



Innovative Finance for WASH

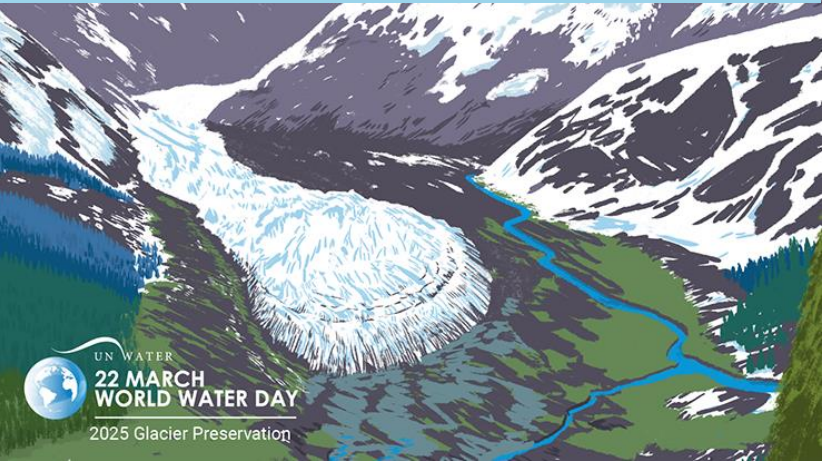
Dr. Meera Mehta/Dr Dinesh Mehta
Professor Emeritus and Center Head,
CWAS, CRDF, CEPT University

National Seminar on World Water Day 2025
WASH Financing and Sustainability Workshop
March 22, 2025, Nepal

WASH and Glaciers

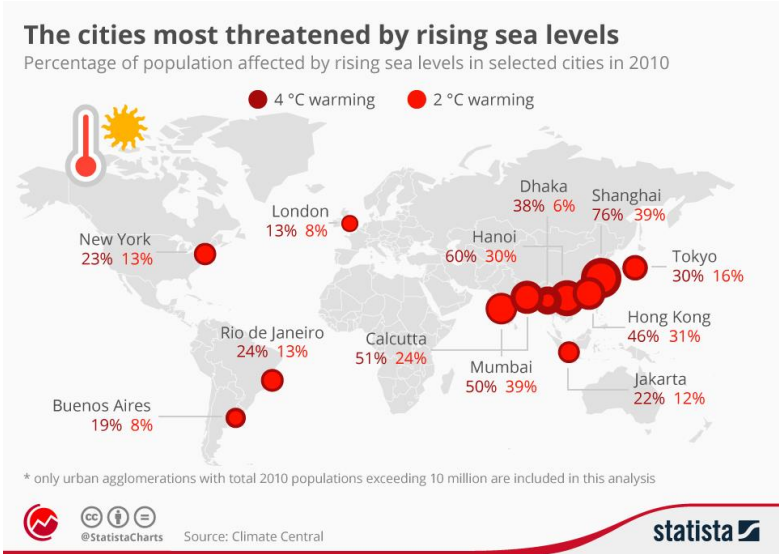
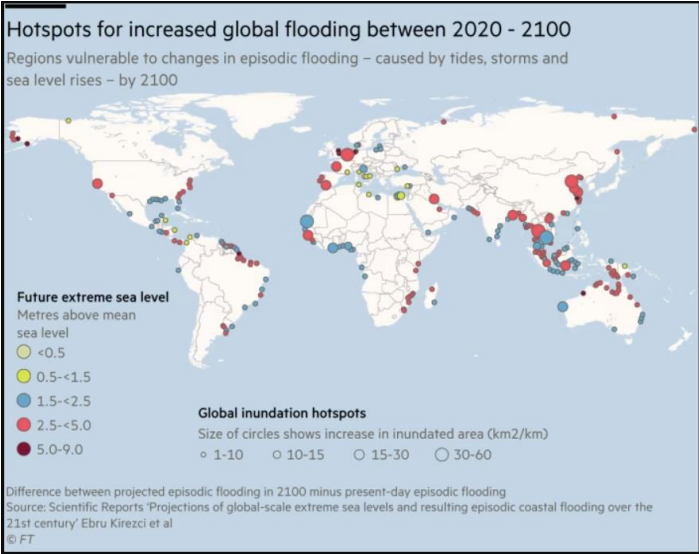


World Water Day 2025
Theme - Glacier Preservation

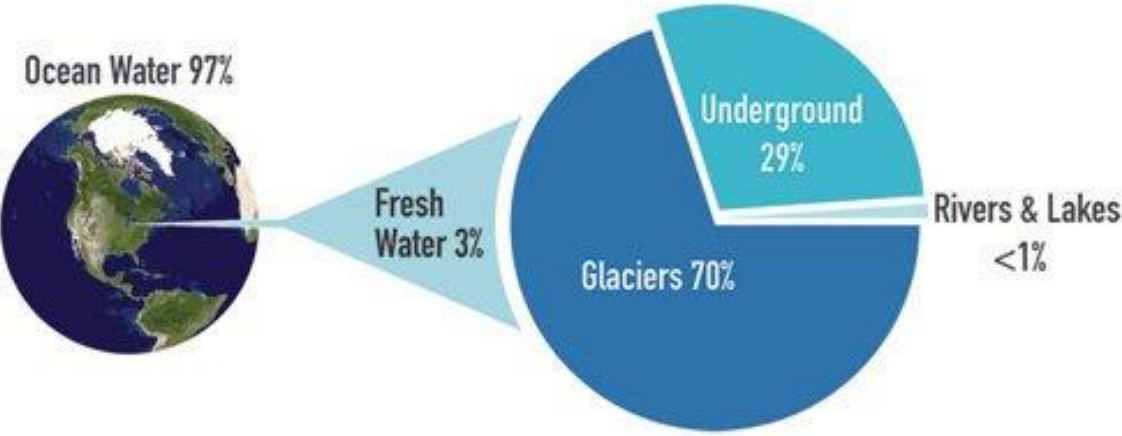




22 MARCH
WORLD WATER DAY
2025 Glacier Preservation



Water on Earth



Only **3% of Earth's water is freshwater** and **70% of this freshwater is embedded in snow and ice.**

WASH and climate change



Glaciers are melting and Sea Level Rise



Water Scarcity and Droughts



Floods September 2024, Nepal



Temperature rise and Heatwaves



WATER is at a central place in the climate talks at COP talks

Increased access to water as climate adaptation and resilience

Countries to integrate water and climate agendas at national level



25% population of
the world is already living in
**DAY
ZERO** scenario.

UN estimates that global
demand for fresh water will
outstrip supply by 40% in
2030

WRI - <https://www.wri.org/insights/highest-water-stressed-countries>

According to JMP **ON-PREMISE
ACCESS IMPROVED**
significantly for water since 2000

33% → 73% however,

**DISPARITY
IN ACCESS**

In the least developed countries, this coverage
is still at 37%. In sub-Saharan Africa, 31%

JMP - Progress on household drinking water, sanitation and hygiene
2000-2022: special focus on gender

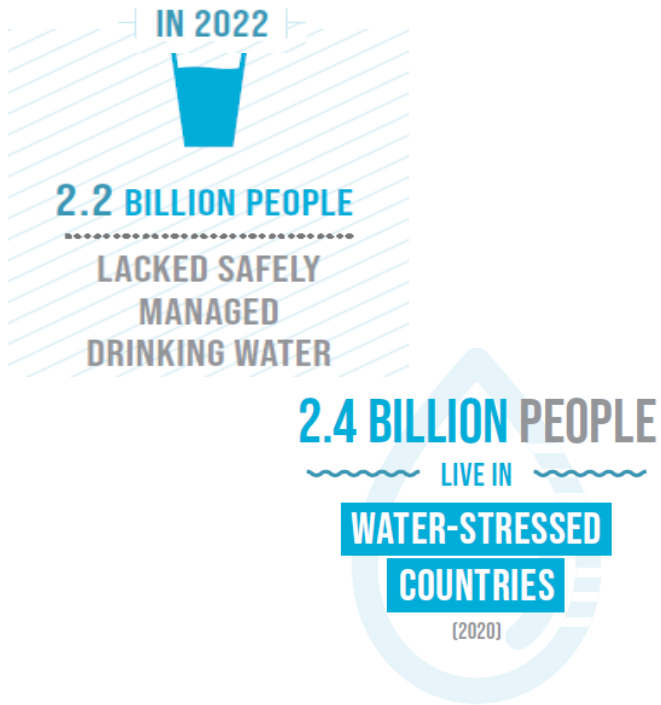
By some estimates, this
water scarcity is affecting
nearly 400 million people and
costing \$4.8 trillion
in economic activity.

Learning from Crises to Build Urban Water Security
<https://www.rand.org/pubs/visualizations/DVA3540-1.html>

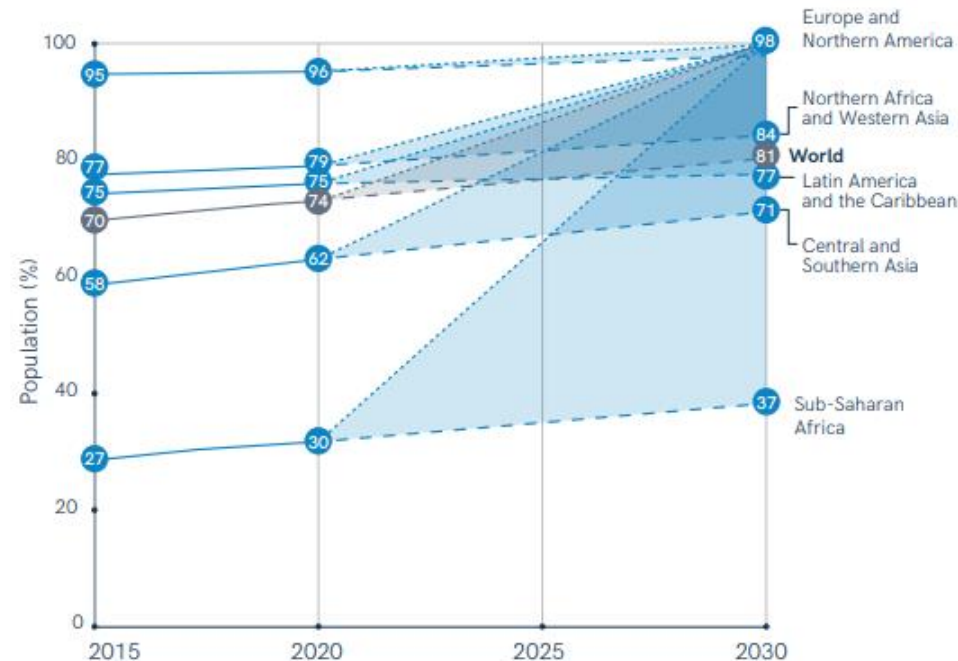
Status of Drinking Water At Global Level



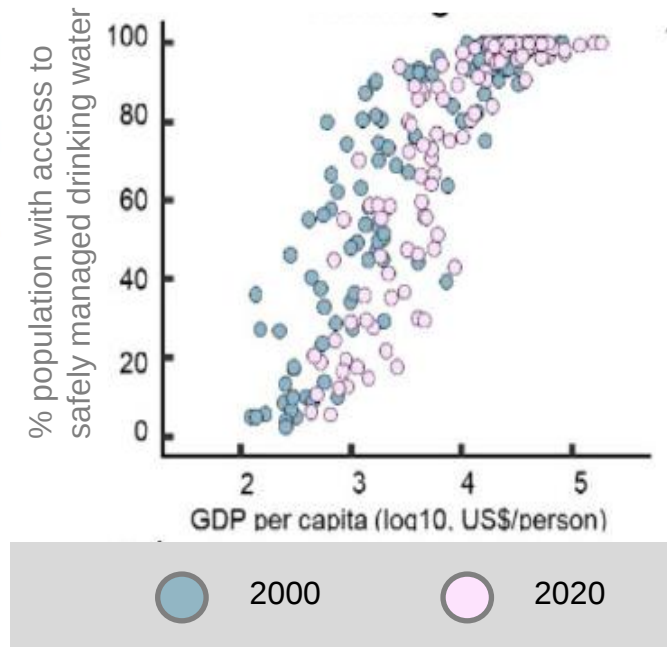
- **One in four** people still lack access to safely managed drinking water across the globe (*JMP report on SDG, 2023*)



- The world is not on track to achieve SDG 6.1 - universal access to safely managed drinking water services by 2030, and requires 4 times increase.
- At current rates of progress, the world will only reach 81% coverage by 2030



- Poor countries have a worse situation related to access to water and sanitation.

