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A photograph of three women in traditional Indian attire (sarees) carrying large metal pots on their heads. They are ascending a set of wide, weathered stone steps. The woman in the foreground is wearing a pink and black patterned sari. The woman in the middle is wearing an orange sari. The woman in the background is wearing a yellow sari. The background wall is made of aged, yellowish-brown stone with some peeling plaster.

HIDDEN RISKS AND UNTAPPED OPPORTUNITIES: WATER AND THE INDIAN BANKING SECTOR

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HIDDEN RISKS AND UNTAPPED OPPORTUNITIES: WATER AND THE INDIAN BANKING SECTOR

CONTENTS

FIGURES AND TABLES	5
FOREWORDS	6
EXECUTIVE SUMMARY	8
WATER RISK AND INDIAN BANKS	12
Overview of water risks	13
Water in the portfolio of Indian banks	15
Water & ‘drowned and drying’ assets	21
HOW ARE BANKS IN INDIA CURRENTLY HANDLING WATER RISKS AND OPPORTUNITIES?	26
A brief context	27
Operational integration of water	27
Strategic integration of water	29
Challenges faced by banks in integrating water	34
THE OPPORTUNITIES IN WATER	36
A brief context	37
Opportunities in ‘grey’ water infrastructure	38
Opportunities in ‘green’ water infrastructure	41
Innovative financing mechanisms for water	45
THE WAY FORWARD	50
Framework for enabling banks to integrate water risks and opportunities	51
Call to action for banks	54
Call to action for regulators	56
REFERENCES	58

FIGURES AND TABLES

Figures

Figure 1. Types of water related risks	14
Figure 2. Instances of businesses impacted by water related risks	18
Figure 3. Water scarcity levels for major crops in India	22
Figure 4. Integration of ESG within the credit appraisal process and the water related elements within the ESG due diligence	28
Figure 5. Use of specific tools/methodologies/frameworks by the banks to enable water risk analysis within the ESG due diligence	29
Figure 6. Focus of banks on water as a commercial opportunity	30
Figure 7. Institutional support in banks for ESG mainstreaming	32
Figure 8. Engagement of the banks with external stakeholders on water related risks	33
Figure 9. Projected required global investment in infrastructure (2013-30) USD trillion	37
Figure 10. WWF Water Stewardship framework adopted for banks	52

Tables

Table 1. Operational water risks by various sectors	15
Table 2. Potential action points for banks	53



FOREWORDS



Water is among the most precious natural resources and is essential for survival of life on earth. Water is key to achieving poverty reduction, inclusive growth, public health, food security and sustenance of the planet's essential ecosystems. Freshwater systems, however, are facing rising pressures for social, economic and environmental needs of the world's growing population. Freshwater habitats across the world face a range of threats including increases in the amount of water we take from them; drainage of wetlands; pollution from industry, sewage and farms; invasive plant and animal species; climate change; and infrastructure development in and along waterways.

These pressures are already being felt significantly in India. Drawing on data from 24 of India's 29 states, NITI Aayog, in its 2018 report, has termed the current water crisis in the country as its 'worst-ever' with more than 600 million people in the country dealing with high to extreme water stress. The situation is expected to get worse with time. The report states that by 2020, 21 major cities in the country are expected to run out of groundwater and by 2030, the country's water demand is projected to be twice the available supply.

Water is a shared resource. A diverse set of user groups place competing demand on freshwater resources for domestic, agricultural and industrial purposes. Pressures on availability and quality of water present an ever-increasing risk for businesses, as they are dependent on water, some more than others. The importance of availability and quality of water in the operations of businesses or along their supply chains, reputational considerations around management of water and relationships with stakeholders, including local communities are some factors underpinning this risk businesses face from water.

As lenders to businesses, banks are exposed to these risks too. Faced with a crisis of non-performing loans, water risks are critical for Indian banks, as these risks are one of the critical factors that can cause the stranding of assets in various sectors including Power and Agriculture – two sectors that account amongst the highest credit exposure of Indian banks. This report builds the case for the importance of integrating water considerations for Indian banks, both from a risk and an opportunity context. The report also provides a guiding framework which provides an aspirational yet realistic pathway for banks to enable a holistic integration of water risks and opportunities within their operations and strategy.

Banks, by the virtue of their influence as providers of capital, have an important role to play in enabling an effective management of freshwater resources. They can do this by influencing businesses to assess, measure and mitigate various water related risks, enabling increased investments and financial support towards solutions which address these risks and bringing together a broad range of actors including government, regulators, public and private sectors. This report will assist banks in this pursuit.

I am happy to note that this report is a result of collaboration between WWF-India and WWF-UK. I am confident that the report will trigger further thinking on the issue of water in India and will contribute in bringing together different stakeholders who can join forces to protect this precious resource.

Water will be central to a prosperous future of our planet. We need to act today to protect our tomorrow.

Ravi Singh Secretary General & CEO, WWF-India



Each year we are consuming the planet's resources at an unsustainable rate, overdrawing the systems that underpin our future prosperity and security. In the finance sector, there is a direct correlation between overdraft and financial sustainability. According to the 2018 Living Planet Report, global wildlife populations have declined by 60% in just over 40 years, starkly underlining the tremendous pressure that we are exerting on the Earth's current resources. This is of significant concern for us and for future generations.

This risk is particularly pronounced in freshwater systems which have seen a more than 80% decline in species in the last 40 years. The overall deterioration in the health of our ecosystems is driven by pressures including unsustainable economic activities, consumption patterns, climate change and population growth. Freshwater underpins almost all sources of economic and social value creation and is a key driver of sustainable growth, poverty alleviation, food security and human health.

The risks to freshwater systems are material for businesses, since water is a critical resource - within business operations and along supply chains. For banks who lend to these businesses, these risks are equally serious. Banks, through their capital allocation and lending decisions, also have a unique ability to enable solutions and help reduce overall water risk.

This report – an important collaboration between WWF India and WWF-UK – provides evidence of why water presents a material risk on the one hand, but also a potential opportunity for banks in India. It also highlights the barriers that banks currently face in integrating these risks systematically. Finally, it provides a guiding framework for banks to enable them to start integrating elements of water-associated issues into their existing risk and opportunities framework. Understanding water risk will enable business and financial institutions to become more resilient and more dynamic in the long term.

Through this report, WWF aims to catalyse thinking amongst various stakeholders in India, the UK, and beyond, on mitigating water risks to businesses and banks and enabling the flow of private commercial capital to help safeguard the water sector. We are eager to work with relevant parties to turn this vision into reality.

For India, the UK, and our planet, there is not a moment to waste.

Tanya Steele Chief Executive, WWF-UK

EXECUTIVE SUMMARY

Water is central to sustaining a functioning and a resilient planet. It is critical for the existence of habitats that sustain all human, plant and animal life on earth. Energy, food and health – indispensable elements for human development, rely on the water services provided by the natural ecosystems. These ecosystems and their biodiversity are also essential for economic growth and poverty reduction, while contributing to climate change adaptation and disaster risk reduction. There is no life, hence, without water.

Water a renewable, but a finite resource is under severe pressure from different drivers, including growing population, rapid urbanization, pollution and mismanagement, and further aggravated by the impacts of climate change. As per a report from NITI Aayog- Government of India's policy think-tank, India is already reeling under a sustained water crisis with 600 million people in the country facing acute water shortage. The report adds that the crisis is only expected to get worse with 21 major cities in the country expected to run out of ground water in the next two years, affecting water access for 100 million people. Further, the report estimates that water scarcity is projected to account for 6% loss in the country's Gross Domestic Product (GDP).

Water is a shared resource with applications in agricultural, domestic, industrial and environmental uses. As a growing economy, the demand of freshwater from most of these sectors will increase. It is estimated that by 2030, the total demand of freshwater resources in the country will be twice as much as available supply. These pressures on demand and supply of freshwater could be one among many critical constraining factors for India's economic growth. Hence, water is inexorably linked to India's future prosperity.

These competing demands on water will also place significant risk to businesses which need water in their operations or along their supply chains. These risks can stem from the operation of the company or from the location the company operates in. These risks then have the potential to materialize into financial risks for the banks and financial institutions that have exposure to these businesses. However, water also represents an untapped opportunity for banks, if understood and managed well. With significant investments in water required now and in the future, water can also be a source of sustainable profit for the banking sector.

Set in context of the Indian banking system, this report provides evidence for why water presents a material risk for businesses and hence, for banks in India. It highlights several instances of water risks materializing into tangible financial impacts for businesses in India while establishing water related factors as key contributors to possible 'asset stranding' in Power and Agriculture sectors – two sectors which account for the highest lending exposure of Indian banks.

The report estimates that out of total gross credit exposure of Indian banks, more than 39% is in such sectors where water risks are significant.

Banks are uniquely positioned to drive innovative solutions to freshwater challenges, given the significant influence they have on corporates.

The report estimates that out of total gross credit exposure of Indian banks, more than 39% is in such sectors where water risks are significant. Since each sector is unique in its processes and supply chains, the water requirements and hence the potential water related risks faced are unique. The report identifies the business sectors for which water is significantly material and describes broadly the elements of water risk for each of these sectors. It is therefore prudent for Indian banks to fully consider this material risk.

While there is a growing awareness among banks on water related risks, water is not yet widely integrated by banks in India. This includes both, a) operational integration- extent of inclusion of water within the day-to-day asset allocation decisions of the bank, and b) strategic integration – availability of broader and long-term institutional support within the bank on water risks and opportunities. Through primary survey, the report presents the broad trend of integration of water risks and opportunities among Indian banks. For instance, out of the banks interviewed for the research, only half of these conduct any ESG due diligence for project finance and high value corporate lending transactions. Also, among these banks, only 50% of them include any water related elements within this due diligence. There are, however, interesting and encouraging examples from Indian banks on water, some of which have been highlighted in this report. The report also summarizes the challenges faced by banks in integrating water related risks and opportunities.

Being a source of potential risks, water also presents opportunities for banks to realize commercial value by financing assets that help mitigate these risks. These opportunities in solutions that contribute to sustainable water management can be in 'grey' infrastructure assets- human-made infrastructure such as wastewater treatment plants, water-efficient irrigation systems etc. or in 'green' infrastructure- solutions based on natural processes that help improve water availability and its quality, such as watershed management and wetlands conservation.

Given the localized nature of the services these assets provide and lack of optimal pricing – conditions which act as barriers for conventional financing, the sector has seen various innovative mechanisms being deployed for financing these assets. While enlisting the aforesaid opportunities for banks, the report also highlights such financing mechanisms including blended finance, bond finance, and bankable projects initiative.

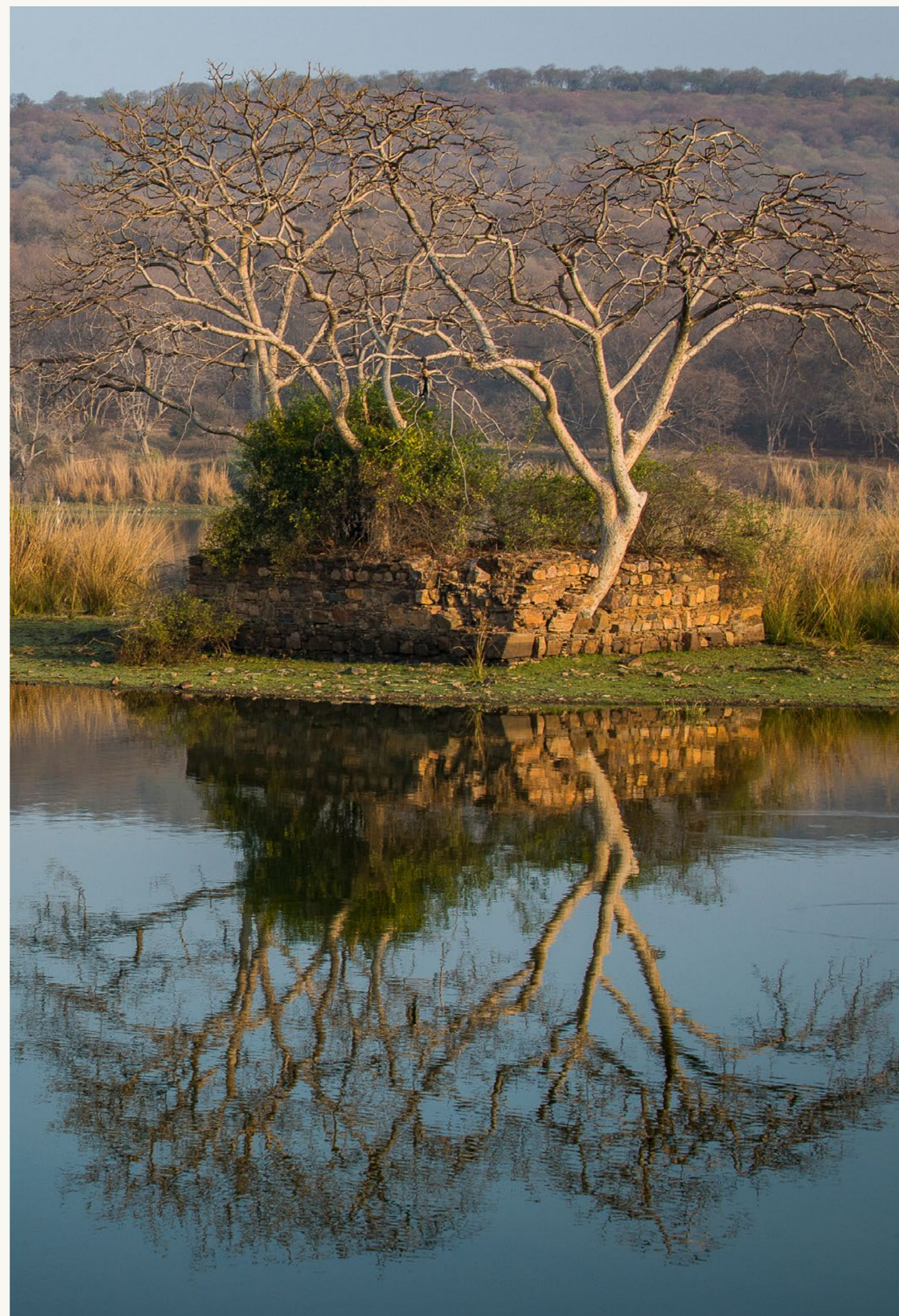


Banks are uniquely positioned to drive innovative solutions to freshwater challenges, given the significant influence they have on corporates. The report presents a guiding framework for banks in India to enable an integration of elements of the water thematic within their existing risk and opportunities systems. The framework is based in part on WWF's Water Stewardship Ladder. The ladder is composed of the following five sequential steps that indicate activities businesses can take in their journey to become good water stewards – those that recognize water as a core and strategic business issue and take appropriate action beyond their operational boundaries to ensure effective water governance at the basin level.

