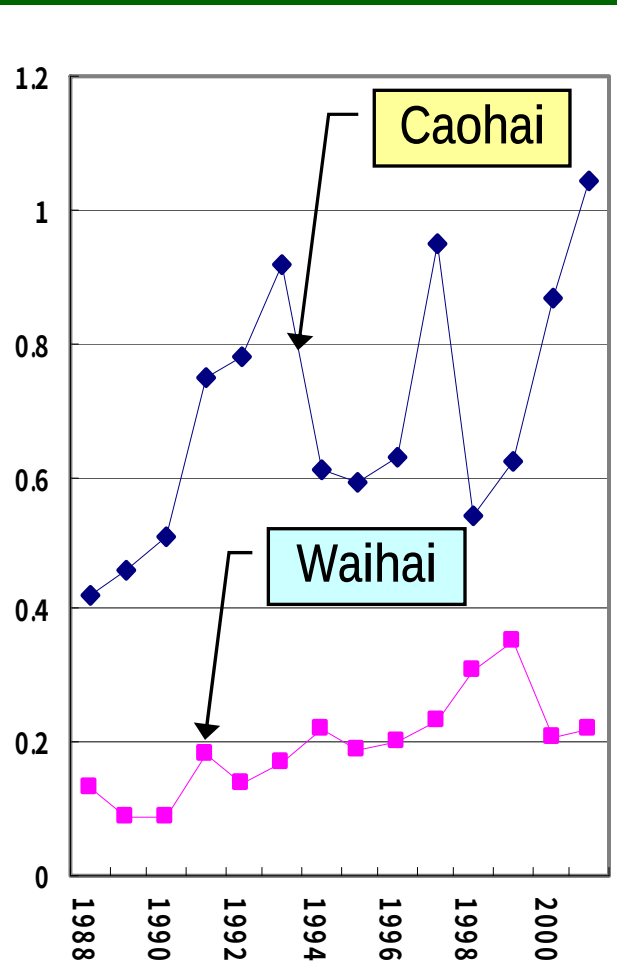
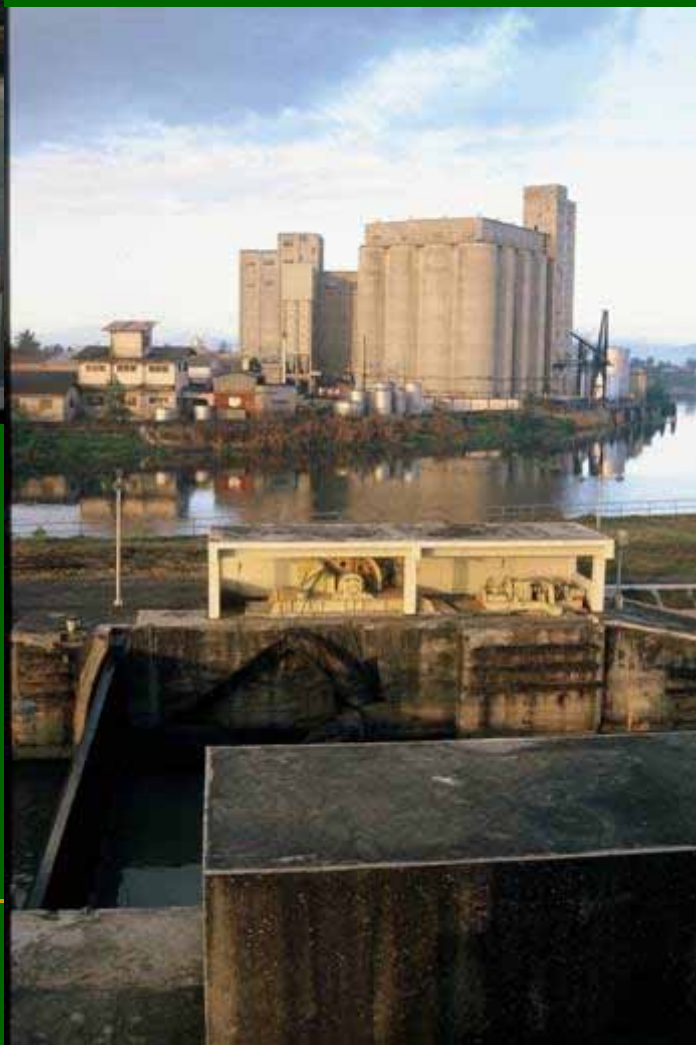