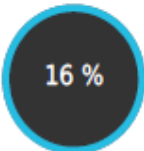


Source: *JMP report on SDG, 2023*

Nepal SDG 6 Snapshot

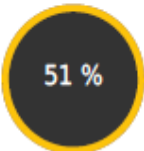


Drinking water



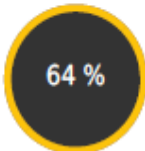
of the population in Nepal uses a safely managed drinking water service (SDG indicator 6.1.1, 2022)

Sanitation



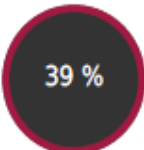
of the population in Nepal uses a safely managed sanitation service (SDG indicator 6.2.1a, 2022)

Hygiene



of the population in Nepal has a handwashing facility with soap and water available at home (SDG indicator 6.2.1b, 2022)

Wastewater



of domestic wastewater in Nepal is safely treated (SDG indicator 6.3.1, 2022)

Water quality



of monitored water bodies in Nepal has good ambient water quality (SDG indicator 6.3.2, 2023)

Efficiency



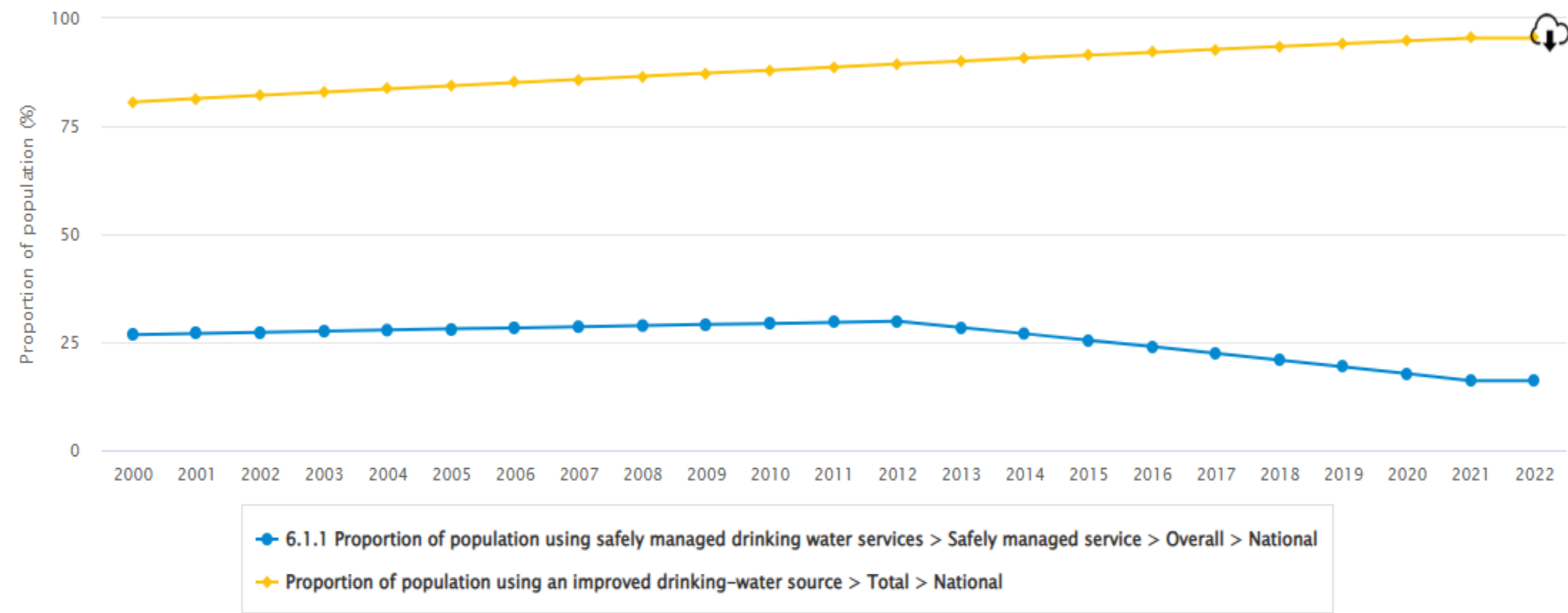
is the value added from the use of water by people and the economy in Nepal (SDG indicator 6.4.1, 2021)

Source: Downloaded from <https://www.sdg6data.org> on 07 March 2025

Progress on SDG 6.1

Drinking water

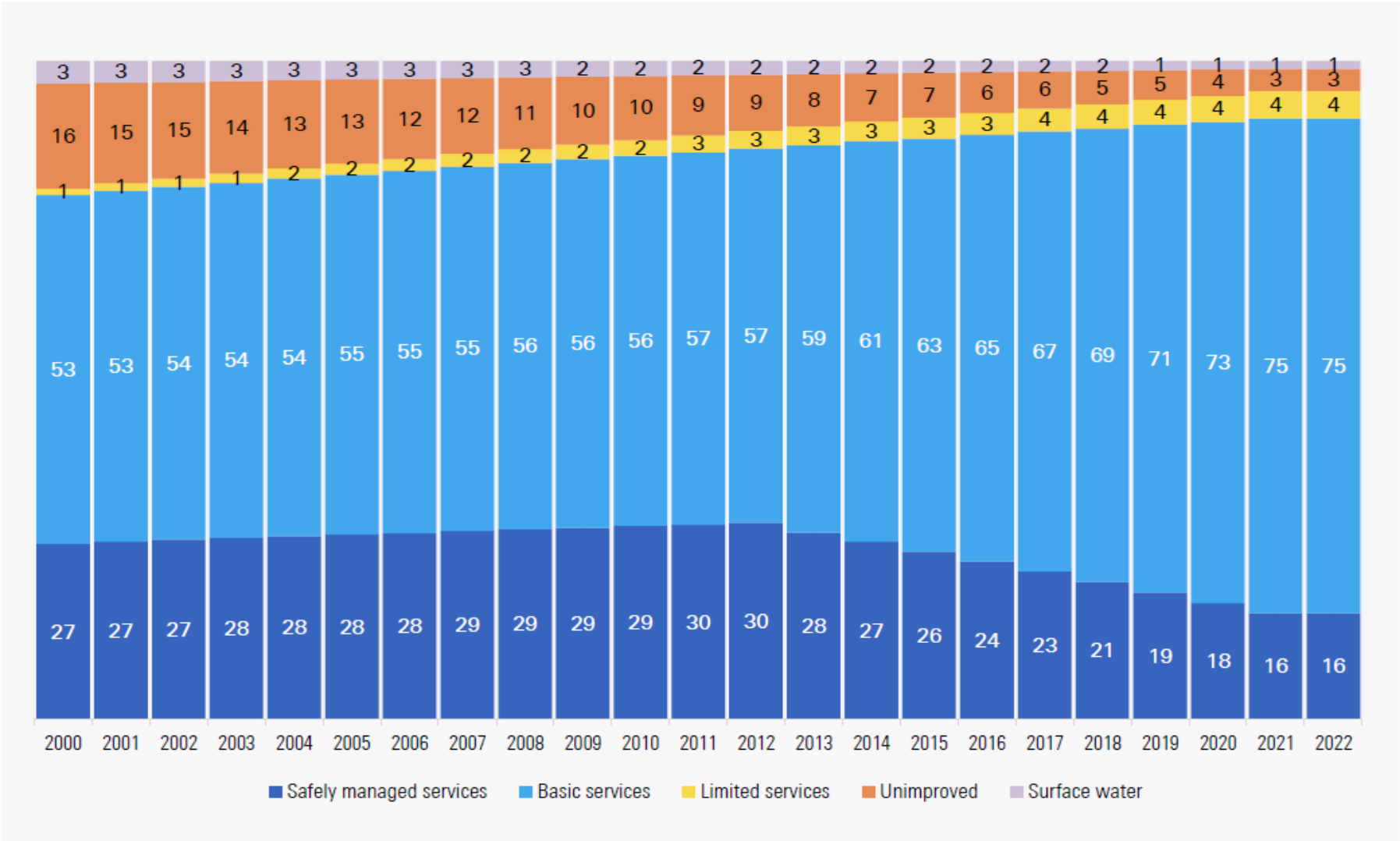
6.1.1 Proportion of population using safely managed drinking water services in Nepal, progress over time ⓘ



Source: Downloaded from <https://www.sdg6data.org> on 07 March 2025

Nepal SDG 6.1

FIGURE 10: Nepal’s five drinking water ladders for 2000–2022 (JMP data)



The good news is that access to Basic Services has improved over time.

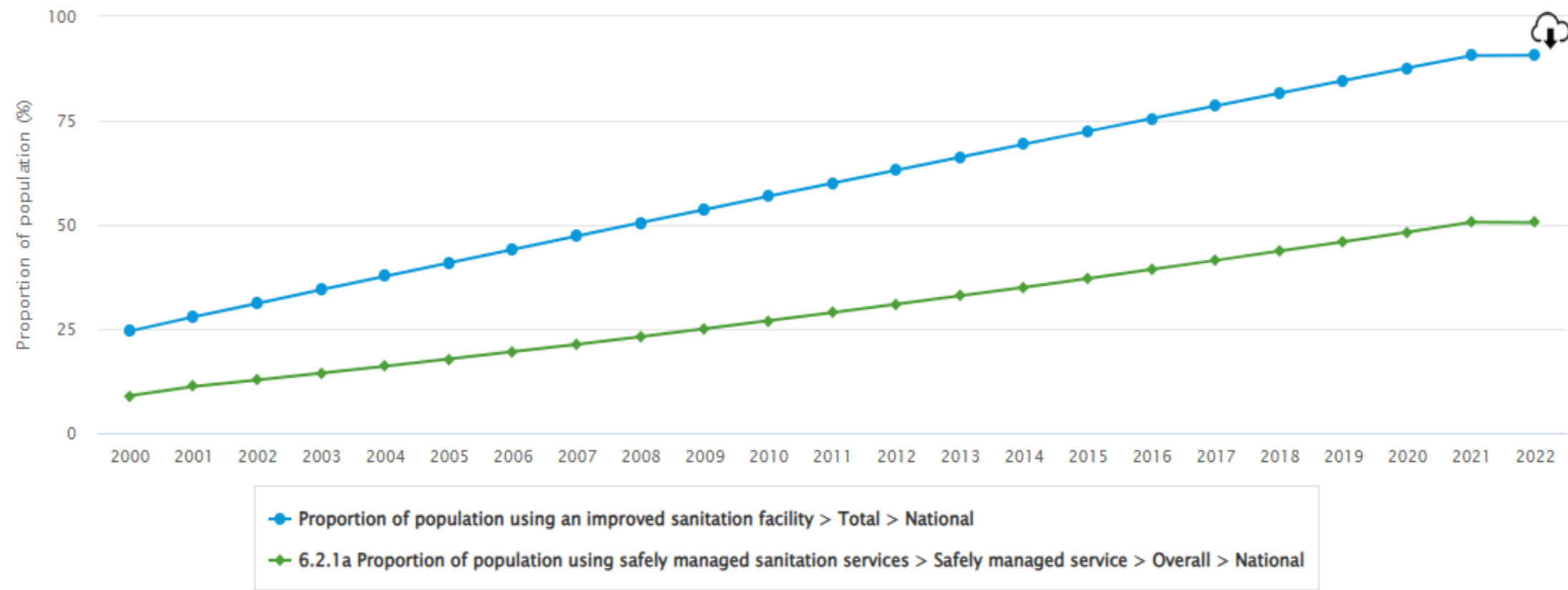
However, only 16% have access to safely managed water services.

Source: Downloaded from <https://www.sdg6data.org> on 07 March 2025

Progress on SDG 6.2

Sanitation and hygiene

6.2.1a Proportion of population using safely managed sanitation services in Nepal, progress over time ⓘ



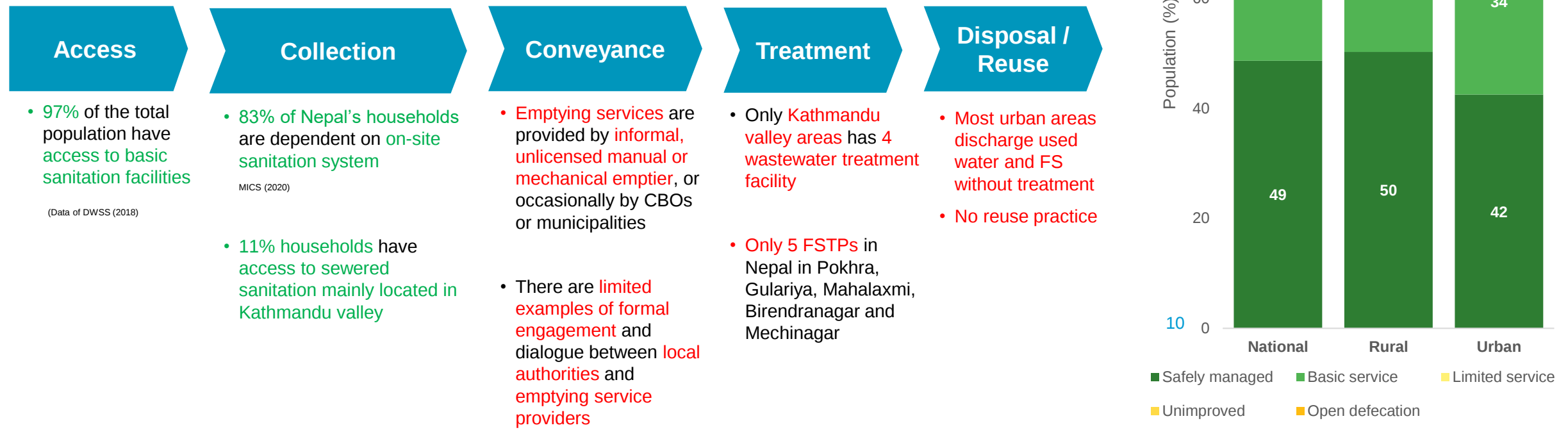
Data provider: WHO, UNICEF

Source: Downloaded from <https://www.sdg6data.org> on 07 March 2025

Nepal has made significant progress in access to sanitation services

Nepal has made impressive progress in eliminating open defecation and was declared ODF in 2019. However, there is a need to focus on the entire sanitation service chain for achieving Citywide Inclusive Sanitation (CWIS) and SDG 6.2

