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# **Towards IWRM and River Basin Planning in Nepal: The Bagmati River Basin Experience**

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# Towards IWRM and River Basin Planning in Nepal: The Bagmati River Basin Experience



Bagmati River, Guhyeshwori - taken during the festival of 'Chhat'



# Bagmati River Basin

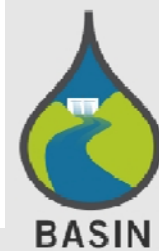
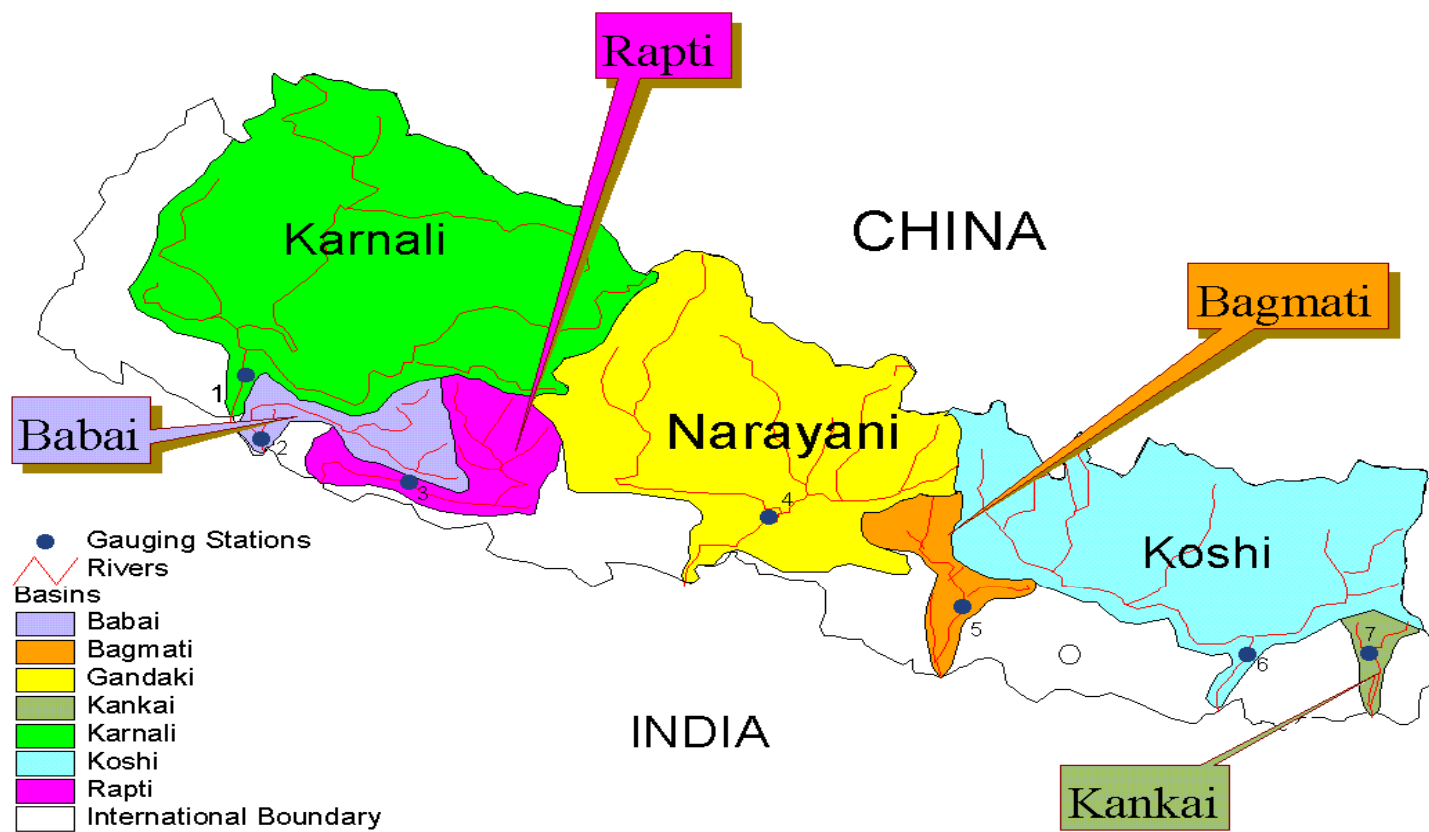
- [1- Introduction](#)
- 2- Key issues and challenges
  - 3- Opportunities
- 4- Way forward for Bagmati Basin



