

ENABLING POLICIES FOR FINANCING WATER-RELATED SUSTAINABLE DEVELOPMENT GOALS

REGIONAL DISCUSSION PAPER



ENABLING POLICIES FOR FINANCING WATER-RELATED SUSTAINABLE DEVELOPMENT GOALS

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Foreword

The Asia and the Pacific region is facing critical water and development related challenges, including increased competition for limited freshwater across key sectors, water and sanitation access, aging irrigation systems, and untreated wastewater discharges. The region also endures the most number of people affected by water-related disasters of any in the world. Governments of the region are facing severe pressures to provide more services, to fund their continuous water operations and maintenance, and to brace for extreme water-related events.

The 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) provide a unique opportunity for the region to stimulate progress towards health and well-being for all, as water-related Sustainable Development Goals centre explicitly on enhancing access for all to safe water and sanitation, and the sound management of freshwater ecosystems.

The 3rd Asia-Pacific Water Summit and the 8th World Water Forum emphasized that governments need to mobilise public resources and expand opportunities for impactful investments to achieve the water related SDGs. This discussion paper is an outcome of those two regional sessions and provides an overview of existing policies and an enabling approach for financing water-related SDGs. The evidence shows that, at present, existing sources of funding do not match the need for investments to meet our region's water-related commitments with a business as usual approach. Indeed, current financing is directed primarily towards water supply and sanitation infrastructure schemes, while the achievement of all other water-related SDG targets by 2030 remains fragmented and project-based.

Considering the magnitude of the financial requirements to meet these challenges, and based on recommendations of the respective sessions, this paper proposes that public policy frameworks be enhanced to help leverage own sources of funds, creatively tap into new sources and develop innovative financing frameworks. In this regard, the policy-makers in the region have repeatedly shown an interest to create conducive policy environments that ensure certainty for institutions and businesses and robust returns on investments in their water markets.

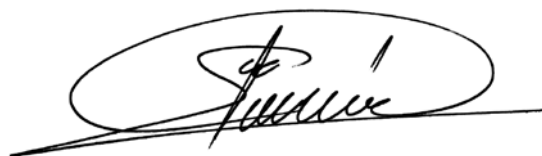
The region also needs to strengthen integrated water resources management processes to build coherence and promote better management of its water cycles, so that investments can be mobilized to help attain the water-related SDGs. Secretariats of ESCAP and the Asia Pacific Water Forum (APWF) network remain committed to supporting Member States and sharing solutions to help achieve the 2030 Agenda for Sustainable Development.

We look forward to continued collaboration and accelerating action throughout the region.



Ravi Narayannan

Chair
Governing Council of the
Asia-Pacific Water Forum



Stefanos Fotiou

Director
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Key Messages

- Water-related issues and SDGs are integral to the advancement of the global development agendas and there is now strong *global consensus and momentum* to address water challenges to contribute to the '2030 Agenda for Sustainable Development', the 'Paris Agreement on Climate Change', the 'Sendai Framework for Disaster Risk Reduction', and the 'New Urban Agenda'.
- Regional discussions on implementation of the global agendas have highlighted the need for innovative and sustainable financial instruments and for a regional monitoring system on the financing of water-related SDGs. The importance of these issues have been affirmed through the 'Yangon Declaration: The Pathway Forward' adopted at the 3rd Asia-Pacific Water Summit.
- Better analysis and understanding of the needs and opportunities along water cycles can help identify key intervention points to plan and mobilize impactful investments.
- The region's experiences indicate that universal access to water and sanitation services cannot be attained solely through large-scale projects and mega infrastructure financing; local, nature-based solutions and decentralized water management systems should also be incentivized.
- To enhance financing sources for the water-related SDGs, governments must identify own sources of funds to leverage concessional finance (development finance, low-interest loans, etc.) and commercial finance. As such,
 - the capacity to grow governments' own source funding must increase to generate more domestic revenue to improve water-related services;
 - when possible, the region's water service managers and providers may need to explore utilisation of commercial, and in particular, domestic finance. Public utilities in the current economic climate need to establish good impactful investment points that are stable and provide good long-term returns and minimize risks.
- Levers for accelerating the regional momentum in Asia-Pacific:
 - Transparency: public trust is instrumental and a multiplier of the efforts
 - Regional cooperation and partnerships: no organization can solve the range of issues on their own, and incentivising collaborative partnerships are important to bring together necessary expertise
 - Capacity building: to transfer and mainstream expertise and increase capacity of governments and utilities to enhance operations and maintenance
 - Credit-worthiness of public utilities: enhanced credit-worthiness and financial sustainability will facilitate greater access to financing to improve water systems.
 - Localizing global agendas: the most critical water-related issues intersect in cities, which must be engaged to untap opportunities to achieve development objectives
 - ESCAP, as well as other regional platforms and organisations, can play a key role in convening member states, local governments, multilateral development banks, civil society, NGOs, academia and others to identify regional needs, share knowledge and foster partnerships to support water-related SDGs.

Executive Summary

This discussion paper is focused on exploring policies, actions, and strategies to attain the Sustainable Development Goals (SDGs) by improving the resilience of water systems and infrastructure. This requires strategic mobilization of public resources and augmenting the opportunities for private investment. The contents of this discussion paper were developed and refined based on the outcomes of two regional sessions, coordinated by ESCAP at the 3rd Asia-Pacific Water Summit (3rd APWS, Yangon, 2017) and the 8th World Water Forum (Brasilia, 2018).

To attract investments and make progress towards the achievement of the water-related SDGs, countries in the region need to focus on policy actions and define strategic frameworks to improve the financial sustainability and resilience of water systems and infrastructure. In all presentations, shared at various intergovernmental platforms, speakers pointed out that governments should strategically mobilize public resources and expand opportunities for private investment.

Experts also shared various regional initiatives, including the lessons learned from macroeconomic perspectives as well as local level innovations. The World Bank proposed a step-by-step framework to improve the credit-worthiness of utilities; the Asian Development Bank shared the lessons learned in financing of the irrigation sector (the primary water-user of the region), which involves institutional, structural and financial reforms.

Apart from regional and national level experiences, various experts also shared practices for possible replication, such as: (i) the experiences of Japan and other disaster-prone countries in the region; (ii) the experience in developing ODA financing tools to improve water security and financing of water infrastructure of the Republic of Korea and the Peoples' Republic of China in collaboration with several developing countries; (iii) the example of privatization of operations as conducted by Manila Water; and (iv) the decentralised financing schemes for wastewater treatment systems, as shared by Indonesia. Effective regional examples are highlighted in water cycle management, raising attention to the multiple entry points for impactful investments within water cycle loops, namely in the local water cycle loop (short, such as in water recycling in a city and at the community management scale), the medium loop (in water services for food and industrial use), or in the long cycle (such as in storage, or in using cascading effects of nature in the wastewater treatment).

Common approaches that focus on solutions to improve the overall sustainability of the water sector were identified. And, discussions covered opportunities to increase partnerships at the regional level to identify regional needs, share knowledge and foster partnerships to support the water-related SDGs in Asia-Pacific, with the following potential areas of regional interventions:

- improving the planning and implementation processes by creating an overall strategy and scenarios to enhance sustainable business models for water infrastructure;
- creating funding and oversight programs and policy frameworks to incentivize decentralized water management financing systems and collaborative partnerships; and
- leveraging the role of the private sector to help attain water-related SDGs and to implement impactful investments from public and private sources.

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Abbreviations & Acronyms

AF	Adaptation Fund
ADB	Asian Development Bank
APWF	Asia Pacific Water Forum
APWS	Asia-Pacific Water Summit
BAU	Business as Usual
BF	Borrowing Framework
CIF	Climate Investment Funds
DEWATS	Decentralised Wastewater Treatment Systems
DRR	Disaster Risk Reduction
ESCAP	Economic and Social Commission for Asia and the Pacific
GCF	Green Climate Fund
GDP	Gross domestic product
GIS	Geographic Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLAAS	Global Analysis and Assessment of Sanitation and Drinking-water
IGFR	Intergovernmental Fiscal Rules
IWRM	Integrated Water Resources Management
LLDC	Landlocked Development Countries
LDC	Least Developed Countries
MDG	Millennium Development Goals
MOU	Memorandum of Understanding
MDB	Multilateral Development Bank
NBS	Nature Based Solutions
ODF	Official Development Finance
ODA	Official Development Assistance
OSR	Own Source Revenue
PES	Payments for Ecosystem Services
PUP	Public-Public Partnership
PPP	Public-Private Partnership
RoI	Return on Investment
SDG	Sustainable Development Goal
SME	Small and medium-sized enterprises
WASH	Water, Sanitation and Hygiene



1. Water-related SDGs of the 2030 Agenda and the Outcomes of the 3rd Asia-Pacific Water Summit

1.1 Introduction

Following the adoption of the far-reaching and ambitious 2030 Agenda for Sustainable Development in 2015, including the 17 Sustainable Development Goals (SDGs), countries in all regions are aligning their growth and development needs with the SDGs, and identifying strategies to accelerate implementation. The 2030 Agenda, and more specifically SDG 6, which seeks to *'Ensure availability and sustainable management of water and sanitation for all'*, can serve as a catalyst and help guide countries in their future policy developments and to meet critical infrastructure needs.

The Asia-Pacific grapples with substantial needs related to safe water and sanitation, wastewater treatment, ecosystem health and water-related disasters. To meet the growing demand from an increasing population, as well as to tackle the pressing reality of ensuring the resilience of water infrastructure to the impacts of climate change, countries must tap into existing and new sources of finance. Long-standing obstacles have prevented optimal investment in the water sector throughout the region, among others: inadequate pricing and incentives; weak credit-worthiness of water utilities; poor tariff structures; and a host of governance-related issues that weaken the ability of water agencies and municipalities to seek recourse to market lending. Countries with special needs, including the Landlocked countries (LLDCs), and Least Developed Countries (LDCs), for example, in Central Asia and Mongolia, also lack stable revenue sources to cover operation and maintenance of the declining water infrastructure, further limiting their ability to attract future investment.

The purpose of this discussion paper is to provide an overview and analysis of the issues of financing water infrastructure needs in the Asia Pacific region to achieve water-related SDGs and contributes to attaining SDG 6, SDG11.5, SDG 13, SDG 17. The special session on 'Financing Implementation of the Water-Related SDGs in Asia-Pacific' during the 3rd Asia-Pacific Water Summit (APWS) in Yangon, in December 2017, allowed experts and policy makers to discuss efforts and to build on regional initiatives, as well as to identify priority areas of action. The resulting 'Yangon Declaration' (Appendix 1) specifically calls for the region to:

- *Support* the development of innovative and sustainable financial instruments that generate low-interest lending mechanisms, long- term cash-flow and attractive returns for high-impact water-related investment at multiple levels and scales;
- *Adopt* innovative financial solutions such as reforming public finance, advancing Public-Public Partnerships, Public-Private Partnerships, structuring blended finance, applying Environment, Governance and Society investment and developing financial tools for long-term investment;
- *Focus* on ex-ante investment for infrastructure and community-based efforts, including disaster preparedness and risk reduction, in addition to post-disaster recovery;

- *Develop* a regional monitoring system on the financing of water-related Sustainable Development Goals and targets, aiming at harmonizing and complementing national and international initiatives and incentivizing collaborative partnerships.

The combination of the management of water resources and urban, regional and national use planning could be organized through integrated financing schemes and investment strategies. As Asia and the Pacific is experiencing unprecedented urbanization, cities now become central targets for action, not only due to the magnification of the issues in urban settings, but also in terms of the untapped opportunities they provide to accelerate and expand progress.

The vast challenges to the achievement of water-related SDGs by 2030 were highlighted by a recent publication of the Asian Development Bank (ADB), which pointed out that the Asia and Pacific region would require \$800 billion, or \$53 billion annually, in investment over the period 2016–2030 to meet water and sanitation infrastructure needs¹ (which includes the costs of climate proofing to ensure that infrastructure is resilient to the projected impacts of climate change). The paper builds on the lessons and case studies presented at the 3rd APWS, and served to guide discussion at the 8th World Water Forum in Brasilia, Brazil, 19-23 March 2018.

The paper is structured to focus on the following key areas:

- Estimated water infrastructure needs in the Asia Pacific region to attain water-related SDGs;
- Investment points along the water cycles, where water-related investments can be made to enhance the effectiveness of public financial resources, as well as opportunities at which to leverage private capital to support the water cycle management at national and local levels;
- The financing architecture available to countries to fund infrastructure improvements, with emphasis on Official Development Assistance and Private Investment.

On the basis of consultations at the 3rd APWS, it was considered instrumental to further strengthen collaboration in undertaking research on the development of policy and decision-making tools so as to support more participation of top-level policy makers in the region. As this paper identifies investment points along the water cycles, these are also points at which collaborative multi-stakeholder partnerships (both centralized and decentralized) can be incentivized to improve water infrastructure and management processes and to contribute to the attainment of the water-related SDGs in Asia and the Pacific and beyond.

1.2 Water Cycle Management to Understand Investments to Meet the Water-related SDGs

Box 1: SDG 6 Targets

SDG 6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

SDG 6.2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls in those in vulnerable situations.

SDG 6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

SDG 6.4 target is aiming by 2030 to substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

The SDG 6.5 by 2030: to implement IWRM at all levels, including through transboundary cooperation as appropriate.

SDG 6.6 by 2030: to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

SDG 6.a is aiming by 2030: to expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

SDG 6.b by 2030: to support and strengthen the participation of local communities in improving water and sanitation management.

The length of time freshwater takes to complete one revolution of the water cycle varies depending on the area of the world, based on the frequency and quantity of precipitation events. In some places, it can take decades for the natural water cycle to regenerate². As such, water must be accounted for and managed to meet the year-round needs of public and private users alike.

The Yangon Declaration from the 3rd Asia-Pacific Water Summit (3rd APWS) calls on the region to ensure sound water cycle managementⁱ (See Appendix 1). In this regard, the policy makers of the region have already shared interesting experiences to eliminate pollution of ecosystems at the source, through effective water policy measures. For example, Japan has enacted a Water Cycle law in 2014 to promote water cycle measures comprehensively and consistently. Australian policy makers started to apply the concept of Water Sensitive Cities in 2012 in city planning to strengthen resilience of cities, by focusing on designing, building, managing cities through water flows of its urban water cycle³.

To better manage water services in the urban and peri-urban areas of the region, a package of new policies and advanced technologies, which should consider the processes of the natural water cycle and the dynamics of the natural ecosystems within the planning cycles, needs to be developed and operationalized. This entails putting special emphasis on water recycling, wastewater treatment, reuse and efficient water use, among others.

