Five Country Regional Study on Institutional Arrangements for River Basin Management:

Lessons from the Case Studies

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Purpose of the Study

"To improve the management of scarce water supplies for agriculture, within a framework of integrated water resource management in river basins"

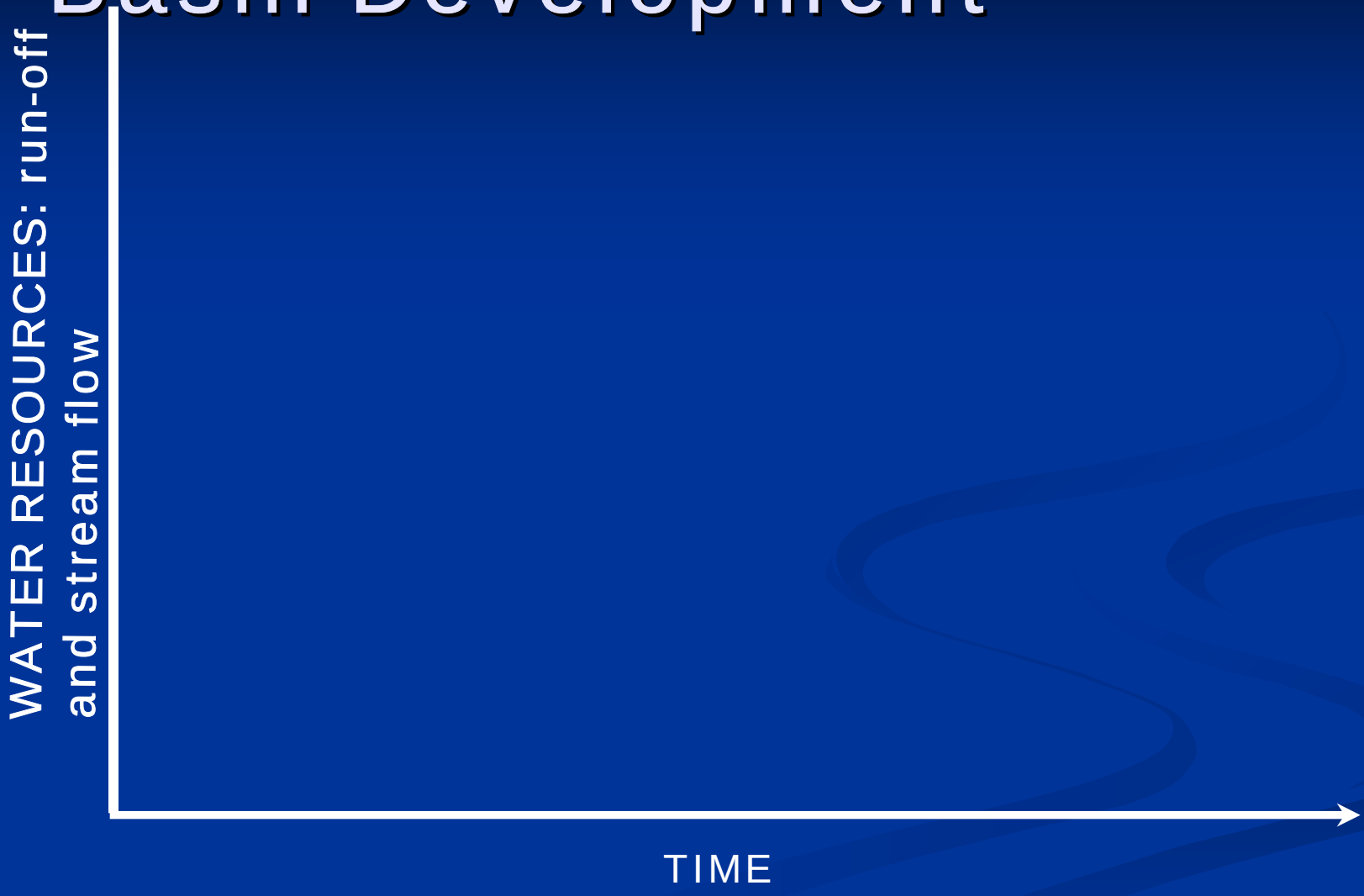
The following river basins were selected for study:

- **Fuyang basin (People's Republic of China);**
- **Singkark-Ombilin (Indonesia);**
- **Upper Pampanga (Philippines);**
- **East Rapti (Nepal)**
- **Deduru Oya (Sri Lanka).**

Working Hypothesis

"River basins evolve and change over time from both from a bio-physical and socio-economic perspective, changing patterns of water use require adaptive institutions for sustainable, equitable, and productive management of basin wide resource.

Basin Development



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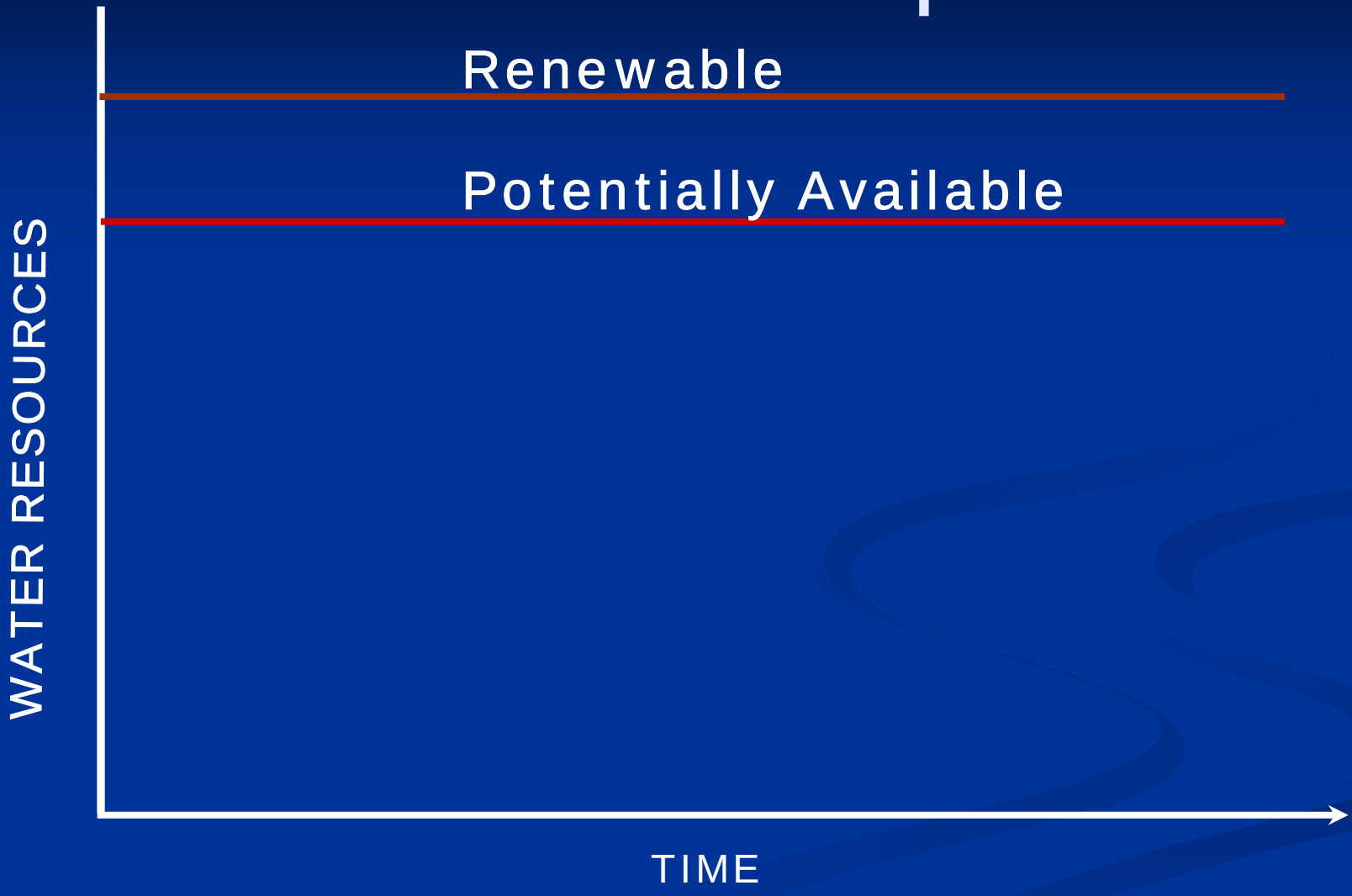