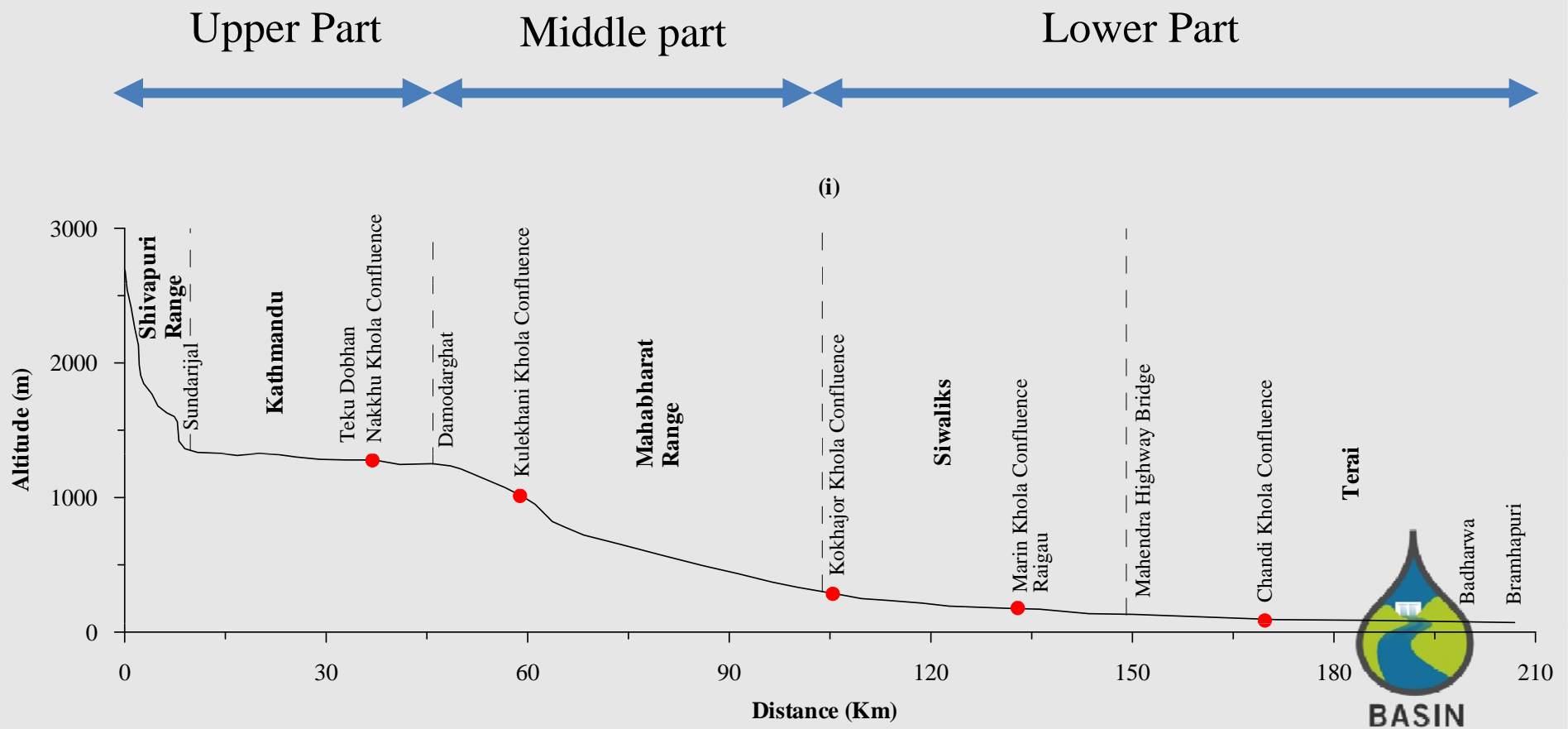
# Introduction



## Introduction contd...



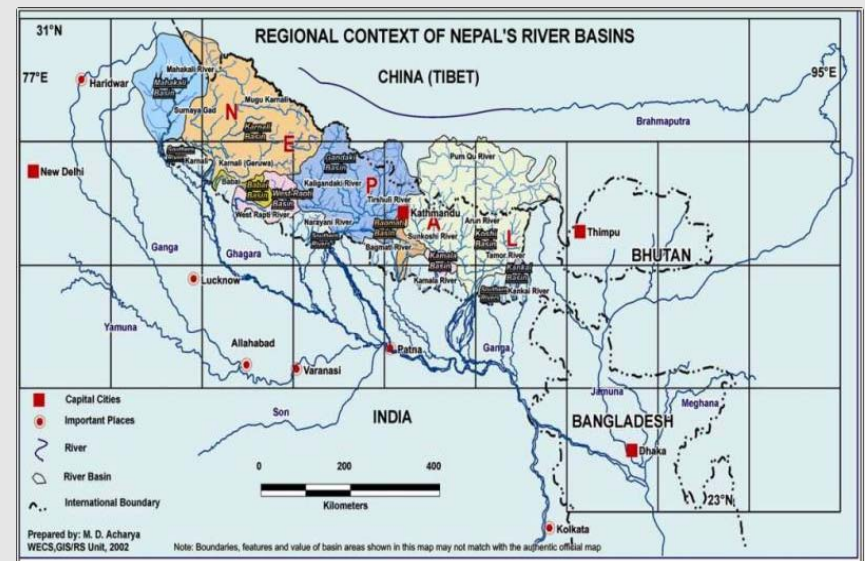
# Introduction contd...





## Introduction contd...

- The Bagmati River is a tributary of the Koshi River (Ganges River) originating from the north of the Kathmandu valley in the Shivapuri hills.
- It has a catchment area of 3,710km<sup>2</sup> in Nepal.
- It is very important for Nepal strategically, religiously, culturally, economically, socially and environmentally.
- Available water is utilized for water supply, irrigation, hydropower, religious, cultural, industrial and recreational use within the basin.



# Bagmati River Basin

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# Key issues and challenges

## Upper Reach

➤ **Pollution and Ecosystem degradation** (Uncontrolled disposal of solid and liquid waste; More than half of the fish species in the river have disappeared; Biologically dead)

- Enforcing compliance of the laws and their effective implementation
- Inadequate infrastructural facilities (sewer systems, treatment facilities, waste disposal sites) need to be addressed.



## Key issues and challenges (contd....)

- **Unplanned growing urbanization** (Migration due to high level of insecurity, lack of job opportunities, health & education facilities)
  - Proper urban planning
  - Land use zoning & their proper execution for new urbanization process
  - Improvement of the older settlements for water and sanitation access.



## Key issues and challenges (Cont...)

- **Water Scarcity** (Total estimated demand of drinking water in Kathmandu valley is about 330 million liters per day. Only about 137 million liters per day during wet season and 70 million liters per day during dry season is supplied. Only one third of design area irrigated during dry season. Water conflicts)
- Augment the discharge of the Bagmati river in Kathmandu Valley and downstream
- Regulate the groundwater extraction



## Key issues and challenges (Cont...)

- Degrading Cultural and heritage sites (Many cultural and historical heritage sites, eg Pashupatinath temple, along Bagmati river banks and other tributaries)
- Immediate need to protect, conserve and renovate the important cultural, historical, religious and heritage sites from further degradation.





## Key issues and challenges (Cont...)

- **River banks encroachment**  
(17 squatter settlements ;2,134 people,1985; Increased to 64; 14,500 people in 2003 and many river sides have been encroached upon permanently for private residence, schools, offices, business centers road construction etc.)
  - Demarcation of the river areas
  - River side land use map
  - Law enforcement to protect the land from encroachment & effective implementation of building codes.