Sanitation Situation in Nepal

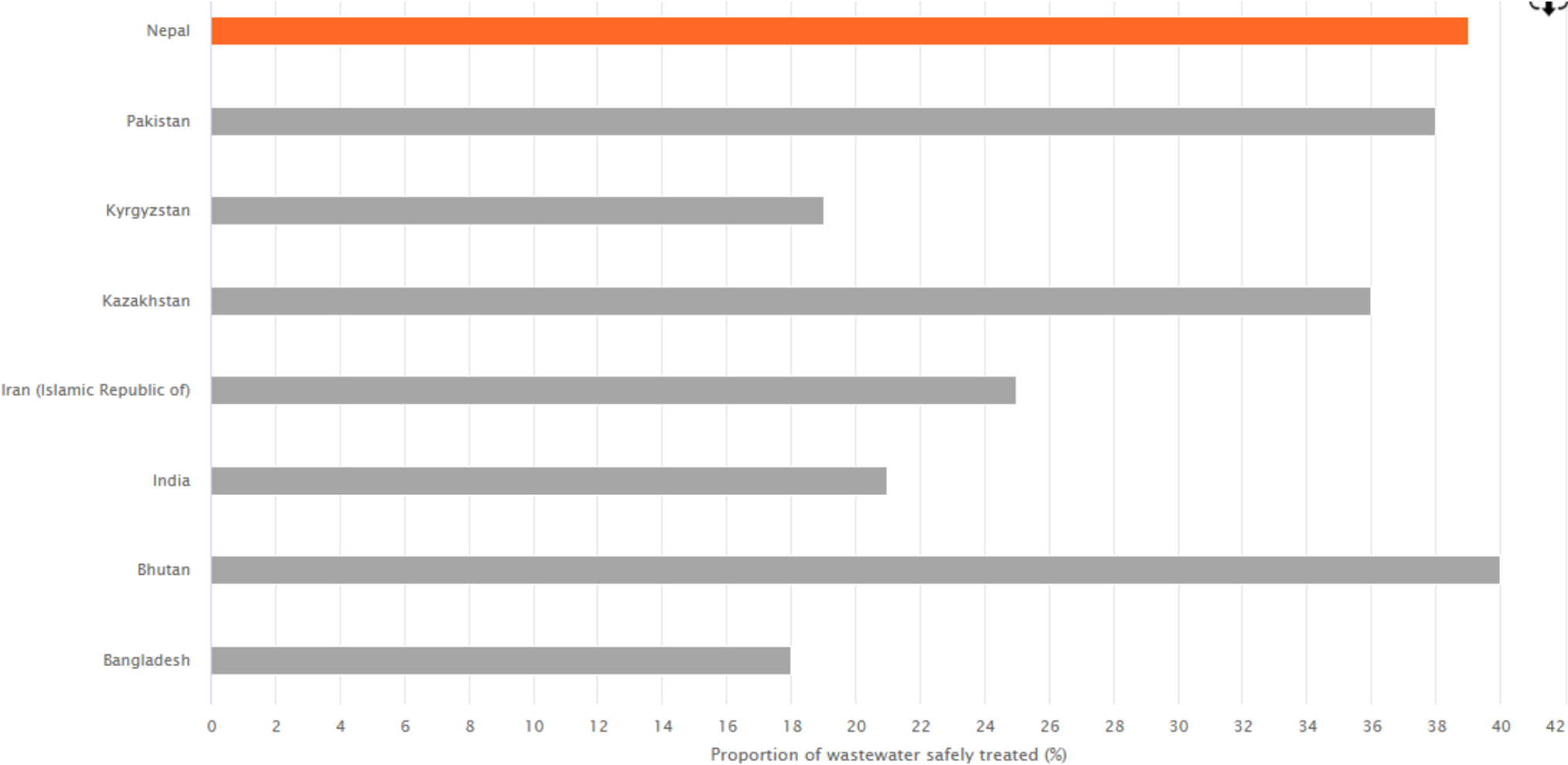


As per JMP (2020), 42% population using improved sanitation facilities with 35% in-situ disposed off the faecal waste and 7% connected to wastewater treatment.

SDG 6.3

Water quality and wastewater

6.3.1 Proportion of wastewater flow (safely) treated > Domestic in Nepal (2022), compared to other countries (and areas) in the region

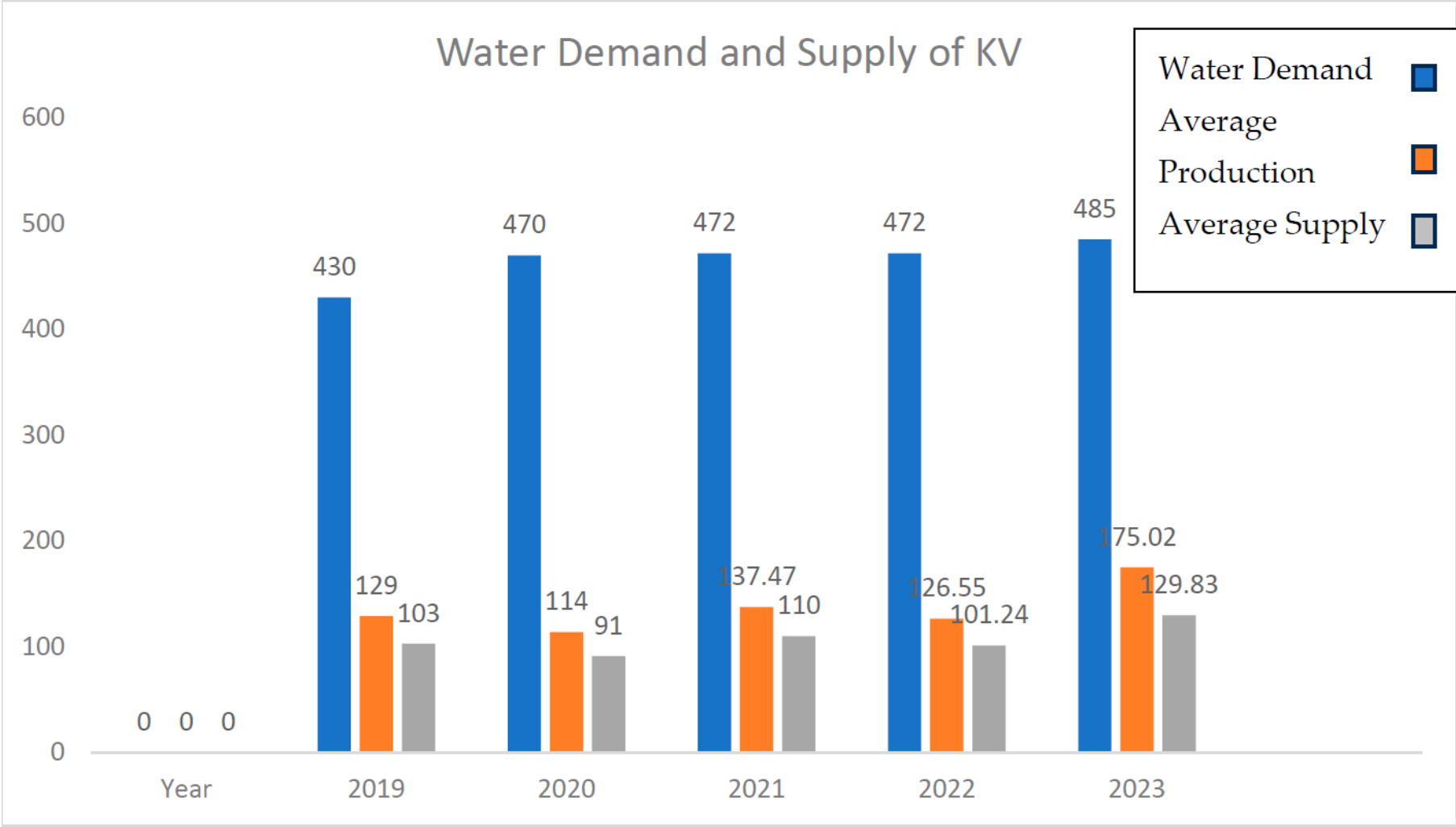


Nepal performs better than other countries in the region in treating domestic wastewater

Data provider: WHO

Source: Downloaded from <https://www.sdg6data.org> on 07 March 2025

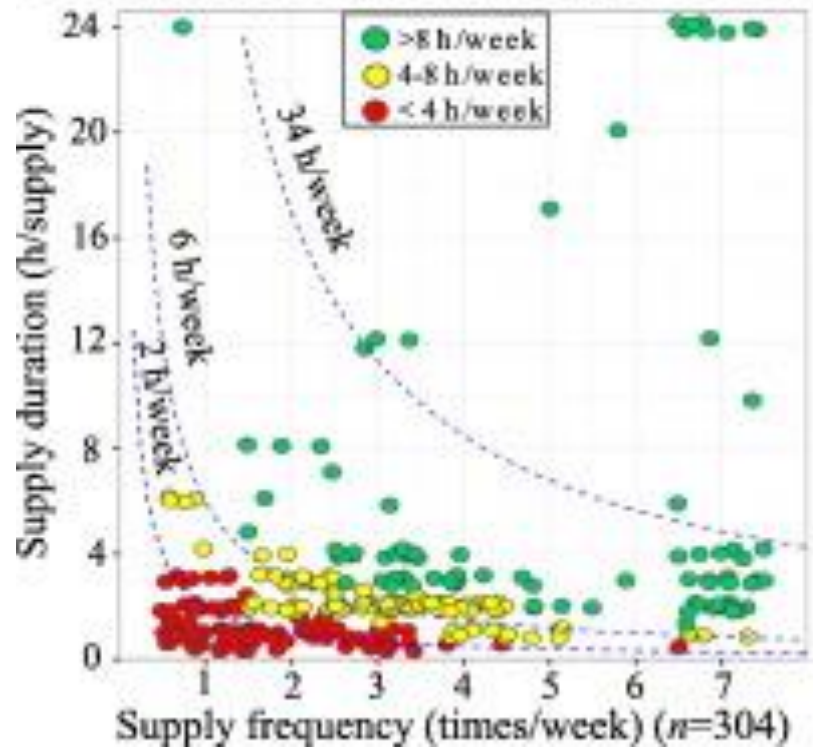
Water Scarcity in Kathmandu Valley



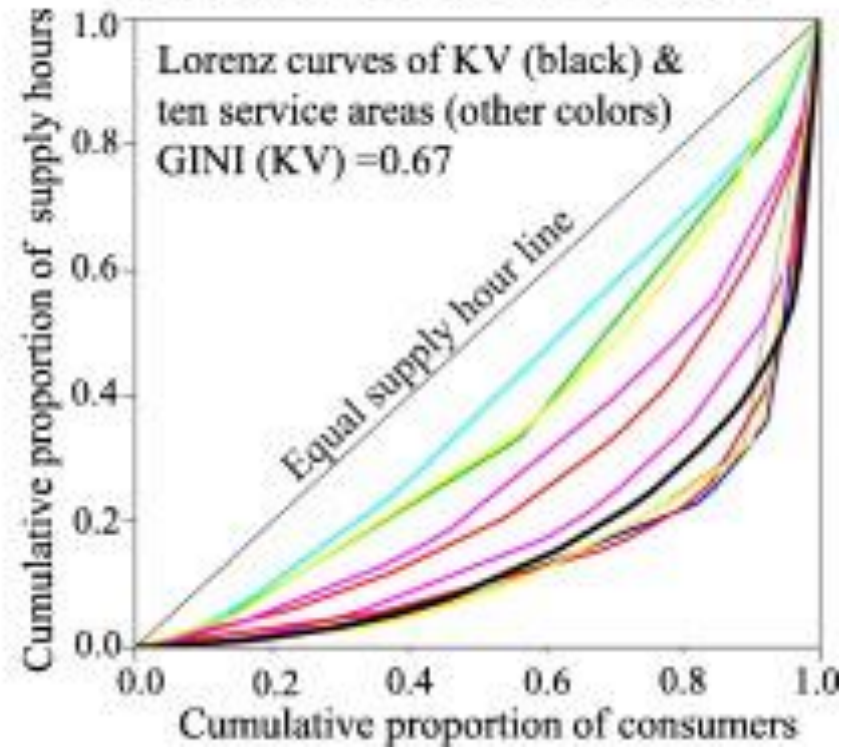
Source: Poudel, N., & Shaw, R. (2025). Challenges of Urban Water Security and Drivers of Water Scarcity in Kathmandu Valley, Nepal. Urban Science, 9(3), 54. <https://doi.org/10.3390/urbansci9030054>

Service Quality in Kathmandu Valley

INTERMITTENT WATER SUPPLY



UNEQUAL SUPPLY HOURS



IWS situation in the KV is serious and half of the consumers receive **pip**ed water for 3 or fewer times/week, for 2 or fewer h/supply, and for 6 or fewer h/week.

Consumers depend increasingly on alternative sources such as **tanker-delivered water**, the major source for 28% of consumers.

