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South Asia Water Initiative **SAWI**

July 2017 – June 2018
Annual Report



The South Asia Water Initiative (SAWI) is a multi-donor Trust Fund (supported by the UK, Australia, and Norway), and managed by the World Bank.

Its work is structured across three river basins (Indus, Ganges and Brahmaputra Focus Areas) and one landscape (Sundarbans Focus Area), spanning seven countries (Afghanistan, Bangladesh, Bhutan, China, India, Nepal and Pakistan). These Focus Areas interface with a Regional Cross-Cutting Focus Area that both supports non-basin specific work and translates national and basin-specific work for wider dissemination or implementation.

SAWI supports a rich portfolio of activities designed to increase regional cooperation in the management of the major Himalayan river systems in South Asia to deliver sustainable, fair and inclusive development and climate resilience. It does this through four complementary outcome areas: strengthening awareness and knowledge on regional water issues; enhancing technical and policy capacity across the region; dialogue and participatory decision processes to build trust and confidence; and scoping and informing investment designs. In the context of water resources planning and management, the program promotes poverty alleviation, economic development, gender inclusion and climate change adaptation.



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The International Bank for Reconstruction and Development /

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1818 H Street, NW

Washington, DC 20433, USA



Norwegian Ministry
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Seven major countries of South and East Asia – Afghanistan, Bangladesh, Bhutan, China, India, Nepal and Pakistan – are inextricably interconnected by virtue of their shared water resources. The Indus, Ganges and Brahmaputra Basins, and the Sundarbans Landscape link these countries to one another not only physically, but also in terms of their future development prospects, including under a changing climate. The fate of the billions of people who live in these basins will be determined by the ability of these countries to join together to manage transboundary water resources, which is critical for poverty reduction, economic development and greater regional stability.

The South Asia Water Initiative (SAWI) serves as a regional connector by promoting increased regional cooperation in the management of the major Himalayan river systems to deliver sustainable, fair and inclusive development.

SAWI is a Multi-Donor Trust Fund administered by the World Bank and financed by the governments of the United Kingdom, Australia and Norway. It implements a large and varied portfolio of activities to advance this objective, working in close partnership with client countries and a range of national and international implementing partners, including NGOs, research organizations, think tanks, universities, and others.

This annual report describes SAWI's progress, results and outcomes for fiscal year 2018 (July 1, 2017 – June 30, 2018). I am very pleased that the program is successfully putting in place the main building blocks for cooperative transboundary water management. This is evidenced by increasing trust amongst stakeholders in client countries, stronger capacity of institutions working on water-related issues, an improved information base on these complex systems, and the sound design and implementation of large investments that have transboundary implications.

With this strong foundation in place, SAWI is now looking towards the future – capitalizing on its achievements and continuing to catalyze change by exercising its convening power, applying its extensive experience and expertise on the management of complex water systems, tapping into its vast network, and leveraging important investments in the SAWI region.

The World Bank is grateful to SAWI donors for their ongoing support, and looks forward to the continuation of this collaboration to promote sustainable economic growth and regional integration in South and East Asia.

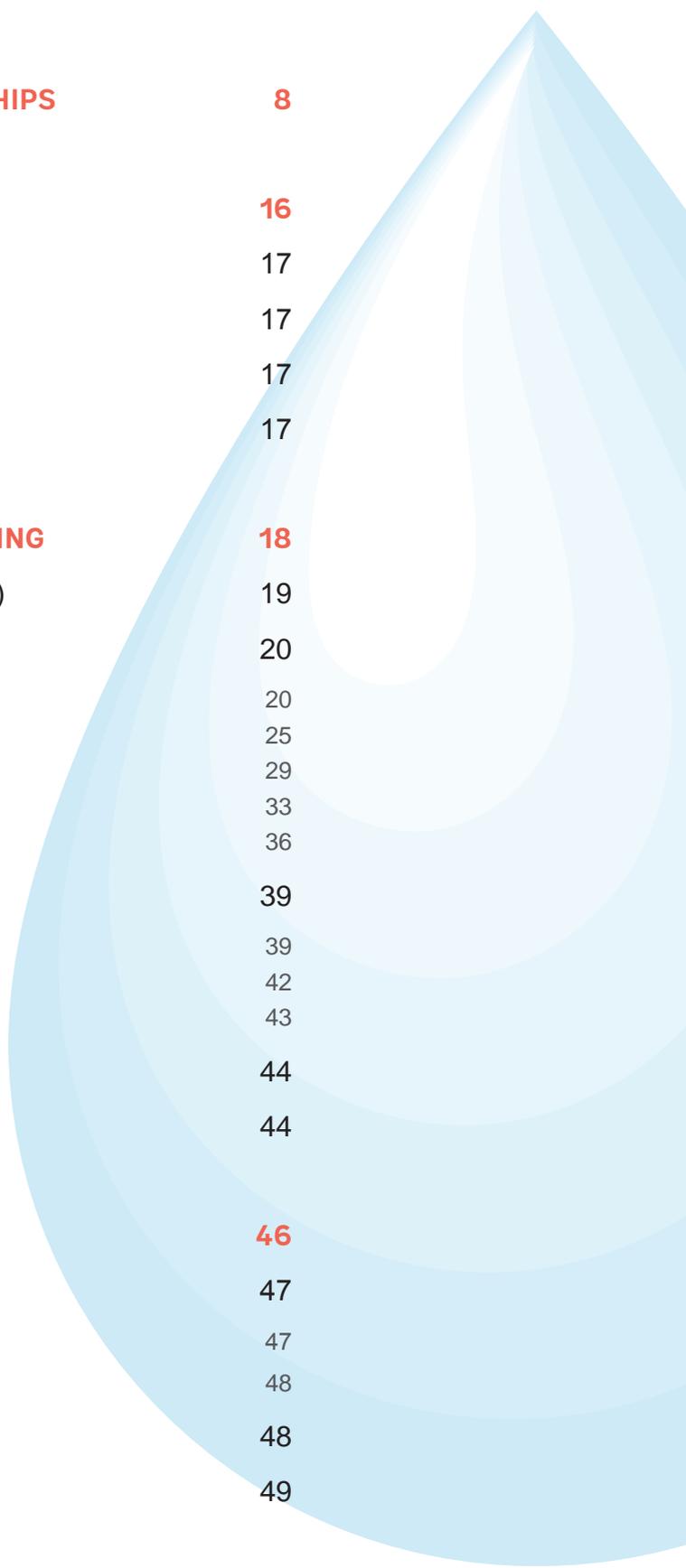
Robert J. Saum

*Director, Regional Integration and Partnerships
South Asia Region, World Bank*

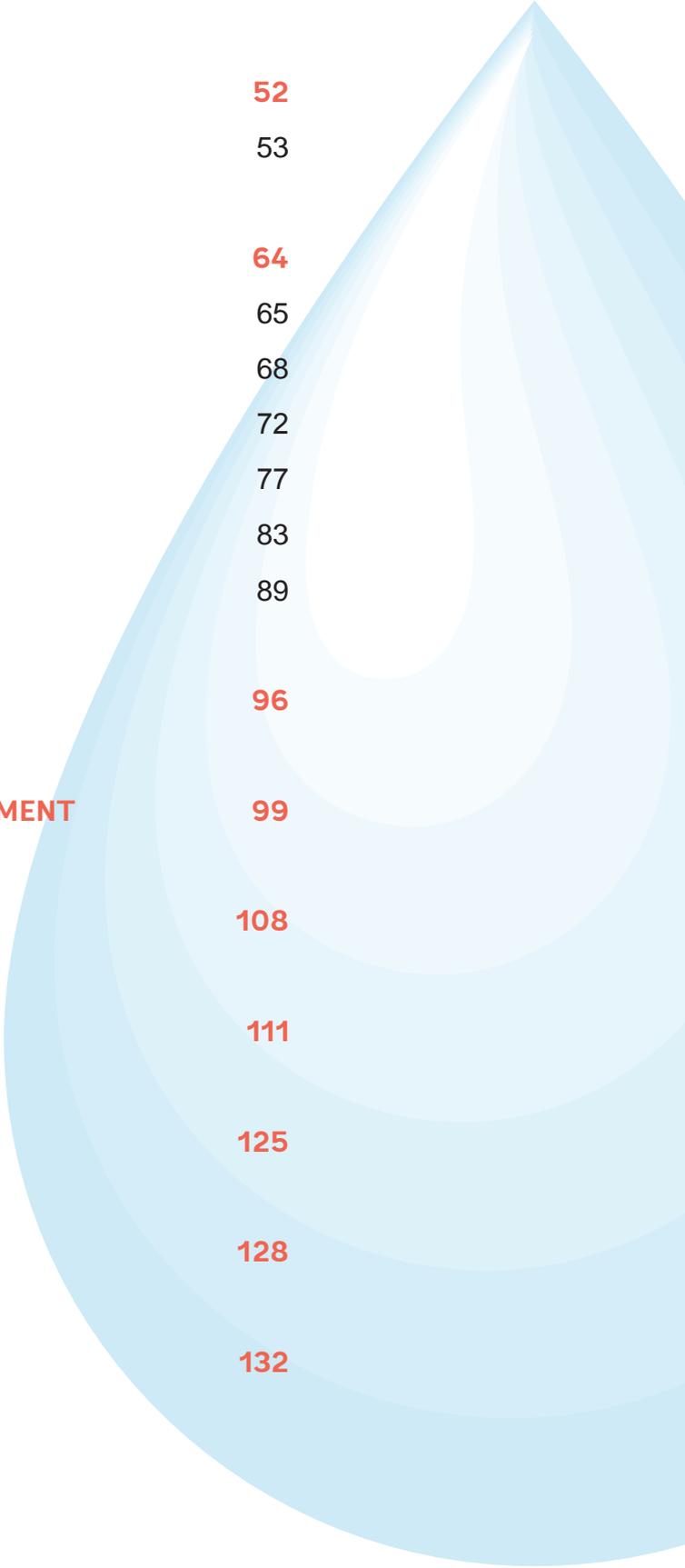
ADB	Asian Development Bank
AIRBMP	Assam Integrated River Basin Management Project
B	Billion (US Dollars)
BBIN	Bangladesh-Bhutan-India-Nepal
BE	Bank Executed
BISRCI	Bangladesh-India Sundarbans Regional Cooperation Initiative
BKDP	Bihar Kosi Basin Development Project
BRB	Brahmaputra River Basin
BRS	Brahmaputra River Symposium
CAEWDP	Central Asia Energy-Water Development Program
CMU	(World Bank) Country Management Unit
COP23	23rd Annual Conference of the Parties to UN Framework Convention on Climate Change
CSIRO	The Commonwealth Scientific and Industrial Research Organization
CWC	(India) Central Water Commission
DFAT	(Australia) Department for Foreign Affairs and Trade
DFID	(UK) Department for International Development
DONER	Ministry for Development of the North-Eastern Region
EU-MOFA	European Union Technical Assistance to the Ministry of Finance, Afghanistan
FRA	Flood Risk Assessment
FY	Fiscal Year
GOI	Government of India
GP	(World Bank) Global Practice
GRB	Ganges River Basin
GRM	(World Bank) Grant Report and Monitoring
HUC	Himalayan University Consortium
IBKF	Indus Basin Knowledge Forum
ICIMOD	International Centre for Integrated Mountain Development
IDSA	Institute for Defence Studies and Analysis
IIASA	Institute of Applied Systems Analysis
IF-WG	Indus Forum-Working Group
IRB	Indus River Basin
IRDp	Irrigation Restoration and Development project
ISWEL	Integrated Solutions for Water, Energy and Land project
IUCN	International Union for Conservation of Nature
IWA	International Water Association
IWG	Indus Working Group
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management

JICA	Japan International Cooperation Agency
JWG	Joint Working Group
M	Million (US Dollars)
M&E	Monitoring and Evaluation
MEW	Ministry of Energy and Water
MoFA	Ministry of Finance, Afghanistan
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MoWR	Ministry of Water Resources
NCAR	National Centre for Atmospheric Research
NEA	Nepal Electricity Authority
NEWIRB	North-East Water Information Base
NGMIP	National Groundwater Management Improvement Program
NGRBP	National Ganga River Basin Project
NHP	National Hydrology Project
NITI AAYOG	National Institutions for Transforming India
PRO	Program Management
PRWSSP	Punjab Rural Water Supply and Sanitation Project
RBO	River Basin Organization
RE	Recipient Executed
REG	Regional Focus Area
RD&GR	Ministry of Water Resources, River Development & Ganga Rejuvenation
RGoB	The Royal Government of Bhutan
SACIWATERS	South Asia Consortium for Interdisciplinary Water Resources Studies
SARRP	South Asia Region's Regional Integration and Partnerships
SAWGP	(DFID) South Asia Water Governance Programme
SAWI	South Asia Water Initiative
SDIP	(DFAT) Sustainable Development Investment Portfolio
SIWI	Stockholm International Water Institute
SUN	Sundarbans Landscape Area
TERI	The Energy and Resources Institute
TTL	(World Bank) Task Team Leader
UIB	Upper Indus Basin
UNDP	United Nations Development Programme
UNESCO-IHE	IHE Delft Institute for Water Education
UPWSRP	Uttar Pradesh Water Sector Restructuring project
USAID	United States Agency for International Development
WCAP	Water Sector Capacity Building and Advisory Services Project
WECS	(Nepal) Water and Energy Commission Secretariat

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OVERVIEW: SAWI-2 IMPACTS AND PARTNERSHIPS



This annual report (July 2017 – June 2018) summarizes progress of the fifth year of implementation of the South Asia Water Initiative (SAWI) Phase II (2013-2020). Whilst the main body of the report and its eight supporting annexes focus on annual results aligned with the Results Framework, this summary overview highlights critical change processes that are emerging, including from work in previous years.

SAWI - A REGIONAL CONNECTOR

SAWI provides a critical building block for regional cooperation and integration in South Asia, particularly in the context of challenges presented by water resources management, including those posed by climate change. The program is closely aligned with the World Bank's South Asia Regional Integration and Partnerships strategy. Although SAWI's main thrust (and technical entry point) is that of promoting regional collaboration on water governance, SAWI connects closely with other related sectors, such as transport (inland waterways), clean energy (hydropower), environment and agriculture (food security), all of which have positive impacts on regional growth, trade, climate adaptation and bring socio-economic benefits for the region's one billion population. SAWI also provides a window of opportunity to contribute to other water-related challenges of water quality, groundwater management, and ecosystem health. In the long term, SAWI is potentially serving as a regional integrator both within South Asia, and with its neighboring sub-regions, notably Central Asia and the Indo-Pacific region.



SAWI is informing 19 World Bank investments worth **\$4.2B**

SAWI works in concert with the World Bank's regional and country-level programs in South Asia. This is an important strategy, especially as South Asia does not have established regional institutions on transboundary water governance with which SAWI could otherwise engage. SAWI brings a regional lens to the World Bank's other activities, is informing 19 investments worth approximately \$4.2 billion (B) and is enabling the World Bank to support partners with other softer measures (such as exposure visits, technical inputs into policy areas) to advance the agenda of regional cooperation. New scientific knowledge, particularly on the interface between climate change and water resources, and operational knowledge of working in a South Asian context, is also informing the Bank's strategy in the region.

Continuum for Cooperation

The first three years of SAWI-II focused primarily on setting the strategy, finding appropriate technical entry points, building new partnerships, and operationalizing activities. In Year 4, SAWI widened its partnerships, seeded and leveraged new opportunities, and progressed regional and basin-level dialogue processes. Year 5 (this year, FY18), SAWI has continued to solidify and build on emerging gains most notably those emerging from the dialogue processes, broaden networks and reach with other regional partners who are increasingly bringing representational voices and helping to take the agenda forward, and leveraging wider regional potential through engaging with other Bank investments in strategically important sectors (e.g. inland waterways, energy, blue economy) that, taken together, could significantly impact regional growth and sustainable development.

SAWI's strategic intent of helping South Asian countries to improve and optimize basin-wide water resource planning and management (transcending administrative boundaries) remains a prime consideration but a sensitive transboundary issue. SAWI continues to work through technical entry points to help countries strengthen capacity and WRM efforts, both nationally and regionally, but the pace of progress varies across the 5 Focus Areas. In the context of increasing cooperation between its four riparian countries, the **Brahmaputra** Focus Area has made significant visible strides on its regional dialogue processes, and through its technical engagement with India's North-Eastern Region's plans for water resource management. These entry points offer significant potential for SAWI's outputs and activities to help boost regional knowledge sharing and action. The **Indus** Focus Area continues to adopt a politically neutral stance; and climate change has emerged as a topic of relevance to all the riparian countries. The main shift has been arriving at an agreement for a joint study by researchers from the four riparian countries (three years since the idea was first proposed), and signals growing intent towards collaboration. In the **Ganges** Focus Area, technical work in Nepal and India is intended to bridge activities in Nepal and India, but the pace of progress remains asymmetric. In Nepal, momentum has started to build for an integrated approach to water resource management in hydropower planning. The work in India is more advanced: the flood modelling work and the development and transfer of customized tools to Central authorities are significant as these will continue under national schemes. A strong process of extensive dialogue and collaborative planning with Indian states is ensuring wider buy-in. The **Sundarbans** landscape work is building trust through its collaborative regional platforms, joint technical work, and comprehensive data that connects poverty and ecosystems, and there is positive momentum towards the establishment of a more formal joint mechanism between Bangladesh and India for management of the Landscape.

BOX 1: NATIONAL-REGIONAL INTERFACE

SAWI remains a regional program, that works at multiple levels (regionally, nationally, locally) and across diverse stakeholders so that it can find relevant entry points to tackle complex issues that constrain progress towards regional collaboration on transboundary water governance. SAWI thus adopts a two-pronged strategy: top-down approaches that facilitate regional engagement and dialogue amongst the riparian countries; and a bottom-up approach that engages with national and sub-national priority themes and actors as means towards achieving SAWI's objectives. National activities are not undertaken in isolation, and some examples of the national-regional connect are as follows:

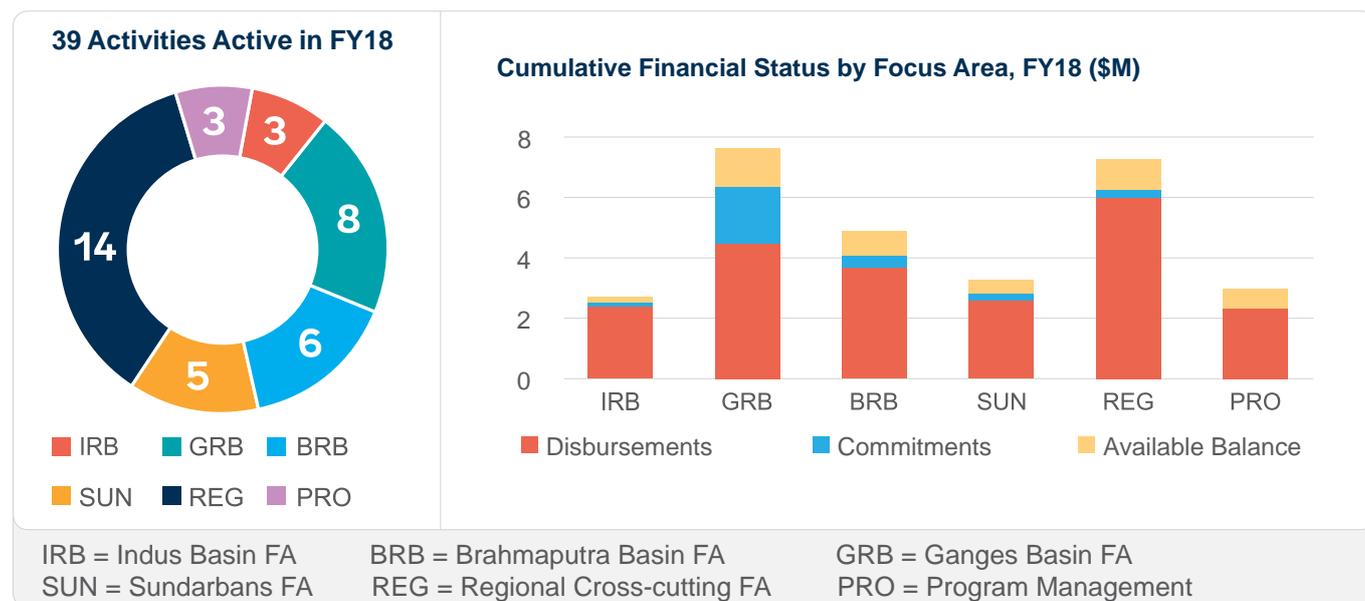
Optimization, Demonstration and Upscaling: Indian states are major stakeholders in integrated river-basin planning and disaster risk management. The flood modeling work piloted in Bihar, India, is being taken up by other Indian states, and a collaborative approach to the river basin modeling work has become an important platform to get wider buy-in towards an optimal approach to using a shared resource. This work is now being taken up under the National Hydrology Project (NHP), and brings new knowledge and offers lessons to regional neighbors which are taken up through regional forums. Similarly, Bhutan's and Bangladesh's work in disaster risk management offers learning to its neighboring states who have expressed interest in learning more about this work.

Shaping future investments: SAWI's technical support to informing national work on hydropower (e.g. Bhutan guidelines, and Nepal river basin modeling) are critical to future investments that are likely to significantly impact future regional welfare, growth / trade, and the ecology.

Capacity building: Nationally focused capacity building efforts – for instance, water diplomacy skills building in Afghanistan and in Bangladesh, are equipping stakeholders with knowledge, and building confidence to participate in regional dialogue on water governance.

PROGRESS

The World Bank’s assessment is that SAWI continues to perform well. SAWI’s resources are nearly fully allocated: 39 activities (of 55 overall) are active in the current reporting year, and a forward pipeline of activities has been approved for the remainder of the current phase of the program. As reported last year, SAWI undertook a strategic exercise to realign its portfolio to the new realities in South Asia. This year, the focus has been on portfolio stability, delivering activities and leveraging results from cumulative efforts.



The annual program-level targets in SAWI’s Results Framework for FY18 remain on track, and highlights are in Table 1 (at the end of this overview section, page 16).

SAWI has successfully positioned itself as a regional water governance program with acceptability, increasing ownership and buy-in of key stakeholders through its on-going program of work. At the regional level, this is evidenced by increasing participation and engagement in regional events, expanding networks, progress on collaborative research, and positive feedback from stakeholders. In parallel, new knowledge, capacity building, and tools (including those initiated or developed in previous reporting years) are finding uptake within country-level systems, mainly through the World Bank’s lending portfolio and country programs which are also supporting convergence between national efforts and regional priorities. Cognizant of the transient and complex nature of South Asia’s political economy, and envisioning a longer-term process of change, SAWI is navigating these issues by demonstrating successes through non-political, technical work and by building collaborative forums that are a powerful means of bringing regional stakeholders together on a common platform.





In FY18, 500+ regional participants came together in participatory processes

The program is gaining wider legitimacy, as evidenced by growing participation of stakeholders in basin-level dialogue processes, visible interest in technical collaboration, and expanding networks.

Three (of five) regional events were held this year, attended by technical experts, government and civil society participants that are increasingly looking at new ways of forging technical collaborations. The Indus Basin Knowledge Forum (IBKF) is one such example where participants from the four riparian countries have jointly prepared a research proposal on understanding and assessing climate change impacts in the Indus Basin. Progression towards formal collaborative mechanisms amongst the riparian countries, and discussions on potential joint investments are moving at a measured pace, as these are subject to wider political factors and sovereign interests that lie beyond SAWI's direct influence. SAWI facilitated other participatory processes at the basin/sub-basin level to raise awareness and share knowledge.

This year, technical work in each of the five Focus Areas has largely concentrated on: consolidating technical knowledge, some of which spans across reporting years; disseminating this new knowledge through various external platforms; providing capacity building and training to government partners, including the completion of a two-year capacity building program for Afghan officials; and helping partner governments to embed the knowledge and tools into operations.

SAWI is extending its reach and influence beyond its immediate activities. For instance, the World Bank was invited to provide technical expertise and to join a high-level Expert Committee for a priority initiative in the North-East of India, driven by the office of the Prime Minister of India, following the devastating floods in that region in 2017. As the World Bank representative was also the SAWI technical lead, this provided an opportunity for SAWI to make a significant contribution to a high priority agenda of water resources management in the North-East and the Brahmaputra Basin.

BOX 2: SIGNIFICANT ACHIEVEMENTS

Researchers from four riparian countries have jointly developed a research proposal on understanding and assessing the impact of climate change in the Indus Basin, since the idea was initiated in 2015. This will bring new knowledge on climate factors and future scenarios, and help to inform forward strategies through the lens of an integrated basin-wide approach.

The Bihar flood modeling work serves as a pilot for other Indian states, whilst the Ganges Basin planning is a first attempt at collaborative river planning across Indian states which will help to support decisions on the competing uses and demands for water resources in the sub-basin. SAWI's approaches are being scaled up by the World Bank-financed National Hydrology Project (NHP), which is being implemented by 29 states and 11 central government agencies.

The Ganges River Basin modeling system and water information dashboard have used collaborative modeling to explore multiple future scenarios, and have been transferred to India's Central Water Commission (undergoing further testing).

The Brahmaputra Basin-level dialogue is making significant strides, expanding its stakeholders and moving from track 3 to track 1.5, and is building consensus among stakeholders to continue the process.

SAWI is providing technical support to the Prime Minister of India's priority initiative in the North-East of India (also a part of the Brahmaputra Basin), aimed at improving the management of water resources in the region which suffers from water-related risks and sub-optimal use of water resources.

The Sundarbans joint landscape plan provides the first of its kind data-based comprehensive picture of the entire Landscape (Bangladesh and India) that connects poverty and ecosystems.

SAWI's previous technical support forms an important backdrop to future hydropower plans of countries in the South Asian region.

Gender disaggregation has been built into SAWI's Flood Risk Assessment (FRA), completed last year, and is being used internally by the CWC.



There are promising signs towards higher-level outcomes following the delivery of SAWI outputs in previous years. For instance, previous work on Nepal's draft Integrated Water Resource Management Policy and Water Resource policy (pending approval) forms an important backdrop to SAWI's ongoing support towards bringing a holistic and integrated water resources management approach to hydropower planning. Following on from previous SAWI diagnostic studies and data repositories, the Royal Government of Bhutan (RGoB) has finalized its first ever Guidelines for the Development of Hydropower, which is an important step towards greening its future hydropower plans. Most of the knowledge and tools produced under SAWI are in the process of becoming embedded in partner government systems, backed by larger World Bank investments.



PARTNERSHIPS

Network of some
33 partners

Taking on board feedback from previous Annual Reviews and an independent evaluation, SAWI has invested significantly in expanding external networks and partnerships, increasingly working with and through others, and playing a facilitating role in bringing regional actors together. This is also central to SAWI's long-term sustainability strategy. Approaches include the following: (i) Regional events are primarily conducted through other regional institutional partners (e.g. IWMI / ICIMOD/ IIASA in the Indus Basin), thereby helping to embed the agenda more firmly in the region, extend reach to a wider community, give voice and agency to a diversity of representative groups, and build capacity. Another prime example is the Brahmaputra Dialogue process, which is now being advanced by the four riparian countries themselves (Bangladesh, Bhutan, China, India); (ii) SAWI is building on work with others. For instance, in Bhutan, the World Bank has had extensive consultations with UNDP and JICA on the hydromet-related work, and is seeking to build on ongoing efforts, including by other donors such as Norway and Finland; (iii) Facilitating South-South exchanges, such as training events between faculty from Chinese and Nepali universities, and a study tour of Afghan officials to the Nile Basin Initiative.

CLIMATE CHANGE

SAWI is successfully informing and contributing to the mainstreaming of climate change resilience and adaptation, including in the World Bank's lending portfolio in South Asia. SAWI continues to build and disseminate scientific climate knowledge, using the process of knowledge development to promote technical cooperation between countries, and integrating climate change into client institutional practices and programs. Notably, SAWI has disseminated a summary report on "Climate Risks and Solutions: Adaptation Frameworks for Water Resources Planning, Development and Management in South Asia" (July 2017), prepared by the World Bank and IWMI. The report provides a valuable consolidated picture of climate changes risks in water management and the status of policy frameworks in place to manage these risks. A research proposal, "Understanding and assessing the impact of climate change in the Indus Basin", jointly developed by researchers from across the Indus Basin countries, is helping to advance technical collaboration among the riparian countries.