## Key issues and challenges (Cont...)

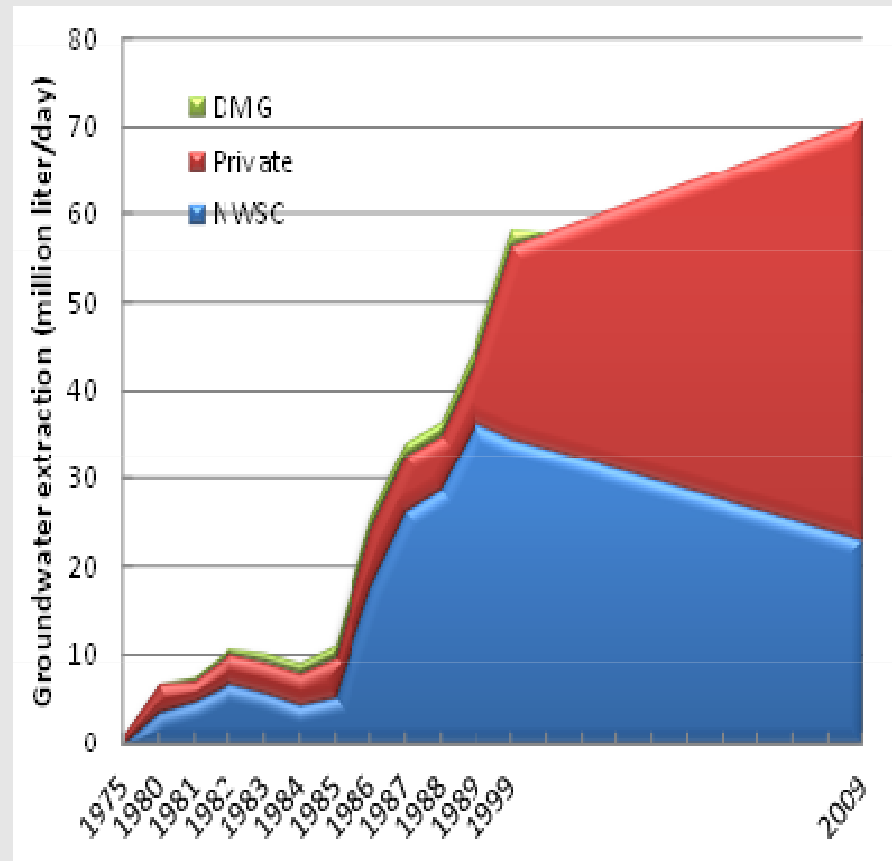
- **Sand mining** (river deepening, narrowing, impact on river environment)
  - Find alternative livelihood for the people who depend on the income from sand extraction.



## Key issues and challenges (Cont...)

➤ **Over extraction of groundwater** (Haphazard extraction of groundwater and depletion of groundwater table; 5 to 6 times more than critical recharge volume )

- Regulating the groundwater extraction
- Protection of the recharge area
- Finding suitable alternative water sources





# Key issues and challenges (Cont...)

## Middle and Lower Reach

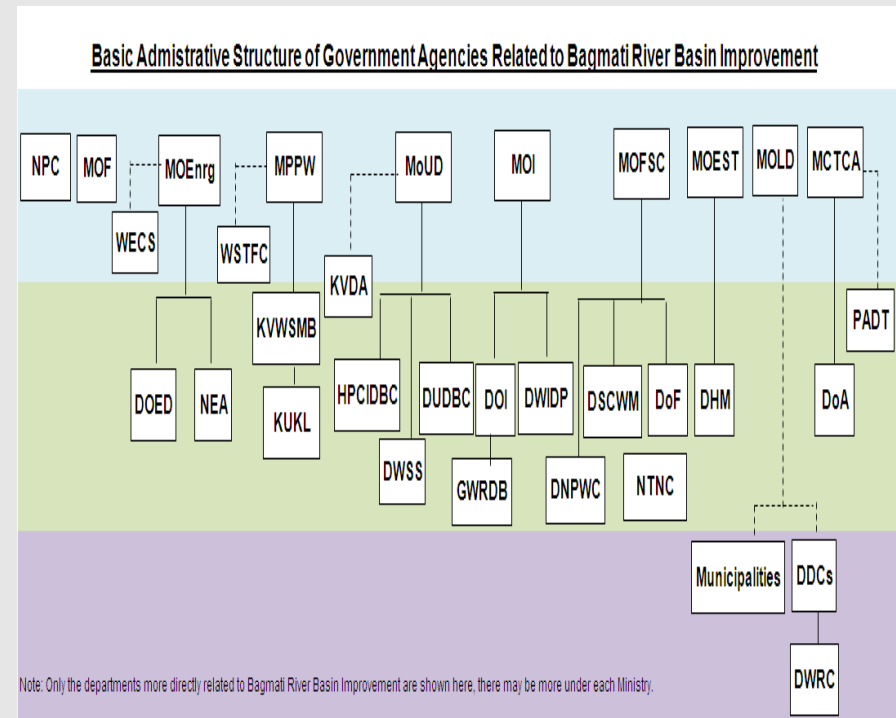
- Watershed degradation and water induced disasters (Deforestation, soil erosion, flooding , landslides etc)
- Integrated watershed protection
- Water induced disaster forecasting system
- Early warning systems need to be in place



