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National Institute of Urban Affairs

Blue Financing: Water For Future

Financing Challenges, Opportunities and Recommendations
for Integrated Water Resource Management

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In partnership with UNESCO New Delhi and NIUA, India

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Year of Publication

2021

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Key Message



Water is a precious resource of limited quantity. It is the foundation of our life, crosscutting all social, cultural, economic and environmental services. Yet, over 2 billion people still lack access to safely managed drinking water services and 3 billion people have no access to proper handwashing facilities at home, the primary line of defense against COVID-19 and other diseases.

To achieve only the first two targets of Sustainable Development Goal 6 (SDG), it would cost \$114 billion per year to provide access to safe drinking water and sanitation in 140 low and middle-income countries. Achieving all the targets of SDG 6, and making the Human Right to Water and Sanitation a reality will require a momentous scaling up of investment into the development and management of water resources. While there is a strong economic case for investment in water security, this does not always translate into a compelling financial case.

Monetary valuation of water presents the disadvantage of underestimating, even excluding, other aspects. For example, how do we quantify the meaning of the 443 million schooldays missed annually due to water-related diseases? Better recognition and expression of the “value” of water can act as a driver for improved water management, appropriate reflection in political attention and thus can stimulate further investment.

The present paper is a first step towards addressing the challenges in facilitation of movement of capital in the water sector in India. It is the result of a collaborative effort of the UNESCO New Delhi, the advisory firm AuctusESG, and the National Institute of Urban Affairs under the “Blue Financing – Water for Future” initiative. Through this paper, an effort has been made to understand the financial risks and challenges in the water sector and present recommendations to address these challenges.

I hope that it will help policy makers in making informed decisions to build more resilient, and water secure societies.

ERIC FALT

DIRECTOR AND UNESCO REPRESENTATIVE
TO BHUTAN, INDIA, MALDIVES AND SRI LANKA



Key Message



Water has been among the government's top priorities for the last few years. With schemes such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Jal Jeevan Mission, National Mission for Clean Ganga, and Jal Shakti Abhiyaan, the stage has been set for a massive transformation in the water sector in the country. When the Finance Ministers announced the launch of the Jal Jeevan Mission in February this year, it conveyed the message that achieving urban water security is a vital cog in the wheel of sustainable development in India. Significant resources have been earmarked for all these initiatives. However, the requirement is enormous. Going forward, there will be a need for innovative financial models and streams, involving diverse stakeholders, in order to meet this requirement. I am happy that this paper addresses this very pertinent and relevant theme.

NIUA's mandate over the years has been to help our cities progress up the development ladder in a sustainable manner. Today, water has a vital role to play in helping cities define their development trajectories. The challenges faced by the urban water sector have changed over the years. With climate change beginning to manifest its effects, strategies of the future will require new thinking and philosophies. Already, cities that are water leaders are exploring unique approaches such as Water Sensitive Urban Design, Low Intensity Development, One Water, Local Sourcing, among others. A common thread that binds these together is a steady financial stream that is required to roll out the actionable interventions. The directions provided in this paper attempt to expound on the knowledge and know-how of securing the finances for water-related provisioning, and can certainly serve a good reference document for governments and practitioners alike.

I congratulate the team from auctusESG, UNESCO New Delhi Office, and NIUA for developing this timely knowledge product.

HITESH VAIDYA

DIRECTOR, NATIONAL INSTITUTE OF URBAN AFFAIRS



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Executive Summary

Global water resources are rapidly declining, with climate change and the COVID-19 pandemic worsening the already impending water crisis. India also faces a turbulent water future. With the rise in extreme weather-related events, a burgeoning urban population and rapidly growing water demand have added immense stress to India's water sources. It is also distressing to note that 21 major cities in the country are in immediate danger of running out of groundwater, with 40% of the population expected to have no access to drinking water by 2030.



Namita Vikas

Founder & Managing Partner, auctusESG

Significant challenges in the Indian water sector such as gaps in the water loop, over-extraction of groundwater, failing water supply infrastructure, and high costs for wastewater treatment facilities, are worsening the country's water crisis. Additionally, considerable financial and non-financial risks in the water sector are also dissuading investors from funding crucial water projects. These include a limited understanding of sector-specific risks, failing infrastructure, lack of water project-related data, and lengthy project tenure, among many others.

This context compels urgent, corrective and preventive action by virtue of water insecurity intensifying several social, economic and environmental challenges like food production, industrial output, public health, biodiversity, and quality of life. However, a large financing gap for achieving effective and efficient water resource management endures. Towards achieving SDG6: Clean Water and Sanitation Targets 6.1 and 6.2, the capital requirement is \$114 billion per year, globally. This is three times the current annual capital investments in the WASH sector. Moreover, WHO data shows that every US \$1 invested in this sector is slated to give a return US \$4.3, presenting a great opportunity for the public and private sectors to bring more focus to water.

Despite the extensive challenges India faces, numerous opportunities exist that can strengthen and revolutionize the country's water sector to address critical concerns. This white paper proposes interventions in 4 key areas of intervention, that aim to achieve sustainable management of water resources by directing capital flows towards water projects.

Policy, reforms and governance

- Strengthen water governance to ensure water security by leveraging existing and innovative interventions at the local, state and central level
- Define clear sustainable water policy goals and targets, at various levels of government, focus on its effectiveness and ensure enforcement to meet the set targets, in order to bolster India's broader water sector governance
- Expedite water-related policies and reforms, to promote efficiency gains, cost reduction and cost recovery for mobilising commercial finance
- Carve out specific category for water and nature-based infrastructure solutions in various public financing instruments such as Priority-Sector Lending, infrastructure debt funds and within India's newly announced development financial institution
- Revolutionize tariff systems towards valuing water economically and equitably, by implementing pay-for-use billing structures
- Improve the balance of tariffs and taxes as sources of finance for enhancement of balance sheet of utilities and municipalities

Alternative financing models

- Catalyse mainstreaming financing by providing risk mitigation instruments linked to credit enhancements, guarantees, and concessional debt, that in form of interest-subsidies and longer repayment periods, make loans more accessible and affordable for end-users and enterprises within the water sector
- Scale private financing through innovative financing instruments like blended finance, insurance products, equity grants, tenor extensions, peer to peer lending, Hybrid Annuity Models, pay-as-you-go models to accelerate and secure finance
- Leverage CSR funding by promoting outcome-based financing, venture capital funding bundled with developmental finance, would be effective in mobilising financing for the water sector
- Given the heterogeneous nature of water financing and varied investor objectives, risk appetites and liquidity needs, deploying specific financial instruments like Green Bonds, debt funds and YieldCos would also lead to greater financial flows to key projects

Investor action

- Augment interest, deepen understanding of the sector, and scale engagement and collaboration to direct capital flows to water with investor community
- Creating an investor ecosystem around the water sector, by building investor capacity and maximising impact based on investor action,
- Evolve with a targeted approach to invest in water enterprises that have the potential to significantly scale, have a strong financial track record, and a deep reach into underserved communities
- Improve investor understanding of relevant water sector risks by introducing risk valuations tools to identify potential material impacts and possible effects of water risks on revenues and/or costs

- Engage with investor groups and other stakeholders to collaboratively act on key resolutions to bolster and enhance risk disclosures and engagement frameworks to promoting transparency and disclosures to improve investor participation in the water sector

Community-based models

- Build community-based small-scale solutions like Water ATMs that focus on access to water 24/7 and are maintained through community participation
- Leverage existing models for effective and efficient reach, and introduce peer-to-peer schemes with a bottom-up perspective, to share natural resources and investments
- Enhanced use of models like water credits that are linked to micro financing
- Educate small entrepreneurs and communities on government initiatives and schemes like the Jal Shakti Abhiyan in order to promote PPP models

The rising severity of world's water sources deficit is said to potentially lead to dire consequences on human existence and its elusive access for a major share of the human population. It is imperative that the world does not reach such a tipping point. Effective integrated water resource management requires the creation of a water ecosystem and heightened execution that fosters and accelerates its supply and fulfils the rising demand at the right place, at the right time and at the right price. Such an enabling ecosystem would then attract private capital and allow innovation to thrive in the sector. This white paper through its recommendation has illustrated proven solutions from across the world, that are replicable and scalable. It encourages all stakeholders in the sector to work collaboratively towards identifying and zeroing on workable solutions, that would deliver a secured sustainable water future for India.



1 | The Global Water Context

While meeting the 2030 Sustainable Development Goals (SDGs) became a primary objective following the Paris Agreement, a recent explosion of extreme climate events and growing social inequalities have intensified its urgency. These range from extreme weather, drought, floods and cyclones to growing income inequality and wide disparities for access to basic needs. The COVID-19 pandemic has further exposed gaps in the global economic and social systems and exacerbated the challenges in how the world manages its finite resources.

Better management of natural resources is one of these focal points of the SDGs. While there has been considerable action around the improvement of air and land resources, water has received less than adequate attention. The value of water for both the global economy and the sheer survival of lifeforms is acknowledged by all. In essence, the water crisis is an existential crisis.

Water is characterised as a public and private resource, and 3 mega-trends make it imperative to manage water resources efficiently and effectively.

3 mega-trends that urge better water resource management



Population explosion

The current global population of 7.5 billion is expected to grow to 9.7 billion by 2050, with a major share of the incremental growth in developing countries which already suffer from inadequate institutional capacity for resource management.



Water scarcity

There is increasing competition for water from agriculture and industry, apart from households, due to a shift towards water-guzzling crops and in growth in water-intensive sectors like apparels and automobiles.



Climate change

Water is also likely to become scarcer as climate change increases water-related risks through frequent droughts, heat stress or floods. These mega-trends will add to the existing stress on water sources.

Source: UN

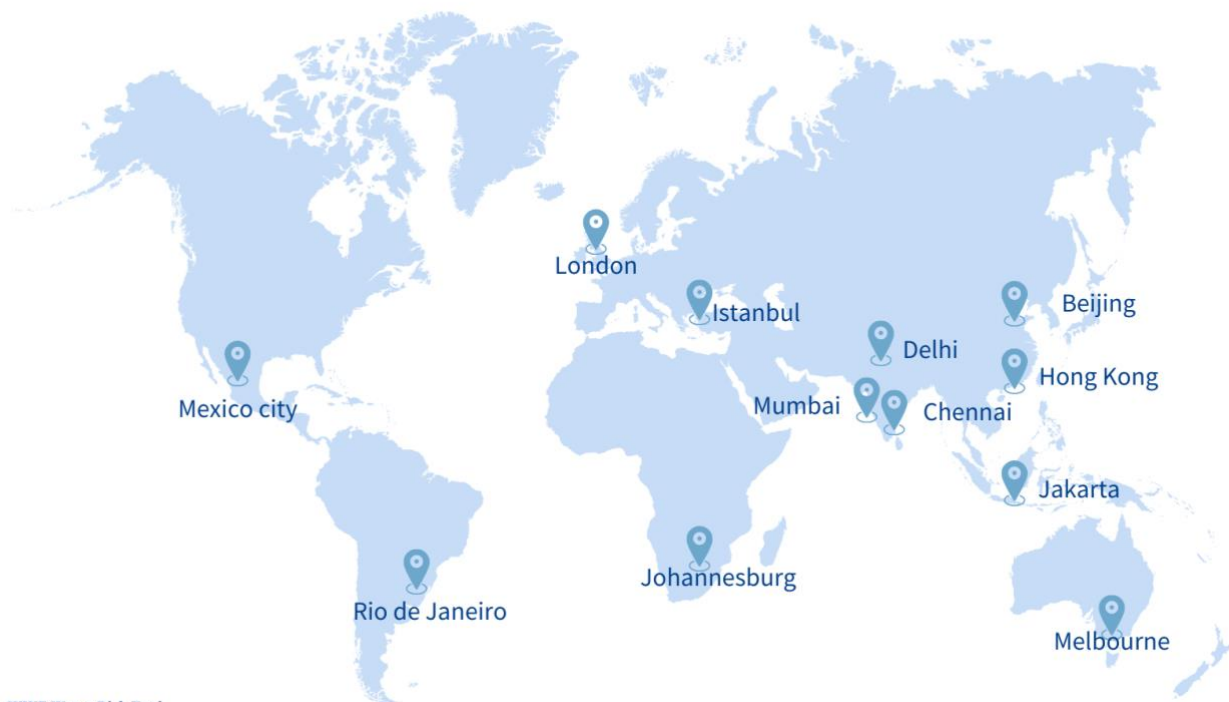
Already, groundwater depletion is considered to be a major global concern. In 2015, NASA's satellite data reported that 1/3rd of the world's largest groundwater basins were being rapidly depleted due to human consumption.¹ Since groundwater is the Earth's largest and most accessible stock of freshwater, its depletion signals its impending shortage.

1/3rd

Of the world's largest groundwater basins are rapidly depleting due to human consumption

In the urban landscape, at a time when, according to the World Bank, the global urban population is set to rise from 4.6 billion to about 6 billion,² a number of major cities are already water stressed. The World Wide Fund's Water Risk tool identified cities such as Mumbai, Delhi, Beijing, Jakarta, Johannesburg, Chennai, and Rio de Janeiro as ones already experiencing water risk.³ These cities, collectively, are home to approximately 107 million people.