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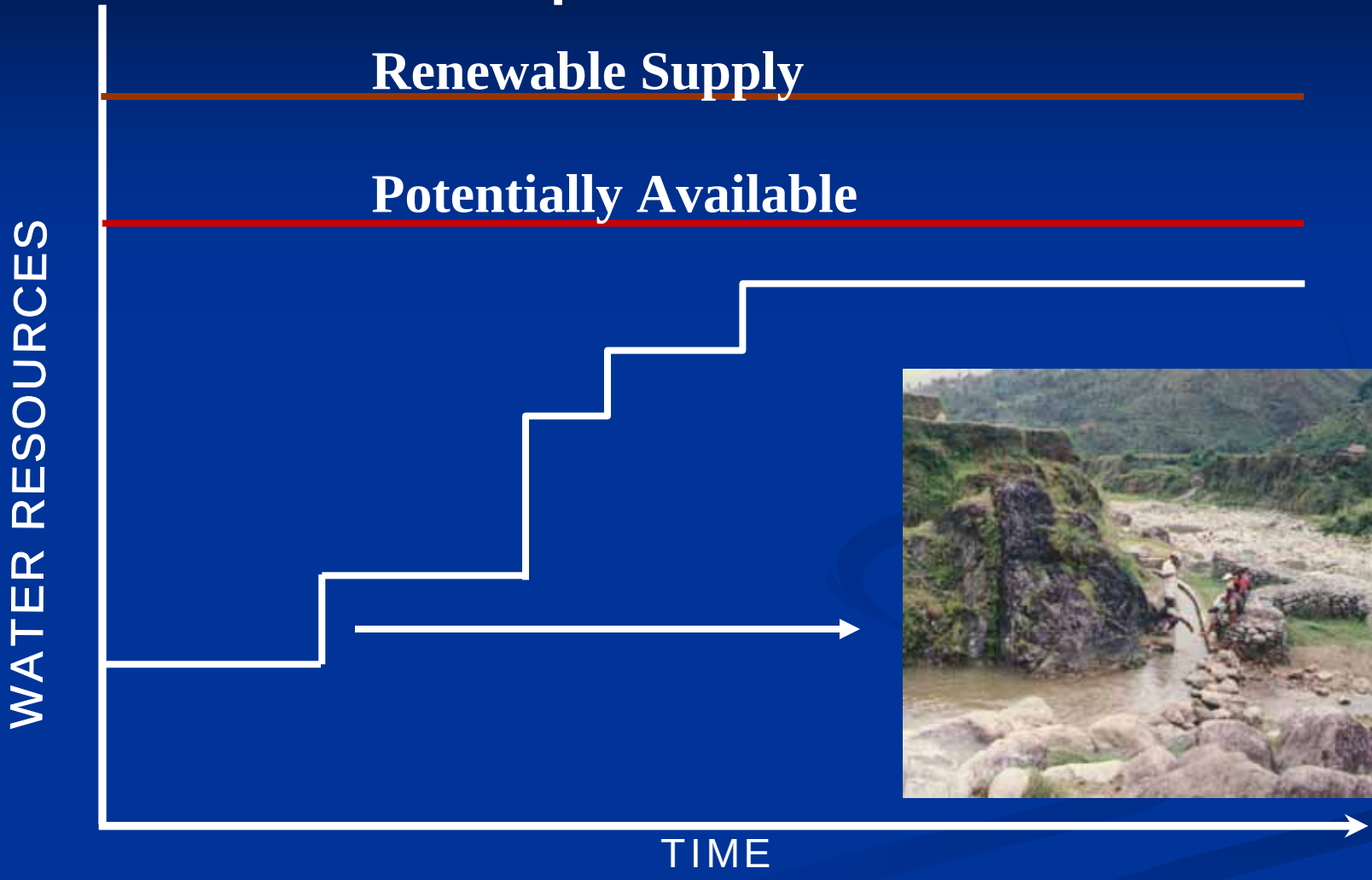

