Updates of Water Environment Governance in Nepal

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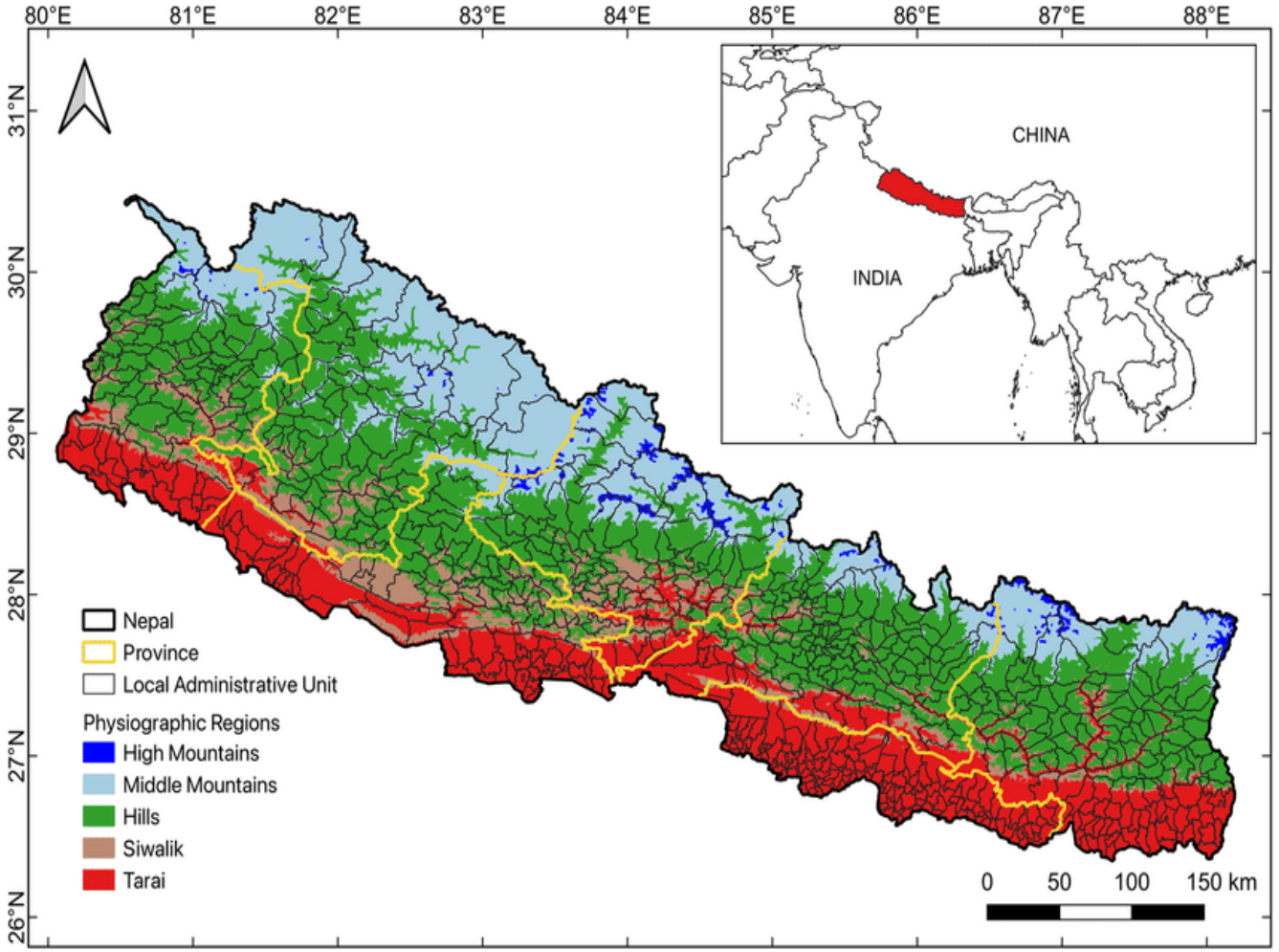
Singhadurbar, Nepal