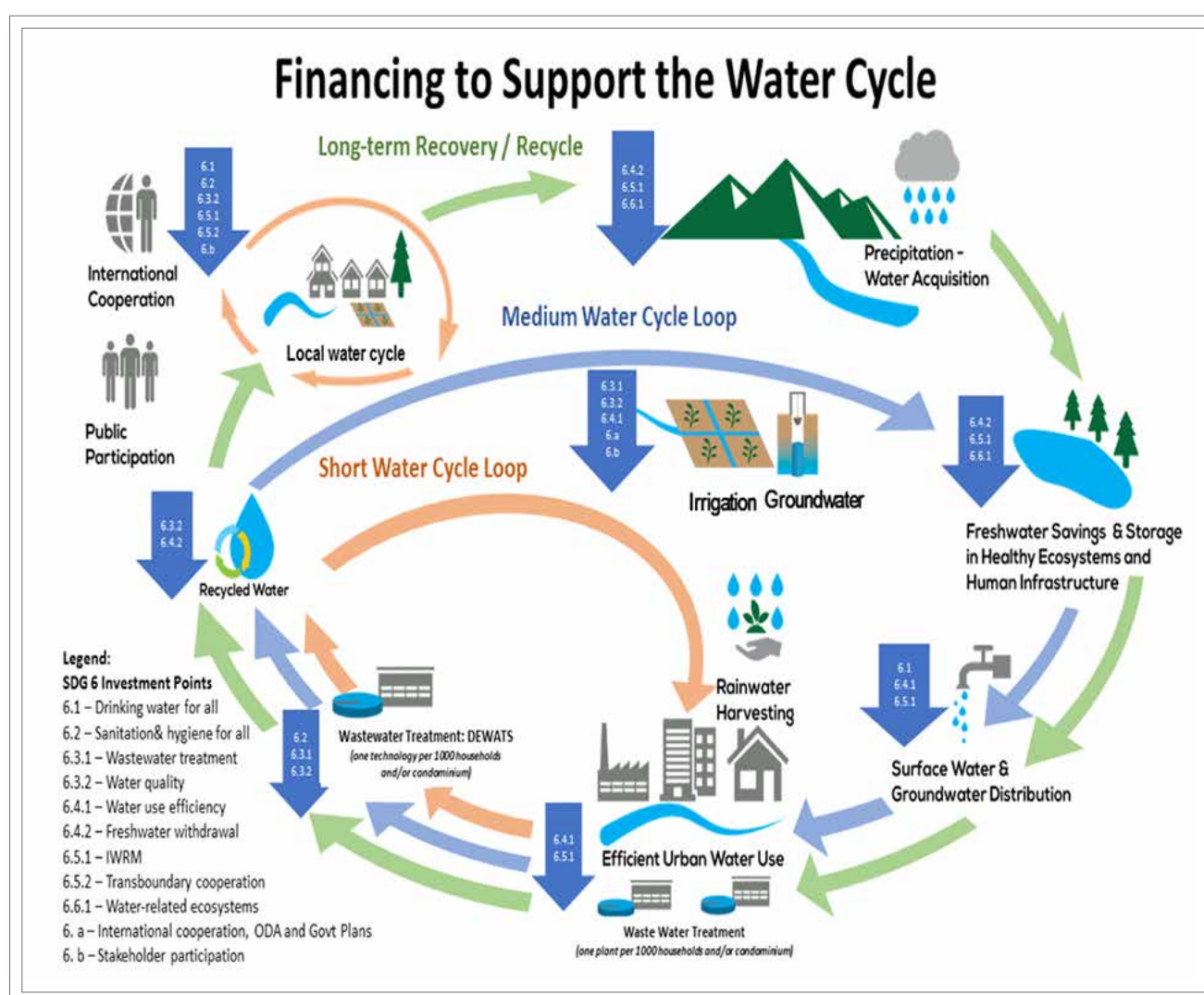
The current planning and management of the urban water cycle in the region usually relies on long-term water recovery streams, where river basin management is based on the cascading effects of water infiltration into the soil and ground. But medium and short-term water-recovery streams, managed through deliberate interventions, could also be established within infrastructure planning, to enable quicker water recovery loops.

ⁱ Yangon Declaration at <http://apwf.org/apwf/wp/wp-content/uploads/2017/12/Yangon-Declaration.pdf>

This section illustrates the water cycle for policy makers to better understand and plan water-related investments and related SDGs by considering the processes of the water cycle. The long-term, medium-term and short-term water recovery loops of water cycles should inform planning of infrastructure and financing of water systems. This conceptual approach opens up key points for interventions or investments, enabling multiple social and environmental benefits (including enhanced resilience of infrastructure), which contribute to SDG targets. Direct and indirect Returns on Investments (RoI) can be estimated at the intervention points to justify the strategic need for impactful investments.

Financial planning within water cycles can also pinpoint where to augment value-based opportunities for private investment and hence, strategically guide the mobilization of private resources. By planning water-related interventions in sync with water cycles (See Figure 1), the capacities of the water ecosystems would be maintained while benefitting from short-term as well as medium- and long-term gains.

Figure 1: Planning efficiency of financing through water cycle and SDG target investment pointsⁱⁱ



(source: ESCAP, 2018)

ⁱⁱ Note: the resilience to water hazards like flood and scarcity could be considered as extreme factors and considered within investment entry points.

Examples of planning investments, and hence weighing costs and benefits, through the water cycle (or sustainability loops) lens:

- Water-use efficiency and water recycling generates smaller water-feedback loops and decreases regeneration time within the overall water cycle. Yet, the focus of policy makers is often on the acquisition of additional freshwater resources, especially in water-scarce areas – whereas the objective should be to only remove sustainable water quantities from the environment.
- A water cycle investment framework would help identify the financial benefits of freshwater storage within healthy ecosystems and water infrastructure during times of abundance, for times of water shortages.
- Investing in wastewater treatment, in turn reduces contamination impacts of future freshwater sources. Some innovative wastewater treatment initiatives stemming from the region are listed in Box 2.

Examples of financing opportunities, as planning interventions, to support the water cycle (See Figure 1) could be grouped in three water-recovery loops:

- Long-term water recovery loop (sustainability loop): follows the long-term planning and relies on long-term recovery of water resources. The principles of nature-based solutions within circular economy approaches can be applied to support water and green growth conceptual frameworks and are illustrated in the *2018 World Water Development Report on Nature-Based Solutions to Water*ⁱⁱⁱ. The investment points identified within this loop in the water cycle could leverage actions towards relevant SDGs (SDG 6.1-6, 6.a-b), and could be better organized to control recovery, using project-based approaches.
- Medium-term water cycle loop (sustainability loop): brings treated wastewater back into the loop, linking with freshwater storage and infrastructure. Investments along this loop can address issues such as leakage and the efficiency of wastewater treatment, while contributing to freshwater savings. This cycle encompasses the on-going efforts of the governments of the region to enhance water productivity in irrigation and drainage to achieve food security and sustainable agriculture (mainly through attaining the SDG 6.4). The development institutions, banks and governments have documented achievements from such project in the region (SDG 6.b).
- Short-term water recovery/cycle loop (sustainability loop): regeneration and recycling of water resources at the local and community scale; localized districts with inter-relationships local scale solutions are being addressed historically and revisited to address the problems with different parts of the water cycle holistically. Thus the issues could be better managed at the community level (this is the focus of the targets of 6.5, 6.6, 6.b of SDG 6), for example, within localized districts with internal infrastructure such as hotels/condominiums and compact residential or commercial developments (See target 5 of SDG 11).

ⁱⁱⁱ WWAP (United Nations World Water Assessment Programme)/UN-Water. 2018. The United Nations World Water Development Report 2018: Nature-Based Solutions for Water. Paris, UNESCO.

Box 2: Wastewater Innovation in Asia-Pacific

The concept of wastewaters as a resource has been advanced in a few countries and promotes water reuse, nutrient reuse and energy production:

- Republic of Korea plans to increase water reuse as part of their Green Growth Initiative, where water is called the “Blue Gold”.
- The NEWater in Singapore currently supplies about 30 percent of the national water demand, especially for manufacturing utilization.
- Operations and maintenance of the communal wastewater treatment system in Indonesia is self-sufficient and sustainable and plays a significant role in improving urban sanitary conditions.

Shifting to water-hazard resilient infrastructure can improve the effectiveness and efficiency of water systems through a focus on the smaller and medium cycle loops. Introducing appropriate infrastructure at these intervention points is ideal as they allow the cycle to mimic the natural water cycle.

In addition, identified intervention points are also optimal entry- and exit- points at which to:

- obtain feedback on effectiveness of the operations and management, technological inputs;
- inform on the socio-economic and environmental impacts through respective data support, and
- inform on the volume of the facilitation needed through financing, trade and investments.

As there are now more people living in cities than there are rural inhabitants in the region, cities are on the frontlines of the need to progress forward in the region. Furthermore, as half of the urban population actually lives in secondary cities, which arguably face the most acute of the service delivery, capacity and financing challenges, these cities provide particularly enticing opportunities to implement innovative solutions.



2. Estimated Water-Infrastructure Investment Needs to Attain SDG 6 within a Business as Usual (BAU) Approach

In numbers:

6% of Asia-Pacific's population is without access to improved water sources

1.5 billion people in the region still need to gain access to improved sanitation facilities to reach the SDG target.⁴

2.1 Water Supply and Sanitation Needs

The investment necessary to meet water supply and sanitation needs globally is estimated to be US\$ 1.7 trillion, which is three times the amount historically invested in the sector⁵. Over recent decades, countries in the region, along with banks and financial institutions, have repeated the need to increase investments in water and sanitation⁶. According to the Asian Development Bank's recent estimate, the Asia and the Pacific region will need \$800 billion in investment over the period 2016–2030 in water and sanitation infrastructure to meet the SDG targets, or \$53 billion annually. This includes climate-adjusted investment needs.

Several ESCAP analytical reports⁷ present the available regional statistics on SDG6 and review the baseline status, as summarised below:

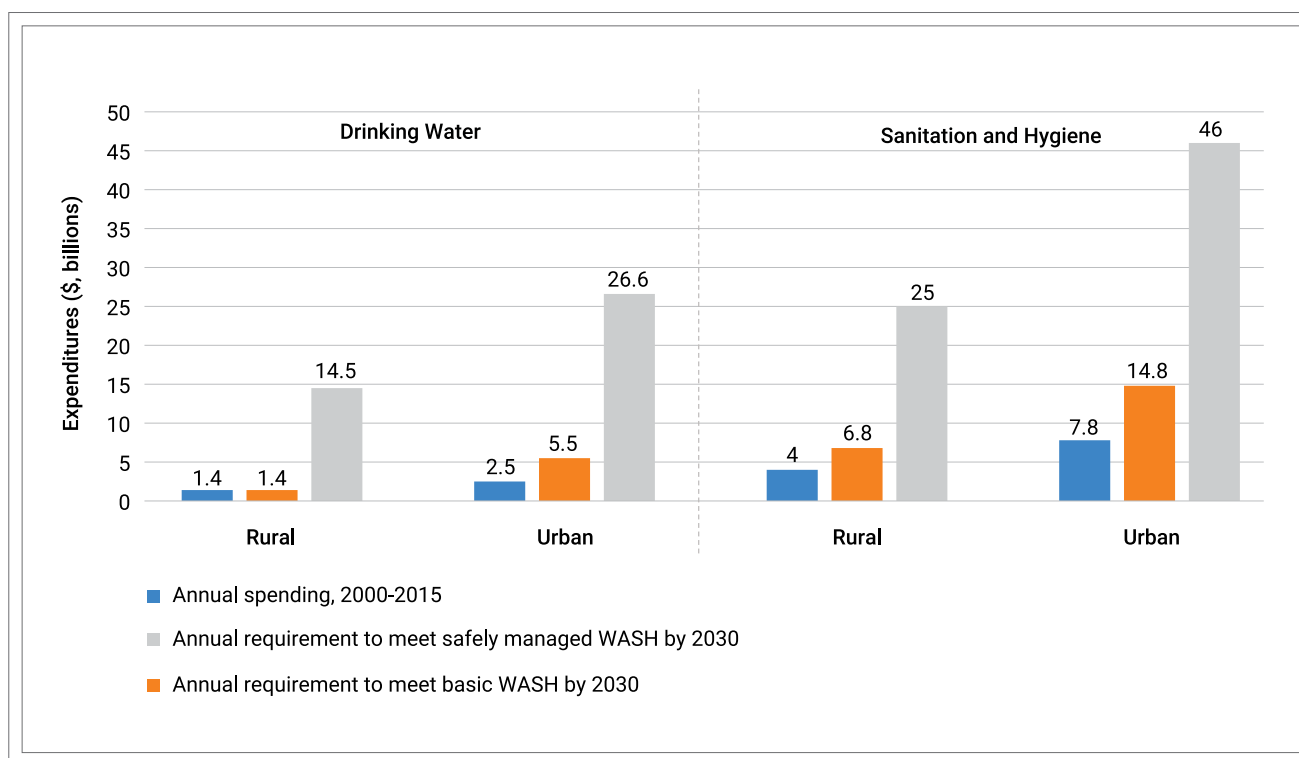
- In 2015, 94 percent of the population in Asia-Pacific had access to improved drinking water⁸, yet 300 million people still lacked access to improved drinking water sources, mainly in countries of South and South-East Asia;
- In 2015, only 65 percent of the population had access to improved sanitation facilities⁹ and about 1.5 billion people lacked access to safely managed sanitation services. Open defecation practices in Asia and Pacific have dropped substantially over time, though it is still a prevalent practice for 15.9 percent of the total population, mainly in rural areas of South and South-East Asia;
- According to estimates of ADB and reports of ESCAP, 80 to 90 percent of all wastewater produced in the Asia and Pacific region is released untreated¹⁰, with alarming situations in coastal zones of South and South-East Asia. In 2011, only 21.3 percent of total produced wastewater was treated in South and South-West Asia; 82 percent and 84 percent of wastewaters went back into ecosystems untreated respectively in Pakistan and Armenia; in 2012, it was 77 percent and 81 percent for Thailand and Viet Nam, respectively. Singapore is reported in 2015 as the only country that achieves 100 percent of treated wastewater¹¹;
- The investments for wastewater and drinking water in Asia reached over US\$ 50 billion in 2015, Japan dominating with a total market share of about 33 percent¹².