Cities already facing water risk



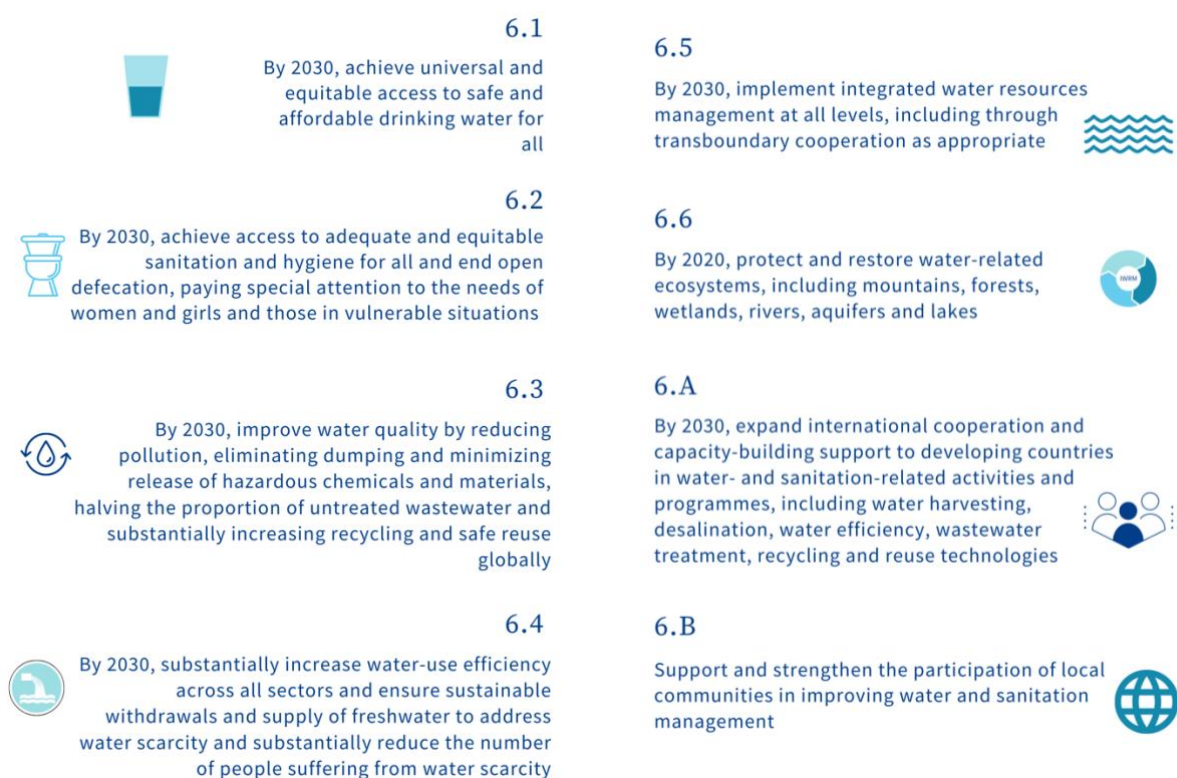
Source: WWF Water Risk Tool

The World Economic Forum's Global Risk Report has ranked water amongst the top 5 global risk factors in 2020.⁴ Moreover, the UN World Water Development Report 2020 demonstrated the inextricability of climate change and water quality and quantity.⁵ About 40% of the global population is already afflicted by the water crisis, which is projected to worsen with the impact of climate change.⁶ This is because climate change impacts water resources in a number of ways, causing phenomena like glacial melting, sea-level rise, abnormal monsoon patterns, frequent and intense storms and more. Floods and droughts during the past 20 years are estimated to have caused a total

economic damage of \$700 billion. Further, 2011-2020 was the warmest decade on record and 2016, 2019 and 2020 were amongst the three warmest years ever recorded.⁷

This global context compels urgent corrective action by virtue of water insecurity intensifying several social, economic and environmental challenges like food production, industrial output, water pollution, public health, biodiversity, and quality of life. Estimates suggest almost 2/3rds of the world's freshwater withdrawals go towards irrigation, followed by industry which consumes 1/5th of the total water withdrawals. Households account for the rest.⁸

The SDG 6, which looks at Clean Water and Sanitation, provides a framework to sustainably manage global water resources in order to ensure the availability of water and sanitation for all, thus ensuring a better, water secure future.⁹



With 3 billion people worldwide lacking basic hand washing facilities at home, the threat of the COVID-19 crisis is heightened. What's worse, 50 million out of these were reportedly Indians.¹⁰ There exists a significant financing gap to achieve SDG 6 by 2030, which can be met through a combination of methods which include greater allocations of budgetary resources, more efficient use of external funding mechanisms, and greater contributions from water users. Challenges such as fragmented governance and inadequate institutional capacity and a lack of sustainable infrastructure in many regions compounds the difficulties for successful execution of interventions. The capital requirement to meet Target 6.1 and 6.2 is US \$114 billion per year globally, which is

3 bn
people worldwide lack
basic handwashing
facilities at home

three times the current annual capital investments in WASH.¹¹ This estimate does not even include the costlier targets (from Target 6.3 to 6.6) which would involve increasing water efficiency, implementing integrated water resource management and safeguarding and restoring water-related ecosystems.¹² Further, 2015 estimates suggest that it would cost US \$1.04 trillion annually from 2015-2030 to achieve sustainable management of water for all countries and major water basins.¹³

2| The Indian Water Context

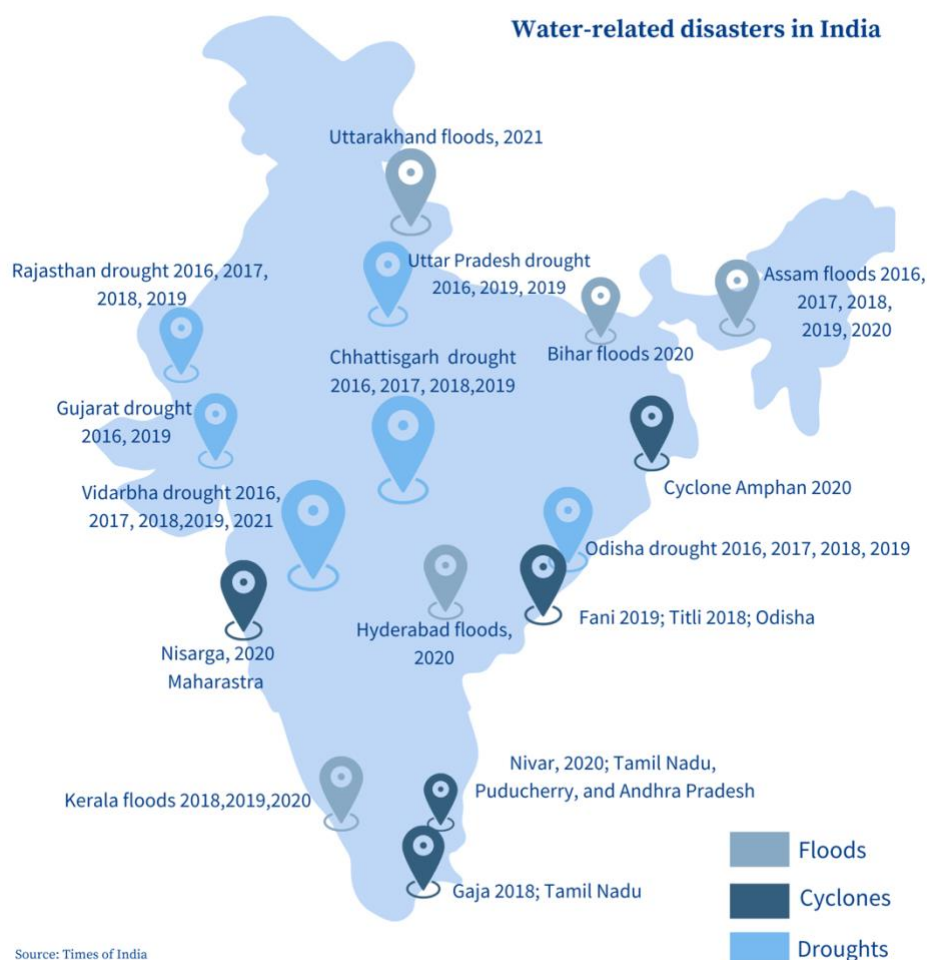
India faces a turbulent water future, unless drastic changes are made in the way in which the country manages water. A number of factors, including growing migration from rural areas to urban centres, especially to unplanned clusters within cities, apart from an already steadily growing urban population, have put an unprecedented pressure on India's hydrological balance. The country's urban population is predicted to rise by 38.6% in the next 15 years.¹⁴ 21 major cities in India are in immediate danger of running out of groundwater, according to the NITI Aayog's Composite Water Management Index and 40% of the population are expected to have no access to drinking water by 2030.¹⁵ Further, the Index estimated that the country's water supply will experience a shortfall of about 50% by 2030,¹⁶ demonstrating the growing gap between water supply and demand, with significant disparities between urban and rural areas, and between higher and lower socioeconomic classes. India is also a hotspot of extreme climate-related weather events like cyclones, storms, droughts and floods. Such events have a devastating impact on public infrastructure, housing, livelihoods and people's lives, apart from the ensuing economic damage. Within this gamut of risks, the scarcity of freshwater to meet the demand of the country's 1.3 billion-strong population is emerging as a serious risk for its sustainable future.

21

major cities in India are in
immediate danger of
running out of groundwater

40%

of India's population
expected to have no
access to drinking water
by 2030



Water issues adversely hits gender parity in developing countries by a multiplier effect. UN Water writes that across a number of low-income countries, women are responsible for household water, health and sanitation management.¹⁷ For example, a study by the Centre for Policy Research and Kalinga Institute of Rural Management, KIIT Bhubaneswar on gender and urban sanitation in 10 slums in Bhubaneswar showed that in 79% households women fetch water.¹⁸ Fulfilling this role impedes their participation in employment or education, which further limits their economic empowerment, resulting in marginalisation.¹⁹ Long walking distances to access toilets also makes women more vulnerable to attacks and abuse, posing a serious safety risk.²⁰

India’s water sector requires a systemic change through sustainable water infrastructure, better governance structures and significant capital allocations to water projects, each of which will contribute to creating a roadmap for a low carbon recovery and growth.

Since, water has a plurality of uses and impacts various sectors, an integrated approach is required to manage these efficiently, equitably and sustainably. One of these is the Integrated Water Resource Management (IWRM) model.

Integrated Water Resource Management

Integrated Water Resource Management is a globally recognised approach, based on 3 principles; social equity, economic efficiency and ecological sustainability, which seeks to ensure consolidation in the development of water and related resources, and augment economic and social welfare.

IWRM, being a cohesive, participatory planning and implementation mechanism for water resource management, offers the opportunity for a multi-stakeholder collaborative model to set policy, and make decisions about water resources.

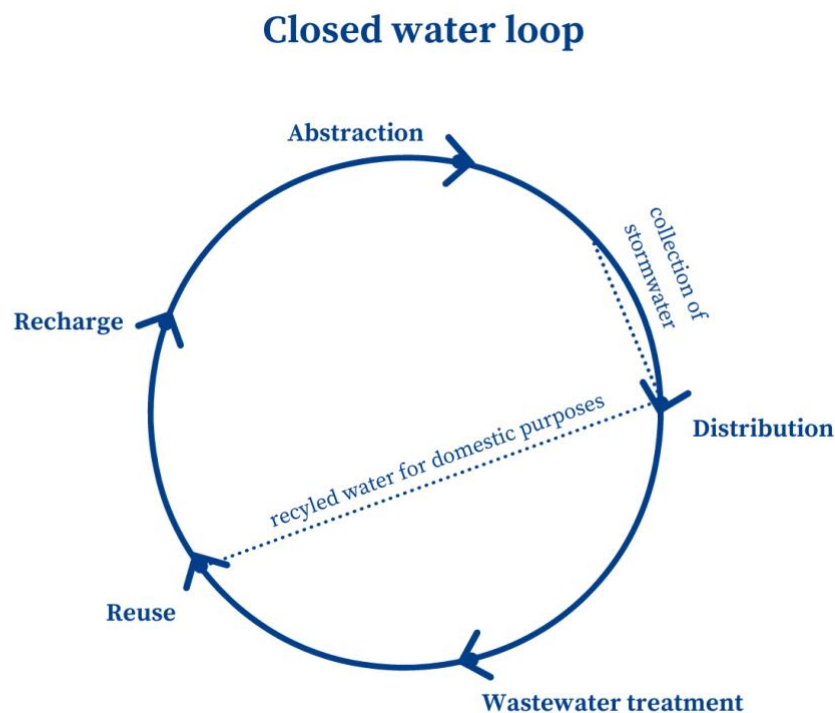
Source: <https://www.gwp.org/en/GWP-CEE/about/why/what-is-iwrm/>

30 Indian cities facing 'severe water risk'

Jaipur	Thane	Jalandhar
Indore	Ahmedabad	Pune
Thane	Jabalpur	Dhanbad
Vadodara	Mumbai	Bhopal
Srinagar	Lucknow	Gwalior
Rajkot	Hubli-Dharwad	Surat
Kota	Nagpur	Delhi
Nashik	Chandigarh	Aligarh
Vishakhapatnam	Amritsar	Kozhikode
Bengaluru	Ludhiana	Kannur

Source: WWF

An essential part of an integrated approach to water resource management is to consider all parts of the water loop in order to involve all relevant stakeholders and design comprehensive solutions that plug key gaps in water supply and reduce water demand.



Source: AdoptIUWM

Urban Outlook

Indian cities are already struggling with issues like water insecurity, lack of upgraded water infrastructure and poor water resource management. Estimates show that about 160 million Indians will be living in water-stressed cities by 2030. 21 major Indian cities including Delhi, Chennai, Bengaluru, Hyderabad and others, will run out of groundwater in the near future. This is expected to affect about a 100 million people.²¹

Furthermore, the COVID-19 pandemic has only exacerbated India's water crisis. The country's urban population was disproportionately affected by the pandemic.²² Given that large numbers of urban citizens, especially the urban poor, have limited access to adequate water, people's first defence against the COVID-19 virus - handwashing - remains a distant possibility for many Indians. Densely populated cities with unplanned settlements and slums are highly vulnerable to infection and disease. These locations are synonymous with unreliable water supply, ill-equipped public infrastructure, congested housing and inadequate upgradation of piping network. Water and

160 mn

Indians will be living in
water-stressed cities by
2030

sanitation in informal settlements in India are generally accessed through shared infrastructure, which are often found lacking or absent.²³



Indices such as the Notre Dame Global Adaptation Initiative (ND-GAIN) Index and the Global Climate Risk Index, which ranked India as highly vulnerable to climate change,²⁴²⁵, also highlight the water-related disaster risk that urban India faces. This is due to the fact that extreme climate-related weather events like cyclones, storms, droughts and floods have a devastating impact on urban infrastructure, housing, public transport livelihoods and quality of life, along with inflicting significant economic damages.