1. **Awareness of Water** – High level understanding of water related risks and opportunities
2. **Knowledge of Impacts** – Systematic knowledge of impacts of water risks
3. **Internal Action** – Optimizing internal water governance
4. **Collective Action** – Engaging with multi-stakeholder platforms to address water issues
5. **Basin Governance** – Effort to influence policy and institutional performance at the basin level

The framework, adopted for banks, is then used to suggest activities that banks can undertake at each stage of the ladder. The report also suggests actions banks and financial regulators can take to enable reduction of overall water related risks and harness greater commercial value from water.

Sustainable water management will require urgent, concrete and interrelated actions by various stakeholders. Banks, by the virtue of their influence as providers of capital, have an important role to play in shaping an ambitious agenda for effective and equitable management of freshwater resources. We urge banks to read and integrate the findings from this report, as it will help them further understand how they impact, as well as depend on, our shared natural world.



WATER RISK AND INDIAN BANKS



OVERVIEW OF THE WATER RISKS



748 MILLION
ACROSS THE WORLD DO
NOT HAVE ACCESS TO SAFE
DRINKING WATER.
(WWAP, 2015)

Commercial banks are a key component of the financial system, especially through their lending activities to businesses. This activity is the focus of this report.


By providing loans, banks are indirectly exposed to the business risks of their clients. These risks can manifest themselves in many forms including the possibility of non-payment or delayed payment of loans by borrowers, or damage to the bank's brand reputation through association with unfair, unjust or manipulative practices by clients in their lending portfolio.

Among the most significant emerging risks for banks is water risk. Water is vital to many different industry sectors. It is used in heating, cooling and cleaning and as a raw material in production, or along supply chains. It has no cost-effective replacement, and its accessibility and quality underpin the stability of ecosystems upon which businesses are dependent. Furthermore, water is critical for the health and wellbeing of employees, suppliers, workers and customers alike.

THE STRESS ON FRESHWATER RESOURCES

- 97% of global water resources consist of salt water, only 1% is freshwater accessible for human use, the remaining 2% being locked in ice caps
- 52% of the world's projected 9.7 billion people will live in water stressed regions by 2050, an additional 1.8 billion people likely to be living under at-least moderate water stress (MIT, 2014)
- 748 million people across the world do not have access to safe drinking water (WWAP, 2015)
- From 1970 until 2014, population of freshwater species declined by 83% (WWF, 2018)
- Global demand for freshwater will exceed supply by 40% in 2030 (WRG, 2009)
- 21 major Indian cities, including Delhi, Bangalore, and Hyderabad are expected to run out of groundwater supplies by 2020, affecting water access for 100 million people (NITI Aayog, 2018)

Water-related risks have the potential to limit production, disrupt supply chains, result in asset write-downs, create conflict with other water users and harm corporate reputations,¹ which can lead to financial impacts for businesses and the banks that lend to them. Global data from CDP in 2014 found that 53% of companies reported significant financial impacts from water, an increase of 40% from when this data was first reported back in 2011.² These risks are also increasing. The pressures of climate change, population growth, rapid urbanization and increasing demand across all sectors – agriculture, domestic and industrial are exacerbating already existing poor management of water sources, the draining of aquifers and desecration of rivers. Unsustainable levels of extraction of water and the ever-increasing pollution of freshwater resources are placing unprecedented pressure on limited water supplies.³ (See box above).



70% OF HOUSEHOLDS IN INDIA RECEIVE CONTAMINATED WATER




India, home to more than 17% of the global population, is already facing a water crisis. The country has 600 million people coping with high to extreme water stress, and 70% of households receive contaminated water.⁴ India is the country with, by far, the most people lacking access to clean water close to home.⁵

As shown in Figure 1, water related business risks can be classified in broadly three categories:

- a) **Physical Risks** largely stemming from the quality and the quantity of water available to the company;
- b) **Regulatory Risks** stemming from the consequences of public policies and enforcement in the context of a company’s operations; and
- c) **Reputational Risks** stemming from the external perception around a company’s water use/pollution and its behavior with relevant stakeholders.

Since water is a shared resource, these risks may either be linked directly to the behavior of the company (‘operational water risk’) or to the location in which the company operates in (basin⁶ water risk).

Figure 1
Types of water related risks

	 Physical Risk	 Regulatory Risk	 Reputational Risk
BASIN RELATED RISK: Linked to the locations of the company	Water quantity (scarcity, flooding, droughts) and quality (pollution) within the river basin and the impacts this might have on society and the environment.	Strength and enforcement of water regulations and the consequences of restrictions by the public institutions. Either felt through direct regulatory actions or from neglect, blockage or failure.	Perceptions around water use, pollution and behavior that may have negative impacts on the company brand and influence purchasing decisions. Public perceptions can emerge rapidly when local aquatic systems and community access to water are affected.
OPERATIONAL WATER RISK: Linked to the behaviours of the company	Water quality and quality issues related to the performance of the company and its supply chain.	The potential for changes in pricing, supply, rights, standards and licence to operate for a particular company or sector.	When the actions of the company are poorly experienced, understood or communicated with local stakeholders and where perceptions and brand suffer as a consequence.

WATER IN THE PORTFOLIO OF INDIAN BANKS

39%

More than 39% of the portfolio of Indian banks is exposed to sectors that face high levels of operational water risk.

In this report, we explore the exposure of the Indian banking sector to highly water-dependent sectors.⁷ Based on an initial assessment, it is estimated that more than 39% of the portfolio of Indian banks⁸ is exposed to sectors that face high levels of operational water risk.⁹

As shown in Table 1, the extent, magnitude and nature of the water risks faced do vary by the type and distribution of the industry. Water risks, for instance, can materialize from the discharge of untreated effluents or from regular conflict with communities for rights and access to water. However, the basin context dictates whether operational water risk exposure constitutes a material concern or not. Although different sectors face unique set of water related risks, water risks such as those arising from the siting of businesses and water pollution from industrial operations are common to multiple sectors mentioned below.

Table 1
Operational water risks by various sectors

The table below summarizes the type of operational water risks faced by various sectors and the gross exposure of Indian banks to each individual sector.

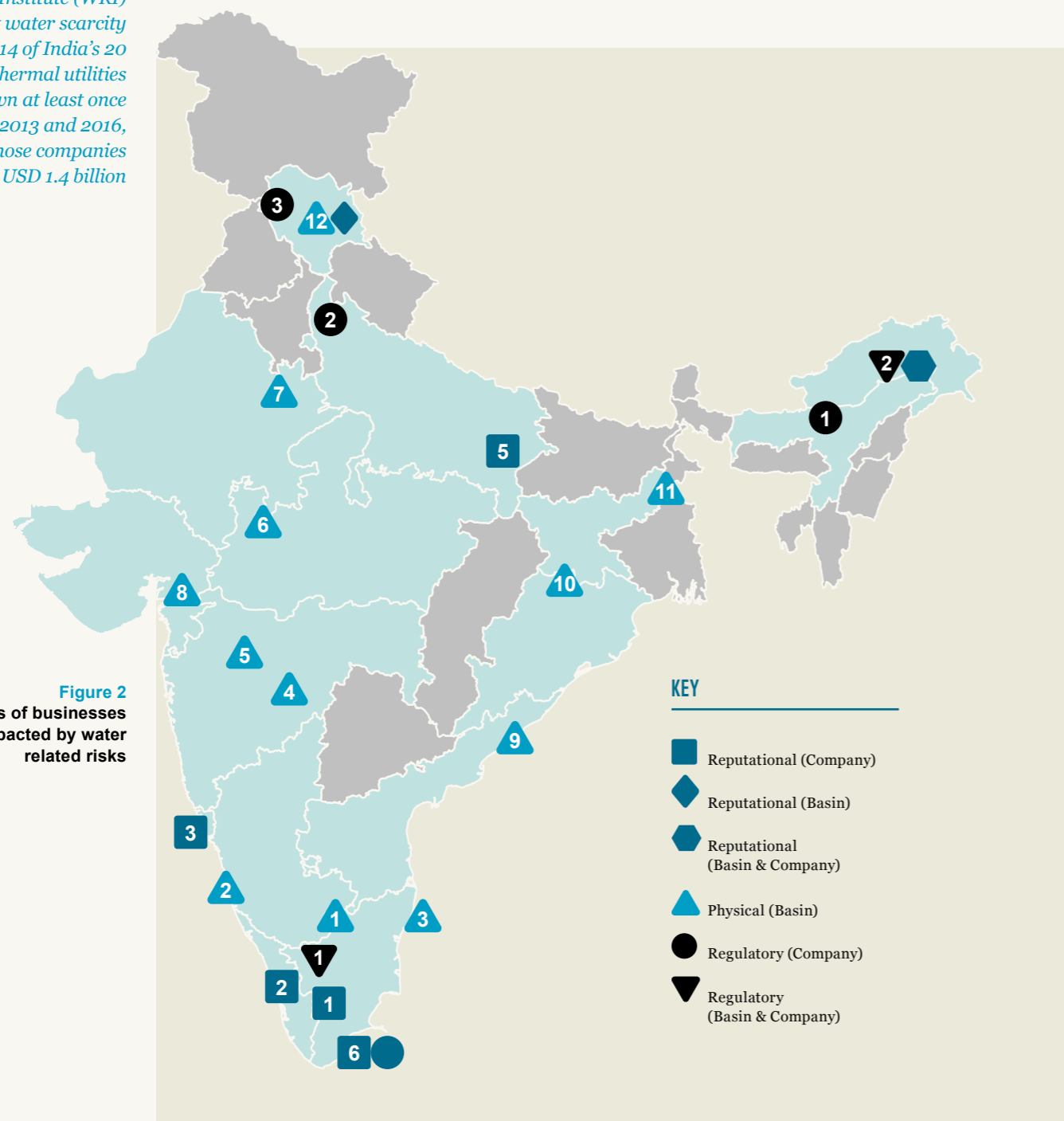
Sector	Description of Risk	Exposure of banks to the sector
Agriculture & Allied Activities	With more than 90% of total water consumption in India coming from the agricultural sector, water scarcity and drought are key issues for this sector. Beside this, other water related issues, such as climate variability, saltwater intrusion in coastal regions, flooding, changes in regulations around water withdrawals can affect the Agri & Allied activities.	13.3%
Power	Energy generation is the largest industrial sector in terms of water abstractions (non-consumptive) after agriculture. The sector requires water for cooling (in the case of thermal and nuclear) and for direct power generation (in the case of hydropower). Though most power plants are assured sufficient water allocations by the governments, there have been multiple instances across the country where power plants have had to be partially or fully shut down due to water shortages (see the map on page 18). Investments in the hydropower sector can also face other physical and reputational water-related risks such as decreasing river flows, floods, downstream water demands, legal actions by civil society groups for impacts on communities and biodiversity, etc.	6.8%
Basic Metal & Metal Products	Most ore abstraction processes use extensive volumes of water for either washing or cooling. Any water scarcity in the basin or the region can affect the operations. Besides water scarcity, regulatory and reputational risks related water pollution can be pertinent, as community conflicts tied to water pollution are amongst the most common form of reputational water risk around the planet.	4.9%
Wholesale Trade (Non-Food)	Indirectly exposed to water risks through supply chains of commodities like textile, leather, chemical, etc.	2.7%
Textiles	Textiles are another heavily water-dependent sector as they are reliant upon the availability of sufficient, clean water for production. Any changes in water availability can affect the operations. The industry is also subject to water risks through its supply chain for cotton, which is both a water-intense crop and one which often requires significant pesticide and nutrient use, resulting in water pollution. Besides, the physical risks the industry has also, on several instances, been affected by regulatory and reputational risks due to pollution impacts (see the map on page 18).	2.5%