# Key issues and challenges (Cont...)

## Other common issues

- Institutional overlap and lack of coordination and integrated planning (7 Ministries and numerous departments directly involved in water related development and management and hundreds of NGOs)
  - Central level planning , coordinating and regulating body with proper mandates
  - Preparation of basinwide Integrated Water Resources Development and Management master plan.
  - Establishment of River Basin organizations



## Key issues and challenges (Cont...)

- Lack of finance and infrastructure development (Limited financial resources and inadequate water related infrastructures)
  - Securing enough investment funds & mechanism for infrastructure development & their sustainable operation & maintenance.
  - Private sector involvement
  - Modalities for Public Private Partnership



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# Opportunities

- Acts and regulations
  - Water Resources Act in 1993.
  - Water Resources Strategy, 2002 and the National Water Plan, 2005.
  - Integrated Water Resource Policy and Nepal's Long Term Water Resources and Energy Sector Vision (2050) under formulation.
  - Numerous other sectoral policies, acts, regulations (soil and watershed conservation act, forestry act, environment protection act, Irrigation policy, regulation; drinking water supply policy, regulation; .....etc in place)



## Opportunities (cont...)

- Institutions and mandates
  - National Planning Commission, National Water Resources Development Council.
  - Water and Energy Commission Secretariat: Central level policy and planning institution for development and management of Water Resources and Energy sector.
  - High Powered Committee for Integrated Development of Bagmati Civilization: Mandated to keep the Bagmati River and its tributaries within Kathmandu valley clean by preventing the direct discharge of solid and liquid wastes to the river.
  - Sectoral Ministries, Departments, Regional and District level offices for implementation of projects.





# Opportunities (cont...)

- Tourism

- Religious (Pashupatinath, Budhanilkantha, Swoyambhu, Boudhanath etc)
- Historical (Kathmandu, Lalitpur, Bhaktapur Durbar squares)
- Trecking (Shivapuri National Park, Phulchowki , Godavari etc)
- River boating, sight seeing





# Opportunities (cont...)

- Public Awareness Building
  - Supreme Court ruling on Bagmati pollution
  - 100s of NGOs for Bagmati improvement, protection, cleaning etc
  - Public demand and desire to improve Bagmati
    - Color
    - Odor
    - Filth



# Opportunities (cont...)

## ■ Past activities

- Numerous studies related to Bagmati basin have been conducted
- Relatively Bagmati basin has more database available as compared to other basins
- Many sectoral development activities have been undertaken in the basin, many of which could be integrated into IWRM concept with little bit of effort.
- ADB assisted TA 7547:Improving water security in Bagmati River Basin (2010-2012), outcomes:
  - Bagmati River Basin Profile
  - Identification of future investment programs for improving water security in Bagmati basin



# Opportunities (cont...)

## ➤ Present activities

### ➤ WECS activities

- With DHM (Department of Hydrology and Meteorology) – Three River Basin Organizations (Koshi, Gandaki, Karnali) being established
- With WWF Nepal –Koshi River Basin Management Program: Piloting of IWRM activities in Dudhkoshi and Indrawati rivers (tributaries of Koshi)
- Under World Bank funded Irrigation and WRM Project– River Basin Organizations in Babai and West Rapti Rivers being established

### ➤ HPCIDBC working on interceptor drains construction along Bagmati, Waste Water Treatment, awareness generation, river area improvement

### ➤ Other sectoral organizations with their mandated works



# Opportunities (cont...)

- ADB PPTA 8050: Preparing Bagmati River Basin Improvement Project
  - Integrated and participatory River Basin Management
    - Support for RBO formation, legal and institutional strengthening
    - Establishment of central water resources information system
    - Preparation of Integrated River Basin Development and Management Plan
  - Upper Bagmati river environment improvement
    - Dry season flow augmentation (dam construction)
    - River environment improvement and beautification (check dams and river right of way protection beautification works)
    - Watershed management
  - Integrated river training and irrigation development in middle/lower Bagmati area
    - Irrigation development
    - Erosion control and river training works
    - Water induced disaster mitigation (early warning system, flood forecasting etc)



## Opportunities (cont...)

### ➤ ADB PPTA: Kathmandu Valley Urban Environment Improvement Project

- Being developed as a sister project of BRBIP
- To support BRBIP requirements in-terms of effluent water quality, interceptor drains and water treatment facilities



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## Way Forward

### ➤ Utilize the opportunities available to meet the challenges

- Proper implementation of Bagmati River Basin Improvement Project (BRBIP) and Kathmandu Valley Urban Environment Improvement Project (KVUEIP)
- The WECS to be given a *de facto* central leading role in planning, guiding and policy formulation within the water resources and energy sectors.
- Formation of a RBO for the BRB (possibility of HPCIDBC).