GENDER AND SOCIAL INCLUSION

SAWI continues to work at multiple levels to bring greater attention to gender equality and empowerment. This remains incremental as achieving shifts in mindsets across various stakeholders takes time, analysis and data on the connections between transboundary water resources management and gender are limited, and traditionally, decision makers have tended to give priority to other pressing issues. SAWI strives to mainstream gender equality, empowerment and inclusion across the portfolio, although progress remains non-uniform across the program. **SAWI's approaches represent relatively small but important steps towards increasing understanding of and buy-in for gender and social inclusion in a field that has traditionally been 'gender blind'.**



**168 women
trained (including 39
in FY18)**

SAWI is undertaking the following: (i) encouraging the **participation of women in training and capacity building**: 39 women benefitted from capacity building and training in FY18; (ii) raising **gender issues in regional platforms**, which are unlikely to have otherwise happened: for example, the Brahmaputra Dialogue introduced, for the first time, a dedicated gender session towards raising public awareness of key issues, and is building on this through further sub-regional events. Also, discussions during the North-East India workshop introduced the importance of having a gendered approach – which were well appreciated by participants. SAWI is now oriented towards mainstreaming gender into the design of a follow-on program for improving water management in North-East India; (iii) **expanding knowledge** on linkages between water governance and impacts on women: for instance, work on the non-

monetary value of water for women has recently begun; Sundarbans studies are assessing the ecosystem, fisheries and potential benefits for poor communities, and causal linkages between nutrition and health status of expectant mothers and children; and, (iv) increasing **partner / stakeholder buy-in** to the strategic integration of gender into policy and programs. SAWI's gendered knowledge products and efforts, such as the Sundarbans Blue Economy study, are also informing larger World Bank lending operations in the region.

THE EVOLVING CONTEXT

The regional context remains significant to SAWI's approach and achievements. Political factors continue to outweigh economic or technical considerations, and global geo-politics, security and economic / trade issues add to the complexity of political relations between countries that are beyond the scope of the program. Positive momentum towards regional collaboration continues to build in South Asia, with several bilateral agreements across sectors and growing economic collaboration amongst the BBIN countries in the Eastern sub-region. Both India and China are prominent in the region, and are likely to impact the future trajectory of regional investments and relations. Persistent challenges to regional cooperation include power asymmetries amongst the countries, historical tensions, and divergent interests and capacity constraints, although there are several positive efforts to strengthen regional economic partnerships. In this reporting year, six South Asian countries have either had their national elections or are gearing up for them, which has presented both new opportunities as well some slower than anticipated progress.



LOOKING AHEAD

There is increasing political will towards cooperation on water governance; and, having established itself regionally, SAWI is well positioned to catalyze this. Water remains critical for South Asia, and governments are publicly acknowledging the urgent need to deal with water-related challenges. Erratic weather patterns, climate related disasters, water scarcity, depleting groundwater availability and declining quality, coupled with increasing demand for water has put water governance firmly on the political agenda.

SAWI is proving to be more than its individual activities, and is uniquely positioned to deliver benefits beyond its focus on transboundary water governance. In addition to leveraging funds (and linking them to investments), the World Bank has an established presence in all SAWI countries and close relationships with stakeholders, including with donor agencies in-country, that allows its work to be relevant and in line with their priorities. The Bank (and SAWI) has a large network of implementing partners (ICIMOD, IWMI, etc.), and brings its global experience and expertise across a range of water-related sectors. The Trust Fund mechanism enables SAWI to be agile in engaging with new, emerging opportunities, whilst ensuring portfolio stability despite regional and geo-political shifts, or external shocks. SAWI's politically neutral approach and technical entry points enable it to work on sensitive topics at the technical level.

Looking ahead, SAWI plans to extend reach and deepen engagement with stakeholders (including donor agencies) within and across riparian countries, including by using the World Bank's wider network. Preparations have begun for the implementation of new activities, and for upcoming events in FY19. SAWI will continue to strengthen gender aspects, institutionalize processes with regard to multi-stakeholder forums, embed knowledge into client systems, and conduct additional capacity building, including for senior decision makers.

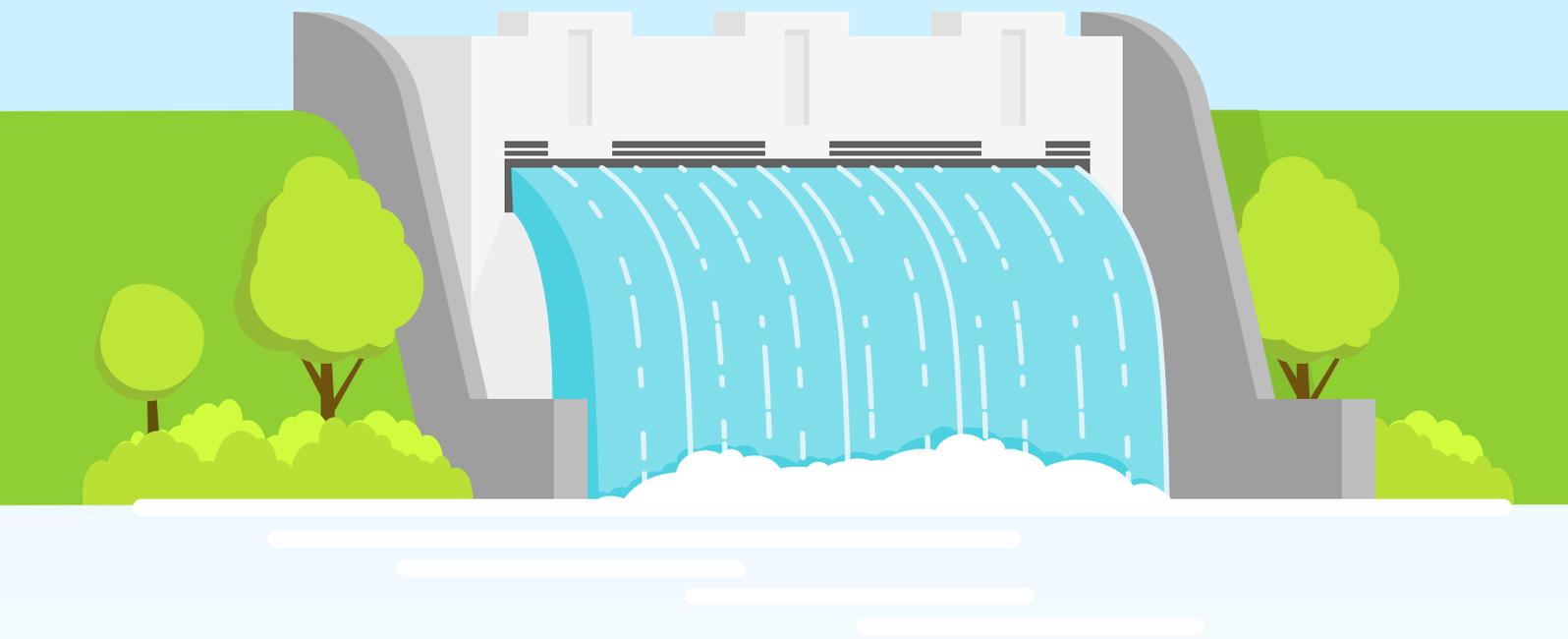
SAWI is actively considering measures for sustaining its work beyond this phase of funding, including the discussion of funding for a potential next phase. These efforts include: scoping out the context and emerging opportunities, identifying priority themes, mapping networks and partnerships (including donors), facilitating uptake of knowledge products and seeking linkages with other World Bank investments.

TABLE 1: KEY RESULTS HIGHLIGHTS (FY18)

DIALOGUE AND DIPLOMACY	<p>Three of five sub-regional and regional level dialogues were held this year, enabling some 500 regional stakeholders to build trust and to work toward mutually beneficial solutions.</p> <ul style="list-style-type: none"> • The 2nd and 3rd Indus Basin Knowledge Forums in FY18 have seen significant increase in participants from research, academia, government, foundations and the donor community, leading to a 10-point action plan, and paving the way for collaboration on research and funding. • The Brahmaputra River Symposium marks a major milestone by bringing together prominent stakeholders from the four riparian countries as it steadily scales up towards Track 1.5 dialogue, and by expanding the network to regional institutions. • Bangladesh-India Sundarbans Regional Cooperation Initiative (BISRCI) continue to drive informal discussions with key stakeholders on sensitive issues on the Sundarbans, and have completed the draft for a formal joint transboundary mechanism. • Preparations for the next regional level dialogue have begun, and SAWI has actively engaged a broader set of stakeholders to build relationships, awareness and impetus for collaborative action.
KNOWLEDGE AND CAPACITY	<p>New knowledge products (41 in FY18), coupled with targeted capacity building (270 people), continue to deepen understanding of transboundary issues by key stakeholders and provide options and tools for addressing these - thus contributing positively to the wider operating environment.</p> <ul style="list-style-type: none"> • A joint research proposal on climate change has emerged from the Indus Basin Knowledge Forum which is significant as it engages all four riparian countries. Officials from the Government of Afghanistan have also benefitted from a two-year capacity building program on transboundary water governance and management, which concluded this year. Training being taken up by other institutions and programs. • An advanced manual on real-time hydrological information (Ganges) with a companion e-tool will helpfully guide operators on data collection and transmission related to surface water, groundwater, water quality, sediment and rainfall/ weather. • The completion and transferal of the customized and purpose-built river basin modelling system and water information dashboard to India’s Central Water Commission is a significant milestone and an important step towards strengthening river basin planning and water resources assessment • The Joint Sundarbans Landscape narrative, background studies on the landscape, environment and the blue economy, geo-coded datasets on ecosystems, and work on climate change, is helping stakeholders to develop a comprehensive understanding of the ecosystem and climate impacts, economic opportunities, and social inclusion particularly for vulnerable communities. • Regional studies are addressing knowledge gaps on priority themes including: climate changes risks in water management and the status of policy frameworks to manage these risks; groundwater management; and guidelines to inform hydropower development. • Capacity building activities are facilitating South-South partnerships and cross-learning, for instance between universities in Nepal and China; and between Afghan officials and the Nile Basin Initiative.

EXTENDED REACH	<p>SAWI is expanding partnerships, and engaging with emerging opportunities and with national priorities beyond its immediate activities.</p> <ul style="list-style-type: none"> • The Government of India’s newly initiated Northeast Water Resource Management technical work and consultation exercise is enabling SAWI to support a high priority area that not only is of national significance in India, but is also contributing to the wider Brahmaputra Basin approach. SAWI has the opportunity to reach a diverse set of stakeholders (not yet represented in the basin-wide activities), and to build comprehensive understanding across sectors / geographies / themes during the process of developing a forward strategy and plan. • In India, SAWI continues to directly inform the development and implementation of national investments (valued at \$2.8 billion), and successfully engage 11 Indian States in the Ganges Basin, where there are competing demands for water resources. • So far, SAWI has 75 extended partnerships and networks with regionally-based institutions, knowledge partners, and country-based partners, which is a critical element of its strategy to build regional ownership, capacity and sustainability. SAWI is also strengthening collaboration with the work of other donor partners – particularly in the Indus and Brahmaputra Basins.
LEVERAGE	<p>Over the years, SAWI technical products are informing 19 World Bank investments across the region (worth \$4.2 billion).</p> <ul style="list-style-type: none"> • In Afghanistan, SAWI supported restructuring (additional World Bank financing of \$70 million (M)) of the World Bank’s Afghanistan Irrigation Rehabilitation and Development Project, with an increased focus on transboundary river basin management. • In Bhutan, SAWI contributed to the preparation of a project on hydro-met services and disaster resilience (\$4M), partially funded with GFDRR. • In Bangladesh, SAWI supported preparation of the Weather and Climate Services Project (\$113M), and the Bangladesh Sustainable Coastal and Marine Fisheries Project (\$240M). • In India, technical work on the Brahmaputra is supporting the preparation of the Assam Integrated River Basin Management Project (\$200M). SAWI activities are informing and supporting implementation of the following: National Hydrology Project (NHP, \$175M); National Groundwater Management Improvement Project (NGMIP, \$500M); Uttar Pradesh Water Sector Restructuring Project–Phase 2, (UPWSRP, \$360M); West Bengal Major Irrigation and Flood Management Project (\$145M); Bihar Kosi Basin Development Project (BKDP, \$250M); and, Neeranchal National Watershed Project (\$178M). Basin-level technical advice supports the National Ganga River Basin Project (NGRBP \$1B). • In Pakistan, SAWI supported additional World Bank financing of \$35M for the Water Sector Capacity Building and Advisory Services Project (WCAP), aimed at bringing an increased focus on river basin management for transboundary rivers. • In Nepal, SAWI is commencing analysis to inform the World Bank’s Power Sector Reform and Sustainable Hydropower Development Project (\$20M), and informed the Kali Gandaki A Hydropower Plant Rehabilitation (\$27M). <p>New in FY18:</p> <ul style="list-style-type: none"> • Punjab Rural Water Supply and Sanitation project (150520) \$248M • Sustainable Forest and Livelihood Project (161996) \$175M • Climate Smart Agriculture and Water Management Project (P161534) \$120M • Coastal Embankment Improvement Project (P128276) \$375M

SECTION 1: INTRODUCTION



1.1 How to Read This Report

This fifth annual report provides an assessment of progress for the reporting period July 2017 – June 2018. This Section 1: Introduction briefly sets out SAWI's key objectives, approaches and portfolio details. Section 2: FY18 Reporting Annual Progress summarizes progress against four intermediate outcomes in the Results Framework for each Focus Area, presents progress against gender and climate change, and outlines program and financial management. The report concludes with Section 3: Lessons, Risks and Forward Look. Further details are contained in nine supporting Annexes.

1.2 SAWI'S Objective, Approach and Portfolio

SAWI Phase II is a six-year (2013/14-2019/20) Multi-Donor Trust Fund (US \$30.7 million) administered by the World Bank, with financing from the governments of the United Kingdom, Australia and Norway. Its objective is to increase regional cooperation in the management of the major Himalayan river systems in South Asia to deliver sustainable, fair and inclusive development and climate resilience. Four inter-linked pathways support this outcome: (i) building confidence and trust amongst the riparian countries; (ii) generating new knowledge, including in partnership with others; (iii) building capacity of key institutions and stakeholders; and (iv) scoping and leveraging investments. The program is structured around four geographic Focus Areas (Indus Basin, Ganges Basin, Brahmaputra Basin, Sundarbans Landscape) interfacing with a Regional Cross-Cutting Knowledge, Dialogue and Communications Focus Area that both supports non-basin-specific work and translates national or basin-specific work for wider dissemination or implementation. Each Focus Area is framed around a high-level objective statement and strategy. SAWI has had a total of 55 activities since its inception. In FY18, 39 activities were active of which five are Recipient Executed (RE) activities, and 34 are Bank Executed (BE). Details are in Annex 2 (Activity Summaries), Annex 4 (Program and Financial Management), Annex 8 (New Activities), and a summary of SAWI-linked investments is in Annex 9.

1.3 Partnership approach

SAWI continues to expand its partnerships and networks, and its activities are carried out with national, regional and global partners. National authorities in all SAWI countries are involved in virtually all SAWI activities. These partnerships ensure the sustainability of SAWI activities, including beyond the duration of the program. They also help in crowding in knowledge and disseminating it to multiple stakeholder groups, and congregate partners around common themes and interest. Most events are organized in collaboration with partners, while knowledge generation is carried out with involvement of policy think tanks, civil society and academics. Activities are primarily implemented through grants or contractual arrangements with external implementing agencies, regional knowledge institutions and experts. (Refer to Annex 7).

1.4 Relevance

SAWI remains strongly relevant, not only to its core objectives but also through its potential role as a regional integrator across sectors, geographies and stakeholders. Firstly, the need for a South Asia approach remains a priority, particularly as inaction and climate change are likely to have adverse impacts on regional growth, security, prosperity and the lives of one billion people. In the absence of a regional transboundary mechanism on water, SAWI is able to bring regional stakeholders together towards collaborative action. Secondly, water and climate are high on the political radar, and SAWI is well positioned to harness this both nationally and regionally, using an apolitical, technical approach that sits well within the complex regional political relations. Finally, SAWI is closely aligned with the World Bank's larger lending investments and adds value by financing activities outside the scope of routine lending operations, by offering small technical assistance to help advance initiatives that would otherwise move at a slower pace, and by supporting coordination across operations within and across countries.

SECTION 2: FY18 ANNUAL PROGRESS REPORTING



2.1 Effectiveness (What difference is SAWI making)

Overall, SAWI's progress is consistent and remains on track. The four intermediate outcome areas are working in complement to build stakeholder awareness, interest and engagement towards joint collaborative action. SAWI is witnessing a positive trend in terms of stakeholder engagement, as evidenced by: active and increased participation in sub-regional dialogue and events, examples of participants using these forums to generate wider interest and funding for research, high continued demand for capacity building and exposure to advanced practices in other countries, greater ownership of working towards collaborative research and in the organization of future events, and the uptake of new SAWI tools and knowledge by client governments. However, there is some variation in pace of activity and uptake across the Focus Areas, largely due to differences in context, diversity of stakeholders, client capacity and demand, and other external factors. A summary assessment of progression toward the four intermediate outcome areas is as follows (with more details in the Results Framework in Annex 1, also see Table 1 at the end of the overview section):



- 1. Building Trust and Confidence:** SAWI's main pathway for building trust amongst riparian countries is through the basin-level dialogues, supplemented with technical knowledge and capacity building. Growing participation and ownership of key stakeholders in these forums is a positive signal of increasing interest in using these neutral platforms as a safe space to discuss issues related to regional cooperation on transboundary water resources. Although progress towards regional cooperation is largely subject to external political factors and international relations, these forums are providing some degree of continuity of dialogue and discourse, enabling participation of multiple stakeholder groups, and opening up thinking and common understanding on a range of issues.



- 2. Generating and Sharing Knowledge:** Appetite for SAWI knowledge products is growing, with several examples of stakeholders contributing to the development of and taking on board SAWI products and disseminating these on their external websites or by other means. SAWI's outputs include new analysis, knowledge and tools, which are informing larger investments at the national and sub-regional levels. These technical entry points are also proving to be a useful mechanism to engage stakeholders on a range of issues, set out markers for water as an integrator, tackle sensitive issues, develop evidence, and encourage joint research among riparian countries. Gender and climate change are also increasingly becoming embedded into SAWI's activities.



3. Building Institutional and Professional Capacity: There is strong demand for study tours, exchange visits, and targeted training – a point that the independent evaluation has also endorsed as a useful mechanism to engage senior officials. Institutional preparedness to take on board the knowledge and tools developed is important, and SAWI's capacity building approaches are cognizant of this reality. Several training programs are therefore being targeted at both the drivers of change (senior decision makers), and the users of the tools (operational staff). Additionally, SAWI's approach of facilitating cross-learning between countries and institutions is starting to take root with several formal institutional partnerships in the works.



4. Scoping Interventions and Investments: SAWI activities are aligned with other World Bank investments in the region, and with national-level programs, which is helping to ensure that SAWI's knowledge is embedded into government systems and likely to be sustainable in the long term. The growing recognition within the World Bank of the potential for regional water to act as an integrator is also opening up additional avenues for SAWI knowledge and forums to inform other investments. Likewise, SAWI is able to leverage the World Bank's presence, reach and networks to deepen its impact in the region.

Achievement Highlights in FY18



500 regional stakeholder participants in dialogue processes



41 new knowledge products



Capacity building for over 270 people



4 New emerging opportunities leveraged

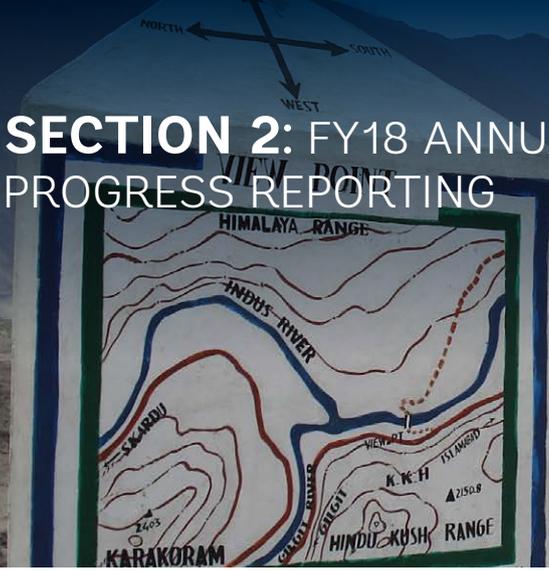
2.2 Focus Area Reporting

Indus Basin Focus Area

Context and Strategic Approach

Climate change remains a significant challenge for the Indus Basin, shared by Afghanistan, China, India and Pakistan. The sub-region is one of the most disaster-prone in the world, subject to extreme floods and droughts and climate variability coupled with high population growth. The sub-region is also highly susceptible to bilateral tensions and geopolitics, all of which impede effective collaboration on transboundary management, putting the lives and livelihoods of the 300 million inhabitants at risk, and impacting agriculture and hydropower generation. Other challenges include lack of collaboration, including on data sharing, lack of a holistic approach to planning and management of water resources, and insufficient knowledge on tackling uncertainties from climate variability.

SECTION 2: FY18 ANNUAL PROGRESS REPORTING



SAWI's approach remains neutral and apolitical, and is increasingly focused on expanding the network of partnerships, strengthening technical knowledge, research, capacity building and exposure visits related to climate change adaptation, cryosphere and water resources in the Indus Basin, and on facilitating dialogue to build trust amongst the riparian countries towards a more resilient future. The overarching **Indus Forum** (track II basin-wide dialogue process) remains the main mechanism to bring together influential stakeholders to engage in regional dialogue and provide linkages with national level discourse on water resources management and basin/sub-basin-level cooperation. Over time the riparian dialogue process has expanded from a group of 15 riparian stakeholders to meetings that now regularly involve around 100 people from the four basin countries, international experts working on the Indus and donor partners, thereby signaling wider interest and greater ownership. Most significantly, this year SAWI has continued to expand its partnership approach through support to two **Indus Basin Knowledge Forum (IBKF)** events, which remain an important avenue for bringing together the producers (scientific communities) and consumers (decision makers) of new knowledge, and for progressing collaborative technical research and information sharing on issues such as glacier monitoring, assessing climate change impacts, and data exchange. The IBKF is co-convened by the International Water Management Institute (IWMI), the International Centre for Integrated Mountain Development (ICIMOD), the International Institute of Applied Systems Analysis (IIASA), and the World Bank, and is an outcome of the Indus Basin Dialogue activity funded by SAWI. SAWI's has also supported the **Indus Working Group (IWG)** which has delivered a joint technical proposal for research on understanding climate change adaptation in the basin.

These forums have been supplemented by **capacity building and study tours** for members of the technical IWG. Furthermore, through a two-year program for Afghan officials, SAWI has helped to strengthen knowledge and capacity, and to enhance collaboration between key ministries involved in transboundary waters. A recent Nile Basin Study tour (co-organized with SIWI and EU-MoFA) in October 2017, has enabled South-South knowledge exchange for Afghan officials, and participants are applying their knowledge, including by engaging in dialogue processes over water with neighbouring countries.

Key Results in FY 2017/18 – What has SAWI Delivered?



Building Trust and Confidence The **3rd Indus Basin Knowledge Forum (31 May – 2 June 2018, Vienna)** brought together more than 100 participants from research, academia, government, foundations and the donor community to assess the nature of existing knowledge relating to Indus Basin development challenges, to explore new knowledge frontiers and to build greater coordination through further co-development and sharing of knowledge. The event built on the outcomes of the previous forums – notably the 2nd IBKF (July 2017, Colombo) from which emerged a 10-point action plan to strengthen the Indus Basin knowledge landscape. The 3rd IBKF was aimed at building further connections, including with potential funders, to facilitate collaboration between science and fact-based decision making for the sustainable management of the Indus Basin. The meeting was co-convened by ICIMOD, IIASA, IWMI and the World Bank, therefore building on the earlier work of the Indus Forum, the Upper Indus Basin (UIB) Network and other basin-level initiatives, noticeably the Global Environment Facility-funded Integrated Solutions for Water, Energy and Land project (ISWEL).

BOX 3: THE INDUS BASIN KNOWLEDGE FORUM

The 3rd Indus Basin Knowledge Forum acted as a veritable marketplace – facilitating connections between researchers (the “producers” of knowledge), and policy makers and funds (potential “users” of knowledge) from across the four riparian countries. The participants recognize the IBKF as a useful platform to meet and exchange information; as well as to establish new partnerships.

Small group discussions have led to proposed pathways/strategies for further collaboration on research, public policy engagement, and awareness raising. These proposals were consolidated and submitted as concept notes at the end of the workshop. For example, it emerged that due to relationships forged in the IBKF process, Afghanistan, China and Pakistan will carry out a joint capacity building project on water and disaster risk management in the Upper Indus Basin (Hunza and Kunar Basins) under a Shanghai Cooperation Organization grant mechanism. A joint research proposal was also presented at the IBKF with the aim of attracting research funding. Participating institutions related the grant funding proposals to other relevant national research councils and funding opportunities. For instance, in China, participating institutions have so far raised an equivalent amount of US\$500,000 for related research. **In terms of sustainability, there is strong external demand for the process of bringing together stakeholders from the four riparian countries to continue this process.** With SAWI grant support, ICIMOD is likely to support the organization of the 4th IBKF in 2020, and play a long-term role in providing a Secretariat for future meetings and a science-to-policy four riparian dialogue process, as this aligns well with its own Indus Basin program.



Generating and Sharing Knowledge A joint research proposal, “Understanding and assessing the impact of climate change in the Indus Basin”, developed by the IWG was finalized and presented at the 3rd IBKF. Since the idea was first suggested at the Pakistan IWG meeting in 2015, SAWI has invested in facilitating the process and has enabled researchers from the four riparian countries to develop and progress a program of joint research. ICIMOD was selected as the Secretariat to promote the implementation of the research program. Climate change remains the main technical focus with an emphasis on the socio-economic impacts across the basin, and the IWG has followed a consultative process. With increasing donor engagement in transboundary water management, the Government of Afghanistan has decided to appoint the Ministry of Foreign Affairs as the focal ministry with responsibility for coordinating donor support in the future. This is an important step forward and highlights the capacity gains on this issue in the Government. The decision followed from a donor coordination meeting on transboundary water management and capacity building in Afghanistan on June 11, 2018 (this and earlier meetings had been facilitated by SAWI). The meeting brought together representatives from the Ministries of Foreign Affairs (MoFA) and Ministry of Energy and Water (MEW), as well as by ADB, ICIMOD, USAID, European Union (EU), Australian Embassy and the World Bank. With increasing donor engagement in supporting the Government in this area, the objective of the meeting was to exchange information on ongoing and planned initiatives to ensure that all development partners are aware of the various programs and to identify areas of potential overlap and opportunities for coordination.

The Indus Joint Research Program aims to develop a framework for integrated basin-wide water resource assessment under the changing climate. It will help to:

- i. identify climate factors and future scenarios and relevant impacts for the basin;
- ii. strengthen monitoring systems, basin-wide knowledge sharing and capacity of stakeholders to sustain efforts;
- iii. develop strategies to strengthen and leverage existing knowledge centres involved in cryosphere, meteorological and hydrological research.



Building Institutional and Professional Capacity This year SAWI concluded its two-year capacity building program on transboundary water governance and management (2015-2017) that was delivered in response to a request from the Government of Afghanistan. A shared folder was set up so participants could access all legal materials, training resources and background papers. This program has been important in developing the government's overall capacity to participate and engage in transboundary water dialogues in South Asia, as well as enable it to apply these skills to the other transboundary basins that Afghanistan shares with its Central Asian neighbours (Iran, Turkmenistan, Tajikistan, Uzbekistan). The skills will assist in advancing the country's engagement in other World Bank projects on cross-border basins, such as in the context of the CAEWDP and currently planned hydropower and water supply projects in the Helmand and Kabul River Basins. Since the onset of the training, the government has increased existing dialogues with Tajikistan, and has initiated dialogues with Turkmenistan and Iran. **Other donors have started to provide additional support to capacity building on transboundary water management for the Afghan Government.** SAWI is working closely with these partners, including the EU-funded Technical Assistance to MoFA, which began activities in February 2017 (200,000 Euro) and participated in the Nile Basin study tour to support knowledge exchange. For instance, the curriculum and modules developed under SAWI's capacity building, have been compiled into a draft training manual for teaching that is being taken forward by the EU Technical Assistance Team for finalization so that it can be used by local trainers in further training. Other partners include SIWI who directly contributed US\$25,000 towards a Nile Basin study tour, and ICIMOD which has also come on board with a US\$2 million grant (DFAT) to support Afghanistan on water resources management.