30th January, 2024

19th WEPA Annual Meeting in Hayama Japan

Nepal at a glance



- Landlocked between China in the North and India in the East, West and South.
- Area: 1,47,181 km2,
  - Himalayas and Mountains 43%,
  - Hills 30% and
  - Terai Plain(Flat Land) 27%
- Varied Topography within a short span (about 193 km)of width ranging from 64m to 8848m in altitude
- Population: 29.19 Million (2021),
- GDP : Total= US$ 40.83 billion
- Per capita= US$ 1337

Nepal at a glance

- **After promulgation of Constitution of Nepal 2015, Nepal has been restructured and renamed into Federal Democratic Republic of Nepal**

Federal Democratic Republic of Nepal

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Seven Provinces
(Koshi Province (1), Madhesh Province (2), Bagmati Province (3), Gandaki Province (4), Lumbini Province(5), Karnali Province (6) and Sudurpashchim Province (7))

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Districts (77 District Coordination Committees)

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Local Units
(6 Metropolitan cities, 11 Submetropolitan cities, 276 Municipalities, 460 Rural municipalites and 6743 Wards)

Goals of Water Environment

MDG Goal: Access to safe Drinking water and hygienic Sanitation

SDG 6 Goal: Ensure availability and sustainable management of water and sanitation for all.

- The government's **SDG 6.1** target is to achieve universal and equitable access to safe and affordable drinking water by 2030.
- The government's **SDG 6.2** target is to achieve access to adequate and equitable sanitation and hygiene for all by 2030.
- The government's **SDG 6.3** target is to improve water quality by reducing pollution, eliminating dumping minimizing release of hazardous chemicals and materials by 2030.

(Source: National Planning Commission 2017)

Goals of Water Environment

Environment Quality Standards for water Environment Governance

- **Standard for Drinking Water Quality, 2022**
  - **It has 19 compulsory test parameters with 9 additional test parameters of Physical, chemical and microbiological.**
- **Guidelines for Implementation and Monitoring of National Water Quality Standards, 2022**
  - **It includes water quality Surveillance Agency and test procedure with monitoring frequency.**

Apart from Generic Standard, Industrial wise different Effluent Standards, Wastewater Effluent standard has been set by the Ministry (MoFE).

- **Generic Standard Part I, II & III**
  - **Tolerance Limits for Industrial Effluents to be Discharged into Inland Surface Waters.**
  - **Tolerance Limits for Industrial Effluents to be Discharged into Public Sewer.**
  - **Tolerance Limits for Wastewater to be Discharged into Inland Surface Waters from Combined Wastewater Treatment Plant.**
- **Wastewater Effluent Standard, 2023**
  - **It has 5 parameters standard for analysis with 4 sampling methods.**

Status of Water Environment

Water Resources and Uses in Nepal

S.No.	Sources	Available amount
1	Annual Renewable Surface Water (billion m3)	225
2	Annual Renewable Ground Water (billion m3)	12
3	Per Capita Renewable Surface and Ground Water (000 m3 / year)	9
4	Total Annual Withdrawal (billion m3 / year)	24
5	Per Capita Annual Withdrawal (000 m3 / year)	1
6	Sectorial withdrawal as % of Total withdrawal	
	Domestic	3.43
	Industrial	0.41
	Agricultural	96.16