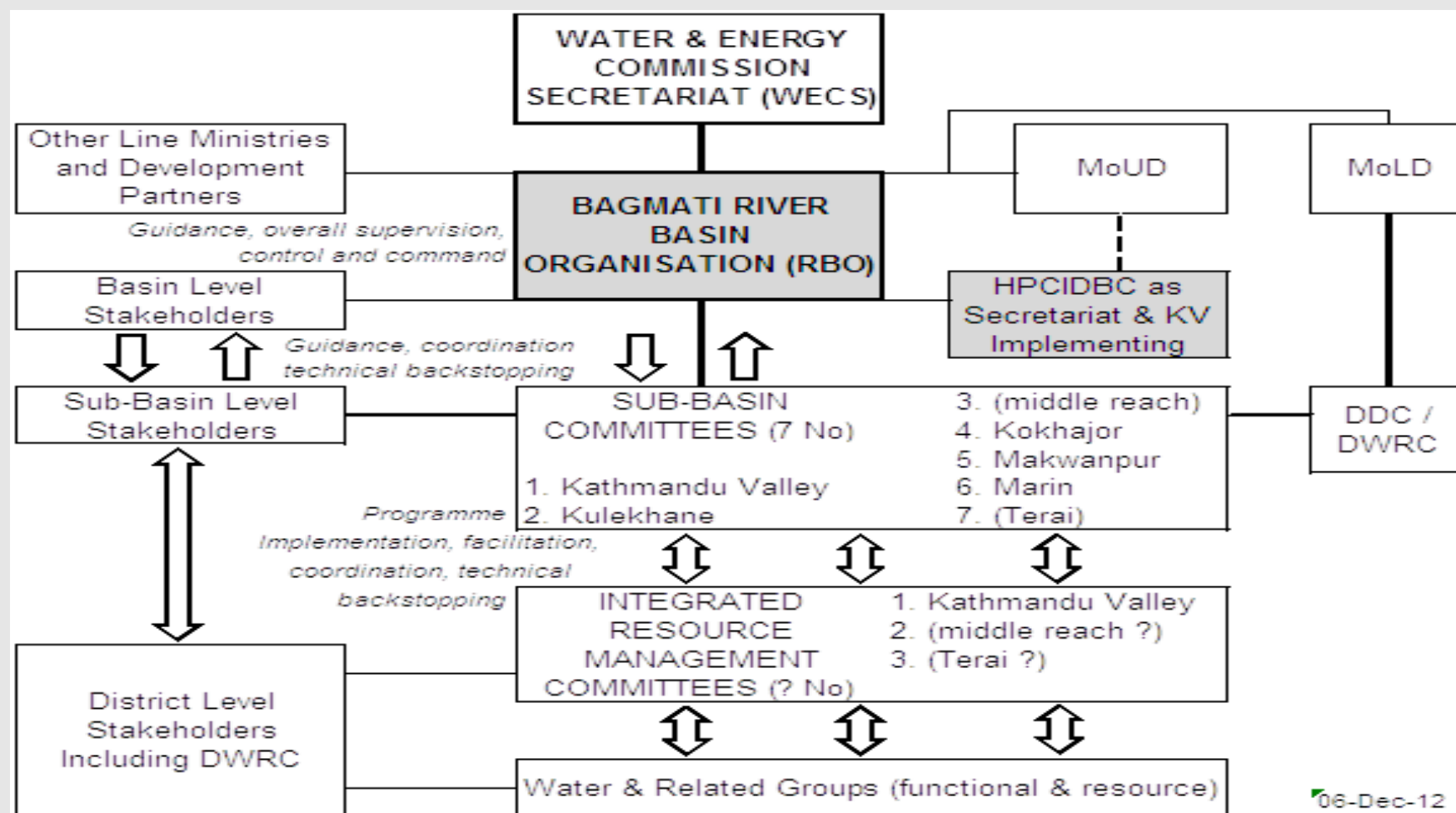


# Way Forward (cont...)



## Way Forward (cont...)

### Possible structure for Bagmati RBO