Source: Guragai, B., Takizawa, S., Hashimoto, T., & Oguma, K. (2017). Effects of inequality of supply hours on consumers' coping strategies and perceptions of intermittent water supply in Kathmandu Valley, Nepal. Science of The Total Environment, 599-600, 431-441. <https://doi.org/10.1016/j.scitotenv.2017.04.182>

Having a water connection is not enough – intermittent water supply has issues of adequacy, equity, affordability, and quality

Intermittent and poor water supply leads to high dependence on groundwater
Study in two cities of India -

Figure 2: Water Sources Used by Households in Kolkata and Chennai

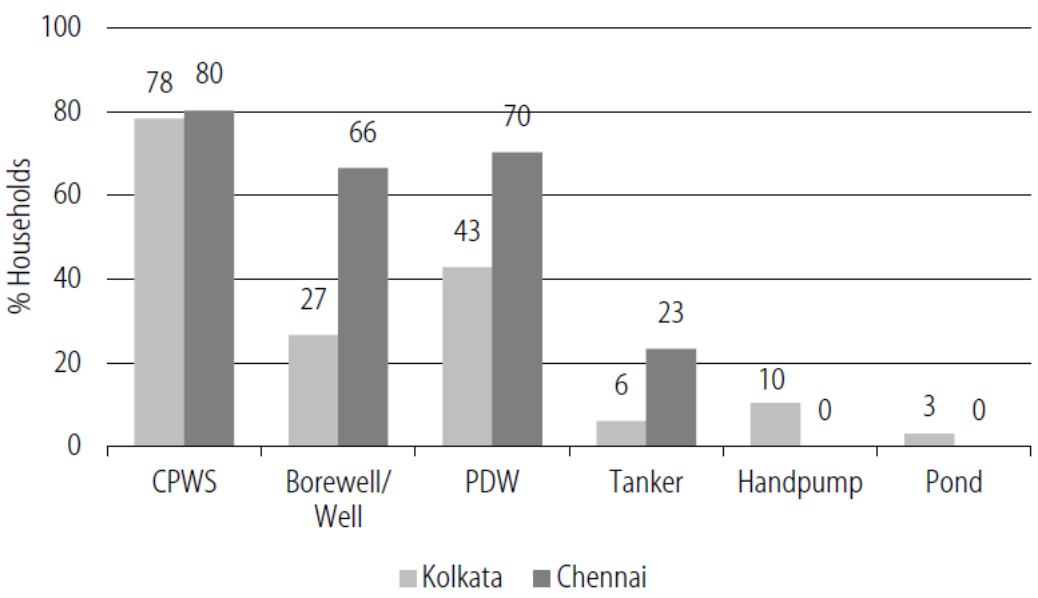
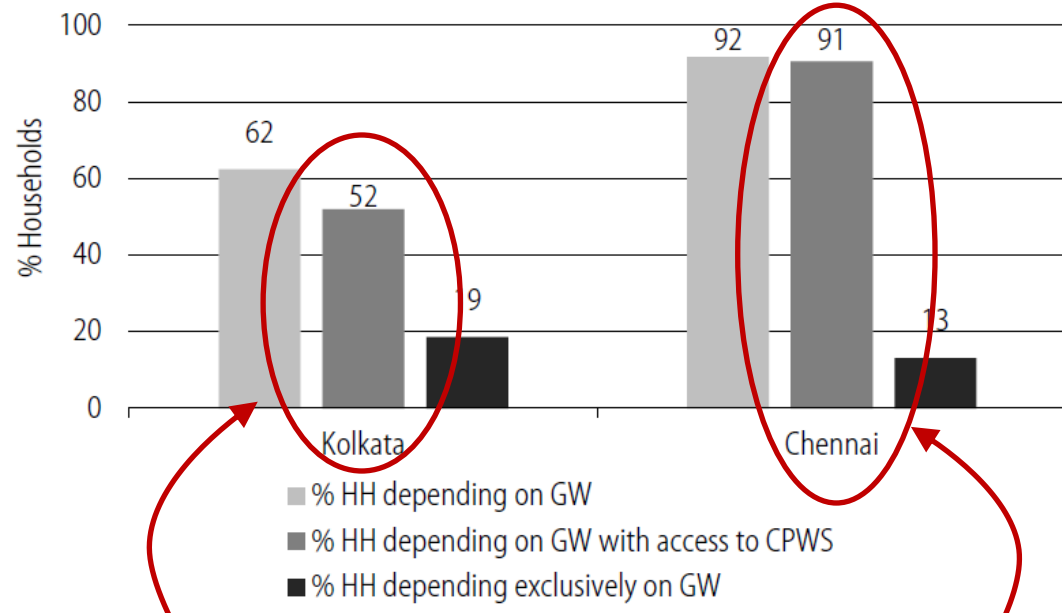


Figure 7: Dependency on Groundwater (GW) among the Sampled Households



Piped municipal supply yet dependent on groundwater!

Source: Sachin Tiwale, Karthikeyan R, Kriti Batra (2025), Serving a Pipe Dream: Alternatives to Centralised Piped Water Supply in Two Metro Cities in India, Economic and Political Weekly, Vol. 60, Issue No. 9, 01 Mar, 2025

It is not enough to provide good water services; there is a need to build climate resilience



**Infrastructure
provision**



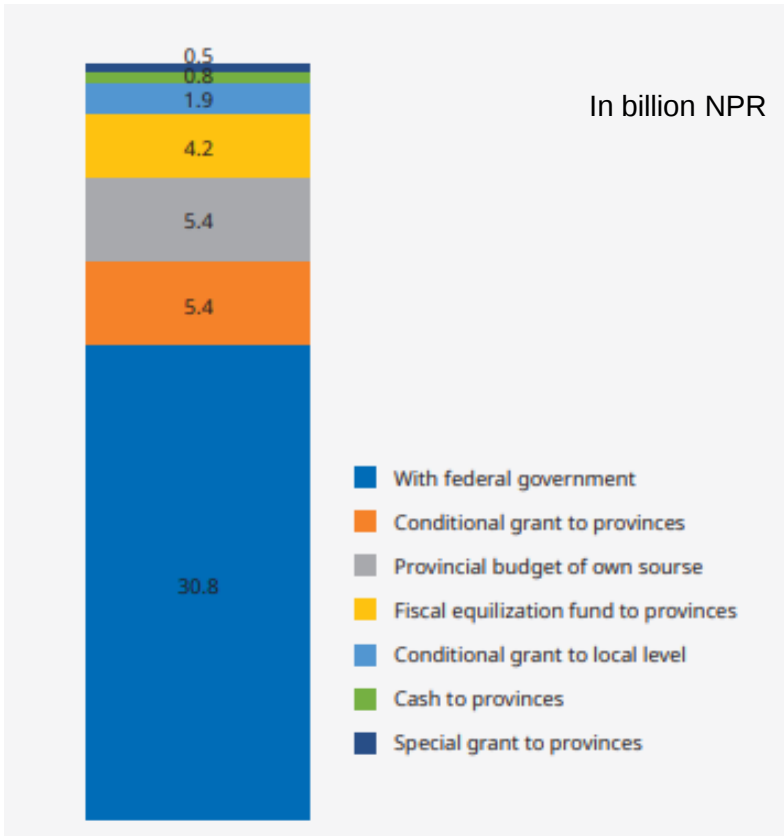
Ensuring Services



**Climate resilience for
WASH systems**

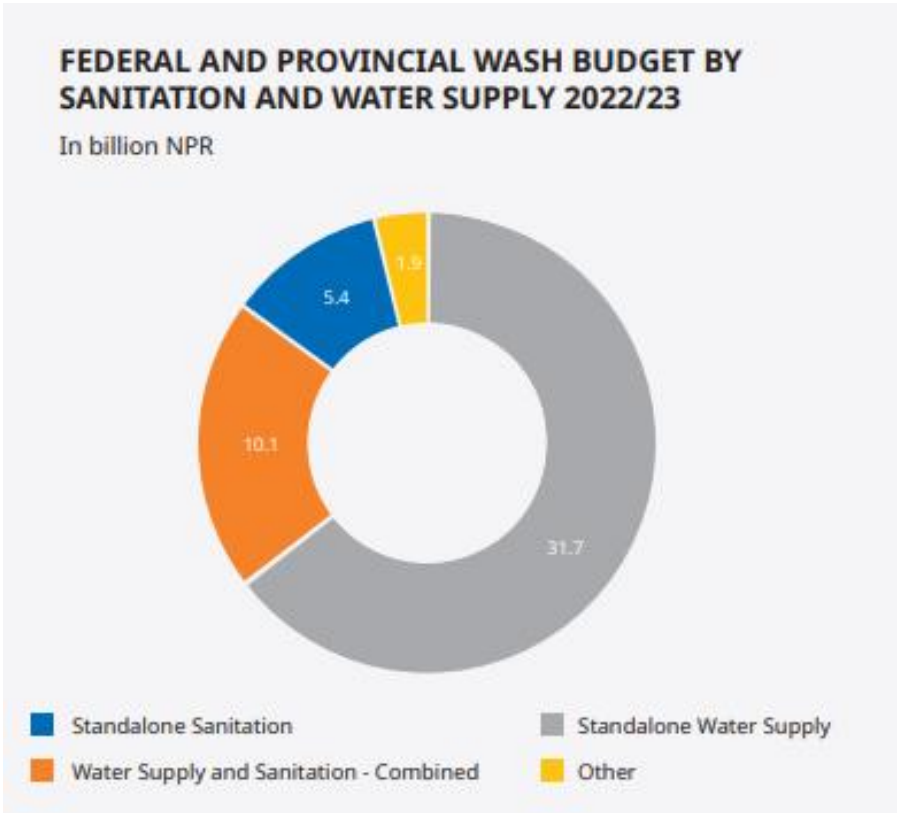
WASH budget allocation of Nepal

WASH BUDGET WITH FEDERAL AND PROVINCIAL GOVERNMENTS 2022/23



WASH budget of **NPR 49.1 billion** is **1 percent of the GDP** (2021) and **2.3 percent** of the combined federal and provincial budget.

Breakup of Water and sanitation sector budget allocation



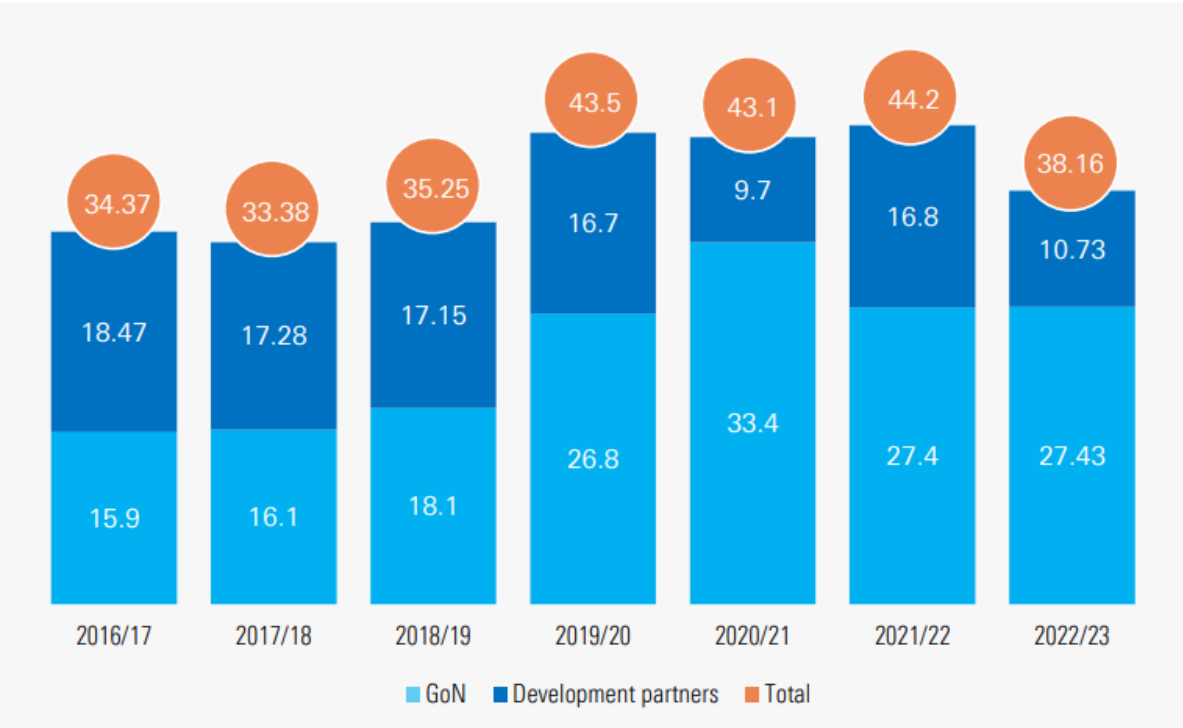
More than 60% of budget was allocated to water supply sector and 20% to combined WASH and 11% to sanitation sector

Source: WASH FINANCING IN NEPAL 2022/23 CONTEXT: SEVEN YEARS TO SDGs 2030; https://washmatters.wateraid.org/sites/g/files/jkxooof256/files/financing-factsheets-for-wash-in-nepal-2022-23_0.pdf

Nepal WASH financing requirements

SDG Targets: Draft WASH Sector Development Plan of Nepal has estimated a requirement of NPR 1,641 billion, excluding user’s contribution to meet SDG targets on WASH by 2030.

FIGURE 1: WASH budget allocations from the federal tier of government, FYs 2016/17–2022/23



- There is shortfall of **NPR 886 billion (USD 8 billion)** as per MoWSS, 2018 to achieve SDG 6 target of achieving safe water and sanitation for all by 2030.
- There has been sharp decline in allocations of GoN federal budget to the WASH sector since 2019/20.