Laguna Lake Basin, Philippines

- Lake basin area: 2,920 km^2 (South of Metro Manila)
- Lake surface area: 891 km^2
- Population (1980) in the basin: 2,380 x 10^3
- Population growth rate: 5.2% per annum

Key WRM Issues

- ★ Social conflicts over the use of lake water between coastal fishermen and fishpen operators
- ★ Water quality degradation
- ★ Intersectoral water allocation (in terms of water quantity and quality)



Mangahan Floodway

Napindan Hydraulic
Control Structurfe

Sonkhla Lake Basin, Thailand

- Lake basin area: 6,938 km^2
- Lake surface area: 1,082 km^2
- Population (1980): 1,200 x 10^3
- Population growth rate: 2.1% per annum

- Key WRM Issues
  - Potential social and environmental conflicts due to the proposed salinity barrier project
  - Increased risk of water quality degradation

Saguling Dam, West Java, Indonesia

- Citarum river
  - Total length: 350 km
  - River basin area: 6,000 km^2
- Saguling dam
  - Total reservoir area: 53.4 km^2
  - Catchment area: 2,300 km^2
- Key WRM Issues
  - Displaced population
  - Shortened project life
  - Water quality deterioration


KE JEMBATAN CITARUM
JALAN
BANGUNAN PELIMPAH
BASE CAMP SAGULING
JALAN
CITARUM
BOTTOM OUTLET
BENDUNGAN
WADUK
LOKASI PAPAN INFORMASI
PUSAT PENGENDALI BENDUNGAN
JALAN
KE CIBANTENG
BANGUNAN PENGAMBILAN AIR
SALURAN TEROWONGAN AIR
SITUASI BENDUNGAN
WADUK PLTA SAGULING
EL. 650.500
BENDUNGAN
99 m
ANAK BENDUNGAN
URUGAN BATU
INTI KEDAP AIR
FILTER
URUGAN BAT
POTONGAN MELINTANG BENDUNGAN
DATA-DATA TEKNIS BENDUNGAN :
TYPE : URUGAN BATU DENGAN INTI KEDAP AIR
TINGGI : 99.0 M
ELEVASI PUNCAK : 650.5 M
PANJANG PUNCAK : 301.4 M
ISI TUBUH BENDUNGAN : 2.570 x 10³ M³

Dependency of Households above the HWL on Resources below the HWL, Saguling Reservoir, Indonesia

Level of Dependency (%)	Landowner		Farm Laborer		Total	
	No. of families	%	No. of families	%	No. of families	%
< 25	1,700	28	419	33	2,199	29
25-49	2,733	43	432	34	3,165	42
50-74	1,525	24	267	21	1,792	23
>75	318	5	152	12	470	6
TOTAL	6,356	100	1,270	100	7,626	100

Source: Institute of Ecology, Padjajaran University

Planned Resettlement Program and Actual Performance, Saguling Dam, Indonesia

Category	Approved Plan June 5, 1981	Resettled Households June 30, 1987
Households within Reservoir		
• West Java	250	--
• Agri-aquaculture	350	223 (346 trained)
• Nucleus estate smallholders	575	104
• Transmigration	1,400	455
• Simple compensation	263	2,256
• Training/employment	200	--
Sub-total	3,038	3,038
Shoreline Households		
• Agri-aquaculture	1,150	330 (499 trained)
• Nucleus estate smallholders	50	180
• Transmigration	600	1,997
• Simple compensation	5,426	6,556
• Training/employment	400	-- (622 trained) (177 employed)
• Sub-total	7,626	9,063
TOTAL	10, 644	12,101

Source: Institute of Ecology, Padjajaran University.

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Policy Issues drawn from the Case Studies (M. M. Hufschmidt and D. S. McCauley)

- The River/Lake Basin as a Management Unit
- Who Speaks for the River/Lake Basin?
- Organization for Management
- Institutional Arrangements (Governance Structure)
- Local Participation
- Multiple Objectives
- Demand Management
- Implementation
- Conflict Management
- Multidisciplinary Approach
- External Factors

The River/Lake Basin as a Management Unit

- A spatial unit for (a) better understanding of ecological processes, and (b) preparing perspective water management plans
- The question of scale: Large and small -- What is the appropriate size of river/lake basins for management purposes?
- Weak linkages with political/administrative boundaries (Implementability issue)

Who Speaks for the River / Lake Basin?