A number of reports have estimated the significant increase in water and sanitation investment required to ensure Water, Sanitation and Hygiene (WASH) access:

- The World Bank estimate of costs to extend the WASH access under SDGs relative to the MDGs to be USD 112 billion (Figure 2);

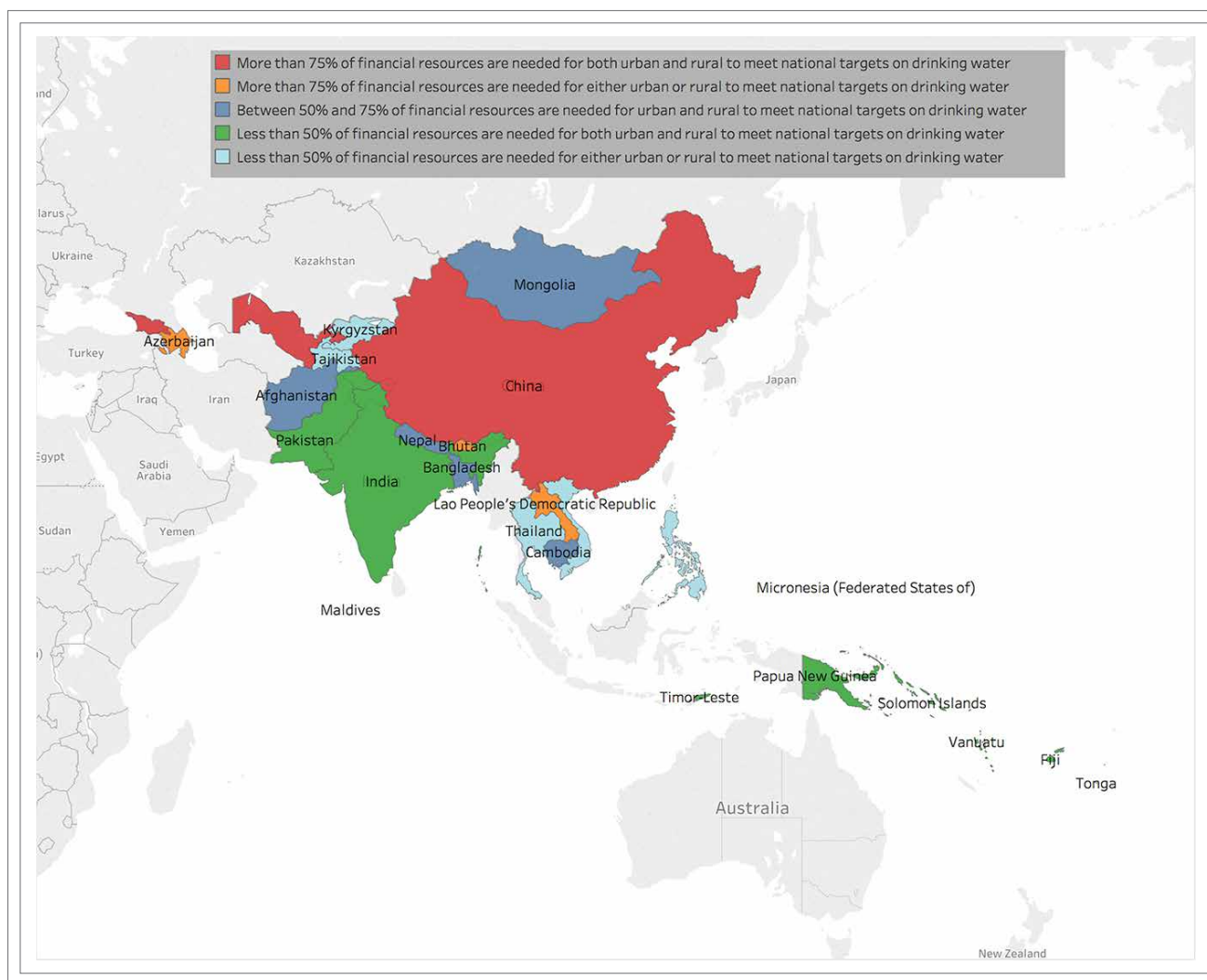
- The 2017 Global Analysis and Assessment of Sanitation and Drinking-water (GLAAS) annual report by the World Health Organization (Figure 3), wherein globally 80 percent of countries report insufficient financing to meet national WASH targets (and many countries in Asia and the Pacific are lagging significantly in this regard);
- The global capital financing for the physical service infrastructure excluding operation and maintenance costs, would need to triple to achieve the targets of the water-related SDGs by 2030¹³.

Figure 2: Costs of Extending WASH Access under SDGs (2016-2030) Relative to MDGs (2000-15)¹⁴



As one possible means to tap into and engage large-scale capital pools, the global sanitation issue could be addressed at the local and decentralised level. For instance, through:

- identifying impactful investments: at the 2nd Asia-Pacific Water Summit (Chiang Mai, 2013), ESCAP submitted proposals to implement impactful investments and financing schemes for sanitation¹⁶;
- organizing local financing schemes and determining RoI from decentralized wastewater treatment systems (DEWATS). There are a number of pilot examples of DEWATS in the region (although still at the project level in South-East and South Asia). ESCAP, UN-Habitat and AIT have outlined the *Policy Guidance Manual on Wastewater Management with a Special Emphasis on DEWATS*¹⁷;
- incentivising the outcome based models of financing water and sanitation services, using a system-thinking approach would allow to mix centralised and decentralised solutions and optimise the individual components through integrated approaches, as in Australia's Cooperative Research Center for Water Sensitive Cities.

Figure 3: Sufficiency of Financial Resources to Meet National Targets on Drinking Water¹⁵

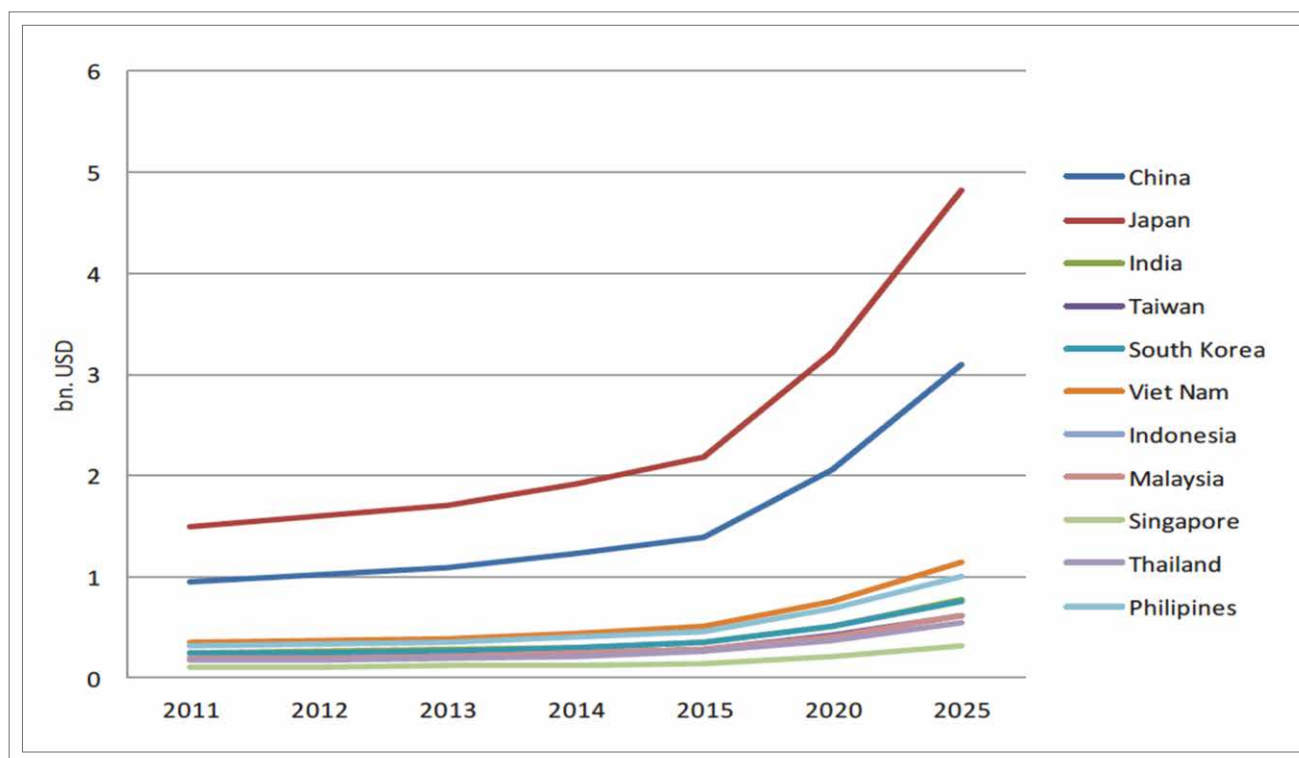
Note: Survey reported by GLAAS (2017) on sufficiency of financing to reach national targets in drinking-water in urban and rural area: countries in red represent those in need of the largest amount of financial resources to meet their national targets on drinking-water; in green are those that need fewest financial resources to meet their national targets on drinking-water.

A state policy framework and investments that enable small-scale projects (like DEWATS, that turn wastewater into resources, ensure flood prevention and drinking water protection measures, serving 1000 households) could be combined with financing schemes. These policies could center on subsidising service providers and declining operational subsidies of PUP, building up appropriate tariff and fee-based system, and should further secure service providers' jobs while ensuring better returns on investments (RoI). Further RoI could be achieved by diversification measures that would be accountable and contribute to the state revenue incomes. These SMEs could take on the functions of the service providers and would contribute to better use of the water and sanitation service lines in different sectors, such as in servicing the food supply and energy needs.

2.2 Irrigation Needs

Overall, 71 percent of the freshwater withdrawals in the region are used for agriculture, and in South Asia agricultural water withdrawals are up to 91 percent (2014)¹⁸. By 2050, agriculture will need to produce 100 percent more food in developing countries, using diminishing water resources in the face of climate change impact and rapid population growth, which will increase the need for irrigation. The most reliable estimates for the Asian region, though these still need data refinement, place the annual investment required for irrigation management, operation and maintenance, between 2005 and 2030 at \$12.31 billion, according to ADB (2017).

Figure 4: Investments in agriculture water markets across countries in Asia (billion USD)¹⁹



Irrigation relies almost entirely on public financing, and irrigation investments have been on an upward trend throughout the region (See Figure 4). Official Development Assistance (ODA) and international financing support has also contributed substantially. ADB's irrigation lending, which in 2016 comprised 14 percent of its overall water sector lending (as compared to 40 percent in 1990) is set to increase again over the next few years, with over US\$ 15 billion of proposed lending in the pipeline.

The region's irrigation and drainage infrastructure suffer from neglect and decline, resulting in poor service, low charges, meagre revenue collection, underfunded operation and maintenance, delayed essential maintenance, and system failures. Inadequate funding of management, operation, and especially maintenance, is a vital factor in the widespread deterioration of surface irrigation systems across Asia. With land in short supply, there is little scope for creating major new schemes, and the core challenge is ensuring adequate financing for the recurrent spending and rehabilitation investment needs of existing large publicly owned and managed surface irrigation and drainage schemes.

Compounding the complexity of the issue, some countries in the region are facing water resources that are under stress with significant consequences on livelihoods. The latest data (2012), available for 11 countries in the region, indicates that the water resources of two countries are under stress and one is even under severe stress²⁰.

2.3 Water-related Disasters Risk Reduction Needs

Policies to achieve the targets of SDG 6 should also enable measures to achieve the targets of SDG 13 by 2030, by *Taking Urgent Action to Combat Climate Change and its Impacts*.

In numbers:

Though the Asia-Pacific region is the world's most disaster-prone region, only 18 out of 58 countries are known to have legislative or regulatory provisions for reducing disaster risk.²¹

While the needs to support water-infrastructure in both developing and developed Asia are known, natural disasters, such as droughts, tsunamis and floods are still difficult to predict and forecast. Asia-Pacific is highly exposed to water-related disasters with more than 4,000 events reported since 1970, resulting in more than two million casualties. During the same period, 6.5 billion people from the region were affected, and around US\$ 1.3 trillion in assets were lost to disasters, impacting housing, transport, agriculture, energy and water and sanitation infrastructure²².

The increased climate variability and extreme weather conditions are expected to severely affect the region, with floods and droughts predicted to increase in both magnitude and frequency. Climate change could also cause huge economic losses. For South-East Asia, it has been estimated that climate change may reduce the region's gross domestic product (GDP) by up to 11 percent by 2100²³.

The High-level Experts and Leaders Panel on Water and Disasters (HELP), established in 2007 by the UN Secretary General's Advisory Board on Water and Sanitation, has set out the goal to double the financing and investment for water-related disaster risk reduction. The 3rd Asia-Pacific Water Summit's Yangon Declaration²⁴ also calls for doubling the region's investments in infrastructure and community-based efforts to address water-related disasters. Japan's experience in this regard attests to the fact that pre-disaster prevention measures save lives and property and should be considered as investments in the future, not as costs (See Box 3).

Box 3: Financing of Water-Related Disaster Risk Reduction in Japan

(MLIT, Japan) Excerpts from a presentation of Mr. Tomoyuki Okada, delivered at 3rd Asia-Pacific Water Summit, Yangon, Myanmar, 12 December 2017

The goal that the High-Level Experts and Leaders Panel on Water and Disasters (HELP) has set out is to double the financing and investment for water-related disaster risk reduction.

- Principle 1: Water-related disaster risk reduction is indispensable for socio-economic development. Counter-measures implemented in advance against water-related disasters are not a cost, but an investment in the future.

Tokai storm in Japan, 2000:

Actual damage of the storm = Yen 670 billion / almost USD 6 billion

Preventive measures implemented after the disaster for a cost of = Yen 71 billion

If they had been implemented before the disaster it could have saved Yen 550 billion, with 7.7 effectiveness ratio

- Principle 2: Pre-disaster prevention measures should be prioritized. Investment for the maintenance and management of infrastructure should be secured to cope with its aging issues and the loss of functionality.

Japan: The ratio of river facilities that are over 40 years old: 2011- 40 percent, 2021- 60 percent, 2031- 80 percent. As the number of aging infrastructure is rapidly increasing, the risks of disasters are growing.

- Principle 3: Governments should improve their fiscal systems and secure sufficient budget.

Japan: the number of fatalities has decreased rapidly over the years, as a function of investment in disaster management.

- Principle 4: Various funding sources should be explored and mobilized.

Despite more frequent disasters and economic losses on the rise, funding to reduce disaster risk has only marginally increased. Funding levels for Disaster Risk Reduction (DRR) are not meeting the current needs and the gap is only widening with newly generated risk. The region is therefore exploring new regional financing mechanisms and investment funds. The ESCAP Multi-Donor Trust Fund for Tsunami, Disaster and Climate Preparedness²⁵, for example, has contributed significantly to the progress made in building regional and national early warning systems for water-related hazards. Since its establishment following the 2004 Indian Ocean Tsunami it has supported 26 projects with a total budget of approximately US\$ 15.5 million, directly benefitting 19 countries. Projects cover mostly aspects of early warning, including but not limited to: monitoring and warning services that provide support to lower capacity countries; risk maps for community preparedness planning; development and testing of Standard Operating Procedures (SOPs); education and public awareness raising activities; strengthening of warning dissemination; and, emergency drills.

Disaster risk reduction investment priorities should reflect the value of diversification of water sources, and no regrets infrastructure investment. The potential role of communities in mitigating the risk of, responding to, and recovering from disasters, as well as the scope for a more active partnership between authorities and local communities are other streams of intervention to advance throughout the region.