Sector	Description of Risk	Exposure of banks to the sector
Commercial Real Estate	Water scarcity and flooding can significantly affect viability and profitability of commercial and residential real estate projects. Regulatory and legal action on projects coming up in river flood plains or reclaimed lakes, wetlands and groundwater stressed regions can also be a risk.	2.4%
Chemicals & Chemical Products	Availability of sufficient, clean water is typically critical for production of chemicals. Any changes in water availability can affect the operations. Besides, the physical risks the industry has also, on several instances, been affected by regulatory and reputational risks due to pollution impacts.	2.1%
Other Infrastructure	Other infrastructure investment such as urban utilities (water supply & sewage treatment), Irrigation project are subject to water scarcity, flooding and pollution risks.	1.7%
Cement & Cement Products	Another industrial sector with large water abstractions. Both water scarcity and pollution impacts are risks.	0.7%
Mining And Quarrying	Mining operations can have significant impacts on aquatic eco-systems, leading to significant regulatory and reputational risks for the mining projects. Dewatering of mines-water pumped out of mines to enable mining operation reduces groundwater levels for surrounding water users, and can cause pollution and high flows downstream.	0.5%
Tourism, Hotels & Restaurants	Hospitality industry is highly dependent on water not only for the physical needs of the tourists, but also for the recreational and spiritual value that the water offers. Water scarcity or damage to the ecology of the water bodies can pose significant risk to the tourism industry.	0.5%
Paper & Paper Products	Availability of sufficient, clean water is critical for Paper production with the commodity accounting for more than 90% of total inputs used for production. Any changes in water availability can affect the operations. Besides the physical risks, the industry has also, on several instances, been affected by regulatory and reputational risks due to pollution impacts.	0.4%
Sugar	Availability of sufficient, clean water is critical for production of Sugar. Any changes in water availability can affect the operations. The industry is also subject to water risks through its Sugar supply chain, which is a water intense crop. Besides the physical risks, the industry has also, on several instances, been affected by regulatory and reputational risks due to pollution impacts.	0.3%
Beverage & Tobacco	Availability of sufficient, clean water is critical for production of Beverages. Any changes in water availability can affect the operations. This sector has also seen conflicts with local communities around water abstraction. The industry is also subject to water risks through its Agri-supply chain for sugar, fruits, dairy etc. Besides the physical risks, the industry has also, on several instances, been affected by regulatory and reputational risks due to over-abstraction and pollution impacts (see the map on page 18).	0.2%
Leather & Leather Products	Availability of sufficient, clean water is critical for production of leather. Any changes in water availability can affect the operations. Besides the physical risks, the industry has also, on several instances, been affected by regulatory and reputational risks due to pollution impacts.	0.1%
Total Credit Exposure of the Banks		39.1%



There is increasing evidence of businesses experiencing negative bottom line impacts from water risks. A report from the World Resources Institute (WRI) found that water scarcity caused 14 of India's 20 largest thermal utilities to shutdown at least once between 2013 and 2016, costing those companies USD 1.4 billion.¹⁰ The textile cluster of Tiruppur in the state of Tamil Nadu and the leather cluster in Kanpur in the state of Uttar Pradesh have faced shutdowns on concerns of excessive water pollution. As shown in the map below, the financial impacts of water issues can vary across time, location and sectors. The way businesses respond to these risks will be one of the significant factors in determining the quality of a bank's lending portfolio in the years to come.

A report from the World Resources Institute (WRI) found that water scarcity caused 14 of India's 20 largest thermal utilities to shutdown at least once between 2013 and 2016, costing those companies USD 1.4 billion



- 1 **Kodaikanal, Tamil Nadu** – In 2001, a factory making mercury thermometers belonging to a FMCG major was shut down after elevated levels of mercury observed in water, sediment and fish samples from Kodaikanal lake.
- 2 **Plachimada, Kerala** – In 2004, a F&B major was shut down after community protests for water abstraction and pollution.
- 3 **Goa** – In 2012, the government shut down all mines pouring Manganese and Iron Ore in the Selaulil Reservoir, the source of drinking water for more than half the state's population.
- 4 **Jaduguda, Jharkhand** – While the uranium mine belonging to a government owned enterprise was shut down in 2014 following issues around lease renewal, the contamination of ground water led to fierce community protests.
- 5 **Varanasi, Uttar Pradesh** – In 2014, a F&B company had to abandon its plans to expand its unit due to community protests on water and other issue.
- 6 **Tuticorin, Tamil Nadu** – In 2018, the state government of Tamil Nadu shut a copper plant on concerns of groundwater contamination and pollution.
- 1 **Hosur, Tamil Nadu** – In 2007, Auto ancillary industry faced severe water shortages due to over extraction and pollution of aquifers and lakes.
- 2 **Mangalore, Karnataka** – In 2012, an oil refinery had to be shut down for 45 days due to water shortage.
- 3 **Chennai, Tamil Nadu** – In 2013, IT industry in the city faced shut down due to shortage of drinking water in the premises.
- 4 **Parli, Maharashtra** – In 2013, a coal based power plant was shut down due to water scarcity.
- 5 **Aurangabad, Maharashtra** – In 2013, a drought forced the government to cut off water supplies to breweries and distilleries in the region.
- 6 **Nagda, Madhya Pradesh** – In 2015, entire operations at a staple fibre plant of a major textile company was suspended due to a water shortage.
- 7 **Kaladera, Rajasthan** – In 2016, a F&B company had to suspend manufacturing operations due to concerns around groundwater availability.
- 8 **Bharuch, Gujarat** – In 2016, some plants of a major petrochemical facility were shut down due to constraints of water availability.
- 9 **Vishakhapatnam, Andhra Pradesh** – In 2016, a major steel plant was forced to run on reduced capacity due to lower availability of water.
- 10 **Rourkela, Orissa** – In 2016, a captive township of the steel plant faced a severe drinking water crisis.
- 11 **Farakka, West Bengal** – In 2018, a coal fired power station shut down five of six turbines due to lack of water.
- 12 **Shimla, Himachal Pradesh** – In 2018, the hotels went out of water leading residents urging tourists to stay away.
- 1 **Tiruppur, Tamil Nadu** – In 2011, 700 textile units shut down on concerns of water pollution.
- 2 **Lower Subansiri, Assam & Arunachal Pradesh** – In 2011, the 2000 MW Lower Subansiri Hydro Project was stalled due to concerns around biodiversity, siltation and downstream livelihoods.
- 1 **Nagaon, Assam** – In 2012, a paper mill was served a pre-closure notice for degrading a major water body of the area.
- 2 **Dasna, Uttar Pradesh** – In 2016, a plant of a major F&B company was shut down through judicial intervention on untreated wastewater.
- 3 **Gurdaspur, Punjab** – In 2018, a sugar mill was fined and forced to shut down for causing mass mortality of fish and ecological damage to the Beas river.



90%
**THE AGRICULTURE
 SECTOR IS THE
 LARGEST CONSUMER
 OF FRESHWATER,
 ACCOUNTING FOR
 MORE THAN 90%
 OF FRESHWATER
 WITHDRAWALS IN
 THE COUNTRY**

WATER & 'DROWNED AND DRYING' ASSETS

Water risks have the potential to create 'Stranded Assets', i.e. assets suffering from unanticipated or premature write-offs, downward revaluations or conversions to liabilities.¹¹

In the context of water risks, stranded assets have been referred to as 'Drowned and Drying Assets.' Assets in sectors which face high water risks are vulnerable to abrupt and material devaluation, and this is a significant concern for banks. For example, the Agriculture and Power (Thermal and Hydropower) sectors, two sectors that face high water risks account for more than 20% of the gross credit exposure of Indian banks.

Agriculture

About 64% of total sown agricultural area in the country is rain-fed¹², i.e. it relies on rainfall for water while the remaining agricultural area is irrigated by groundwater and surface-water sources. Rainfed-only agriculture is particularly exposed to natural or climate change driven fluctuations in rainfall, which, on short timescales, is buffered to some extent in irrigated agriculture as this draws on stores of water (e.g. reservoir, groundwater). With climate change, as monsoon patterns in India will get more variable, it will create new challenges for rainfed agriculture which will increase pressure to expand irrigation to mitigate this impact. Given the criticality of groundwater for drinking, any approach will need to recognize the aspects of climate change vulnerability and source sustainability.

Hence, water availability presents a key material risk to agricultural assets and the supply chains reliant on agricultural products. The agriculture sector is the largest consumer of freshwater, accounting for more than 90% of freshwater withdrawals in the country.¹³ Banks, which have exposure to both agricultural commodities and the supply chains relying on these commodities, are significantly exposed.

Furthermore, a significant part of the production area of those crops in India which need substantial amounts of water in their production cycle lie in the areas with high water scarcity.^{14,15,16} Physical water scarcity – water demand outstripping supply, could lead to changes in productivity across the production zones, leading to agricultural assets being stranded. Water scarcity puts the production of wheat and rice – two of the country's most important food crops – under threat. Close to 74% of the area under wheat cultivation and 65% of the area under rice cultivation faces significant levels of water scarcity. The two major cash crops in the country, cotton and sugarcane, are also prone to disruption due to high levels of water scarcity in about 96% of the area under cotton cultivation and about 60% of the area under sugarcane cultivation.¹⁷

In India, the risk of stranded agricultural assets has not yet materialized on a wide scale, but that is partly due to frequent government interventions in the form of financial packages, loan waivers and subsidies. During 2016-17, six state governments waived off farm loans amounting to close to USD 13 billion, or 0.45% of India's GDP (nominal).¹⁸ A Bank of America Merrill Lynch report estimated that loans amounting to USD 40 billion are likely to be waived in the run up to the 2019 general elections in India, equivalent to about 1.3% of the country's GDP.¹⁹ These government interventions involve enormous spending (see box below) which puts huge pressure on public finances. However, given the level of groundwater depletion across the country, it is critical to integrate hydrology and hydro-geology in planning any future interventions. This will ensure sustainability of sources, reduce the pressure on public finances, and lower the risk of having stranded assets in the future.

Water scarcity levels in areas under cultivation for Cotton, Wheat, Sugarcane and Rice crops

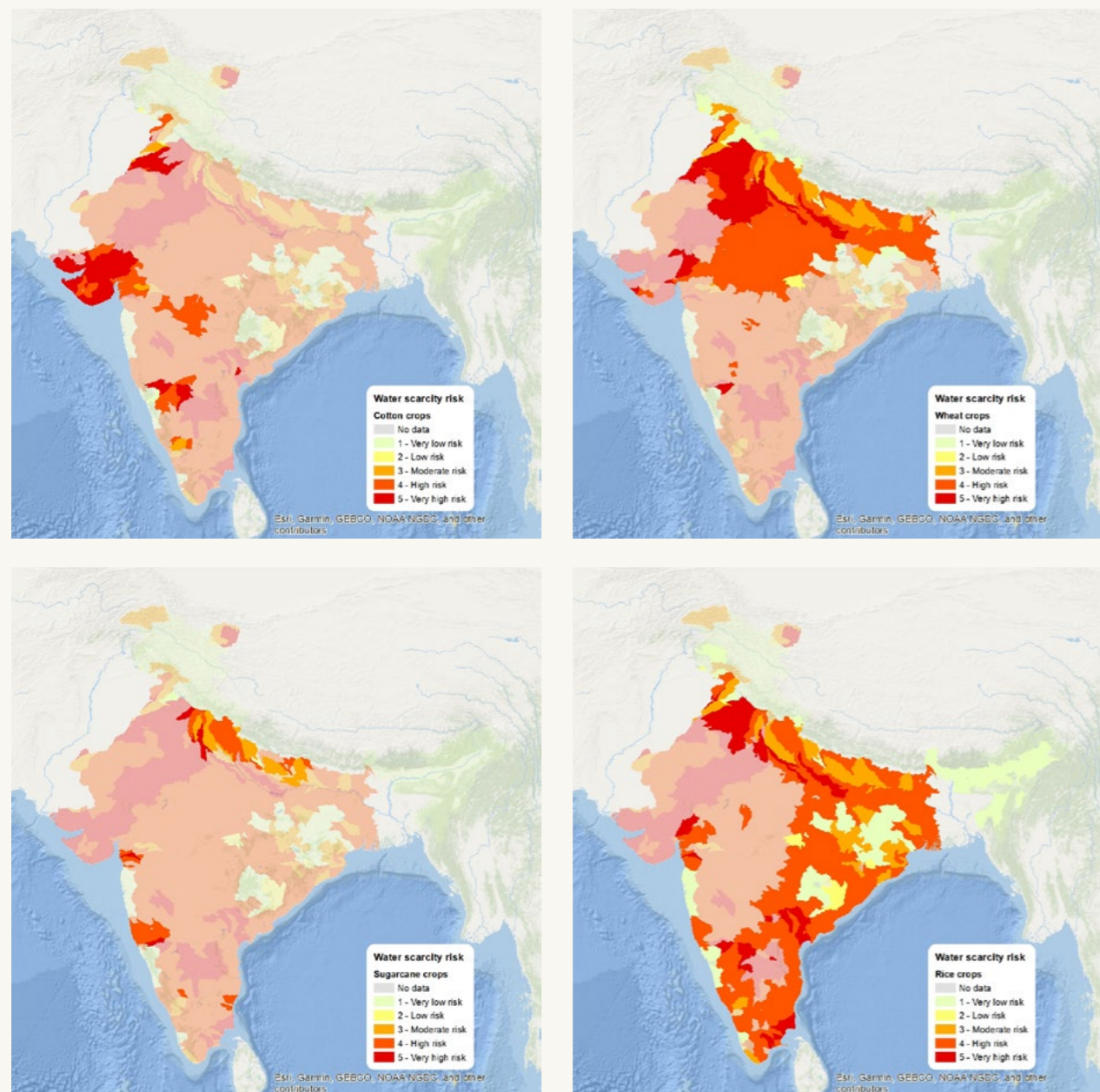
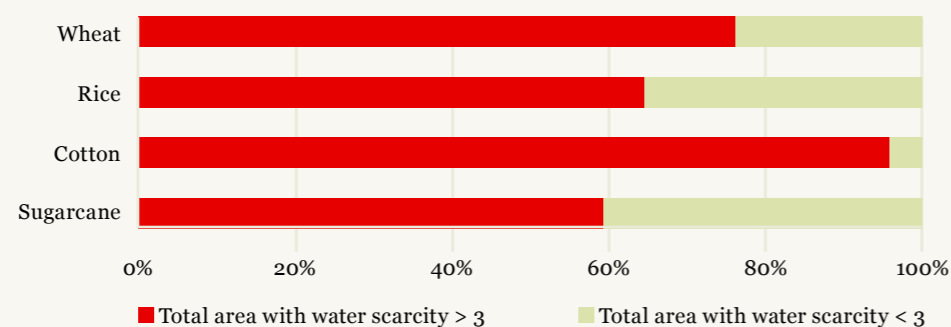


Figure 3
Water scarcity levels for major crops in India



Power

The declared bad loans of Indian banks as of March 31, 2018 stood at close to USD 148 billion,²⁰ which amounts to close to 12% of the gross advances by the banks. Out of this, India’s power sector is estimated to be responsible for USD 38 billion of this bad debt,²¹ more than a quarter of the total.