- Effective resources management requires some entities -- public, private, or mixed -- to speak for the basin interests involved.
- Special management agency/organ
  - Laguna Lake Basin Authority, Phil.
  - Lake Basin Development Authority, Kenya
- Community-based organization
  - Yahagi River Basin Water Quality Protection Association, Japan
- Ad hoc planning study team

Organization for Management

- Closely related to (a) the river/lake basin as a management region; and (b) the question of who speaks for the basin.
- Organizational arrangements for interagency coordination, collaboration and cooperation -- Vertical and horizontal

- Country/region specific organizational arrangements

Institutional Arrangements (Governance Structure)

- Formal and informal (customary) rules: Laws and regulations
  - Defining rights and obligations of individuals, groups, and organizations (Rules of the game for basin resources management)
- Strategy to accommodate the existing set of institutions while devising new changes in the institutional arrangements as part of the management plan

Local Participation

- Top-down and bottom-up: Two ways of communication
- WRM affects the interests or involve the activities of diverse individuals and groups (upland and lowland farmers, fishermen, urban dwellers, industries)
- Success of WRM is highly dependent on the effective participation, involvement, and cooperation of individuals and organizations
- How to stimulate local participation?

Encouraging Participation

- Participation in all aspects (benefits and costs, decision making, implementation, management, and evaluation) is the central feature of successful development and resource management.
- Project design, organizational structures, and role-sharing should be fashioned to support ongoing process of participation that enlists people's ideas and energy as well as their material contributions and management skills.

Optimum Participation

- Planners often demand maximum involvement of people in all aspects of planning and management.
- However, participation has costs and benefits.
- Costs of participation (in terms of time, forgone income opportunities, and money and other contributions, and tensions with officials and neighbors) are often overlooked and can become excessive relative to their associated benefits.

Optimum Participation

- Planners should think in terms of optimum participation -- People are conscious of the costs they bear.
- Deciding what is optimal should itself be determined in a participatory way, based on the assessments of people about how much involvement in what kinds of decisions and activities would best serve their needs.

Where to Begin the Process of Participation?

- There are many ways in which people can participate in their own development.
- The process of participation best begins with decision making (the essence of empowerment).
- Constructive dialogue with and among people focusing on the following questions encourages their participation:
  - What are the principal needs and problems?
  - What are promising and reasonable solutions?
  - How should costs be appropriated?
  - How would responsibilities be allocated or shared?
  - What technologies are likely to be effective and accepted?

Multiple Objectives

Ultimate Goals

- Human development
- Coexistence with nature (Sustainability)

Criteria

- Economic viability (Efficiency)
- Socio-political acceptability (Equity)
- Environmental compatibility (Ecological integrity)

Demand Management

- Key question -- How to ensure effective allocation of scarce water resources among competing demands?
- Supply augmentation vs. Demand management
- Reduction of per-capita or per-unit-of-activity use rate -- An essential element of WRM strategy

Implementation

- Implementation is the weakest link in WRM
- Planning for implementation
  - Integrated programme and budget
  - Organizational arrangements
  - Institutional arrangements
  - Local participation
  - Monitoring and evaluation
  - Implementation tools

Implementation Tools

- Information, education, extension, research and development
- Regulatory mechanisms
- Economic tools: Incentives and disincentives
- Strategic use of public funds (Construction, operation, maintenance and replacement)

Conflict Management

- Conflicts: Quantity, quality and mixed quantity and quality
- Sources of conflicts
  - Increased demands
  - Lack of information
  - lack of consultation among parties concerned
  - Difference in value
- Solutions
  - Public participation in decision processes
  - Mediation by a third party