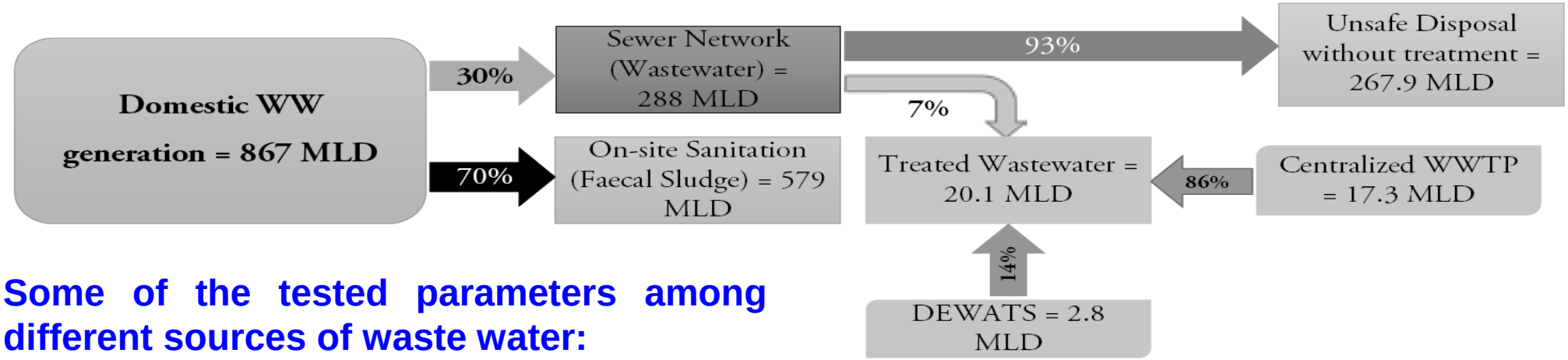
Status of Water Environment

Wastewater Production in Major Urban Areas of Nepal as of 2011:

S.No.	Urban Centers	Waste Water Production (MLD)			Collected for Treatment (million liter/day)
		Domestic	Industrial	Total	
1	Kathmandu	64.497	4.515	69.012	34.506
2	Lalitapur	15.647	1.095	16.742	8.371
3	Bhaktapur	5.971	0 .418	6.389	3.195
4	Kritipur	3.920	0.274	4.194	2.097
5	Madhyapur Thimi	3.069	0.215	3.284	1.642
6	Pokhara	NA	NA	13.42	NA
7	Biratnagar	NA	NA	12.15	NA
8	Birgunj	NA	NA	8.68	NA
9	Bharatpur	NA	NA	6.84	NA
10	Janakpur	NA	NA	5.41	NA
11	Dhangadi	NA	NA	5.37	NA
12	Butwal	NA	NA	6.01	NA
	Total	**93.104**	**6.517**	**157.501**	**49.811**

Status of Water Environment

Domestic Wastewater Management in Nepal as of 2016



Some of the tested parameters among different sources of waste water:

Parameters	Source Type		
	Domestic	Industrial	Hospital
pH	7.04	6.67	7.1
TSS (mg/l)	356	429	195
DO (mg/l)	1	-	4
BOD (mg/l)	420	411	166
COB (mg/l)	640	766	329
Ammonia (mg/l)	118	17	48
Nitrate (mg/l)	6	-	4
TP (mg/l)	16	2	-
Oil & Grease (mg/l)	18	37	2

- Centralized WWTP have been unsuccessful as the existing traditional lagoons or activated sludge type wastewater treatment plants are not functioning or partially functioning at far below capacity.
- **DEWATS** is decentralized wastewater system in a low maintenance treatment system, treating small volumes of wastewater for reuse or discharge within National Standards.

Identification of Pollution Source

Main sources of water pollution:

The main sources of water pollution are Industrial waste, Domestic waste and sewage drainage.

- Industrial and domestic waste disposed in an unsafe and unsanitary manner which has become public health hazard and environmental pollution.

Industrial wastewater disposal in river

Domestic wastewater disposal in river

Identification of Pollution Source

- Currently, Wastewater and Fecal Sludge management is very in adequate and poorly operated and maintained.
- Major Industrial pollution source in Nepal are leather processing, Pharmaceuticals, medicinal chemical product, Beverage, Fermentation industry, Dairy, Sugar mills, Textiles, Soap, Vegetable ghee and oil, Hospital Paint and galvanization and electroplated.
- Open defecation and open disposal both have serious Public heath hazard and environment consequences including the spread of diseases, Contamination of water sources and pollution of environment.

Open Fecal Sludge disposal in drain

Implement measures to address issues

- Improving Wastewater and Faecal sludge management is big Challenges in Nepal.
- A multifaceted approach involving government, private sector and other stakeholder including community.
- The existing problems of wastewater treatment in Nepal can be solved by using appropriate and viable technologies (like Centralized or Decentralized Wastewater Treatment plant).
- The centralized wastewater treatment plants are not the most cost-effective, require sophisticated technologies and skilled manpower as well as have huge O&M costs.
- The centralized wastewater management was noted to have failed in addressing the wastewater problem in Nepal.