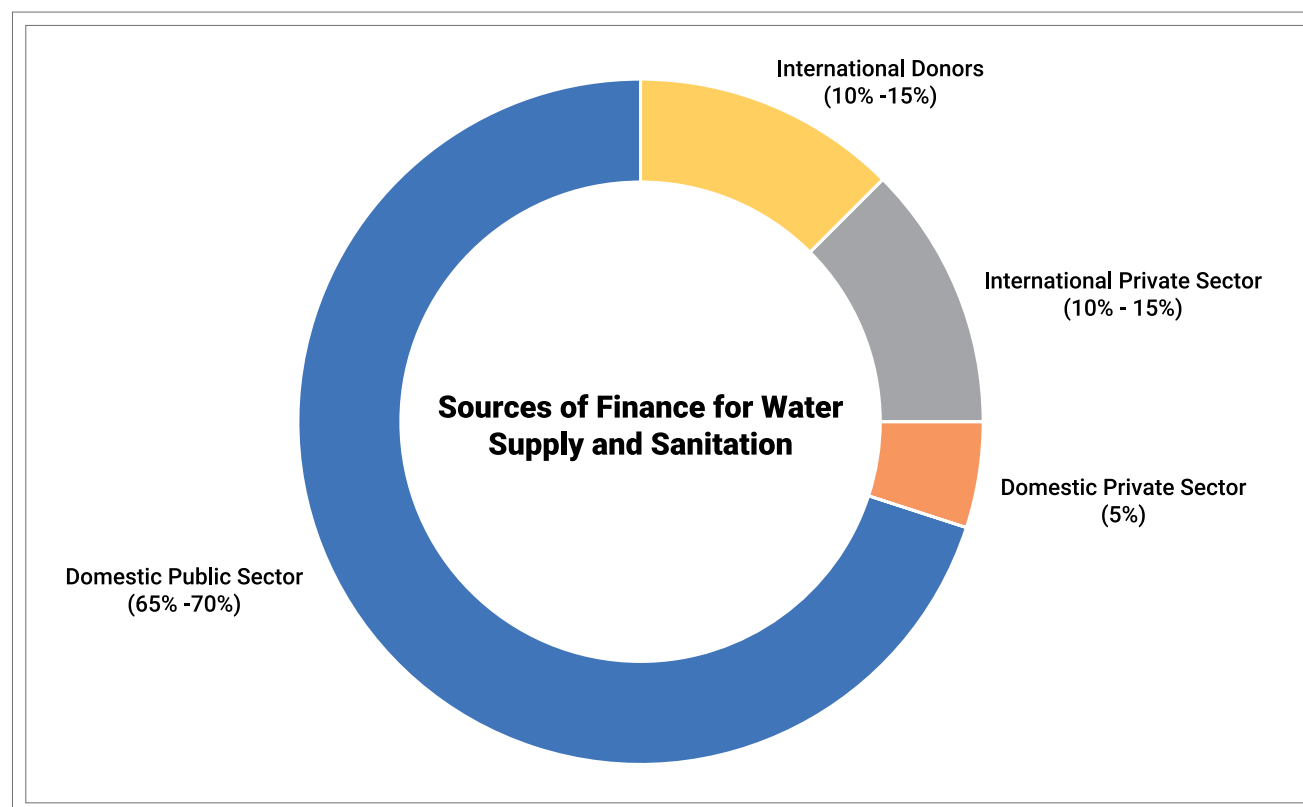
3. Financing Conditions to Support the Water-related SDGs

In most developing countries, city governments face challenges of creating infrastructure/local public goods in the context of globalization (that increasingly demands quality infrastructure), and continued migration of people (often the poor) into cities. These drivers of change have impacts on sustainable development. The effects of these public goods, for example, improved roads and transport on higher growth trajectories, cleaner water and sanitation on lowering morbidity, and green spaces that improve sustainability are well understood and reflected in most development strategies. There is also ample evidence that these huge infrastructure gaps in Asia-Pacific cities are holding back opportunities to reduce poverty and decrease environmental degradation.

The water sector in the region has historically relied on non-repayable public funding to meet its investment needs – through taxes, transfers and tariff systems. But there are issues related to lack of prioritization of water by national and local authorities, poor management, and some resistance to cost-recovery tariffs. Cost recovery below operating and maintenance costs has proven to be a key factor for maintaining the current system and credit worthiness of projects to meet future needs. Achieving adequate tariff structures needs to go hand in hand with improved metering and billing information, if they are to be used to drive more efficient water demand, rather than just act as a tax.

For example, the water tariffs currently in use in most cities in South Asia are not accomplishing their principal objective, which is: to support the operational costs and generate surplus for investment. They are not generating sufficient revenues to ensure utilities can recover their financial costs. They are not sending the correct economic signals to households, i.e., that water is scarce and must be treated as a valuable commodity. To address this, metering and water accounting could be promoted as a priorities for improving systems operations and investments. To further compound the problems, many poor households are not connected to the piped distribution system²⁶. The current financing architecture relies mainly on public investments, and cost-recovery and fiscal management of these existing investment flows are fundamental to the discussion on mobilizing private and ODA investments for water – all of which could be viewed through the lens of the SDG framework. Though not covered here, mention ought to be made that climate funds (CIF, AF, GCF)²⁷ are being created to support the water infrastructure needs.

For water supply and sanitation specifically, sources of finance stem from four sectors, including domestic public sector, domestic private sector, international donors, and international private sector (See Figure 5). The bulk of water supply and sanitation funding hails from the domestic public sector, accounting for 65 percent to 70 percent of total finance sources. Globally, international donors and the international private sector compose 10 percent to 15 percent of total finance sources respectively. The domestic private sector accounts for 5 percent of finance sources for water supply and sanitation²⁸. As a case in point, the specific investment and financing profile in China is presented (see in Box 4) with the breakdown of the blending of public funds, loans, corporate bonds and private funds in a split of 45:42:13 percent.

Figure 5: Regional sources of finance for water supply and sanitation²⁹**Box 4: Profile of Water Investment and Financing in China**

Ministry of Water Resources Government of China. Excerpts from a presentation of Mr. Hao Zhao, delivered at 3rd APWS, Yangon, Myanmar, 12 December 2017

Between 2011 and 2015, China invested more than 2 trillion RMB in water projects, which is close to three times that which was spent in the period of the “11th Five Year Plan” (2006-2010).

Funding for the development of water infrastructure in China originates from the following three sources:

- 44.7 percent from fiscal funds: budgetary appropriations, water infrastructure construction funds, water resources fees, and gains from land transfer used for development of farmland water infrastructure;
- 42.5 percent from domestic and international loans and corporate bonds, etc.;
- 12.8 percent from social funds: investments from enterprises and individuals.

3.1 Recent Trends in Public Policies to support the 2030 Agenda and SDGs

In numbers:

31 out of 32 Asia-Pacific countries with reported data have been developing water management plans, though only a few have reached the stage of advanced implementation.³⁰

Since the 1990's, there is an increased emphasis in most countries, on local empowerment, reflected through national legislation. Decentralization laws typically embody the principle that local public goods, such as water, are best produced and financed locally, based on demand-driven needs that are articulated through community processes. This agenda appears to be a near universal trend, across countries of varying levels of economic development and requires city governments to have the authority to plan, design, finance and pay for the public goods that they produce. (See the French decentralization laws 1983, India -74th Constitutional Amendment in 1992, South Africa-Municipal Finance Management Act, Philippines-Local Government Code 1991, etc.).

However, the implementation of this decentralization agenda has been unbalanced in many countries, with the responsibilities transferred from national to local levels usually unmatched by the transfer of necessary powers and resources, often leading to functional (who does what in the city?) and geographical fragmentation-governance boundaries are slow to catch up with the urban and often dense settlements outside city jurisdictions (i.e.: which governance unit is responsible for water services?). This is obvious in most metro cities and often affects water infrastructure creation and service delivery in small and medium cities. Governance reform to reduce both types of fragmentation (by introducing accountability of parastatals to local governments and flexible municipalization criteria to handle the physical expansion), are necessary and underway in most countries.

To meet the water-related SDG needs, the region must focus on policy and actions with multiple positive impacts, which improve both the financial sustainability and resilience of water systems and infrastructure. The reality is that mega water projects are capital intensive with high up-front costs and long payback periods, which necessitate financing in long-term maturities and with sufficient grace periods to accommodate long construction schedules especially for major network expansion. Government-owned systems often do not have significant capacities to manage large-scale projects or to mobilize capital financing. In addition, private investment will not flow to systems that cannot demonstrate proper fiscal governance, efficient operations and returns on investments.

In most countries, government-owned systems or organizations are responsible for drinking water supply, wastewater treatment and irrigation. Hence, the region needs to strategically mobilize its public resources and enhance its fiscal management of water systems to increase service providers' cost-recovery of their water services, which in turn will also facilitate expanded opportunities for private investment.

The financing for water-related infrastructure to attain the SDGs should rely increasingly on commercial and domestic finance. Public utilities in most developed countries have relied primarily on commercial and domestic finance for over 100 years, and many emerging markets are starting to tap into this as well, particularly in the energy and transport sectors, as reported by The World Bank at the 3rd Asia-Pacific Water Summit (3rd APWS, Yangon, December 2017). While it may result in immediate higher costs, these costs can be offset by risk mitigation instruments and by the appropriate blending of public and concessional funds with domestic commercial finance.

According to the World Bank (as per the presentation delivered at the 3rd APWS), capital and commercial financing is currently in search of long-term investments and moderate but risk-free returns, which the water sector has the potential to offer. In the current low interest rate environment, infrastructure investments are a pretty good option for financiers. The water sector has not been very successful in mobilizing commercial finance to date. However, public financing needs to be used more specifically with the aim of increasing the cost-recovery of services (i.e.: own-source revenue), through enhanced fiscal management and building local capacities of municipalities and water service providers.

Water-related interventions do not necessarily all require additional financial resources. Many initiatives, such as nature-based solutions, can involve redirecting and making more effective use of existing financing. A comprehensive package of interventions includes tested enabling policies to enhance governance, local capacities, technological innovation and creative partnerships. Finally, by looking at where investments can yield the best returns, a water cycle overview must remain at the core of the decision-making – so that by solving one water-related issue upstream, we are not creating another or bigger problem downstream. A water cycle overview steers towards specific entry and exit investment points that yield multiple benefits.

3.2 Summary of Common Governance-related Challenges

The current assessment of investment trends, and opportunities of water and sanitation markets in the Asia-Pacific region was documented in an ESCAP discussion paper on water markets in 2016³¹. The study demonstrates that increased investments in regional water infrastructure depend on main drivers such as, regulatory and legislative conditions, and environmental protection initiatives.

Obstacles that have prevented optimal investment for the water sector in Asia and the Pacific include key governance-related issues³²:

- Inadequate pricing (tariffs and fees) and incentive structures and ineffective cost recovery models.
- Uncoordinated policy responses to competing sectoral water demands.
- Poor management of scarce water resources.
- Lack of innovative approaches to financing water and sanitation infrastructure, such as public-private partnerships and the absence of community and private sector involvement in the development of water and sanitation services.
- Lack of commercialization and privatization models, resulting in continuation of inefficient public-sector monopolies.
- Unsustainable financial models in municipal or water agencies, limiting recourse to market lending³³.
- Property rights need to be well defined and enforced and supported by good information systems based on the projected flows of future benefits and costs.

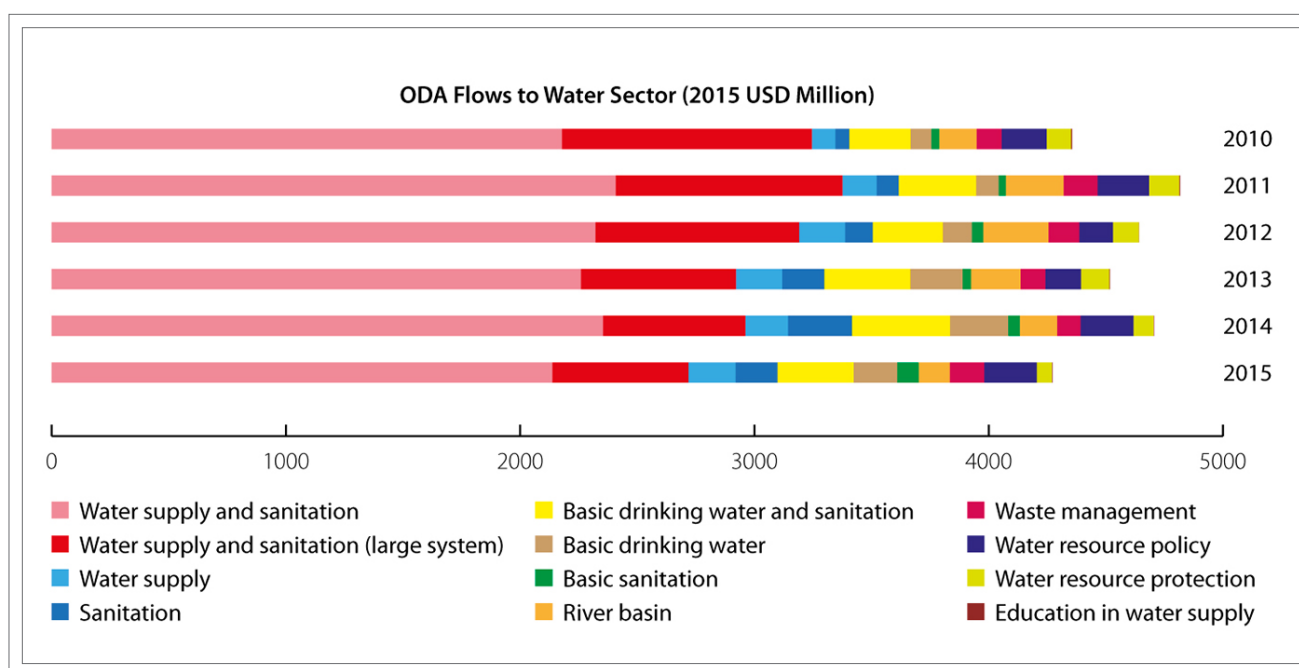
- As governance-related issues, especially poor cost-recovery models, can significantly limit opportunities for financing the water sector, the leadership of governments and the empowerment of municipalities to strengthen governance and fiscal management are central to attract more investment for water and sanitation infrastructure.

3.3 Role of Official Development Assistance (ODA)

International collaboration in terms of exchange of knowledge and technology dealing with flood control, water quality, urban drainage, disaster prevention and mitigation, and the aquatic environment can bring tremendous assets to the water sector workforce. ODA often closes the gaps particularly in funding of educational programs to effectively train water professionals in developing Asian countries. The total amount of ODA into water sectors in Asia and the Pacific was about US \$4.5 billion per year, from 2010 to 2015 (See Figure 6). Water supply and sanitation attracted the bulk of the ODA flows in the water sector, though flows to water supply and sanitation - large systems shrunk by half, from US \$1,066.8 million in 2010 to US \$581.2 million in 2015. Among all the water sectors in Asia and Pacific region, ODA flows into the categories of water supply, sanitation, basic drinking water and sanitation, water resource policy, show an upward trend line from 2010 to 2015. Flows to basic sanitation, which were US \$50 million in 2014, approximately doubled to US \$91 million in 2015.

Together with many Western countries, Japan and Korea are major players in the water and sanitation market of the region due to their significant investments in the sector in the form of ODA (See example in Box 5 for ODA by RoK).

Figure 6. ODA flows to water sectors from 2010 to 2015 in Asia and Pacific region³⁴



Note: the data used for this figure is detailed in Appendix 2.