\$13 bn
was the economic
damage caused by
the Amphan super
cyclone

A recent study ranked the Amphan super cyclone that affected both, India and Bangladesh and the floods that hit several parts of India between June and October in 2020, ranked 4th and 7th respectively, in a list of the 10 most expensive extreme weather events of the year. The cyclone costing US\$13 billion and the floods resulting in damages worth US\$10 billion.²⁶

India's urban water system has substantial weaknesses, with each part of the water loop in desperate need of strengthening.

- A. **Abstraction:** 80% of urban domestic water is supplied through groundwater.²⁷ The rapid rise in urban water demand has resulted in a meteoric rise in wells, excessive extraction and exploitation of groundwater. Moreover, India receives

about 4000 billion cubic meter (bcm) rainfall a year, a majority of which results in runoff due to inadequate collection and storage infrastructure.

- B. **Distribution:** In 2019, only about 41% of urban households had piped water connections,²⁸ with per capita water supply in urban slums as low as 20 litres per capita per day (LPCD), instead of the urban standard of 135 LPCD.²⁹ Leakages in the ageing distribution infrastructure have also led to water losses of up to 56% in cities like Bangalore,³⁰ leading to shortages and placing added pressure on extracting groundwater when distribution networks fail.³¹ Further, water theft and illegal connections cause significant financial damages to water utilities and can result in consumption of contaminated water, and the spread of water-borne illnesses.³²
- C. **Wastewater Treatment:** 80% of water supplied to households is discharged as wastewater, but only 30% of India's wastewater is treated.³³ Dauntingly substantial investment in wastewater treatment plants also begets investor hesitation.³⁴
- D. **Reuse:** The inability of current urban water infrastructure to collect and treat wastewater effectively, the lack of wastewater treatment facilities and the absence of a clear policy environment results in the continual wasting of untreated water and extraction of freshwater supplies to meet demand.³⁵
- E. **Recharge:** More than half of urban India's untreated sewage is released into water bodies, thereby polluting crucial surface water resources.³⁶ Almost none of the states have built the infrastructure required to support groundwater recharge, especially in over-extracted or critical areas.³⁷

Only 30%

of India's wastewater
is treated

Rural Outlook

The NITI Aayog reports that of the water that is available to rural India, 70% is contaminated, resulting in 200,000 deaths each year.³⁸ With groundwater, which makes up 40% of India's water use, increasing by 500% in terms of usage over the last 50 years,³⁹ groundwater is extracted faster than it is replenished.

Given that 84% of India's rural population does not have access to piped water, frequent hand washing, as recommended by the WHO and Indian Ministry of Health and Family Welfare as a COVID-19 precaution is practically impossible for many in rural areas. As per India spend analysis, Uttar Pradesh, Maharashtra, Bihar, West Bengal and Madhya Pradesh,⁴⁰ which have some of the largest rural populations, account for 46% of all COVID-19 cases in the country.⁴¹

Increased incidences of flooding threaten to destroy water and sanitation facilities and contaminate water sources. In the state of Maharashtra, where most rainfall is limited to the monsoon season from June through September, even small reductions in rainfall can compromise agricultural yields, drinking water supplies, and the community's

84%

of India's rural
population does not have
access to piped water

entire livelihood and quality of life. In the face of unabated climate change, reductions in monsoon rainfall are likely to become increasingly common.

If climate change-induced impact like a reduction in their agriculture yields and income persists, it will further add to the pressure of involuntary migration from rural to urban regions, not to mention a higher dependence on the costly and extractive water tankers to supplement the drinking water supplies.

India's rural water system has substantial weaknesses, with each part of the water loop in desperate need of strengthening.

- A. **Abstraction:** The lack of piped water supply in rural areas leaves no choice but to drill wells to access groundwater. Over extraction of groundwater has led to rapid decline in groundwater levels. Adding to this is the shrinking of freshwater sources like rivers, wells, and groundwater. Moreover, the lack of rain catchment facilities results in significant runoff and loss of stormwater.
- B. **Distribution:** Supply infrastructure in rural regions is abysmal, and concerns are growing about the inequity of water distribution and access. Although the government assures that drinking water is available in most rural areas, the quality of that water supply poses a challenge. Currently, a large proportion of India's rural communities is consuming water that does not meet the WHO drinking water quality standards.
- C. **Wastewater treatment:** The main source of contamination for rural areas is grey water. With growing population, the wastewater volume is also at an alarming rise. Wastewater seeps into the ground, contaminating underground water sources. The result is that almost every water source is today heavily polluted — from rivers and wells to coastal areas.
- D. **Reuse:** Lack of rural water infrastructure poses a large obstacle in collecting and treating wastewater. This wastewater goes again into the natural water bodies and contaminates these resources. Hence there are limitations in reusability of water.
- E. **Recharge:** Nearly 60% of all districts have issues related to availability or quality of groundwater and 85% of rural domestic water requirements are fulfilled by groundwater. There is a lack of infrastructure related to watershed management for effective water recharge. More decentralized solutions are required, which aid in water conservation, rainwater harvesting and groundwater recharging at villages.

Lack of water infrastructure poses a large obstacle in treating wastewater

Circular economy models to close the water loop

The Ellen MacArthur Foundation writes that implementing a circular model in cities would foster thriving, liveable and resilient cities, where planning, designing and implementing this model aligns with the SDGs, including reducing carbon emissions and adapting to the effects of climate change.

Applying a circular economy model in urban centres would result in ‘closing the urban water loop’. This means that each gap in the urban water loop would be plugged and a closed water system would be implemented with no leakages and waste. A circular economy model would make use of a number of water management solutions to create a comprehensive system that achieves a number of water resource management goals.

Source: <https://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities>

3| Challenges

Issues in the water loop

There are substantial issues with each component of the urban water loop, which holds serious consequences for urban residents.

Encouraging over-extraction: As observed in earlier sections, over-extraction of groundwater is rampant in India due to the excessive and unregulated use of borewells and pumps, despite considering that 54% of India's groundwater wells have declined over the past 7 years.⁴²

In fact, India is the largest extractor of groundwater in the world.⁴³ Subsidies on electricity are a key contributor to excessive extraction, given that a large portion of groundwater pumps under usage are either unmetered or billed at a flat, non-volumetric rate.⁴⁴

Climate change impact on urban infrastructure: Water-related extreme weather events have seen a staggering rise in recent years. 75% of Indian districts, home to about 638 million people are hotspots for cyclones, floods, droughts, and heat.⁴⁵ More than 97 million people are currently exposed to extreme floods in India.⁴⁶ Cities like Bengaluru, Delhi, Surat, Mumbai, Hyderabad and others are experiencing flooding more frequently. The ORF cites a 2019 study of monsoon patterns that depicted fewer rainy days with a heightened intensity of precipitation, resulting in added pressure on existing urban stormwater drainage systems.⁴⁷ Grey infrastructure such as drains, gutters, collection systems and pumps, which already face regular wear and tear, have not been modernised, nor augmented to effectively manage the added pressure of a fast-growing urban population. Extreme weather events impact urban infrastructure over and above this. Considering this, infrastructure is becoming easily overwhelmed and heavily inundated, in most Indian cities as seen in Jaipur in August of 2020.⁴⁸

India is the
largest extractor of
groundwater in
the world



Leakages and non-revenue water: Water theft through unauthorised connections and underpriced water tariffs lead to over-use and wastage, holding financial implications for India's water utilities. For example, non-revenue water (NRW), including leakages, unauthorised connections and error in metering, costs the Municipal Corporation of Latur, in Maharashtra, roughly US \$4.7 million annually,⁴⁹ almost equivalent to the actual revenue it books.

Illegal water tanker 'mafias' are also troubling. These water tanker mafias often capture water from community pipes and charge exorbitant prices in its resale,⁵⁰ thereby making affordability and access even more challenging. Ineffective water metering and inefficient water pricing have placed additional pressures on water utilities as they continue to incur losses and result in intermittent, irregular, contaminated and unreliable water supply to several cities.⁵¹ For example, the World Resource Institute found that Bengaluru gets about 3 hours of water for 3 days a week, with slum clusters receiving as little as 2 hours of water for 2.5 days a week. Mumbai's Siddharth Nagar slum gets no piped water any day of the week.⁵²

Issues in reuse and recharge: Building wastewater and sewage treatment plants (STPs) is a costly affair with certain plants costing about US \$130,000 per million litres to build.⁵³ Further, the capacity utilisation of treatment facilities is also dismal. Wastewater treatment facilities in a number of Tier I cities face utilisation gaps of as high as 68%.⁵⁴ According to officials in the Municipal Corporation of Greater Mumbai, 61% to 64% of the wastewater generated flows untreated into the sea. In Delhi, more than 3 billion litres of untreated sewage flows into the Yamuna.⁵⁵ This poses a serious risk to investors who might consider investing in building large wastewater facilities in India. The pollution caused to other water bodies due to the unbridled flow of untreated water is an ecological risk in itself. Complications arising due to a lack of planning, regulatory guidelines and effective frameworks have also made reuse and recharge projects and initiatives unsustainable in the country.⁵⁶

Water financing and risks

Climate risk, but more specifically, water risk, is one of the most prominent emerging risks for all stakeholders, across sectors and geographies. According to the World Bank Climate Change Knowledge Portal, India faces high exposure to riverine, flash and coastal flooding along with a high exposure to tropical cyclones, droughts and associated hazards - all physical and imminent risk factors.⁵⁷ The World Wide Fund for Nature's Water Risk Filter, which assesses water-related risks to inform companies and investors on water risks, identified that 30 of the 100 cities in its analysis that were susceptible to water risk were located in India.⁵⁸ These vulnerabilities are demonstrative of the substantial amounts of effort needed to build resilience, mitigate and adapt to climate change, including for water-related projects.

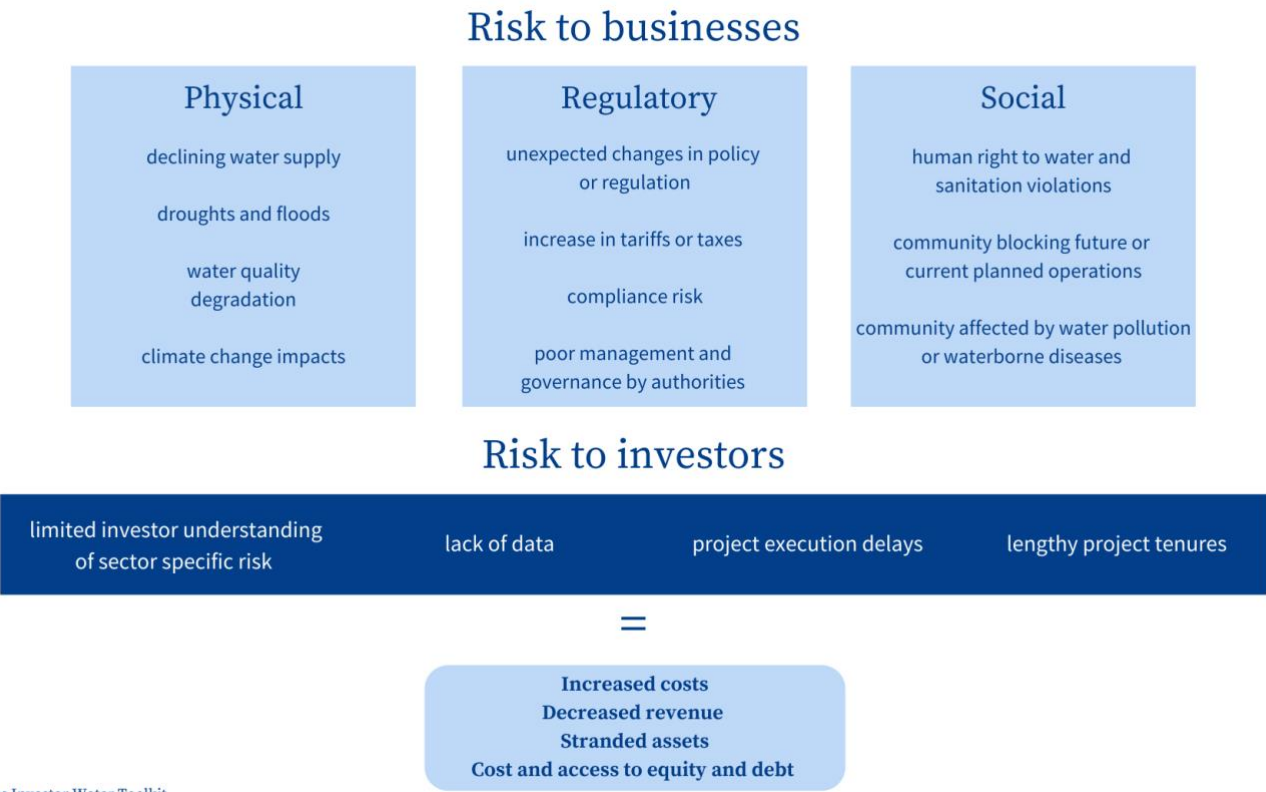
Parts of Mumbai get
no piped water any
day of the week

90%
of Delhi's wastewater
flows into the
Yamuna, untreated

Only 2.6%
of 2016's climate
finance went to
water and waste
management

According to the Climate Policy Initiative, only US \$11.7 billion out of the US \$455 billion of climate finance in 2016, i.e., a mere 2.6% went towards water and wastewater management, under both climate adaptation and mitigation.⁵⁹ This is despite climate finance having seen an uptake in recent years, from US \$360 billion in 2012 to about US \$510-530 billion in 2017.⁶⁰ The lack of financing is aggravating global water woes.

Ceres highlights specific water risks that investors may experience.



Source: Ceres Investor Water Toolkit

According to the Carbon Disclosure Project (CDP), in 2020, companies reported maximum financial impacts of water risks at US \$301 billion.⁶¹ This is worth 5 times the cost of addressing these risks, worth US \$55 billion.⁶² To close the financing gap, there is a need to adjust tariffs, taxes and subsidies. If private sector involvement in financing the water sector is to be increased, more attention needs to be paid to improving the enabling environment.