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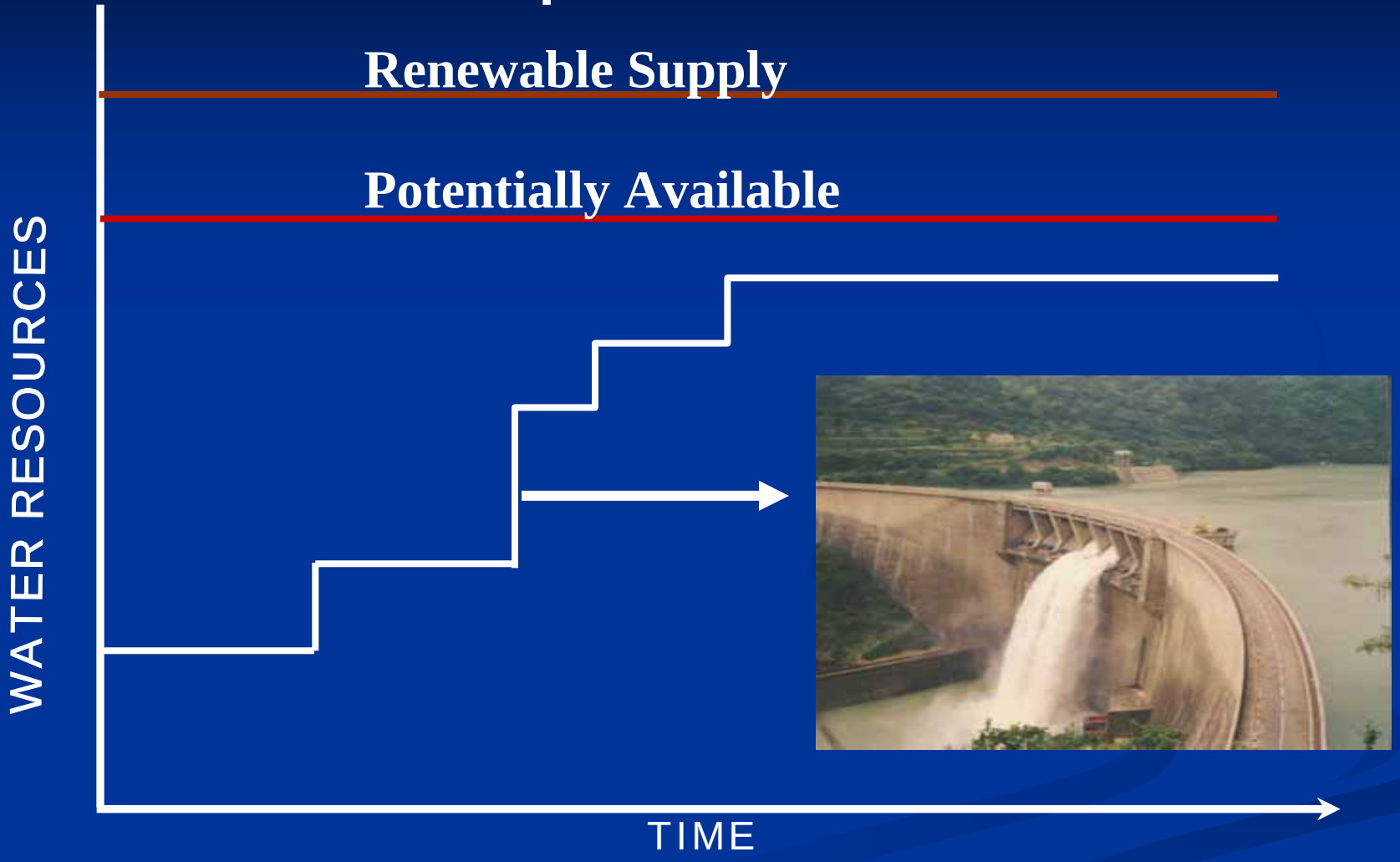

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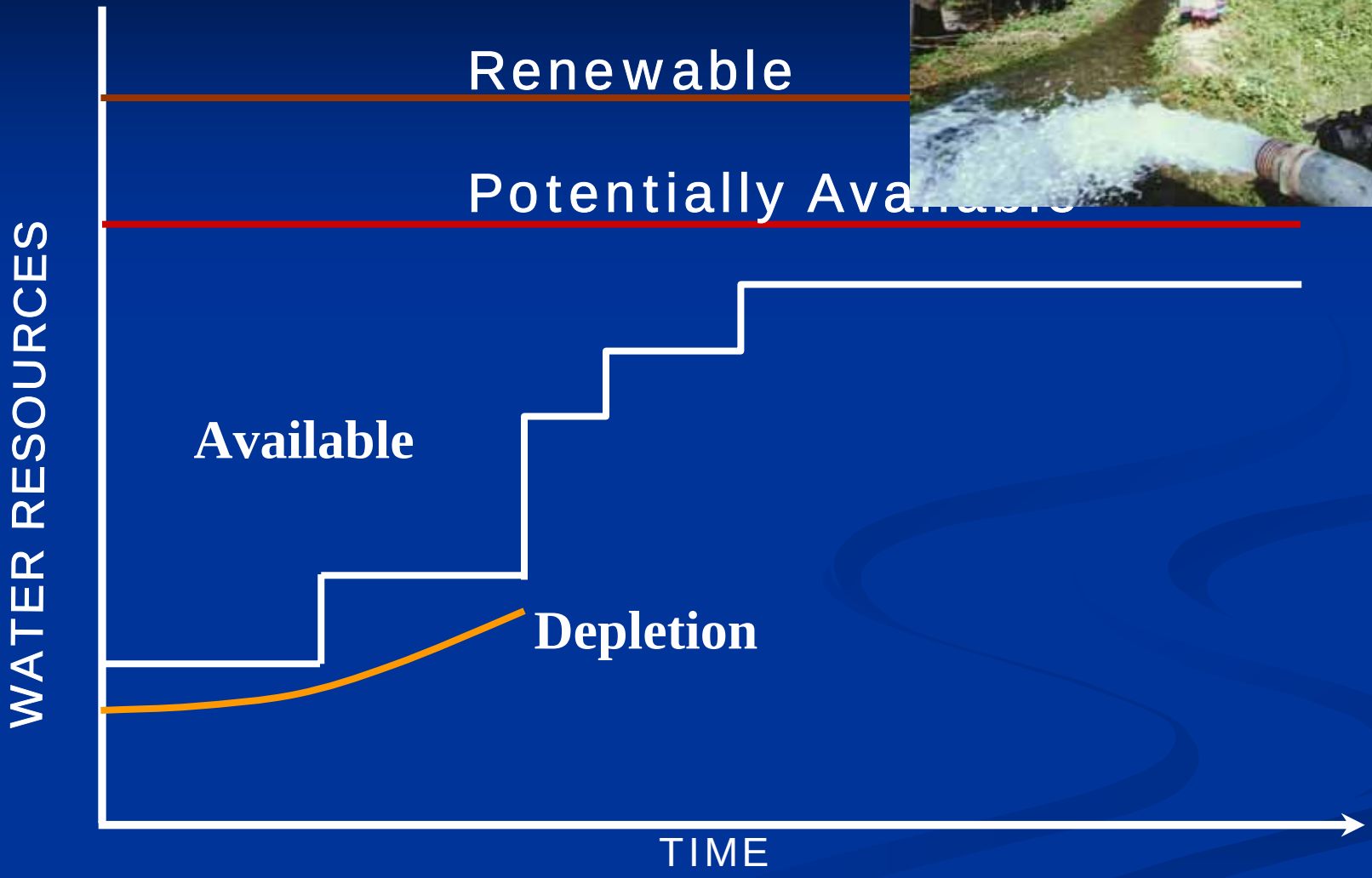