BOX 4: AFGHAN CAPACITY BUILDING – NILE STUDY TOUR

The Nile Basin study tour provided Afghan participants the opportunity to understand firsthand cooperative activities in transboundary waters in the Nile Basin, exchange knowledge and views with local experts and negotiators, and identify “lessons learned” that can be applied to Afghanistan. The tour allowed Afghan government officials to understand the various perspectives of upstream and downstream Nile countries. Activities were designed to further strengthen inter-ministerial relationships among key Afghan ministries dealing with transboundary waters. Participants gained deeper insight into the potential benefits associated with the establishment of river basin organizations and the role that these can play in helping to facilitate cooperation and promote sustainable development. Participants also gained greater awareness of the importance of data and information exchange between countries and the critical role that organizations such as the Eastern Nile Technical Regional Office (ENTRO) play in facilitating data and information exchange. The participants were able to compare the institutional situation in the Nile Basin with that in the Amu Darya Basin. This helped develop an understanding of the potential benefits of Afghanistan's integration into existing regional institutional structures in Central Asia.



Nile Study Tour

“All the regional experts were impressed with the preparation and enthusiasm of the Afghan participants. We get many study tours here at NBI, but seldom do we engage with such an interested, committed and well-informed study group.” **Dr. Abdulkarim Seid (Head of Water Resources Management Department, Nile Basin Initiative (NBI))**

“Transboundary capacity building programme has built my capacity, capability and knowledge. Nowadays, I am using those information in capacity building of MEW staff and other professionals including provision of advice to high-level politicians, parliamentarians and technicians.” **Shobair Sayed Sharif, MEW**

Twelve members of the Afghan Government transboundary water inter-ministerial working group participated in the **study tour of the Nile Basin** (9-14 October 2017), funded by SAWI, SIWI and the EU. Participants included representatives from the Ministry of Finance (MoF), MoFA, MEW and the Water Negotiation Committee appointed by the President for negotiation with Iran. The study tour contributed to enhancing coordination among the involved Ministries, and donor partners to ensure seamless continuation of capacity building support to the Afghan Government going forward. This coordination has continued with follow up sessions held in the World Bank offices in Kabul (November 2017, June 2018), with participation from Afghan Ministries, WB-SAWI, SIWI and the EU.

A draft reference and training manual, **“Transboundary Water Law and Negotiation”** (December 2017) has been developed based on training sessions held between October 2015 and October 2017. The manual includes guidance on relationship building with riparians, international law, negotiating skills, transboundary water governance, benefit sharing and instructional dimensions of building RBOs, that can be used as reference material for future use by Afghan government and non-government training institutions. Many trainings have been co-implemented with the EU’s parallel technical capacity building program. The EU is now continuing much of the work that SAWI has done, including through the establishment of a training program at the Institute for Diplomacy at MoFA. SIWI and ICIMOD are also coming on board for capacity building on transboundary water management in Afghanistan

During the implementation of this capacity development activity, two Afghan nationals were hired by the World Bank to assist with research, development and delivery of materials. These nationals are now considered as local experts and have been included as part of the teams preparing materials for the Water Negotiating Committee. One of these experts also teaches at Kabul University. In this way, capacity has been built beyond the government itself which will survive possible changes to government staff.



Scoping Interventions and Investments SAWI has financed Bank TA to ensure that the additional financing of IRDP includes the establishment of a transboundary unit at MEW and to facilitate coordination between the ministries responsible for transboundary water management and relations in Afghanistan (MoFA, MEW, MoF), including a comprehensive capacity building program for the government. Knowledge gained on coordination with other countries, including notification procedures for new projects, will be tested on the new Kabul Water Supply Project supported by the World Bank.



Ganges Basin Focus Area

Context and Strategic Approach

The Ganges Basin, home to over 650 million people encompasses all of Nepal, more than a quarter of Bangladesh and nearly a third of India. The basin is critical to regional food security and has an estimated GDP of US\$700 Billion, which could grow to US\$6 Trillion by 2050. The basin is a complex hydrological system characterized by high levels of water withdrawal primarily for irrigation, widespread pollution and declining water quality and ecosystem health, as well as frequent devastating floods. The resources of the basin are under increasing pressure given development and population growth, and water resource management will be further challenged by climate change and the weak capacity for integrated resource management. Despite multiple bilateral treaty mechanisms, there is no multilateral basin agreement on water sharing, hydro-meteorological data sharing, or cooperative development, planning or management.

Within India, the basin spans 11 states. In India, water management is largely a state responsibility, and while formal mechanisms have been in place for many decades to resolve inter-state water disputes, few formal processes for cooperative water or basin planning or management across multiple states exist. Establishing a cooperative inter-state process for river basin planning for the Ganges is a necessary and realistic precondition for improved international transboundary cooperation. SAWI is thus continuing its strategy of combining technical assistance and capacity building across central and state government organizations in India, with client-driven analytical work, to build the foundations for cooperative strategic river basin planning. This is supplemented by work in Nepal to establish mechanisms and build capacity for strategic planning for hydropower development, as well as work on improved flood forecasting in the India-Nepal border sub-basins.

By far the largest effort under the Focus Area is the multi-year **Ganges Strategic Basin Planning activity**, which commenced in mid-2015. A major achievement this year was the completion and transfer of the customized and purpose-built **river basin modelling system and water information dashboard** to India's Central Water Commission. There has been increasingly strong engagement by government and this modelling system is expected to provide the technical foundation for strengthening river basin planning and water resources assessment across the basin. This technical achievement has been complemented by a basin-wide stakeholder consultation process, and capacity building at central and state levels in India through multiple training workshops during the last year.

Significant progress was also made on **Bihar flood modelling**, capacity building and development of a Management Information System. Both the flood modelling work and the basin planning work are being scaled up by the World Bank-financed National Hydrology Project (NHP) which is being implemented by 29 states and 11 central government agencies. The flood modelling informs the Bank-financed Bihar Kosi Development Project (BKDP).

Key Results – What is SAWI Delivering?



Building Trust and Confidence Activities at multiple levels are helping to build trust and confidence in cooperative water management in the Ganges Basin. The Strategic Basin Planning work is bringing Indian state agencies together across the Ganges basin to share diverse perspectives and to work on collaborative modelling, and the work on flood forecasting in Bihar is facilitating cross-border cooperation on data sharing for flood modelling. SAWI funded the introduction of the Riverware model (in addition to Waterware) by organizing the training of some 60 government officials. It also funded setting up the Damodar Valley model, which is enabling data sharing between Damodar Valley Corporation and the riparian states for reservoir operation. The Riverware model is cost effective and user friendly and is already being introduced in other basins in India. An advanced workshop on state-of-the-art Hydrometric Data Acquisition and Transmission Networks: Measurements and Modelling, (Delhi, February 2018) brought together government officials and academics from across India, Nepal, Bhutan and Bangladesh. The workshop discussed pathways for improving regional cooperation on hydro-met networks, potentially between the BBIN countries, facilitated sharing of best practices, and identified the need for more exposure and exchange visits amongst the countries.



Generating and Sharing Knowledge The technical work under the Ganges Strategic Basin Planning activity has been completed and transferred to the Government of India's Central Water Commission (CWC). This is a significant input to the development of a strategic plan for the integrated management and development of water resources of the Ganges River Basin in India. The activity used collaborative modelling to explore multiple future scenarios (including climate change and population growth) and management strategies (pollution control, environmental flows, irrigation efficiency) to explore potential directions for balancing economic growth with improved river health and ecosystem services. Comprehensive reports outlining these alternative futures were drafted and will be finalized in FY19. The modelling suggests that the implementation of strategies proposed by governments for pollution control, environmental flows and irrigation efficiency does little to improve environmental health or sustainability in the face of rapid development and population growth that continue to drive increasing food and water demands. Climate change adds additional challenges, but the primary ones are growth-related. Much deeper reforms and greater investments than those envisaged to-date are likely to be required to address ongoing decline in basin health and to meet growing demands for food and water.

BOX 5: STRATEGIC PLANNING FOR THE GANGES RIVER BASIN MODELLING

The final Ganges Strategic Basin Planning Consultation and Training Workshop (20 March 2018) brought together over 85 participants from all 11 basin states in India. The workshop was chaired by the Secretary, MoWR, RD&GR, with participation of two Joint Secretaries, thus signaling strong ownership. To emphasize the transition and ownership of the model, the training was conducted at the Basin Planning Modelling Center at CWC, where the trainees from various agencies will continue their modelling work. The customized and purpose-built Ganges River Basin Modelling suite, and associated Water Information Dashboard, will guide basin planning, water resource assessments, and other aspects of basin water planning and management. The emerging results from the assessment of surface water – groundwater interaction, the assessment of environmental flows, and the evaluation of scenarios and strategies for future management of the Ganges Basin were presented and discussed. exchange information; as well as to establish new partnerships.



Innovative work on Riverware and Waterware modeling software for Integrated Water Resources Management has been handed over and is undergoing testing by Government before being rolled out. These tools, pertaining to reservoir operations and management of the Damodar Valley Corporation (DVC), will aid in determining optimal water allocation for various uses, along with the amount of water to be released. The models have been linked with real-time climate data and can be used to forecast flows and inform planning. These tools are expected to improve operation of five reservoirs to serve multiple uses, including hydropower, irrigation and domestic uses, while ensuring minimization of floods. In Bihar, India, a report was finalized on the **implementation and operationalization of a customized meteorological framework in the Bagmati-Adhvara and Kosi Basins** (by NCAR, USA). An Interim Meteorological Report on Flood Forecasting Model Development was also developed (by BMT Australia).

This year, SAWI finalized an advanced manual, **“An Introduction to Real-time Hydrological Information System”** (soon to be published online at <http://nhp.mowr.gov.in/>), covering different aspects of data collection and transmission related to surface water, groundwater, water quality, sediment and rainfall/ weather. A robust companion e-tool to the Hydro-met Manual has been developed. This versatile e-tool steps a user through the nuances of hydro-met network design, including selection of appropriate instrumentation and specifications, site selection and cost estimation (<http://nhp.mowr.gov.in/onlinesubmission/SiteSelection.aspx>). The e-tool is undergoing further enhancement to add greater functionality. A draft “North-East Hydro-met Plan for advanced setup of network” was developed to help implementing agencies determine equipment needs and locations for deployment. Both outputs are also guiding the development of the hydro-met network under the NHP.



Building Institutional and Professional Capacity Nepal’s Integrated Water Resource Management (IWRM) Policy and Water Resource Act (with previous SAWI technical support) forms an important backdrop to SAWI’s ongoing support towards bringing a holistic and integrated water resources management approach to hydropower planning. Following procurement delays for a Recipient-Executed (RE) river basin study, Nepal’s Ministry of Finance (MoF) subsequently issued a letter of assurance for funding (to cover gaps beyond SAWI’s contribution), which indicates the high priority accorded to this work. This assurance from Government and SAWI’s continuing support has enabled WECS to move ahead with procuring expertise for a study of select river basins.

A complementary Bank-Executed (BE) activity in Nepal continues to offer policy advice and capacity building on IWRM approaches for sustainable hydropower investments. SAWI organized an exposure visit for 11 Parliamentarians and Journalists to the Three Gorges Hydropower Project and the Hubei Yiba Highway Project in China (August 29–September 5, 2017) to introduce the delegates to the importance of the river basin and hydropower planning. SAWI also enabled three staff members from Nepal’s Electricity Authority to attend a three-week course on the fundamentals of hydropower development and management (August/September 2017, Norway). SAWI has facilitated a process whereby Kathmandu University has come on board (since February 2018) for a faculty exchange on water resources and hydropower development, and has been visited by a delegation from Wuhan University, China, which delivered specialized lectures to engineering students in Nepal. Following a competitive process, ten Nepali students have been selected for a student fellowship on hydropower and water resources at Wuhan which commenced in April 2018.

A high-level delegation of officials from the Government of Bihar, headed by the Minister Water Resources, participated in an exposure trip to China (April 2018). The purpose was to gain firsthand knowledge of the institutional and technological aspects of real-time flood forecasting and management in the Yellow River Basin, and measures to control sedimentation. As Bihar experiences severe floods annually, knowledge on the role of lead rainfall analysis and its adoption in real time is likely to strengthen local expertise and understanding. A five-member delegation, led by Principal Secretary, Government of Bihar also visited the Asian Institute of Technology (25-27 June 2018, Thailand), for training on hi-tech flood management tools and techniques, which is relevant to implementing and operating the developed meteorological framework for the Bagmati-Adhwara and Kosi Basin.



Scoping Interventions and Investments In India, several SAWI activities continue to inform the design and implementation of the National Hydrology Project (NHP) (P152698, US\$175 million). Most notably, these include: (i) knowledge and modelling tools on IWRM that are heralding in a trans-basin approach for both the Ganges and Brahmaputra Basins, and are providing a technical guide for the entire country; (ii) Strategic basin planning work that is informing improvements in data, information and knowledge systems to strengthen water resources planning, operation and management in the Ganges Basin, with implications for the rest of India (and beyond); and (iii) Bihar flood modelling, which is being replicated under NHP, and extended to other basin states.

Bihar Government Officials - Capacity Building



Physical Modelling Centre, Zhangzhou, China



Smart Water Operation Centre, Bangkok, Thailand

SAWI's work on river basin planning and hydropower development in Nepal is directly linked to the World Bank's investment in Power Sector Reform and Sustainable Hydropower Development (P150066) (US\$ 20 million). While the RE activity is helping to prepare river basin plans, including the hydropower development plans, the BE activity is providing essential capacity building and technical expertise as Nepal considers its draft IWRM Policy and Act.

Brahmaputra Basin Focus Area

Context and Strategic Approach

The Brahmaputra River Basin (BRB), shared by Bangladesh, Bhutan, China and India, is one of the largest and most complex basin systems in the world for a variety of reasons, including its challenging topography and hydrological environment. Complex geopolitics and power asymmetries between the riparian countries, incomplete knowledge of the basin, varying technical capacities of water resources management professionals, and the absence of a basin-wide cooperative framework act as constraints to regional economic growth, including in hydropower development and trade, inland water transport and disaster risk reduction. SAWI is working to address these challenges and build on potential opportunities through a mix of promoting dialogue, developing technical knowledge, and supporting joint action. SAWI's strategic approach involves engaging at multiple levels – within India at the inter-State level (North-East water resources), at the country level (Bhutan and Bangladesh hydro-met services / disaster risk management, Bhutan hydropower), and at the regional level (dialogue). SAWI aims to bring consistency, alignment and integration with other-related World Bank investments at the state and country levels, and to ensure that they inform each other.

As SAWI continues to engage multi-stakeholders on **Brahmaputra Dialogue activities**, there has been a significant development in that the process has now become institutionalized. Originally initiated by SaciWATERS (India) in 2013, the dialogue is now being led by a consortium of institutions from each of the four riparian countries. The dialogue process is using multiple mechanisms including national and regional-level workshops, closed-door meetings, and knowledge exchanges / study tours to convene key stakeholders, increase understanding of the complex Brahmaputra river system and common water-related challenges, and explore potential opportunities for collaboration.

Of special significance is SAWI's recent engagement on **water resources management in North-East India**, an initiative driven by the Prime Minister's Office following the aftermath of the disastrous floods in 2017. At the request of the Secretaries, Ministry of Water Resources (MoWR), RD&GR and DoNER, under the leadership of NITI Aayog, and in close consultation with several ministries and the nine riparian states, the World Bank has taken a front seat in advancing the initiative. SAWI has been instrumental in developing the action plan (June 2018) for improving management of the water resources of the North-East, including on the Brahmaputra Basin. The action plan will be presented to the Prime Minister in the coming months. This engagement replaces the Strategic Basin Assessment work that was held up for various reasons, but allowed SAWI to nimbly and swiftly respond to the Government of India's highly time-sensitive request for assistance.

Key Results for FY17/18 – What has SAWI Delivered?



Building Trust and Confidence SAWI organized the Brahmaputra River Symposium (BRS) (September 2017, New Delhi). The objective of the Symposium was to unpack the development challenges and possibilities in the Brahmaputra Basin, and to rally stakeholders from community to cabinet in each of the four basin riparian countries to find common ground on transboundary issues and to take action. The BRS marked a major milestone in the dialogue process, bringing together 150 delegates, including, for the first-time, prominent stakeholders from all four riparian countries. This exemplifies the strides that the dialogue process is making – from its humble beginnings of a small group at the track 3 level to an expanded set of stakeholders, including at the track 1.5 level – and is a testament to its growing credibility and importance. A major outcome of the BRS was consensus among the delegates that the dialogue process has the potential to navigate the geopolitical complexity hindering good governance in the basin, and that it should be continued.

BOX 6: BRAHMAPUTRA RIVER SYMPOSIUM (BRS)

Four major recommendations emerged out of the BRS:

- i. **Need for a reliable**, comprehensive common knowledge base for the Brahmaputra Basin.
- ii. **Structural reforms and capacity building** of the existing institutions are required to manage the river system effectively.
- iii. **Integrated investment in the Brahmaputra Basin** can help to mitigate risks and make more productive use of water resources, and help enhance cooperation between the riparian countries and states by promoting inland navigation.
- iv. **A sustained multilateral and multi-stakeholder dialogue** is required to build trust and confidence among the riparian nations.

SAWI is linking with other initiatives (e.g., World Bank-supported projects and technical assistance) to advance the recommendations coming out of the BRS.

Brahmaputra River Symposium, December 2017

“We couldn’t have imagined a convention like this, in South Asia, ten years ago.”

Professor Ainun Nishat, former Member, Joint Rivers Commission, Bangladesh and key figure in the Brahmaputra discourse for over 20 years.

In the run up to the BRS, SAWI held meetings with prominent academics and thought leaders in China (in late 2017), which helped to expand the network beyond Yunnan University to other reputed institutes in Shanghai (Shanghai Institute of International Studies and Fudan University) and Beijing (Peking University, Beijing Institute of Contemporary International Relations and influential think tanks like China Reform Forum). The meetings were important in gaining strong Chinese representation at the BRS, indicating its increasing interest in engaging on this sensitive topic. SAWI engagements in India were also instrumental in the strong Indian presence at the BRS, including the Commissioner, Brahmaputra and Barak Basin Wing, MoWR, RD&GR. **Building on the agenda that was set at the BRS, the next phase of the Brahmaputra Dialogue was launched in December 2017.**

Signaling increasing ownership of the dialogue process, the third phase is being co-implemented by a consortium of institutions across the four riparian countries, namely, IIT-Guwahati (India), Institute of Water Modeling (Bangladesh), Bhutan Water Partnership (Bhutan), and Yunnan University (China). An Inception Meeting to agree on the specific activities under this phase was held in Delhi in early 2018. Some of the activities have begun, whilst others are yet to start. These include: (i) a power mapping study and capacity needs assessment for disaster risk reduction; (ii) development of a Brahmaputra Knowledge Portal to collate and curate the currently dispersed information and data on the Basin for more informed decision-making; (iii) and follow-on dialogue events on key themes - water-energy nexus in China (September 2018), and inland water transport (Sri Lanka, December 2018).



BOX 7: NORTH-EAST WATER RESOURCES MANAGEMENT

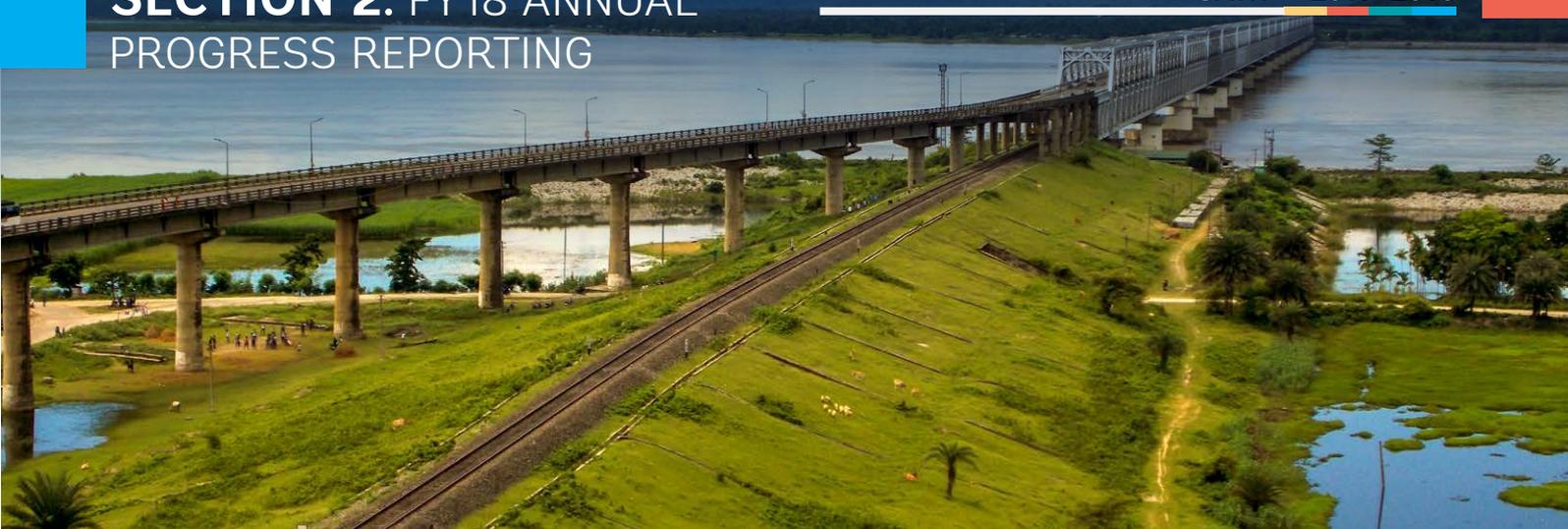
The North-East Water Resources Interim Workshop (April 2018) was a unique and high-priority event. It brought together key stakeholders from multiple central ministries and state agencies to jointly deliberate on the recommendations of the technical work done by SAWI, and to identify corresponding actions and pathways for future work. It provided the opportunity for stakeholders to appreciate the importance of water resources across multiple sectors, share experiences and forge contacts, and introduce cross-cutting dimensions such as gender. Signaling the significance of the event, opening remarks were provided by the Vice Chair, NITI Aayog; the Secretary, Ministry of Water Resources (MoWR); the Secretary, Ministry for Development of North-East Region (DoNER); and the Chair of the Expert Committee, also former Chair of the Central Water Commission (CWC).

The High-Level Committee and Expert Committee are significant in that they are the first multi-agency and multi-state platforms ever established to address the water resources issues of the North-East. By sitting on the technical Expert Committee, the World Bank team (represented by the SAWI Technical Lead) was provided a unique opportunity to inform the future direction of water resources management in the Brahmaputra Basin and the North-East more broadly. Members of the Expert Committee are also now actively participating in the wider Brahmaputra Dialogue.

SAWI funded several activities, including the preparation of the rapid assessment, the development of NEWRIB, and multi-stakeholder consultations including two regional workshops. All aspects of water resources management were covered in the rapid assessment – which was a comprehensive evaluation of the existing challenges and opportunities related to water planning, management and development and cut across multiple sectors (including inland water transport, power, agriculture, environment, tourism, etc.). The recommendations could be useful in informing future decisions towards more optimal use of water resources and the mitigation of water-related risks (floods, erosion, sedimentation).



Generating and Sharing Knowledge SAWI has provided technical support to the Prime Minister's initiative on water resources management in North-East India. This involved working closely with the High-Level Committee (chaired by the Vice Chair of NITI Aayog and consisting of Secretaries of all water-related Ministries and Chief Secretaries from all North-East States) and the Expert Committee (on which the World Bank team was invited to sit) to conduct a rapid assessment of water resources with recommended actions and to build an interactive North-East Water Information Base (NEWRIB). The NEWRIB knowledge portal is a user-friendly web portal that will act as a central repository of water related primary and secondary data, reports, documents, studies on North-East India. The expected benefit is that bringing together the currently scattered data and information on the Brahmaputra / North-East region will help improved decision-making on the management and use of water resources. The exercise was highly consultative, including a tour of the nine riparian states, where over 100 in-depth multi-stakeholder meetings were held with all concerned departments. In addition, a Launch Workshop (Delhi, December 2017) and an Interim Workshop (Guwahati, April 2018) were convened. The final report of the Executive Committee, commissioned and led by the World Bank's SAWI team, was delivered to the High-Level Committee in June 2018 – some six months after the work commenced. The report was so well received that the World Bank was requested to support the preparation of the High-Level Committee Report, which draws heavily from the Expert Committee Report and will be submitted directly to the Prime Minister's office.



The revised (final) draft **Delta Management Investment Plan** was submitted to the Government of Bangladesh (July 2017). A presentation on the Delta Plan was made to the Bangladesh Prime Minister and other top-ranking ministers (Finance, Agriculture, Local Government, Water). The Delta Plan is informing the preparation of the Bangladesh Climate-Smart Agricultural Water Management Project (US\$170 M).



Building Institutional and Professional Capacity SAWI continues to strengthen capacity of Bhutan's National Center for Hydrology and Meteorology on hydromet monitoring, forecasting and service delivery in priority sectors. This year, SAWI has helped to facilitate procurement processes for essential meteorological observation systems to support civil aviation automatic weather observation systems. SAWI helped to orient the National Centre for Hydrology and Meteorology on procurement processes which was important especially as the client was working with World Bank procurement guidelines for the first time. The RGoB has subsequently awarded the contract for the 'supply, delivery, installation and commissioning of meteorological observation systems to support civil aviation automatic weather observations system, ceilometer and wind profiler', and the equipment installation is expected to be completed by July 2018.



Scoping Interventions and Investments This year, the closely interlinked activities under the Brahmaputra Focus Area helped to inform two Bank-supported operations in India – the Assam Integrated River Basin Management project, (AIRBMP), under preparation, USD 500 million) and the NHP (USD 175 million). For example, the recommendations arising from SAWI's engagement in the North-East included the need for technical studies to be conducted on the Brahmaputra Basin. These are being designed into AIRBMP, which is significant not only for Assam, but will also be relevant for the North-East. Another recommendation to establish a Center of Excellence on the Brahmaputra Basin is being considered for funding under NHP. In addition, the capacity needs assessment on disaster risk reduction under the SAWI-supported Brahmaputra Dialogue is meant to inform other World Bank investments in hydro-met services / disaster management projects in India (NHP), Bhutan (Hydromet Services and Disaster Resilience Regional Project, USD 4 million), and Bangladesh (Bangladesh Weather and Climate Services Regional Project, USD 113 million). The aim is to better understand the varying capacity needs of these countries and to tap into opportunities for cross-learning for improved regional coordination. This approach contributes to SAWI's strategy of working towards integrating activities across multiple levels of State/Inter-State, Country and Regional.



Sundarbans Landscape Focus Area

Context and Strategic Approach

SAWI's Sundarbans Landscape Focus Area strategy remains the main channel through which plans for collaboration between Bangladesh and India, including the operationalization of the 2011 bilateral Memorandum of Understanding (MoU), are being progressed. Although the two countries have been discussing the establishment of a joint mechanism to guide development, conservation, and resilience of the Landscape, they are yet to reach formal agreement.

SAWI's support is enabling the **Bangladesh-India Sundarbans Regional Cooperation Initiative (BISRCI)** to remain an effective platform that engages with policymakers in both countries, and to advance collaborative thinking on the Landscape. BISRCI continues to work towards a formal Joint Mechanism between the two countries. By using technical entry points, SAWI has helped to stimulate discussion and initiate joint technical work between the scientific community, government officials and other key stakeholders. A social media strategy (Facebook, Twitter), and deeper engagement with the media in both countries is on-going.