The cost of water risks is 5 times the cost of addressing them

4| Opportunities

WHO data shows that every US \$1 invested in this sector is slated to give a return of US \$4.3.⁶³ It is estimated that if 80% of urban wastewater can be treated by 2030, there would be a 400% increase in the volume of available wastewater.⁶⁴ Global and national interventions, and frameworks and initiatives are creating enabling conditions to direct capital flows to the water and sanitation sectors.

\$4.3

is the slated return for
every \$1 invested
in water

Global and Indian frameworks

Overarching global and national frameworks aimed at delivering fast results at an increased scale augur promising opportunity as the world nears 2030.

- SDG 6 Global Acceleration Framework - a multi-stakeholder model to create a highly engaged collaboration amongst the international community to hasten the progress on SDG 6.⁶⁵
- Global Framework on Water Scarcity in Agriculture – encourages greater collaboration between global players to address the issue of water management in agriculture, with the ultimate aim to ensure food security.
- National Water Policy 2020 - prioritizes drinking water, irrigation, hydropower, ecology, industries and navigation. It involves a shift in focus from supply-side arrangements and identifies an independent water regulatory authority to fix tariffs, recommendation on levying water service fees to cover operational costs.⁶⁶
- Swachh Bharat Mission - accelerates efforts towards universal sanitation coverage and waste management by eliminating open defecation and promoting cleanliness.
- Jal Jeevan Mission - aims to assist, empower and facilitate potable drinking water security through adequate and regular supply in every Indian household by 2024.⁶⁷ Further, the Indian government has also established the Jal Shakti Ministry which is working towards developing integrated solutions.⁶⁸

India's water initiatives

Jal Jeevan Mission

The Indian government has allocated US \$39 billion to strengthen close to 4000 urban local bodies and provide safe drinking water to upwards of 28 million urban households in India.

Source: <https://www.downtoearth.org.in/news/water/government-launches-new-jal-shakti-ministry-64869>

Union Budget 2021

India's Union Budget 2021 also earmarked US \$8.2 billion for the Drinking Water and Sanitation Department, and US \$1.2 billion for the Department of Water Resources, the River Development and Ganga Rejuvenation.

Source: https://www.business-standard.com/budget/article/budget-2021-fm-sitharaman-allocates-rs-50k-crore-for-jal-jeevan-mission-121020101568_1.html

Namami Ganga Action Plan

The Namami Ganga Action Plan, worth about US \$2.7 billion is India's flagship program to effectively abate pollution, conserve and rejuvenate the Ganga river.

Source: <https://www.worldbank.org/en/news/press-release/2020/07/07/project-signing-world-bank-provides-400-million-to-enhance-support-for-rejuvenating-the-ganga>

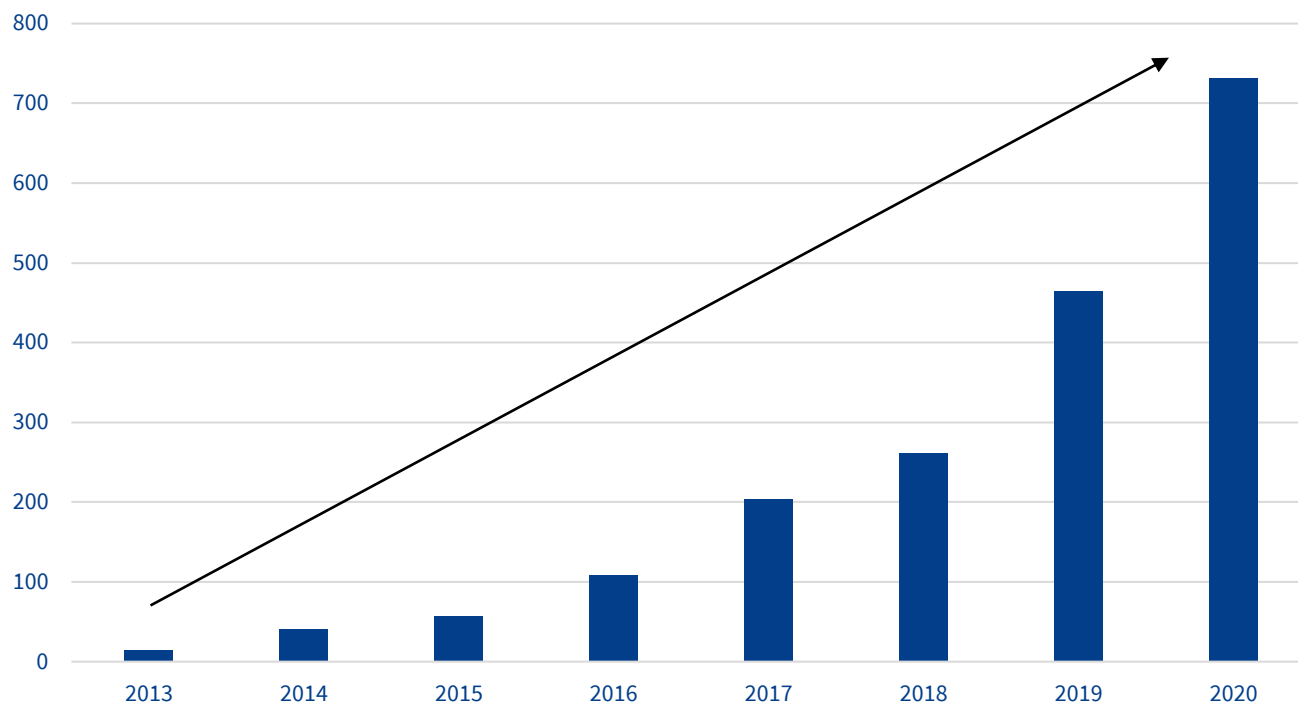
In 2018, Climate Bonds Initiative released a Water Infrastructure Criteria, under the Climate Bonds Certification where water-related bonds can be certified for low-carbon and climate-resilience water management standards. This criterion lays out the requirements of types of interventions consistent with bolstering climate resilience of water assets and will help investors determine the climate credentials of a water-related product.⁶⁹

Lastly, various water indexes also exist that track water-related investment opportunities. These include the *Dow Jones U.S. Water Index*, the *ISE-B&S Water Index*, the *S&P 1500 Water Utilities Index*, the *S&P Global Water Index*, the *Bloomberg World Water Index*, and the *MSCI World Water Index*.

Uptake in sustainable debt flows enable future water projects

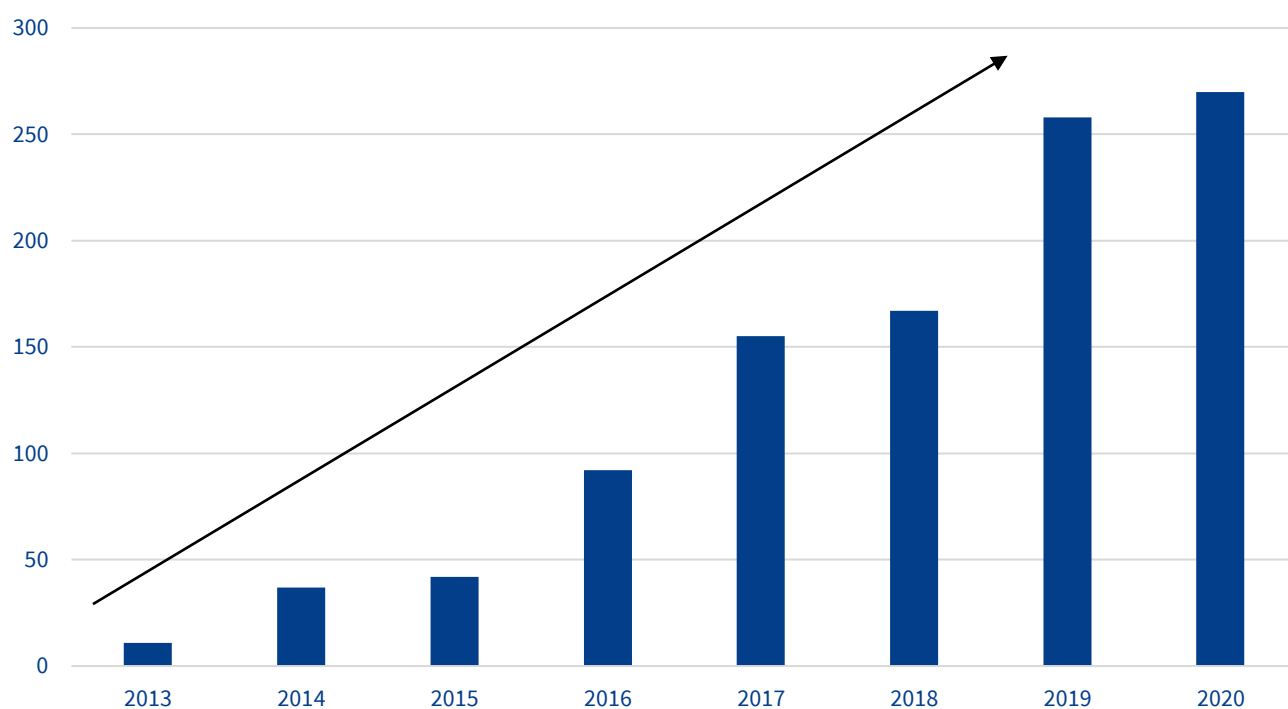
Global sustainable financing initiatives have grown exponentially. In 2020, global sustainable debt issuance, including green, social and sustainable bonds, sustainable-linked loans and bonds, and green loans was \$732 billion, a 10x rise from 2014.⁷⁰

Global Sustainable Debt Issuances (US \$ billion)



Within this, the green bond market reached a new record in the third quarter of 2020, as issuances peaked at US \$64.9 billion, making it the highest volume in any third quarter period since the inception of the market.⁷¹ 2021 predictions posit a green bond market worth US \$360 billion,⁷² along with a strong growth in Asia.⁷³

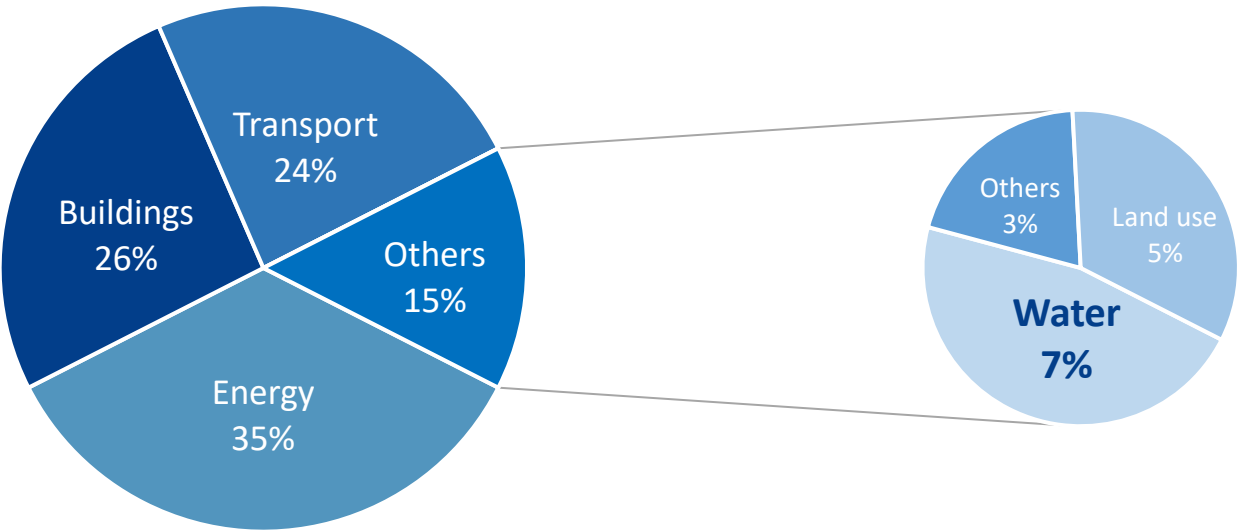
Global Green Bond Issuances (US \$ billion)



The green bonds market in India with US \$10.3 billion worth transactions in the first half of 2019 has become the second-largest emerging green bonds market after China.⁷⁴ The country's largest lender State Bank of India entered the green bond market with a US \$650 million certified climate bond in 2018.

Critically, only about US \$17.5 billion i.e., 7%, of 2020's proceeds went to water infrastructure, according to Climate Bonds Initiative.⁷⁵

Distribution of green bond issuance in the water sector



Source: Climate Bonds

Water Aid also highlights that currently, less than 3% of overall climate finance goes towards water-related projects, and of those funds, only 1/10th goes towards projects directed at ensuring water and sanitation services.⁷⁶ While this highlights a lack of prioritization towards water in the current financing flows, it also demonstrates the sector holds ample headroom for growth.

Multilateral and bilateral climate finance for water can also be accessed for water-related projects. These include the Green Climate Fund, the Adaptation Fund and the Global Environment Facility, among others.

The blue bond market is also emerging as a promising product category. ‘Blue’ bonds are instruments that raise capital for ocean biodiversity and marine conservation. Existing instruments include the Seychelles Sovereign Blue Bond, the Nordic-Baltic Blue Bond and the Miami Forever Bond.