Basin Development

Renewable Supply

Potentially Available

WATER RESOURCES

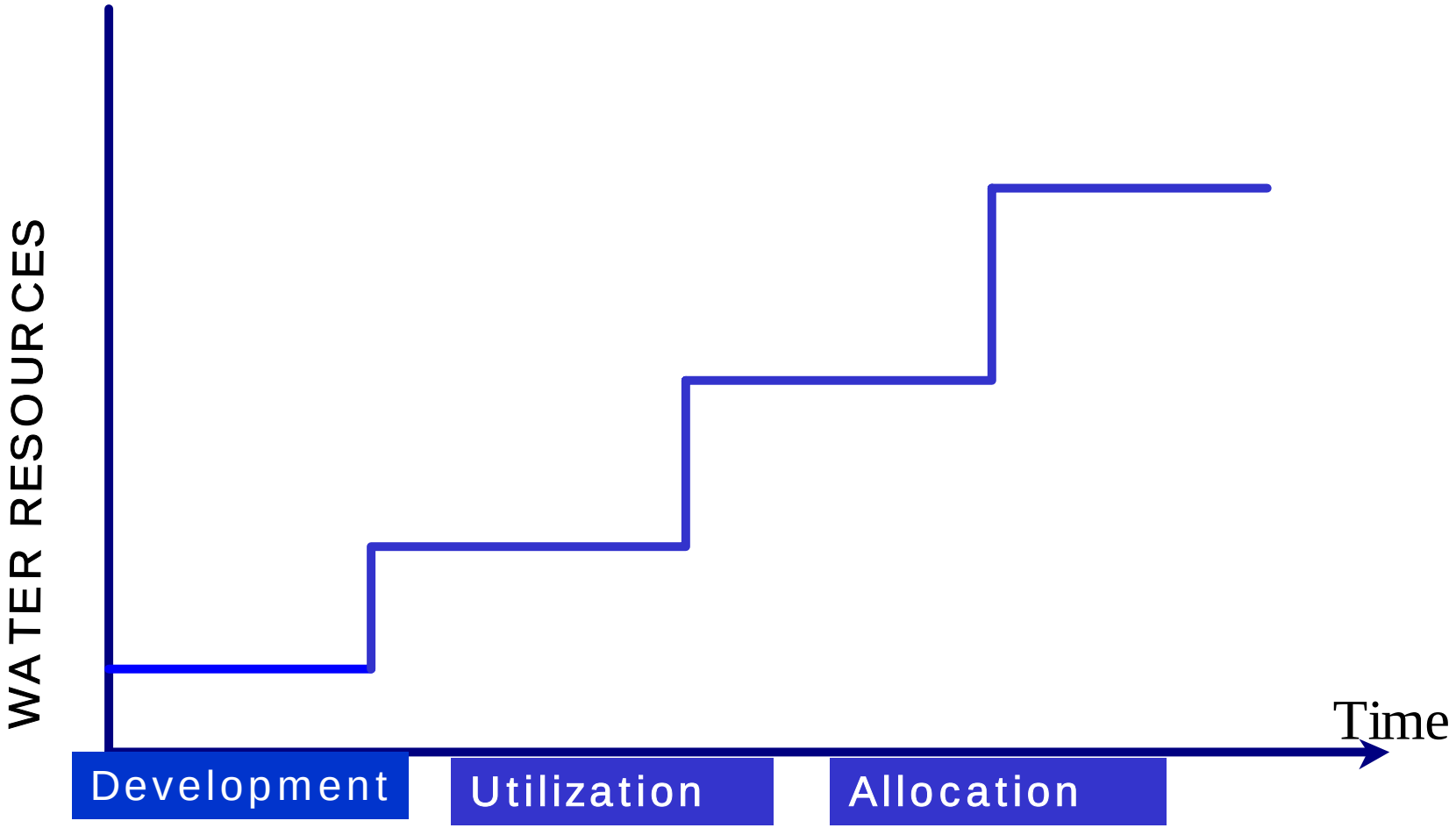
Closed Basin

Depletion