Most notably, this year, SAWI has continued support to **Sundarbans Dialogue** activities that have the support and guidance of BISRCI members, including: (i) the completion of the **joint landscape plan**, which, for the first time, provides a data-based comprehensive picture of the entire Landscape (Bangladesh and India) that connects poverty and ecosystems. This includes four specialized technical studies that investigate sustainable economic growth through business development using local products and services, and a study of the ecosystem and potential benefits for poor communities; and (ii) the inception report on the **Blue Economy**, which assesses the economic value of Bangladesh's coastal and estuarine resources, with an investment strategy that cuts across 25 sectors. SAWI is also advancing technical work on the Landscape. Although the quality and availability of reliable data has delayed the development of a uniform **hydro-met information system**, SAWI has used the process and draft outputs to inform stakeholder deliberations. Additionally, the on-going **targeted environmental studies** on the critical biodiversity of the landscape in a changing climate by 2050, is oriented towards enhancing awareness about climate change risks, promoting technical cooperation, building a knowledge base to support joint management, and facilitating a holistic approach to the sustainable management of this extremely fragile mangrove. The production and dissemination of joint technical products is enabling stronger buy-in, ensuring a holistic approach to the Sundarbans, building capacity and new understanding, and opening up the space for collaborative action.

Key Results FY 2017-18 – What has SAWI delivered?



Building Trust and Confidence This year, SAWI supported BISRCI's efforts by developing final draft options for the joint transboundary mechanism, with five multi-stakeholder meetings and one workshop at Delhi, and the draft was launched for public consultation. Although there was some expectation that the mechanism would be formalized in 2018, this has been delayed in part due to electoral cycles, transfers / postings of bureaucrats, and on-going discussions on the detailed institutional arrangements. SAWI support enabled BISRCI members to participate in COP23, where they made presentations on the Sundarbans at the India Pavilion (November 2017, Bonn). This was intended to raise international attention towards managing climate change induced risks in the Sundarbans, which could potentially impact future investments, international attention and imperatives to act.



Generating and Sharing Knowledge The Sundarbans Joint Landscape Narrative, which describes the defining characteristics of the Sundarbans Landscape across national boundaries, has been finalized and is being prepared for print publication. The process engaged stakeholders from across the scientific community, government and other key discussants. SAWI developed a draft 'Vision for the Sundarbans Region: Rationale & Structure for Joint Action' which was launched in August 2017 (Delhi), with participation from Indian Parliamentarians and the Bangladesh High Commission, Delhi. This incorporates sustainable economic growth through cooperation and joint action, business development and economic growth for local communities, and valuation of ecosystem services.

Four background studies have been drafted with a view to propose joint initiatives. These studies (under review) investigate sustainable economic growth through business development using local products and services, and include: (a) assessment of the state of nutrition of mothers and children and stunting in children and the causal linkage to diet of expectant mothers; (b) development of sustainable tourism; (c) sustainable transboundary inland navigation; and (d) inventory of flora and fauna and biodiversity mapping.

Emerging findings from the **environment studies** were presented to the Governments of Bangladesh and West Bengal (India), and are informing on-going dialogue for mainstreaming climate change concerns in the management protocols for the Sundarbans. **An inception report on the Blue Economy** was produced, which assesses the growth and development potential of the estuarine systems, and contains detailed chapters on the status of fisheries and estuarine resources. This is strongly relevant to the Sundarbans, home to vulnerable communities that are largely dependent on the estuarine system for their food and livelihood.

"This research (environmental studies) provided the Government of Bangladesh with spatio-temporal assessment of vulnerability as well as a menu of feasible investment options. It contributed to 5 out of 5 pillars of the Climate Change Strategy & Action Plan of Bangladesh."

Dr. Ainun Nishat, Professor Emeritus, BRAC University and Principal member, Climate Change Negotiation Committee Bangladesh



SAWI is bringing new insight into the vulnerability of the ecosystem to climate change. Four geo-coded databases have been compiled on erosion of the coastline and cyclone landfalls, including two databases of mangrove species, and two of fauna, in the Bangladesh and Indian Sundarbans. Three papers were developed and published on the impacts of progressive salinization on mangrove species and on fresh water fish habitats; and the impacts of sea-level rise on habitats of amphibians, birds, mammals and reptiles of Bangladesh (refer Annex 3). **SAWI is also undertaking systematic analysis of the implications of climate change on tackling poverty reduction in the Sundarbans.** The report on Climate Change, Livelihood Threats and Household Responses is complete for the Bangladesh Sundarbans, whilst the work for the Indian Sundarbans is on-going and for which data has been compiled. An econometric study on 'The socio-economics of fish consumption and child health in Bangladesh' (October 2017) was posted on the World Bank Open Access Policy Research Working Paper Series.



Building Institutional and Professional Capacity By following a participatory process with academia, experts and other stakeholders in dialogue activities, knowledge sharing and the development of technical studies, SAWI is helping to build technical capacities across a range of stakeholder institutions. Examples include: (a) workshop on the Economic Case for Cooperation on the Sundarbans (3 November 2017, Delhi); (b) workshop on Challenges and Management of Sundarbans Landscape: Finding a Shared Way Forward (11 October 2017, Dhaka); and, (c) focused discussion (led by BISRCI members) on the Sundarbans at a workshop, 'India and Europe: Debating the challenge of climate change', (27 May 2017, Dublin).

SAWI has also built on media engagement (print and electronic media) and has supported training and orientation programs for journalists from Bangladesh and India to promote regular writing of op-eds in newspapers on issues related to Sundarbans. SAWI has also stepped up its external outreach strategy, including by showcasing a Documentary on the Sundarbans at 11 international films festivals across the world; study findings were disseminated through 17 presentations at various conferences and through a keynote address (by IDSA) at the 9th Biennial Conference of Indian Society for Ecological Economics (Kerala, India, November 2017). The SAWI team has written three blogs (two in local language Bengali) and posted on the World Bank website to ensure broader outreach in the region. (refer Annex 3).



Scoping Interventions and Investments SAWI's targeted environmental studies are informing Bank operations as follows:

- I. Technical analysis of three coastal embankments is informing **the Bangladesh Coastal Embankment Improvement Project, P128276, USD \$375 million**. SAWI is identifying mangrove species, width of mangrove belt and density of plantation required in the foreshore areas to best protect the embankments from cyclone-induced storm surges;
- II. **The Blue Economy and Sundarbans Assessment in Bangladesh** is supporting preparation of a plan to nurture and enhance the fisheries and aquaculture resources to the benefit of poor communities living in the Sundarbans landscape. It has provided inputs to the preparation of a Bangladesh Sustainable Coastal and Marine Fisheries project (P161568, US\$250 million, appraisal completed, yet to be approved); (iii) Technical information on which mangrove species are likely to survive in the region in a changing climate has contributed to the Bank's Sustainable **Forest and Livelihood Project** (P161996, US \$ 175 million) – appraised in July 2017; (iv) Following a request by the Government of West Bengal last year, the BISRCI was able to progress a proposal to access Green Climate Funds with some technical support from SAWI.

"The findings from this World Bank research will immediately help designing the forest cover in the foreshore of polders to attenuate storm surge and wave and water velocity during cyclones and complement the height of embankments as part of the coastal protection infrastructure."

Mr. Zahirul Huque Khan, Director, Coast, Port and Estuary Division of the Institute of Water Modeling and Advisor to the Coastal Embankment Improvement Project.



Regional Cross-Cutting Focus Area

Context and Strategic Approach

The Regional Cross-Cutting work supports cross-fertilization of knowledge and capacity building across basins in support of transboundary cooperation. This Focus Area complements and underpins the work under the four geographic Focus Areas. This year, SAWI's analytical products are bringing new insight and building the information base and tools, while targeted capacity building activities are oriented towards enhancing skills, awareness and informing existing practices of key regional stakeholders and institutions. SAWI's work extends across several thematic areas of groundwater management, water quality monitoring, watershed management, climate change risks, integrated water resource management, hydro-electric power, hydro-diplomacy and transboundary water governance. SAWI has advanced activities through partnerships with IWMI, IUCN, ICIMOD, South Asian universities and other institutions in the region.

Key Results for FY2017/18 – What has SAWI Delivered?



Building Trust and Confidence No regional dialogue events were held in FY18, as two were held in the previous FY. However, substantial headway was made in organizing a Regional Dialogue that will take place in Sri Lanka in December 2018. The event will be co-convened with the US State Department, which has supported past Dialogues, and held in partnership with other agencies (under discussion). The theme will be “Resilience Through Connectivity: Responding to the Challenges of Water Scarcity and Floods in South Asia.” It is expected that approximately 120 participants will attend. The event is being designed to build on the momentum generated from two previous Regional Dialogues with related themes – the South Asia Groundwater Forum held in Jaipur in 2016 and the Water-Energy-Food Nexus Forum held in Kathmandu in 2015.



Generating and Sharing Knowledge IWMI's on-going regional study on **Managing Groundwater for Drought Resilience plays to an increasingly significant issue in South Asia.** The work is developing a knowledge base that is currently incomplete and scattered, and compounded by diverse groundwater systems and usage across sectors, and management capacities across South Asia. The preparation of a diagnostic study of groundwater governance reforms and groundwater management actions is underway. This has the potential to guide ongoing regional dialogue, building on the South Asia Regional Groundwater Forum, and encourage more strategic utilization of groundwater resources to buffer against drought shocks in South Asia. Following a draft baseline report (2017) that summarizes existing knowledge and practice, a final report will be based on a series of case studies. A dissemination workshop is planned in FY19.

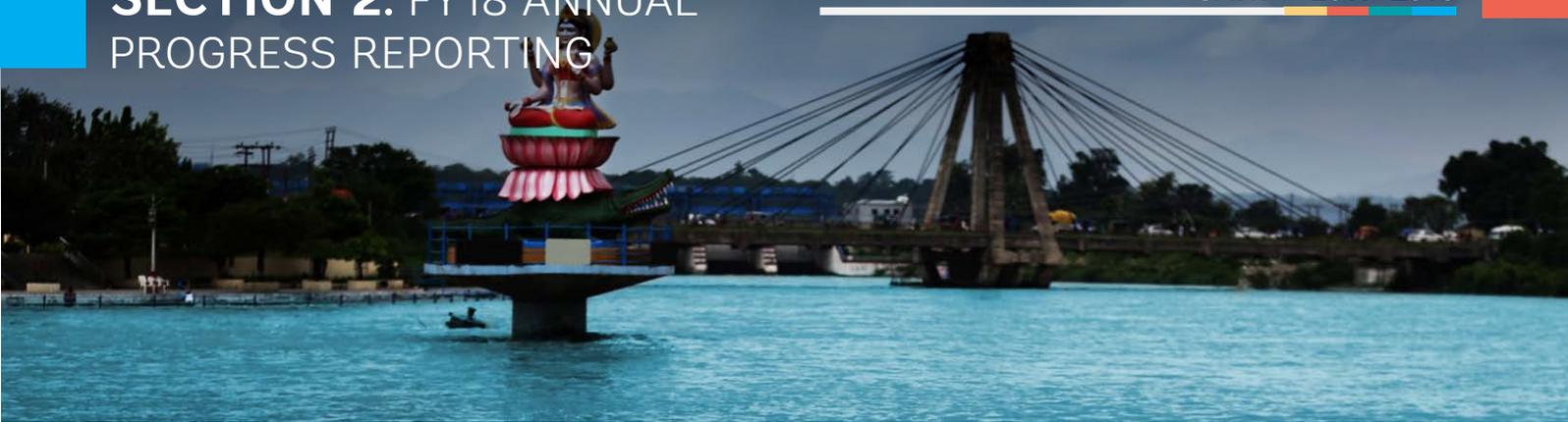
To expand the knowledge base on water quality, a technical report prepared by CSIRO, “**Potential Health Risks from Inorganic Chemical Contamination of Groundwater in Punjab, India**” was finalized and published in August 2017. The methodology developed and lessons learned are highly relevant to other parts of South Asia that confront similar groundwater quality challenges.

Following on from previous SAWI technical assistance (2016-18), the Royal Government of Bhutan finalized its first ever **Guidelines for the Development of Hydropower**, approved by the Minister of Economic Affairs in June 2018. The guidelines are instrumental to incorporating environmental and social aspects, and cumulative impacts, into future plans for hydropower expansion. SAWI also delivered an improved national repository on aquatic biodiversity through the launch of a “Improved Bhutan Biodiversity Portal” (March 2018) and on cultural heritage through a report on “Integrating Cultural Landscape Considerations in Large Infrastructure Planning in Bhutan” (January 2018); and, an online interactive map showing available georeferenced data on cultural heritage which are important in informing the planning of any future hydropower investments.

Dissemination of a summary report on “Climate Risks and Solutions: Adaptation Frameworks for Water Resources Planning, Development and Management in South Asia” (June 2017), prepared by the World Bank and IWMI. The report provides a valuable consolidated picture of climate changes risks in water management and the status of policy frameworks in place to manage these risks. The study has followed a collaborative process to build knowledge, tools and capacity that will assist governments in adapting to climate change challenges in the water sector. Three background reports that accompany the summary report are being published by IWMI (nearly finalized).



Building Institutional and Professional Capacity This year, SAWI has concluded some capacity building activities, including holistic approaches to planning and management of water resource management targeted at water engineers, basin managers and policy/decision makers across South Asia. Additionally, whilst officials from the Ministries of Foreign Affairs and of Water Resources, Bangladesh have in previous years benefitted from training on transboundary water governance and hydro-diplomacy, this year, a sub-divisional engineer, Joint Rivers Commission, Bangladesh, participated in the UNESCO-IHE Short Course on Watershed and River Basin Management (Netherlands, July 2017).



An RE capacity building water governance activity, implemented by **IUCN India, is preparing the ground to build institutional capacity in the long-term** by helping to increase the availability of high quality training modules on water diplomacy and basin governance with a view towards regional cooperation. This year, seven training modules were developed and have now gone live (May 2018) (<http://www.southasianwaters.org/>) following 3 pilot workshops to test the training effect at the country level (India, Bangladesh), and at the regional level (Bangkok). Efforts were made to engage female teacher and pilot testing participants to ensure priorities and gendered aspects are integrated in course modules. A video was showcased at the 8th World Water Forum to raise awareness about the upcoming availability of the online course modules (<https://www.youtube.com/watch?v=n-wSZZOGCdM>). SAWI's activity has been designed to institutionalize teaching of transboundary water governance in South Asian Universities; with a view that course modules are taught by South Asian institutions for South Asians, including government officials. This year, two academic institutions (South Asia University and Dhaka University) have agreed to adopt the modules for a joint diploma course.

SAWI's partnership with ICIMOD is strengthening the Himalayan University Consortium (HUC) to build an active south-south forum on knowledge generation and sharing amongst research institutions in the Hindu Kush Himalayan (HKH) region, particularly those that are working on issues of significance to regional water resources management. So far, 22 regional participants (of which eight were women) from eight HKH countries, comprising full time faculty members and PhD scholars, were admitted to a ten-day field school, "HUC Academy on Disaster Risks and Water Management" (Kathmandu, July 2017); nine researchers and faculty members from institutions in Bangladesh, Bhutan, Nepal and Pakistan received Conference Grants to participate in international conferences in FY18; and contracts for eight Seed Grants and one Seeding Grant were signed. The HUC online portal has been developed, with a soft launch done in October 2017. More than 120 participants attended the International Conference on Mountain Water and Livelihood, alongside the HUC Annual Meeting (China, November 2017).



Scoping Interventions and Investments Recommendations from CSIRO's work on Potential Health Risks from Inorganic Chemical Contamination of Groundwater in Punjab, India, were implemented in the World Bank's investment in the Punjab Rural Water Supply and Sanitation project (PRWSSP) (US \$248 million), which envisages a comprehensive program of reforms in management of the state's water resources in general, and with particular focus on water supply to consumer level, drainage, groundwater, and sanitation.



2.3 Cross-Cutting Themes

Gender, Social Inclusion and Disability

The Indus, Ganges and Brahmaputra Basins are home to millions of extremely poor, marginalized and vulnerable people. More than 200 million people live below the poverty line in the Ganges Basin in India alone, and the Sundarbans is home to about 7.5 million people with an average per capita income of less than US\$1 per day—the vast majority of whom are exposed to regular and highly destructive natural disasters. SAWI's Focus Area Strategies take account of poverty, vulnerability and social inclusion issues.

As reported last year, SAWI is working at multiple levels to improve attention to gender equality, empowerment and inclusion. This builds on the ongoing work by the World Bank's Water GP on social inclusion and water, and draws on the World Bank's South Asia Regional Gender Action Plan (RGAP) (2016-2022). However, there are challenges to fully integrating gender concerns as achieving shifts in mindsets across different stakeholders takes time, analysis and data on the connections between transboundary water and gender are limited, and traditionally, other pressing issues have tended to assume first priority by decision makers.

To the extent possible, SAWI strives to mainstream gender equality and empowerment across the portfolio, and to meaningfully engage beneficiaries and other stakeholders in gender sensitive project design and implementation, but progress remains non-uniform across activities. This year, SAWI's efforts have continued to build on its previous work, and include the following:



BOX 8: BRAHMAPUTRA RIVER SYMPOSIUM – GENDER IN TRANSBOUNDARY WATER MANAGEMENT

At the Brahmaputra River Symposium, gender issues in transboundary water resources management were given special attention. This included spotlighting gender concerns in a number of sessions, such as those on Reaching Last Mile – Voices from the Field, and Living with the Brahmaputra. In addition, a dedicated session on Gender and Transboundary Waters was held. The session deliberated on the role of gender in transboundary water management, with a focus on understanding the distinct relationship that women have with water resources and how their enhanced participation is critical to ensuring sustainable solutions, in addition to social equity and inclusion. It was noted that water management has traditionally been male-dominated, although there is evidence that women view water management not only differently, but also more holistically than men. Speakers discussed how various challenges can be better addressed by understanding and integrating a gendered perspective. This requires giving women and other disadvantaged groups – such as the poor as another axis of inequality – voice and empowering them to engage more centrally in water governance.

- i. **Capacity Building and organizational development:** SAWI is helping to build skills and knowledge of its stakeholders for gender-sensitive water resource management. SAWI is also encouraging the inclusion of women in training and capacity building: so far 168 (39 in FY18) women have benefitted over the SAWI implementation period showing an incremental progression in their participation. SAWI is encouraging women to play leadership roles in regional dialogue events, including as speakers, facilitators, organizers and active participants – for instance in the Brahmaputra River Symposium.
- ii. **Public awareness and social marketing,** which is oriented toward informing and effecting behavioral changes among water users in the way they manage shared resources. SAWI is raising gender issues in regional platforms, which are unlikely to have otherwise happened. For example, the Brahmaputra River Symposium introduced a dedicated gender session which helped to raise public awareness of key issues, and discussions during the North-East India workshop introduced the importance of having a gendered approach. These represent small, but important steps towards mainstreaming gender issues into discourse and action.

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- iii. **Gender Analysis and expanding knowledge on linkages between water governance and impacts on women:** As reported last year, the base of literature and evidence in South Asia on the differential impacts of transboundary water-climate on men and women is limited. SAWI is contributing to building this evidence through its technical and analytical work, and through its linked World Bank investments. The SAWI-supported, “South Asia Climate Change Risks in Water Management”, has recommended that, “a water, climate, poverty and gender initiative could help design water-related adaptation measures to better benefit the poor and disadvantaged communities and to integrate gender-responsiveness into current and future adaptation approaches.” SAWI’s Sundarbans Focus Area has also initiated work on the non-monetary valuation of climate-induced changes in water resources and the implications for women’s welfare. The study will highlight the implications for women’s health, nutrition, access to safe drinking water, labor force participation and participation in household activities. The Sundarbans studies are also assessing the ecosystem, fisheries and potential benefits for poor communities, and causal linkages between nutrition and health status of expectant mothers and children. SAWI is initiating similar work for the Brahmaputra Basin;
- iv. **Strengthening Data and Systems for decision making:** SAWI’s Flood Risk Assessment (FRA), completed last year, is being used by the CWC for internal flood risk assessment, and has been installed on their website. By generating risk reports and estimate losses for areas with severely impacted populations, disaggregated by gender, the tool is expected to help governments to prioritize their response to populations and areas that would benefit from immediate attention to flood risk reduction.
- v. **Increasing partner / stakeholder buy-in to the strategic integration** of gender into policy and programs: SAWI’s gendered knowledge products and efforts, such as the Sundarbans Blue Economy study, are also informing larger World Bank lending operations in the region.

Gender M&E: Capturing annual gender results remains work in progress, especially as SAWI’s efforts are focused at policy level and do not include grassroot-level targeted initiatives. Nonetheless, SAWI is continuing to build on the gender mapping (initiated last year) that shows entry points within each of the technical areas at the state / local, national and transboundary levels. This is helping SAWI to monitor gender disaggregated results, assess progress and prioritize its forward gender approaches. From FY17 onwards, all SAWI Task Team Leaders (TTLs) have started reporting in their annual Grant Report and Monitoring (GRMs) on gender mainstreaming actions and what difference this is making, while providing supporting evidence where possible.



Climate Change and Building Resilience

The World Bank Group remains strongly committed to tackling climate change, and launched a Climate Change Action Plan (CCAP) two years ago to increase climate-related finance. The aim of building resilience and reducing vulnerability to existing and future climate related risks strongly underpins all SAWI activities, and its approaches are aligned with country climate adaptation and disaster risk management priorities. It is also a priority for the World Bank's South Asia Regional Strategy. This year SAWI's approach, with supporting examples, has included:

- i. **Building scientific climate knowledge and disseminating this widely.** The Sundarbans, a transboundary UNESCO heritage site, has a fragile ecosystem that is highly vulnerable to climate change. SAWI has recently completed analytic studies on cyclone risks and impacts of salinization of water; as well as a study on impacts of land loss on biodiversity of the Bangladesh Sundarbans. This adds new information to enhance planning related to tackling the vulnerability of the ecosystem to climate change, and to potential threats to populations from sea-level rise. The studies were peer-reviewed, published in scientific journals and are in the World Bank's Open Access Policy Research Working Paper series. Methodology and findings of these studies were presented at several World Bank Country Offices, professional conferences, universities and research organizations in countries across South and East Asia as well as to World Bank's development partners. Bhutan's technical guidelines for the Development of Hydropower, finalized in FY18, incorporate climate change and disaster risk management into the project appraisal, design and operation of hydropower development, including run-of-river and reservoir storage hydropower projects as well as projects with differing plant capacity factors. The guidelines were disseminated at over 5 international events.
- ii. **Using climate studies to promote technical cooperation between countries:** SAWI supported a process whereby researchers from riparian countries in the Indus Basin came together to develop a joint research proposal, "Understanding and assessing the impact of climate change in the Indus Basin". This was finalized by the IWG and presented at the 3rd Indus Knowledge Forum, and marks a step forward in terms of advancing technical collaboration between the riparian countries. The Sundarbans work has followed a similar approach, successfully bringing together researchers from Bangladesh and India for conducting collaborative research, including the sharing of historic data by the Meteorological Departments. Impacts of climate change on progression of water salinity in Bangladesh Sundarbans was projected with hydrological models; the estimates were then extrapolated to predict water salinity in the Indian Sundarbans where data is inadequate to support water salinity modeling. Impacts of progression of water salinization on mangrove species were first predicted for Bangladesh Sundarbans; Indian researchers learnt from the study on Bangladesh and used a similar methodology to predict changes in mangrove species in the Indian Sundarbans. Bangladeshi and Indian researchers developed a common survey instrument and used it to collect primary data on impacts of environmental degradation on livelihood and perception of risks of climate change of inhabitants of Sundarbans.

iii. Integrating Climate Change into Institutional Practices and Programs: SAWI continues to strengthen capacity of Bhutan’s National Center for Hydrology and Meteorology on hydro-met monitoring, forecasting and service delivery in priority sectors. This supports one component of the Bhutan Hydro-met Services and Disaster Resilience Project (USD 4 Million), and builds on recommendations arising from another SAWI deliverable, ‘Modernizing Weather, Water and Climate Services: A Roadmap for Bhutan’. In the Ganges Basin, recently concluded water modelling work is building a better understanding of the current and projected impact of climate change to basin level water yields, and will help inform policy, planning and investments. SAWI activities also influenced the climate change agenda in India’s national Watershed Management program (Neeranchal) by supporting coordination of meetings with the Indian Institute of Science and other agencies for the development of a Climate Change strategy within the project.

Innovation

SAWI continues to adopt multiple strategies and actions to adapt to existing challenges, to create and harness new opportunities, and to shift intractable positions on transboundary cooperation.



BOX 9: REAL-TIME HYDROLOGICAL INFORMATION SYSTEMS

SAWI has supported the Indian MoWR, RD&GR to develop a hydro-met manual on real-time Hydrological Information Systems (HIS), (January 2018). Real-time hydro-met and water resources data can help planners make informed decisions for flood forecasting, water supply management, irrigation, hydropower generation, as well as for environmental monitoring and planning. Access to real-time data allows operators to consider the impact of any decision rapidly and efficiently, saving time, money and, more significantly, people’s lives. In a marked departure from current (outdated) systems, the manual covers crucial elements in real-time systems, including providing information on various types of sensors, equipment and specifications, terrestrial-based and satellite-based relay systems, concepts of integrated monitoring, database management, data sharing, visualization, and sustainability. The manual serves as guidance for government agencies as they plan, design, install, and use hydro-met monitoring systems to monitor all the processes of the hydrological cycle, including rainfall, evaporation, river flow, groundwater recharge and extractions. The guidance is being applied under the NHP. The detailed guidelines for planning and installation are available on the website (<http://nhp.mowr.gov.in/>) along with other training materials. This manual is also being adapted into an interactive e-tool.

2.4 Sustainability

As this phase of SAWI progresses towards the outer years of implementation, its sustainability approach emphasizes: (i) institutionalizing the dialogues, knowledge and tools, including through supplementary capacity building measures; (ii) working in partnership with and through others to build ownership and uptake, for instance, other institutions are increasingly taking over the organization of sub-regional events, such as the Brahmaputra dialogue; and (iii) informing and leveraging investments (mainly World Bank and national projects).

BOX 10: SUSTAINABILITY IN THE INDUS FOCUS AREA

As part of SAWI's capacity building activities in the Indus Focus Area, experts that benefitted from training are likely to continue to support the Government's High-Level Commission on Transboundary Waters (under the Chairmanship of the President of Afghanistan), as well as international negotiations with its neighboring countries. Materials generated from the workshops have been compiled into a draft training manual that will be further developed and finalized as resource document for future use by Afghan government and non-government training institutions. The EU-MoFA project will build on these materials for the establishment of a training program at the Institute for Diplomacy at MoFA, and the University of Kabul has also expressed interest in using this material for their academic curriculum. Two Afghan nationals were hired by the World Bank to assist with research, development and delivery of materials. These nationals are now considered as local experts and have been included as part of the teams preparing materials for the Water Negotiating Committee. One of these experts also teaches at Kabul University. In this way, broader capacity is being built outside of government staff members.

2.5 Program and Financial Management

SAWI sits within the World Bank's South Asia Region's Regional Integration and Partnerships (SARRP), which is headed by the Director and managed by a team of experts in DC and Delhi. SAWI works across multiple Global Practices (Energy, Environment, SURR, etc.) and the Water Global Practice plays a special role as technical lead for program implementation, ensuring that SAWI is fully embedded within and aligned to the Bank's broader water agenda. SAWI is an important and strategic instrument for the World Bank in South Asia, and the Bank's senior managers provide a strategic steer through the Internal Review Committee which meets at least once a year to approve the annual work plan, endorse activities over \$50,000, and review annual progress. This year, SAWI has developed a **management information system (MIS)** – currently being tested – which includes: tracking Results, Financial information, and a Knowledge repository of over 330 documents.

SAWI resources have almost been fully allocated. In FY18, 39 activities were under implementation and 16 activities were completed. As of end FY18, the total amount of established SAWI activities reached \$28.9M. Cumulative disbursement stood at \$21.66M. Of this, disbursement in FY18 was \$4.92M. An additional \$2.9M was committed in contracts.

Table 2: SAWI Financials	USD \$M	Cumulative to June 2018 (USD \$M)
a. Donor disbursements (of the overall pledge of \$30.7M)		\$30.7
b. Total amount allocated for established activities		\$28.9
Disbursed up to June 2018 (including \$4.92M in FY18)	\$21.66	
Committed in contracts but not yet spent	\$2.9	
Balance yet to be disbursed or committed for established activities	\$4.34	
c. Overall Balance (a-b)		\$1.8

The overall balance shown in the table above does not reflect administration fees, investment income and approved activities and top ups that have not yet been activated. Accounting for these, the total unallocated amount is just under \$900K.