Blue bond issuances

Bond	Value (USD)	Focus areas
Seychelles Sovereign Blue Bond	15 million	Sustainable marine and fisheries
Nordic-Baltic Blue Bond	234 million	Wastewater treatment and water-related climate change adaptation.
Miami Forever Bond	400 million	Sea-level rise, building resilience and prevention of floods in Florida

Source: World Bank, NIB and Miami Gov

Public-Private Partnerships to finance water

The global community is increasingly looking to private sources of financing to fund key sustainable development initiatives. This is partly owing to a lack of fiscal resources vis-à-vis the financing gap faced, as well as a need for improved monitoring, cost optimization and project execution that private players are more known for. Despite investor reluctance and a growth in capital incommensurate with current water

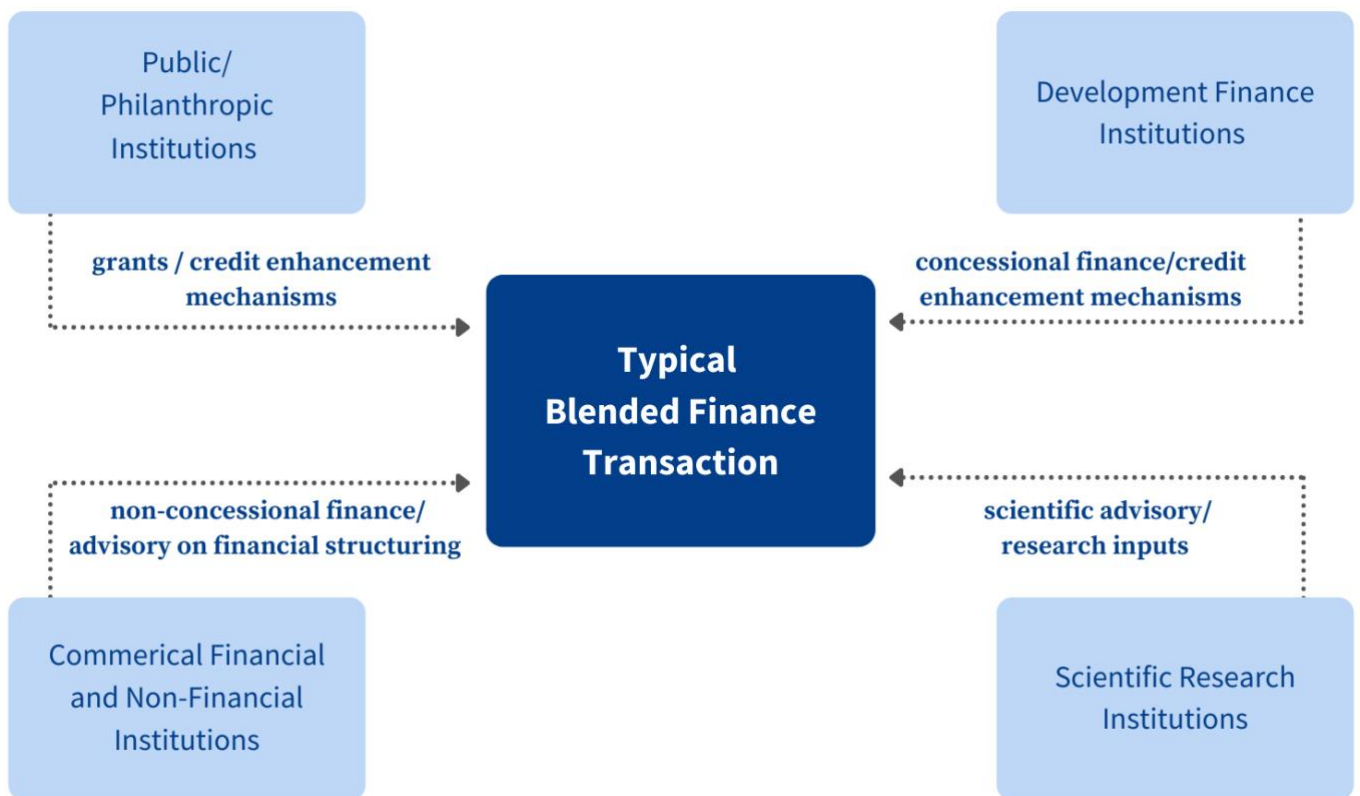
Successful PPP ecosystems in the water sector

The Nangloi Water Services water infrastructure project. A 15-year contract on a PPP model, in collaboration with Veolia Water India and Swachh Environment (a Srei Infrastructure Finance venture initiative), it aims to provide uninterrupted water supply in the Nangloi area in New Delhi by the Delhi Jal Board. This project's scope included the rehabilitation and expansion of the water supply, transmission and distribution network in the area.¹ Additionally, the World Bank's Karnataka Urban Water Sector Improvement Project which ran from 2004-2011, aimed to reform the state's water sector. The primary objectives of the project were to improve water supply services by inviting private sector participation in Karnataka's water sector. The project was conducted in Belgaum, Gulbarga and Hubli-Dharwad where the World Bank provided technical assistance. A private operator was engaged for providing continuous water supply. This collaborative project resulted in close to a 100% piped access to water in households, with a 7x increase in revenues collected by the ULB.¹ The Netherlands Water Partnership also works with governments across geographies to implement important water-related projects, such as the Mekong Delta Plan or GirAgua, which stores water in empty aquifers underground.¹ These projects serve as examples of an extant PPP ecosystem that can be leveraged to implement successful interventions in India's water sector.

Source: <https://nwswater.com/our-partners/>,
<http://documents1.worldbank.org/curated/en/436231468043455838/pdf/722560WSP0Box30rnataka0water0supply.pdf> and
<https://www.netherlandswaterpartnership.com/news/giragua-chile-underground-water-storage-and-reuse-water-battling-drought>

financing needs, PPP models are emerging as favoured mechanisms to execute projects and increase financing flows.

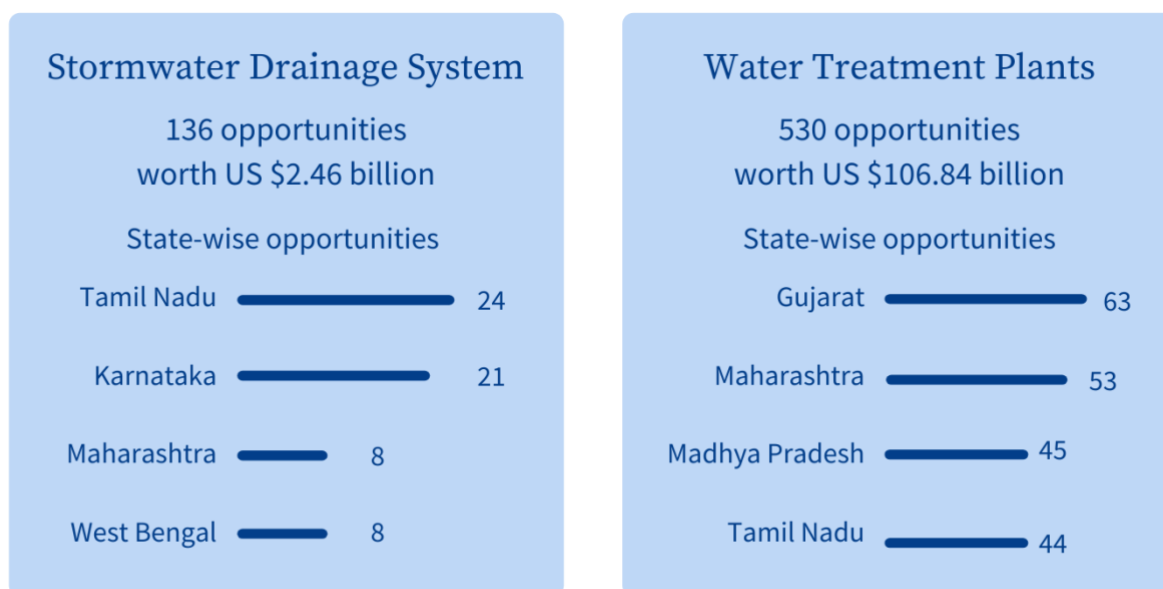
Blended Finance is an increasingly popular financial structuring model that aims to use public or philanthropic money to raise multiples of private capital towards sustainable development. This type of financial structuring encourages investors to engage in crucial sustainable development interventions that would otherwise not meet their investment criteria, especially in developing countries where the median sovereign risk rating is the S&P equivalent of “B”, a rating too low for the comfort of most private sector asset owners and asset managers.⁷⁷ The OECD reports that guarantees, credit enhancement, credit lines and technical assistance are among the most commonly used tools in blended finance.⁷⁸ The improved risk-return profile through the use of such credit enhancement mechanisms with public funds, helps reduce the project risk and drive more private capital to key water projects. As of 2020, blended finance has mobilised US \$144 billion towards sustainable development interventions.⁷⁹



In February 2021, the UK Foreign, Commonwealth and Development Office (FCDO) launched the COP26 Blended Finance Platform, an initiative focused on identifying blended finance solutions that aim to mobilise climate finance and investment to emerging markets.⁸⁰ This platform specifically targets institutional investors, asset owners and asset managers, will help enhance reporting, risk management and return.⁸¹

Amongst other public-private partnerships, the UN World Water Development Report highlights that the World Bank and the International Water Association's (IWA) Public-Private Infrastructure Advisory Facility (PPIAF) has defined climate change as a strategic priority for 2018-2022. This facility will focus on climate change interventions and ensure that its technical assistance and knowledge work is underpinned by climate activities.⁸² The PPIAF Climate Change Trust Fund for Infrastructure will promote climate-smart models and promote an enabling environment for climate-focused public-private partnerships, with water supply and sanitation being one of the key sectors included in this program.

The India Investment Grid platform that seeks to connect potential investors with project promoters. Its website shows that there are 2,013 investment opportunities, worth US \$297 billion in Swachh Bharat Mission and the Nation Rural Drinking Water Program projects.⁸³



Source: India Investment Grid

Viability Gap Funding is a central government scheme which supports large-scale PPP social infrastructure projects in India. It seeks to financially support the PPP social infrastructure projects by funding up to 30% of their total project cost.⁸⁴

Additionally, the India Infrastructure Project Development Fund (IIPDF) fund allows states to receive assistance at the development stage of PPP projects. This is a revolving fund designed to support the development of PPP projects that can be offered to the private sector. Specifically, IIPDF is a mechanism through which the sponsoring authority (the State or its executing agency) can cover a portion of PPP transaction costs such as feasibility, environmental impact studies, financial restructuring, legal reviews and development of project documentation. The fund assists 75% of the project development expenses in the form of interest free loan.

5| Recommendations

Mobilizing finance, especially from private capital, is crucial to achieve the SDG 6 targets and successfully implement integrated water resource management. However, facilitating this mobilization would require creating enabling conditions that would attract investors. In this context, an enabling environment that promotes the water financing ecosystem is slowly emerging, but more needs to be done. The following are recommendations to implement and strengthen the financing of integrated water resource management in India.

Policy, reforms and governance

There is an urgent need to expedite water-related policies and reforms, and to strengthen water governance in India to ensure water security in the country. Existing and innovative interventions can be leveraged to do the same.

Strengthening water sector governance

Effective water governance is crucial for realising the SDGs and plays an important role in the sustainable management of water resources. Current water governance practices need to be strengthened for sustainable and equitable provision of drinking water. The complexity of the decision-making system, conflicts associated with water rights, and lack of water-related expertise among stakeholders are some of the reasons why water utilities are underperforming despite investments to improve infrastructure and capacity. Importantly, in developing economies like India, the weak absorption capacity of the public sector restrains the actual and effective translation of budget into proper water infrastructure.

Designing intermediary agencies that are able to pool specialised knowledge on finance supply and investment projects can help connect the interests and capabilities of the water and financing industries. Such institutions could also pool financial resources which helps mitigate the risk profiles of individual investments, scale-up operations, and lower transaction costs, leading to efficiency gains.

Subsidies and the classification of water as a public resource has ensured its unregulated access, which has encouraged its overconsumption and depletion. The development of an institutional capacity (the “capacity to act”) is a systemic requirement for development in the water sector.⁸⁵ The draft National Water Policy 2020 which shifts its focus from the supply-side arrangements identifies the need for an independent water resources regulatory authority that can fix tariffs for domestic water usage, an approach long overdue.⁸⁶

To make the water sector more sustainable and secure, developing policies with a clear incentive structure and addressing the reluctance of water users to pay for the service and appropriate water charges would lead to water use efficiency. Likewise, leveraging

existing and innovative interventions at a local, state and national level would also ensure cohesive action.

Enhancing water financing mechanisms needs national governments and development institutions to collaborate to develop a framework to facilitate water supply, cooperation, and security. Successful WASH sector initiatives are driven by leveraging international partnerships and are crucial to create economic opportunities and building resilience for national well-being. The Finance Ministers' Meetings organised by Sanitation and Water For All brought together regional finance ministers from around the world, in a high-level discourse to develop and strengthen partnerships for climate-smart investments in WASH facilities. Fostering active discussion between policymakers and leaders from development agencies, such as political dialogues are essential to ensure access to water, sanitation, and hygiene for all.⁸⁷ Working collaboratively with authorities from other geographies can enhance Indian water-related interventions as such knowledge-sharing could lead to key learnings for India.

Sustainability in water sector policies and finance regulations

While the Reserve Bank of India (RBI) has previously considered setting up a taxonomy to establish green finance guidelines, it cited a lack of standard terminology as the cause of not doing so, in its 2019 Report on Trend and Progress of Banking in India.⁸⁸ However, the global sustainability discourse is evolving rapidly.