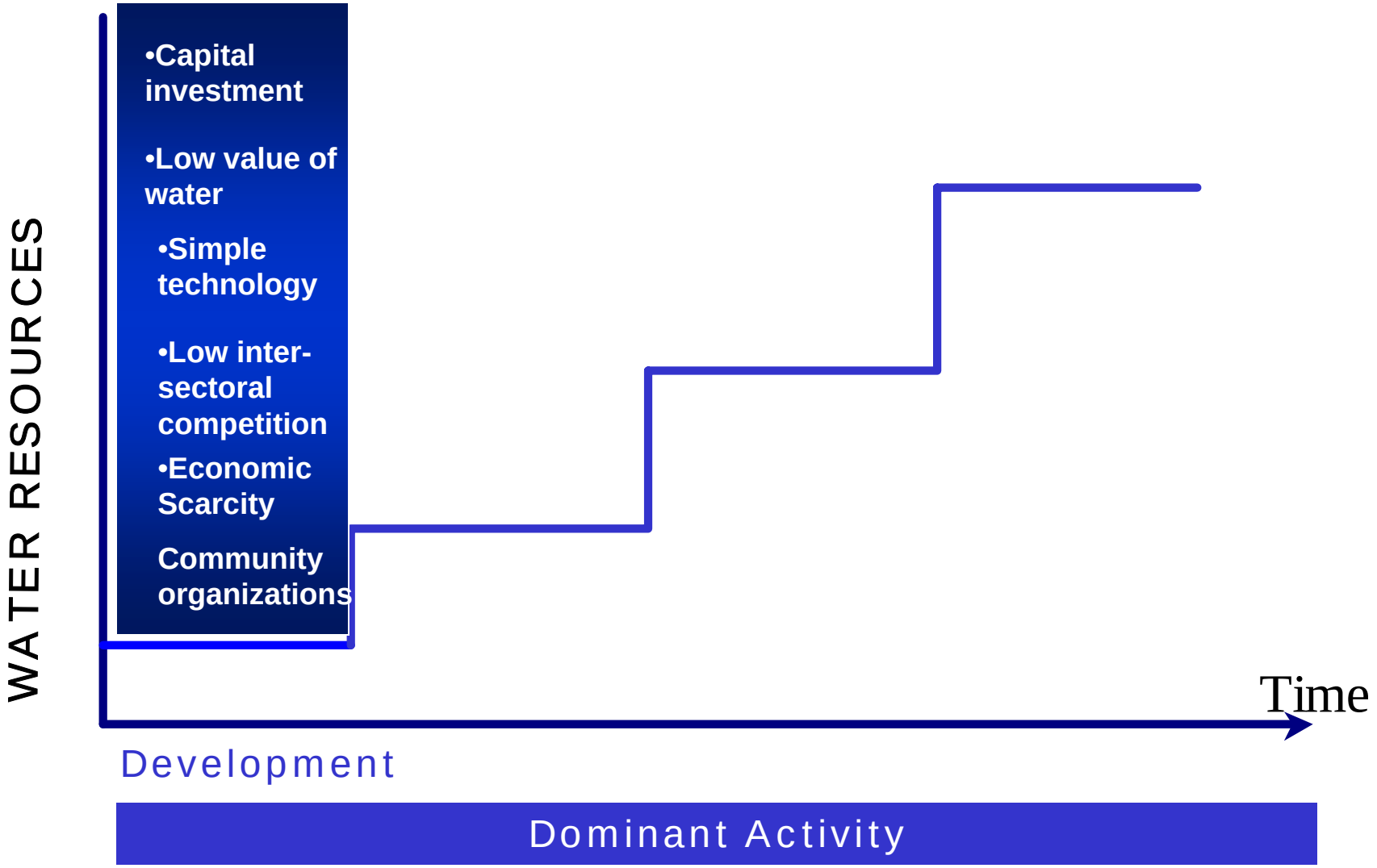
Open Basin

TIME

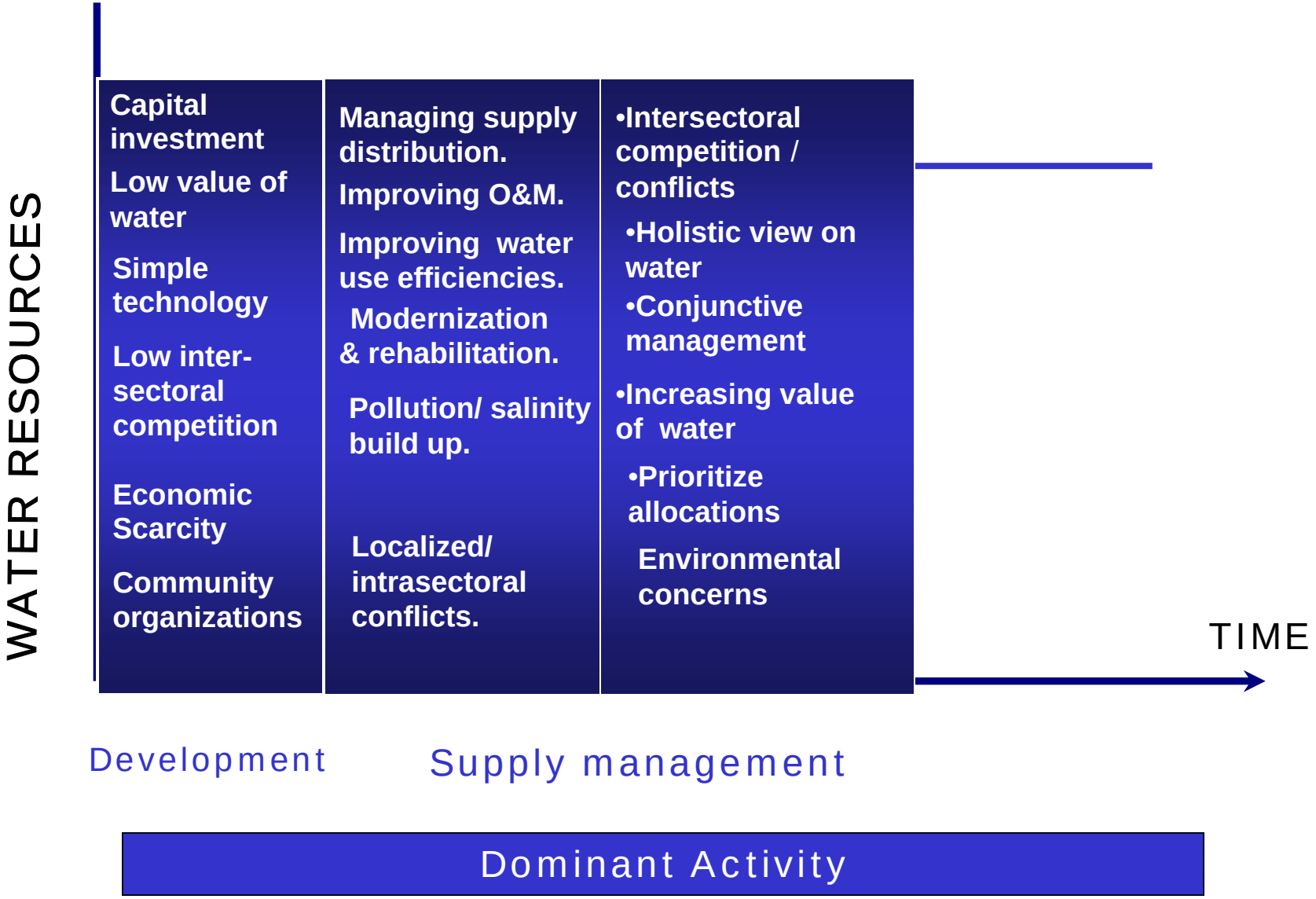
Phases of river basin development.