Box 5: Water Security Assistance by the Republic of Korea

Ministry of Land, Infrastructure and Transport (MOLIT), Republic of Korea. Excerpts from a presentation of Dr. Sangwoo Park, delivered at 3rd Asia-Pacific Water Summit, Yangon, Myanmar, 12 December 2017

The financing tools dispensed by the Government of Korea, through the MOLIT, for water security for international cooperation are:

1. Official Development Assistance (ODA): Grant Government of Korea has disbursed ODA funds for drawing up master plans (USD 1M/year). Based on the outcomes of that initial Master Plan phase, specific projects have been selected and funding disbursed for Feasibility Studies (USD 0.4M/y)
2. Economic Development Cooperation Fund (EDCF): Loan (ODA base). This is a concessional loan with very low interest rate. If the project is deemed feasible (based on the Feasibility Study above), a project can be financed through the EDCF.
3. Development Financing: Loan. Higher interest rate than the EDCF (but much lower interest rate compared to a private loan).
4. Direct Investment: Equity (by K-water). K-water, a specialized company of the Government of Korea invests in overseas water security projects as equity, in co-financing with MDBs.

Aside from providing financing, the government of Korea also supports countries in:

- project implementation – through K-Water
- education, research and networking – through the International Centre for Water Security and Sustainable Management
- providing a platform to link between government and private sector – through Korea Water Forum (i.e.: Water Business Forums to help match technology & financing needs)

3.4. Role of Private Investment

SDG 17.1 is aiming by 2030: to strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection, and

SDG 17.3 is aiming by 2030: to mobilize additional financial resources for developing countries from multiple sources

In numbers:

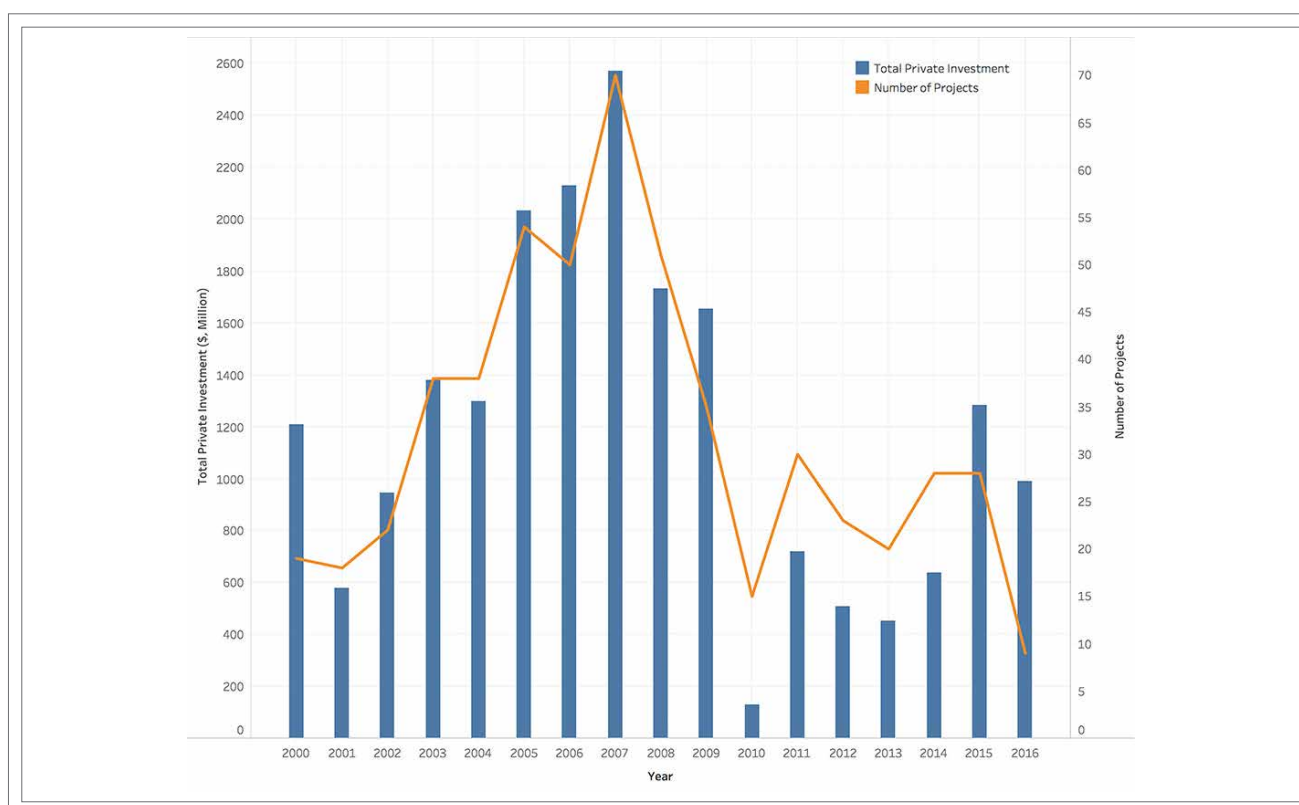
Between 2000 and 2012, all subregions in Asia and the Pacific managed to significantly reduce their debt service as a proportion of export incomes.

In low-income countries, policy measures can help reduce debt distress and improve financial sustainability including debt relief, efficient debt management and access to international capital markets with more attractive borrowing options.³⁵

At present, existing sources of funding do not come close to covering the needs associated with existing demand or achieving the comprehensive 2030 Agenda and the other water-related SDGs. Reaching universal access will require large increases in investments as compared to the requirements of the Millennium Development Goals (MDGs) era. Countries will need to tap into new sources of finance to meet the growing demand, not just for more services for more people, food and industries, but also to fund adequate operations and maintenance as well as the supervision required for more sustainable services.

Both private investment projects and total private investment of water and sanitation in the region increased from 2000 to 2007. However, both of them dropped dramatically until 2010, with only 15 private projects and \$128.7 Million investment. Since then, both projects and investment amount show an upward trend, but remain modest, as they are around half of the 2007 amounts (See Figure 7).

Figure 7. Private investment projects vs. amount of total investment in water and sanitation (2000-16) in ESCAP³⁶



Both sanitation- and water supply-related investment from private sources increased from 2000 to 2007 in the region, but has decreased since. There are more sanitation-related projects with private investments than water supply ones (See Figure 8).

Figure 8: Trends of sanitation and water supply investments from private sources in ESCAP region (2000-16)³⁷

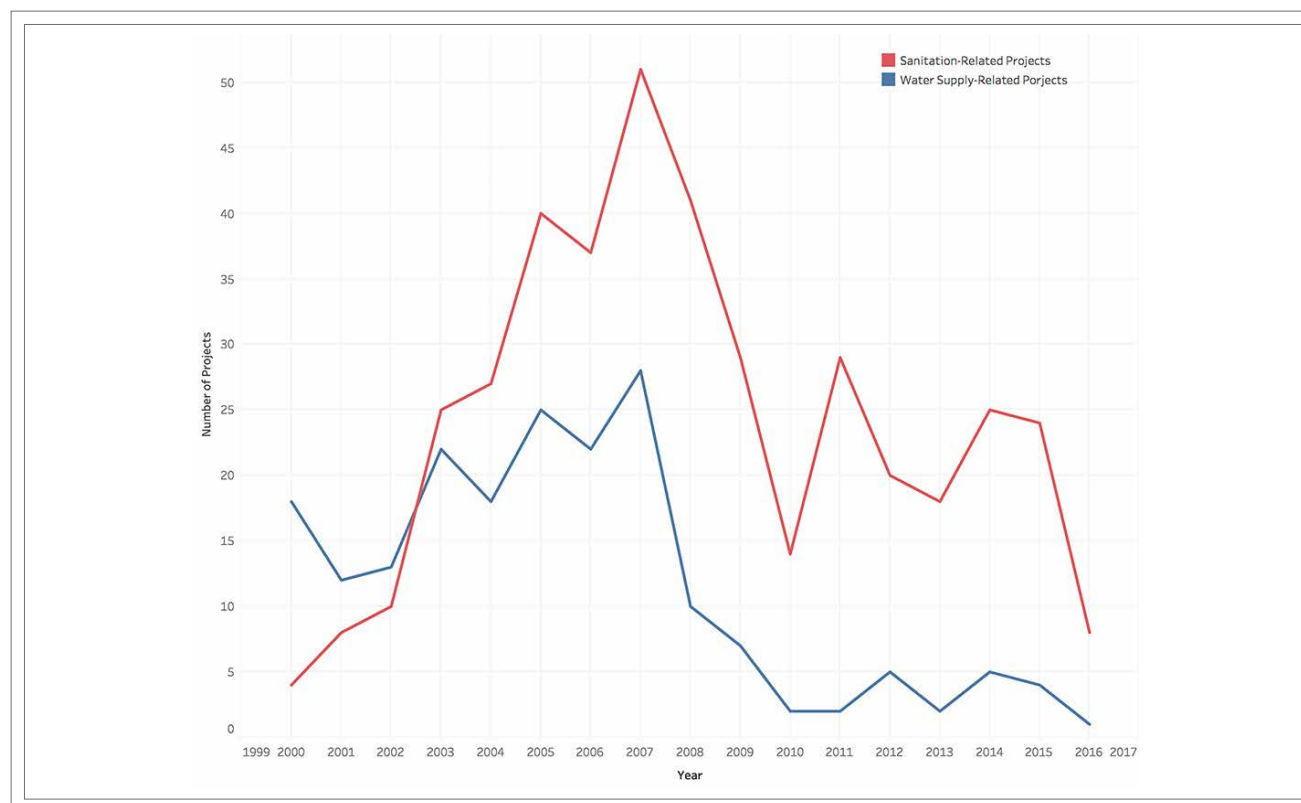
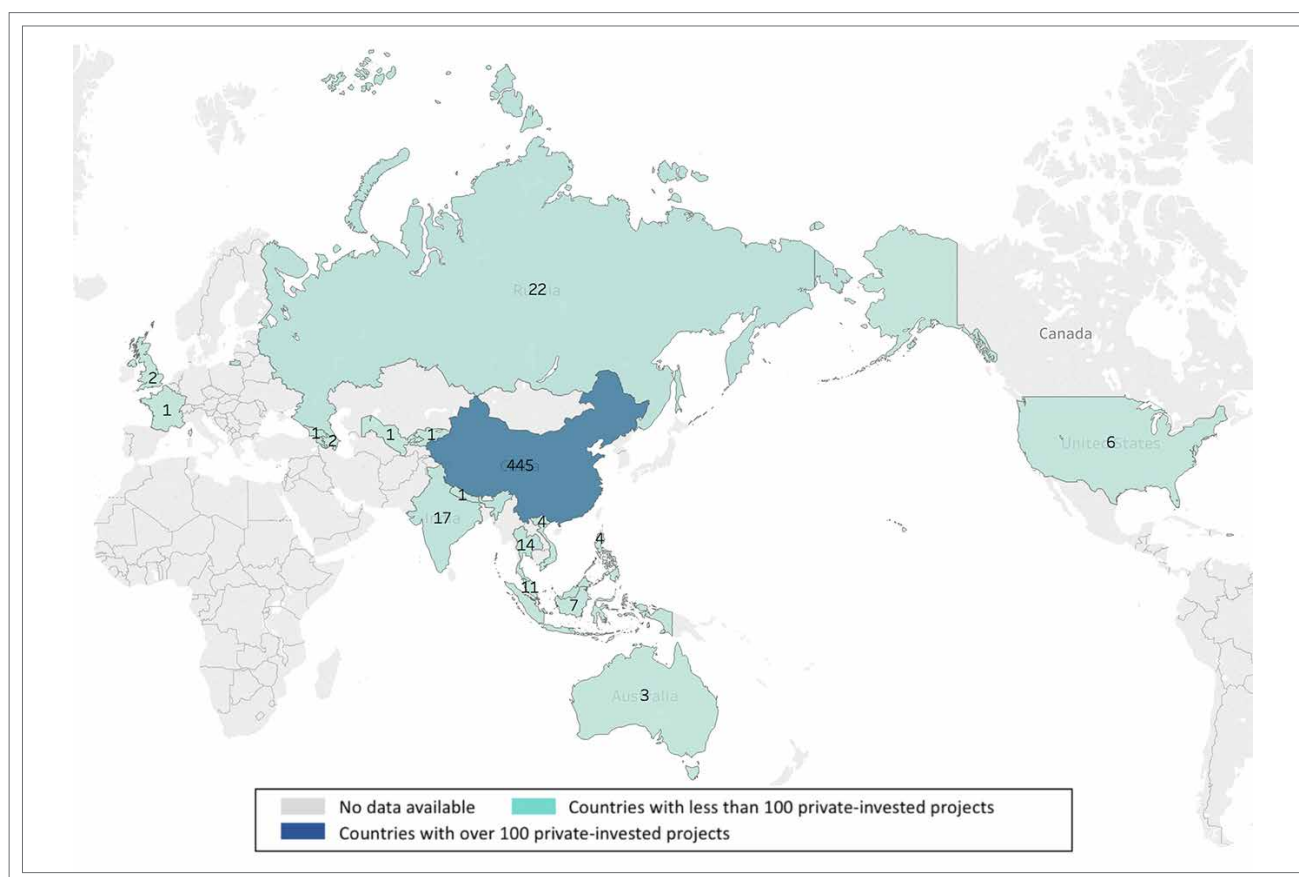


Figure 9 reveals the distribution of 548 projects with private investment across 21 ESCAP member states. The bulk of private investment projects, some 81 percent, are in China. Russia, India, Thailand and Malaysia have a combined share of about 10 percent of private-invested projects. The balance of ESCAP countries accounts for only 7 percent of total private-invested projects.

Figure 9: Distribution of 548 private investment projects in 21 ESCAP member states (2000-16)³⁸



China, for example, has funded its water infrastructure through a blend of public funds, loans and corporate bonds and private funds (See earlier, Box 4).

As the region needs to enhance private sector involvement^{iv} to secure further contributions to attainment of the SDG 6 targets, this can be accomplished through targeted investment points outlined further (See earlier Section 1.2 on financing to support the water cycle, see in Figure 1) and by ensuring smart budget appraisals. Creating smart budget appraisals³⁹ that support the water cycle in urban infrastructure would catalyse the efficient delivery of water and sanitation services, especially in municipal and local government's water and sanitation projects, which experience the financial leakages.

3.5 Enabling Policies and the Need for the Public Reforms

Infrastructure can be financed using different capital channels and involve different financial structures and instruments, ranging from subsidies (See Boxes 6 and 7) to public-public (PUP) and private-public partnerships (PPP), or even payments for ecosystem services.

iv It is to note that access to private finance is not equivalent to the privatization of services. The source of finance (i.e.: where the investment originates) is separate from the implementation model (i.e.: who owns and manages the system). For instance, in many high-income countries such as in the United States, while publicly owned water service providers have leveraged commercial finance, they have not relinquished ownership and control of the management of their services.

Box 6: Boost Local Economy by Wastewater Treatment through Subsidies and Private Finance Initiative

Case Study From Japan on Subsidies and PFI Framework for Dissemination of “Johkasou” System: Ministry of Environment (MOEJ), Japan. By Ms. Rieko Kubota, National Institute for Environmental Studies, Japan

The private financing mechanisms are provided by the Government of Japan, through the MOEJ, and local government to disseminate the decentralized domestic wastewater treatment system. One of the major purposes is to make the decentralized domestic wastewater treatment project bankable, and therefore, to boost local economy and to engage local SMEs.