The World Bank follows technical, legal and fiduciary procedures to establish activities and commits funds through its standard processes. All trust fund beneficiaries and bidders are required to observe the highest standard of ethics in World Bank-financed grants and contracts. Funds are disbursed according to the grant agreements and financing plans. SAWI grants are subject to the World Bank’s Anti-Corruption Guidelines, the Procurement and Consultant Guidelines, and the Standard Conditions for Trust Fund Grants, which delineate standard operating procedures for any fraud issues. The Anti-Corruption Guidelines provide for certain actions to be taken by grant recipients to prevent and combat fraud and corruption, and the Standard Conditions provide for suspension and/or cancellation of disbursements, as well as the refund of disbursed grant proceeds in the event that fraud and corruption does occur. Standard audit procedures and value for money protocols are followed. More details on financial management and value for money are available in Annex 4.

This year, SAWI had an independent evaluation (commissioned by donors), half yearly check-ins and informal discussions with donors on a regular basis. SAWI also organized a field visit for donors to the Brahmaputra Basin (Assam, May 2018) to experience firsthand, the challenges that natural and human-made processes present to the fragile ecosystem of Majuli – the world’s largest riverine island, which is disappearing due to erosion – and the impacts on people’s livelihoods, threats from climate change, and arrangements for transporting people and cargo.

SECTION 3: LESSONS, RISKS, FORWARD LOOK





3.1 Lessons

What Has Worked Well

- **A combination of the basin dialogue processes**, underpinned by supporting analytical work is enabling stakeholders from riparian countries to engage in a collaborative manner that goes beyond the rhetoric of discourse, leading in some instances towards joint research plans. Furthermore, the linkage of technical entry points (water resource planning, flood forecasting, environmental sustainability, hydropower development) with World Bank lending operations are proving effective ways to engage stakeholders on water governance and resource management. Capacity building and training, exposure to international best practices, knowledge partnerships, and demonstration of participatory river basin modelling, are supporting the uptake and use of new practices and tools for effective water resource management and large-scale river basin planning.
- **The flexibility of the Trust Fund instrument has enabled SAWI to remain strategic and to grasp emerging opportunities**, such as supporting the Government of India's priority for water resource management in the North-East. The Trust Fund mechanism has enabled SAWI to respond rapidly to requests as these emerged.
- **An incremental and structured approach to capacity building is effective.** For example, experience from the Indus Focus Area training for Afghan officials shows that, in order to build capacity in a sustainable way, it is important to ensure training does not occur only through one-off events, but rather takes place as a series of events engaging the same stakeholders over multiple times.
- **SAWI's increasing shift towards a partnership approach** – that of working with and through others – is enabling the program to broaden its reach, play a strong facilitative role with other partners, and set the stage for longer-term regional institutional capacity and sustainability beyond the program. For example, the Brahmaputra dialogue process is now being advanced by institutions in the four riparian countries: the Indus Basin Knowledge Forum was conducted through regional institutional partners (e.g. IWMI / ICIMOD / IIASA); SAWI has facilitated South-South exchanges such as training events between faculty from Chinese and Nepali universities, and a study tour of Afghan officials to the Nile Basin Initiative; and in Bhutan, the World Bank has had extensive consultations with UNDP and JICA on the hydromet-related work, and is seeking to build on ongoing efforts, including by other donors.

What Has Worked Less Well

- **A combination of the basin dialogue processes**, underpinned by supporting analytical work is enabling **Individual training has not always translated into wider institutional change**. For instance, SAWI's work in the Ganges Focus Area has shown that the implementation of advanced technologies in developing countries must take into account an organizational change management process that includes attitudes and behaviors towards technology, data use, incentives and accountability. Changes in leadership, and resultant reorganization, has in some cases led to movement of technical staff away from key functions in which they had received SAWI training on real time water quality monitoring, for example.
- **Gender mainstreaming and encouraging larger participation of women in capacity building remains a challenge**. Shifts in mindsets takes time, and SAWI is making efforts to encourage more women participants in capacity building, dialogue, knowledge generation and other events.
- **The budget has come under constraint with time-only extensions. Nearly 100% of SAWI funds have been allocated**. Whilst the two extensions (time-only) during the lifetime of SAWI have usefully provided activities with more time to adjust and complete in a changing external environment, this has also meant that the existing resource envelop is stretched leaving little scope for some on-going activities to complete on existing budgets. The intensive adaptive management exercise last year resulted in a significant reallocation of resources to priority areas, and SAWI continues to monitor annual performance and adjust spend accordingly.

3.2 Risks and Mitigation

SAWI's overall risk rating remains Medium. The SAWI Program Strategy (2013) identified five key implementation risks and mitigation measures, on which an update is provided below:

Financial Risks – Low: Two financial risks were identified: (i) reduction in program funding; and (ii) unutilized funds. SAWI funds are nearly fully allocated, and a no-cost time-only extension until 2020 means that the risk of underspend remains low. SAWI's adaptive program management continues to ensure that funds are allocated effectively, and that poorly performing activities are closed or clawed back.

Operational Risks - Low/Medium: Two key operational risks were identified: (1) loss of key program staff; and (2) poorly designed or executed activities. The SAWI team has put in place MIS systems to track progress, with senior engagement and attention to the quality of spend. However, procurement delays or non-performance of contractors has emerged as a risk, and SAWI has increasingly been taking measures to terminate non-performers, apply the World Bank's internal quality control and peer-review processes. For instance, this year, SAWI terminated contracts under the Brahmaputra Focus Area due to poor performance.

Relationship Risks – Medium: Three key relationship risks were identified: (1) reluctance of stakeholders to engage; (2) disengagement of donor partners; and (3) poor integration with World Bank operations. SAWI has broadened its network and is successfully engaging with and through other regional stakeholders in various forums. Engagement with donor partners is positive, with regular meetings this year and candid discussions through the process of external evaluations. SAWI activities are well integrated with the World Bank operations, including through its country investments, joint policy dialogue with government clients, and the Bank's wider SARRP regional South Asia strategy and investments.

Reputational Risks – Low: Risks at the start-up of SAWI-II in 2013 included: (1) perceived poor quality; and (2) dialogue processes that enter spheres inappropriate for World Bank engagement. SAWI is increasing its external communications, although this remains work in progress. The increasing participation of key regional stakeholders in SAWI-facilitated dialogues and technical work, suggests that the agenda of transboundary water governance is slowly gaining traction. The World Bank is careful to ensure that it plays a neutral role and that SAWI activities are designed as such.

Security Risks - Medium-High: This continues to be subject to external factors and bilateral tensions. The risk is being managed through engagement of in-country contractors where possible, holding regional events in locations which are safer and accessible to all regional stakeholders, and by applying the World Bank's security protocol.

3.3 Portfolio Forward Look

SAWI will continue to strengthen gender technical inputs, focus on means to institutionalize processes with regard to multi-stakeholder forums and embedding knowledge into partner systems, and enable additional capacity building for senior decision makers.

Demand for SAWI funds remains strong. This year, following a call for proposals under thematic priorities, requests totalling \$6.4 million were received. Of this, the SAWI Independent Review Committee (IRC) has approved \$2.4 million, which includes prioritised new activities and top-ups to existing activities. A full list is available at Annex 8.

In the absence of a single formal framework for transboundary cooperation on water, SAWI offers continuity, scale and extended reach to stakeholders across the region. On the one hand, SAWI shows potential for water to act as a regional integrator across sectors and geographies. On the other hand, there is potential for SAWI's water diplomacy and knowledge to become embedded in wider discourse and action on regional economic integration. Several of SAWI's activities are already complementing other World Bank regional efforts in South Asia and Central Asia. For instance, hydro-met work in Bhutan is complementary to the Global Facility for Disaster Reduction and Recovery (GFDRR), and the Indus Focus Area work is complementary to the World Bank's Central Asia Energy-Water Development Program (CAEWDP). The SAWI team will continue to explore ways of harnessing these opportunities.

ANNEX 1: ACTIVITY PERFORMANCE

FY18 Results Dashboard¹

RESULTS INDICATORS	IRB	GRB	BRB	SUN	REG	TOTAL
1. Trust and confidence in regional or basin water management increased by dialogue processes						
1.1 Number of regional and basin/landscape dialogue processes facilitated or supported by SAWI	1/1	0/1	1/1	1/1	0/1	3/5
2. Stakeholder input to government decision making strengthened by participatory processes that facilitate transboundary knowledge generation and sharing						
2.1 Number of regional, basin/landscape or sub-basin level participatory processes that support transboundary knowledge generation and sharing and stakeholder input to government decision making	0/0	1/0	1/1	1/0	1/0	4/1
3. Capacity of water resources organizations strengthened in areas relevant to transboundary cooperation						
3.1 Number of professionals trained in the aspects of water management, water policy or water diplomacy relevant to basin-scale planning and management or regional cooperation ²	25/50	172/60	31/0	0/5	43/30	271/145 ⁴
3.2 Number of key water management organizations with policy or technical capacity significantly strengthened by SAWI activities in areas relevant to basin-scale planning or regional cooperation ³	4/1	29/20	2/1	0/1	1/2	36/25 ⁴
4. Regional, basin or sub-basin-level knowledge increased and accessible to stakeholders including decision makers						
4.1 Number of regional, basin/landscape or sub-basin-level knowledge products produced and shared with key stakeholders, including decision makers	5/1	6/2	4/1	17/2	9/4	41/10
5. Regional, basin or sub-basin-level interventions designed to improve livelihoods and ecosystem sustainability						
5.1 Number of regional, basin or sub-basin-level feasibility studies or intervention designs informed by SAWI activities	0/1	1/1	2/1	2/2	1/0	6/5

Acronyms: Indus River Basin Focus Area (IRB); Ganges River Basin Focus Area (GRB); Brahmaputra River Basin Focus Area (BRB); Sundarbans Landscape Focus Area (SUN); Regional Cross-Cutting Focus Area (REG)

¹ Note on how to read the Results Numbers: The numerator denotes annual Results actually achieved against the denominator of Targets in the Results Framework

² 3.1 tracks those who participated in training that was conducted over a sustained period of more than one day.

³ 3.2 tracks “capacity strengthened” rather than the subjective “capacity significantly strengthened”. Water-related organizations that participated in training conducted over a sustained period (more than one day) are counted.

⁴ Performance targets were set in advance of detailed activity design. Actual target achievement depends on the level of client engagement.

Program Development Objective	Outcome Indicators for PDO	Progress Update
To increase regional cooperation in the management of the Himalayan River systems to deliver sustainable, fair and inclusive development and climate resilience	To support five existing or new bi-lateral or multilateral governance processes	SAWI continued to support formal or semi-formal sustained processes for making or operationalizing water management decisions, including in the Brahmaputra and Sundarbans, where there are now well-established and ongoing platforms for discussion to inform decision-making and to operationalize existing agreements (such as the 2011 Sundarbans MoU).
	To inform US\$1B of investments	<p>A number of SAWI activities link closely with World Bank investments and have contributed to investment design and supervision support. To date, investment projects valued at more than US\$4.2B in Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan have been informed by SAWI. In other words, SAWI's US\$31M has leveraged nearly 14 times that amount. This is a conservative figure as not all SAWI funds have been allocated or disbursed, and some investment projects are in early stages of conceptualization, so are not counted.</p> <p>Pakistan Water Sector Capacity Building and Advisory Services Project – Additional Financing (P155226) \$35M</p> <p>Afghanistan Irrigation Development and Rehabilitation Project – Additional Financing (P152892) \$70M</p> <p>India National Ganga River Basin Project (P119085) \$1B</p> <p>India National Hydrology Project (P152698) \$175M</p> <p>India Uttar Pradesh Water Sector Restructuring Project Phase II (P122770) \$360M</p> <p>Nepal Power Sector Reform and Sustainable Hydropower Development (P150066) \$20M</p> <p>Nepal Kali Gandaki A Hydropower Plant Rehabilitation Project (P132289) \$27M</p> <p>India Bihar Kosi Basin Development Project (P127725) \$250M</p> <p>India's West Bengal Major Irrigation and Flood Management Project \$145M</p> <p>Assam Integrated River Basin Management Project (P158260) \$200M</p> <p>Hydro-met Services and Disaster Resilience Regional Project (P154477) \$4M</p> <p>Bangladesh Weather and Climate Services Project \$113M</p>

Program Development Objective	Outcome Indicators for PDO	Progress Update
		<p>Bangladesh Sustainable Coastal and Marine Fisheries Project \$240M</p> <p>India National Groundwater Management Improvement Program (P158119) \$450M</p> <p>India Neeranchal National Watershed Project (P132739) \$178M</p> <p>Punjab Rural Water Supply and Sanitation project (150520) \$248M</p> <p>Sustainable Forest and Livelihood Project (161996) \$175M</p> <p>Climate Smart Agriculture and Water Management Project (P161534) \$120M</p> <p>Coastal Embankment Improvement Project (P128276) \$375M</p>
	<p>To improve the quality of planning processes underpinning new investments.</p>	<p>This qualitative indicator is difficult to measure, but there is evidence that the breadth and strength of stakeholder consultation has increased as a result of SAWI support. SAWI's technical support to the Prime Minister's initiative on water resources management in Northeast India, for example, involved working closely with the High Level Committee (chaired by the Vice Chair of NITI Aayog and consisting of Secretaries of all water-related Ministries and Chief Secretaries from all Northeast States) and the Expert Committee (on which the SAWI team was invited to sit) to conduct a rapid assessment of water resources with recommended actions and to build an interactive Northeast Water Information Base (NEWRIB). The exercise was highly consultative, including a tour of the nine riparian states, where over 100 in-depth multi-stakeholder meetings were held with all concerned departments.</p>

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
Trust and confidence in regional or basin water management increased by dialogue processes	Number of regional and basin/landscape dialogues facilitated or supported by SAWI	3/5	<p>*Met Expectations*</p> <p>Three sub-regional dialogue processes continued to make good progress. SAWI's value add has been in getting diverse stakeholders together, providing a neutral platform, bringing issues of gender and climate change onto the agenda, and using technical discourse to facilitate dialogue and discussion on a range of sensitive issues. Getting stakeholders to agree to and initiate joint research is a good beginning and an indication of growing confidence in the process, and discussions are underway to identify suitable projects for joint cooperation. Serving government officials are participating in Brahmaputra and Sundarbans dialogue processes and there is evidence that their involvement is constructively influencing discussions within government. For example, the participation of officials in the Brahmaputra Dialogue has led to an increasing appreciation of the need for basin-wide planning across the States of India sharing the Brahmaputra Basin, and between India and the co-riparians. Because there were two regional dialogue events in FY17, no regional dialogue event took place in FY18. However, planning was underway for the next regional dialogue event in December 2018 in Colombo on resilience through connectivity.</p>
			<p>IRB (1) (1) Indus Basin Knowledge Forum</p>
			<p>GRB (0)</p>
			<p>BRB (1) (1) Brahmaputra Dialogue</p>
			<p>SUN (1) (1) Sundarbans BISRCI dialogue continued to have significant traction at the highest policymaking levels in both Bangladesh and India. BISRCI is facilitating the creation of a joint bilateral mechanism.</p>
<p>REG (0)</p>			

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
Stakeholder input to government decision making strengthened by participatory processes that facilitate trans-boundary knowledge generation and sharing	Number of regional, basin/landscape or sub-basin level participatory processes that support trans-boundary knowledge generation and sharing and stakeholder input to government decision making	4/1	<p>*Exceeded Expectations*</p> <p>These participatory processes that bring together diverse stakeholders are an offshoot of the basin-level dialogues and are helping to raise awareness, share knowledge and best practice across multiple sectors, and to advance understanding on sensitive issues outside of formal dialogue processes.</p>
			IRB (0)
			GRB (1) (1) Consultative process under the Strategic Basin Planning activity
			BRB (1) (1) Consultative process under the Basin Modeling and Analysis activity
			SUN (1) (1) Sundarbans dialogue: sustained local dialogues (between the community/local government and the state/federal levels of government), which is seen critical to strengthening the current positive steps in Bangladesh-India dialogue and collaboration
REG (1) (1) Himalayan University Consortium			
Capacity of water resources organization strengthened in areas relevant to trans-boundary cooperation	Number of professionals trained in the aspects of water management, water policy or water diplomacy relevant to basin-scale planning and management or regional cooperation.	271/145	<p>*Exceeded Expectations*</p> <p>SAWI has responded to rising demand for capacity building from stakeholders, which has included exposure visits, targeted training and technical workshops to embed new tools and knowledge, and familiarization with social impact analysis and climate change issues.</p>
			IRB (25)
			<p>(6) International Groundwater workshop</p> <p>(12) Nile Basin Study Tour</p> <p>(7) Nile Basin Study Tour Follow up workshop</p> <p>GRB (172)</p> <p>(9) Continuous on-the-job training was provided to nine young experts from government agencies in all aspects of model development and maintenance.</p> <p>(20) A training on the Ganges Basin Model, GangaWIS and SPHY</p> <p>(10) Training on the Ganges River Basin Model</p> <p>(9) Exposure visit to the Three Gorges Dam Project and Hubei Highway Project in China</p> <p>(3) Supported participation of three NEA representatives in the three-week Hydropower Development Management Course in Norway</p>

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
			<p>(10) Student fellowships to Wuhan University</p> <p>(100) Training workshop on state-of-the-art hydro-metric data acquisition and transmission networks</p> <p>(6) Study tour to Yellow River in China</p> <p>(5) Study tour to AIT, Bangkok</p> <p>BRB (31)</p> <p>(10) Study visit to Suvanabhumi international airport in Bangkok for familiarization on new aviation equipment such as wind profiler, ceilometer and AWOS</p> <p>(16) SMART-Met system training on operation of common operating platforms</p> <p>(3) An institutional visit to the Finish Meteorological Institute for SMART Met system review and familiarization program in aviation meteorology</p> <p>(2) Training on Nowcasting and short-range weather forecasting at the WMO regional training center in Beijing (international training course on aeronautical meteorology services)</p> <p>SUN (0)</p> <p>REG (43)</p> <p>(22) HUC Academy on Water and Disaster Risk Reduction Management</p> <p>(1) JRC, Bangladesh capacity strengthening programme</p> <p>(20) Pilot testing of transboundary governance modules</p>
Capacity of water resources organizations strengthened in areas relevant to trans-boundary cooperation	Number of water management organizations with policy or technical capacity significantly strengthened by SAWI activities in areas relevant to basin-scale planning or regional cooperation	36/25	<p>*Exceeded Expectations*</p> <p>SAWI's strategy is to target its capacity building toward organizations and key professionals who are involved in water management and cooperation, and to focus on technical areas where there is strong need, demand, and relevance to basin-scale planning. By enabling stakeholders to participate in a range of events, SAWI is helping to enhance understanding of good practice from international experience, deepen knowledge on specific issues, introduce new models and tools to improve efficiency, and help to stimulate new ways of beginning to address old, intractable problems.</p>

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
			<p>IRB (4)</p> <ul style="list-style-type: none"> (1) MEW (1) MoFA (1) National Security Commission (1) MoF
			<p>GRB (29)</p> <ul style="list-style-type: none"> (1) NIG (1) NMCG (1) CWC (1) CGWB (1) NEA (1) MoWR, RD&GR, (1) CWPRS (1) NIH (1) B & BBO, Silong (1) CSR, Coimbatore (1) KGBO, Hyderabad (1) IBO, Chandigarh LGBO, Patna (1) MERO, Bhubaneswar (1) Monitoring Central, Nagpur (1) NBO, Bhopal (1) UBGO, Lucknow (1) YBO, New Delhi (1) KGBO, Hyderabad (1) WRD, Odisha (1) Dept of Irrigation, Punjab (1) WRD, Andhra Pradesh (1) WRD, Maharashtra (1) Irrigation and CAD Dept, Telangana (1) Ground Water and Water Audit Dept, Andhra Pradesh (1) WRD, Chhatisgarh (1) Irrigation and WRD, Mizoram (1) WRD, Madhya Pradesh (1) WRD, Jharkhand (1) WRD, Assam

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
			<p>BRB (2)</p> <ul style="list-style-type: none"> (1) NCHM (1) Department of Air Transport <p>SUN (0)</p> <p>REG (1) (1) JRC, Bangladesh</p>
<p>Regional, basin or sub-basin-level knowledge increased and accessible to stakeholders, including decision makers</p>	<p>Number of regional, basin/landscape or sub-basin-level knowledge products and shared with key stakeholders, including decision makers</p>	<p>41/10</p>	<p>*Exceeded Expectations*</p> <p>As part of its strategic outreach and dissemination activities, SAWI has not only generated innovative knowledge products but has also ensured that these are disseminated appropriately. Most of the products are developed in close partnership with key stakeholders and thus embedded within existing systems to strengthen quality of planning and management and ensure their uptake.</p> <p>IRB (5)</p> <ul style="list-style-type: none"> (1) The Indus Forum (brochure) (1) Understanding and Assessing the Impact of Climate Change in the Indus Basin: A Joint Research Program Proposed by the Indus Forum (1) Capacity Building Program Transboundary Waters Law and Negotiation Reference and Training Manual (1) Afghan Study Tour to Nile Basin (1) The 2nd Indus Basin Knowledge Forum: “New Knowledge Frontiers for Development and Resilience” <p>GRB (6)</p> <ul style="list-style-type: none"> (1) An Introduction to Real-time Hydrological Information System (1) IWRM river basin modelling system for Damodar Basin in Ganges (1) E-Tool to support clients with the design and implementation of Hydro-met Network (1) Final Report on Implement and Operationalize a Customized Meteorological Framework in Bagmati-Adhwara and Kosi Basins in Bihar State (1) Interim Meteorological Report on Flood Forecasting Model Development (1) Final Report on Flood Forecasting Model Development and Results

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
			<p>BRB (4)</p> <ul style="list-style-type: none"> (1) Framework for Planning and Management of Water Resources in North East India (1) North East Water Resources Information Base (1) Investment Plan for the Bangladesh Delta Plan 2100 (1) Basin Modeling of the Brahmaputra River System in Bangladesh <p>SUN (17)</p> <ul style="list-style-type: none"> (1) Toward a Blue Economy: Pathways and Prospects for Bangladesh’s Investment in Sustainable Growth (1) Joint Landscape Narrative (1) Assessment of the State of Nutrition of Mothers and Children and Stunting in Children and the Causal Linkage to Diet of Expectant Mothers (1) Development of Sustainable Tourism (1) Sustainable Transboundary Inland Navigation (1) Inventory of Flora and Fauna and Comprehensive Biodiversity Mapping (1) Cyclonic Storm Landfalls in Bangladesh (1) Mangroves as Protection from Storm Surges in Bangladesh (1) Sea-Level Rise and Species Conservation in Bangladesh’s Sundarbans Region (1) The Socioeconomics of Fish Consumption and Child Health in Bangladesh (1) When Cyclones Strike: Using Mangroves to Protect Coastal Areas (1) Aamaar sontaan jyano thaake maachhe-bhaate (1) Jolobayu poribortoner saathe saathe ki Sundarban Elaakaay ki maachher praapyotaa kombe? (1) Biodiversity of Indian Sundarbans (1) Biodiversity of Bangladesh Sundarbans (1) Database of Cyclonic Storms (Landfalls, Tracks and Wind-speed Along the Tracks) in Bangladesh, West Bengal and Odisha, 1877-2016) (1) Database of Erosion and Accretion of Bangladesh and Indian Sundarbans: (1904-2016)

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
			<p>REG (9)</p> <p>(1) Climate Risks and Solutions: Adaptation Frameworks for Water Resources Planning, Development and Management in South Asia</p> <p>(1) Status of Aquatic Biodiversity in Bhutan (and online portal)</p> <p>(1) Integrating Cultural Landscape Considerations in Large Infrastructure Planning in Bhutan</p> <p>(1) Guidelines for the Development of Hydropower</p> <p>(1) Potential Health Risks from Inorganic Chemical Contamination of Groundwater in Punjab, India.</p> <p>(1) An online interactive map showing available georeferenced data on cultural heritage, which will inform planning of hydropower investments.</p> <p>(1) IUCN training module course</p> <p>(1) IUCN training module video</p> <p>(1) Hydropower resilience guidelines</p>
<p>Regional, basin or sub-basin-level interventions designed to improve livelihoods and ecosystem sustainability</p>	<p>Number of regional, basin or sub-basin-level feasibility studies or intervention designs informed by SAWI activities</p>	<p>6/5</p>	<p>*Met Expectations*</p> <p>The basins and landscape have made good progress in responding to emerging opportunities. In some cases, SAWI has leveraged funding or directly shaped larger policies and investments (e.g. Ganges, Brahmaputra), while in other instances SAWI is informing the design and implementation of larger programs. The technical focus of these efforts is on improving climate responsive planning in water resource management, and integrating gender issues and sustainability into approaches. Regional level investments are yet to happen, but SAWI's support to advancing the basin-level dialogues is a critical step toward that objective by continuing to build trust between various stakeholder groups across the riparian countries. SAWI also has traction with national and sub-national governments, particularly through the World Bank's country investments.</p> <p>IRB (0)</p> <p>GRB (1)</p> <p>The manual and the North-East Hydro-met Plan for advanced setup of a hydro-met network are guiding the development of the Hydro-met Network under the NHP</p>

Intermediate Results	Result Indicators	FY18 Milestone	Progress Update
			<p>BRB (2)</p> <p>(1) A rapid assessment of water resources is informing the Government of India’s initiative on proper water resources management in the North-east</p> <p>(1) The Investment Plan is informing the Bangladesh Climate-Smart Agricultural Water Management Project.</p> <p>SUN (2)</p> <p>(1) The Blue Economy report is informing the design of the Bangladesh Sustainable Coastal and Marine Fisheries Project</p> <p>(1) Technical information on which mangrove species are likely to survive in the region in a changing climate has contributed to the Bank’s Sustainable Forest and Livelihood Project</p> <p>REG (1)</p> <p>(1) Recommendations from CSIRO’s work on Potential Health Risks from Inorganic Chemical Contamination of Groundwater in Punjab, India, were implemented in the World Bank’s investment in the Punjab Rural Water Supply and Sanitation project.</p>

ANNEX 2: ACTIVITY SUMMARIES



PROGRAM

Overview

Activities have been established to cover: (1) program management; (2) strategic communications; and (3) monitoring and evaluation. The program management activity is seven percent of all contributions and is the management “fee” referred to in the Administrative Agreements. This fee is taken from each contribution payment.

Program Management

SAWI sits within the World Bank’s South Asia Region’s Regional Integration and Partnerships (SARRP), which has the ultimate responsibility for program delivery. The program is overseen by the Internal Review Committee, chaired by the Director, SAARP. The IRC meets once a year to approve the annual work plan, endorse all new activities over US\$50,000, and conduct an annual review of program implementation. On a day-to-day basis, a small Secretariat team in the Water GP and SARRP manages the program. The program management activity supports strategic oversight and coordination of the program across all Focus Areas and activities, financial management, and annual progress reporting and donor liaison, including the annual donor meeting. Donor liaison includes the governance processes as laid out in the Administrative Agreements, interactions with the partner organizations funded by Australia’s Department of Foreign Affairs and Trade (DFAT) under their South Asia Sustainable Development Investment Portfolio (SDIP) and DFID’s South Asia Water Governance Program, in addition to participation in the annual reviews of those programs.

Strategic Communications

This activity supports implementation of the program Communications and Engagement Strategy, with a long-term goal to create an enabling environment for cooperation at the basin level. This includes advocacy, awareness building, dissemination and engagement with key stakeholders (government officials, NGOs, academia, civil society groups and the media). The activity works upstream to strengthen positioning at dialogues, national and international workshops and conferences, and extends support to Focus Area activities toward the delivery of programmatic results. The activity also supports the maintenance of the program website, regular Program Updates, and the widely distributed weekly media roundup.

