

**The First General Meeting of the
Network of Asian River Basin Organization (NARBO)
in
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**Country Paper on
Integrated Water Resources Management in Nepal**

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Country Background

- PHYSIOGRAPHY

- Location In between China and India
- Total land area about 147, 181 km²
- Length 885 km (East-West)
- Width 145-248 km (North-South)
- Country divided into three physiographic regions
 - Terai (Plains)
 - Mid-hills
 - High Himalayas

Country Background *contd...*

- DEMOGRAPHY

- Ethnic groups about 60
- Religion
 - Hindu Majority
 - Buddhist Second Largest
- Population 23.15 million (2001)
- Population density 164 per sq. kM

Country Background *contd...*

- DEVELOPMENT INDEX
 - HDI 0.499 (2003), ranked-143rd
 - GDP about US\$ 248 per capita
 - Life expectancy at birth about 61 years
 - Average literacy about 54 %
 - Primary school enrollment about 80 %
 - Infant mortality rate 64 per 1000 births
 - Access to drinking water supply about 72 %
 - Population below poverty line about 38 %

Country Background *contd...*

- DEVELOPMENT INDEX
 - Employment about 50 %
 - People depending on subsistence agr. about 80 %
 - Contribution of agr. on GDP 40 %
 - Avg. agr. growth rate 2.48 %
 - Avg. non agr. growth rate 10.44 %

Water Resources Overview

- Nepal's water resources is confined within four major river basins
 - Koshi Catchment area - 66,400 km²;
46 % or 27,863 km² within Nepal
Avg. discharge - 1,409 m³/s
 - Gandaki Catchment area -34,960 km²
90% within Nepal
Avg. discharge - 1,600 m³/s
 - Karnali Catchment area - 43,679 km²
94% within Nepal
Avg. discharge - 1,397 m³/s
 - Mahakali Catchment area-15,260 km²
34 % within Nepal
Avg. discharge - 573 m³/s
- Nepal contributes about 70 % of the Ganges flow in dry season

Important River Basins



Water Resources Overviewcontd.

- Total drainage area - 1,94,471 sq. km
 - Drainage area within Nepal – About 76 %
 - 33 rivers have drainage area more than 1,000 sq. km.
- Avg. annual precipitation - 1530 mm
- Total surface water - 220 billion m³
- Nepal possesses about 2.27 % of world fresh water
- Rechargeable ground water - 5.8 to 11.5 billion m³
- 64 % of rainfall is converted to surface runoff⁸

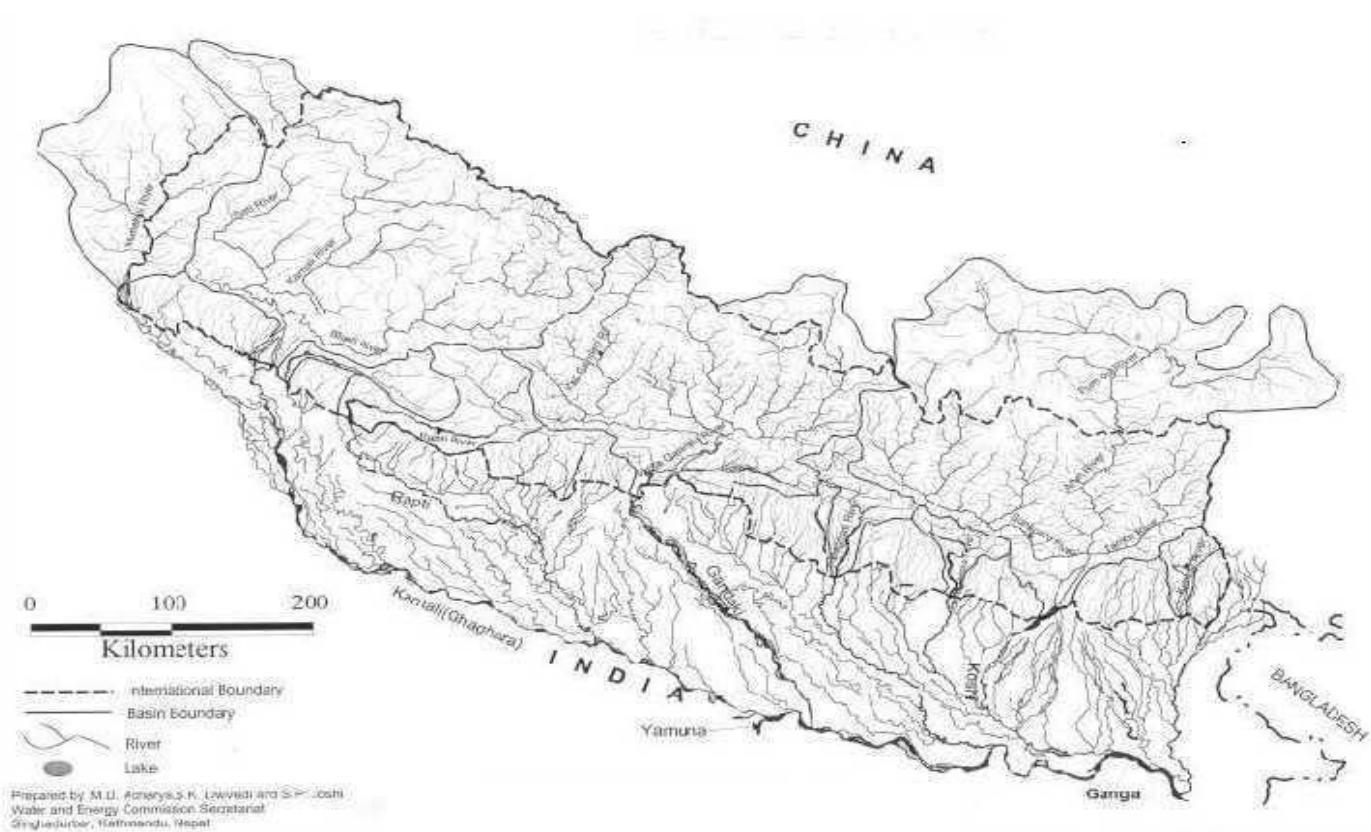
Water Resources Overviewcontd.