This includes thermal, hydro and gas-based power generation. India’s Ministry of Power published estimates in 2017 that classified 17 under-construction thermal power projects aggregating to a capacity of 18,420 MW, 17 gas-based power projects aggregating to 11,154 MW and 20 hydroelectric projects with capacity of 6,329 MW as ‘stalled’. Further, it was mentioned that a total investment of about USD 52 billion (based on conservative estimates of about USD 7 million per MW stalled for thermal projects and about USD 10 million per MW stalled for hydro projects) is stalled in these projects.²² Water related risks are one of the important factors in the stalled assets within the Thermal Power and Hydropower sectors.

Thermal Power

While there are many drivers of asset stranding in the thermal power sector, including the cost competitiveness of renewables, the distressed financial situation of Distribution Companies (DISCOMs), air pollution regulations and higher input costs of imported coal; water scarcity stands out as a significant factor.²³ Thermal plants use water to cool steam during electricity production and for the disposal of ash waste, hence reduced water supplies resulting from drought or from increased competition among water users can cause forced disruptions leading to tangible financial losses.

Water scarcity contributes to lost revenue, higher operational costs (due to lower capacity utilization), and higher capital expenditures (for upgrades to more water efficient technologies). The sector is also plagued by excessively low capacity utilization rates – less than 60% over the past two years coupled with relatively high levels of debt – making debt servicing extremely difficult.²⁴

Almost 90% of thermal power generated in India depends on freshwater for cooling.²⁵ Water scarcity often forces power outages in the power plants leading to generation losses and lost revenue. Power outages forced by water scarcity led to generation losses of 14 TWh in 2016, more than 20% of the total power generated between 2015 and 2016. This translated to a loss of USD 614 million in revenue, about 2.3% of the total revenue generated from the sale of thermal power in 2016. Cumulatively between 2013 and 2016, water scarcity issues led to a generation loss of 30 TWh, enough to fulfil the per-capita electricity demand of more than 26 million people in the country.²⁶

LESS WATER, LOST REVENUE

2100 MW Farakka Thermal Power Station, 1720 MW Raichur Thermal Power Station and 3300 MW Tiroda Thermal Power Station – these were some among many thermal power stations that suffered monthly power outages due to water scarcity leading to generation losses and lost revenue. In June 2016, a part of the Tiroda power plant shut down leading to a 69% drop in generation from the average generation level at the plant. The Farakka power plant shut down in April 2016 and Raichur in June and July 2016 leading to a 45% and 37% reduction respectively in generation relative to average generation at these plants.



13,363MW

IT IS ESTIMATED THAT HYDROPOWER PROJECTS WITH A CUMULATIVE CAPACITY OF ABOUT 13,363 MW ARE STRANDED AT DIFFERENT STAGES OF PROJECT DEVELOPMENT

Hydropower

It is estimated that hydropower projects with a cumulative capacity of about 13,363 MW amounting to total cost overruns of INR 52697 crore (USD 7.5 billion)* are stranded at different stages of project development.²⁷ The stranding of assets can broadly be attributed to various issues including land acquisition and community rehabilitation, insufficient market depth and scope including undifferentiated tariff structures, safeguards issues including environmental and human aspects and financing and risk sharing including high capital cost and low availability of long-term debt. Like thermal power, it is difficult to attribute specific water related risks as having stranded particular projects however inter-state water conflicts, community impacts related to water on upstream and downstream communities such as fishermen, concerns around optimum utilization of river basins and potential detrimental impacts on river flows and biodiversity have been some of the critical drivers in several hydropower assets being stranded (See box below).

TOLERANCE OF ENVIRONMENTAL DEGRADATION RUNS DRY

In 2013, in the aftermath of Uttarakhand floods, the Supreme Court of India revoked green clearances of 24 out of 70 planned projects in the Alaknanda-Bhagirathi river basins, asking the Ministry of Environment, Forests and Climate Change to review the potential impact on biodiversity of the river basins and the extent of contribution of these dams to the flood situation. None of these dams, in which substantial amounts have been invested already have been initiated to date leading to stranded assets.

In the eastern state of Arunachal Pradesh, dams with a cumulative capacity of 56,000 MW are planned. Apart from micro projects, mega dams are planned on five major river basins of the state – Kameng River Basin, Subansiri River Basin, Siang River Basin, Dibang River Basin and Lohit River Basin. Most of these dams, including the planned 2,000 MW dam on Subansiri river have been stalled for more than 10 years now, due to community protests over concerns of the biodiversity impact (leading to loss of livelihoods for fishermen downstream) and potential generational inefficiencies due to siltation.

SUMMARY

As lenders, banks have significant stakes in the performance of the businesses they lend to, and share risks that threaten the ability of clients to repay. The financial risks presented by water to businesses are significant, widespread, growing and increasingly evident. The banks in India have a high level of exposure to water risk through the companies and sectors that make up their lending portfolios. Some sectors constituting the highest exposure of banks are also characterized by stalled investments in unproductive assets and water is a critical factor behind the potential for ‘drowned or drying’ assets.



* 1 USD = INR 70

HOW ARE BANKS IN INDIA CURRENTLY HANDLING WATER RISKS AND OPPORTUNITIES?



A BRIEF CONTEXT

The scope of this research is restricted to the commercial bank divisions of the banks in India, and hence includes only project finance and corporate lending. Other financial services including capital market transactions and investments & asset management typically fall within the investment bank division. This section is based on the primary research conducted with 13 commercial banks in India representing about 30% of the total assets deployed by Indian banks.

The extent of integration of water related risks and opportunities within the credit appraisal process of the banks is broadly considered from two perspectives: a) Operational integration of water within the day-to-day asset allocation decisions, and b) Strategic integration of water in terms of the bank's broader and long-term view on water risk and opportunities.

OPERATIONAL INTEGRATION OF WATER

The operational integration of water related risks and opportunities by Indian banks has been gauged in terms of two major parameters:

- a) Type of transactions for which banks undertake environmental, social and governance (ESG) due diligence and the extent that water specific elements are included within this; and
- b) Use of specific tools, methodologies and/or frameworks to enable water risk analysis within the ESG due diligence.

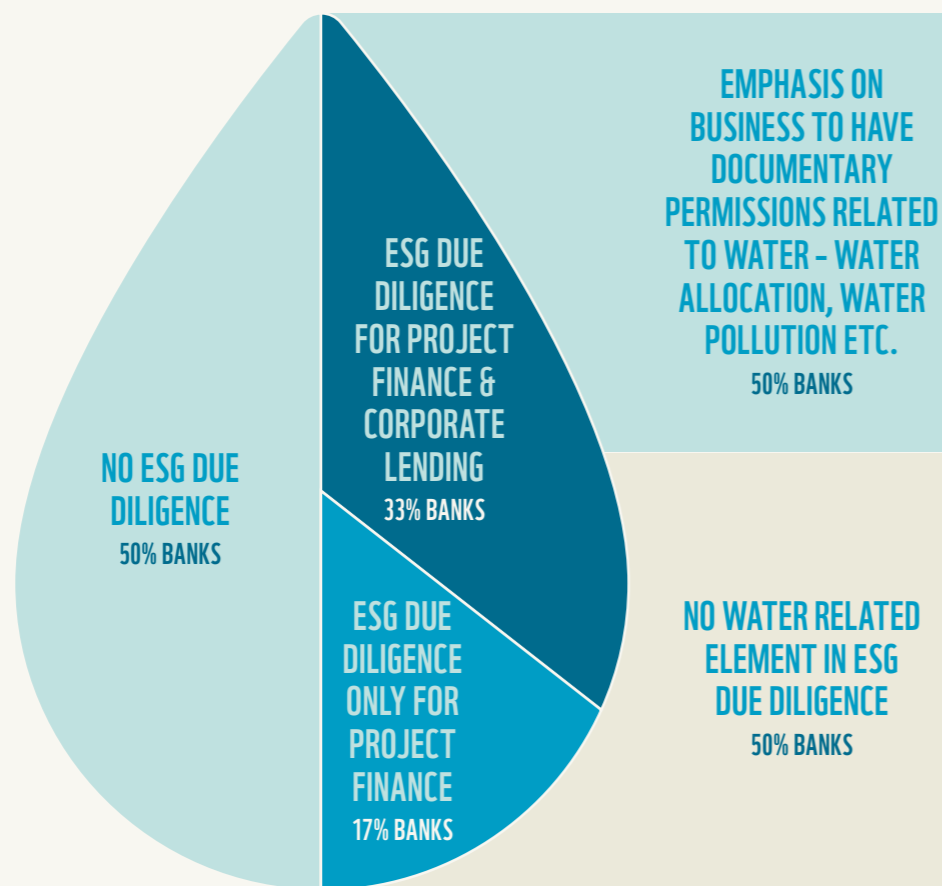
ESG Due Diligence and the Inclusion of Water Specific Elements

The banks in India tend to opportunistically prioritize ESG due diligence (see box below) only for long-term project finance investments, i.e. those related to project finance (such as project related corporate loans or bridge loans to be refinanced using project finance), and for specific non-project finance transactions involving amounts above a specific threshold (which varies for different banks) where the level of potential E&S risk involved is significantly higher.

The phrase 'ESG due diligence' here refers to a basic due diligence conducted by the Indian banks based on a checklist of indicators that ensure compliance to the legal standards relating to ESG indicators. The ESG due diligence by the banks in India is mostly restricted to this level and does not normally include voluntary due diligence which goes beyond legal compliance nor uses data from third party ESG data providers or other sophisticated approaches on ESG due diligence.

For project finance loans, an Environmental Impact Assessment (EIA), a mandatory requirement for project proponents, is an essential requirement for the banks before making financing decisions. The banks also often incorporate elements of ESG risk while defining the scope of a Lender's Engineer (bank's representative whose job is to audit a project from a technical viewpoint) assessment and demand the 'Consent to Establish' – license from the State Pollution Control Board permitting the commencement of the construction activities on the project site and 'Consent to Operate' – license from the State Pollution Control Board permitting the commencement of the production activities.

Figure 4
Integration of ESG within the credit appraisal process and the water related elements within the ESG due diligence



Of the banks interviewed for the research, 17% conduct ESG due diligence only for project finance transactions and project related corporate loans, 33% of the banks conduct ESG due diligence for project finance transactions and for non-project related corporate lending transactions above a specified threshold as specified in the bank's credit policy, while the remaining 50% do not conduct any type of ESG due diligence.

Even for project finance and high-value corporate lending cases where ESG due diligence is undertaken, water is a minor part of the overall risk management processes and procedures. The water related parameters typically looked at are the availability of water in the case of businesses with highly water-intensive operations, the location of the business in the context of the water situation, and documentary compliance of business with regulations on water such as pollution from discharged effluents and abstraction of groundwater etc. The current and the expected state of the watershed, aquifers or basins in which the business is operating in is also often overlooked in the ESG due diligence.

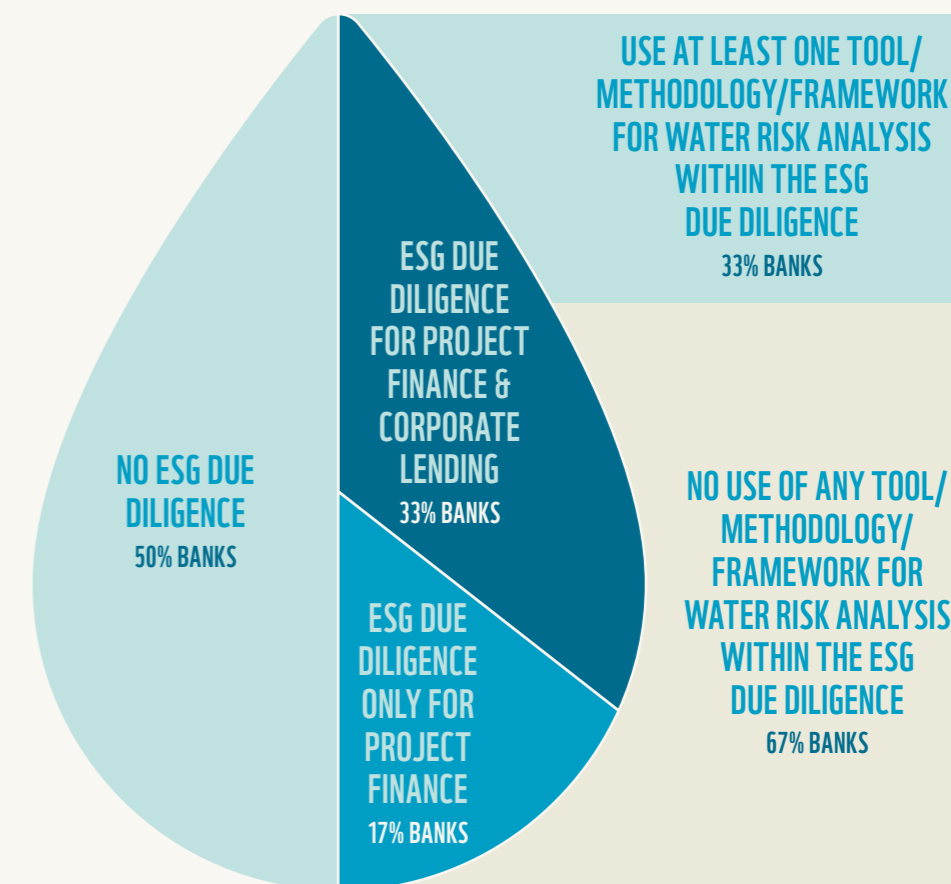
Out of 50% of the banks which conduct ESG due diligence for specific transactions, no bank has holistically integrated elements specific to water risks within their credit policy and hence water related risks do not factor significantly in the credit appraisal process. 50% of these banks have incorporated some elements related to water within their ESG due diligence process, mostly around ensuring documentary compliance and checking relevant approvals to businesses relating to water. The other half of these banks do not have any water related element included within their ESG due diligence.