1. Subsidies to cover the cost of Johkasou installation

To increase the rate of dissemination of “Johkasou” system, national subsidies system has started to assist local government covering the cost of Johkasou installation. Cost bearing by resident has reduced to down to maximum 10% of the total cost and other percentages are covered by national government and local government tax.

2. Private Finance Initiative (PFI) mechanism

To avoid the overloading amount of work and financial burden for the capacity of medium to small-scale local government, PFI mechanism has been introduced to local government and had some successful cases in the last years. With PFI mechanism, installation of Johkasou is promoted by sales promotion by service providers. Service providers can ensure the bigger lot of Johkasou installation in local city compare to individual contract.

Direct operation by local government (LG)			PFI by service provider (SP)		
Johkasou installation	Registration	LG	Johkasou installation	Registration	SP
	Field survey and design	LG		Field survey and design	SP
	Request of installation	LG		Request of installation	SP
	Tendering and contract	LG		Tendering and contract	SP
Operation & Maintenance	O&M contract	LG	Operation & Maintenance	O&M contract	SP
	Inspection	LG		Inspection	SP
	Recording	LG		Recording	SP
	Billing	LG		Billing	LG
	Accounting admin	LG		Accounting admin	LG

Box 7: Toolbox of Financing Instruments and Policies for Water and Sanitation

The following are descriptions of financing tools quoted from various authors and institutions, per the references provided accordingly:

Equitable Share: The equitable share is constitutionally provided and is local government’s part of revenue raised nationally. The transfer to the municipality is unconditional.⁴⁰

Subsidy: design of policy for household subsidies to provide appropriate incentives may consider timing of subsidies to ensure demand responsiveness as well as community mobilization for community decided targeting of subsidies.⁴¹ *Declining operational subsidies*

as an instrumental tool, can support the service providers (perhaps in wastewater management), facilitate development of the sustainable business to ensure return of investment and open opportunities for local economic diversification with international benefits. (See Box 7 and 8)

Taxes: funds originating from domestic taxes that are channeled to the sector by central, regional and local governments, and repayable finance borrowed by governments other than ODA.⁴²

Water pricing: water pricing embraces a range of distinct policy instruments that affect the scale and/or the pattern of production and resource- exploitation costs. Economic costs of water and water services, that should ideally be reflected in the price users pay for them, is a combination of financial costs of service delivering water infrastructure, environmental costs arising from harm induced to ecosystems and ecosystem services, and resource costs attendant to social welfare losses from not using the water for the most socially beneficial purpose.⁴³

Tariffs: Tariffs lie at the core of water sector financing. Tariffs are essentially set at three levels: at the formal administration of water resource management and for the use of national infrastructure; at the water boards for purification and distribution and at the municipalities for the final water service delivery.⁴⁴ Water tariffs must balance economic efficiency, social equity and financial viability. Water tariffs must be raised to meet the costs of water supply, which continue to increase because of more advanced treatment, greater distances to be traveled, lower groundwater tables and more costly distribution in densely populated areas. Tariffs must be high enough to induce people to manage their water use better and reduce nonrevenue water (NRW). However, there is little attempt to use higher tariffs to restrict demand and realize the true value of water.⁴⁵

Loans and Bonds: Debt instruments can take the form of direct loans held on the balance sheets of financial institutions or may be structured for resale to investors or distribution in markets, be it private markets or public markets through registered corporate and government bonds.⁴⁶ Debt instruments have historically comprised 70 percent to 90 percent of the total capitalization of infrastructure projects. Infrastructure's capital-intensive nature, generally low-to-manageable operating risk, and the long-term importance of infrastructure services can help to support higher levels of leverage than similarly rated non-financial corporations.⁴⁷

Transfers (external sources): funds from international donors and charitable foundations. Transfers include grants and concessional loans, which include a grant element in the form of subsidized interest rate or grace period.⁴⁸

Public-public partnership (PUP): a collaboration between two or more public authorities or organizations, based on solidarity, to improve the capacity and effectiveness of one partner in providing public water or sanitation services. Far more countries have hosted PUPs than host PPPs in water, and these PUPs cover a period of over 20 years, which have been used in all regions in the world. In general, the objectives of PUPs are to improve the capacity of the assisted partner, including training and developing human resources, providing technical support on a wide range of issues, improving efficiency and building institutional capacity, financing water services and improving participation.⁴⁹

Public-private partnership (PPP): a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears

significant risk and management responsibility and remuneration is linked to performance.⁵⁰ Private sector complements public sector financing and allows projects to go forward that otherwise would have been discarded due to fiscal constraints. Besides, involvement of the private sector has the potential to improve efficiency as well as asset and service quality.

Payments for Ecosystem Services (PES): PES involves a series of payments to land or other natural resource owners in return for a guaranteed flow of ecosystem services or certain actions likely to enhance their provision over-and-above what would otherwise be provided in the absence of payment. The narrow definition of PES as a voluntary transaction negotiated among private contractors has been surpassed by the implementation of conceptually alike but broader schemes characterized by the intermediation of the Government between those who benefit and those preserve the ecosystems' functioning. PES can thus support the conservation and expansion the ecosystems when the latter generate services that can be valued in economic and financial terms.⁵¹

To date, far more countries in all regions of the world have relied on PUP, rather than PPPs, for water-related projects. In PUP schemes, which typically cover a period of over 20 years and comprise collaboration between two or more public authorities or organizations, neither partner expects a commercial profit, directly or indirectly. PUPs involve low risk to municipalities, non-commercial relationships, low transaction costs, and administrative costs at around two percent of projects.

The Indian national level reforms were undertaken in the Tamil Nadu state (see in Box 8), suggesting political, financial, legal and administrative reforms, focusing on IGFR, OSR and BF, with the leverage to be substantial and sustainable and empowering the municipal decisions.

Box 8: Tamil Nadu State- India, Empowering Municipal Decisions

Source: Rajivan Krishnaswamy (2005)

Recognizing the need to free up municipal decisions, and position municipalities as proactive creators of infrastructure, major political, legal, administrative and financial reforms were undertaken in the Indian state of Tamil Nadu in mid 1990's. These reforms included the linking of fiscal transfers to state taxes (rule based rather than on patronage), strengthening own sources (including powers to set rates) and setting up a supply side intermediary.

Based on the needs in the WASH sector and recognizing the need to lower costs for these projects, the state government set up Water and Sanitation Pooled Fund (WSPF) in 2003, as a trust with limited equity, and eliminating dividend expectations. WSPF, with little recourse to the capital, relied on credit enhancements of a debt service reserve fund and repayment from borrower's taxes and fees. The average size of projects was USD 1 million (drinking water

connections, pumping stations, etc.) and by pooling these demands, WSPF raised USD 30 million through a bond issue (rated as AA with a spread of about 70 bps over state government borrowing cost). A study of the bond issue of WSP demonstrated that domestic private debt can finance municipal infrastructure at low costs, if sufficient attention is given to the design of the intermediaries' capital structure, and security structures. This case is particularly

relevant for market access for small and medium cities, demonstrating the advantages of pooling in overcoming small size of issues and ensuing high transaction costs. This also shows the efficacy of market making intermediation.

The initial investors in the bond were commercial banks and the project size (less than USD 10 million individually) shows the efficacy of intermediation. The secondary investors in the bonds were private pension funds - evidence of the maturing of the debt market, and the ability to sell municipal obligations to long-term private funds, seeking fixed income returns.

As the SDGs call for expanding the scope of water-related outcomes, traditional approaches need to be upgraded and policies that will enhance sound water management need to be pursued, such as:

Integrated water resources management (IWRM), which opens research and development opportunities in searching for sustainable solutions and in organizing integrated policy frameworks. Asia and the Pacific has made substantial progress: 31 out of 32 countries with reported data have been developing water management plans, though only a few have reached the stage of advanced implementation.⁵² Substantial progress has been made by 31 out of 32 countries (with reported data) that have been developing water management plans, though only a few have reached the stage of advanced implementation as per ESCAP statistical data from 2017.

Empowerment of regional and local governments to develop policies and norms for financial frameworks and investments in decentralized projects is also required, as water and sanitation-related SDGs cannot be attained solely through large-scale projects and mega infrastructural financing. (See examples of policies presented in Section 4.1).

While between 2000 and 2015, the proportion of people without access to safe drinking water in the Asia-Pacific region declined from 17.8 percent to 6.3 percent, there is lack of knowledge and practice of empowerment of the local communities in improvement of water and sanitation managements. The State of Gujarat in India provides an example of empowering local communities for the delivery of water services (See Box 9).

Box 9: Community Managed Water Supply Schemes in Gujarat, India

Meena Bilgi, Specialist on Gender and Sustainable Solutions, India; Steering Committee Member on Gender and Water Alliance, www.wasmo.org

Pursuant to the 73rd amendment of the Constitution of India, the roles of Government, in 1993, had a paradigm shift in drinking water sector from service provider to facilitator. This enabled the community to act as planner and implementer of village water supply schemes. There was also a shift from the supply-driven government-owned systems to decentralized demand-driven, community-owned water supply systems with emphasis on empowerment and capacity building of local communities. The Panchayati Raj Institutions (PRIs) were given a constitutional status granting them greater power in managing local resources and community affairs.

Water and Sanitation Management Organisation (WASMO), created in 2002 in Gujarat, built strong partnerships with non-governmental organisations to create community-based institutions called *Pani Samitis* or 'water committees' and capacity building through

support and guidance. WASMO is closely associated with UNICEF and other International Organizations.

The water committees empower communities through a process driven approach, involving formation of Pani Samitis. The committees consist of 10-12 members within Gram Sabha (i.e.: village meeting). Their role is to plan, implement, manage, own, operate and maintain the village water supply system. It is a democratically elected standing committee of Gram Panchayat comprising of all sections of the society whereby it is essential for women constitute a third of the membership at minimum and ideally up to 50 percent of women members.

WASMO has created a unique system through the Atmarpan ceremony (dedication to self) for commissioning completed works to communities. It is an elaborate ceremony where all Pani Samiti members take an oath in front of their village communities to operate, maintain and manage the schemes. The WASMO experiment in Gujarat proves that the government can move from being a service provider to be a facilitator of services, provided it can make significant investments in creating the necessary infrastructure, developing technical, managerial and administrative skills, and transferring decision-making to the communities.

A greater diversification of the revenue streams through further engagement of local SMEs and communities can help ensure greater returns on investment at local level through enabling policies (such as declining operational subsidies). A favourable policy environment could further support a service-oriented economy whereby service-providers operate as SMEs. This may also support implementation of the bankable projects and respective capacity building. There is a huge opportunity for governments to report the best practices and enable them by providing targeted subsidies and incentives that generate and report on greater social, environmental and financial returns (See Box 10).

Box 10. Innovation Led Gradual Shift from Cross-Subsidy in Agriculture Sector

Karan Chouksey, ADB Clean Energy Finance (Consultant)

An agriculture developing economy like India, is heavily dependent on ground water of irrigation purposes. Government of India had been cross-subsidizing electricity for agriculture sector for decades. The agriculture sector power tariffs are cross-subsidized by the industrial tariffs for providing cheap power to Indian farmers.

Rapidly diminishing ground water levels in almost all parts of the country has become a pressing issue. At the same time, farmers are moving extensively towards water-intensive cash crops like cotton and sugarcane. Coupled with the availability of exploitatively cheap electricity, intense ground water is pumped out. This has resulted in over-exploitation of ground water even during normal monsoon seasons in India. This is however changing in the last few years. Since 2007, the electricity tariffs in agriculture sector has seen a huge jump of about 138%.⁵³ In addition, the Ministry of New and Renewable Energy (MNRE, India) has also introduced credit scheme and subsidies for efficient irrigation technologies like Solar Water Pumps. In 2015, the State Government of Maharashtra, has announced to take the burden off of the industries by reducing their cross-subsidized power tariff share and instead, has set up scheme to give solar water pumps to farmers and reduce their dependence on conventional

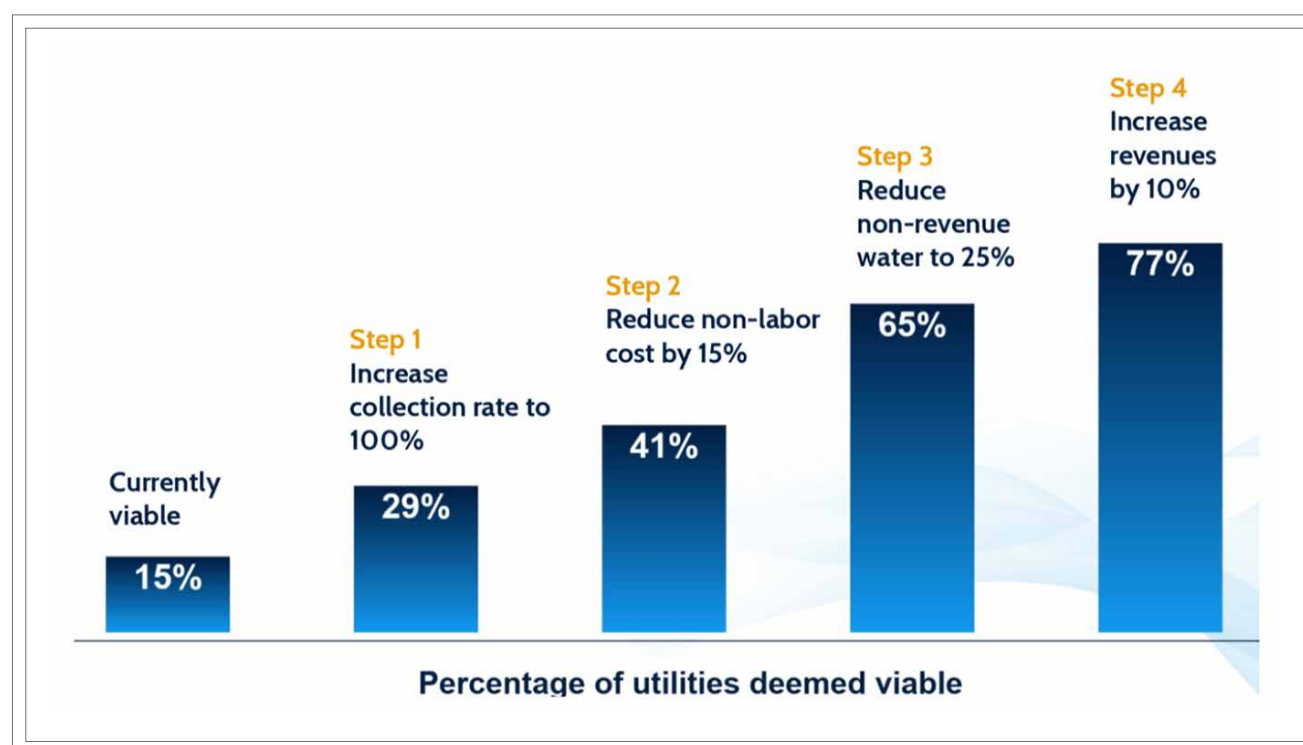
energy. Innovative schemes and policy tools are being designed, tested and adopted by the Government at federal, state and community levels to address the challenges of Food-Water-Energy nexus, either directly or indirectly. Optimization of ground water use for irrigation and agroforestry are few policy action and tools promoted by the Ministry of Environment, Forestry and Climate Change in India. However, there is still huge need for innovation.