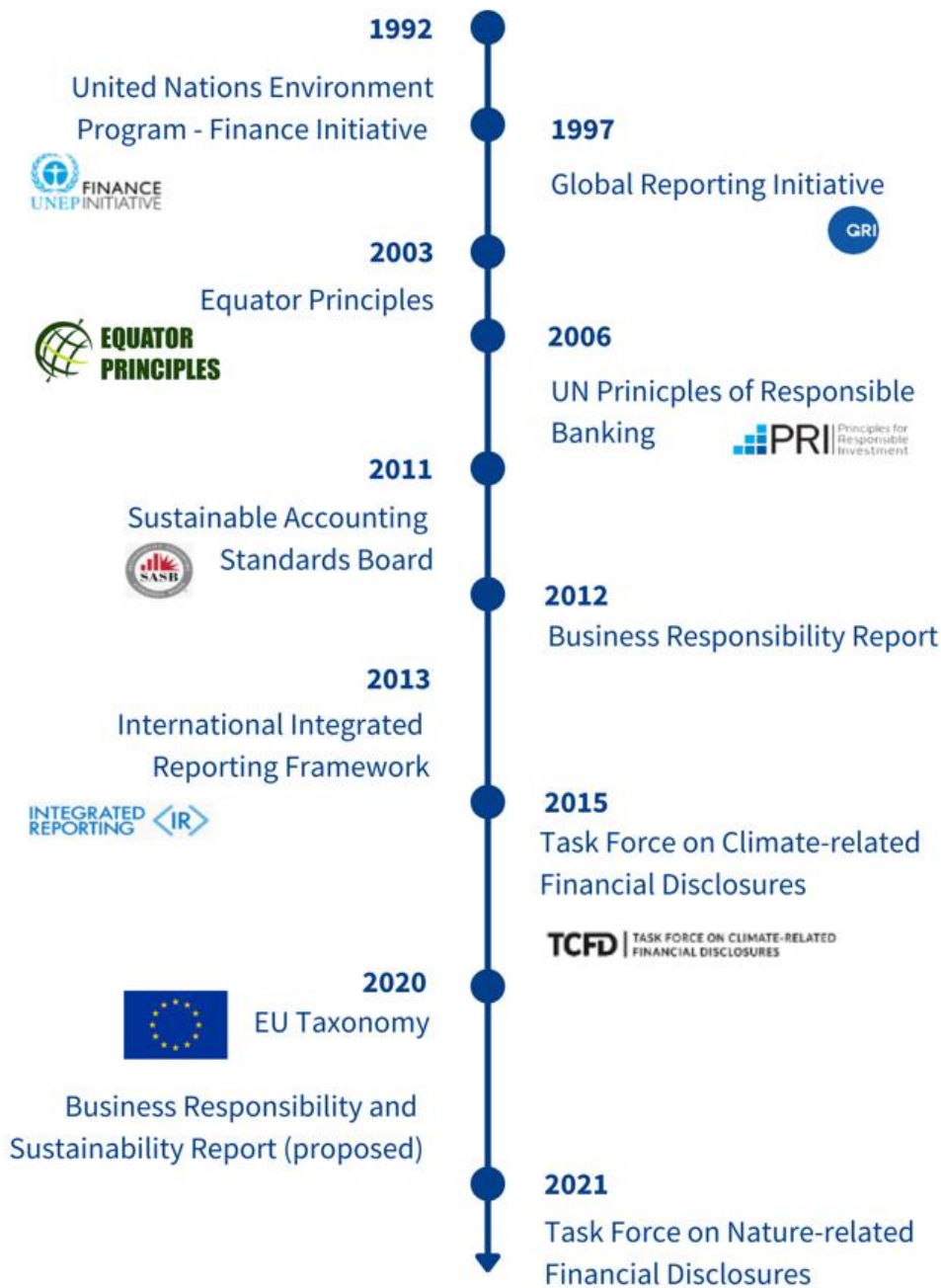
In 2020, the EU presented its EU taxonomy, EU Green Bonds Standard and the European Climate Law as part of its European Green Deal, a holistic plan that aims to effectively manage financial and non-financial climate-related risks and so, reorient capital flows to sustainable activities.⁸⁹ To alleviate India's water crisis, a similar water taxonomy that promotes coherence and transparency in the water sector is the need of the hour.

Water sector policy can also include regulations on reporting water-related risks and data. The Securities and Exchange Board of India (SEBI) has also released a consultation paper on the revised Business Responsibility and Sustainability Reporting (BRSR), a holistic reporting format for corporates. Water is already one of elements of reporting, demonstrating that the requirements for water-related disclosures are already being enhanced.⁹⁰ Similar regulations pushing for financial and non-financial water risks and

International
partnership help
drive successful
water sector
initiatives

A water taxonomy
that promotes
coherence and
transparency is the
need of the hour

reporting across all sectors, but especially by water-intensive industries would improve transparency and could lead to greater investor confidence and attract capital flows.



Inclusion of water as a separate category under PSL norms

The Priority Sector Lending (PSL) guidelines, issued by the Reserve Bank of India (RBI), underwent a comprehensive review to align existing instructions with emerging national priorities and bring a sharper focus on inclusive development. Currently, there are 9 categories under the PSL guidelines, with water being grouped under the Social Infrastructure category. Bank loans have been capped at US \$683,000 per borrower for drinking water facilities and sanitation facilities, including the construction and refurbishment of household toilets.⁹¹ This capital allocation is far too low given the water and sanitation financing gap that India faces. Creating a separate water category under the PSL norms, dedicated to allocating capital solely to water-related projects, would allow banking institutions to mobilise financing towards crucial water projects. Moreover, increasing the cap limit on loans would also help attract larger investment flows in the sector.

Creating a separate water category under PSL norms would help mobilise financing towards water projects

Priority Sector Lending (PSL) Categories



Source: RBI

Apart from allocation under the PSL norms, increased allocation in urban infrastructure development schemes in India like the Jawaharlal Nehru National Urban Renewal Mission's Urban Infrastructure Development Scheme for Small and Medium Towns and the latest 15th Finance Commission's recommendation of 30% of state financing to rural and urban local bodies, to be tied to performance of water supply and management would help boost financing flows from central government towards water supply infrastructure at local levels. This would also bring in a culture of performance linked payouts. Likewise, the Integrated Housing and Slum Development Program of JNNURM can increase its water and sanitation allocation linked to performance.

Water as special focus-sector for the new Indian DFI

India's 2021 Union Budget allocated US \$2.7 billion for the creation of the National Bank for Financing Infrastructure and Development, a development finance institution (DFI), with a proposed lending target of US \$68 billion in 3 years.⁹² The Union Cabinet has also approved the creation of the DFI, in mid-March 2021, wherein the institution would raise long-term funds and finance crucial infrastructure projects. A dedicated outlay towards water projects by making water one of the focus-sectors for this DFI would strengthen financing flows to crucial water infrastructure.

Moreover, this sovereign-backed DFI could also use credit enhancements and related mechanisms to mitigate risks in key areas of water resource management, due to which such high-risk projects suffer from a lack of private capital interest.⁹³

Leveraging infrastructure debt funds for urban piping infrastructure

Infrastructure debt funds, which usually focus on roads, renewables and e-mobility sectors can also be leveraged to include a specific classification for water in order to attract private investment. Moreover, Infrastructure debt funds are also uniquely positioned to fund piping infrastructure, especially in urban areas where there is heavy reliance on delivery by water tankers, often controlled by the water mafia. Carving out a special category focused on piping infrastructure would allow more funds to be allocated to address the dearth of efficient piping in urban centres.

Increasing focus on nature-based, blue and green infrastructure solutions

A special focus on nature-based solutions would lead to better and more sustainable management and restoration of natural ecosystems. Nature-based solutions for water management, and climate change mitigation and adaptation, which are low-cost, scalable interventions,⁹⁴ are gaining traction globally, as focus has shifted away from grey or hard infrastructure solutions. These include natural, green and blue infrastructure solutions which make for more resilience and lower-cost interventions,⁹⁵ such as green roofs, rain gardens, urban tree canopies, wetlands, floodplains or permeable pavements. These act as versatile and porous landscapes that offer solutions to stormwater runoff and flooding. Benefits of these range from increase in replenishing and recharging of groundwater to improvement in the quality of water due to increase in filtration and reduced water pollution.

Harnessing and funding these solutions is crucial, given the number of benefits, and due to their replicable and scalable models. The Global Commission on Adaptation noted that 534 cities around the world could regulate water flows and manage extreme floods more effectively by restoring upland forests, whilst saving an estimated US \$890 million a year.⁹⁶

\$68 bn

in 3 years is the proposed
lending target of the
DFI set up by the Indian
Government

\$890 mn

was saved annually in 534
cities through nature-
based solutions to help
regulate water flows

Durban, South Africa and Barcelona, Spain

Remodeling urban landscape and expanding green spaces across the city are beating the heat, ensuring the well-being of the urban population and providing shelter to wildlife of the region.



Improving vegetation cover and increasing green spaces dampen the heat island effect



Chicago, USA

With over 500 green roofs covering an area of 5.5 million square feet, Chicago's roof initiative has helped reduce stormwater runoff and conserve energy. The rooftop gardens can retain up to 75% of 1 inch rainfall and reduce HMC by over 95%

Greening rooftops provide thermal and sound insulation and help in stormwater management and sustainable urban drainage systems



Rep of Singapore

Singapore's National Water Agency has also implemented the Active, Beautiful, Clean Waters Program to transform itself into a City of Gardens and Water, in 2006. This strategic initiative works towards leveraging the potential of water bodies by integrating drains, canals and reservoirs with the surrounding environment comprehensively.

Stormwater is runoff to canals and drains in a controlled manner as porous landscapes temporarily hold stormwater



Vancouver, Canada

Vancouver has deployed city-wide nature-based strategies to manage urban floods. Vancouver's hybrid rain city strategy focuses on providing a roadmap for climate resilience through adaptive management, restoring the natural water cycle, with a target of capturing and cleaning 90% of the city's rainwater.

Rain is collected and clean by plants and soil, and eventually returned to waterways and the atmosphere



Source: WRI, City of Vancouver, Singapore National Water Agency

Interventions such as these are already emerging in India. For example, East Kolkata is saving the costs of constructing and maintaining a wastewater treatment facility, due

to their use of wetlands to clean the city's wastewater.⁹⁷ These provide 150 tons of fresh vegetables daily along with 10,500 tons of table fish annually, resulting in increased livelihood opportunities for 50,000 people.⁹⁸ Promoting such innovative initiatives through an increased focus on natural, green and blue infrastructure projects by existing infrastructure financing instruments, for both urban and rural landscapes would not, only lead to cheaper alternatives to costly grey infrastructure, but also, enable replicability and scalability, resulting in reduced costs, greater resilience and better management of water resources.

Revolutionising tariff systems towards valuing water economically and equitably

Relevant pricing models for water would help develop market-based financing mechanisms like bonds and funds for financing the water sector. Implementing a tax slab-like system, such as the Indian income tax structure, where higher prices for water are charged to higher levels of consumption by individuals and families, would lead to water equity as users would pay according to their usage. Effective functionality of water meters would be the key in ensuring a consumption-based billing structure. In doing so, local utilities would be able to generate greater revenue which can in turn, be used to subsidise water supply infrastructure and possibly offset the losses that might be incurred in urban slums or rural areas.

**Tax slab-like
tariff system
based on usage
can lead to water
equity**

While India previously did have a Water Cess Act (1977), it was dissolved after the implementation of the GST tax structure.⁹⁹ However, reinstituting a water cess, might aid in mobilising financing for key water projects. Additionally, to reduce industrial consumption and waste, businesses can be incentivised with tax opportunities, subsidised loans or partial risk guarantees, to install wastewater treatment or reuse facilities, especially in water-intensive industries such as tanneries, textiles, beverages and soft drinks, paper mills and more. Some companies in water-intensive industries have already taken initiative to reduce water demand and consumption.

Arvind Mills' wastewater treatment facility

Arvind Limited has set up a water treatment facility that will eliminate the use of freshwater at Arvind's Gujarat mill that manufactures denim. The facility will treat domestic wastewater from the surrounding community, without using chemicals, and is expected to save an estimated 8 million litres of freshwater per day, translating into water access benefits for the local community.

Source: https://www.business-standard.com/article/companies/gap-arvind-s-new-water-treatment-facility-to-save-2-5-bn-litres-a-year-119110500903_1.html

Setting up units by other water-guzzling sectors could be brought under the ambit of tax incentives or interest rate subvention schemes (on the loans required to set up such units).

The Brihanmumbai Municipal Corporation (BMC) already provides upto 13% in property tax rebate to housing societies in Mumbai for segregation of wet and dry waste, and about 5% for rainwater harvesting for reuse.¹⁰⁰ The latter could be leveraged with the Indian government's recent campaign on Jal Shakti Abhiyan: Catch the Rain,¹⁰¹ for rainwater conservation.

Extensive widespread implementation of models that are incentivising such initiatives at the community-level through tax benefits, would decentralise water resource management to the community and reduce the burden on utilities.

Alternatively, penalisation through a water cess or tax for those who do not invest adequately in water recycling and reuse might also encourage industries and communities to strengthen their water collection, use and reuse practices.

Work for Taxes - Peru

Peru's "Work for Taxes" program allows the private sector to use their tax obligations for direct investments into public infrastructure, triggering a tax credit for the funds spent. Work for Taxes is a mechanism to incentivise the private sector to invest in key water projects. Such a program would not only increase the flow of private finance in social infrastructure, but also, would reduce the burden on government budgets.

Source: https://www.ifc.org/wps/wcm/connect/98cfcf17-5387-4976-80df-f0efc19b4fe5/EMCompass_Note_55-WorksForTaxes.pdf?MOD=AJPERES&CVID=miU0Ugz

National and regional water policies could also adopt the Polluter Pays Principle, specifically aimed at industrial water usage to hold polluters accountable. The Polluter Pays Principle, a widely accepted practice of polluters bearing the cost of managing natural resources to prevent damage to human or environmental health.¹⁰² There are not many instances in which the Polluter Pays Principle has been applied to water. However, 2030 Water Resources Group's Kenya working group, in collaboration with the Water Services Regulatory Board (WASREB) and the World Bank Water Practice, is supporting technical and financial innovations to reduce urban water losses and expand water access and treatment. As part of this initiative, 5 performance-based contract demonstration projects are being developed to reduce non-revenue water. Furthermore, the working group is developing a trade waste effluent mechanism based on the Polluter Pays Principle, in partnership with the Nairobi and Nakuru counties. The objective of this instrument is to promote compliance with discharge and pollution regulations and increase investment in technologies for pre-treatment and recycling of wastewater.

Polluter Pays Principle puts the onus on polluters to prevent damage to human and environmental health

2030 Water Resources Group is also developing Wastewater Reuse Certificates (WRCs) which are innovative, tradable permit mechanisms that:

- Maximise the use of wastewater treatment assets in the urban and industrial sector that leverages IT-enabled tools like IoT and blockchain, for better and transparent data management on water quality,
- Accelerate the recycling and reuse of wastewater through specific target setting for large urban local bodies and industries/industrial parks,
- Maximize private sector financing and disruptive technologies to create water infrastructure for the Fourth Industrial Revolution, and
- Create the right fiscal and institutional incentives through Tradable Permits, user rights, and tariff structures.