Management Challenges At Different Development Stages



Management Challenges



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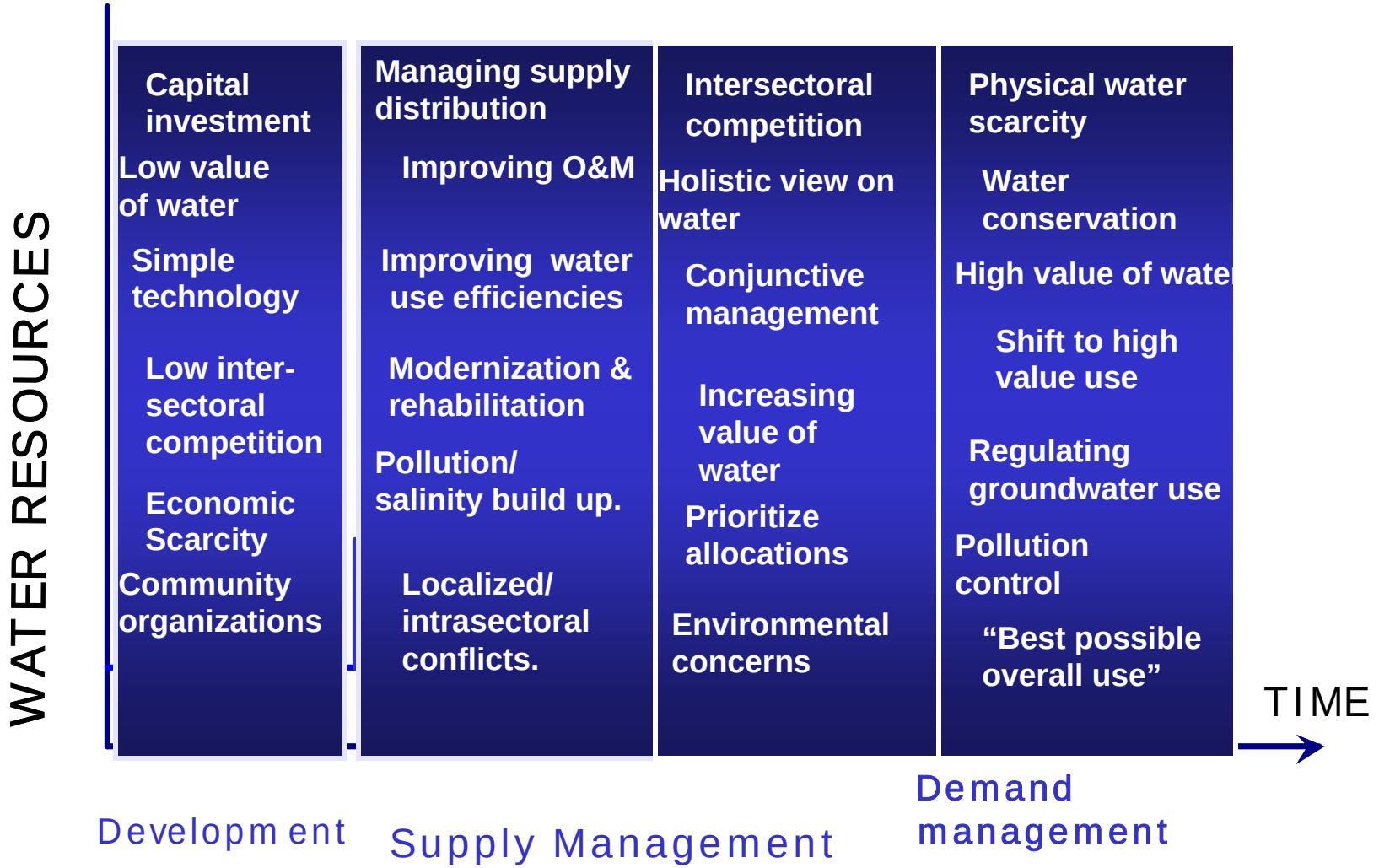
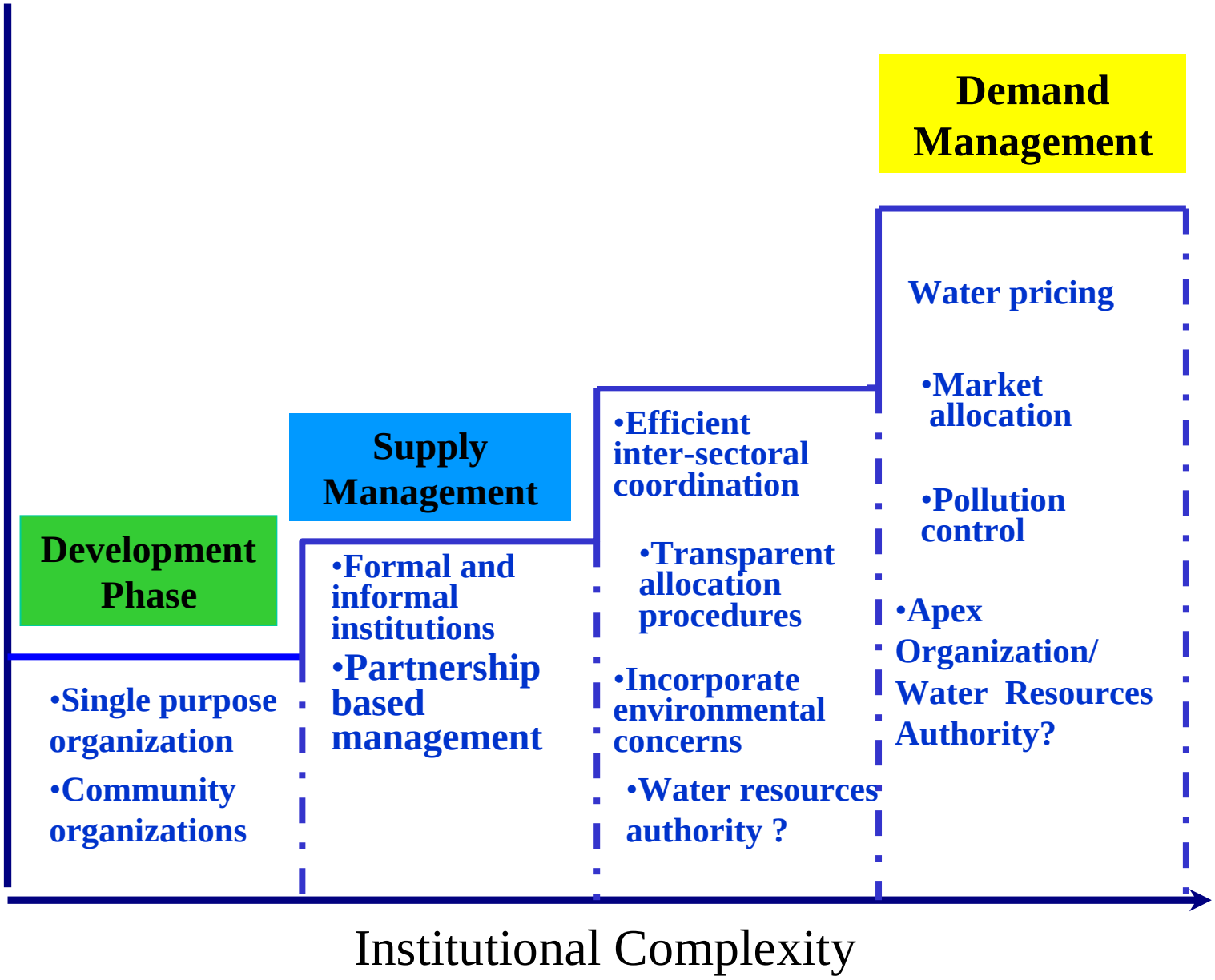