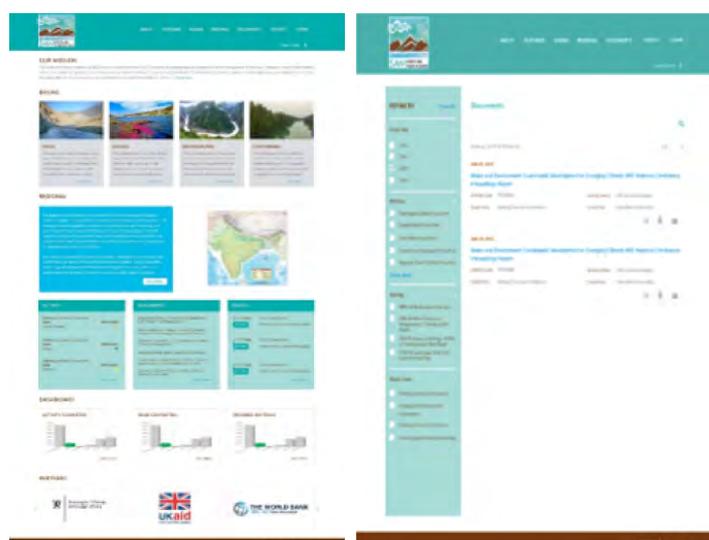
The SAWI Communications and Engagement Strategy (endorsed by donors in 2014) focuses on establishing SAWI’s credibility as a source of robust knowledge and as a facilitator of cooperative dialogue on water resources management across South Asia. The regional/basin level dialogue fora have been main avenues for targeted outreach of evidence generated by SAWI. These fora often provide direct access to policymakers, opinion leaders and practitioners who are the intended beneficiaries of the knowledge products. SAWI’s external website (<http://www.worldbank.org/en/programs/sawi#6>) serves as a knowledge repository and dissemination platform. The website features the current FY implementation plan, activities supported under the different Focus Areas, and a calendar of upcoming events. Program updates are shared with donors on a bi-monthly basis, as well as across World Bank Country Offices and GPs (Water, Energy and Extractives, Environment and SURR) to facilitate internal communication, promote cross learning, and build synergies. Direct engagement with the media is limited due to sensitivities around transboundary waters, but SAWI consistently partners with organizations such as IWMI, IWA, and The Third Pole Project to create visibility around its activities and to acknowledge donor contributions. Partner networks are used to inject scientific evidence into the public discourse on transboundary water management, while keeping the SAWI/World Bank footprint low to minimize risk. The Weekly Media Digests, servicing 300 subscribers, helps to keep SAWI’s extended team and stakeholders updated on the latest relevant developments. This comprehensive compilation of news reports and editorials gives a 360-degree view of how water-related issues are covered in different countries



and the media narrative that informs public perception. This strategic approach to communications has helped SAWI to evolve from the closed-door Abu Dhabi Dialogue process to a more open and engaged network of decision makers, water practitioners, academics, think tanks and civil society representatives, who increasingly recognize the value of the SAWI program. As Phase II approaches completion, SAWI will give greater focus to dissemination and uptake of program outputs. This could, for instance, include building narratives around the value of cooperation and benefit sharing and other fit for purpose communications products such as policy briefs and infographics for targeted dissemination.

Achieving Results (M&E)

This activity supports M&E at the program level and at the Focus Area level. This includes tracking progress in achieving indicator targets at all links of the results chain—activities, outputs, intermediate results and ultimately outcomes. It includes regular reporting, including annual, “mid-term” and closing. M&E also includes qualitative narratives to report on and demonstrate impact in terms of tangible results aligned with the program objective. The activity supports communication with donor partners to ensure that information used in their M&E processes is accurate and up-to-date. This year, SAWI strengthened its M&E approach to better capture and assess the impact of the program through development of a management information system (MIS) prototype. The MIS will help to strengthen SAWI’s program M&E and enhance the evidence base for reporting by: (i) tracking more granular detail for the Results Framework; (ii) providing analysis and visualization of financials disaggregated by outcome area, Focus Area, geographical extent, and disbursement; and (iii) providing a streamlined repository for all knowledge products for lesson sharing, communication and dissemination. As part of the MIS, a document repository has been compiled, containing 270 internal and public documents. Each has been sorted by type and result area tag, if applicable, and includes a short abstract. This is work in progress, and SAWI’s external website will be updated to include all public reports.



In FY18, SAWI had an independent evaluation (commissioned by donors), a half yearly check-in with donor partners to provide updates, and informal discussions with donors on a regular basis. SAWI also organized a field visit for donors to the Brahmaputra Basin (Assam, May 2018) to experience firsthand the challenges that natural and human-made processes present to the fragile ecosystem of Majuli—the world’s largest riverine island, which is disappearing due to erosion—and the impacts on people’s livelihoods, threats from climate change, and arrangements for transporting people and cargo.

INDUS BASIN FOCUS AREA

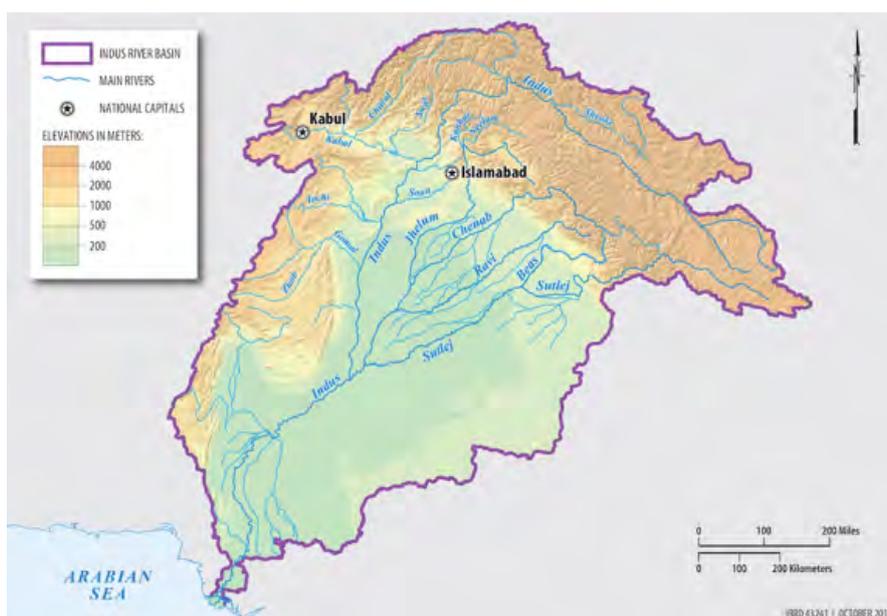
Objective

To improve water resources management and coordination among the riparian countries, Afghanistan, China, India and Pakistan, to enhance water and energy security.

Focus Area Theory of Change

Given complex water challenges, high glacier dependency and growing per capita water scarcity, the Indus is the most vulnerable river basin in Asia. The uneasy relationship between riparian countries, different levels of capacity and the presence of a fragile, post-conflict country in the basin pose additional challenges to regional cooperation on water resources management. Given the World Bank’s role in the 1960 Indus Waters Treaty (IWT) and the importance of neutral engagement, maintaining transparency in World Bank engagement in the Indus Basin is critical. In response to communications from key riparian stakeholders, investment in this Focus Area is relatively low and focuses on issues not under the purview of the IWT.

Activities focus on tractable efforts where client demand is clear, including: (1) identification of the need for and provision of technical assistance at the national level to enhance transboundary (including inter-provincial boundaries) water resources management capacity; and (2) continued support to the basin dialogue (commenced in 2013) focusing on development of joint research activities on climate change impact in the Indus Basin. Pillar 2 focuses primarily on Afghanistan, and also Pakistan, to mitigate for cross-basin differences in country capacity.



Pillar 1 – Long-Term Basin Development and Investment Planning

Indus Basin (Pakistan) Groundwater Analysis

Scope: While the Indus region has a long history of major investment in surface water infrastructure, by contrast, the management of groundwater infrastructure has remained in private hands, contributing to uncontrolled expansion of access to groundwater. Poorly managed conjunctive use of the interconnected surface and groundwater systems has led to a corresponding deterioration of the groundwater resource. Institutional capacity for governance of these resources is weak and essential groundwater data that would facilitate improved governance are fragmented and not easily discoverable for a significant proportion of the Indus Basin. This activity aims to extract and synthesize knowledge of groundwater and its governance in the Indus Basin (Pakistan) and conduct an analysis of trends in available data. The work will contribute to an ongoing consolidation of the groundwater knowledge base in South Asia, and highlight opportunities for regional cross-learning on common groundwater management issues. It will complement the groundwater work already completed by the World Bank in the Indian Punjab portion of the Indus Basin. The work will also benefit from the current SAWI advisory work on managing groundwater for drought resilience in South Asia.

Timeframe: March 2018 – February 2020. Geography: Indus Basin; Pakistan. Budget Allocation: \$0.30M

FY18 Progress: Activity preparation was initiated toward the end of the FY.

FY19 Plan: The work will commence with targeted (sub-Basin level) stakeholder meetings, followed by a collation and review of published and grey literature, identifying sources of archived and current data, and analyzing the status of groundwater in the study area. This will be done with reference to the physical/environmental condition of the resource, its connection to rivers and other surface water bodies, and the mechanisms of both formal and informal governance of this resource—including a review of institutional capacity. The work will include an assessment of resource sustainability and capacity for growth as well as an analysis of user groups and of the capacity for monitoring the resource condition.

Pillar 2 – Investments and Capacity Building for Water and Energy Security

Kabul/Kunar Basin Development

Scope: This activity aims to strengthen capacity within the governments of Afghanistan and Pakistan for establishing institutional frameworks for transboundary waters and infrastructure, and to facilitate dialogue between the two countries to enhance coordination and reach cooperation on the development and management of the Kunar/Kabul River Basin. Based on government request, the activity is engaged in an extensive capacity building program with the Government of Afghanistan on transboundary water resources management. The training has covered a broad spectrum of issues related to dialogue and developing relations with co-riparians. This activity is closely linked to the World Bank's Irrigation Rehabilitation and Development Project (IRDP) Additional Financing (\$70M). SAWI support aided in strengthening the focus on water sector issues more generally in the IRDP (\$220M).

Timeframe: June 2015 - December 2017. Geography: Indus Basin; Afghanistan, Pakistan. Budget Allocation: \$0.60M



FY18 Progress: After 19 workshops covering 150 hours of “in class” time in Kabul, and 54 government staff from MoFA, MEW and MoF receiving training on various aspects of transboundary water resources management, the two-year capacity building program came to a close. Two workshops and one study tour were conducted in FY18. The July 2017 international groundwater workshop, with six participants, was an introduction to the topic of transboundary groundwater to provide better understanding of the advantages and disadvantages of addressing groundwater in negotiations for surface water agreements. A study tour to the Nile Basin, co-financed with SIWI, and implemented in collaboration with EU-MoFA, took place in October 2017, with participation from the MoF, MoFA, MEW and the Water Negotiation Committee appointed by the President for negotiation with Iran. The development and cooperation seen in the Nile is illustrative of what could conceivably be accomplished with Afghanistan and its neighbors in the coming decades. The Nile Basin offers different examples of cooperative energy projects and energy trading, and different mechanisms for financing, building and operating dams. The Nile Basin was also chosen because there are several parallels between Afghanistan and upstream Nile countries, such as Ethiopia and Uganda, from both a geographic and socioeconomic perspective. It also provided an opportunity for Afghanistan to learn from the perspectives of downstream countries, such as Sudan. The study tour also gave participants an understanding of the potential benefits associated with the establishment of river basin organizations (e.g., Eastern Nile Technical Regional Office) and the role that these can play in helping to facilitate cooperation and promote sustainable development. The tour capped the capacity building program, allowing the participants to relate the theoretical knowledge base acquired throughout the training program directly to the Nile Basin as a real-life case study and to interact directly with experts who have been negotiating the Nile water resources over the past 15-20 years. A follow up seminar, attended by seven government officials, focused on a review of the lessons learned and their application to Afghanistan. It also provided an opportunity for the EU-MoFA and SIWI initiatives to update participants on their on-going engagement and to ensure seamless continuation of capacity building support to the Afghan Government going forward. It is difficult for Afghan officials to travel and study outside their country, and there are no universities or courses in Afghanistan that deal with transboundary water. However, the materials generated in this capacity building program were developed into a training manual that could be used to develop curricula in Afghanistan. These materials will be further developed and finalized by EU-MoFA for uptake in trainings by the Foreign Affairs Institute at the MoFA. The activity convened a donor coordination meeting among those supporting transboundary water management and capacity building in Afghanistan in June 2018. As more and more donors are engaged in supporting the Government in this area, the objective of the meeting was to exchange information on ongoing and planned initiatives to ensure that all development partners are aware of support programs and to identify areas of potential overlap and opportunities for coordination. It was agreed that the Government will, in early FY19, appoint a focal ministry that will be responsible for coordinating donor support in the future.

FY19 Plan: Activity Completed.

Pillar 3 – Basin-Level Dialogue

Indus Basin Dialogue

Scope: Since 2013 the World Bank has supported a dialogue for Indus Basin countries—the IF—to build confidence and trust in order to establish an enabling environment for basin-wide cooperation. This activity aims to support dialogue in the Indus Basin, including the IF, and it focuses on technical collaboration on issues previously identified by the IF. The activity finances meetings and exposure visits of participants of the IF. It also aims to facilitate a national dialogue process with key stakeholders in Pakistan to implement the recommendations from the 2013 Pakistan Water Summit and to identify specific opportunities for water reform and investment. The IF-WG has been developing a proposal for a joint research program on climate change impacts in the Indus Basin. The proposed research aims at addressing the scientific gaps in knowledge, regarding the impacts of climate change on the Indus Basin and would guide the policymakers of the basin for adaptation strategies.

Timeframe: November 2014 – February 2020. Geography: Indus Basin; all riparians. Budget Allocation: \$0.70M

FY18 Progress: Over time the dialogue process has expanded from a group of 15 riparian stakeholders to meetings that now regularly involve around 100 people from the four basin countries, international experts working on the Indus, and donor partners. The 2nd Indus Basin Knowledge Forum (IBKF), co-convened with IWMI and ICIMOD, was held in Colombo in July 2017; bringing together about 90 participants from the four basin countries, scientists, academics, the private sector and civil society, and development partners. A key objective of the meeting was to build stronger collaboration among science communities (the ‘producers’ of knowledge) and those who can use greater knowledge and understanding to make informed decisions and construct and implement more effective policy. The principle outcome that emerged was a 10-point plan aiming to strengthen the Indus Basin knowledge landscape and build opportunities for knowledge sharing and co-development, while at the same time making the knowledge that is already available more readily accessible. The Indus Forum Working Group (IF-WG) preparing a joint research proposal on “Understanding climate change adaptation in the Indus Basin” met on the sidelines of the 2nd IBKF to: (1) agree on the next steps to finalize the joint research proposal including key messages that will be used to facilitate fundraising for the proposal; and (2) identify international peer reviewers for the quality control of the proposal. In October 2017, the joint research proposal was finalized. The proposal is composed of a set of coordinated research activities, described as ‘Work Packages’ (WP), which will be carried out by a consortium composed of various organizations/institutes that have expertise in the subject. Researchers from each riparian country will conduct research activities within their respective national geographic domains but will coordinate research plans with researchers from the other countries within the basin under each of the WPs. WPs 1-3 focus on coordinating research activities among researchers to address the knowledge gaps pertaining to climate change impacts in the basin. WP 4 focuses on capacity building, training, networking and knowledge exchange among stakeholders from these four countries, as well as with the wider global climatological, glaciological and hydrological research communities. The outcomes of the proposed research will guide policymakers in the basin to devise an informed adaptation strategy for sustainable development of water resources. The 3rd IBKF—hosted by the International Institute of Applied Systems Analysis (IIASA) and jointly convened and organized by IIASA, ICIMOD, IWMI and the World Bank, took place in Laxenburg, Austria in May/June 2018. The 100 participants deliberated on ways to take each of the 10 action points forward. (About 40 percent of the participants at the 3rd IBKF had also been at the 2nd IBKF).

FY19 Plan: The activity will support the creation of a Secretariat for the coordination and smooth operation of the Indus Basin Joint Research Program, which will be hosted by ICIMOD. This will build on ICIMOD’s experience and role in facilitating the HUC. The Secretariat will organize the next IBKF (anticipated to take place in FY20) and annual meetings of relevant research institutions, academia, government entities, policymakers and decision makers in the Basin to enhance coordination, cooperation and cross learning.

Ganges Basin Focus Area

Objective

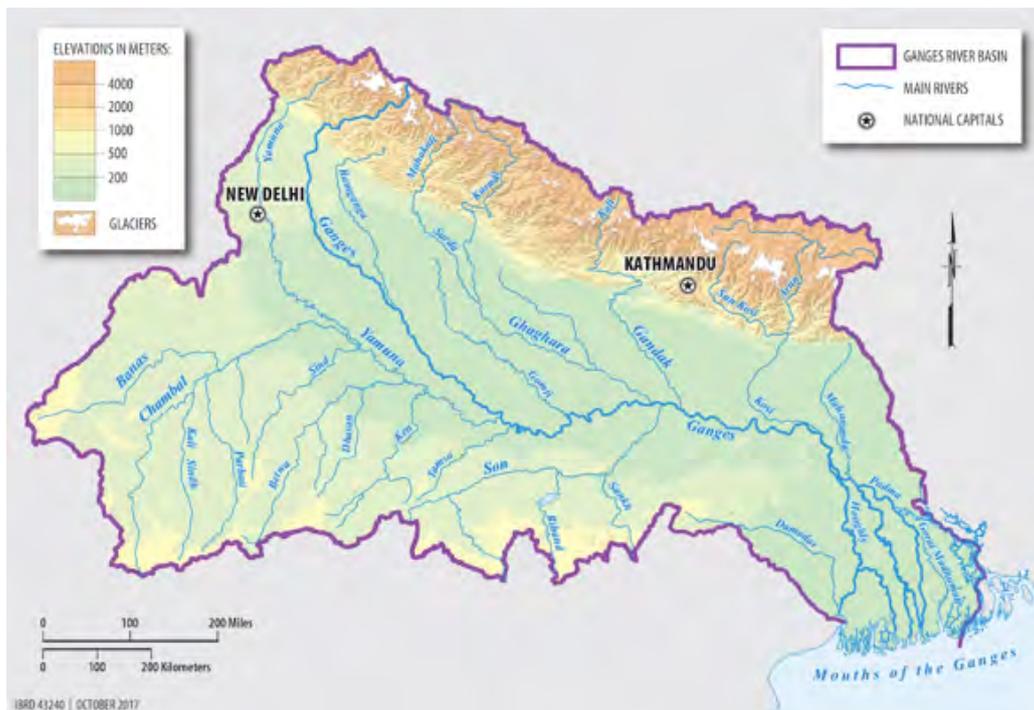
To improve management and development of water resources in the Ganges Basin to support economic growth and improve resilience to climate variability and change.

Focus Area Theory of Change

Countries in South Asia are unlikely to cooperate for effective basin management if water resources are not well managed nationally. Therefore, the strategy for the Ganges Basin Focus Area is to support improved water resources management nationally and facilitate connections between countries through technical dialogue and capacity building. In addition to improving water management nationally for economic stimulation and poverty reduction, these connected efforts build confidence in transboundary engagement and increase trust around knowledge and information exchange. In India, working to improve data sharing between the center and the states is a necessary precursor to broader public and international transparency.

In India and Nepal, support is being provided to river basin planning. In Nepal this is via the accelerating development of hydropower (with associated work on watershed management for sediment control), and in India this is via the drive for river cleanup as well environmental flows for healthy rivers, cross-sectoral water allocation and inland navigation. Work under the Focus Area supports the design and implementation of the World Bank-financed NHP in India that includes river basin planning on a platform of more open data access and sharing, in addition to informing other lending operations.

Operationalizing flood forecasting in the Ganges Basin at the sub-basin-level focuses on activities in the Bagmati sub-basin to build technical competence and improve forecasting skill, as well as to strengthen cross-border cooperation in flood management between Bihar and Nepal. Again this work will guide larger-scale and longer-term efforts in flood forecasting planned under the NHP.



Pillar 1 – Valuing the Environment and Ecosystem Services

Strategic Basin Planning for the Ganges in India

Scope: This activity is providing technical assistance to the Government of India and basin State governments in scenario-based river basin modeling and participatory river basin planning for the Ganges Basin in India. The activity aims to develop a comprehensive basin model for the Ganges in India that enables objective assessment of the likely effectiveness of different options for improving river health and the impacts these options have on the ability to meet consumptive water demands and support inland waterway navigation. The activity is being implemented via a major contract with Deltares for work on basin-scale modeling, surface water-groundwater interactions, environmental flows, stakeholder consultation and basin information systems. The work is proceeding in close cooperation with the Indian Ministry for Water Resources, River Development and Ganga Rejuvenation and relevant state government agencies. The activity is highly relevant to the NHP and is seen by the Government of India as a pilot for the multiple river basin modeling and planning activities to be progressed under this project. The activity is also relevant to the NGRBP and the UPWSRP.

Timeframe: December 2014 – September 2018. Geography: Ganges Basin; India. Budget Allocation: \$4.00M

FY18 Progress: The river basin modeling component (Milestone 4) of the activity was largely completed. The main outcome achieved in FY18 was the completion and transfer of the customized and purpose-built Ganges River System Modeling Suite and associated Water Information Dashboard (to display and interrogate modeling data) to the Central Water Commission (CWC). The suite can be utilized in guiding basin planning, conducting water resources assessments, and effectively carrying out other aspects of basin water management. In July 2017 project progress was presented and discussed with the Secretary and the members of the Strategic Advisory group. An important decision was that a dedicated unit shall be set up in CWC to further work on the suite. A comprehensive stakeholder consultation program and technical training across the 11 basin states also advanced. Training courses on model use were organized in Madhya Pradesh, West Bengal, Rajasthan, and Chhattisgarh. From July to September 2017, continuous on-the-job training was provided to nine young experts from government agencies (NIG, NMCG, CWC and CGWB) in all aspects of model development and maintenance. A training on the Ganges Basin Model, GangaWIS and SPHY, was conducted in October 2017 for 20 participants from NIH, CWC and CGWB. In November 2017, 32 experts from institutions within the basin took part in a training workshop on environmental flows, which focused specifically on indicators for Ganges environmental flows. In March 2018, the project conducted a final training on the Ganges River Basin Model with 10 participants from CGWB, NIH, and CWC. Ahead of the workshop, all model software had been developed and associated data files were delivered and installed at the Basin Planning Modelling Center at CWC. To emphasize the transition and ownership of the model the training was conducted at the Basin Planning Modelling Center at CWC, where the trainees (also those from other organizations than CWC) will continue their modelling work. In the spring of 2018 the surface water-ground water interaction assessment was prepared based on collected information and discussions with the Central Ground Water Board and other stakeholders. An environmental flow assessment was also conducted. The final major consultation workshop on the model took place in March 2018, with 85 participants and representation from all 11 basin states. The workshop informed the government representatives about the results of the activity; discussed the results of environmental flows, surface-groundwater interaction and strategy and scenario assessments; and deliberated on the ways in which results can be used and sustained. The event was chaired by the Secretary of the Ministry of Water Resources (MoWR), and two Joint Secretaries from the MoWR participated. Based on the workshop results and comments, the assessments were further detailed and translated to report form. The Ganges River Basin model documentation and manuals were finalized as drafts in June 2018.

FY19 Plan: The surface-groundwater interactions assessments and the documentation of methods for environmental flows will be finalized. With the transfer of the modeling software to CWC, the activity has entered the transition period of transfer to the institutes that will be responsible for sustaining and maintaining activity results.

Sustainable Water Resources Development for HEP in Nepal (RE)

Scope: This RE activity aims to strengthen the capacity of the Nepalese power sector to plan and prepare hydropower and transmission line projects according to international standards and best practices that take account of basin-wide water resource management issues, and to improve the readiness of the power and water sector for regulatory and institutional reforms. This activity is linked to the Power Sector Reform and Sustainable Hydropower Development Project.

Executing Agency: Water and Energy Commission Secretariat (WECS) in the Ministry of Irrigation, Nepal

Timeframe: June 2016 – June 2018. Geography: Ganges Basin; Nepal. Budget Allocation: \$2.50M (reduced to \$0.5M in FY18)

FY18 Progress: The WECS' implementation of integrated water resource planning and management to guide sustainable hydropower development using a basin-wide approach continued, albeit at a pace that was significantly slower than planned. At the end of FY18, WECS was evaluating proposals of the firms shortlisted to carry out a strategic environmental and social assessment to support a basin-wide approach for hydropower development planning. The evaluation, negotiation and signing of the contract is expected to be completed in early FY19.

FY19 Plan: The selected firm will carry out the assessment.

Sustainable Water Resources Development for HEP in Nepal (BE)

Scope: This activity will enable the World Bank to provide implementation support to the above RE activity. This activity aims to enhance the Government of Nepal's GoN water resources management and development capacity by: (1) increasing awareness of river basin planning as a mechanism to guide environmentally sustainable development hydropower balanced with water resource uses; (2) facilitating institutional and regulatory reform in the water resources sector; and (3) building capacity in environmental and social safeguards. By strengthening capacity in the GoN and supporting river basin planning and improved water management the activity will enable the GoN to engage in a more informed and more confident way with downstream riparian countries in future transboundary discussions and negotiations.

Timeframe: September 2014 – February 2020. Geography: Ganges Basin; Nepal. Budget Allocation: \$1.70M

FY18 Progress: An exposure visit to the Three Gorges Dam Project and Hubei Yiba Highway Project in China was organized for seven Nepalese Parliamentarians and a parliamentarian assistant, and two journalists, in August/September 2017 on the importance of river basin and hydropower planning. The delegates visited the state energy agency and learned about river basin planning for the Yangtze. The activity supported participation of three NEA representatives in the three-week August/September 2017 Hydropower Development Management Course in Norway, to build their capacity for environmental and social safeguard management to facilitate technically, socially and environmentally sustainable and equitable water resources and hydropower development. The approval of Nepal's Integrated Water Resource Management Policy and Water Resource Act was pending as the newly instated Government (March 2018) started the review and approval processes. The activity also facilitated a process by which Kathmandu University came on board, from February 2018 onward, to participate in a faculty exchange initiative on water resources and hydropower development. A delegation from Wuhan University, China visited Kathmandu University to deliver specialized lectures to engineering students from Nepal. Following a competitive process, ten Nepali students were selected for a student fellowship on hydropower and water resources at Wuhan University. The students began their tenure at Wuhan University in April 2018.

Pillar 2 – Moving from Data to Information Services

Water Resources Management in Transboundary Basins

Scope: This activity provides support to NHP by facilitating access to international best practice to inform project design and implementation—especially relating to river basin planning and management in transboundary basins. NHP focuses on the use of water data in planning and management, including via modeling in support of basin planning and basin water resources assessments, flood management and reservoir operations.

Timeframe: November 2014 – February 2020. Geography: Ganges and Brahmaputra Basins; all riparians. Budget Allocation: \$0.50M

FY18 Progress: An advanced hydro-met manual was produced. The manual is intended to serve as an exhaustive reference for all implementing agencies/government agencies under NHP. It covers all aspects of hydro-met data and instrumentation, including basic concepts of data collection pertaining to weather, surface water, groundwater, water quality, sediment transport, data collection, transmission and management. The manual also covers instrumentation and options, and provides guidance on choosing equipment and designing a network of instruments (site selection) and other related considerations. A robust companion e-tool to the hydro-met manual has been developed. This versatile hydro-met e-tool walks a user through all nuances of the network design pertaining to hydro-met, selection of appropriate instrumentation and corresponding specifications, support in performing site selection and cost estimation. Additionally, it links to the advanced hydro-met manual and other references/operational resources. It can be used to help prepare reference bid documents and match the user needs with appropriate vendors. The e-tool is undergoing further enhancement to add greater functionality. A draft “North-East Hydro-met Plan for advanced setup of network” was developed to help implementing agencies to determine equipment needs and locations for their deployment. The Integrated Water Resource Model for reservoir operations and management of water resources of the Damodar Valley Corporation (DVC), which had been previously prepared, was handed over to the client for further testing. The model will help to more precisely determine the optimal water to allocate for various uses and will also determine the amount of water to be released and impacts downstream. At the end of FY18, the client was preparing to mainstream use of the model for water management decisions on irrigation and hydropower. The model will also be transferred to a local university to provide technical support and to facilitate improving the model over time. An advanced training workshop on state-of-the-art hydrometric data acquisition and transmission networks: measurements and modeling was conducted for 100 people (15 women) from India, Nepal, Bangladesh and Bhutan in New Delhi (February 2018) (MoWR, RD & GR, CWPRS, CGWB, NIH, among others) to discuss ideas and pathways for improving regional hydro-met network cooperation. The training is helping state level implementing agencies of NHP to be able to develop and run models. Twenty-nine participants (7 women), including participation from water resources departments in Ganges and Brahmaputra Basin states (DVC, Irrigation Dept, Government of Kerala; Dept of Water Resources Investigation and Development, Govt of West Bengal, Irrigation and Waterways Department, Government of West Bengal, WRD, Government of Gujarat, WRD, Government of Rajasthan, WRD, Government of Karnataka) participated in a training on the Waterware software.