TABLE 1: WASH allocations in comparison to allocations to other social sectors, as % GDP (2018–2022)

FY	Social Protection	Education	Health	WASH
2018/19	3.41	3.48	1.69	0.91
2019/20	3.22	4.02	1.96	1.12
2020/21	3.71	4.03	2.51	1.01
2021/22	3.91	3.71	2.92	0.91
2022/23	3.68	3.56	2.23	0.69

Source: MoF Redbook (various years), NRB (2022), and WaterAid (2023)

Source: <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/financing-factsheet-for-wash-in-nepal-2019-20.pdf>; https://clearinghouse.unicef.org/sites/ch/files/ch/sites-PD-WASH-WASH%20Knowledge%20unicef-Nepal%20WASH%20Budget%20Brief%202024_Sneha%20Pradhananga-4.0.pdf

Annual Investments Required to meet SDG 6 in Nepal

Nepal's Constitutional Commitment:

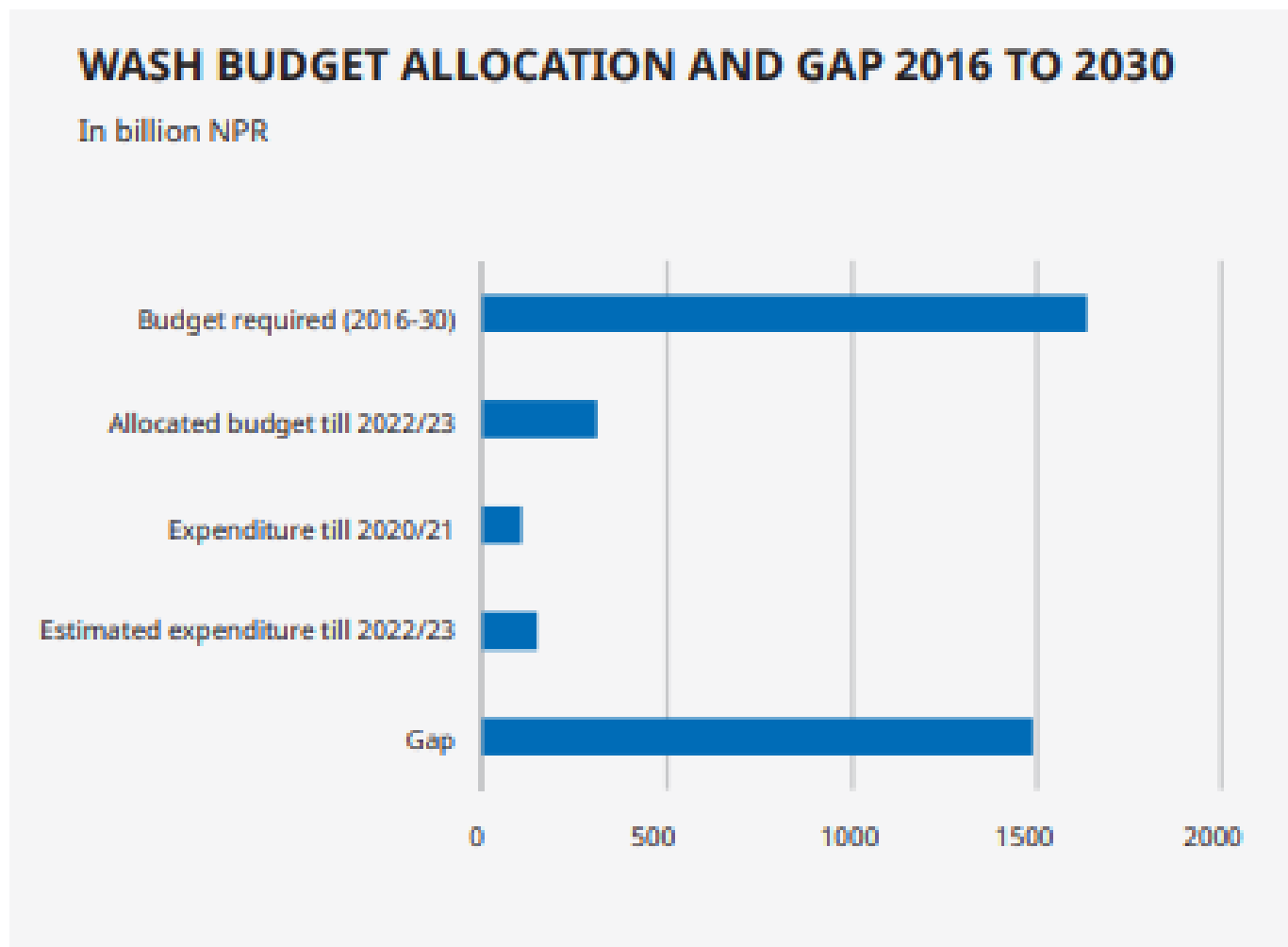
Nepal's 2015 constitution recognises access to safe water and sanitation as a fundamental right for citizens.

Table 3.10: Major interventions and annual average investment requirement for water and sanitation*
(Unit: Nepali Rs in billion)

Intervention	2016-19	2020-22	2023-25	2026-30	Average over 2016-30
Enhancing Access and Utilisation	17.9	49.5	45.1	42.5	37.8
Enhancing Functionality and Sustainability of Services	0.9	2.5	2.2	2.1	1.8
Ecosystem/Water Augmentation and Production	7.5	19.4	17.7	16.7	14.8
Governance Institutional set-up and Strengthening and Capacity Development	0.7	1.8	1.7	1.6	1.4
WASH Diplomacy, Sector Convergence, Network Communication and Promotion	3.1	8.4	7.7	7.2	6.4
Improving Water Quality	0.5	1.5	1.4	1.3	1.2
Responding to Emergency and Vulnerability	1.2	3.1	2.8	2.7	2.4
Adjustment of Cost of Population Growth during SDP period	3.1	8.4	7.7	7.2	6.4
Supervision and System Management	2.1	5.9	5.4	5.1	4.5
Total	37.0	100.5	91.7	86.4	76.7

Source: Govt. of Nepal (2018), Needs Assessment, Costing and Financing of SDGs, National Planning Commission

WASH Budget Gap



WASH Budget Gap of **NPR 1500 Billion till 2030** in Nepal

How can this funding gap be met?

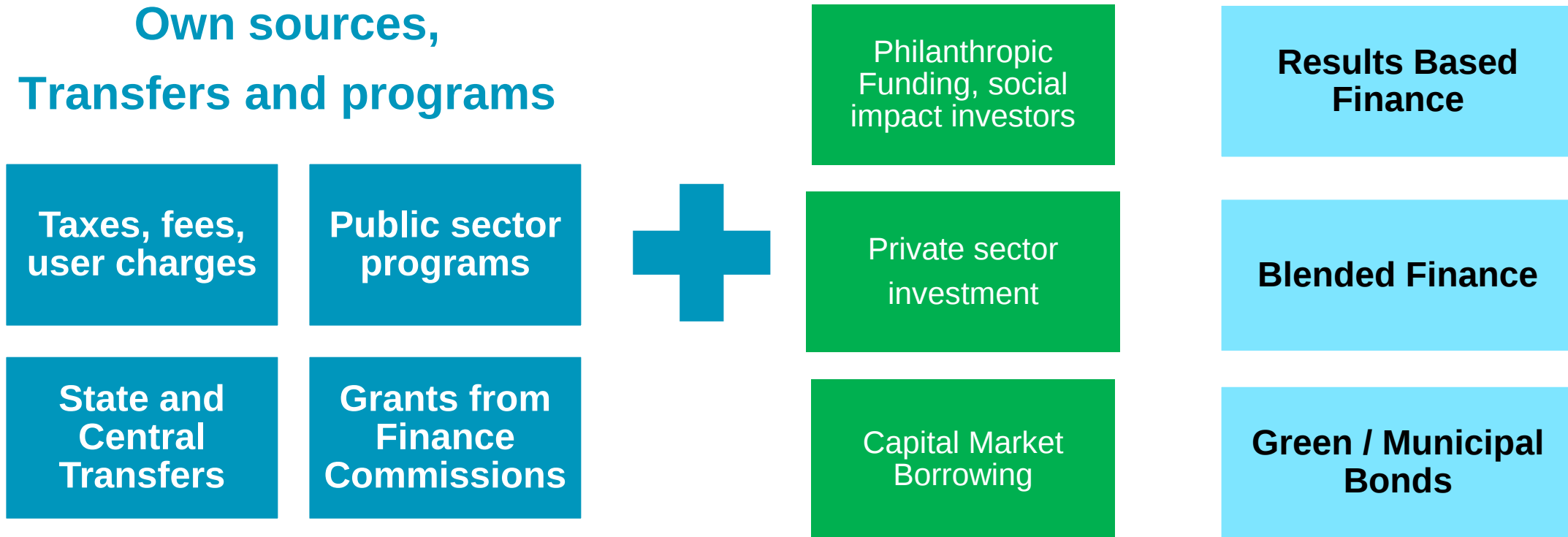
Source: WASH FINANCING IN NEPAL 2022/23 CONTEXT: SEVEN YEARS TO SDGs 2030; https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/financing-factsheets-for-wash-in-nepal-2022-23_0.pdf



Innovative Finance Options

Innovative financing mechanisms for WASH services are emerging

Urban WASH infrastructure has been generally financed through public funds however, innovative financing mechanisms need to be explored for additional and more effective funding



Options to leverage private resources and impact investments

Results based funding



Funders makes payments only if and when pre-agreed outcomes/ results are achieved

Blended finance



Leveraging private or commercial funding to achieve development outcomes – through PPPs, borrowing etc.

Municipal bonds / Green bonds

Borrowing from local banks and financial institutions, community finance institutions or capital markets using municipal or green bonds mechanisms

Benefits of using innovative financing mechanisms



Efficiency of private sector

Used to leverage additional private sector or commercial funds. Help in bringing efficiencies of private sector operations.



Improved performance

Innovative models provide incentives for improved performance and effectiveness by using performance linked approaches, particularly for public-private partnership (PPP) models



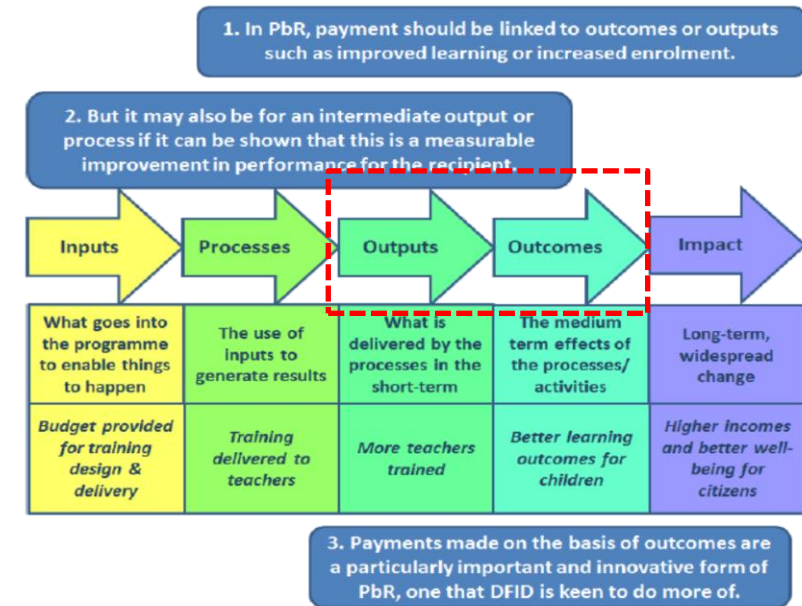
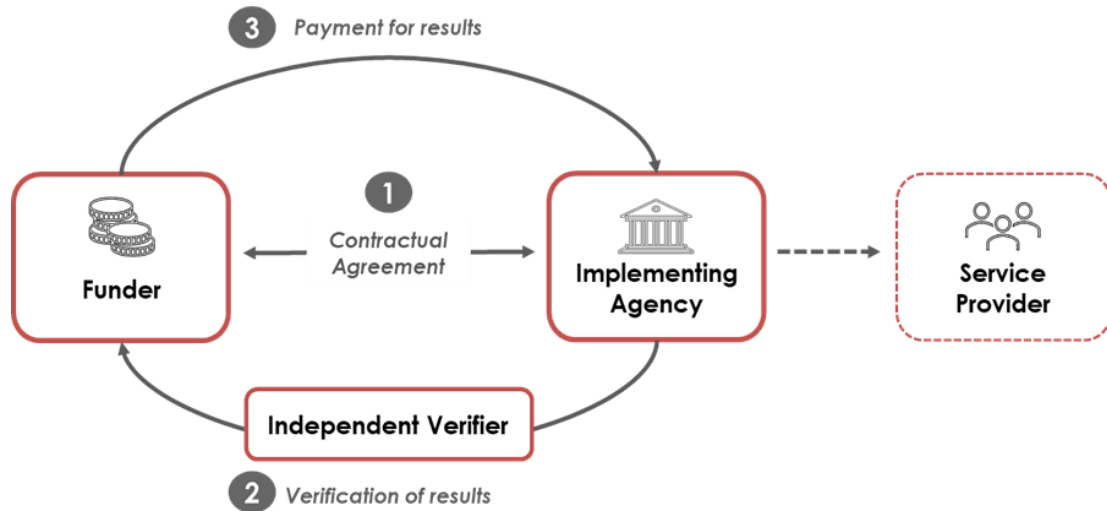
Social & environmental impacts

Emerging interest globally on impact investing for funding activities.

Results based approaches have started to become the norm

What is Results based financing ?