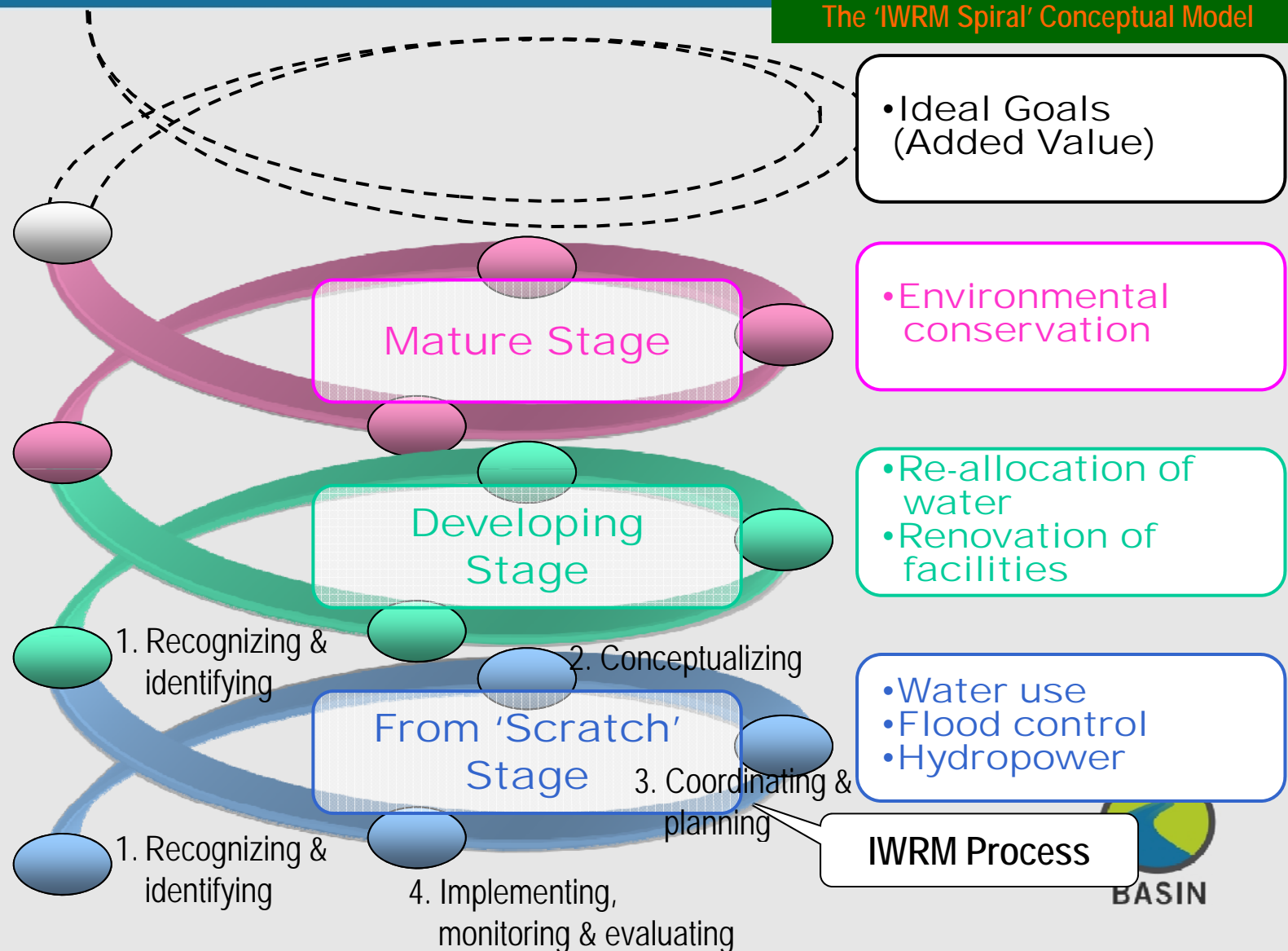


# Way Forward (cont...)

Progress of IWRM

Guidelines Part2-1

The 'IWRM Spiral' Conceptual Model



• Ideal Goals  
(Added Value)