Hence, 75% of the banks surveyed for the research have no mechanism to address their water risks while making lending decisions.

Use of Specific Tools/Methodologies/Frameworks by the Banks within their ESG Due Diligence to Enable Water Risk Analysis

Among the banks which undertake ESG due diligence either for project finance transactions or for high value corporate lending cases, 33% of these indicated using a pre-defined tool/methodology/framework for a systematic analysis of water related risks within the broader ESG due diligence undertaken by the banks, while the other 67% instead rely on a subjective and case-to-case approach for analysis of water risks. One bank uses a pre-defined algorithm which integrates the location of the business and its water intensiveness with the local water data to raise red flags on the availability of water for business operations. The bank uses the India-WRIS portal, WRI Aqueduct and the datasets from the Central Ground Water Board (CGWB) to feed contextual data on water resources into the algorithm. Another bank conducts a continuous concurrent portfolio analysis with a cohesive tool for Environmental and Social Risk management which also covers water risk as one of the elements of non-financial risk.

Figure 5
Use of specific tools/methodologies/frameworks by the banks to enable water risk analysis within the ESG due diligence



In both cases, these tools do not impact directly the decisions on the credit disbursement. However they are used by the banks to identify areas of potential risks for businesses and work with them to address these proactively.

Hence, out of the banks which undertake ESG due diligence, about one-third use a systematic methodology/framework.

STRATEGIC INTEGRATION OF WATER

The strategic integration of water related risks and opportunities by Indian banks has been gauged using the following three parameters: a) Focus on water as an opportunity by Indian banks, b) Institutional support in banks for ESG mainstreaming and c) Engagement of the banks with the stakeholder institutions.

Water as an Opportunity by Indian Banks

Currently, water does not appear to be a focus area of opportunity for banks in India. Out of those interviewed, only a third (33%) of banks indicated that they view water through the lens of a commercial business opportunity. The research touched upon two aspects of the opportunity paradigm of water – a) Business development opportunity for banks by financing technologies, businesses and projects which are driving water-efficient solutions and b) Opportunity to deepen existing client relationships through collaborative engagement on water related risks and opportunities for businesses.

Figure 6
Focus of banks on water as a commercial opportunity



The research indicated that the sectors that the banks focus most commonly on from the perspective of business development are waste water treatment and distribution, water sanitation and desalination plants. Banks also tend to focus on agro-based business, bottling plants, desalination plants and other industrial units which use water-efficient technologies, leading to a lower consumption of water and energy.

A small proportion of the banks have worked with their clients in helping them understand, measure and mitigate water related risks – an approach which has helped them strengthen their relationships with existing clients in terms of the increased wallet share from these clients.

PROFITABLE LOANS BEGIN TO FLOW

A large private sector bank interviewed identified commercial opportunities in financing a sewage treatment plant to the extent of USD 24 million and funding the construction of local infrastructure for water treatment and sanitation through a revolving term loan facility of USD 14 million.

Another bank with significant asset deployment in agriculture sector partnered with an NGO to develop a Decision Support System which enabled its client in the Agro-Business space to assess the spatio-temporal variation in the availability of water resources in the areas where it was sourcing its raw materials from. This tool supported the company in planning its operations given the projected availability of water and helped it to design an effective management strategy for using water resources sustainably, which is critical to the company’s long-term financial performance.

As well, a private sector bank specializing in lending to Small and Medium Enterprises (SMEs) worked with an SME client to flag the issue of the effluents generated in the industrial processes not being treated as per the compliant regulations. The bank helped the client set up an Effluent Treatment Plant within the premises of the firm at a discounted rate of financing.



Institutional Support in Banks for ESG Mainstreaming

50% of the banks indicated having created some mechanism of institutional support which enables systematic support and encouragement for the mainstreaming of ESG elements. This included some banks which have created a process for integrated ESG assessment to be concurrently merged with the traditional risk assessment process undertaken by the banks.

Figure 7
Institutional support in banks for ESG mainstreaming



These banks have mandated the inclusion of ESG professionals within the Risk unit responsible for ensuring ESG due diligence for all Project Finance transactions and corporate lending transactions above a specific threshold. A significant number of banks also reported some level of oversight and monitoring from their Board on the performance of the bank on various ESG indicators. Some banks have identified a lack of awareness of ESG related factors in the risk officers as one of the critical barriers in mainstreaming ESG into the traditional process of risk assessment.

ESG GOVERNANCE IN PRACTICE

A bank interviewed for the research has an ESG committee within their Board headed by an Executive Director. This committee, on a quarterly basis takes stock of all elements of ESG risk the bank is exposed to, the appropriate mitigation measures adopted for these risks and challenges faced by the bank in doing so.

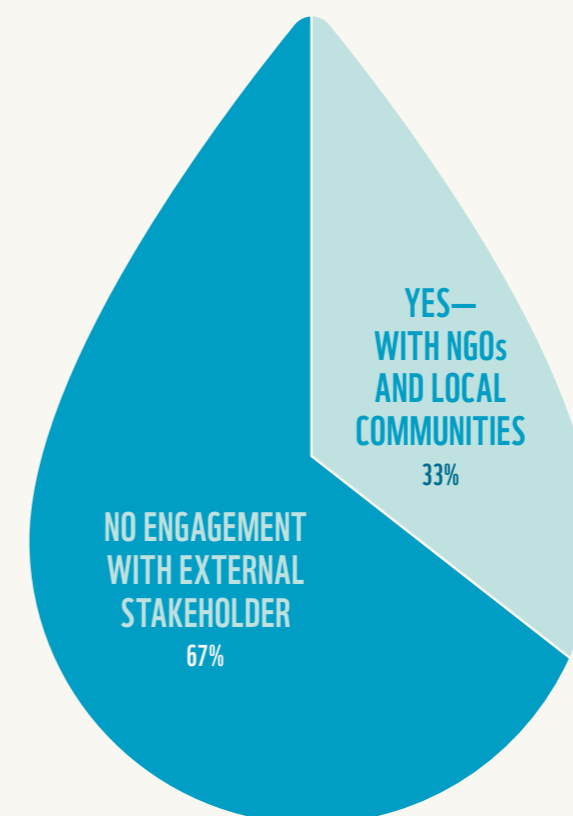
Another bank, among the largest lenders in the country by asset size, has a quarterly briefing from the project managers and risk officers with the top executive leadership of the bank on the potential ESG challenges from the bank's portfolio companies and the bank's preparedness in dealing with such challenges.

One bank has created mandatory ESG training modules for risk professionals before starting their respective roles. The bank also conducts in-house training for its risk professionals in association with NGO's and research institutions focused on sustainability.

Engagement of the Banks with External Stakeholders on Water Related Risks

A cohesive water strategy of a bank will include not only working with their clients in the context of the dependence of their operations on the availability of water but also working with a broad range of stakeholders such as local communities, regulators, standard setting bodies, government departments etc. to play their part in ensuring that water is managed sustainably as a shared, public resource.

Figure 8
Engagement of the banks with external stakeholders on water related risks



33% of the banks reported having such engagements with the relevant stakeholder institutions including NGOs, local communities and global standard setting bodies.

HELPING CLIENTS ASSESS WATER RISKS

One of the participating banks, specializing in lending to agro-based businesses, helped clients identify water related risks in their operations and coordinated the client's collaboration with an NGO to develop a Decision Support System (DSS) which helped the client plan its operations according to the current and projected availability of water in the future.

A large private sector lender proactively works with local communities and NGOs on watershed management and conservation in areas of water stress and where its clients have a geographical presence.

Another bank is working with the Natural Capital Finance Alliance (NCFA) to develop a holistic Advanced Environmental Risk Management (AERM) tool which, among other parameters, helps banks assess the water risks it is exposed to through asset allocations to a particular client.

CHALLENGES FACED BY BANKS IN INTEGRATING WATER

Lack of reliable, relevant data and a robust framework to analyze water risks:

To be able to gauge water related risks in the context of a business, it is important to have access to information not only of the nature of the operations of the business and its dependency on water (i.e., operational water risk), but also of the location that the business operates in (i.e., basin water risk). The geographic location of the business not only dictates the regulatory allocation of water to the industry in the particular region but is also important from the perspective of the nature of the local water risks and their potential to impact the long-term sustainability of the operation. Most of the banks interviewed indicated that the lack of reliable, relevant and recent data of industry-specific and location-specific water metrics and a framework that integrates the contextual nature of water related risks and opportunities are the biggest challenges to analyzing water related risks.

“The only comprehensive national level dataset which captures the availability of ground water in different regions of India is the one provided by the Central Ground Water Board (CGWB). However, this information is often outdated (the latest datasets are for 2013) and is focused on broad geographical blocks which leads to a lack of granularity that is essential for a bank like us while conducting water based due diligence for our clients.”²⁸

Lack of internal capacity on water: The banks interviewed cited a lack of internal professional capacity to enable a systematic integration of water related risks and opportunities in the strategic and operational contexts of the bank. Specifically, the banks indicated that a lack of understanding and knowledge on water related risks and opportunities among risk professionals and project managers often led to water not being considered during the risk appraisal process while disbursing loans to clients.

“A critical reason why water does not figure at all while the process to disburse loans is being carried out is because the professionals in the Risk and the Business department are not trained in the subject. While the bank has specific training modules on broader ESG risks and opportunities, there are none specific to water.”



“Working on water means working with government and engagement between a bank and government can be challenging.”

Lack of a level playing field: Since there is no regulatory mandate in India for the strategic and operational integration of water related risks and opportunities by the banks, it is often left to the discretion of individual banks. The banks which have attempted to integrate water as a key risk element while making asset allocation decisions have often faced pressure from clients while seeking additional information from them during due diligence pertaining to water in the context of the client's business operations and the location the business operates in. Additional water-specific due diligence has also led to an increase in turn-around time for making asset allocation decisions which has led to banks losing business to competitors who do not conduct the same enhanced level of water specific due diligence.

“For one of our potential clients in the construction industry that we were looking to get onboard, water was identified as critical to business operations. While we approved the disbursement of the loan to the client, a water specific due diligence focused on current and future availability of water to the business to be carried by an independent water expert was included as a pre-disbursement condition for granting the loan. Since no other bank required such due diligence, the client opposed this condition and eventually proceeded to get the loan approved from another bank without any such due diligence leading to a loss of business for us.”

Challenges in engagement between private sector and public sector/

government: Government is a key player in the management of water resources in India. Any attempts by the banks to integrate water related risks and opportunities within their operations will involve working with the government – either directly with the various departments of the government or with public sector enterprises, or indirectly with regulatory agencies, standard-setting bodies, academic institutions or public sector enterprises. The challenges of engagement between private sector and government arising from the fundamental organizational differences between the two, was mentioned as one of the critical barriers listed by banks in mainstreaming water related risks and opportunities.

“Working on water means working with government and engagement between a bank and government can be challenging.”

The framework to enable better integration of water related risks and opportunities by banks presented in the last chapter of the report attempts to address some of these challenges mentioned by banks during research for the report.

SUMMARY

While the banks consider water to be critical to the operations of the companies in their portfolios, it is not yet widely integrated into various operational and strategic elements in the banks' day-to-day functioning. The depth of water risk assessment also varies by the type of lending, with banks reporting an enhanced due-diligence of non-financial risks for project finance compared to corporate lending. Absence of a regulatory mandate to integrate water related risks, lack of robust data and a framework to analyze water related risks, low internal capacity within banks to understand and manage water related risks and the challenging dynamics of engaging with the government were some of the barriers listed by banks in enabling integration of water related risks.

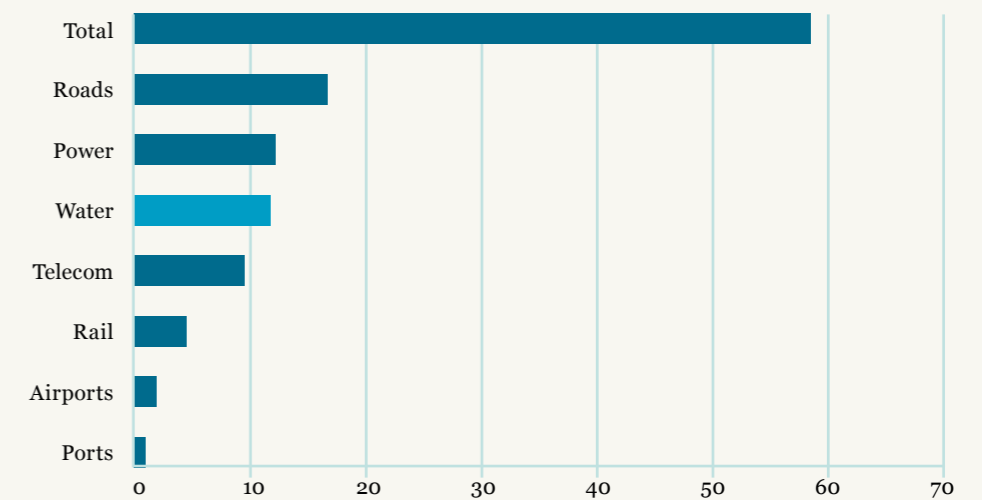
THE OPPORTUNITIES IN WATER



A BRIEF CONTEXT

Water issues also present opportunities for banks and investors to invest in technologies and businesses that help improve sustainable water resource management while generating attractive financial returns. It is estimated that to keep pace with the current levels of GDP growth, a global cumulative capital investment of USD 57 trillion will be needed in infrastructure between 2013 and 2030, including USD 11.7 trillion in water infrastructure.²⁹ (See figure below) To put it in perspective, the investment required in water is higher than telecom (USD 9.5 trillion) and comparable to power (USD 12.2 trillion).