- Public funds or those from donors or social impact investors are made available not as “inputs” but only on delivery of “outputs or agreed performance”, generally for innovative approaches



- Different methods such as (RBA, RBF, COD, OBA, P4R etc.) reflect a combination of financier, recipient and results for payment. Some are linked to outputs (OBA) or some to outcomes (COD, SIB, DIB, P4R, etc.)
- Extent of financing /funding linked to results can also vary

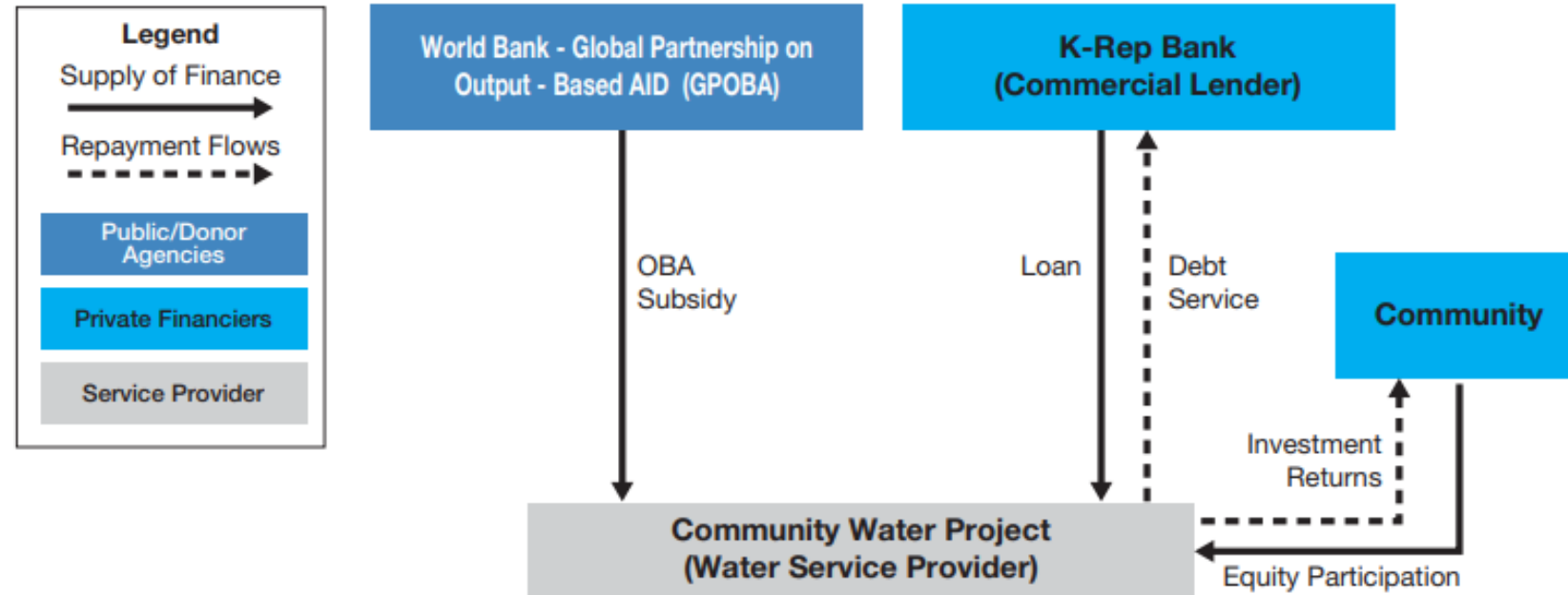
Source: from DFID (2014), “Sharpening incentives to perform: DFID’s strategy for Payment by Results”, p. 6.

Mobilising commercial finance with Results-based partial subsidies

- The World Bank launched the **pilot loan program in 2007 with K-Rep Bank**, a Kenyan commercial bank specializing in microfinance lending.

Fig: Scaling Up Blended Financing for Water and Sanitation in Kenya: Maji ni Maisha Financial Structure

- The objective was to **incentivize rural and peri-urban communities to access loan financing** so as to rehabilitate and expand small-piped water systems.



- By 2012, **35 communities** had borrowed **US\$3.4 million** from K-Rep Bank, raised **US \$1.2 million of equity**, and accessed **OBA grants of US \$2.8 million**. This enabled provision of access to 190,000 people.

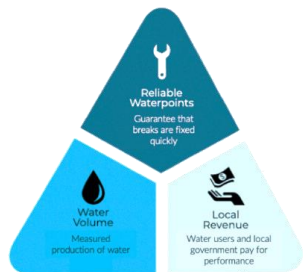
Source: World Bank Group (2016), "Scaling up blended finance for water and sanitation in Kenya" in "Case studies in blended finance for water and sanitation", p. 2.

UPTIME - Results based financing model

- Link non-repayable grant funding to drinking water service results through three key performance metrics and a **standardized, transparent and scalable payment** model.

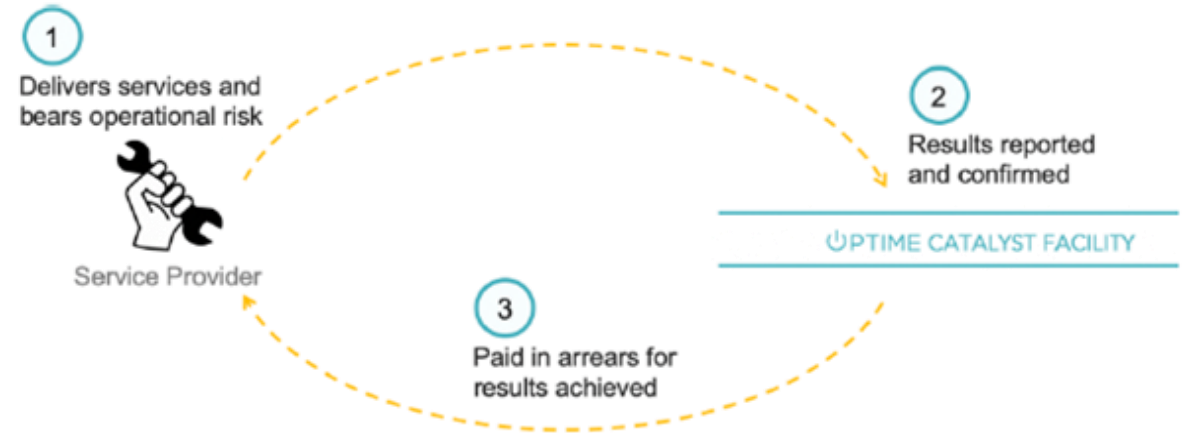
Performance metrics are:

- **Uptime** – the proportion of time that infrastructure is working
- **Water volume** – the amount of water used
- **Local revenue** – what users pay for the service.



- These metrics assess the **scale, reliability, use and perceived user value** of a water service.

UPTIME results-based funding model



Results-based funding to provide safe drinking water services for public schools and healthcare facilities in Zambia

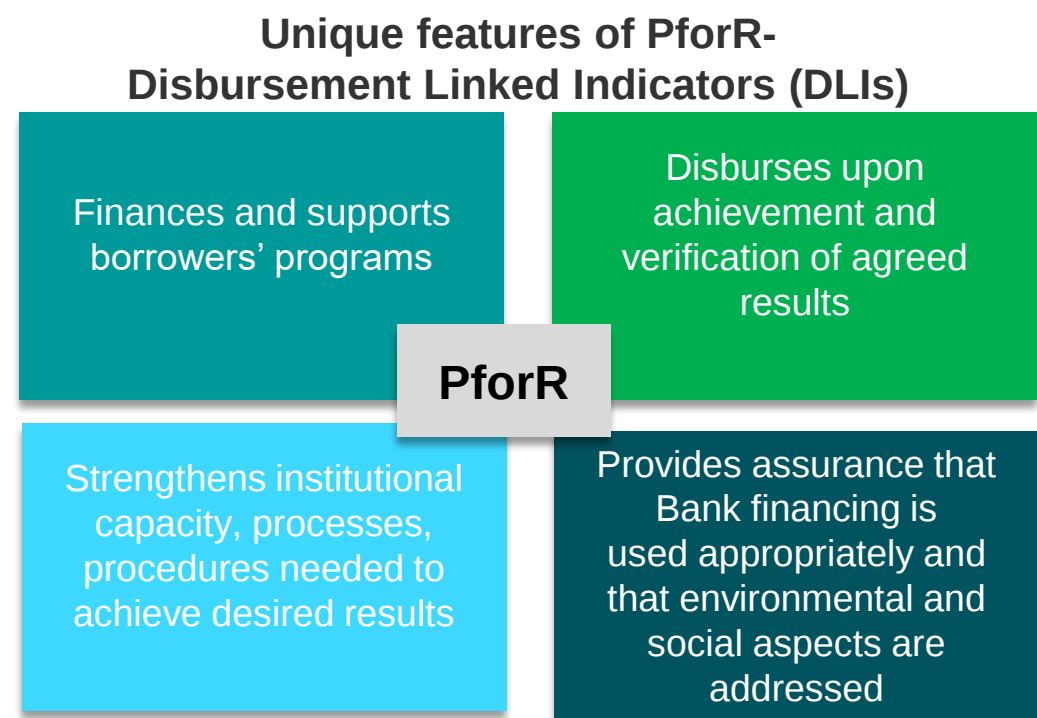
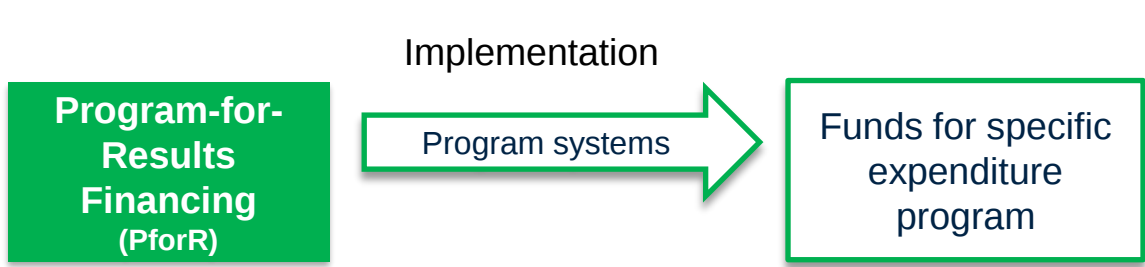


Results based contract ensure repairs to water systems are completed in three days and water safety is improved in Mumbwa – **one of Zambia's 116 districts**

Source: Retrieved from <https://www.uptimewater.org/solution-index>; Results based funding to provide safe drinking water services for public schools and healthcare in Zambia, 2025

Program for Results – P4R by the World Bank

Unique features of World Bank’s P for R approach include using a country’s own institutions and processes, and linking disbursement of funds directly to the achievement of specific program results.



Examples of P4R

Morocco National Initiative for Human Development 2
(\$300M Bank financing supporting a \$1.1B Government program)

The Morocco program—the first PforR operation—focused on improving access to participatory local governance mechanisms, basic infrastructure, social services, and economic opportunities in a defined area.

Vietnam Results-Based Rural Water and Sanitation Program
(\$200M Bank financing supporting a \$260M Government program)

The program supports eight provinces in the Red River Delta region to provide sustainable water supply, sanitation, and hygiene services using a results-based approach in alignment with the National Target Program.

Program Outcomes
Percentage of children aged 12-23 months immunized with Pentavalent 3 vaccine

Access to Services
Percentage of population provided with access to improved water supply in rural communes

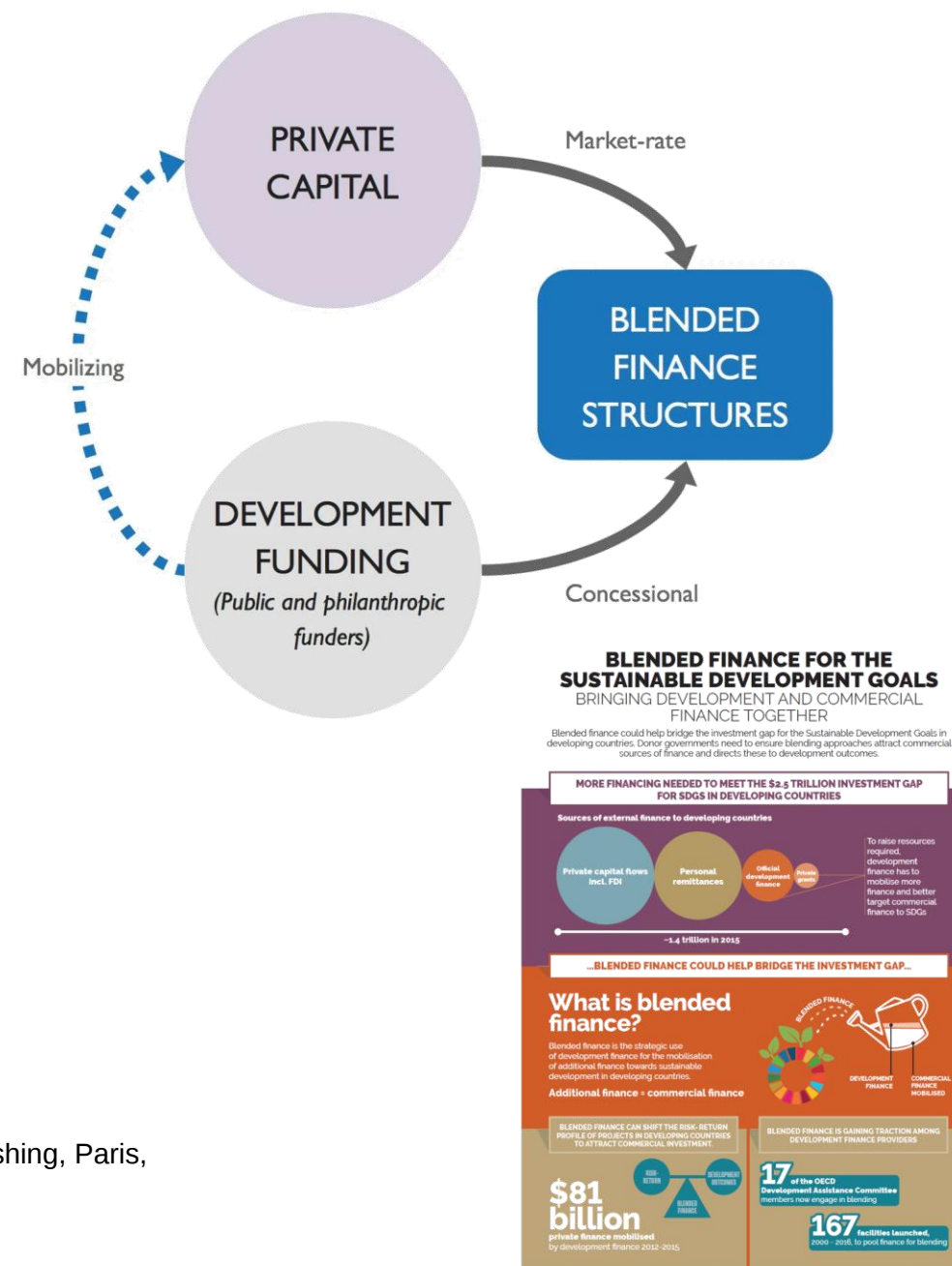
Participatory Governance
Percentage of women and youth in local governance bodies