Centralized wastewater treatment plant

Implement measures to address issues

- Decentralized wastewater treatment systems including constructed wetlands are supposed as effective, economic and environmentally friendly and sustainable systems in context of Nepal.
- The effective policies at local and national levels can accelerate decentralized wastewater systems in Nepal.
- Ministry of water supply released the Institutional and Regulatory Framework for Faecal Sludge Management in Urban Areas of Nepal in 2017.
- The purpose of the framework is to improve planning, implementation, monitoring and regulation of faecal sludge management across the service chain, as presented in Figure.

Service chain of Faecal Sludge Management

Implement measures to address issues

Existing Wastewater Treatment Plants in Kathmandu Valley and Other Urban Areas of Nepal

Location	Type/Stage	Capacity MLD	Present State	Service Details
Dhobighat, Patan (Kathmandu Valley)	1st Pond – Aerobic 2nd Pond – Anaerobic 3rd Pond – Facultative 4th Pond- Aerobic	15.4	Not working	HH Connections-53,900 Sewerage Lines-61,650 Combine channel- 44Km
Kodku, (Kathmandu Valley)	1st Pond – Aerobic 2nd Pond – Anaerobic 3rd Pond – Facultative 4th Pond- Aerobic	1.1	Partially working	HH Connections- 15,500 Sewerage Lines- 20,443 Combine channel- 11Km
Sallaghari, Bhaktapur (Kathmandu Valley)	Aerated lagoon	2.4	Not working	Details not available
Hanumanghat, Bhaktapur, (Kathmandu Valley)	Oxidation Ditch	0.4	Not working	
Guheswori, Kathmandu (Kathmandu Valley)	Oxidation Ditch	16.4	Partially Working	Sewers- 6 Km Population Served- 53,000 Urban area- 21 Ha
Hetauda Industrial Estate, Hetauda	Oxidation Pond	1.1	Working	Industrial Wastewater Treatment Plant
Dhulikhel Hospital	Reed Bed (Constructed Wetland)	< 0.10	Working	Without Primary Treatment Bed Size- 261 m^2 Population served- 330
Kathmandu Municipality	Reed Bed (Constructed Wetland)	< 0.40	Working	No Primary Treatment Bed Size- 362 m2 Population served- 330
Mulpi International School	Reed Bed (Constructed Wetland)	<0.25	Working	No Primary Treatment Bed Size- 376 m^2 Population Served- 850
SKM Hospital	Reed Bed (Constructed Wetland)	0.15	Working	Bed Size- 141 m^2 Population Served- 500

Implement measures to address issues

Existing Wastewater Treatment Plants in Kathmandu Valley and Other Urban Areas of Nepal

Kathmandu University	Reed Bed (Constructed Wetland)	< 0.035	Working	No Primary Treatment Bed Size- 587 m^2 Population Served- 1300
Middle Marshyangdi Hydropower Project	Reed Bed (Constructed Wetland)	< 0.026	Working	No Primary Treatment Bed Size- 298 m^2 Population Served- 870
Pokhara Municipality	Reed Bed (Constructed Wetland)	< 0.115	Working	No Primary Treatment Bed Size- 3,308 m^2 Population Served- 3830
Kapan Monastry (Kathmandu Valley)	Reed Bed (Constructed Wetland)	< 0.015	Working	No Primary Treatment Bed Size- 150 m^2 Population Served- 300
Tansen Municipality	Reed Bed (Constructed Wetland)	< 0.030	Working	No Primary Treatment Bed Size- 583 m^2 Population Served- 1000
Sunga Community Wastewater Treatment Plant (Kathmandu Valley)	Reed Bed (Constructed Wetland)	50 m^3/day	Working	Community Wastewater Treatment Plant Bed Size- 150 m^2 Population Served- 1200

The government has set a target for 380 million liters/day of wastewater to be treated before being discharged in water body by 2025.