FY19 Plan: This activity has been extended to complete IWRM model mainstreaming; to ensure wider dissemination of the developed hydro-met manual; to prepare additional knowledge resources on hydrology; to further develop the e-tool for linking potential vendors and suppliers of equipment; and to introduce a selection/decision support system for make/models of each type of sensor. The finalization of the DVC IWRM model will be carried out and will include stakeholder consultation and development of materials to strengthen technical capacity in model utilization.

Strengthening FMIS Capacity in Bihar (RE)

Scope: This RE technical activity builds on the outcomes of the regional scoping study on flood forecasting to strengthen institutional capacity in the Government of Bihar, India, and to improve community outreach for flood management in the Baghmata-Adhwara (B-A) Basin (a transboundary sub-basin of the Ganges Basin spanning Nepal and India). The activity is linked to the ongoing BKDP.

Executing Agency: Government of Bihar, India

Timeframe: February 2016 – June 2018. Geography: Ganges Basin; India. Budget Allocation: \$0.475M

FY18 Progress: A report was finalized on the implementation and operationalization of a customized meteorological framework in the Bagmati-Adhwara and Kosi Basins (by NCAR, USA). An Interim Meteorological Report on Flood Forecasting Model Development was also developed (by BMT Australia). A high-level delegation of five officials from the Water Resources Department, Bihar and Flood Management Improvement Support Centre, Patna, and headed by the Minister Water Resources, participated in a study tour (April 2018) to China to gain firsthand knowledge of the institutional and technological aspects of real-time flood forecasting and management in the Yellow River Basin, and measures to control sedimentation. As Bihar experiences severe floods annually, knowledge on the role of lead rainfall analysis and its adoption in real time is likely to strengthen local expertise and understanding. A five-member delegation from the Government of Bihar also visited NCAR (Boulder, USA) for training and capacity building to implement and operate the developed meteorological framework for the Bagamti-Adhwara and Kosi Basin (May/June, 2018). A five-member delegation from the WRD, Bihar, WRD Patna and Flood Management Improvement Support Centre, Patna, visited Thailand in June 2018 to share knowledge in the field of flood management between the Asian Institute of Technology (AIT), Bangkok and Bihar; to learn about the way flood forecasting and early warning systems are functioning in Thailand; and to understand the latest research in disaster management produced at AIT. It was decided to use Delft-FEWS, TUFLOW and URBS software to develop the flood forecast and inundation modelling tool for Bagmati-Adhwara Basin. A report on the proposed approach for integrating ensemble rainfall estimates and weather forecasts was approved by SRC in November 2017. Flood Forecast Model and Inundation Mapping Tool reports were approved by the SRC in March 2018. The beta version of the model has been installed in FMISC. A final report on implementation and operationalization of the Flood Forecast Model and Inundation Mapping Tool in WRD, including a the suggested framework for scaling up to other basin in Bihar was submitted to FMISC.

FY19 Plan: Activity Completed

Bihar FMIS Flood Forecasting (BE)

Scope: This activity enables the World Bank to provide focused support to the Government of Bihar in their implementation of the RE activity above. The activity aims to improve flood forecasting capability of the Government of Bihar by supporting travel of government officials to flood modeling centers of excellence, and supporting visits to Bihar by experts and consultants to improve the existing flood risk model.

Timeframe: November 2015 – September 2017. Geography: Ganges Basin; India. Budget Allocation: \$0.50M

FY18 Progress: This BE activity was used to follow up on and support the activities undertaken in the RE activity.

FY19 Plan: Activity Completed.

Pillar 3 – Basin-Level Dialogue

Ganges Basin Dialogue

Scope: Building on the national level technical assistance in river basin modeling and planning in both India and Nepal, this activity supports basin-wide dialogue on hydrologic and water resources modeling. The activity aims to connect technical institutions in the region with scientists and academics around the world that are actively engaged in modeling the Ganges Basin. A key element of the original design of this activity was to bridge river basin modeling work supported under SAWI in India and Nepal. The activity was effectively placed on hold for FY17 pending outcomes of an internal review of the SAWI program and an assessment of the progress of river basin modeling work in support of hydropower development in Nepal, which has not proceeded as planned (as mentioned above).

Timeframe: November 2014 – February 2020. Geography: Ganges Basin; all riparians. Budget Allocation: \$0.40M

FY18 Progress: No outcomes achieved, as activity was placed on hold for FY18

FY19 Plan: Scoping activities for advancing dialogue.

Brahmaputra Basin Focus Area

Objective

To improve the shared understanding and management of the Brahmaputra Basin as a means to strengthen resilience and economic growth for the riparian countries.

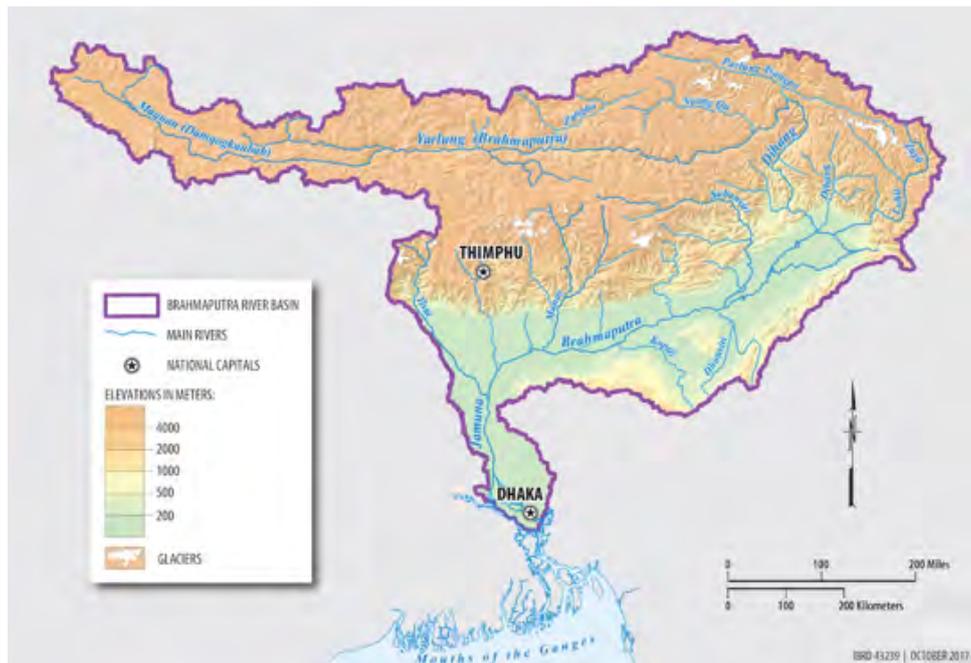
Focus Area Theory of Change

Activities under the Brahmaputra Basin Focus Area focus on addressing water-related challenges (e.g., floods, sediment and erosion) and assessing economic opportunities, including from hydropower and inland navigation. Knowledge exchange activities, study tours and workshops and assessments conducted to support these issues will not only demonstrate economic benefits from cooperative management, but will also provide a platform for riparian countries to come together and build the case for regional cooperation.

Pillar 1 activities will develop a shared knowledge base for the entire Brahmaputra Basin to support investment planning and decision-making. This will include relevant assessments and modeling, decision support tools to assist policymakers in making informed, analysis-driven decisions, and capacity building activities within relevant agencies to operationalize these tools and make strategic, informed decisions. The knowledge base will fill critical knowledge gaps; support basin-wide river management, investment planning at a national and/or basin level, adaptive management in deltaic regions, and flood, sediment, and erosion management; and provide the information base required to scientifically explore cross-sectoral cooperative opportunities such as those related to hydropower and navigation.

Pillar 2 activities focus on reducing community vulnerability to water and climate-related risks and building community resilience. An adaptive management framework is used to strengthen riparian countries' capacity to respond and adapt to changes in the basin. Activities include (1) improvements in investments and instruments, including early warning systems and flood mitigation measures; (2) improving the understanding of river morphology and sedimentation and erosion trends; and (3) capacity building, training and knowledge exchange activities, particularly focused on flood and erosion management.

Pillar 3 provides a platform for riparian countries to discuss challenges and identify opportunities for collaboration through study tours, workshops and conferences. The overarching aim is to improve cooperation through increasing opportunities to engage and discuss common challenges.



Pillar 1 – Knowledge and Capacity Building for Basin Management and Investment Planning

Basin Modeling and Analysis

Scope: This activity aims to fill critical knowledge gaps in the Brahmaputra Basin and serve as a launching pad for integrated basin planning. It will undertake a strategic basin assessment (in India) as a basis for basin planning. The activity will include multi-stakeholder consultations and capacity building for State agencies. The activity links closely with the Assam Integrated River Basin Management Project that is under preparation. It is also aligned with the 'sister' SAWI-supported activity in Bangladesh (now closed).

Timeframe: March 2016 – December 2018. Geography: Brahmaputra Basin; India. Budget Allocation: \$1.20M

FY18 Progress: Shortly after the original contract for the Strategic Basin Assessment work was cancelled in early FY18, the activity moved nimbly and swiftly to respond to the Government of India’s highly time-sensitive request to the World Bank for assistance to its initiative on proper water resources management in the Northeast—which was driven by the Prime Minister’s Office following the aftermath of the disastrous floods in 2017. SAWI has taken a front seat in advancing this initiative. SAWI’s technical support involved working closely with the High Level Committee (HLC) (chaired by the Vice Chair of NITI Aayog and consisting of Secretaries of all water-related Ministries and Chief Secretaries from all Northeast States) and the Expert Committee (EC). The HLC and EC are significant in that they are the first multi-agency and multi-state platforms ever established to address the water resources issues of the Northeast. By sitting on the technical EC, the SAWI team was provided a unique opportunity to inform the future direction of water resources management in the Brahmaputra Basin, and the Northeast more broadly. As a result of SAWI’s engagement, Members of the EC are now also actively participating in the wider Brahmaputra Dialogue. On behalf of the EC, the activity contracted Research Triangle Institute (RTI) to conduct a rapid assessment of water resources in the Northeast, with the aim of recommending actions for improvement to the HLC. Vassar Labs was also contracted to develop a complementary Northeast water information portal. A study launch workshop was held in New Delhi in December 2017, and included participation from all related central ministries and agencies and the nine states covered under the study. The objectives of the study were to review and assess existing institutional frameworks for water management in the North East; to propose interventions that may improve water management, reduce existing or emerging risks, and optimally utilize the existing water resources; develop actions for supporting the management of water resources, including data acquisition and sharing needs, and tools and frameworks utilizing this data to support this process; and to create a roadmap for action to improve water management and utilization in the North East. The workshop was followed by an extensive tour of several weeks in the nine states to hold in-depth consultations. More than 100 official stakeholder meetings were conducted with a range of Ministries, state-level departments, Chief Secretaries, research institutes and universities to understand water resources management issues, challenges and opportunities in the region. An interim report was delivered in April 2018, along with an interim study workshop in Guwahati, Assam, to discuss the initial recommendations and to launch the knowledge portal (“North East Water Resources Information Base” (NEWRIB)). The interim study workshop enabled key stakeholders from multiple central ministries and state agencies to jointly deliberate on the recommendations of the technical work, and to identify corresponding actions and pathways for future work. It also provided the opportunity for stakeholders to appreciate the importance of water resources across multiple sectors, to share experiences and forge contacts, and to introduce cross-cutting dimensions, such as gender. The final report was delivered to the HLC in June 2018. The final report was well-received by the HLC and the SAWI team was requested to support the preparation of the HLC Report, which will draw heavily from the final report and will be submitted directly to the Prime Minister’s Office.

FY19 Plan: A final study dissemination workshop is planned for early FY19. The NEWRIB will be made fully operational and handed over to the client. The team will explore the possibility of providing additional support for the identified recommended actions.

Delta Management Investment Planning and Basin Analysis

Scope: This activity is supporting the Government of Bangladesh in the preparation of the Investment Plan for BDP 2100—a long-term holistic and integrated plan for the Bangladesh Delta. The activity will build on the State of the Basin Assessment to identify interventions or capacity building areas that assist in investment planning. The work will explore a range of issues, including the climate change impacts; options analysis for investment planning; impacts from development scenarios including HEP development and interventions to improve irrigation productivity; and recommendations for improving basin-wide water management. The activity is a key part of a larger analytical study that will provide multi-sectoral solutions to delta management in Bangladesh. It helps give effect to the MoU signed by the governments of Bangladesh and the Netherlands, together with the World Bank, to advance Adaptive Delta Management in Bangladesh in the context of basin-wide planning and management, and is co-financed by an activity under the Sundarbans Focus Area. The activity is also carrying out a basin analysis to develop a better understanding of the dynamics of the Brahmaputra Basin in Bangladesh, through inventory and assessment of available data and knowledge and prioritizing development issues through a stakeholder consultation process. The existing knowledge base will be used to examine the potential development in the basin and attendant impacts of development. An information-based dialogue within and between riparian basin entities will be encouraged and supported.

Timeframe: September 2015 – January 2018. Geography: Brahmaputra Basin; Bangladesh. Budget Allocation: \$0.80M

FY18 Progress: The draft Investment Plan was revised and finalized in July 2017, reflecting responses at a consultation workshop with stakeholders—including the different ministries/divisions/agencies, NGOs, academic and research organizations, the private sector and development partners, conducted in April 2017 (chaired by General Economics Division). The final Investment Plan was submitted to the Government of Bangladesh in July 2017. The Netherlands Government is proposing a follow-on project to support General Economics Division (GED) in operationalizing the Delta Plan, including institutional development, preparation of Delta Act, capacity strengthening, etc. The Delta Plan and its Investment Plan have formed the basis for the preparation of the Bangladesh Climate-Smart Agricultural Water Management Project (US\$170 M). The final report on basin modeling of the Brahmaputra river system in Bangladesh was also finalized and submitted to the GED in July 2017.

FY19 Plan: Activity Completed

Non-Monetary Values of Water

Scope: This task will present evidence from selected South Asian countries that are riparian to the Brahmaputra river on the non-monetary values of water and will argue why attention to this aspect matters for policy design and practice in the water sector. To do so, it will draw on diverse sources of information, including historical accounts, religious texts and legal frameworks, for example, to show how water gained cultural, spiritual and legal significance in the region, given its agrarian context. It will also contrast the value water holds in South Asia against other regions, such as Africa and Latin America, where too water is used as a space to assert power and reinforce hierarchy, and is a significant resource around which entire communities are organized. Finally, it will present examples of successful policies, programs and projects worldwide that have focused on the non-monetary importance of water and in the process, changed norms, specifically around women's association with the resource.

Timeframe: June 2018 – November 2018. Geography: Brahmaputra Basin Budget Allocation: \$0.50M

FY18 Progress: Activity preparation was initiated toward the end of the FY.

FY19 Plan: A literature review on non-monetary values of water will commence. A concept note to guide the next phase of this work will be prepared.

Pillar 2 – Reducing Vulnerability to Floods and Erosion

Hydro-met Modernization in the Brahmaputra Basin

Scope: This activity aims to undertake technical analysis and provide recommendations for modernization of hydro-met systems in Brahmaputra Basin countries. This will be done through an assessment of hydro-met-related needs and priorities, assessment of their existing meteorological and hydrological observation networks and forecasting systems, and flood/disaster related early warning systems. The overall aim of the task is to strengthen national capacity for monitoring and forecasting that can lay the groundwork for long term regional cooperation on water and climate.

Timeframe: December 2014 – September 2017. Geography: Brahmaputra Basin: Bhutan and Bangladesh. Budget Allocation: \$0.25M

FY18 Progress: To be completed.

FY19 Plan: Activity completed.

Bhutan Hydro-met Services and Disaster Improvement (RE)

Scope: This RE activity builds on the Hydro-met Modernization in the Brahmaputra Basin activity to strengthen Bhutan's capacity for hydro-met services and disaster preparedness through (1) strengthening the capacity of Bhutan's Department of Hydro-met Services to improve hydro-met monitoring, forecasting and service delivery to priority sectors; (2) strengthening capacity for disaster preparedness and response (working through the Department of Disaster Management); and (3) funding the design of an agro-met decision support system, development and delivery of agro-met information products in two administrative and judicial districts, training and capacity building (working through the Department of Agriculture). This is a US\$3.3M activity co-financed by the Global Facility for Disaster Risk Reduction and Recovery.

Executing Agency: Royal Government of Bhutan

Timeframe: October 2016 – December 2018. Geography: Brahmaputra Basin: Bhutan. Budget Allocation: \$0.50M

FY18 Progress: The activity continued to support the financing of the Bhutan Hydro-met Services and Disaster Resilience Regional Project component 3, which has the objective to strengthen the capacity of the National Center for Hydrology and Meteorology to improve hydro-met monitoring, forecasting and service delivery to priority sectors. In particular, the activity continued to support the procurement process of this component. The activity helped to orient the National Centre for Hydrology and Meteorology on procurement processes under the World Bank's procurement guidelines. The contract for the supply, delivery, installation and commissioning of meteorological observation systems to support civil aviation automatic weather observation system, ceilometer and wind profiler was awarded and implemented, with installation completion expected in July 2018. The activity supported building the NCHM's capacity by enabling NCHM staff participation in highly technical trainings provided by the World Meteorological Organization (WMO) and partners in the region. The institutional inspection study visit with 10 Department of Air Transport and NCHM officials to Suvarnabhumi international airport in Bangkok (June 2018) to become familiar with new aviation equipment like wind profiler, ceilometer and AWOS; an institutional visit to the Finnish Meteorological Institute, Finland in December 2017, for three officials for a SMART Met system review and familiarization program in aviation meteorology; a training on Nowcasting and short range weather forecasting at the WMO regional training center in Beijing (international training course on aeronautical meteorology services) for two officials in September 2017; and a SMART-Met system training at NCHM offices on operation of common operating platforms in April 2018 for 16 officials.

FY19 Plan: The procurement of civil aviation equipment is expected to be installed by mid-July 2018.

Pillar 3 – Basin-Level Dialogue

Brahmaputra Basin Dialogue

Scope: This activity is increasing regional cooperation by providing a platform to discuss shared water challenges and opportunities. It is enhancing trust and working relationships between basin riparian countries to progress consideration of river basin management of the Brahmaputra Basin, considering country-specific needs and priorities. The activity is supporting national and basin-level meetings as well as capacity building events, dialogue events, workshops, roundtables, and study tours to facilitate the exchange amongst stakeholders of ideas, viewpoints, knowledge and development plans for the Brahmaputra Basin. It is also serving as a platform for engaging stakeholders in the development of knowledge products developed under the Focus Area and for dissemination.

Timeframe: January 2015 – February 2020. Geography: Brahmaputra Basin: all riparians. Budget Allocation: \$0.70M

FY18 Progress: To be completed.

FY19 Plan: Activity completed.

FY18 Progress: The Brahmaputra River Symposium (BRS) was held in September 2017 in Delhi. It marked a major milestone in the SAWI-supported dialogue process that started in January 2016. The BRS brought together 150 delegates, including for the first time, prominent stakeholders from all four participant countries, exemplifying the strides this dialogue has made in terms of credibility and importance. One of the major outcomes of the BRS was consensus among the delegates that the dialogue process has the potential to navigate the geopolitical complexity hindering good governance in the basin. Four major recommendations emerged out of the BRS: (1) common knowledge base: need for reliable and comprehensive common knowledge base for the Basin; (2) institutions and policies: need for structural reforms and capacity building for the existing institutions to manage the river system effectively; (3) integrating investments: integrated investment in the Basin to mitigate risks and make more productive use of water resources and enhancing cooperation between riparian countries and states by promoting inland navigation; and (4) dialogue: a sustained multilateral and multi-stakeholder dialogue to build trust and confidence among the riparian countries. Preparing and organizing the BRS included holding meetings in China (at the end of FY17) with academics that have close ties to the government (e.g., act as advisors). The meetings helped to expand the network beyond Yunnan University—to reputed institutes in Shanghai (Shanghai Institute of International studies and Fudan University) and Beijing (Peking University, Beijing Institute of Contemporary International Relations and influential think tanks like China Reform Forum). These meetings were important to ensuring that there was strong Chinese representation at the BRS. SAWI engagements in India were also instrumental in the strong Indian presence at the BRS, including the Commissioner, Brahmaputra and Barak Basin Wing, MoWR, RD&GR. The next phase of the dialogue, commencing at the end of the FY, aims to advance the agenda set at the BRS. This next phase will see the dialogue process institutionalized across the four riparian countries—co-implemented by IIT-Guwahati (India), Institute of Water Modeling (Bangladesh), Bhutan Water Partnership (Bhutan) and Yunnan University (China). An inception meeting was held in Delhi in May 2018 to agree on the activities of the new phase with the implementing partners.

FY19 Plan: The dialogue will focus on four main activities: (1) knowledge products, including a power mapping study on decision making processes within the basin, and a capacity needs assessment for disaster risk reduction; (2) constructing a Brahmaputra Basin Knowledge Portal, which aims to collate and curate the currently dispersed information and data on the Basin for more informed decision-making, and build on the NEWRIB; (3) a multilateral workshop on the water-energy nexus in the Basin, taking place in China in September 2018; and (4) a high-level meeting on inland water transport in the lower Brahmaputra.

Sundarbans Landscape Focus Area

Objective

To operationalize joint management of the Sundarbans for sustainable development that delivers mutual benefits for the two countries.

Focus Area Theory of Change

The challenges of the Sundarbans (extreme poverty, frequent natural disasters and erosion of ecosystem services) would be better managed if Bangladesh and India developed and implemented a joint conservation and development policy, and increased collaboration on plans and programs. To date the formal dialogue and collaboration between the two countries has been inadequate. While non-binding bilateral agreements were signed in late 2011 outlining a framework for collaboration on international waters, information sharing, disaster management and climate change, these are yet to be implemented. The Sundarbans Focus Area directly supports implementation of these agreements and country actions based on a landscape perspective.

Focus Area support includes developing a stronger analytical basis to help governments move toward integrated planning and management. Bilateral dialogue, research and information exchange will support the analytical work and will build technical capacity, thus enhancing cooperation. A landscape-level planning and management framework and supporting institutions are required for collaborative management. Technical analyses will be complemented by (1) advocacy work to generate public support for cooperation; (2) establishment of governance arrangements for joint planning; and (3) substantive joint actions (e.g. shared plans and policies) for conservation and sustainable development.

Given broad agreement for collaboration exists, activities under the Focus Area are demand-driven. Initial activities were informed by stakeholder consultation. Establishing a more formal mechanism for collaboration will guide future activity choices, and multi-stakeholder dialogue will guide all joint studies and joint planning work.





Pillar 1 – Enhancing Bilateral Cooperation

Landscape-scale Joint Environmental Plan

Scope: This activity aims to help Bangladesh and India establish appropriate information (collection, collation and dissemination) systems to support preparation and implementation of plans for the development and conservation of the Sundarbans.

Timeframe: April 2016 – June 2018. Geography: Sundarbans; Bangladesh, India. Budget Allocation: \$0.30M

FY18 Progress: The Joint Landscape Narrative, describing the defining characteristics of the Sundarbans Landscape across the national boundary for the first time, was completed in April 2018. Its objectives are to create a multi-layered and holistic understanding of the Sundarbans to initiate planning activities that transcend political boundaries and multiple scales; to align and analyze information of ecological, socioeconomic and cultural variables of the Sundarbans from different sources and records to support joint understanding of the Sundarbans; to synthesize current literature to identify effective management approaches and practices of the past; and to identify the gaps to learning, knowledge, data and information of the Sundarbans. The narrative has served as the background document to inform four distinct but interrelated draft reports, each of which was prepared through a participatory process involving the scientific community, government, academia and other experts, and was presented to multiple stakeholder groups (organized under the Sundarbans Dialogue activity). The four studies— (1) assessment of the state of nutrition of mothers and children and stunting in children and the causal linkage to diet of expectant mothers, September 2017; (2) development of sustainable tourism - draft report, June 2018; (3) sustainable transboundary inland navigation – draft report, March 2018; and (4) inventory of flora and fauna and comprehensive biodiversity mapping – draft report, June 2018—are expected to inform investments by the two countries (existing and future) toward implementing poverty alleviation programs and sustainable development in the Sundarbans. The activity also conducted a report titled *Toward a Blue Economy Pathways and Prospects for Bangladesh's Investments in Sustainable Growth*, March 2018, that synthesizes current theory and practice on the application of the blue economy concept to govern economic activity linked to the ocean in Bangladesh, and on this basis, puts forward suggestions on what information the Government of Bangladesh would need in order to assess the blue economy concept's potential to help the country achieve its sustainable development aspirations. This report is informing the design of the Bangladesh Sustainable Coastal and Marine Fisheries Project.

FY19 Plan: Activity completed. Further dissemination activities will be undertaken as part of the Sundarbans Dialogue activity.

Sundarbans Dialogue

Scope: This activity aims to build trust and working relationships between India and Bangladesh to further sustainable management of the Sundarbans based on country-specific needs and landscape-level priorities. The dialogue process (through identification and implementation of specific cooperative activities) aims to create Sundarbans management ownership among government and non-government agencies and to facilitate the operationalization of the MoU on Sundarbans Cooperation signed between the two countries in 2011. WWF, IWA and the Observer Research Foundation are key partners in delivering this activity.

Timeframe: April 2015 – February 2020. Geography: Sundarbans; Bangladesh, India. Budget Allocation: \$1.00M

FY18 Progress: This activity continued to support multi-stakeholder dialogue to create and sustain a Joint Mechanism between Bangladesh and India on sustainable management of the Sundarbans. In doing so, it supported participation of stakeholders in the following dialogue events in the FY: (1) Searching Roadmap for Sustainable Development (Kolkata, July 2017), with 40 participants from State Government and state-level elected representatives from the Sundarbans region; (2) Launch of the Draft Document on Vision for the Sundarbans Region: Rationale & Structure for Joint Action (Delhi, August 2017), with 50 participants, including stakeholders from West Bengal and Bangladesh and with participation from the Bangladesh High Commission, Delhi and from Indian Parliamentarians. Review and acceptance of the recommendations are delayed and not expected before elections in both countries; (3) Sundarbans Media Workshop (Kolkata, September 2017), with 30 participants from media to identify possible media collaboration and build an outline for a Sundarbans news website; (4) Workshop on Challenges and Management of Sundarbans Landscape: Finding a Shared Way Forward (Dhaka, October 2017), with 18 participants, including policymakers, researchers and conservationists from both countries; (5) Sundarbans Media Workshop (Dhaka, October 2017), with eminent editors and journalists from Bangladesh to advance discussions on the media collaboration; (6) Workshop on the Economic Case for Cooperation (Delhi, November 2017), with experts from both countries to finalize an approach to building cooperation; (7) COP23 India Pavilion, Session on Climate Change Adaptation and State Action (Bonn, November 2017), where the BISRCI presented the case of the need for further adaptation action in the Indian Sundarbans; (8) Climate Change in Coastal Areas of Bay of Bengal (Indian part of the Sundarbans region, December 2017), to develop a media advocacy strategy regarding climate change impacts in the Sundarbans region to promote regular writing of op-eds in newspapers on Sundarbans issues. Journalists and experts from both countries participated; (9) Eco-tourism in Sundarbans (Delhi, December 2017), where the Secretary, Ministry of Shipping, India and Bangladesh Inland Water Transport Authority officials met to discuss Sundarbans cruise tourism; (10) Understanding Climate Change Impact in Bangladesh (Bangladesh part of the Sundarbans, February 2018), with journalist and experts from both Bangladesh and India in attendance. The BISRCI continued its regular interaction with senior policymakers and key influencers in Bangladesh and India, through approximately ten informal meetings. The activity-supported documentary on the Sundarbans, Nature's Own People, was screened at 11 international film festivals in FY18, including the Large Short Films festival in Mumbai in October 2017 and the CinemAmbiente Environmental Film Festival in Turin, Italy in May 2018. A social media strategy, through Facebook and Twitter, along with higher engagement with media in the two countries, was under implementation.

FY19 Plan: The activity will continue with lower intensity and profile until the elections in both countries are completed. The media collaboration efforts, including development of a website and refinement of Facebook and Twitter pages, will be disseminated in mid-FY19.



Pillar 2 – Technical Cooperation to Support Joint Management

Landscape Hydro-met Design

Scope: : This activity supports the design of a hydro-met system for the Sundarbans that would include climate stations, tide gauges, wave rider buoys and water quality monitoring. It will develop a strategy for establishing and operating hydro-met and local weather forecasting systems, and analyze bathymetry, salinity intrusion and conservation needs of the freshwater resources.