Basin Development Stage and Institutional Needs



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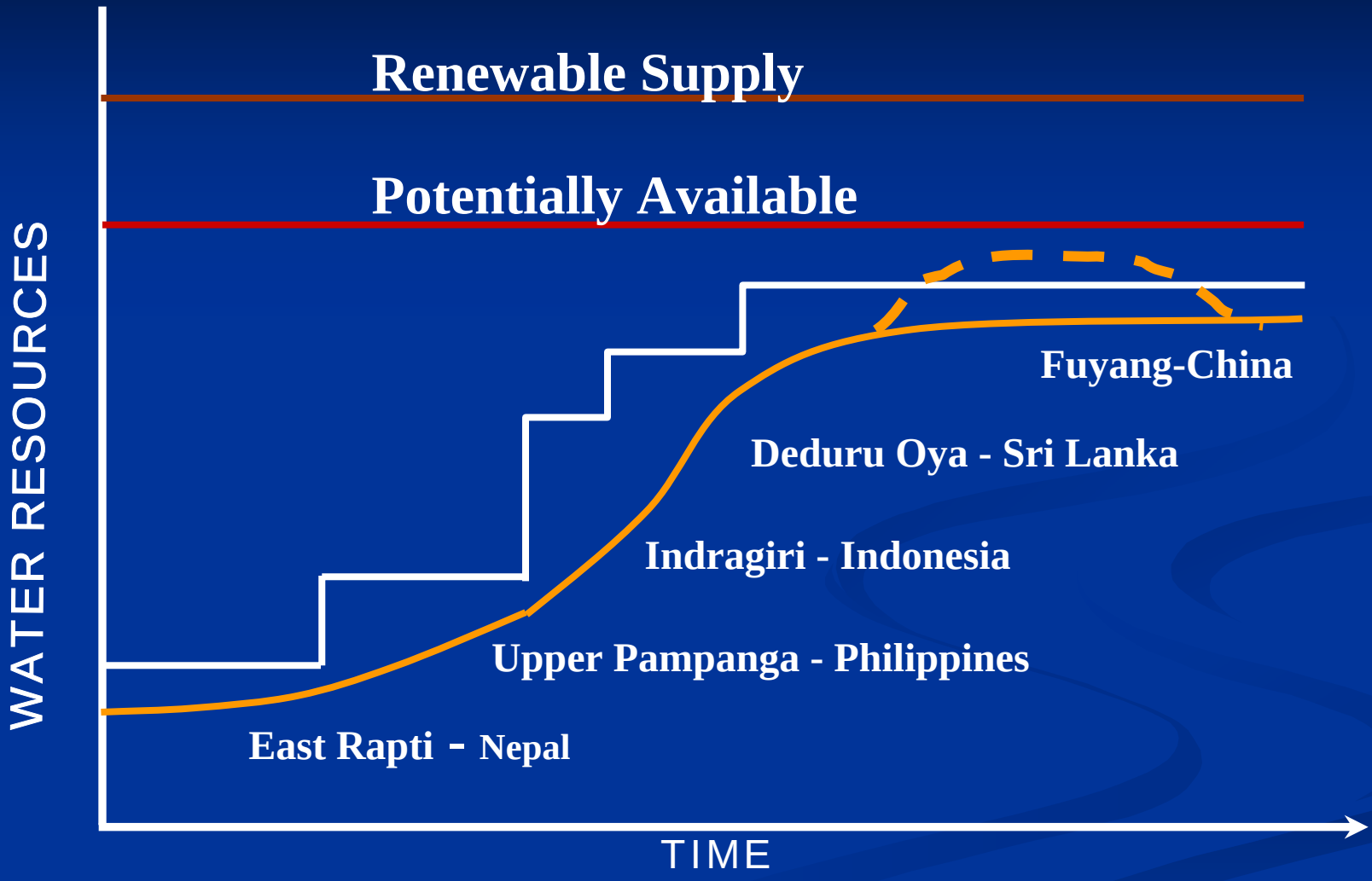
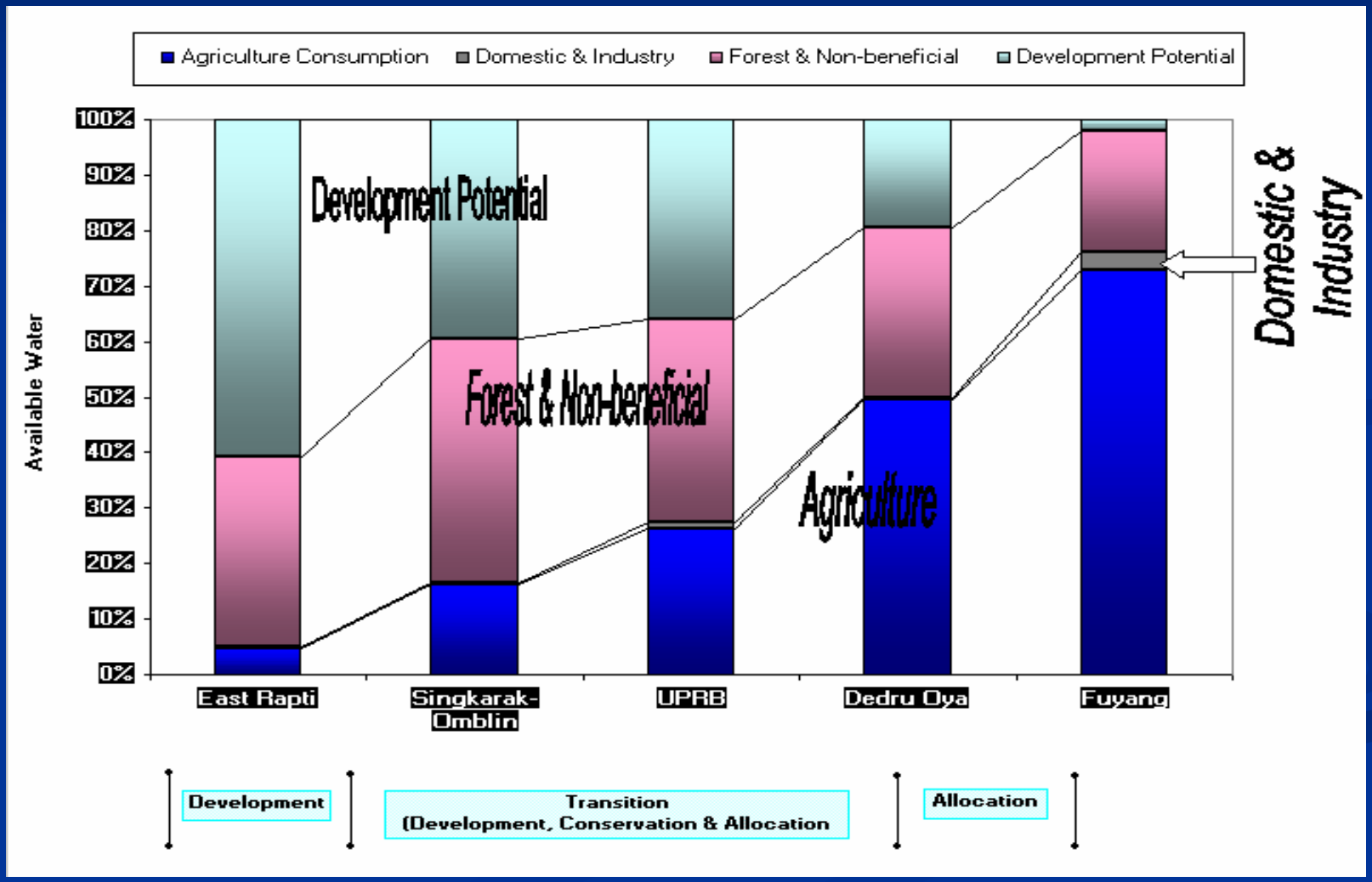


Water Use and Development Potential



STUDY COMPONENTS

PHYSICAL SYSTEM
- **Infrastructure**
- **Sources of water**
- **Water quality**
- **Drainage**
- **Topology**
- **Soil conditions**

EXISTING NSTITUTIONAL FRAMEWORK
- **Water-related organizations**
- **Interactions among them**
- **Existing water laws**
- **and policies**

WATER ACCOUNTING
- Basin maps
- Rainfall
- Groundwater
- Inflow
- Diversions
- Committed water

SOCIO-ECONOMIC SITUATION
- **Water users**
- **Other stakeholders**
- **Incomes, taxes,**
- **water charges**
- **Prices**
- **Subsidies**

Commonalities in the five basins

- Explicit recognition of the importance of integrated water resource management
- Explicit recognition of the river basin as the unit of management of water resources
- Growing Scarcity of water and inter-sectoral competition for water.
- The need for clearer definition of water rights
- Groundwater is emerging as a importance source of water. Given this trend groundwater management is becoming an important issue
- Water Quality issues and committing water for environmental purposes are major issues.