Facilitating issuance of local-level financing instruments

Indian municipal bodies can also issue bonds which can be leveraged to address the funding gap in water supply infrastructure. Few Indian municipal bodies have issued bonds for infrastructure since the 1990s. The largest single issuance worth US \$40 million by the Karnataka Water and Sanitation Pooled Fund in 2010.¹⁰³ An uptake in municipal bonds was observed following the launch of the Smart Cities and Atal Mission for Urban Rejuvenation and Transformation (AMRUT) schemes.¹⁰⁴

Municipal bond issuances

Year of Issuance	City	Purpose	Amount Raised	Credit Rating
2017	Pune	Water metering	200	AA+
2018	Hyderabad	Strategic road development	200	AA
2018	Indore	Development of infrastructure	1139.90	AA
2018	Hyderabad	Strategic road development	195	AA
2019	Ahmedabad	Development projects under AMRUT	200	AA+

Source: Vinod Kothari Consultants

In case of renewable energy, the green masala bond issuance by Indore's Municipal Corporation for a floating solar project is indicative that innovating financing mechanisms like these can be replicated for local level bodies. However, for such issuances, the financing community would require updated disclosures and a strong

balance sheet. This implies a need to improve capacities in measurement and reporting leading to transparent disclosures.

Strengthening urban local bodies' (ULB) revenue flows through capping the level of non-revenue water and improving efficiencies would facilitate access to capital for municipal-level interventions. Municipal revenue bonds, that focus on specific water-related projects, can leverage water user charges to generate revenues and channel those to repay the interest on the bonds.

Municipal development funds (MDFs) can also allow local bodies to raise funds for infrastructure projects. MDFs allocate loan capital to local government investment projects, providing below-market rates and reach local authorities and smaller investment projects. This type of fund can substitute government grants and act as a bridge to private credit markets and facilitate private sector lending to municipal bodies.

Alternative financing models

New financing mechanisms can help mobilize private sector capital and bring it to the mainstream of financing for climate or sustainability-related interventions. But such mechanisms would require innovative structuring using risk mitigation instruments linked to credit enhancements, guarantees and concessional debt, mostly sourced from multilateral, government or philanthropic sources. These instruments can, in the form of interest-subsidies, assured returns and longer repayment periods, make financing more accessible and affordable for water-related projects.

Encouraging blended financing towards water

A financing mechanism based on innovative structuring is blended finance, hold immense potential to scale up mainstream private sector financing towards the water sector by reducing the sector's 'high-risk' perception. Large international microfinance institutions, bilateral funding agencies or international philanthropic foundations are often used within blended structures, apart from government monies. Most of the public and philanthropic funds are often concessional in nature, thus reducing the overall cost of capital for the project. Organisations such as the Japan International Cooperation Agency, the Asian Development Bank and the Gates Foundation have already been involved in large-scale sanitation infrastructure interventions in India.

Blended finance examples such as the Water Revolving Fund in the Philippines (PWRF), which provided loans to finance local water and wastewater projects and where repayments made are revolved to finance other projects,¹⁰⁵ can help channelise increased capital towards necessary projects. The PWRF blended official development assistance and domestic public funds with commercial financing, which resulted in lower rates of borrowing along with longer tenors for water service providers. In this process, credit enhancement under the PWRF lowered investor risk and allowed the flow of private capital.¹⁰⁶

Blended finance structures hold the potential to reduce the water sector's 'high risk' perception

Similarly, the WaterCredit Investment Fund 3 (WCIF3) by WaterEquity, which provides debt funding to financial institutions across developing markets, including India, working towards safe water and sanitation solutions, uses a blended finance approach, including zero and low-interest loans and a first-loss guarantee.¹⁰⁷ In fact globally, guarantees account for 58% of the private finance mobilized in the water and sanitation sector.¹⁰⁸

Example of blended finance transactions

USAID's WASH-FIN project offers technical assistance and resources to track and mobilize financial resources for better service delivery. Addressing gaps in improving the effectiveness of private finance and public investments, Tetra Tech, through the USAID project, works with governments, development partners, capital markets and local stakeholders to finance WASH investments and improve the governance structures for reliable access to capital sources. In Cambodia, Tetra Tech is providing cross-sectoral technical expertise to USAID/Cambodia and the Government of Cambodia on water security, capacity-building, and strategic assessments. The Cambodia Sustainable Water Partnership seeks to build water resilience by mobilizing water security investments, implementing water supply improvements, policy reforms, and knowledge sharing. With Tetra Tech's technical leadership, the four-year process involves a participatory approach by engaging with stakeholders to advance water security. Such collaborative intervention models can be leveraged in India to achieve water security.

Source: <https://www.oecd.org/environment/resources/Making-Blended-Finance-Work-for-Water-and-Sanitation-Policy-Highlights.pdf> and <https://www.tetrattech.com/en/projects/water-sanitation-and-hygiene-finance-wash-fin#:~:text=Through%20the%20U.S.%20Agency%20for,to%20close%20financing%20gaps%20and>

These structures can also include grants, especially in areas where the scope for commercial finance is less. For example, Water.org's WaterCredit initiative provides technical assistance and project preparation funds to financial institutions to set up dedicated water and sanitation loan products to low-income borrowers. The WaterCredit structure uses small grants from donors for project preparation work like market assessment, loan product development, education materials, which could eventually help mobilize commercial finance.¹⁰⁹

However, mobilization of private capital, through blended finance (or other mechanisms), has a lot of catching up to do because it accounts for a mere 1.4%, of the total private finance of US \$157 billion mobilized from 2012 to 2017. One of the reasons for this is such innovative financing structures require building technical capacity within the financial sector and project staff to understand and structure innovative sustainable finance transactions.

Pooled funds between public and private sources are another instrument within the blended finance discourse. Sanitation and Water for All's Handbook for Finance Ministers, highlights four critical intervention areas, including maximizing value from existing public funding mechanisms, mobilizing additional funding, increasing repayable domestic finance and encouraging innovation and alternative financing approaches.¹¹⁰ The first three interventions can help achieve scaling up blended finance structures. By incentivizing the water sector's performance, improving subsidy targeting or reforming tariff systems, the public sector can not only be strengthened, but also help attract greater private investments into the water sector.

Kenya Pooled Water Fund

The Kenya Pooled Water Fund (KPWF), initiated by the Water Financing Facility and supported by the Kenyan and Dutch governments, amongst others. The KPWF provides utilities with access to capital market financing for water and sanitation infrastructure. The pooled bonds are expected to draw local currency from domestic pension funds and institutional investors to be lent to Kenyan water utilities for projects with a long tenor. Pooling loans lowers the bondholders' risk exposure, thus helping overcome the main challenge private capital faces whilst investing in development sectors.

Source: <https://www.reuters.com/article/kenya-bonds-utilities-idUSL5N1RH276>

Setting up a pooled entity or trust in partnership with a third party, be it private or public financiers, to integrate ULBs into the active debt market can also be beneficial. An example is Tamil Nadu's Water and Sanitation Pooled Fund (WSPF) created in 2002. The WSPF functions as a special purpose vehicle to help ULBs finance water and sanitation services by using effective credit enhancements to lower the risks for commercial financiers and raising capital on a pooled basis. As per the World Bank, this pooled fund demonstrated the success of grouped financing vehicles in attracting finance to small and medium-sized water and sanitation service providers.¹¹¹

When it comes to structuring public funding into infrastructure projects, the Hybrid Annuity Model, can help reduce the upfront cash payment pressures on the government. This is unlike the EPC model, where payments are given over the construction stage. In the Hybrid Annuity Model, part of the payment is given by the concessionaire (typically a government agency) to the developer during the construction stage, while the rest is paid as annuities to the developer over the operating and maintenance life of the project. Thus, the annuity payments are based upon the revenue collection over the operating life, a risk borne by the concessionaire in return for the additional risk borne by the developer during the construction stage. Such Hybrid Annuity models can be instrumental to attract private financing in governments' water infrastructure projects which are based on an operating revenue model.

To mobilize increased private capital, structures like YieldCos, or Yield Companies, which are a sort of Special Purpose Vehicle that disaggregate the low cash flow yielding (hence, high risk) activities of the project from its high cash flow yielding (hence, low risk) activities, can be useful. Mostly used in the renewable energy space, structuring only the high cash flow activities helps attract more investors' interest, preferably at a lower cost of capital. Low cash-flow yielding activities could be research and development, training and capacity-building, amongst others, which have a limited impact on cash flows, but can reduce the attractiveness of the project if seen in aggregate with the cash-flow generating activities. Such YieldCos can also be a useful mechanism to mobilize increased investments into the water space, including from the private sector capital.

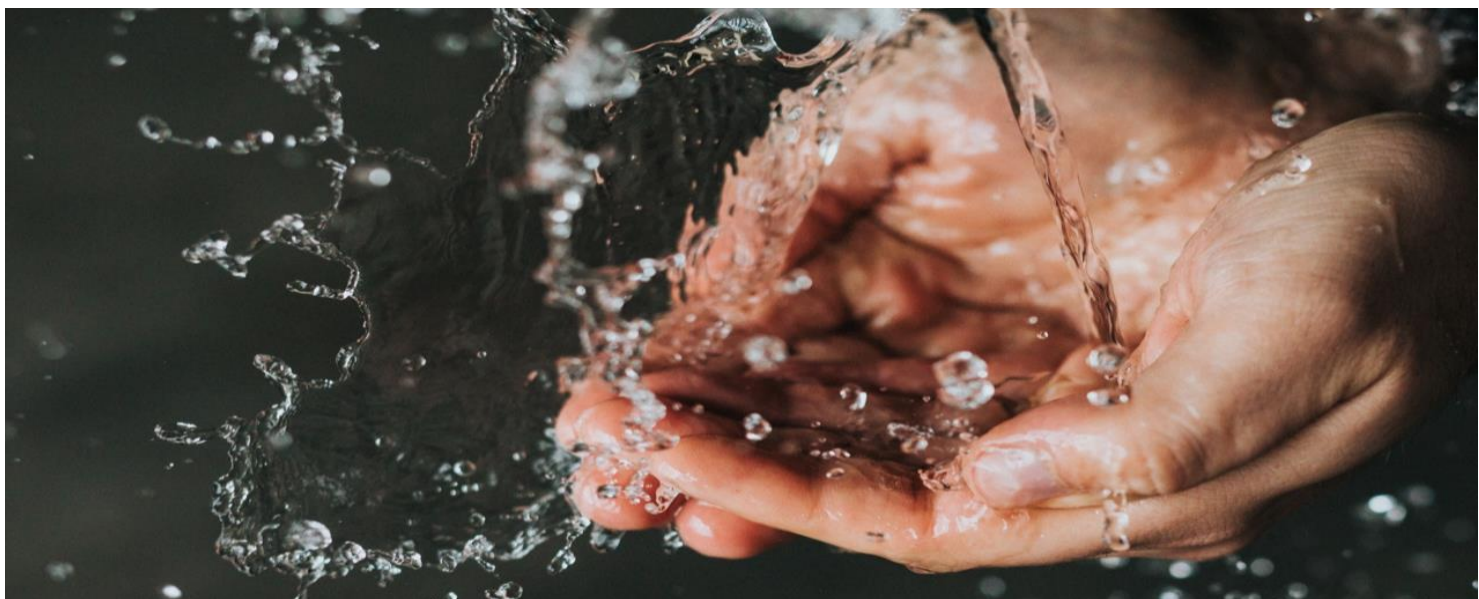


Another method for innovative financing, especially from the end-users' perspective, is around Pay-As-You-Go (PAYG) models. This model has been successful with solar devices in East African countries, as seen with M-Kopa in Kenya, Mobisol in Tanzania or Ignite Power in Rwanda. Such a model helps tackle the product's relative unaffordability for low-income communities in developing countries, who may be unable to pay the upfront cost. It is the company which indirectly extends the credit to the end-user, for the entire period it takes to convert the cost into cash flows. Such PAYG models can be extended to the water sector for spurring the demand for devices like low-cost water pumps. For instance, Claro Energy operates a PAYG irrigation service in India using e-rickshaws fitted with solar panels, which is then used to power water pumps instead of diesel.¹¹²

There is a growing consensus amongst global pension funds on viewing infrastructure as an asset class, with some of them participating in the financing, building and operating of infrastructure through PPP models. Investments in infrastructure projects, given their long-term nature, aligns with the typical long-term investment horizon of pension funds. Moreover, most pension funds are signatories of the Principles of

Responsible Investment, and thus have a focus towards the Sustainable Development Goals. This alignment should be capitalized by expanding water as an infrastructure-sub sector for these pension funds, so that private sector capital from the pension funds can also be channelized towards the water sector in particular.

In essence, the heterogeneous nature of the water sector and its financing needs, coupled with variations in investors' objectives, risk appetites and liquidity will demand innovations in terms of financing mechanisms and structuring. That would also help incentivize private sector capital to look further at this space.



Outcome-based financing to scale private sector finance, including CSR

The approach of outcome-based financing has risen to link finance to pre-defined results (or outcome) that are verified independently, so that impact is achieved on-ground. Implemented in sectors such as energy, water and sanitation, the approach has grown to over US \$25 billion in development spending, in the process delivering outcomes, accountability and impact.¹¹³ Incentivizing provider-participant relationships through its pay-for-success model helps achieve actual impact while encouraging evidence-based policymaking.¹¹⁴ In Kenya, water utilities have managed to access commercial finance through outcome-based financing to provide water and sanitation facilities to low-income and underserved communities. Pre-financing for their projects occurs through commercial loans from financing institutions, and after meeting the project outcomes, the loans are subsidized at a percentage of the project cost. Such structures based on meeting pre-defined outcomes enhance the value for money in a given intervention and can add a lot of momentum towards promoting water-focused financing.

Outcome-based financing can also be a useful mechanism to channelize corporate social responsibility (CSR) funding from corporates, including private sector companies. In FY20, corporate India spent over US \$1 billion towards CSR.¹¹⁵ The previous years the

\$25 bn

spent in development
services and
infrastructure using the
outcome-based financing
approach

\$1 bn

spent towards CSR by
corporate India
in FY20

spending on average has been upwards of US \$6 billion. In essence, these CSR funds if utilised for outcome-based funding, could then be structured to reimburse the project participants for either the interest subvention of the loan upon the achievement and verification of the pre-defined outcomes or used as guarantees against principal components. This way, the CSR financier is assured that the projects being funded are indeed generating on-ground impact.