- out of remaining 36 % of rainfall, some retained in the form of snow and ice and some infiltrate to ground water reservoir
- 80 % of rainfall in summer (June - September)
- 20 % of rainfall in winter (October - May)

Annual Precipitation Distribution



Ganges River System



Water Resources Utilization

- Irrigation
- Drinking water Supply
- Hydropower Development
- Recreation
- Watershed Management (Preservation)
 - *protection of aquatic and natural habitat*
- Traditional and commercial fishing
- Navigation
- Cultural and religious purposes

Irrigation

- Cultivated Area : 26,42,000 ha (18 % of Land Area)
- Potential Irrigable Area : 66 % of cultivated area
- Present Status
 - 42 % of Cultivated Area has some sort of irrigation
 - 17 % Cultivated Area has year - round Irrigation
- In Terai Irrigated Area: 8,89,000 ha
 - 82 % by Surface Irrigation
 - 18 % by Ground Water (Tube wells)
- Existing Irrigation System Contribute 33 % of Country's Current Agriculture Production
- By 2027, Irrigation water demand will grow by 185 % as of today (from 13 mill m³ to 37 mill m³)

Drinking water

- BY 1970,
 - 6 % of the population in rural area had access to a protected water source
- At present,
 - 66 % of the population has access to drinking water systems
- Future consumption will grow steadily
- By the year 2027,
 - Domestic water consumption would grow from about 800 to 1800 mill m³ per year (125 %)

Hydropower

- Hydropower Potential (Theoretical) : 83,000MW
- Techno-Economically Viable : 43,000MW
 - Storage potential 49 %
 - R-O-R potential 51 %

Hydropower Development opportunities

- The first Hydropower Project - PHARPING HPP
(500 KW in year 1911)
- Present Installed capacity 609 MW, of which
553 MW (hydro)
- Private sector contribution 144 MW (out of 553 MW)

Industrial Use

- Current estimate
 - industrial consumption is about 80 mill m³ per year
- By the year 2027
 - Expected to increase to 180 mill m³ per year

IWRM in Nepalese Context

- Key Policy Documents
 - Water Resources Strategy (WRS) approved in 2002
 - National Water Plan under preparation
- Objective:
 - Management of water resources of the country in an integrated manner
- Vehicle to IWRM
 - Integration
 - Coordination
 - Participation
 - Equity
 - Implementation of water related programs

IWRM in Nepalese Context contd...

- Integration
 - Formation of water users group in each sub-river basin
 - Formation of sub-basin committee - representative from water user group
(As executive body)
 - Existing district water resources committee (DWRC) - restructured to carry out responsibility of IWRM
 - Constitute River Basin Authority in WECS to improve IWRM policies, guidelines; provide advice and support to river basin entities
- Coordination
 - WECS at central level for integrated national water planning, policy analysis and development, development of legislation and mechanisms
 - DWRC at district level, responsible to coordinate activities and programs

IWRM in Nepalese Context contd...