Figure 9
Projected required
global investment in
infrastructure (2013-30)
USD trillion



USD 57 TRILLION
WILL BE NEEDED IN
INFRASTRUCTURE
BETWEEN 2013
AND 2030, INCLUDING
USD 11.7 TRILLION IN
WATER INFRASTRUCTURE.

Given the investment needs, commercial finance will be important to ensure sustained investments in the sector, and also in influencing the improvement of operational and financial standards in the sector (See the box below). However, commercial finance cannot be a standalone solution for financing needs in the sector and it needs to supplement the existing public finance structures to unlock increased investments in the sector.

BENEFITS OF INTRODUCING COMMERCIAL FINANCE IN WATER

- Increased sector funding:** Commercial finance can supplement available public funds to increase the funding available in the sector.
- Quicker access to finance and reduced time to construction:** Once commercial financing is established in the sector, creditworthy service providers should be able to achieve financing relatively quickly for commercially viable projects and not depend on slow public finance approval.
- Matched financing to asset life:** Commercial finance can match tenure of the financing with the asset life (which is long-term for most water infrastructure) by spreading out the repayment of up-front capital investments with business cash flows, allowing future beneficiaries to help pay for the initial costs of infrastructure.³⁰
- Increased sector management capacity:** Commercial finance requires a level of operational and financial management in line with private companies and should incentivize the sector to increase the sophistication of the service provider management.

Not all the investment required in water will be bankable – projects/investments having adequate collateral coverage, sustained future cash flows and high probability of success, to be acceptable to banks and investors for financing.³¹ Inadequate governance in the institutions that manage water resources, poor pricing of water as a resource, challenges for banks and investors in engaging with governments and concerns around poor creditworthiness of the borrowers are some of the factors that make these investments unattractive for banks and investors and will necessitate investments by government and Development Finance Institutions (DFIs).

However, there exists substantial investment opportunities for banks and investors in water. Many governments are incentivizing investments in water not just financially, but also by reducing transaction costs for businesses and investors through streamlined investment approval procedures and enforcing more effective regulations and policies.³² This slow but steady evolution of blended finance mechanisms which combines development finance to leverage private investment has the potential to enable more private sector participation in water related projects. The development finance can lower the risk for private investors by providing a risk coverage guarantee, financing the early stage (one with the highest risk) development and providing concessional credit on below-market terms.

Most of the investment in water is currently in supply-side solutions – those with an objective to increase the access to water,³³ through ‘grey’ or ‘human-made’ infrastructure such as treatment plants, water supply and sanitation.³⁴ Beyond this, there exists opportunities for banks in ‘nature-based solutions’ or ‘green’ infrastructure – solutions which use or mimic natural processes to enhance water availability, improve water quality and reduce risk to water related disasters and climate change.³⁵ These solutions will be critical in sustainable water management as they can deliver multiple benefits, such as reduction of water-related risks, climate change adaptation, biodiversity conservation, protection of human health and growth of natural capital.³⁶

OPPORTUNITIES IN ‘GREY’ WATER INFRASTRUCTURE

Fast-paced unsustainable urbanization and increasing industrialization have also contributed significantly to the deterioration in the quality of freshwater resources in the country. Meanwhile a rapidly growing population is also placing increasing demand on freshwater resources. This, in turn, has resulted in tighter regulatory controls around pollution abatement of freshwater, especially on pollution caused by the domestic and industrial sectors. These drivers have caused a surge in growth for water related infrastructure. Consequently, there exists a significant commercial opportunity in this space for banks to explore.

Wastewater Treatment & Cleaner Technologies

The market for Industrial Wastewater treatment has been significantly catalyzed by implementation of strict regulations in certain sectors which mandate the treatment of industrial effluents before these are discharged into the surrounding ecosystem. In February 2017, India’s Supreme Court directed all industrial units to ensure that their primary Effluent Treatment Plants (ETPs) are operational in three months and all industrial areas to have their common ETPs operational within the next three years, failing which they will be shut down.³⁷ The Central Pollution Control Board (CPCB), a statutory organization under the Ministry of Environment has also enforced standards for the discharge of environmental pollutants including water from certain industries including Sugar, Petroleum Refining, Textiles, Thermal Power, Cement, Rubber, Pulp and Paper, Leather and Fertilizer³⁸ promoting Zero Liquid Discharge (ZLD) and use of treated effluent for irrigation.³⁹

**FAST-PACED
UNSUSTAINABLE
URBANIZATION
AND INCREASING
INDUSTRIALIZATION
HAVE ALSO CONTRIBUTED
SIGNIFICANTLY TO THE
DETERIORATION IN THE
QUALITY OF FRESHWATER
RESOURCES IN THE
COUNTRY.**



The water and wastewater treatment market in India is a USD 4 billion industry and growing at a rate of 10-12 % each year.

The wastewater treatment market in India for the industrial sector which includes industry level and common ETPs and the domestic sector which includes Sewage Treatment Plants (STP), presents significant potential avenues of investment for banks in India. The water and wastewater treatment market in India is a USD 4 billion industry and growing at a rate of 10-12 % each year.⁴⁰ Industrial and municipal segments constitute close to 90% of the market. It is estimated that government and public institutions account for about 50% of the revenues generated in the market, while the private sector accounts for the other half.⁴¹ The government has been encouraging more private investment in the sector through various programs, including allowing investments in sewage treatment under the Hybrid Annuity Model (HAM) (See box below).

USING H.A.M. TO CATALYZE WASTEWATER TREATMENT

In 2016, the Government of India approved investments in wastewater treatment under Hybrid-Annuity, based on a Public-Private Partnership model within the ‘Namami Gange’ program. This is to facilitate private investments in the sector, fast tracking projects and ensuring effective utilization of funds.

The Hybrid Annuity-based-PPP Model (HAM) is a mix of the EPC (engineering, procurement and construction) and BOT (build, operate, transfer) models. Under HAM, the project is to be undertaken by the Special Purpose Vehicle (SPV) of the winning bidder. The government pays 40%⁴² of the capital expenditure quoted upon specific construction-linked milestones while the remaining 60%⁴³ of costs are borne by the bidder. This is paid back to the bidder by the government over the life of the project as quarterly annuities along with the operation & maintenance (O&M) expenses. The annuity and O&M payments are contingent upon the asset meeting pre-defined performance standards, which ensures long-term optimal performance of the asset.

Currently, 19 Sewage Treatment Plant (STP) projects with a cumulative capacity of more than 900 million liters per day are in the pipeline with some already initiated.⁴⁴



The total sewage generation from these urban centers is expected to grow more than three-fold to 120,000 MLD by 2051.

The size and the growth of the market is also being driven by the gap in the current wastewater generation by households and industry and its projected growth vis-à-vis the current installed capacity for treatment. The total industrial wastewater generated by industries in India is estimated to be 13,468 million liters per day (MLD) of which only 60% is treated. The total domestic sewage generation in the Class I cities and Class II towns in the country is estimated to be 38,254 MLD, while the installed treatment capacity can cater to only 30% of the total discharge.⁴⁵ The total sewage generation from these urban centers is expected to grow more than three-fold to 120,000 MLD by 2051⁴⁶ while the rural pockets of the country will generate close to 50,000 MLD by 2051. Even the existing treatment capacity is not effectively utilized due to improper design, poor maintenance, electricity outages and financial stress.

The current gap in the installed capacity and the projected growth in sewage generation in the country coupled with the ever-growing competition for scarce public finance will make commercial finance from banks essential, while also presenting an opportunity for banks to harness growing value from the sector.

Beside the end of pipe water treatment, an ever-increasing number of companies are implementing technologies and processes that make their operations water efficient and help streamline their processes with regard to their water usage and discharge. This not only presents opportunities for banks to finance investments in such technologies but the implementation of such technologies or processes will also reduce water related risks banks are exposed to through investments in such companies. Such opportunities may include potential investments in technologies that lead to water conservation and reuse, sludge minimization and energy recovery from sludge, nutrient recovery, advanced oxidation, and improved water testing among others.⁴⁷

Precision Irrigation

The concern over water availability in India has led to the realization of more efficient use of water resources in irrigated agriculture. Precision irrigation is considered as application of water based on the specific needs of a given location in the crop field. However, precision irrigation is now quite widely used, often to mean drip irrigation, but there is no commonly accepted definition. Precision in irrigation is met by demand side management of water (Automatic Irrigation System – creating a sync between the crop water requirement and water application) or supply side water management (micro irrigation – efficient distribution of irrigation water)



With greater advancement in the field of Internet of things expected in the coming years, AIS could emerge as an intelligent system which is efficient, fast and less costly.

Automatic Irrigation System (AIS)

The basic principle of AIS lies on controlling water through real-time monitoring of soil and crop conditions to trigger site-specific irrigation. It works on the crop area production functions that optimize water use at a given site over a set time period and enable management decisions accurately.

Backed up by the application of data and sciences, AIS uses Internet of things (IoT) and sensor network technology to meet the crop water requirement through irrigation management. The integrated system requires weather data like temperature, humidity, precipitation etc., and deploys soil moisture sensors. Based on the decision values generated, the land gets automatically irrigated by the turning ON/OFF of the motor. The water controller optimizes the water application at the accession and recession point during the pump operation. Much of the wastage in irrigation happens at that point of water application.

With greater advancement in the field of Internet of things expected in the coming years, AIS could emerge as an intelligent system which is efficient, fast and less costly. Crop insurance schemes such as Pradhan Mantri Fasal Bima Yojana have enabled the strengthening of weather stations even at a village level. The data generated from the weather stations will in turn strengthen the AIS.

Micro Irrigation

Micro Irrigation – the slow application of water as discrete or continuous drips, tiny streams or miniature spray on, above, or below the soil by surface drip, subsurface drip, bubbler and micro-sprinkler systems is among the critical policy priorities of the central and regional governments in the country as a way to tackle the growing water crisis.⁴⁸ Micro irrigation techniques help increase water efficiency at the farm level by reducing unused water returning to rivers or groundwater, decreasing energy and fertilizer consumption and bring an overall increase in farm productivity and hence, higher disposable income to farmers.⁴⁹

CAUTION

Though micro irrigation was found to improve the water productivity of crops, its installation has been cost intensive. Introduction of micro irrigation systems can change the dynamic of the entire farming system. It encourages farmers to shift to high value input intensive crops to generate high returns. Water saving impact will therefore not be felt owing to the change in crop water requirement aftermath of micro irrigation adoption leading to increased scarcity and risks for other water users in the basin. To address this, micro irrigation should not be adopted by means of ad-hoc projects but implemented at a strategic level within overall basin management and water allocation planning.

With half the cultivable land in the country still being rain-fed, there is an untapped potential for implementation of micro irrigation techniques on the farm. The potential area which can be covered under micro irrigation in the country was estimated to be 69.5 million hectares in 2015.⁵⁰ With the government's focus on adding one million hectares under micro-irrigation annually,⁵¹ the estimated annual investment required in the sector is projected to be between USD 714 million and USD 1.14 billion.⁵² While the government budgetary allocations are expected to be a significant source of financing in the sector, there will still be an opportunity for banks to finance some of these investments.



Carefully planned investments in nature-based solutions that restore and strengthen natural capital can deliver significant value and generate returns for banks and investors.

OPPORTUNITIES IN 'GREEN' WATER INFRASTRUCTURE

Integrating nature-based solutions with built infrastructure for water treatment, storage or delivery can reduce operating costs of the infrastructure and elongate its lifespan while enhancing the natural capacity of freshwater ecosystems to mitigate the impact of floods, droughts and storms on communities and cities.⁵³

Carefully planned investments in nature-based solutions that restore and strengthen natural capital can deliver significant value and generate returns for banks and investors,⁵⁴ not just from these solutions directly but from the enhanced long-term performance of assets that rely on these ecosystems.

Watershed Management

Watershed management and restoration can provide a host of 'watershed services' including water availability, aquatic, flow regulations and buffering against storms/floods, filtration of nutrients and erosion control – all of which are critical in ensuring water availability and quality. These services are critical not just for communities around the watersheds and their livelihoods but also for the businesses downstream which depend on the water for their operational sustenance. While most investments in watershed management are being done through public finance, commercial finance – especially through mechanisms of blending between public and commercial finance, can play an important part in this too.

There are different mechanisms that exist for watershed management.⁵⁵

- Public funding for watershed protection** – Funded by governments (at times with multilateral or donor support), these reward land owners and communities for enhancing or protecting ecosystem services at a large scale.
- User-driven watershed investments** – These channel payments from downstream water users such as companies or water utilities on behalf of customers to landholders or other parties in exchange for conserving, restoring or creating green infrastructure.