Implement measures to address issues

Few Faecal Sludge Management Plants

1) Kakarbhita- 12 m^3/day
2) Chareli- 27 m^3/day
3) Bardiya- 5 m^3/day
4) Waling- 27 m^3/day
5) Gulariya- 5 m^3/day
6) Lubhu- 3 m^3/day
7) Birendranagar- 15 m^3/day
8) Tikapur- 20 m^3/day

Faecal Sludge Management Plant in Lubhu

The government has set a target for 60,000 cubic meters/year of faecal sludge to be managed by 2025.

Evaluating outcomes and revising policies

Policy and Legal Framework for Water Environmental Governance

The Constitution of Nepal:

- Constitution of Nepal(2015)
  - Part 3: Fundamental Rights and Duties
    - Article 30: Right to clean environment, healthcare and conservation, management and use of natural resources.
      - Sub-article (1): Every citizen shall have the right to live in a clean and healthy environment.
      - Sub-article (2): The victim shall have the right to obtain compensation, in accordance with law, for any injury caused from environmental pollution or degradation.

- The 15th Periodic Plan (2019/2020 – 2024/2025)
  - To enhance quality services by ensuring basic drinking-water and sanitation services to all.

Evaluating outcomes and revising policies

Policy and Legislative Frameworks:

S.N.	Documents	Category	Enactment Year	Purpose
1	Water Tax Act	Act	1966	It provides modus operandi of recovering the amount of the water tax leviable pursuant to the prevailing law.
2	Water Resources Act	Act	1992	The umbrella Act governing water resource management and declares the order of priority of water use .
3	Water Resources Rules	Rules	1993	The umbrella Rules governing water resource management, Sets out the procedure to register a Water User Association and to obtain a license.
4	Drinking Water Service Charge Rules	Rules	1994	Details the procedures for Tap connection and hole change and ownership of Taps and its transfer.
5	National Solid Waste Management Policy	Policy	1996	Waste management by Local Bodies; mobilize wastes as resources and reduce wastes at sources.
6	Drinking Water Rules	Rules	1988	Regulates the use of drinking water; provides for the formation of Drinking Water User Associations and sets out the procedure for registration.
7	Water Resources Strategy	Strategy	2002	Sets out sectoral and cross cutting short, medium and long term strategies to optimize the sustainable benefits from the resource.
8	National Water Plan	Plan	2005	Plots short, medium and long term action plans for Water Resource Sector; More focused on Environmental Concerns; Introduces Integrated Water Resources Management (IWRM).