Systems Improvements
Percentage of key staff (in specific units) trained in environmental and social safeguards and management guide

Blended finance for WASH

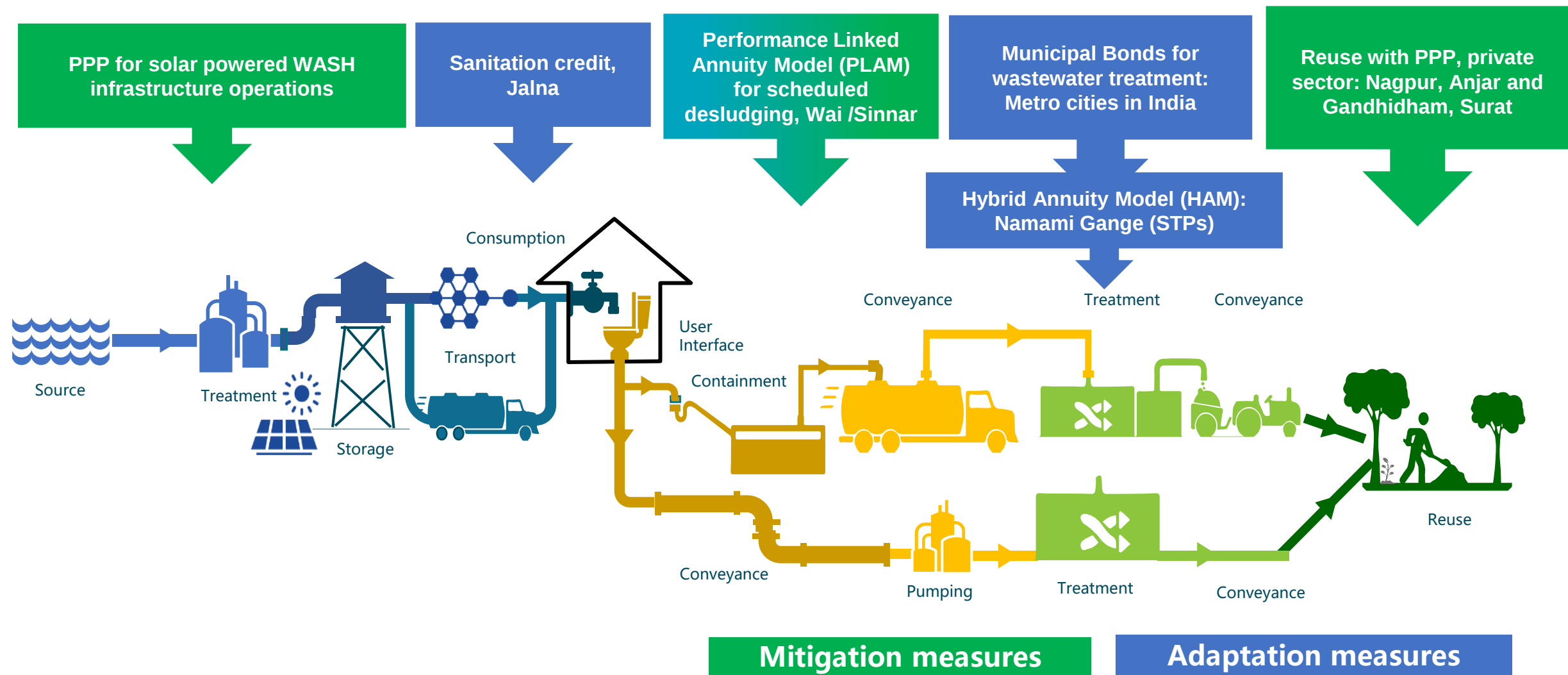
What is blended finance?

- “Strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets” (OECD)
- Blended finance can help risk-return profile of projects to attract private and commercial finance to project and activities that help achieve SDGs in different sectors



Source: OECD (2018), *Making Blended Finance Work for the Sustainable Development Goals*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264288768-en>.

Blended Finance for climate resilient WASH across the value chain



Performance linked annuity model (PLAM) for engaging private operators in scheduled desludging services in Maharashtra

- **Lack of ULB capacity** to implement scheduled desludging

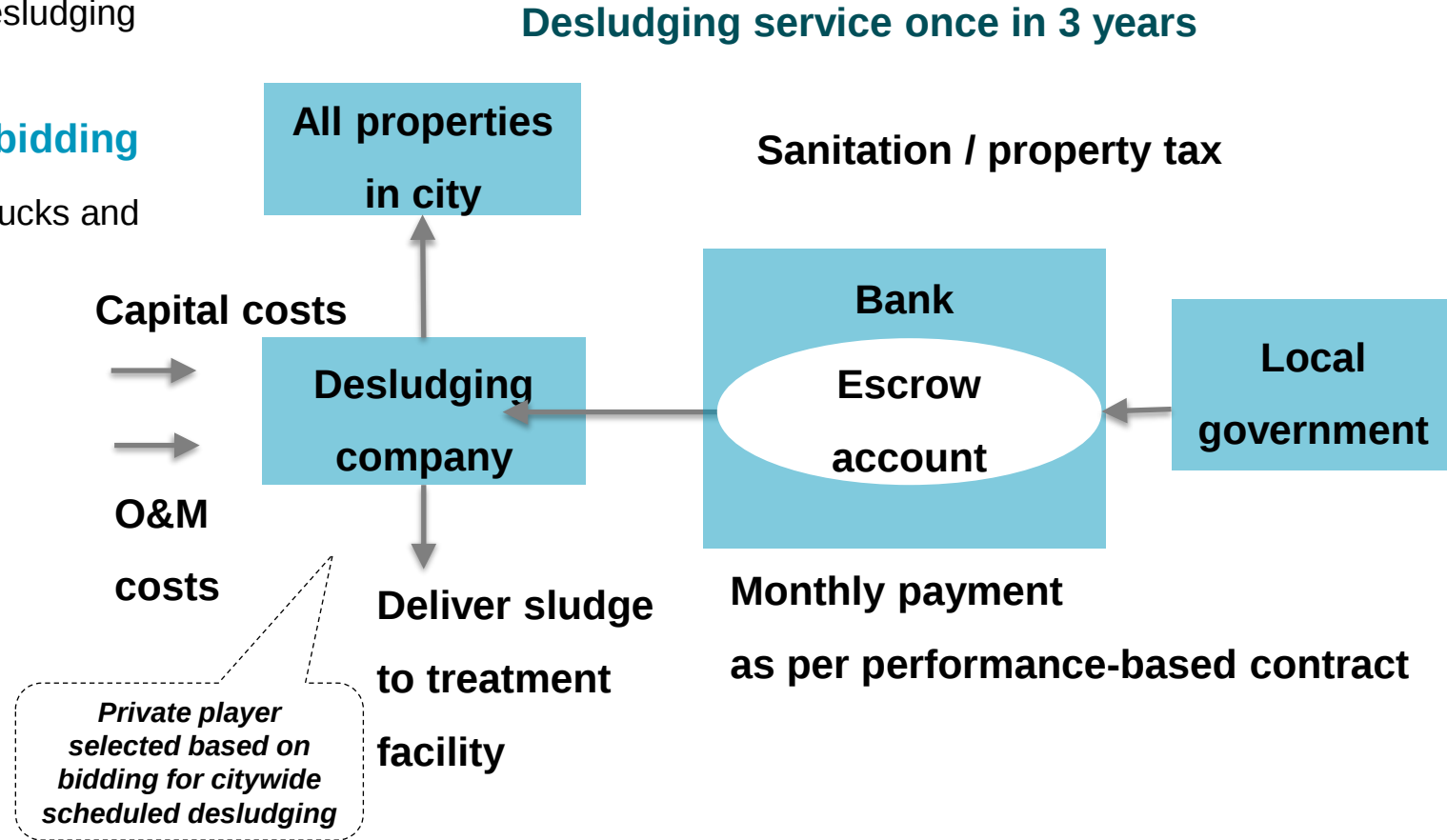
- **Hired private operator** through **transparent bidding process** wherein Private operator need to bring in trucks and manpower

- **Finance through Sanitation Tax**

Households paying small sanitation tax to finance operations instead of high emptying charges.

- **Risk coverage through Escrow Mechanism**

Local government is supposed to keep 3 month payment in the account to mitigate private operator's payment risk.



- ✓ **No user charges during emptying**
- ✓ **Assured market for the contracted player.**

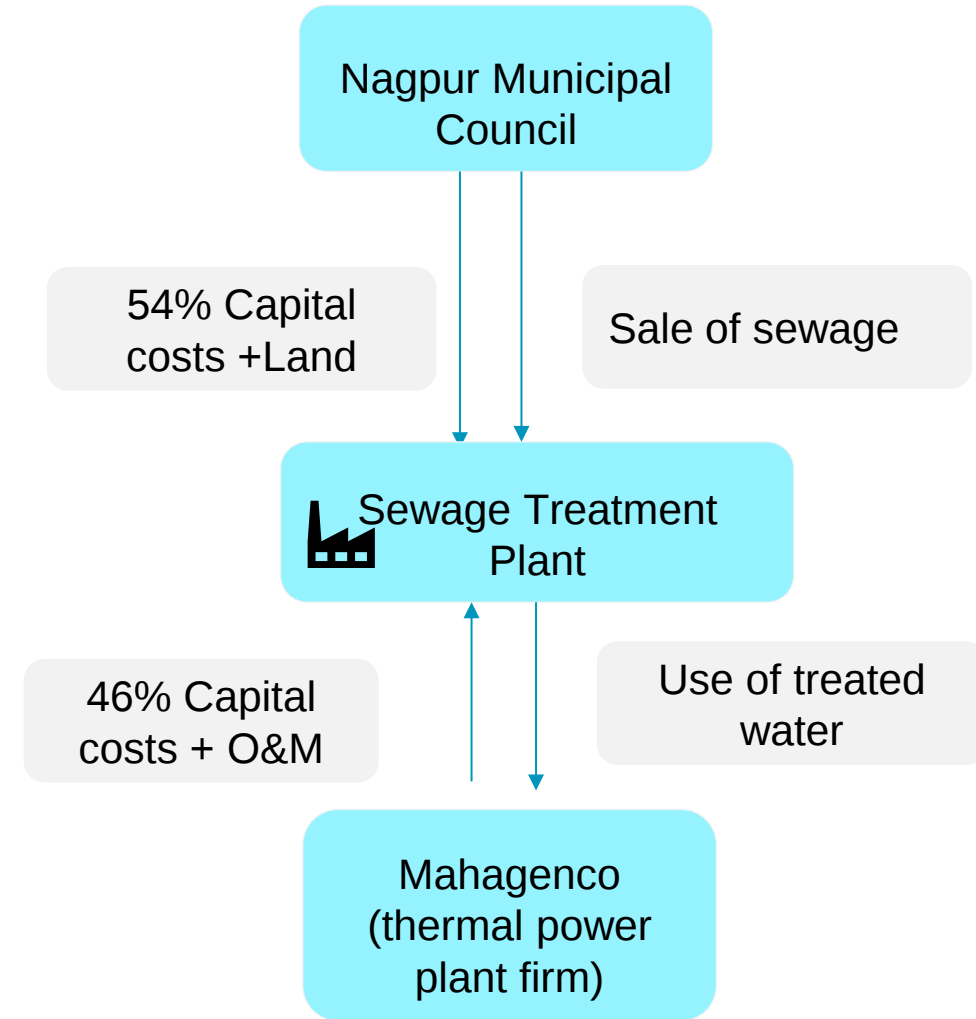
<https://cwas.org.in/theme/finance/innovative-san-finance/innovative-financing-mechanism>

Reuse for thermal plant using a PPP Model – Nagpur, Maharashtra

- **Mahagenco – a thermal power plant firm in Nagpur**, purchases sewage water from the Nagpur Municipal Council. A STP along with secondary and tertiary treatment was constructed and is operated and maintained by private provider.
- **Capital cost - US\$28 million: Private provider- 54%** of capital cost and O&M cost, **Local government gave 46%** of capital cost and land for STP. Private provider pays local government a fixed amount **US\$ 2.25 million a year for 110 million liters a day** of raw wastewater.

Benefits

- ✓ Reduction of net freshwater extractions by the power sector, freeing up freshwater resources for other uses.
- ✓ Wastewater reuse significantly contributes to climate mitigation through its embedded carbon sequestration potential.



Access to sanitation credit for individual household toilets

Over **300 women** of self-help groups (SHGs) in the city of **Jalna, India**

Access to
Sanitation Credit



Banks/micro-finance institutions(MFIs) for construction of individual household toilets.

- ✓ Demand generation
- ✓ Mobilizing toilet loans from banks
- ✓ Overseeing toilet construction, and
- ✓ Ensuring loan repayment.



Impact

- Over **3500 loans** mobilized with loan amount of **USD 0.5 million (INR 5cr)**
- Based on this success, it is now being scaled up by MAVIM, a State agency with support from water.org.



Source: CWAS (2018), Mobilizing Sanitation Credit through Urban SHGs - A Case of MAVIM, Maharashtra, <https://cwas.org.in/cwas-resources/mobilizing-sanitation-credit-through-urban-shgs-a-case-of-mavim-maharashtra>

In India, USD 490 million mobilized through municipal and green bonds for water and sanitation projects

35 municipal bonds
by
14 Urban Local Governments
+
2 state development authorities raised
pooled bonds to implement
23 WASH projects

FY 1997- 2017



FY 2017-2023



Total **USD 288 million** mobilized for
WASH projects

USD 202 million mobilized for WASH projects +
USD 21 million leveraged in the form incentive-
based grants offered by GoI to raise bonds

128 USD million for Wastewater treatment

Type of projects



Augmentation of water
supply projects



Development of sewerage
treatment systems

Type of investors



Retail investors



Institutional investors

Source: SEBI (2023), Retrieved from SEBI database, available on <https://www.sebi.gov.in/>

Green bonds for WASH investments in India

Enabling environment and incentives by GOI and Regulatory framework by SEBI for issuance of green bonds

Vadodara Municipal Corporation

Municipal Bond of INR 100 crore (FY 2023)

- Deployment of funds for **Sindhrot water supply project** to cater drinking water needs of the city and liquid waste management project.
- Bid subscribed for **36 times**
- Bond has **AA rating**.
- VMC's '**successful listing**' of municipal bond now case study for US Treasury.