RESTORING WATER QUALITY

In the late 1980s, Perrier Vittel – a French brand of natural bottled mineral water (later acquired by Nestlé) designed and implemented its program in order to improve water quality by reducing nitrates and pesticides and restoring natural water purification in a sub-basin of the Rhin-Meuse watershed in northeastern France. The company paid the upstream dairy farmers and forest landholders to incentivize the improvement of farming activities to restore water quality to desired levels.⁵⁶

c) Water quality trading and offsets – This allows water users to manage their impacts on watersheds by compensating others for offsite activities that improve water quality or supply.

NUTRIENT TRADING TO REDUCE WATER POLLUTION

In many rivers in the United States, high nutrient loads have dramatically reduced water quality. As an alternative to regulations which have largely been ineffective, nutrient trading has recently been instituted in several areas as an effective way to achieve or exceed water quality standards in watersheds.

It also gives non-point sources – those who discharge from diffused sources such as fertilizer runoff from agricultural fields, a financial incentive to participate in pollution control. Trading of pollution reduction credits among sources allows polluters with low treatment costs to reduce their nutrient loads below allowable levels and sell the difference (a credit) to polluters for whom buying credits is cheaper than compliance costs.⁵⁷

US\$25 BILLION
 IN 2015, TOTAL GLOBAL
 SPENDING ON GREEN
 INFRASTRUCTURE FOR
 WATER WAS ESTIMATED
 TO BE USD 25 BILLION –
 AN 11.8% INCREASE
 FROM 2013

d) Environmental Water Markets – These refer to the trading of water rights to achieve environmental objectives and can come in a variety of forms.

The scale of financial transactions for watershed management continues to increase. In 2015, total global spending on green infrastructure for water was estimated to be USD 25 billion – an 11.8% increase from 2013, with more than 486 million hectares of land protected or rehabilitated as a result of this spending. While most of this spending (USD 23.7 billion) came in the form of subsidies from the government or supranational bodies, water users such as cities, companies or water utilities spent USD 657 million to manage water risks in their basins.⁵⁸ While this presents a source for direct investments for banks, green infrastructure can also improve the functioning of built infrastructure which can help banks fully capture the expected returns on built infrastructure investments.

Wetlands Conservation

Wetlands – areas where water covers soil all, or part of the time, play a critical role in improving water quality, providing habitat for fish and wildlife, storing floodwater, recharging groundwater and maintaining surface water flow during dry periods. The water quality and the risks emanating from extreme water related events such as floods and droughts has a severe impact on businesses and thereby for the banks with exposure to these businesses and restoration and creation of wetlands can help minimize these risks.

Constructed wetlands can have important applications in domestic and industrial wastewater treatment. While grey infrastructure solutions might continue to be needed for treatment of certain effluents, industrial effluents such as petrochemical, dairy, meat processing, abattoir, breweries, tanneries and pulp and paper effluents can be efficiently treated through constructed wetlands⁵⁹ (See boxes below for examples).

NATURAL SOLUTIONS TO TREAT WASTEWATER

In East Ukraine, pilot scale-constructed wetlands demonstrated tremendous potential in removing pharmaceuticals from wastewater, with removal rates for different pharmaceuticals ranging from 5%-90% with higher efficiency in removing difficult compounds such as carbamazepine and diclofenac – pharmaceuticals that are among those detected in the highest concentrations in treated wastewater.

At the Shafdan wastewater treatment plant in Israel, the plant's secondary-treated effluent is infiltrated into the sandy coastal plain of Israel, where its quality improves further as it infiltrates into the aquifer for subsequent recovery. The effluent is then recovered from two rings of production wells surrounding the infiltration basins. Through soil aquifer treatment, the water quality is significantly improved and used for unrestricted irrigation, increasing water availability in the arid regions of Israel.

In Lebanon, the Litani River is highly polluted due to the discharge of untreated agricultural, industrial and domestic wastewater. This has resulted in soaring concentrations of nutrients and pathogens in the river. A constructed wetland system has been designed to treat water flows in the river and removed between 30% and 90% of the pollutant mass, resulting in wetland effluent quality that falls within the range permitted by international environmental standards.⁶⁰



Restoring the floodplains and constructing new wetlands could help manage hydroclimatic variability and change, which has extensive environmental and socio-economic benefits, as it helps to safeguard against extreme climate events and disasters.

Constructed wetlands can also be used to treat domestic wastewater too which can then be used for other purposes, including irrigation. Domestic wastewater is made up of three basic components: water, carbon and nutrients.⁶¹ As most treatment systems, constructed wetlands are intended to reduce organic matter and pathogens to a minimum, but are of varying efficiency when it comes to nitrogen and phosphorus reduction. Hence, the effluent leaving constructed wetlands can have relatively high levels of these nutrients, making it a highly suitable source of water for irrigation.⁶²

Constructed wetlands can be an important part of water related disaster risk management strategy as well.⁶³ Restoring the floodplains and constructing new wetlands could help manage hydroclimatic variability and change, which has extensive environmental and socio-economic benefits, as it helps to safeguard against extreme climate events and disasters⁶⁴ (See box below).

CREATING AND RESTORING WETLANDS

LafargeHolcim – a Swiss multinational manufacturing building materials worked with the municipality of Bellegarde in France to expand flood prevention infrastructure through quarry rehabilitation and management programs and create wetlands that became fully operational in 2015.⁶⁵ The company leveraged quarries as water reserves. The extracted quarry areas were converted into stormwater reservoirs thus reducing the risk of flooding to the local communities.

In addition to presenting a sizeable commercial opportunity, wetlands can also be crucial in reducing the damage from natural disasters such as floods and thus prevent loss of commercial value for businesses and banks. A case in point is the flooding in Houston, Texas in 2017 by Hurricane Harvey. It was estimated that the hurricane caused a total economic loss of USD 73.5 billion, with most of the damage sustained in the Greater Houston Area.⁶⁶ This area has seen more than 38,000 acres of wetlands vanish between 1995 and 2015, making the area prone to flooding.⁶⁷

Since, there is largely no market determined price for services from green infrastructure for water and because hydrological benefits from such services are often localized, no unified global market for green infrastructure for water exists. With no conventional financing mechanisms present in this space yet, an opportunity exists for innovative financing mechanisms to be developed. These mechanisms will also be needed to finance conventional solutions in water since the market is not fully developed yet to integrate full-fledged integration of commercial finance.

INNOVATIVE FINANCING MECHANISMS FOR WATER

Water and sanitation continue to be significantly under-financed in most developing countries including India⁶⁸ resulting in under-performance and deterioration and could potential lead to the collapse of water infrastructure in these countries. Public finance – the biggest source of water investment in these countries will not be enough by itself to sustain the growing demands for investment in the sector given the rising competition for scarce public funds and increasing sovereign debt burdens.⁶⁹ While in the long-term, policy-driven structural reforms that improve the sector's revenue generation potential will be needed to bridge this financing gap by attracting more private investments, in the short to medium term, innovative financing instruments which draw on both public investments and private capital will be essential to fill this gap.⁷⁰

Blending Grants and Repayable Financing

Blending grants with repayable financing refers to combining concessionary financing – either from philanthropic grants or loans with a grant element with repayable finance – from Development Financial Institutions or market-based sources.⁷¹ Blended finance is not a separate asset class, rather it uses various financial instruments. It combines small amounts of risk-tolerant capital that can support upfront project investments with an extended payback period which leverages larger amounts of market-based long-term capital such as loans from commercial banks or equity infusions from private investors.

Blending finance for financing water projects can come in different forms. The blending can either be achieved at a project level or at institutional level where specific institutions are set up to pool financing from both concessionary and market-based sources with an explicit mandate for institutions to combine these financing sources (See box below for example). The mode of providing concessionary finance- interest rate subsidies, establishment of project preparation facilities or seed financing for market-driven revolving financing⁷² and the type of private finance leveraged – syndicated loans, direct investment in companies, guarantees or investment in Common Investment Vehicles (CIVs) can vary significantly across various blending mechanisms too.⁷³

An OECD survey revealed that official development finance mobilized an additional USD 1.5 billion of private resources in 2012-15 for water and sanitation (USD 385 million on average per year) with guarantees (USD 1 billion) and syndicated loans (USD 388 million) contributing to the bulk of this financing.



Water and sanitation continue to be significantly under-financed in most developing countries including India resulting in under-performance and deterioration and could potential lead to the collapse of water infrastructure in these countries.

USING BLENDED FINANCE IN TAMIL NADU

In 1996, the state of Tamil Nadu in India created Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL), an asset manager, jointly owned by the Government of Tamil Nadu and private financial institutions. To overcome the challenge faced by this asset manager in tapping capital markets, a blended finance fund was created with support from German Development Bank – KfW. The developmental bank disbursed a EUR 10 million concessional loan to the Government of India. This amount was used to fund the subordinated tranche (35%) of a Special Purpose Vehicle (SPV) managed by TNUIFSL called the Water and Sanitation Pooled Fund (WSPF) designed to disburse loans to urban local bodies. The KfW-funded tranche was combined with the Government of Tamil Nadu's equity support as cash collateral (10%) to provide an additional cushion against any potential losses suffered by the projects. The SPV issued two bonds in 2012 and 2013 primarily to institutional investors, including public and private pension funds. The combination of the KfW loan (interest rate of 0.75%) and interest on the bonds (the first bond issued at 10.6%) permitted lending to municipal projects.⁷⁴



The market in Municipal Bonds is expected to grow, presenting banks with commercial opportunities in this space.

Bond Finance

Debt financing via bonds in the water sector constitutes a small, but increasing proportion of financing in the sector.

Sub-Sovereign (Municipal) Bonds

The municipal bond market in the country is still in its infancy. A total of nearly USD 249 million for 27 projects (16 of which were for water supply and sewer system projects) was raised by municipalities in India between 1997 and 2014⁷⁵ while the total annual bond issuance in the country in 2015 alone stood at USD 61 trillion.⁷⁶ The issuance size also fades in comparison with that of other countries – the US municipal bond market stood at USD 303.66 billion in 2014⁷⁷ while the cumulative issuances by the local governments in China was estimated to be USD 17.8 billion in 2014.⁷⁸

However, given the scale of investment needed in the water sector in India, the growing pressure on public finances, increasing domestic savings and a policy push by the government (See box below), the market in Municipal Bonds is expected to grow, presenting banks with commercial opportunities in this space.

REGULATION TO ENABLE CITIES TO FUND WATER INFRASTRUCTURE

In March 2015, the Securities & Exchange Board of India (SEBI) passed regulations to facilitate issuance of municipal debt and listing of debt securities by municipalities in India. This will enable investment in public infrastructure of the 100 Smart Cities that the Government of India proposes to develop. Moreover, the 14th Finance Commission has allocated INR 17,400 Crore (USD 2.48 billion) to municipalities for the period 2016-20 as performance grants that are tied to conditions which, when complied to, will help municipalities raise money from the markets.⁷⁹



Green & Blue Bonds

The global market for Green Bonds – a financial instrument used by companies to support their environmental sustainability or conservation projects is increasing and a part of the issuances of these bonds is towards building assets in water infrastructure. The global green bond market grew from around USD 11.5 billion in 2013 to over USD 155 billion in 2017. In 2017, it included USD 30 billion of bonds related to sustainable water management (See the box below for an example), which is around 13% of annual green bond issuances for the year.⁸⁰ In India, the issuances of green bonds doubled to USD 4.3 billion in 2017 putting the country among the top ten global issuers of such bonds.⁸¹ However, the allocation of such issuances to projects in water management is only about 2.2%, most of which is under the broader umbrella of low-carbon buildings.⁸²



The global green bond market grew from around USD 11.5 billion in 2013 to over USD 155 billion in 2017.

WASHINGTON DC'S ENVIRONMENTAL IMPACT BOND

In September 2016 the Washington DC, District of Columbia Water and Sewer Authority (DC Water) issued an Environmental Impact Bond ("EIB"). The EIB is a 30-year tax-exempt municipal bond issued at a USD 25 million face value and an initial 3.43% interest coupon, payable semiannually, for the first five years.

At the five-year mandatory tender, there is provision for a USD 3.3 million payment as per the annual coupon rate of 3.43%, payable to Investors by DC Water or to DC Water by Investors, contingent on the relative success or failure of the project. If the constructed Green Infrastructure (GI) produces stormwater runoff reductions greater than 41.3% of the measured baseline, DC Water will make a one-time additional Outcome Payment to Investors of USD 3.3 million. If runoff is reduced less than 18.6% of the measured baseline, investors will make a one-time Risk Share Payment to DC Water of USD 3.3 million. A performance measurement of between 18.6% and 41.3% reduction in runoff will result in no additional payment other than the basic principal and interest payable on the EIB.⁸³ The DC Water EIB represents the first use of the Pay for Success model in the water sector and the first to be issued as a tax-exempt municipal bond.

Blue Bonds are an instrument similar to green bonds but different in the sense of a specific end use of the proceeds raised. Issued by the government, development banks or others, they are used to raise capital to finance freshwater, marine and ocean-based projects that have positive environmental, economic and climate benefits. While the market is nascent, there are interesting examples of sovereign blue bond issuances (See box below), providing an opportunity for banks as underwriters and investors in the bonds.

THE WORLD'S FIRST BLUE BOND

In October, 2018, the Republic of Seychelles launched the world's first sovereign blue bond. The bond will raise USD 15 million⁸⁴ from institutional investors and the proceeds from the bond will include support for the expansion of marine protected areas, improved governance of priority fisheries and the development of the Seychelles' blue economy.

Though not labeled as 'Blue Bonds', Nigeria, Fiji and France⁸⁵ have also included marine assets in their green-labeled sovereign bond issuances.