Evaluating outcomes and revising policies

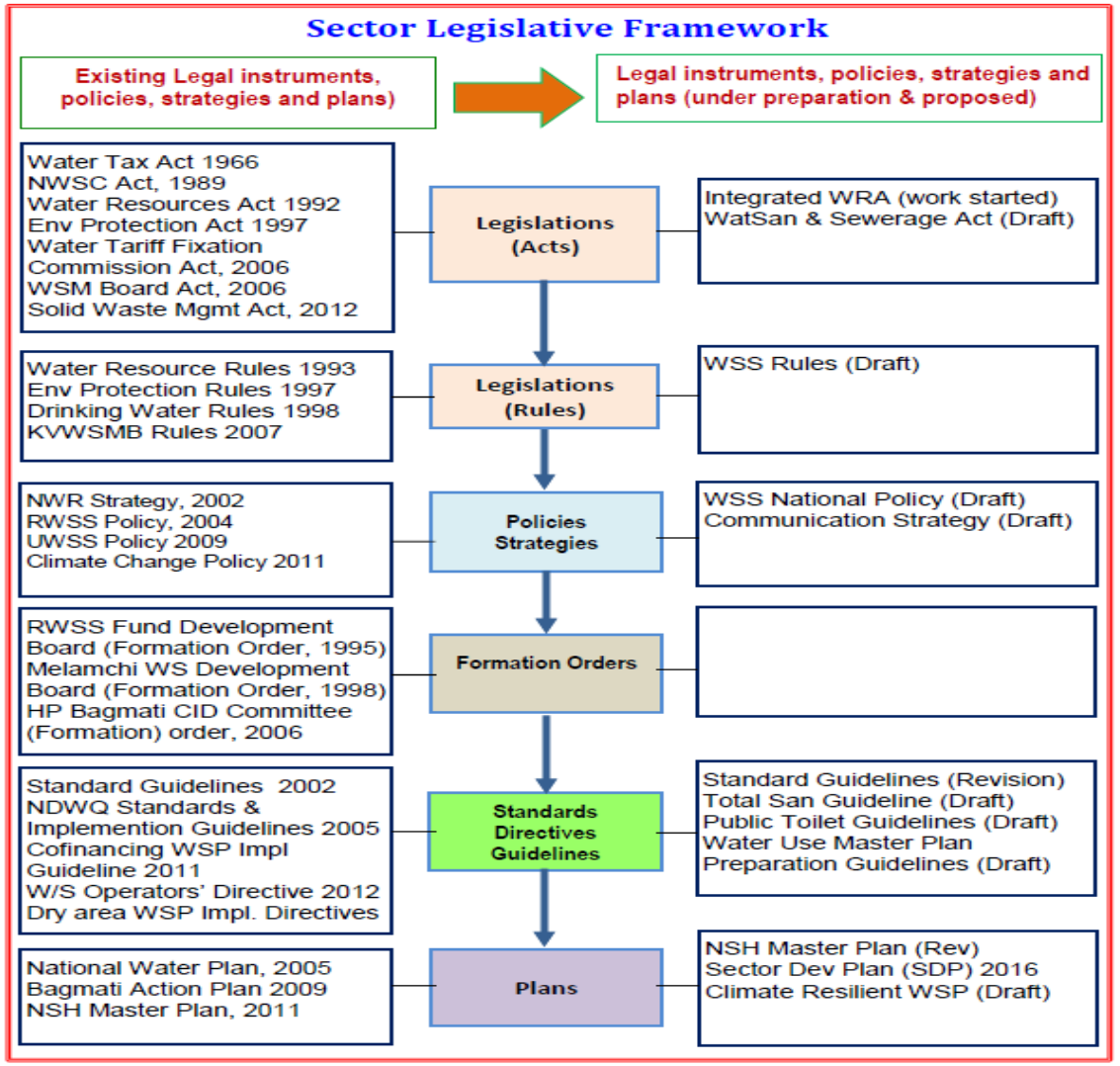
Policy and Legislative Frameworks:

S.N.	Documents	Category	Enactment Year	Purpose
9	Water Supply Management Board	Act	2006	The act puts emphasis on the participation of local bodies and WaSH institutions in water and sanitation services in the urban areas.
10	Sanitation and Hygiene Master Plan	Plan	2011	Recognizes the leadership and Coordination of local bodies; ODF status as entry point of Total Sanitation.
11	Local Government Operation Act	Act	2014	Sets out the powers, functions and duties of local government in relation to water and Sanitation.
12	Environment Protection Act	Act	2019	The umbrella Act governing over all environmental protection of the country and responsibilities are also assigned to local level and province level Govt.
13	Environment Protection Rules	Rule	2020	The umbrella rule governing over all environmental protection of the country and further elaborates the Act.
14	Water Resource Policy	Policy	2020	The policy is aimed to cover all aspects of water resources development and management based on the Integrated Water Resources Management (IWRM) principle and newly restructured three tires of government.
15	Water Supply and Sanitation Act	Act	2022	To access easy availability of clean and quality water supply and to achieve access to adequate Sewerage and Wastewater Management
16	Standard for Drinking Water Quality	Standard	2022	Customization of Global drinking water quality standards as per local condition.
17	Wastewater Effluent Standard	Standard	2023	To maintain the Standards of waste water effluent disposal on river, pond and reservoir.

Evaluating outcomes and revising policies

Sectoral Legislative Framework in changed context:

- The government has substantially strengthened environment-related legislations, acts, policies, and guidelines related to the water environment.
- Under its federal structure, the government is also revising or drafting acts and legislations and establishing new institutional structures at federal, provincial, and local levels.
- The establishment of Ministry of Water Supply reflects the government's national and international commitments and increasing prioritization of the water, sanitation and hygiene (WASH) sector together with relevant goals and targets.