Green Bond of INR 100 crore (FY 2024)

- Enhancing **liquid wastewater management** infrastructure across Vadodara for developing 2 STPS of 121 MLD and 1 APS with drainage network.
- Bid subscribed for **44 times**
- Bond has **AA+ Stable rating**.
- Recorded as the **first certified green municipal bond** for sustainable WASH infrastructure.



Indore Municipal Corporation

Green Bond of INR 100 crore (FY 2024)

- Set up a **60-megawatt solar power plant** that would generate electricity to bring water from Narmada river which is some 80 km from Indore
- Bid subscribed for **5.9 times**
- Bond has **AA+ Stable rating**.
- **Selling of carbon credits** worth INR 52 lakhs which is encashed for O&M of WASH solar project

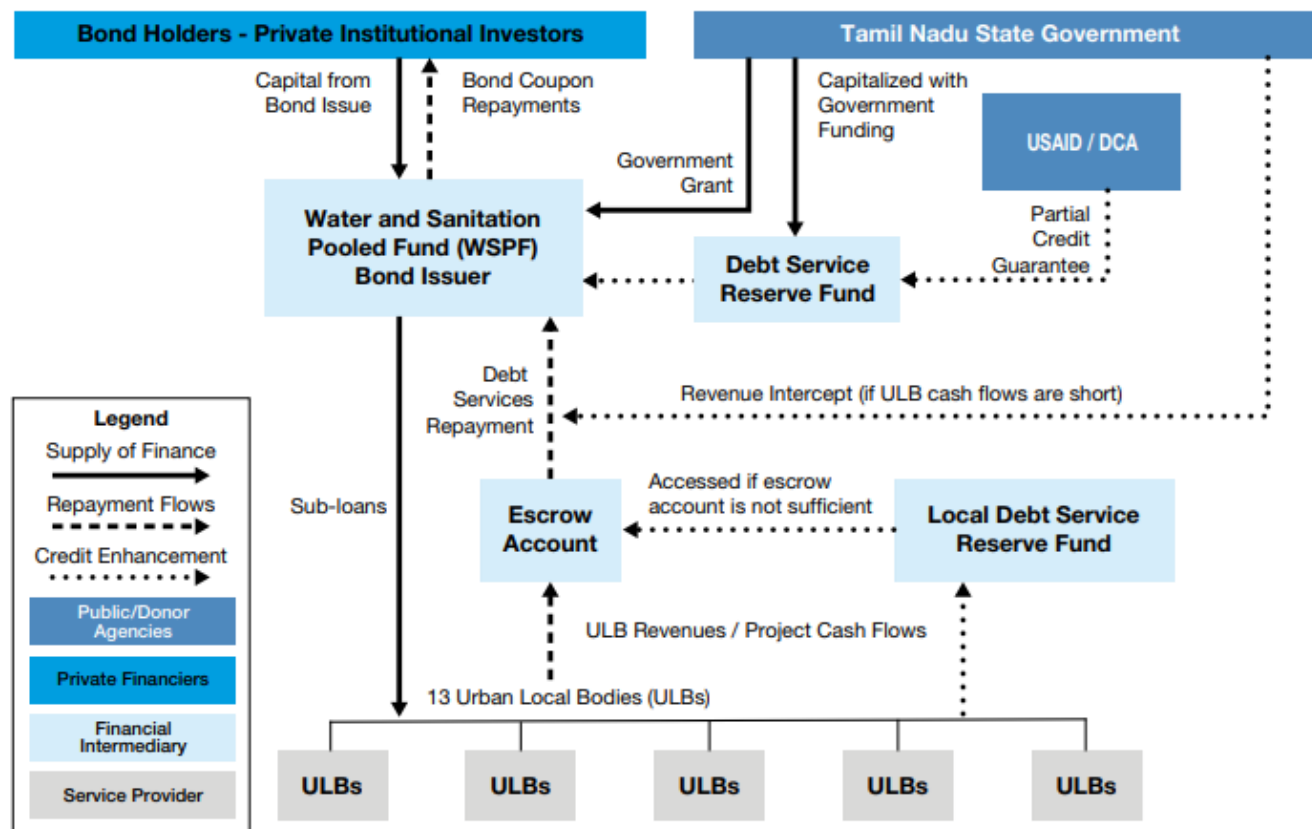


Sources: The Indian Express (2022). VMC's 'successful listing' of municipal bond now case study for US Treasury. Retrieved from <https://indianexpress.com/article/cities/baroda/us-treasury-department-book-vadodara-municipal-bond-listing-bse-8247788/>; The Climate Bonds Initiative (2024). Retrieved from <https://www.climatebonds.net/resources/press-releases/2024/02/vadodara-municipal-corporation-initiates-india-and-asias-first>, Retrieved from https://www.business-standard.com/article/economy-policy/indore-s-first-municipal-green-bond-a-beacon-for-india-s-urban-local-bodies-123030500436_1.html

Pooled Bonds to enable access to small municipalities

Pooled financing, where multiple **smaller municipalities issue bonds together**, can help them access capital markets more easily and at lower costs, facilitating infrastructure projects and urban development.

Figure: Pooled Municipal Bond Issuance in Tamil Nadu, India: Financial Structure



Key Benefits

- ✓ Diversification of risk
- ✓ Structuring possible to enhance credit quality
- ✓ Optimum use of credit enhancement
- ✓ Credit enhancement by multilaterals or Government
- ✓ It becomes possible for small ULBs to access credit markets

- The success of pooled finance model in the States of Tamil Nadu and Karnataka subsequently led Government of India to create a central fund called the Pooled Finance Development Fund (PFDF) – with Rs 2500 crore allocated under 12th Plan.

Source: Based on Kudwa Roopa (2004), "Financing Municipalities and relevance of Credit Rating - the Indian experience", CRISIL, Presentation made at *International Conference on Financing Municipalities and Sub-National Governments, Washington*; World Bank (2016). Pooled Municipal Bond Issuance in Tamil Nadu (India), p.2

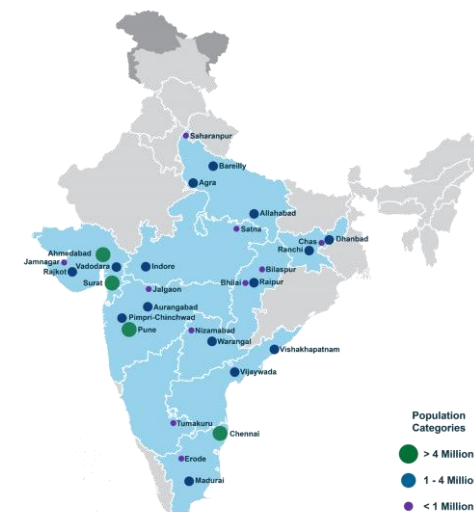
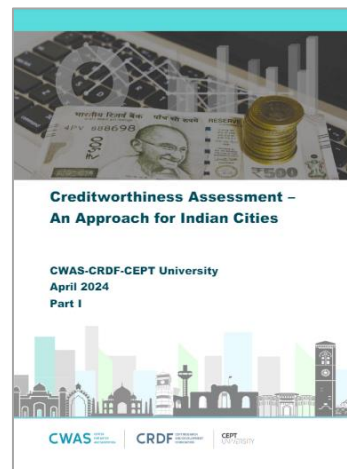
Creditworthiness assessment for cities

Creditworthiness Assessment Framework for cities

Cities can use a **creditworthiness self-assessment tool** as a pre-cursor to formal credit rating

Our Framework uses both **financial performance indicators and service level indicators**

It uses **publicly available datasets**



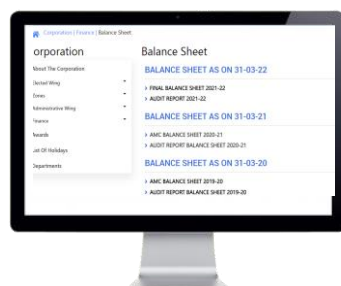
Approach and framework for 30 Indian Cities

Both larger and smaller cities have ‘significantly’ higher potential to borrow compared to their actual borrowings

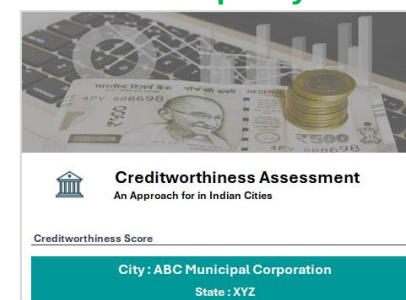
A Simple Excel Based Tool to assess creditworthiness and borrowing capacity of a city



**WASH and administrative
Data – Performance
Assessment System**
(www.pas.org)



City Balance sheets, Audited account statements and City Budgets



ESG assessments for cities



ESG Assessments, disclosures and investing

Measuring sustainability and societal impact to better determine future performance

Popular amongst corporates but city governments are also adopting

Access new markets for development funds
Build credibility for investors



US Municipal Bond marketplace - ISS ESG Muni QualityScore (formerly ACRE Data) maintains ratings and data for all cities



Toronto's Debt Issuance Program linked to strategic ESG outcomes and reporting

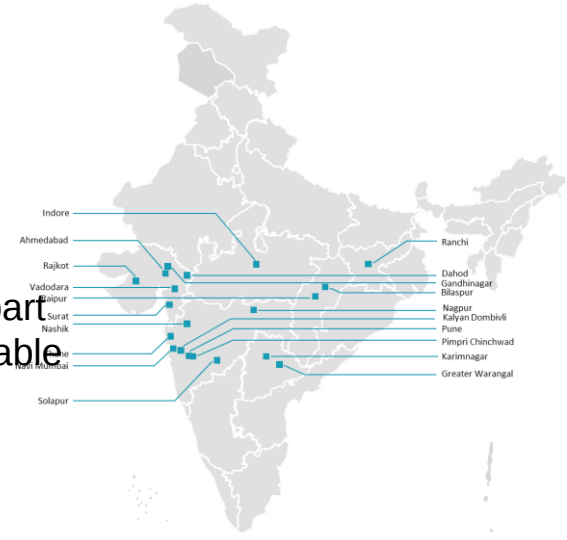


Vancouver, Montreal adopting TCFD recommendations in financial reporting

ESG for Indian cities



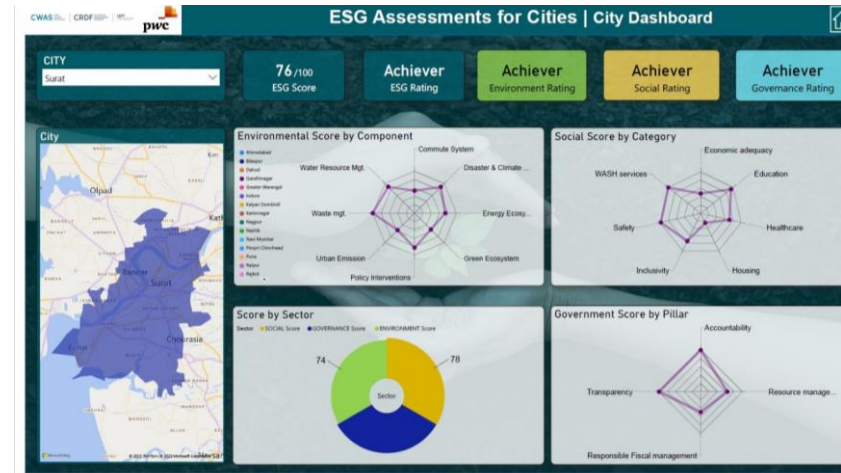
Indian cities already reporting on multiple ESG relevant topics as part of govt. initiatives – publicly available data



Framework by CWAS and PwC India

19 themes, 62 indicators - City mandates, service performance, Laws and policy, National commitments/ programs

Tested on **20 cities** - ESG ratings, profiles



Leader
Achiever
Performer
Aspirant
Initiator

In summary

Nepal will need more funds to meet its SDG 6 goals

Need to use results-based funding and tap new sources

Use of **results-based funding (RBF)** mechanisms will be key as funders look to ensure outcomes.

Both **governments and bilateral /multilateral funders** increasingly use RBF mechanisms.

Blended finance models can help **leverage private funding sources** to mobilize investments through locally designed PPP projects and by supporting access to credit, local industries to adopt PPP models

For **capital market access through green bonds**, and **smaller municipalities** can opt for **pooled bonds** schemes

CWAS

CENTER
FOR WATER
AND SANITATION

CRDF

CEPT RESEARCH
AND DEVELOPMENT
FOUNDATION

CEPT UNIVERSITY

Thank you

CWAS

CENTER
FOR WATER
AND SANITATION

CRDF

CEPT RESEARCH
AND DEVELOPMENT
FOUNDATION

CEPT UNIVERSITY

The Center for Water and Sanitation (C-WAS) at CEPT University carries out various activities – action research, training, advocacy to enable state and local governments to improve delivery of services.



pas.org.in
cwass.org.in



pas@cept.ac.in



[pas_project](https://twitter.com/pas_project)



[pas.cept](https://www.facebook.com/pas.cept)



[pas.org.in/web/ceptpas/pase-
news](http://pas.org.in/web/ceptpas/pase-news)
Sign up: tiny.cc/pasenews