- Public participation
 - Participation of stakeholders for optimal use of water resources through water user groups and sub-basin committees to ensure IWRM
- Equity
 - Equity, women participation, and social inclusion policies are country's commitment to shared growth. Adequate policies to be developed for inspiring stakeholders enthusiasm and popular participation in decision making process to ensure IWRM.

Strategy, Policies, Acts and Regulations **Related to Water Resources Development**

- Water Resources Strategy 2002
- Hydropower Development Policy 2001
- Irrigation Policy 2003
- National Water Supply Sector Policy 1998
- Water Resources Act 1992
- Water Resources Regulation 1993
- Electricity Act 1992
- Electricity Regulation 1993
- Foreign Investment and technology transfer act 1992
- Environmental Protection Act 1997
- Environmental Protection Regulation 1997
- Local Self Governance Act 1998

Existing Policy Towards IWRM

- Concept of IWRM has yet to be legally adopted
- HMGN has committed development of water resources through IWRM concept
 - Provision in Hydropower Development Policy, 2001
 - Consider whole river basin as basis of water resource utilization
 - Adopt a broader perspective in development and management of water resources in an integrated manner
 - Water Resources Strategy, 2002
 - Realized the need of adopting an Integrated National Water Resources Policy.
 - Irrigation Policy, 2003
 - Project formulation shall be guided by the principles of IWRM

Existing Institutional Framework

- Institutions involved in policy, planning and decision making process
 - National Water Resources Development Council (Apex body); National Planning Commission; Water and Energy Commission; Water and Energy Commission Secretariat
- Administration, Management and execution level Ministries
 - Ministry of Water Resources; Ministry of Physical Planning and Works
- Department level institutions
 - Department of Irrigation; Department of Electricity Development; Department of Water Induced Disaster Prevention; Department of Water Supply and Sanitation; and Nepal Electricity Authority
- Various community based User Groups and Private Sector are participating in water resources development.

Nepal's strategy towards regional cooperation

Nepal has envisaged Short, Medium, and Long Term targets for achieving regional cooperation for substantial mutual benefits.

•Short-term,

- Develop and implement an improved framework for regional cooperation;
- Monitor existing water-sharing treaties in conjunction with an effective mechanism for ensuring compliance;
- Evaluate regional water use demands and the potential for hydropower trade with its neighbouring countries ; and
- Continue to explore appropriate treaty mechanisms for equitable sharing of water.

Nepal's strategy towards regional cooperation

contd..

•Medium Term

- Resolve riparian issues between neighbouring countries; and
- Ensure effective bilateral and multilateral agreements for equitable water sharing

•Long Term

- Various bilateral and multilateral projects for irrigation, hydropower, flood control, transmission grid and navigation will be completed; and
- Substantial mutual benefits achieved

Action Plan for NARBO

- The principles of IWRM are equally important for the river basin that are shared by two or more states.
- Since the stress on water resources will be inevitable in future, the need of optimum utilization of water resources of the river basins should be a priority in any water resources planning development.
- NARBO in this context, could help its member countries provide food and livelihood by proper water resources management through IWRM concept.
- To achieve above objectives, following action plans for NARBO are proposed.

Action Plan for NARBO contd ...

- Short Term
 - Establish a focal institution;
 - Identify possible partners in each member country ;
 - Make a data base of the policies of each member country regarding IWRM, and bilateral agreements;
 - Collect the best practices and lessons learned from each member countries;
 - Need assessment for strengthening and capacity building of collaborating partners in each member countries, which have not yet been able to establish River Basin Organisation (RBO) and promote good water governance; and
 - Establish official web site of NARBO for dissemination of information

Action Plan for NARBO contd ...

- Medium Term
 - Develop collaborating mechanism among the member countries/RBOs;
 - Develop mechanism for exchange of information;
 - Disseminate best practices and lessons learned from each member countries; and
 - Strengthening and capacity building of collaborating partners in each member countries through field observations and site visits in other member countries.

Action Plan for NARBO contd ...

- Long Term
 - Work towards making NARBO as a possible forum for resolution of bilateral or multilateral riparian conflicts;
 - Create a mechanism for involving education and research institutes of member countries to develop, improve, and exchange better water resource management practices;
 - Foster cooperation between member countries and RBOs for optimum use of water, particularly in developing projects in a trans-boundary river; and
 - Continue strengthening and capacity building of collaborating partners in each member countries through field observations and site visits in other member countries.

Thank you very much
for your kind attention