Evaluating outcomes and revising policies

Institutional Framework for Water Environmental Governance

Name	Level	Working Area
Ministry of Energy, Water Resources and Irrigation	Central	Over all Energy, Hydropower, Irrigation and Water Resources development of the country.
Ministry of Water Supply	Central	Water supply, sanitation and hygiene development and management of the country.
Ministry of Urban Development	Central	Over all urban planning, development and Management for the development of municipalities in the country.
Ministry of Forest and Environment	Central	Forest resources and environmental development and management and enforcement environmental mandates.
Water and Energy Commission Secretariat	Central	Policy and planning regarding energy and water resources development and management covering all sectors. Advisory role on critical issues related to large water resources projects.
Department of Environment	Central	Responsible for the implementation and the compliance of Environmental Protection Act , and Rule (EPR), and pollution control standard as promulgated by the Government of Nepal.
Ministry of Physical Infrastructure Development	Provincial	Provincial level policy planning formulation and development of all sorts of physical infrastructures and their environmental management.
Department of Water Supply and Sewerage (DWSS)	Central	DWSS is dedicated to planning and implementation of both rural and urban WaSH projects.

Challenges and Future Plans

Issues & Challenges need to addressed:

- **Funding Gap and Limited Resources**(Budget, Manpower, laboratory facilities, tools and equipments) **at Federal Level, Provincial Level and Local Level.**
- **Poor Maintenance and Limited Infrastructure**.
- **Lack of Awareness** (sensitivity & technology) at Local Level Government.
- **Lack of Institutions** for WASH at local level.
- **Lack of Capacity Development** of available manpower with growing technology.
- **Lack of Specific guideline and Standards** for inspection except the effluent standards.
- **Lack of Research and Development.**
- **Land acquisition issue** for treatment plant.
- **Lack of robust monitoring and evaluation**.

Challenges and Future Plans

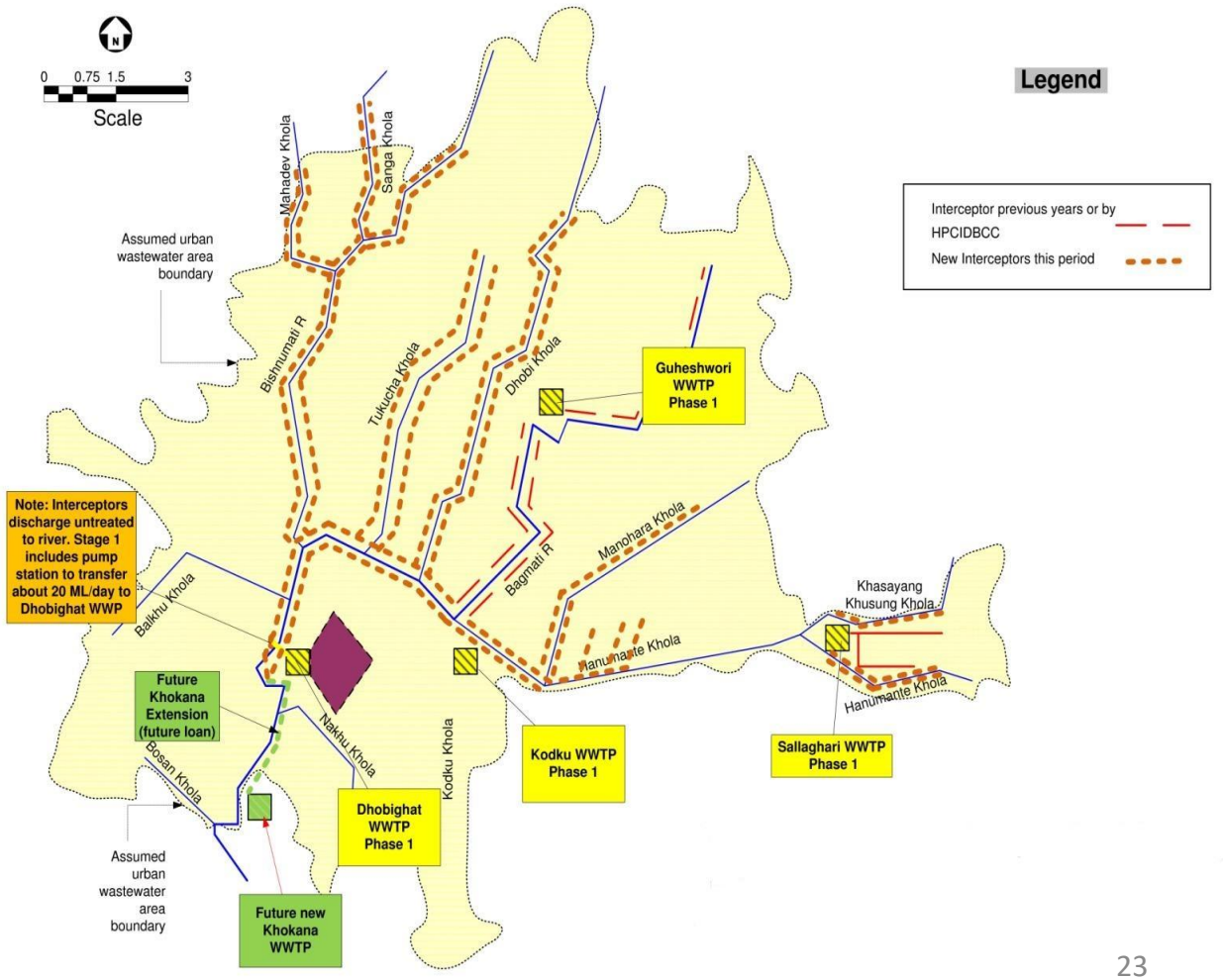
Wastewater Treatment Plan in Kathmandu Valley in 2020-2030