To further enable investments, local water utilities need to improve financial viability and credit worthiness. Worldwide, a recent World Bank study found that only 15% of water utilities in developing countries are currently commercially viable, i.e.: meaning they can cover their operation cost and generate a 20% surplus that can be used for other financial needs. The World Bank provides an incremental step-by-step global model to achieve this through marginal improvements (see Figure 10), namely: *Step 1: improve collection rates; Step 2: reduce non-labour costs; Step 3: reduce the water losses; Step 4: increase the utility's revenues.*

ADB has identified three categories of **institutional, financial and efficiency reforms**, which contribute to the twin aims of greater efficiency and financial sustainability, in particular for irrigation:

1. Structural and Institutional Reforms:
 - Independent status for irrigation authority
 - Financial autonomy for irrigation authority
 - Vertical restructuring
 - Third-party operator
 - Irrigation management transfer and water user association
2. Financial Reforms:
 - Budget for irrigation and drainage
 - New investment
 - Tariffs
 - New sources
 - Better use of existing sources (results based financing)
3. Efficiency Reforms
 - Managerial reforms in irrigation authority
 - External support and capacity building for irrigation authorities and water user associations
 - Public-private partnerships and improved private sector and community engagement.
 - In addition, enforced property rights and water resources planning and allocation systems could be considered within structural and institutional reforms. Similarly, the transparent financial and performance reporting/benchmarking could be added within the financial reforms.

Finally, for private investors, investing in water supply and sanitation infrastructure is attractive when **technology is relatively well known and accessible**, and when there is a strong demand for the services and willingness to pay by end-users. The region has in fact a host of various technological innovations of water services in different sectors (See Box 11 and along various intervention points of the water cycles in Figure 1).

Figure 10: Stepwise process to full credit-worthy utilities by The World Bank**Box 11: Innovative Technologies and Financial Models**

Since water is an essential component for manufacturing and economic development, investing in the appropriate technology creates a positive cycle for sustainable development. Examples of the countries documenting the progress:

- Bangladesh has a technological focus on solar water heaters, solar water pumping, biomass gasifier, water pumping wind mill/irrigation and micro-hydro.
- China and Indonesia are also using the solar water heaters and geothermal heat pump technologies.
- Small hydro power projects are well used in Fiji, Nepal, Kyrgyzstan, Philippines, Thailand and other countries.
- Philippines promotes micro-hydro batteries, solar water heaters, mini-, micro- and pico-hydropower plants.
- In addition to micro-hydro turbine, Sri Lanka focuses on solar water heaters and distillers
- Government of China taxes industrial waste water
- Japan is subsidizing the annual operation and maintenance per capita at the municipal level (USD 50 per person per year).
- In Thailand the Board of Investment provides investment incentives to water based renewable energy projects.
- China is retrofitting some secondary cities into sponge cities with reconstructed wetlands, green areas below road levels and underground retention ponds for rainwater harvesting, and rooftop gardens.



4. Recommendations for the Way Forward with Policy Implications

Water-related SDGs cannot be attained solely through mega projects and by the search for mega-infrastructure financing. Progress will require the empowerment of local governments and leadership to develop policies and norms for financial frameworks and decentralized financing systems where appropriate. For example, policies enabling decentralized wastewater management practices in Thailand, Indonesia, Vietnam and the Waste Management and the Public Cleaning Law in Japan, mandate local governments and municipalities to participate in the management of water and sanitation services.

Cities, especially the region's secondary cities, provide particularly promising avenues to make progress due to the magnification of the issues at this level, as much of the growth they will experience offers untapped potential within their cities. The medium and short-term loops within the water cycle (Figure 1) present possibilities for planning interventions for more efficient water management, expanded services, and enhanced ecosystem service potentials both upstream and downstream.

Financing services are also needed for data collection and monitoring, especially using modern smart technologies, taking advantage of what GIS mapping technologies and Earth Observations technologies offer. Decentralized applications of enterprise blockchain solutions and various developer tools are also being explored. For example, Water ATM machines that are supported by The World Bank, can detect water leakages and ensure water security of the system within the Smart City Concept, as in India.

By creating both smart budget appraisals and the efficient delivery of water and sanitation services, governments can avoid inefficiencies and misallocations in the management of funds, especially in water and sanitation projects of municipal and local governments, which can be vulnerable to financial leakages. Better public fiscal management across water boards is critical to prevent revenues collected from being re-appropriated or re-allocated away from needed water infrastructure. Proportions of specific service taxes collected for different purposes at the central level should be allocated for water and sanitation provision in the local governments with clear programmes and implementation codes.

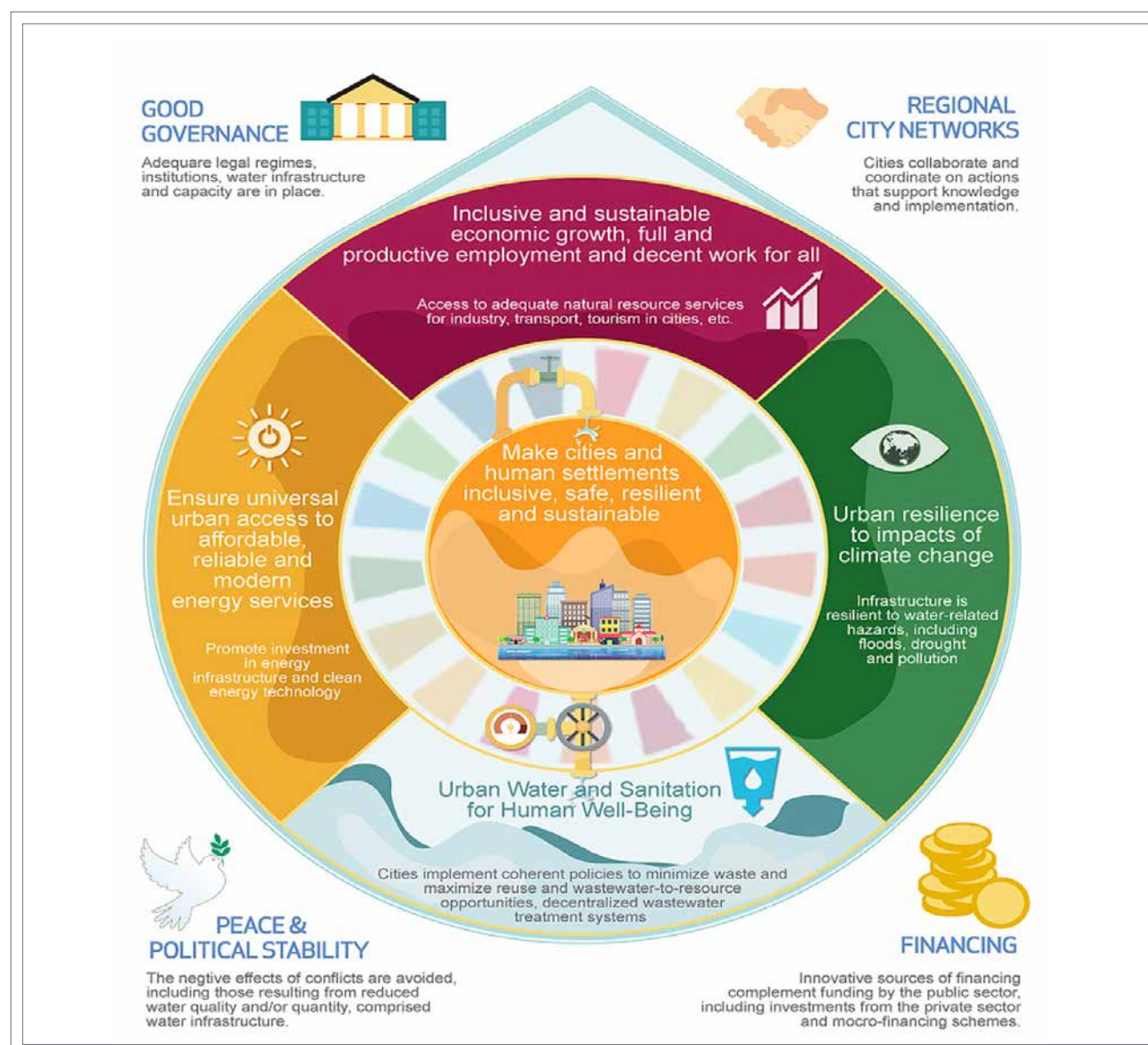
The SDG framework simultaneously highlights the governance, technical and environmental angles that could support a more attractive financial and investment climate from government, donors and entrepreneurs. Agenda 2030 and the SDGs are opening opportunities for national authorities across the region to apply holistic and integrated approaches in policies and planning.

4.1 Integrated Pathways for Implementing Water-Related SDGs

Facilitating investments in water and sanitation infrastructure will allow countries to meet local (See Box 12) and national needs, while contributing to the achievement of the SDG 6. The baseline status of SDG 6 and other water-related SDGs has been documented in ESCAP's statistics reports of 2015-17⁵⁴ and the Asia-Pacific Sustainable Development Goals⁵⁵ report. Figure 11 visually presents a conceptual approach towards integrated policy frameworks, which are instrumental for attainment of water-dependent SDGs. The funding sources from the public sector and private sector, including the utilization of micro-financing schemes, could complement innovative⁵⁶ sources of financing in the most population-condensed settlements, such as in urbanised areas,

which are responsible for over 70 percent of GDP in the region. ADB has analysed the impacts of urbanization, through five key dimensions of urban water security, and documented this in its Asia Water Development Outlooks of 2013 and 2016. To follow-up, ESCAP has elaborated an integrated policy framework, which defines potential water sector solutions for a shift towards resilience of water infrastructure. In this regard, the investment points specific to the water-related SDGs are further explored and presented earlier in Section 1.2 on water cycle framework. The framework, measuring progress of SDG-readiness is illustrated through best practices, policy briefs, holistic strategies and approaches of good urban governance in the interactive ESCAP e-learning course^v. Water-resilient and sustainable cities are cities that achieve safe and adequate water supply and sanitation services based on sound water-related ecosystems, high-level of water use efficiency, and a greater urban resilience to water-related disasters.

Figure 11: Key Factors Enabling Implementation of Water-Related SDGs



(source: ESCAP, 2017)

^v ESCAP. 2017. Interactive e-learning course on Shifting Towards Water-resilient Cities for Sustainable Development. The course assists the regional policy makers and practitioners with a proactive policy measures to achieve SDG-readiness through lenses of Water-Resilient Cities, providing an environment with a sense of larger social well-being and happiness. <https://sdghelpdesk-elearning.unescap.org/thematicarea/detail?id=9>

Box 12: Crafting Communities for Change in a Megacity

Case Study from Bangalore on Interventions for Sustainability in Water and Sanitation Infrastructure: The Case of CoEvolve and ECOSTP Technologies. Simar Kohli Das.

In the last 40 years, Bangalore has shown 525 per cent growth of built up area, 78 per cent decline of vegetation and 79 per cent loss of its water bodies. A very recent report by BBC⁵⁷ listed the city amongst the 11 globally to potentially run out of water. When Bangalore decides to reuse its wastewater, it can easily meet half the city's water demands. (See Figure 12))

ECO-STP (Eco-Sewage Treatment Plant) is a Patent Pending sewage treatment technology based on gravity and natural processes and works independent from power supply and daily surveillance while complying to the stringent Pollution Control Board norms. Drought resistant plants are also being used to reduce water consumption in irrigation. Additionally, there are water -efficient fixtures and fittings in all toilets to reduce water consumption (See Table A). The commodes used are dual flushing mode of 3 l and 5 l whereas all faucets are fitted with water aerators that reduce water flow without compromising on user experience.

Table A: CoEvolve Northern Star's annual savings per apartment

RESOURCE	Quantity	Unit	Rate	Savings
Electricity	2953.7	Kwh/y	6	17,722
Water	160.5	KLD	10	1605
Organic Compost	77	Kgs	10	768
Diesel	45.3	Lts	60	2721

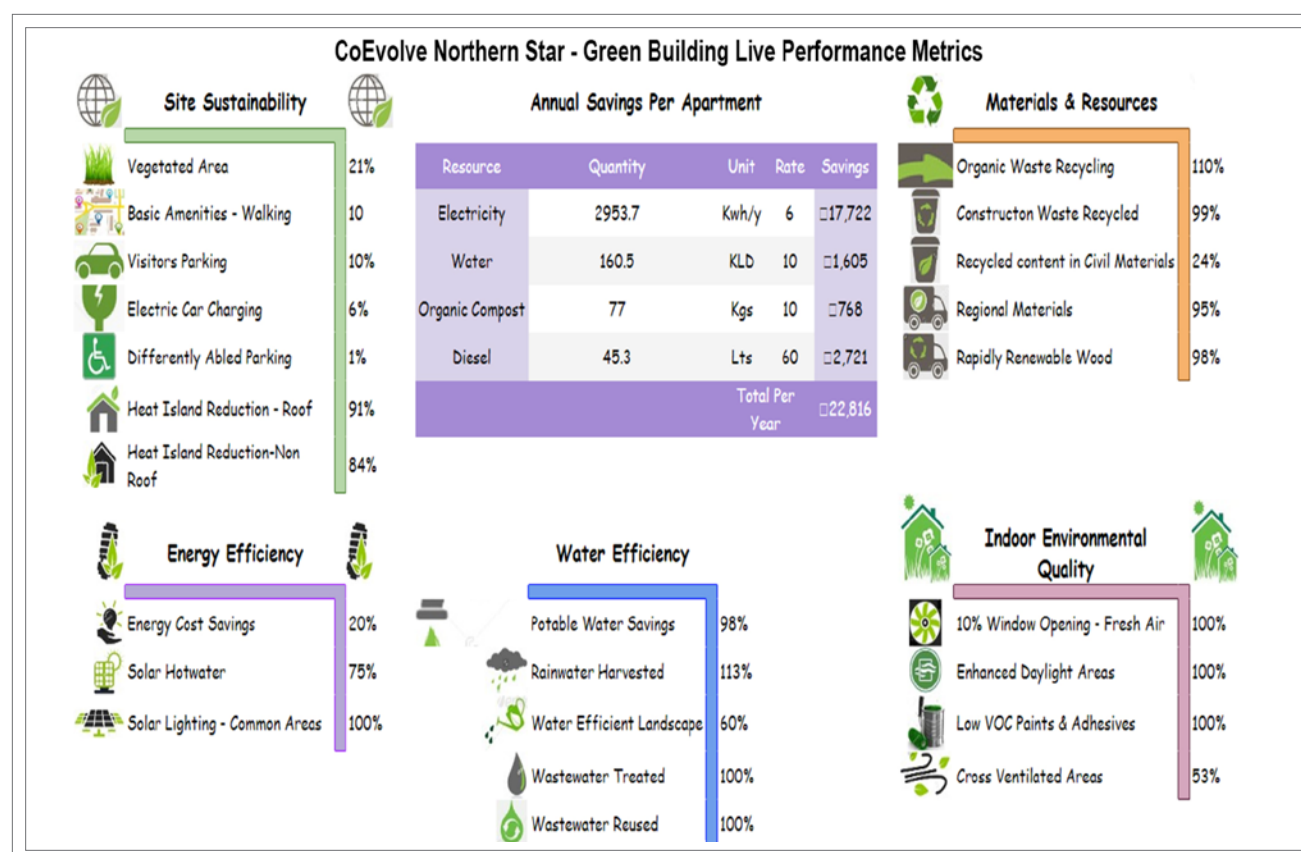
This project intends to be a zero-water discharge facility where the community can create a self-sustainable local hydrological cycle utilising all water to the maximum via rainwater harvesting (a water softener plant will treat all incoming water from bore wells or tankers). All rainwater runoff is directed to Deep Recharge Pits via a network of storm water drains, replenishing the groundwater (See Table B)

Table B: Water Efficiency

Potable Water Savings:	98 percent	Rainwater harvested:	113 percent
Water efficient landscape:	60 percent	Wastewater treated:	100 percent
		Wastewater reused:	93 percent

The ECO-STP treats about 80 kilo litres of water every day and has completely removed the dependency on power and a trained team to run the treatment plant. It has also resulted in zero space used for the STP as the unit will be built below the ramp and car parking with no operators involved. This will allow the targeted community to use biological processes to recycle sewage for flushing, gardening and car washing. The intention is to take the treated grey water and further treat it including filtration and ozonisation bringing it up to drinking quality.