List of Problems reported in the case Studies

Issues	Basin				
	East Rapti	Singkarak Ombilin	Upper Pampanga	Deduru Oya	Fuyang
A. Basin Level Issues					
•Need for reliable data and information management	✓	✓	✓	✓	✓
•Inadequate or absence of basin level planning procedures	✓	✓	✓	✓	✓
•Absence of well defined water rights and allocation principles	✓	✓	✓	✓	✓
•Absence of institutional mechanism to integrate surface and groundwater resources development and use	✓	✓	✓	✓	✓
•Watershed degradation and surface and groundwater pollution	✓				✓
•Absence of riverine control measures				✓	
B. Agriculture Sector Issues					
•Water inadequacy during dry season	✓		✓	✓	✓
•Head-tail differences			✓	✓	
•Groundwater decline					✓
•Low productivity	✓			✓	
•Inadequate water control			✓	✓	✓
•Water logging and flooding			✓		

Main Categories of Problems

- Need for data - Information Gap
- No Planning - Haphazard interventions
- Absence of water rights
- Lack of coordination - within specific sector and between sectors
- High incidence of poverty (except China)

Singkark - Ombilin Basin, Indonesia

Problems

1. Rapid decline in water availability and reliability for agriculture due to: (i) inter-basin transfer of water, and (ii) construction of hydropower plant
2. Non-existent organization for river basin management
3. Formal water use rights not implemented not only due to gaps in regulation but lack of data on which to make decisions.
4. Need for low-cost technology for lift irrigation to replace water wheels whose performance has been impaired by reduced flows.

Solutions

1. Short term - establish water allocation rules and release more water to the basin
2. Short term - improved technology lifting water
3. Long term - develop a Brantas River type basin management body
4. Long term - review and strengthen water laws, rights, and regulations

Site Specific Problems and Proposed Solutions

East Rapti Basin, Nepal

Problems

1. **Adequate water resources but inadequate development of ground water resources and management of water resources for conjunctive use.**
2. **Needed protection of water requirements for Chitwan National Park and buffer zone.**

Solutions

1. **Develop a basin level coordinating facility**
2. **Support shallow tube-well development to reduce farmers dependence on river water**
3. **Review, establish and implement water rights among sectors**
4. **Strengthen and implement pollution control standards**

Upper Pampanga River Basin, Philippines

Problems

1. **Adequate water but more storage facilities and water conservation measures along with conjunctive use of groundwater needed to reduce temporal and spatial shortages of water in the basin.**
2. **Rapid decline in O&M budgets coupled with government decision on complete irrigation management transfer.**
3. **Growing deterioration of surface water qualities due to increased industrial and municipal pollutants.**

Solutions

1. **Form a river basin coordinating council**
2. **Strict enforcement of existing laws, regulations and policies on pricing, allocation and water quality**
3. **Strengthen and enhance irrigation association capacity for O & M.**

Deduru Oya Basin, Sri Lanka

Problems

1. Inadequate surface and groundwater resources in middle reaches of system coupled with high incidents of poverty
2. Unregulated proliferation of wells and of pumps lifting from river
3. Inadequate river flow at tail-end during dry season coupled with industrial development and shrimp farming causing conflicts and environmental problems - destruction of mangrove swamps, sea water intrusions, groundwater contamination etc.
4. Uncontrolled exploitation of riverine resources - sand mining etc. - leading to lowering of the water table

Solutions

1. Creation of river basin management committee
2. Coordination of river basin management and planning with district, division and agrarian services level

Fuyang Basin, China

Problems

1. With basin becoming “closed” about 1980, shift to emphasis on groundwater development for agriculture
2. With agricultural reforms beginning in 1980s, shift toward privatization of groundwater
3. Depletion and overdraft of groundwater resources

Solutions

1. Strengthen enforcement of national water policy, laws, and regulations
2. Promote market-oriented property right management and innovation measures: rational water price, water market, water right transfer
3. Implementation of groundwater withdrawal permit system

Some Generic Lessons

- ✓ **The study has shown that there are clear stages to river basin development. The development responds to the changing pattern of demand for water over time linked to population growth and economic development.**
- ✓ **There is no single "best" institutional model. Rather, institutional requirements differ with the different phases of development of the river basin, and institutional designs must be set up to adapt to these changes.**
- ✓ **A country's ability to adopt new policies and institutions is highly contextual and is dependent upon the overall state of the economy, political system, legal system, cultural background and its physical resource base**

- ✓ **There is an urgent need for clearly defined water rights. Without clear understandings about water rights and effective enforcement, the poor and disadvantaged groups are vulnerable to losing access to water**

- ✓ **Water management agencies focused on agricultural water management, such as the LIDs in the Omono Gawa basin, have a major role to play in the management of water resources.**

- ✓ **The need to build up on traditional institutional arrangements which are time tested and adapted to local conditions and needs.**

- ✓ There is a clear need design effective mechanisms for stakeholder consultations and enlist their cooperation in implementing programs for developing and managing water resources. Well-designed stakeholder driven institutions are more likely to have positive outcomes.

- ✓ The lessons from the case study of advanced river basin management (Japan and Australia) suggests that formal “river basin organizations” or creation of large public bureaucracies are not essential for managing water-scarce river basins. Other arrangements, including various kinds of committees and networks, can often work just as effectively. But there needs to be a clear legal framework, including clarity on water rights, and a regulatory framework to make such arrangements work.

- **The "success stories" Murray-Darling, Omonogawa, and Brantas, suggest that institutional development for river basin management is a slow process taking decades and cannot be done overnight**
- **Although the basin management arrangement is in principle a win-win proposition, it appears that existing institutional constraints (vested interests) and lack of confidence often hinder development of such arrangements.**
- **Adaptive Institutions: water resource management institutions must adapt to meet different challenges as patterns of water use change. Common water problems are seen because agencies do not change fast enough to adapt to changing needs.**