Wastewater Treatment Plants	Projected Population ('000)		Wastewater generation (MLD)		Wastewater Treatment plant Capacity (MLD)		WWTP Area Available (hectare)	Effluent Standards(BOD mg/l)	
	Year 2020	Year 2030	Year 2020	Year 2030	Year 2020	Year 2030		Year 2020	Year 2030
Guheshwari	237	454	17.1	41.8	32.4	48.6	5.0	15	15
Gokarna					3	6	0.93	15	15
Sallaghari + Hanumanghat	122	153	8.8	14.1	14.2+1	15.2	3.4	50	50
Kodku - Balkumari	207	380	14.7	35	17.5	35	6.5	50	50
Dhobighat + Tukucha	2530	4417	182	407	74+17.2	330	30	50	50
Khokana					-	64.2	38.5	50	50
Total	**3096**	**5404**	**223**	**498**	**159**	**499**	**84.33**	50	50

Challenges and Future Plans

Recent development in Wastewater Treatment Plants in Kathmandu Valley

- Existing wastewater treatment facilities at Gokarna, Guheshwori, Sallaghari, Kodku and Dhobighat will be rehabilitated and upgraded and their treatment capacity will be increased.
- A new wastewater treatment facility will be constructed in Khokana.



Challenges and Future Plans

Recent development in Wastewater Treatment Plants in Kathmandu Valley

Project	Major Activities	Progress
Kathmandu Valley Sewer Management Project	**To minimize effect of effluent to water bodies by construction of Wastewater Treatment Plant**	**In Operation :** ➢ Guheshwari WWT operating at 22-23 MLD (Cap. 32.4 MLD) **In Testing & Commissioning Phase :** ➢ Dhobighat WWT 1 unit out of 2 units@37 MLD each **Under Construction & Planning:** ➢ Dhobighat WWTP 1 unit out of 2 units@37 MLD each ➢ Sallaghari WWTP (Cap: 14.2 MLD) ➢ Balkumari WWTP (Cap: 17.5 MLD) **Planned WWTP :** ➢ Gokarna (Cap. 3 MLD) ➢ Kodku (Cap. 17.5 MLD first phase) ➢ Khokana (Cap. 66.2 MLD)
	To stop direct disposal of sewer and effluent to water bodies by construction of Intercepting Sewer line on both bank of the rivers	➢ Completion of 22 km Intercepting Sewer Pipe line (KUKL/PID) ➢ Hampered due to land acquisition issues

Thank You