Multidisciplinary Approach

- Multiple objectives
- Multiple purposes
- Multiple means

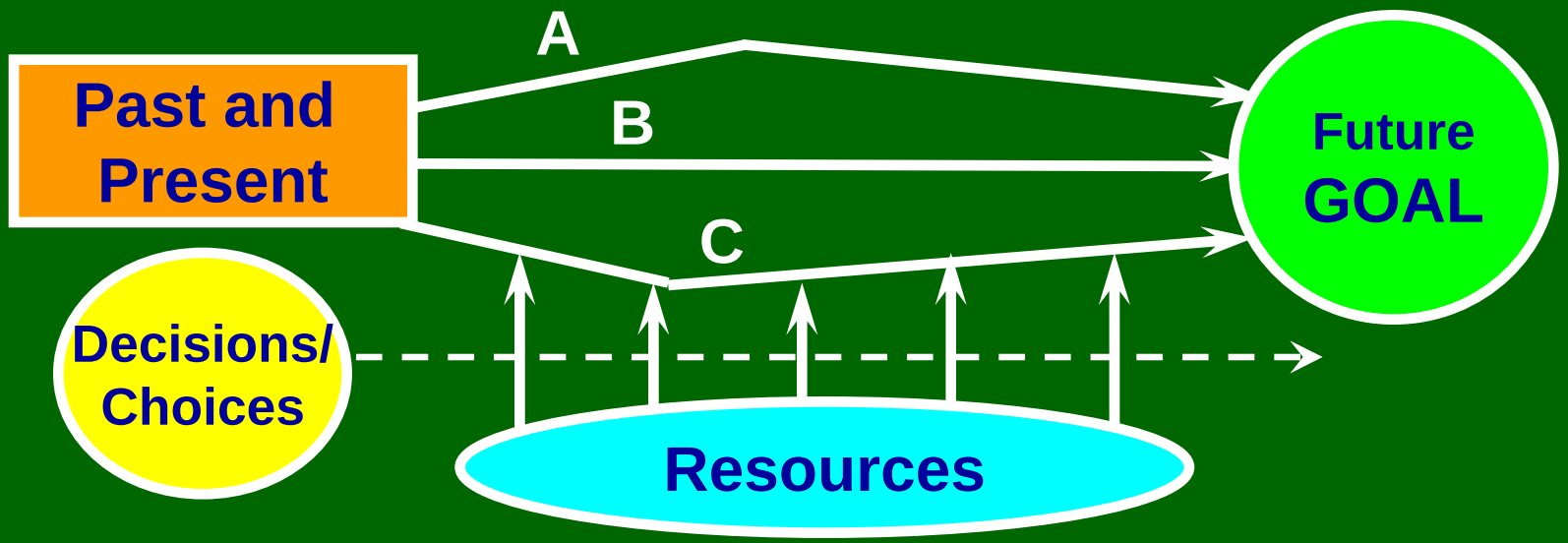
- Multidisciplinary teamwork approach

External Factors

- Shift of emphasis / priority in national policies and plans
- Foreign exchange policy
- International environmental concerns
- Policy of international financing institutions (WB, ADB, AfDB, IDB, OECF,..)

What Do We Mean by 'Planning'?

Planning: A continuous **process** which involves **decisions,** or **choices**, about **alternative ways** of using available resources, with the aim of achieving particular **goals (objectives)** at some time in the **future**. (Diana Conyers and Peter Hills, 1984)



Elements of a Strategy for Lake Basin Management: At the Planning Stage

- Defining the management region
- Defining management goals
- Ensuring stakeholder participation in decision processes
- Identifying and designing policy tools
- Planning for implementation

Elements of a Strategy for Lake Basin Management: At the Implementation Stage

- Integrated programme and budget
- Monitoring and evaluation
- Stakeholder participation in implementation

Institutions and Organizations for Lake Basin Management

Capacity-Building for Lake Basin Management

What do we mean by “capacity building”?

- Human resource development – Education and training;
- Organizational development
  - Intra-organizational development for efficient and effective performance; and
  - Inter-organizational development for ensuring concerted action between and among agencies concerned.
- Creating an enabling policy and institutional environment.

The Planning Process for Joint Learning

- The process of planning is more important that its product (plan documents) -- Learning Process vs. Blueprint
- The shared understanding and the consensus built up among the actors concerned during the process of planning make subsequent efforts (i.e., project implementation, operation and management) more coherent and more focused.
- Learning process must be ongoing, and it should be carried out not just by planners and implementers but even more so by people themselves.
- Start small and slowly and then accelerating.

Capacity-Building for Lake Basin Management: Designing the Learning Process

Phase 1: Initiating the process of learning through experimentation (action research) in the field (This phase enables the actors (both government agencies and communities) to learn how to work together in the planning process and how to link learning with action.

Phase 2: Integrating the new methods of planning and procedures developed during phase 1 into the broader structures and operations of the agency; and

Phase 3: Promoting expansion through staff training and adjustment of local procedures to facilitate project implementation and management at the field level.

Creating an Enabling Social and Policy Environment

- Local economic and social development thrives when representatives of the government, the people and communities, and the private sector create forums in and through which they can identify and pursue common goals.