Figure 12: CoEvolve Northern Star-Green Building Live Performance Metrics in Bangalore (see Box 12)



4.2 Policy Actions and Measures for Achieving Water-Related SDGs

Rapidly increasing urbanisation, industrialisation and progress towards achieving universal access are resulting in more demand for limited water supplies. According to the world's urbanisation prospects of 2018, the urban population is expected to grow to 68 per cent by 2050. Many urban areas face increasing water stress and water scarcity, as well as inadequate infrastructure and poor water resource management. Diminishing water resources could pose risks to urban development, continued economic wealth and prosperity, and social development, and threaten progress towards the SDGs. Regional cooperation can be instrumental in the establishment of the economic/financial paradigm proposed in this paper, to support investments for meeting the water SDGs.

ESCAP and the Asia Pacific Water Forum, as thematic leaders of the session on Financing Implementation of Water-Related SDGs at the 8th World Water Forum and through this discussion paper, aimed to inform on the financial challenges, as well as on opportunities that would assist relevant government agencies in the mobilization of funding for country-based water and sanitation projects through fostering public-public and public-private partnerships. In addition, ESCAP could help to facilitate dialogues on the development of sub-regional/regional financing mechanisms to support sound water cycle management, for example, through preparation of policy briefs for enabling water markets, water bonds, national water pricing schemes and reforms, payments for ecosystems services, and by proposing sustainable approaches for corporate river basin management.

Key Policy Actions to achieve water-related SDGs:

- improve the planning and implementation processes by creating an overall sector and subsector strategy to address inter-sectoral thematic interventions in support of the efficiency of the water cycle loops;
- increase the cost-recovery of water service providers;
- crowd in commercial lenders and, where possible, the private sector as key participants in attaining water-related SDGs and in implementing impact investment approaches from public and private sources;

Sub-Actions:

- correct/enhance the sustainable business model of water service providers;
- select financial instruments and arrangements that make sense with the current environment, using ecosystem based approaches and link banks of developed countries with countries of special needs;

Measures (optional): creating funding and oversight programs and policy frameworks at the regional level to incentivize collaborative partnerships in application of the decentralized (local) financing systems for water management in urban and peri-urban areas.

4.3 Roles of Partners

As the population has shifted and economic growth concentrates in urban areas, changing ratios of water resource use across rural and urban areas have significant implications for agriculture and food production and commercial, industrial and residential activities. Water services would enable the achievement of related SDGs only if all stakeholders, namely governments, development partners and private sector, play their part through enhanced or incentivised collaboration, with joint policy actions and measures to attain the SDGs. In this regard, partnerships can be developed, capitalizing on the following respective roles:

Governments:

- Address the pricing of water-related services coherently through framework strategy
- Facilitate mobilization of domestic finance
- Mobilize and target additional volumes of public and concessional funds
- Encourage greater capital efficiency by setting an adequate tariff and fee-based water system
- Incentivize the collaborative partnerships through regulated market and water services trading
- Build the capacity of municipal officials, particularly in secondary cities to apply urban water cycle management

Development Partners:

- Orient support and mobilize domestic finance
- Crowd commercial finance using guarantees and other instruments
- Provide the monitoring reports on efficiency of the financing frameworks

Private Sector:

- Improve capital and operating efficiency

- Explore potential financing relationships and transactions
- Returns on investment should be reported at multidimensional level
- Organise the sustainable business models to support the water infrastructure to attain the water SDGs

Financing water and sanitation needs of the region is currently a part of global, national and local plans. Regional think-tanks, and financing institutions need to jointly review their current strategies and to map out the sustainable sources for the growing water services needs and opportunities, and to further complement each others' inputs, using outcome-based approach and scenario planning tools. This collaboration should shift the focus of attention from "supply only" towards water-efficient infrastructure to reduce losses and wastes, manage water use across all sectors and enable sustainability of water withdrawals. Financing the upgrade and expansion of water infrastructure will be a critical issue, especially in the secondary cities of the region where much of the future growth will occur. Better planning for water-related disasters requires an integrated approach that addresses water supply and management, planned growth and the development of resilient infrastructure, factored to short-, medium-, long-term planning.

Appendix 1:

Yangon Declaration: The Pathway Forward

The Asia-Pacific region, with the largest and most dynamic economies in the world, is experiencing vigorous growth accompanied by a rapid reduction of poverty. However, approximately 1.1 billion people in Asia alone live in areas currently experiencing severe water stress and, unless significant action is taken, the number of affected population is expected to increase by more than 40% by 2050. Water security is a key component of sustainable development and faces enormous challenges. Achieving the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) can only be materialized if water is valued and if water resources are effectively protected and managed for the enhancement of water security in all the countries of the region.

The Third Asia-Pacific Water Summit (3rd APWS) was convened in Yangon, Republic of the Union of Myanmar, on 11-12 December 2017, with the aim of promoting cooperation and partnership, as well as sharing knowledge and experiences to enhance water security in the region towards concrete actions and solutions for sustainable development. This marks the beginning of a regional endeavor to take a leading role in the implementation of the International Decade for Action, “Water for Sustainable Development”, 2018-2028.

We, the Leaders of the Asia-Pacific region,

Celebrating the significant progress made in the past ten years since the First Asia-Pacific Water Summit held in Beppu, Japan, in 2007, and the Second Summit in Chiang Mai, Thailand, in 2013, in which period there have been large contributions to the achievement and improvement of the water-related targets of the Millennium Development Goals across the region, particularly in strengthening water supply to fulfill basic human needs,

Expressing continued concern over the remaining gaps between the ambition to deliver internationally agreed post-2015 water-related goals contained in the 2030 Agenda for Sustainable Development and the increasing threats to water security, such as climate change, particularly in the lowest income countries, countries with mountain areas and Pacific Island Countries, as well as the impacts on vulnerable groups, such as women, children and the elderly, in rural areas alongside emerging and rapidly growing urban areas,

Reaffirming shared commitments to achieving the water-related Sustainable Development Goals and targets, the Sendai Framework for Disaster Risk Reduction and the Paris Agreement on Climate Change to enhance resilience and the quality of socio-economic growth,

Being aware that the abovementioned threats will continue to intensify as the world population is expected to reach 10 billion inhabitants in 2050, in which over half of them will be living in the Asia-Pacific region, meaning that the sustainability of the region becomes a key component of our global future,

Hereby *express* our determination to achieve water security for sustainable development in the Asia-Pacific region and *declare* to:

Provide safe and affordable drinking water and basic sanitation for all in the region by 2025, five years in advance compared to the 2030 Agenda for Sustainable Development, as agreed at the First Asia-Pacific Water Summit, both in fast-growing urban areas, as well as in rural areas;

Double investment at the regional level in infrastructure and community-based efforts to address water-related disasters and significantly increase water security;

Advance research and development, as well as education and training, to generate innovative solutions, particularly in water use efficiency and productivity, recycling, risk assessment and reduction, policy and governance, meet growing water demand, reduce disaster damage and improve sanitation and wastewater management;

Recognize that there is no one-size-fits-all solution and *apply* measures tailored at local conditions of countries and communities through regional knowledge management;

Facilitate the implementation of integrated water resources management at all levels, including through transboundary cooperation, as appropriate, and partnerships.

We *envision* the Pathway Forward to upscale innovation for water security in the Asia-Pacific region and are *determined* to:

Sound water cycle management

Integrate rainwater, rivers, groundwater, glaciers, oceans and ecosystems, where relevant, into water cycle analysis and related policies at the river basin level;

Undertake efforts to conserve and restore water-related ecosystems, including deltas and estuaries, and promote the inclusion in the development agenda of wastewater management, green infrastructure and nature-based solutions for disaster risk reduction;

Take actions to increase water productivity in irrigation and drainage to achieve food security and sustainable agriculture; *Combine* the management of water resources and urban, regional and national land use planning;

Governance and inclusive development

Establish sound regulatory mechanisms and planning at the local and national level to supply safe and sustainable drinking water and to extend and improve sanitation and wastewater management services;

Ensure the protection of vulnerable groups from water-related disasters and engage them in disaster management;

Promote the integration of scientific and engineering approaches with sociologic and economic perspectives, along with local and traditional knowledge, in water-related assessments and activities;

Take measures to build the capacity of all stakeholders, particularly women, youth, disabled and the poor, and create mechanisms for involving them in water-related decision-making processes and multi-stakeholder partnerships at the different levels of govern- ance;

Urge all parties to end open defecation by 2025, as agreed at the First Asia-Pacific Water Summit, ensuring the availability of sanitation facilities, as well as promoting hygiene education for behavioral change;

Financing the implementation of water-related Sustainable Development Goals

Support the development of innovative and sustainable financial instruments that generate low-interest lending mechanisms, long-term cash-flow and attractive returns for high-impact water-related investment at multiple levels and scales;

Adopt innovative financial solutions such as reforming public finance, advancing Public-Public Partnerships, Public-Private Partnerships, structuring blended finance, applying Environment, Governance and Society investment and developing financial tools for long-term investment;

Focus on ex-ante investment for infrastructure and community-based efforts, including disaster preparedness and risk reduction, in addition to post-disaster recovery;

Develop a regional monitoring system on the financing of water-related Sustainable Development Goals and targets, aiming at harmonizing and complementing national and international initiatives and incentivizing collaborative partnerships.

We *request* the Asia-Pacific Water Forum (APWF), as a leading coordination and facilitation platform for water security solutions in the region to:

Water cooperation at all levels

Present this Yangon Declaration “The Pathway Forward”, accompanied by a supporting document to Call for Action, to relevant regional and global fora;

Provide region-specific inputs to the outcomes of the High-Level Panel on Water (HLPW);
Contribute to the Asian Water Development Outlook as an ongoing analysis to support the improvement of the water security situation in the Asia-Pacific region;

Lead the regional contribution to the Eighth World Water Forum, to be held in March 2018 in Brasilia, Brazil; *Advocate* innovation and *lead* through action at the Singapore International Water Week, to be held in July 2018;

Keep playing its coordination role for the contributions of the Asia-Pacific region to the Stockholm World Water Week.

We collectively *express* our sincere appreciation to the Government of the Republic of the Union of Myanmar for successfully hosting the Third Asia-Pacific Water Summit and for the warm welcome and generous hospitality extended to all participants.

Yangon Declaration:

http://apwf.org/apwf_wp/wp-content/uploads/2017/12/Yangon-Declaration.pdf

Appendix 2:

Dataset of ODA for Water in Asia-Pacific, in Million US\$, 2010-2015

Series	2010	2011	2012	2013	2014	2015
ODA: Water supply and sanitation	2,178	2,408	2,321	2,259	2,353	2,137
ODA: Water supply and sanitation (large system)	1,066.8	967.7	869.7	662.1	607.9	581.2
ODA: Water supply	100	146	196	197	182	201
ODA: Sanitation	60	94	118	180	274	179
ODA: Basic drinking water and sanitation	261	330	299	367	418	325
ODA: Basic drinking water	90	97	124	223	248	186
ODA: Basic sanitation	32	30	49	36	50	91
ODA: River basin	160	247	278	212	159	134
ODA: Waste management	107	145	132	105	100	146
ODA: Water resource policy	192	220	143	153	226	225
ODA: Water resource protection	104	128	111	121	86	64
ODA: Education in water supply	5	4	1	3	2	3

Data source: ESCAP-ADB-UNDP. Asia-Pacific SDG Partnership Data Portal. Available from: <http://data.unescap.org/sdg/> Accessed on 10/01/2018.

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The World Water Forum is the world's biggest water-related event and is organized by the World Water Council (WWC), an international organization that brings together all those interested in the theme of water. Its mission is "to promote awareness, build political commitment and trigger action on critical water issues at all levels, to facilitate the efficient conservation, protection, development, planning, management and use of water in all its dimensions on an environmentally sustainable basis for the benefit of all life on Earth". The World Water Council organizes the Forum every three years together with the respective host country and city. To date, there have been seven editions of the World Water Forum, in different countries, on four different continents. In 2014, Brazil's candidature to host the event was successful and Brasilia was selected as the host-city for the event. Accordingly, in 2018, Brazil hosted the 8th edition of the World Water Forum. It was the first time the event was held in the Southern Hemisphere.



Asia Pacific Water Forum (APWF, apwf.org) is an independent and not for-profit network organisation launched in September 2006 by the water Ministers of the Asia-Pacific Region during the Fourth World Water Forum (Mexico City, March 21, 2006). The on-going efforts of the APWF are aimed to strengthen mechanisms of more collaborative efforts on water resources management, such as those on safe drinking water and basic sanitation, and to accelerate the process of effective integration of water resources management at the national level into the socio-economic development process of countries in the Asia-Pacific region. Regional APWF experts work collaboratively with a wide variety of water-related organisations to build capacity and enhance cooperation, and to boost investments at the regional level and beyond. ESCAP and the ADB are the Governing Council members of the APWF, among others, while Japan Water Forum is acting as a secretariat of the APWF, since its inception. APWF is carrying the functions of a regional coordinator of the Asia-Pacific Water Summit.



The Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations' regional hub promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 Member States and 9 associate members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed insight into the evolving economic, social and environmental dynamics of the region. The Commission's strategic focus is to deliver on the 2030 Agenda for Sustainable Development, which is reinforced and deepened by promoting regional cooperation and integration. ESCAP's research and analysis coupled with its policy advisory services, capacity building and technical assistance to governments aims to support countries' sustainable and inclusive development ambitions.