• Environmental  
conservation

• Re-allocation of  
water  
• Renovation of  
facilities

• Water use  
• Flood control  
• Hydropower

IWRM Process



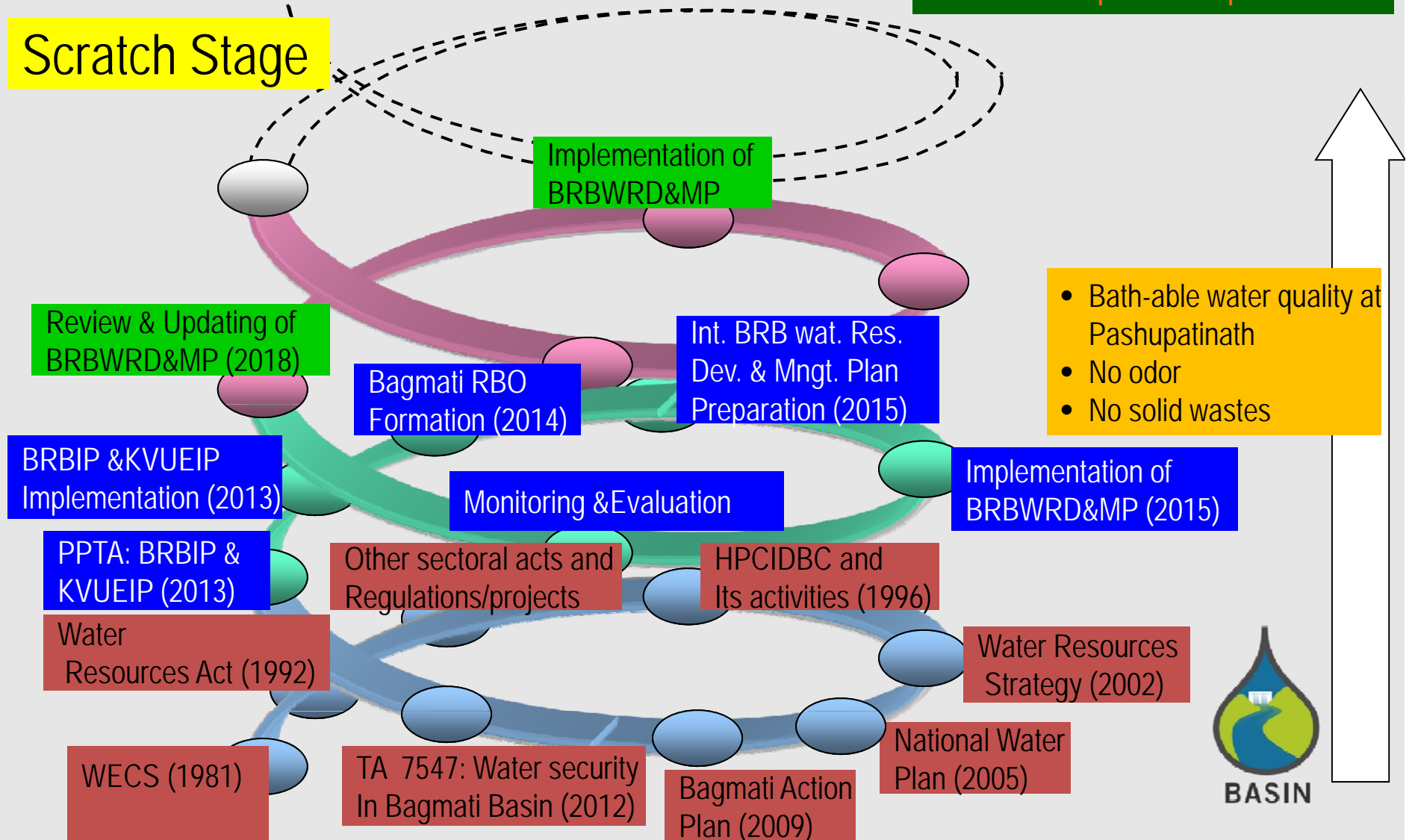
# Way Forward (cont...)

## Progress of IWRM for Bagmati Basin

### Guidelines Part2-1

The 'IWRM Spiral' Conceptual Model

Scratch Stage



# Way Forward

- Diverse Issues
- Multiple Challenges
- Keys for Success
  - Committed and strong political backup
  - Adequate institution, resource and legal mandate
  - Stakeholder involvement / consultation from the very early stages of planning
  - International Knowledge and Experience Sharing



**Everybody is racing with their utmost capacity to reach future targets; we just want to go back in the past: just 30 years back!!**

Current situation

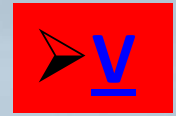


Target (picture taken 30 years ago)



Pashupatinath temple: the Bagmati river banks – cremation site





**Thank you for your kind attention !**