'Bankable Projects' in Water

Lack of bankable, packaged projects is among the biggest limiting factors for infrastructure investments in the water sector. Bankable projects can attract long-term commercial capital and therefore can be critical in enabling the creation of assets in water infrastructure, most of which have long gestation periods and consequently long tenor financing requirements. Creating an ecosystem which encourages and supports such projects will require active participation of all stakeholders – a) Corporates – to identify opportunities for better water management within their operations and supply chains, b) Financiers – to mobilize capital at scale through innovative mechanisms, c) Governments and Regulators – to create ideal conditions to enable effective water management and d) NGOs – to enable coordination, ideation and innovation.⁸⁶ (See box on WWF Bankable Projects Initiative).

Creating an ecosystem which encourages and supports such projects will require active participation of all stakeholders.

WWF BANKABLE PROJECTS INITIATIVE

Investors and banks are investing heavily in water-related infrastructure and are keen to invest in more sustainable water projects, but there is no pipeline of viable projects. WWF is helping to bridge this gap by catalyzing a stream of bankable projects, which will improve freshwater ecosystems in our river basins, while providing investors with an acceptable return on their investment. These can range from investments in solar and wind energy to natural flood protection.

To date, we have collected 37 ideas for potential bankable projects in 24 river basins with some being at a conceptual phase, while others are being implemented and scaled. WWF is focusing on project types that both improve water sustainability and offer an attractive risk/return profile. More specifically, the projects identified should have:

- 💧 Sustainable impact: There is a clear positive impact on water sustainability in priority basins
- 💧 Clear revenue model and return: There is a clear revenue model which has been proven elsewhere
- 💧 Acceptable risk and other constraints: The risks related to the project have to be identified and should match the expected returns.

SUMMARY

Water, while representing risks in the portfolio of the banks, also represents a sizeable commercial opportunity in water infrastructure assets – grey and green that help mitigate the causes of these risks. However, there are challenges which are preventing large-scale mobilization of commercial capital in the sector which necessitate the deployment of innovative mechanisms to raise and deploy capital in the sector.



FRAMEWORK FOR ENABLING BANKS TO INTEGRATE WATER RISKS AND OPPORTUNITIES

Water could be a source of both portfolio risk and commercial value creation for banks.



The higher the banks move up the ladder, the better prepared they will be in dealing with potential water related risks and in realizing financial value from the opportunities.

The fundamental drivers of water risk and opportunities to businesses are drawn from the cumulative use of water in a river basin from all stakeholders. Banks, by serving individuals, businesses, governments and civil society organizations, are in a unique position to potentially address these drivers through an emphasis on water stewardship – sustainable management of shared water resources in the public interest through collective action with other businesses, governments, NGOs and communities.⁸⁷

WWF's Water Stewardship framework can provide important guidance for how banks can play a leading role in identifying, mitigating and reducing water related risks while realizing value from the commercial opportunities in this space. The steps in the framework indicate the water-related activities banks can undertake to become a 'good water steward' – one which recognizes water as a strategic and a core business issue that is material to profits and long-term opportunities for growth and acts on it through proactive and collaborative responses.⁸⁸

The framework emphasizes developing an **awareness of water** and a **knowledge of impacts** from water as foundational pillars in the journey to become a water steward. For banks, this translates to having a high-level understanding of water related risks and opportunities and then translating this understanding to have a systematic knowledge of the impacts these can have on the bank's portfolio. These can then further facilitate **internal action** by banks to proactively identify, measure and mitigate water risks in their portfolio and seize commercial opportunities present in the sector. Since water is a collective resource that cannot be 'managed', but that rather must be collectively 'stewarded',⁸⁹ an effective strategy on water will see banks engage at a scale beyond their immediate sphere of influence by encouraging **collective action** and **engaging in water governance**. These involve working with various stakeholders such as customers, NGOs, communities, government etc. to enable and encourage systemic mitigation of water risks and harness commercial opportunities.

Figure 10
WWF Water Stewardship framework adopted for banks



Table 2
Potential action points for banks

The higher the banks move up the ladder, the better prepared they will be in dealing with potential water related risks and in realizing financial value from the opportunities. The potential action points (See table below) for the banks will depend upon the stage of the ladder they are at and the ambition of the bank with regard to water related risks and opportunities. The steps along the framework and the corresponding action points should not be seen as prescriptive and contained but fluid, iterative and indicative.

Stage of the ladder	Potential action points for banks
5—Basin Governance	<p>Influence governance for systemic change</p> <ul style="list-style-type: none"> Engage with regulators and government to push for a policy regime that mandates water related risk management by banks and facilitates investment flows in the sector Encourage government to enforce improved governance and better financial performance of public companies including water utilities and strong legal structures on tariffs, cash flows and asset ownership to facilitate commercial capital Assist development of water related institutions, intermediaries, consultants, knowledge platforms etc. to bridge knowledge gap on water
4—Collective Action	<p>Action at the sectoral level</p> <ul style="list-style-type: none"> Adopt/promote industry level sustainable lending guidelines to enable a level playing field for integration of water risks Engage with customers, suppliers, employees, NGOs, peers, public sector, communities, DFIs etc. to disclose and address water issues at catchment/basin level Work with government, DFIs to leverage public funds to catalyze, facilitate deployment of commercial capital in the sector
3—Internal Action	<p>Portfolio alignment and action at the client level</p> <ul style="list-style-type: none"> Integrate water in decision-making related to business planning, capital allocation, product design & development and opportunity identification Include water related due diligence as key element of risk management, use instruments like subsidies, insurance, credit ratings, partial credit guarantees, co-financing to reduce risk Identify and invest in commercial opportunities in improvement, expansion of water infrastructure including 'green' infrastructure for long-term mitigation of the water risks at the basin level Set accountability for water through appropriate governance mechanisms which include bank's top leadership
2—Knowledge of Impact	<p>Develop internal frameworks</p> <ul style="list-style-type: none"> Identify and assess water risk of existing portfolio at operational (company, sector) and locational (basin, geography) level using appropriate tools and methodologies Create water related broad due-diligence criteria for new client assessments such as 'go/no go' policy based on water withdrawal, consumption or wastewater discharge criteria Seek water related disclosures, mitigation strategies for potential water risks from major companies in the bank's portfolio
1—Awareness	<p>Understanding water risks</p> <ul style="list-style-type: none"> Understand the water risks embedded within the portfolio that are already impacting, likely to impact portfolio sectors, companies Track water risk elements within the broader analysis of market intelligence, competition review conducted by banks Build internal capacity for risk, compliance and business departments on water related risks and opportunities Include potential water trends and financial impact scenarios while defining bank's medium and long-term strategic plans

CALL TO ACTION FOR BANKS

Banks have a necessary role to play in the transition towards sustainable management of water.

As lenders to businesses, banks are exposed to water related risks faced by businesses and these risks can manifest in various forms for banks including the possibility of non-payment or delayed payment of loans by the borrowers and the loss of bank's brand reputation resulting from unfair, unjust or manipulative practices by clients among others. These risks also present to banks opportunities for creating commercial value by investing in solutions that help mitigate the causes of these risks. The following are some actions that banks can take to reduce water related portfolio risks and harness greater commercial value from water:

- a) **Integrate water within the core strategic considerations of the bank** through governance structures, policies, standards and processes that influence internal decision-making within the bank
- b) **Strengthen capacity to recognize, measure and act on water risk & response** – including ESG understanding and data, in order to evaluate portfolio companies and the value chains of these companies (See the box on WWF Water Risk Filter)
- c) **Tap into the ever-increasing potential opportunities in water** by proactively supporting companies/assets/technologies that seek to reduce water related risks and developing water-specific offerings (e.g. water mutual funds, water risk credit-adjustments etc.)
- d) **Disclose own water risk exposure and demonstrate water risks mitigation actions** publicly through internationally recognized standards and guidelines
- e) **Use the influence with the clients to promote sustainable management of water** through measures such as encouraging customers to disclose water related data, adopt stronger water policies (and promote stronger regulatory policies with the government) and practices which can include criteria on water withdrawal, consumption and wastewater discharge by the company and adopting a basin perspective
- f) **Contribute proactively to wider network of institutions** which addresses the systemic levers that can lower risks and increase investments in the sector including supporting stronger regulatory frameworks for banks and businesses on water, facilitating dialogue with peers to improve banking industry standards on water etc.



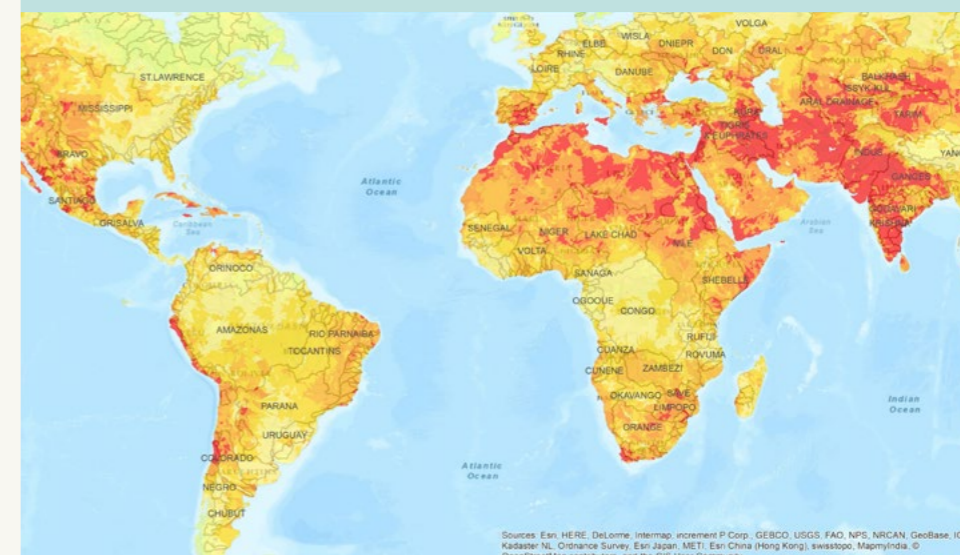
After a major upgrade in 2018, the Water Risk Filter 5.0 now enables financial institutions to better assess water risks and evaluate a company's water stewardship response.

WATER RISK FILTER

First released by WWF in 2012, the Water Risk Filter was developed in collaboration with the German Development Finance Institution, DEG, to understand and analyze the water risks in its portfolio. Designed for non-water experts, this practical online tool can be used by financial institutions during the scanning and due diligence phase as well as for portfolio monitoring.

After a major upgrade in 2018, the Water Risk Filter 5.0 now enables financial institutions to better assess water risks and evaluate a company's water stewardship response. It is the only tool to provide a comprehensive assessment of water risks, by taking into consideration:

- 💧 **Basin Risks:** Risks related to a company's geographic location are assessed using 32 state-of-the-art basin risk indicators and 12 high resolution country data sets, including the Greater Mekong region.
- 💧 **Operational Risks:** Risks related to a company's impact/performance are assessed using either a short form questionnaire (10 quick drop-down questions, applied to all sites) or a more detailed questionnaire (45 questions, applied site-by-site).
- 💧 **Water Stewardship Response:** Based on a company's water risk exposure (basin and operational risk), the new Respond section will provide a customized set of mitigation response actions. Financial institutions will be able to compare a company's current mitigation measures versus WWF recommended actions in order to evaluate the appropriateness of a company's water stewardship response to risks. The Water Risk Filter 5.0 is evolving to allow financial institutions in the future to estimate financial value impacts from water events and seize opportunities to invest in sustainable water projects.
- 💧 **Valuing Water Risks:** Powered by CDP Water Security, a new user guided-valuation module will enable financial institutions to understand how a portfolio's water risk exposure translates into financial value impacts.
- 💧 **Analyzing Opportunities:** Within the context of WWF's work on Bankable Water Solutions, financial institutions will be able to use the Water Risk Filter to identify not only basins in need of investments (i.e., high water risk), but also ones that perhaps have suitable investment environments (e.g., low corruption risk).





Effective policies and regulations can encourage sound water related risk management, promote transparency in water related risk disclosures and ease the flow of commercial investments in the sector.

CALL TO ACTION FOR REGULATORS⁹⁰

Strong regulatory support will be crucial in increasing participation of commercial finance in the sector. Effective policies and regulations can encourage sound water related risk management, promote transparency in water related risk disclosures and ease the flow of commercial investments in the sector. The following are some of the actions that regulators can take to facilitate water risk mitigation and the flow of commercial capital to the water sector:

- a) **Mandate public disclosure by listed companies (including banks) of their exposure & responses to water risks** in a comparable, relevant and widely accepted format that also speaks to financial materiality
- b) **Publish their position on water as regulators** listing the minimum required expectations from banks and businesses on water risk with a call for proactive, collaborative and transformational approach on water
- c) **Facilitate a dialogue among stakeholders including businesses and banks** on the way forward on integration of water related risks within the strategy and operations of the business
- d) **Build internal and sectoral capacities on water** to ensure sufficient personnel and organizational knowledge to prioritize water risks
- e) **Streamline the process of declaring and reporting of non-performing loans by banks** by mandating the disclosure of drivers of defaults under clearly defined categories including environmental factors

SUMMARY

Water is not just a source for potential risks to banks but also for untapped commercial opportunities. Banks can play a critical role in enabling sustainable water management which reduces systemic water related risks faced by banks in their portfolio while opening up new financing avenues in water solutions for banks to deploy capital and earn returns from. The WWF Water Stewardship framework can provide useful guidance for banks in their journey towards being a 'good water steward'.



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39%

Percentage of gross credit exposure of Indian banks exposed to sectors with high water risks

21

Number of major Indian cities expected to run out of groundwater supplies by 2020



USD 11.7 TRILLION

Total global investment needed in water infrastructure between 2013 and 2030

USD 4 BILLION

Estimated size of water and wastewater treatment market in India

USD 25 BILLION

Total global spending on green infrastructure for water in 2015



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