CSR funding can also be leveraged to scale up financing for key water projects in rural regions or low-income communities.

Examples of CSR initiatives

Nestle sponsors the construction of sanitation facilities for female students in village schools in India, which has a direct impact on the attendance of girls. Under this CSR program, 430 facilities for over 150,000 girls students have been set up in 11 states across the country. Amul initiated a Rural Sanitation Campaign with the aim of making the milk producers community open defecation free in Gujarat by providing interest-free loans for setting up 'pucca' toilet blocks. ACC and NTPC aim to provide better sanitation facilities for families living around their factories in India by building toilets for the local communities as well as individual households. Unilever Foundation and Domestos, HUL's toilet hygiene brand, support UNICEF's Community Approaches to Toilet Sanitation (CATS) Program in Asian and African countries. The initiative supports access to hygiene and sanitation through community awareness and knowledge to use toilets.¹ While most of these CSR-based initiatives are focused on sanitation and hygiene, projects targeted clean drinking water or general water access for domestic use can be potential opportunities.

Sources: <https://www.nestle.in/csv/water/access-conservation/access-to-sanitation>, <http://www.amuldairy.com/index.php/about-us/13-csr-initiatives>, <https://www.acclimited.com/sustainable/corporate-social-responsibility>, and <https://www.unilever.com/news/press-releases/2012/12-06-18-Unilever-and-UNICEF-partner-to-help-bring-sanitation-to-over-400000-people.html>

The Paani Foundation in Maharashtra, a state which suffers chronic water shortage in its interior regions, has built rural capacity through grassroot-level engagement with farmers to address the supply shortfall in rural areas. Projects such as building water tanks for rainwater harvesting and better watershed management can ensure water access through a decentralized model, considering the challenges of installing and managing water supply infrastructure and last-mile connectivity in rural regions. Decentralized models would also reduce the pressure on the central water utilities. Scaling up CSR funding towards such initiatives in rural regions would also benefit water access.

CSR funding, or development finance in general, needs to also be used in tandem with venture capital (VC) funding. There is an underlying premise that many innovative development projects are in early-stage, which increases the risk-perception, since such projects may have only passed the 'proof of concept' in most cases and are yet to generate an operating track-record. Many water projects fall in this category and therefore struggle to get funding beyond grants or mezzanine finance. Here the early-stage finance, or VC financing, is most viable, since it involves funders willing to bear the

additional risks. VC investments are also associated with developing new technologies which can enhance product access and bring in efficiencies in the management of the projects they invest in.¹¹⁶ These factors also contribute to scaling up a project, such that it develops a track-record wherein it can justify the raising of commercial financing. In many cases, VC funding can be used to create breakthroughs in a niche solution or technology, which can then be plugged into a larger solution. Technology solutions have been most popular amongst VC investors like Khosla Ventures, Siemens Venture, SAIL Venture, Baytech Venture, Dow Venture and XPV Capital when it comes to the water space.¹¹⁷ If CSR monies are combined into such VC-based financing, it may help ensure that the CSR funds are used efficiently and towards measurable impact, while delivering a critical developmental need like clean water access.

Expanding blue economy financing instruments to include water resource management

Just like green bonds raise long-tenor debt capital towards specific green end-use, blue bonds are emerging as the green bond-equivalent in the water domain. However, the primary focus-areas of the blue bonds currently in the market are ocean and marine conservation. That includes the pioneering Seychelles blue bond. Other innovative blue economy bonds have focused on flood resilience and wastewater management, as seen with the City of Miami Forever Bond or the Nordic-Baltic blue bond. India's Ministry of Earth Sciences' draft policy on blue economy also concentrates on the country's national economy consisting of the entirety of the ocean resources system and human-made economic infrastructure in marine, maritime and onshore coastal zones.¹¹⁸

Expanding the blue economy discourse to include integrated water resource management would augment the water sector



Expanding the existing interventions in blue economy financing to include integrated water resource management would augment the water and sanitation ecosystem.

Leveraging the India-Norway blue economy relationship

India's existing relationship with the Norwegian government can be a promising avenue to generate interest and accelerate capital towards key water projects, since not only is Norway working to develop its blue economy, but the two countries already have a collaborative project on Integrated Ocean Management and Research to promote ocean and marine conservation.¹ Additionally, the India-Norway Task Force on Blue Economy for Sustainable Development was launched in 2019 to develop joint initiatives such as the Integrated Ocean Management and Research intervention.¹ This engagement between the two governments can be leveraged to develop projects and instruments directed at integrated water resource management. The Nordic-Baltic Blue Bond, which focuses on wastewater management, water reuse and recharge, demonstrates an opportunity for India to leverage existing mechanisms to augment the water sector.

Source: <https://pib.gov.in/newsite/PrintRelease.aspx?relid=199414>

Investor action

In order to secure a sustainable water future for India, it is critical to augment investor interest in the water sector. That starts from building the investors' understanding of the sector and deepening the engagement and collaboration amongst the investor community to direct capital flows towards water. An ecosystem around building investor capacity and maximizing impact based on investor action is emerging globally, which the Indian water sector must leverage.

Improving investor awareness, engagement and disclosures

Transparency and disclosures can substantially improve investors' interest in the water sector, as well as expand the collaboration between various stakeholders, thus leading to greater participation in integrated water resource management. Improving the capacity of water project staff to develop more compelling project proposals for financing, maintaining periodic monitoring data from the projects, and regular reporting of the project financials are some of the ways to achieve this. Emphasis on the need for water risk disclosures by portfolio companies is critical for investors to develop a complete understanding of the risk exposure. That includes improving their understanding of risks using appropriate risk valuations tools, which can help better identify the potential material impacts of the water risks on the projects' revenues and/or costs. Such disclosures would also help investors develop financial risk mitigating measures like contingent guarantees to share the risk and ultimately make more and more water-related projects attractive for private investors.

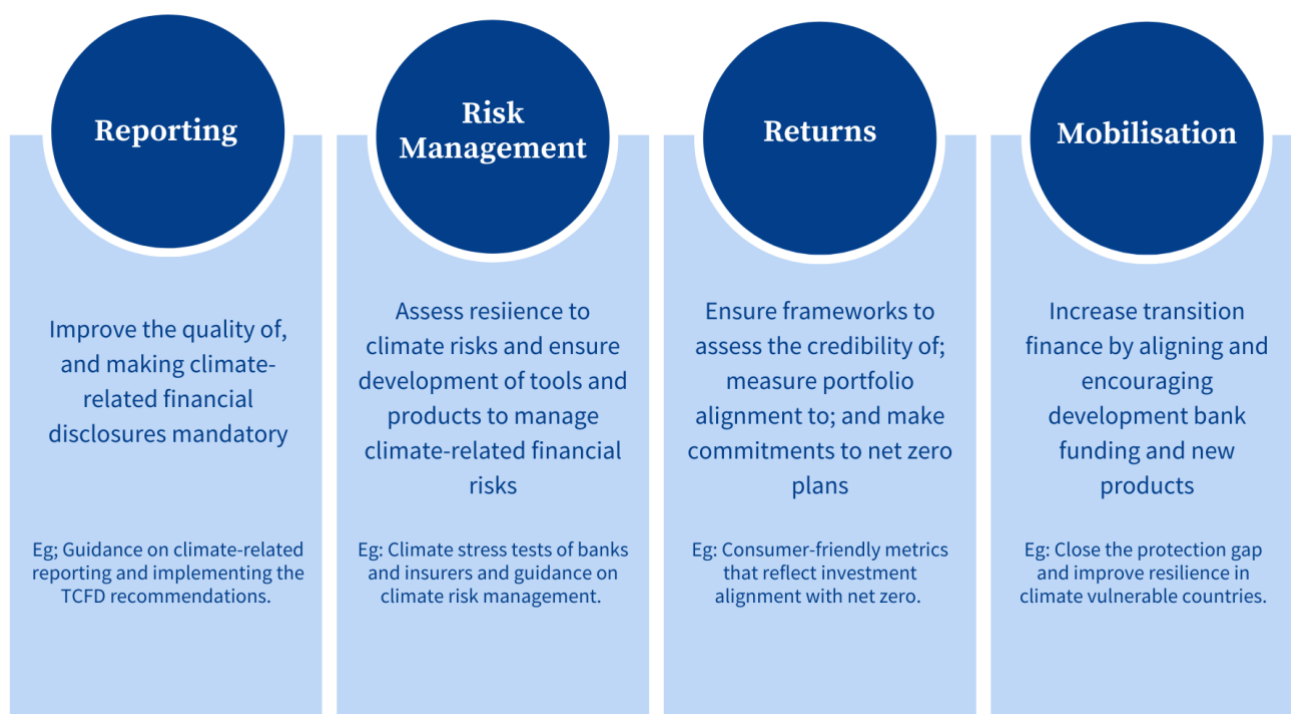
Ceres' Investor Water Toolkit

Ceres' Investor Water Toolkit is a comprehensive 'how-to' guide for investors to effectively identify, evaluate and manage water-related risk in investment portfolios. The toolkit specifically aids in understanding water risks, establishing priorities, buy/sell analyses, portfolio and asset class analyses and engagement, while also providing case studies as examples to learn from. Such resources can substantially improve investors' understanding of water risks and augment more informed decisions on capital allocation, thereby strengthening the financing of the water sector. In this Toolkit, Ceres recommends determining the material risk-factors for water portfolio companies and tailoring engagement strategies accordingly. Increased engagement with portfolio companies with the aim to collect relevant information on potential water risks would not only help strengthen investee companies' systems, but also mitigate ESG, and specifically water, risks.

Source: <https://www.ceres.org/resources/toolkits/investor-water-toolkit/details>

Similarly, one of the engagement agenda of Climate Action 100+ requires investee companies to make corporate disclosures in line with TCFD and sector-specific Global Investor Coalition on Climate Change's Investor Expectations on Climate Change guidelines.¹¹⁹ Investors can also develop performance indicators to track companies on water risks, using the SMART (Specific, Measurable, Achievable, Relevant and Time-bound) framework.¹²⁰

Frameworks such as the COP26 Private Finance Hub, can also help investors enhance reporting and risk management for mobilizing greater levels of financing flows.¹²¹



Source: COP26 Private Finance Hub

The intent of improving investor awareness, engagement and disclosures is to help develop a targeted approach to invest in water enterprises which can help the sector scale up, build a strong financial track record to aid future fundraising, and deepen its outreach into vulnerable, underserved and rural communities.

Collaborative engagement between investors and broader stakeholders is crucial to manage water resources. Investor groups such as Ceres' Investor Water Hub or the UN Principles for Responsible Investment (PRI) seek to integrate water into investment decision-making and engagement practices. The UN PRI and WWF has developed a Water Stewardship Framework which entails practices to facilitate investor dialogue with portfolio companies on managing their agricultural supply chain water risk. Such existing mechanisms can be leveraged to act on key resolutions to enhance risk and disclosure frameworks as well as transparency for greater investor participation in integrated water resource management.¹²²

Community-based solutions

While it is critical to mobilize public and private investment for water projects, bottom-up action with small-scale projects at a community-level would also help by promoting decentralized solutions and self-reliance amongst the local communities, while also reducing the pressure on water utilities. Existing models provide effective and efficient options that can close the water loop, locally.

Community-based water tech solutions

Water technologies can be developed on several fronts, be it through smart meters and pumps, data tools and intelligence and tech-based water access platforms. At the level of local communities, small-scale water tech solutions like Water ATMs that are maintained by the communities themselves can be instrumental in creating 24x7 water access. For example, Swajal Water's water ATMs, located across villages and public spaces like schools, stations, slums, hospitals, etc., use solar-powered water purification systems in the water dispensing kiosks. In places where last-mile connectivity is a challenge or affordability of the more expensive packaged drinking water poses a limitation, water ATMs can provide access to low-cost clean drinking water to the community while reducing dependence on non-revenue water by generating a revenue source.¹²³

WaterCredit to create water and toilet access using the microfinance concept

WaterCredit, a solution by Water.org, is a pioneering solution that combines the concept of microfinance to create access to affordable small-ticket loans for local communities seeking to install household water and toilet solutions. Water.org executes this financing through local financial institutions who create water and sanitation small loans in their loan portfolio and target a specific region or community. The outcome for the household could be as simple as installing a tap or a toilet, but which had proved

Water ATMs

maintained by the
communities can be
instrumental in creating
24x7 access

33 mn

people have benefitted
through WaterCredit
with the use of US \$2.6
billion
in capital

elusive so far owing to the lack of appropriate community-level financing. The capital is revolving in the sense that repayments are lent onward to other households in that community who also want to install a water or toilet solution. Till-date, WaterCredit has seen 33 million beneficiaries through the use of US \$2.6 billion in capital.¹²⁴

Peer-to-peer sharing models

A novel peer-to-peer (P2P) market has emerged in solar energy, that allows consumers to trade excess energy and earn money by doing so.¹²⁵ For example, in Bangladesh, SOLshare has conducted a successful peer-to-peer solar energy trading pilot by connecting several solar home systems and homes without electricity supply.¹²⁶ Interconnecting the SOLshare households via a P2P grid enables users to buy and sell surplus electricity with neighbouring households, thus creating an incentive structure which helps scale up the program while sustaining the local power system.¹²⁷ Similarly, a P2P project in Medellin, Colombia is focused on creating local energy markets wherein low-income consumers with installed solar panels trade energy with high-income consumers. The program also nurtures community-based models by installing combined solar and storage solutions in a community centre.¹²⁸ Such programs transfer the responsibility to the rural households. The structures of such community-based models can be replicated in the water sector for say, rainwater harvesting by households.



At the end, community-level initiatives will not be complete without a degree of education and awareness creation. Only then will financing schemes see the demand-pull. This implies a need to educate the local communities and small enterprises in the water sector about the various government schemes in this space, be it the target to

ensure piped water in every Indian household by 2024 (Jal Shakti Abhiyan), the National Rural Drinking Water Program, the National Water Mission, Catch the Rain campaign, amongst others. This also includes educating communities and small-scale local entrepreneurs on the government schemes associated with the construction of toilets, including under PPP models, under the Swachh Bharat Abhiyan program.

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