Timeframe: July 2015 – August 2018. Geography: Sundarbans; Bangladesh, India. Budget Allocation: \$0.40M

FY18 Progress: The activity continued to review the quality of data available from the Indian part of the Sundarbans Landscape, and to compare the quality and extent of data from the Bangladesh side. Draft reports have been prepared on Review and Evolution of Geomorphology in the Sundarbans Landscape; Tracing of the Dampier-Hodges Survey, reported in brief in the above study; conceptual proposals for preparation of an integrated asset management system for the Sundarbans in India; a proposal for Development of Joint Hydro-meteorological Services for the Entire Sundarbans Region; and a water quality analysis and salinity intrusion analysis to support the technical papers prepared under the Targeted Environmental Studies activity. These draft reports were prepared through consultation with about 50 experts and academics. A consultant was hired toward the end of the FY to ensure quality control of these reports for public dissemination. Although the quality and availability of reliable data has delayed the development of a uniform hydro-met information system, SAWI has used the process and draft outputs to inform stakeholder deliberations.

FY19 Plan: The final hydro-met plan for the Sundarbans Landscape will be handed over to the respective government agencies in both countries. Dissemination of other outputs and further work will be closely linked to the Sundarbans Dialogue.

Targeted Environmental Studies

Scope: This activity is undertaking hydrological, ecological and econometric studies for vulnerability assessment of the Sundarbans ecosystem in a changing climate. This activity will enhance awareness about climate change risks, promote technical cooperation, build the knowledge base to support joint management, and facilitate planning a holistic approach to the sustainable management of this extremely fragile mangrove forest.

Timeframe: April 2015 – December 2018. Geography: Sundarbans: Bangladesh, India. Budget Allocation: \$0.80M

FY18 Progress: Papers were developed and published on the impacts of progressive salinization on mangrove species and on freshwater fish habitats, and the impacts of sea-level rise on habitats of amphibians, birds, mammals and reptiles of Bangladesh. Two geocoded databases on erosion of the coastline and cyclone landfalls, including of mangrove species in the Bangladesh and Indian Sundarbans and fauna in the Landscape, were compiled. A conducted study, Cyclonic Storm Landfalls in Bangladesh, West Bengal and Odisha, 1877-2016: A Spatiotemporal Analysis (January 2018), constructs and analyzes a spatial panel database of cyclonic storm tracks and coastal landfalls in Bangladesh, West Bengal and Odisha, and highlights their implications for socioeconomic analyses of household and community responses to cyclonic storm risks. A prepared paper, Sea-Level Rise and Species Conservation in Bangladesh's Sundarbans Region (February 2018), develops a methodology for identifying high-priority species conservation areas in Bangladesh's Sundarbans region, considering both species vulnerability and the likelihood of inundation by future sea-level rise. The conducted species vulnerability analysis develops a composite spatial vulnerability indicator based on total species counts, endangered species counts, endemism, and four measures of extinction risk from the high-resolution range maps and conservation status assessments for 378 terrestrial vertebrate species provided by IUCN Bangladesh, IUCN International and BirdLife International. A study, Socioeconomics of Fish Consumption and Child Health in Bangladesh, published in October 2017, uses more than 36,000 records from several waves of the Bangladesh Demographic and Health Survey. The research focuses on the socioeconomic determinants of household consumption of all animal-source foods, the socioeconomic determinants of fish consumption, given its importance in the Bangladeshi diet, and the impact of observed consumption patterns on mortality and resistance to infectious diseases for children in their first years of life. Methodology and findings of these studies were presented at several professional conferences, universities and research organizations in countries across South Asia and East Asia, as well as to development partners. Three blogs (two in Bengali) were written and posted on the World Bank website to ensure broader outreach in the region.

FY19 Plan: A number of draft outputs will be prepared, with final delivery expected in FY20. These include: a technical paper on cyclone impacts and population changes in the Sundarbans region; a paper on the implications of these changes for poverty and social change; a comparative study of national and regional policies of India and Bangladesh that have affected household and community responses to cyclone impacts; a summary report and policy notes drawing on deliverables listed above to assess the future consequences of alternative policy regimes for coastal population change and cyclone vulnerability; and technical papers on maternal and child health risks from rising salinity; maternal and child health risks from reduced nutrients from freshwater fish; the health implications of changing access to drinking water; the socioeconomic implications for women in the Indian Sundarbans region; and the implications of episodic climate events and climate-induced biome change for women's workforce participation and employment opportunities.

Delta Management Investment Planning

This activity is co-financed under the Brahmaputra Basin Focus Area and progress is described under that Focus Area (above).

Timeframe: October 2015 – September 2017. Geography: Sundarbans Landscape; Bangladesh. Budget Allocation: \$0.20M

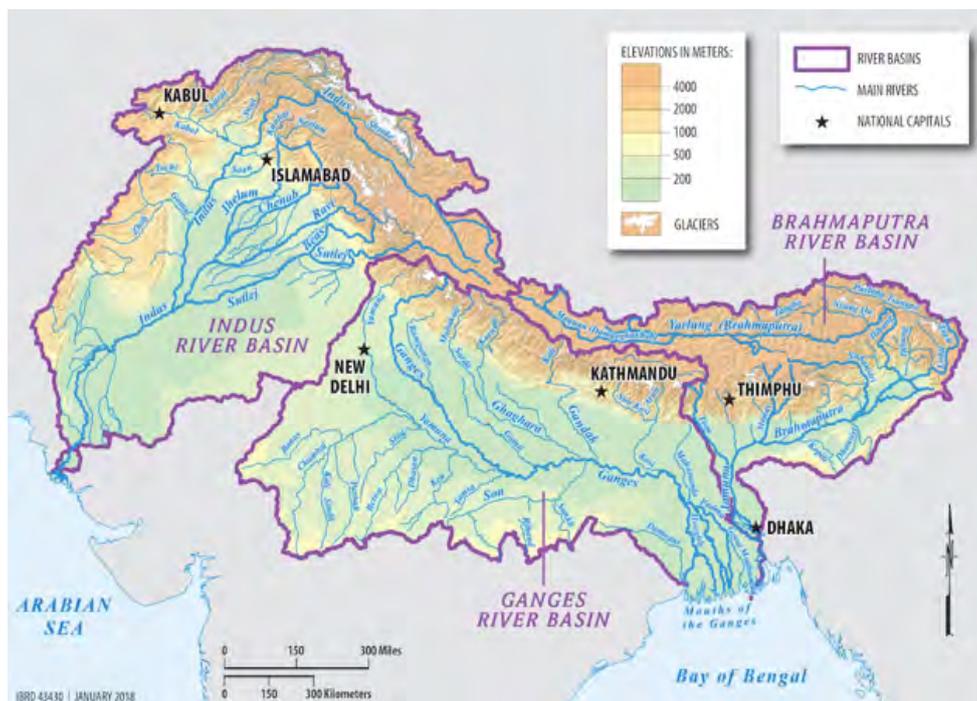
Regional Cross-Cutting Focus Area

Objective

To build knowledge and capacity across the region in support of transboundary basin dialogue and cooperation.

Focus Area Theory of Change

The Regional Cross-Cutting Focus Area will improve the regional water resources knowledge base, undertake capacity building for shared water resources management and cooperation, and support broad-based regional dialogue to enhance cooperation and management of transboundary waters in South Asia.



Pillar 1 – Knowledge Related Activities

Climate Change Risks in Water Resources Management

Scope: This activity is compiling and reviewing the knowledge base and tools that could assist governments in South Asia to adapt to emerging climate change challenges in the water sector. It will identify knowledge gaps for potential program support.

Timeframe: November 2015 – July 2017. Geography: Regional. Budget Allocation: \$0.53M

FY18 Progress: FY18 Progress: The report *Climate Risks and Solutions: Adaptation Frameworks for Water Resources Planning, Development and Management in South Asia* was finalized in July 2017. The overarching goal of this study was to use a collaborative process to build knowledge, tools and capacity that will assist governments in adapting to climate change challenges in the water sector. It draws from three commissioned papers and builds on the output of a regional meeting convened in 2016, which brought seven countries together to discuss climate-related water management for adaptation. It unpacks and addresses the nature of resulting policy, planning and operational challenges as regional governments and social systems attempt to adapt, mitigate and manage these challenges and ensure that sustainable water management remains a central pillar in economic development and social stability. And it provides an evidence-base on which to build future capacity to improve water resources planning, development and management decision making under a changing climate. The final report was shared with government partners and will be disseminated through SAWI regional dialogue events and technical workshops, and the SAWI and IWMI websites.

FY19 Plan: Activity Completed.

Himalayan University Consortium Grant (RE)

Scope: This activity will enhance the partnership of research institutions participating in the Himalayan University Consortium (HUC) and strengthen their joint capacity for collaborative research. It will establish the HUC as a vibrant and active South-South forum of knowledge generation and sharing, mountain curricula development, and capacity building among regional members, who will be able to leverage HUC participation and resultant benefits to provide water and mountain-related policy and technical advice to their respective governments.

Executing Agency: ICIMOD

Timeframe: January 2017 – August 2018. Geography: Regional; Hindu Kush Himalaya. Budget Allocation: \$1.02M

FY18 Progress: The HUC Secretariat continued to administer Conference and Mobility grants on a rolling basis. Nine researchers and faculty members from institutions in Bangladesh, Bhutan, Nepal and Pakistan received Conference Grants to participate in international conferences in FY18. Contracts for eight seed grants and one seeding grant were signed. By the end of 2017, all institutional grants had completed their first meeting or write up, attended a partnership building workshop, and had consulted with resources persons during the implementation phase. To enhance partnership of research institutions in the HKH Region, the HUC Secretariat visited existing and potential HUC members. A delegation of four HUC Steering Group members and the Secretariat Lead conducted a visit to the International Secretariat at the University of the Arctic in Rovaniemi, Finland in July 2017. From this interaction, the HUC delegation learned about establishing and strengthening a consortium of higher education institutions across nations in a region in the context of adaptation to climate change and globalization. The representatives of the two consortia of higher education recognized opportunities to promote a working relationship for sustainable development, especially in the areas of international and multi-disciplinary cooperation and research, education and outreach; and subsequent discussions led to an MoU, signed in November 2017, outlining priority actions of collaboration between the consortia. A delegation also visited vice chancellors, deans and heads of departments at the Bangladesh University of Engineering and technology in Dhaka and the University of Chittagong in Chittagong, to discuss ways to expand the HUC in Bangladesh. Some of the immediate outcomes of these interactions included

the signing of the HUC Charter by the two universities at the HUC Annual Meeting in Chengdu in November 2017 and the subsequent active participation by the existing HUC members in Bangladesh in all HUC activities. Twenty-two full time faculty members and PhD scholars (all under 35 years old and eight women) from eight HKH countries were admitted to a field school, titled HUC Academy on Disaster Risks and Water Management, which took place in July 2017. The ten-day program provided opportunities for participants to engage in cross-disciplinary scholarship through 12 modules on select issues in water resources and water-related disaster risk management in the region—led by faculty members from ICIMOD and its regional and international partners. The participants evaluation of the course showed it met most of their expectations and the relevance of the Academy was unanimously confirmed. At the HUC annual meeting in November 2017 in Chengdu, the general assembly endorsed membership for 15 universities from inside and outside the region, bringing the total members of the HUC to 62. A major step forward at the meeting was the establishment of thematic working groups, led by members, and organized around areas of common interest among members, aiming at joint efforts in partnership building, resource mobilization and shared leadership for regional collaboration. Held in conjunction with the HUC annual meeting, more than 120 people from the HKH region attended the International Conference on Mountain Water and Livelihood, to discuss issues around improving livelihoods through sustainable use of mountain resources through the presentation of 24 research papers in five parallel sessions on such topics as water resources management, disaster risk reduction and resilience building, and the importance of data collection and sharing across countries. The HUC online portal—an interactive website with searchable database and an e-digest—has been developed; with a soft launch done in October 2017.

FY19 Plan: A visit by representatives from the Asian International River Center, Yunnan University, China, and Tribuvan University, Nepal to the Center of River Studies, Aryabhatta Knowledge University, Patna, India, is planned for curriculum building purposes. An additional component to the activity will be considered, which would focus on collaborative research in the Indus Basin, and would facilitate the collaboration of government and non-government research institutions from the four Indus Basin riparian countries to assess climate change impacts in the Indus Basin and strengthen science to policy knowledge exchange.

HEP Environmental and Social Planning

Scope: This activity aims to support the development of sustainability guidelines for hydropower development in Bhutan. The new guidelines are urgently needed to support the sustainable development of the planned vast expansion of hydropower in Bhutan in the next decade, which will see development in all major rivers of Bhutan (which are all transboundary).

Timeframe: October 2016 – December 2017. Geography: Regional: Bhutan focus. Budget Allocation: \$0.30M

FY18 Progress: The Royal Government of Bhutan (RGoB) finalized its first ever Guidelines for the Development of Hydropower. The Guidelines were approved by the Minister of Economic Affairs in June 2018 and are in the process of being integrated into Bhutanese policies. The guidelines are instrumental to incorporating environmental and social and transboundary aspects, and cumulative impacts, into the RGoB's ambitious plans for hydropower expansion, estimated at 12,600MW of new capacity in the next decade. This activity has specifically contributed to strong environmental and social guidance being part of the overall set of guidelines. These environmental and social guidelines have been formulated and informed by international good practice, including the importance of having a basin-wide perspective and addressing cumulative impacts. The activity has also been instrumental to the buildup of data repositories for crucial environmental and social data that are needed for effective implementation of the new national guidelines. The guidelines have been developed in close collaboration with the key hydropower institutions, the Department of Hydropower and Power Systems, Druk Green Power Corporation and Bhutan Power Corporation. The RGoB has now taken full ownership of the guidelines and is in the process of having them formally adopted by the Minister of Economic Affairs as the guiding document for development of future hydropower in Bhutan. A Status of Aquatic Biodiversity in Bhutan report, prepared in collaboration between the RGoB and the World Bank (July 2017) was developed as an important resource for hydropower developers and consultants involved in preparation of hydropower projects, summarizing the available data and information on aquatic biodiversity data in Bhutan, and where and how data can be accessed. This gap analysis was used to develop recommendations forming a plan

of action/‘roadmap’ for the creation of a national repository (database) for aquatic biodiversity. The activity also supported preparation of a report, Integrating Cultural Landscape Considerations in Large Infrastructure Planning in Bhutan, (January 2018) and an online interactive map showing available georeferenced data on cultural heritage, which will inform planning of hydropower investments.

FY19 Plan: Activity Completed.

HEP Resilience Studies

Scope: Building on the successful Climate Change Impacts in HEP activity that concluded in FY16, this activity will undertake a small number of South Asian case studies of new global guidelines that are being developed for building climate resilience into hydropower design. The work will link closely to the ongoing SAWI technical assistance in support of hydropower basin planning and the environmental and social sustainability work for hydropower in Bhutan. This activity is part of a larger global World Bank effort on resilience in hydropower.

Timeframe: November 2016 – December 2017. Geography: Regional Budget Allocation: \$0.2M

FY18 Progress: The Resilience Guidelines, developed by Mott Macdonald, were finalized in early FY18. These guidelines are designed to improve climate resilience for the hydropower and dams development community and to become a practical set of methods and insights that enable projects to be resilient to future climate change risks as they proceed to completion. The Resilience Guidelines were disseminated at six events in FY18: the Hydropower and Dams Resilience Guidelines Workshop for Practitioners (Washington DC, July 2017); the International Risk Management Forum in Hydroelectric Power Plants (Salto Grande, Argentina, November 2017); the Seminar on Decision Making Under Uncertainty (Cambridge University, November 2017); a resilience workshop with EBRD (London, November 2017); the Seventh International Conference and Exhibition on Water Resources and Renewable Energy Development in Asia (Da Nang, Vietnam, March 2018); and the 5th European Conference of the International Association for Hydro-Environment Engineering and Research (Trento, Italy, June 2018).

FY19 Plan: Activity Completed. The guidelines will be disseminated at the ICOLD Congress (Vienna, July 2018) and the Hydro 2018 conference (Gdansk, Poland, October 2018).

Pillar 2 – Capacity Building Activities

Capacity Building—Water Quality Monitoring and Analysis

Scope: This activity is building capacity in the use of modern technologies for water quality monitoring and in techniques for water quality data analysis across South Asia. It is providing technical assistance to government agencies for design and implementation of real-time water quality monitoring networks, and supporting study tours for government officials to facilitate regional knowledge sharing on the real-world application of modern technologies and tools for real-time water quality monitoring, analysis and dissemination of information.

Timeframe: February 2015 – September 2017. Geography: Regional; India focus. Budget Allocation: \$0.31M

FY18 Progress: The activity finalized a technical report by CSIRO in August 2017 **Potential Health Risks from Inorganic Chemical Contamination of Groundwater** in Punjab, India. The report includes information on analysis of 18,509 wells. Recommendations from this report were incorporated into the Punjab Rural Water and Sanitation Sector Improvement Project (\$248M).

FY19 Plan: Activity Completed.

Capacity Building—Transboundary Water Governance

Scope: This activity is enhancing the capacity for transboundary waters governance and hydro-diplomacy of current and future water leaders in South Asia. To date, this grant has been used to support the implementation of a two-year capacity strengthening program requested and approved by the Bangladesh Ministry of Water Resources for training of officials of the Joint Rivers Commission, Bangladesh, and the Bangladesh Ministry of Water Resources and Ministry of Foreign Affairs in transboundary waters governance. Capacity strengthening program participants have received training in both basic and advanced water resources management (e.g. fundamentals of hydrology and IWRM, river basin modeling, flood risk management, hydropower management, groundwater management and conjunctive use) and topics related to transboundary water governance (e.g. international law and institutional frameworks, benefit sharing, and hydro-diplomacy). Government officials from the other SAWI countries have also received support to participate in these external training events.

Timeframe: December 2014 – August 2017. Geography: Regional: Bangladesh focus. Budget Allocation: \$0.37M

FY18 Progress: The JRC, Bangladesh capacity building program was completed. In early FY18, the activity supported one sub-divisional engineer from JRC, Bangladesh to attend the UNESCO-IHE Short Course on Watershed and River Basin Management in Delft, the Netherlands (July 2017). Across the two-year program, the activity supported 33 individual trainings at 11 external training events. Seventeen government officials from JRC, Bangladesh and the Government of Bangladesh Ministry of Water Resources and Ministry of Foreign Affairs, one official from the Government of Bhutan, and one official from the Government of Afghanistan filled these 33 training slots. The personal interaction with other water professionals and government officials from around the world through this program has been considered critical to learning and understanding, and fostering personal connections that will lead to future knowledge exchanges. Participants noted that they would be able to use the knowledge attained to educate others within their respective government departments.

FY19 Plan: Activity completed.

Capacity Building—Water Governance (RE)

Scope: This RE activity will support the design of short training modules and curriculum in water diplomacy and basin governance for uptake by participating universities and other institutions for long-term teaching of the topics. The training modules will aim to build capacity at the policy and technical levels, with a focus on transboundary water governance and hydro-diplomacy at the basin and sub-basin levels for policymakers, water agency technical staff, and students. With a goal to institutionalize and ensure sustainability of teaching on these subjects, the modules will support current and future decision makers to identify and consider transboundary and cooperative water governance as a policy option, and to negotiate and handle sensitive inter and intra-state water resources issues in bilateral and multilateral contexts

Executing Agency: IUCN

Timeframe: January 2016 – June 2018. Geography: Regional. Budget Allocation: \$0.42M

FY18 Progress: The project inception workshop was held in July 2017. The modules have been developed with a focus on the economic, social, cultural and ecological aspects of water and regional cooperation in the great Himalayan River Basins. The content links the need for water cooperation with emerging issues such as livelihoods, disaster risk reduction, inland navigation, energy, ecology and economic development. Each module has been developed by one or more authors from South Asia, who are experts in topic theory and also engage with the topics covered as practitioners. The five drafted modules are titled: (1) Integrated Water Resource Management and Governance of River Basins; (2) Transboundary Water Governance: Principles, Instruments and Institutions; (3) Hydro-Diplomacy as a New Approach to River Basin Cooperation; (4) Cooperative Arrangements Worldwide and its Relevance to Himalayan Rivers; and (5) Cooperation in the Himalayan River Systems: Legal and Institutional Response. The draft modules were pilot tested at three workshops, held in India and Bangladesh (national level) and Bangkok (regional level) between October and December 2017. Ten participants from India and ten participants from Bangladesh, most of whom were mid-level professionals representing government, civil society organizations, think tanks, academia and media, attended these workshops. Participants provided positive feedback and said they found the modules informative, relevant and well designed. A video showcasing the developed training curriculum was presented at the 8th World Water Forum in Brasilia (March 2018) <https://www.youtube.com/watch?v=n-wSZZOGCdM>. The finalized e-modules for this curriculum are live online (May 2018) <http://www.southasianwaters.org/>.

FY19 Plan: Activity completed. South Asia University and Dhaka University are planning summer courses using the module curriculum.

Capacity Building for Groundwater Management

Scope: This activity is supporting improved groundwater management across South Asia by informing the design of the World Bank-financed NGMIP, and by supporting India's ongoing dialogue with Pakistan and Bangladesh to reduce reliance on groundwater and to better utilize the resource as a buffer against droughts.

Timeframe: February 2016 – February 2020. Geography: Regional; India focus. Budget Allocation: \$0.70M

FY18 Progress: The preparation of a diagnostic study of drought resilience, groundwater governance reforms and groundwater management actions was underway in FY18. The work is developing a knowledge base that is currently incomplete and scattered, and compounded by diverse groundwater systems and usage across sectors, and management capacities across South Asia. This has the potential to guide ongoing regional dialogue, building on the South Asia Regional Groundwater Forum, and encourage more strategic utilization of groundwater resources to buffer against drought shocks in South Asia.

FY19 Plan: The diagnostic study will be finalized. A final two-day dissemination workshop is planned for December 2018 in Colombo.

Improving Watershed Management

Scope: This activity is strengthening coordination between the Neeranchal National Watershed Project (India) and other programs addressing basin-level water resources, watershed management and climate resilience in the region.

Timeframe: October 2014 – September 2017. Geography: Regional; India focus. Budget Allocation: \$0.13M

FY18 Progress: A review of the best practices on climate resilient and climate smart agriculture (completed in FY17, with minimal administrative disbursement in FY18) helped to identify the existing gaps in the DPR (November 2017). It has identified gaps in the design of the World Bank's support to the Neeranchal project. The review offers best practice options, based on suitability to the local contexts, for adoption by farmers, including: land, soil and water management; agriculture and livelihood activities; and information, knowledge and markets, all of which have potential impacts across boundaries.

FY19 Plan: Activity Completed.

Pillar 3 – Regional Flood Forecasting

No active grants

Pillar 4 – Dialogue Processes

Regional Dialogue

Scope: This ongoing activity supports diverse opportunities to engage a broad set of stakeholders, including new and past dialogue participants. This grant has been used to convene multi-stakeholder dialogue processes at the regional level in South Asia in order to build trust and confidence among riparian countries and create an enabling environment for sustainable management of transboundary water resources. The approach has been to build on technocratic networks established at the country level and leverage the relationship to engage decision and policy makers at the regional level. The dialogue processes are designed to open up government-dominated water management to participatory multi-stakeholder processes from the local to the river basin level. The activity supports a diverse suite of dialogue events and forums and reaches out to a wider and more diverse set of actors across South Asia.

Timeframe: December 2014 – February 2020. Geography: Regional. Budget Allocation: \$0.90M

FY18 Progress: No regional dialogue events were held, as two regional dialogues were held in FY17. However, progress was made in reaching agreement with the US State Department to co-convene the next regional dialogue in December 2018, titled Resilience Through Connectivity: Responding to the Challenges of Water Scarcity and Floods in South Asia. This event will build on these previous Regional Dialogues.

FY19 Plan: The objective of the December 2018 Regional Dialogue is to improve the in-country and cross-border authorizing environment (attitudes and policy) for regional connectivity in South Asia by building awareness and “championing” the need for, and benefits from, increased regional cooperation on water and disaster risk management—in particular, on water scarcity (including droughts) and floods. This will be achieved through dialogue sessions that focus on: (1) Strengthening the comprehensive understanding of the current and anticipated future water scarcity, drought and flood challenges and solutions in South Asia; (2) Facilitating knowledge sharing (on new disruptive technologies, institutions, best practices for building resilience to water scarcity (including droughts) and floods both for people and ecosystems) among different stakeholders in South Asia; and (3) Showcasing strategies and methodologies to improve sharing of hydro-meteorological data and modernization and forecasting in South Asia.

ANNEX 3: KNOWLEDGE PRODUCTS

This table lists knowledge products supported entirely or partially by SAWI resources in FY18.

Output	Format	Dissemination
Indus Focus Area		
The Indus Forum. Prepared by SAWI, April 2018	Brochure	Public
Understanding and Assessing the Impact of Climate Change in the Indus Basin: A Joint Research Program Proposed by the Indus Forum. Prepared by SAWI, April 2018	Leaflet	Public
Capacity Building Program Transboundary Waters Law and Negotiation Reference and Training Manual. Prepared by World Bank, December 2017	Manual	Public
Afghan Study Tour to Nile Basin. Prepared by Glen Hearn and Mir Ahmad, November 2017.	Report	Limited
The 2nd Indus Basin Knowledge Forum: "New Knowledge Frontiers for Development and Resilience". Prepared by IBKF organizers, undated	Report	Public
Ganges Focus Area		
Implement and Operationalize a Customized Framework in Bagmati-Adhwara and Kosi Basins in Bihar State. Prepared by NCAR, undated.	Report	Public
Developing, Implementing and Operationalizing a Flood Forecast Model and Inundation Mapping Tool in Bagmati-Adhwara Basin Using Public Domain and License-Free Software. Prepared by BMT WBM, April 2018	Report	Public
Developing, Implementing and Operationalizing a Flood Forecast Model and Inundation Mapping Tool in Bagmati-Adhwara Basin Using Public Domain and License-Free Software: Meteorological Inputs Report, BMT WBM, October 2017	Report	Public
Web-Based River Flood Forecasting and Information Dissemination System for Bagmati-Adhwara and Kosi River Basin in Bihar. Prepared by RMSI, May 2018	Report	Public
Report on Exposure and Study Visit to China, World Bank, April 2018	Report	Internal
Study Tour to AIT, Bangkok, World Bank, June 2018	Report	Internal
Brahmaputra Focus Area		
Framework for Planning and Management of Water Resources in North East India: Report of the Expert Committee for Suggesting Immediate Measures for Proper Management of Water Resources in North Eastern India. RTI International. April 2018.	Report	Public
North East Water Resources Information Base (Undated)	Database	Public
Basin modeling of the Brahmaputra River System in Bangladesh, World Bank, July 2017	Report	Public
Investment Plan for the Bangladesh Delta Plan 2100, World Bank, July 2017	Report	Public

Sundarbans Focus Area		
Toward a Blue Economy: Pathways and Prospects for Bangladesh's Investment in Sustainable Growth. World Bank, EU, Government of Bangladesh, March 2018	Report	Draft
Joint Landscape Narrative, IWA	Report	Public
Assessment of the State of Nutrition of Mothers and Children and Stunting in Children and the Causal Linkage to Diet of Expectant Mothers, World Bank, September 2017.	Report	Draft
Development of Sustainable Tourism, World Bank, June 2018	Report	Draft
Sustainable Transboundary Inland Navigation, World Bank, March 2018	Report	Draft
Inventory of Flora and Fauna and Comprehensive Biodiversity Mapping, World Bank, June 2018	Report	Draft
Cyclonic Storm Landfalls in Bangladesh. World Bank, January 2018	Report	Public
Mangroves as Protection from Storm Surges in Bangladesh. Dasgupta, Islam, Huq, Khan and Hasib, November 2017.	Report	Public
Sea-Level Rise and Species Conservation in Bangladesh's Sundarbans Region, Dasgupta, Huq, Sobhan and Wheeler, February 2018	Journal	Public
The Socioeconomics of Fish Consumption and Child Health in Bangladesh. Dasgupta, Mustafa, Paul, Wheeler, October 2017	Report	Public
When Cyclones Strike: Using Mangroves to Protect Coastal Areas	Blog	Public
Aamaar sontaan jyano thaake maachhe-bhaate (in Bengali)	Blog	Public
Jolobayu poribortoner saathe saathe ki Sundarban Elaakaay ki maachher praapyotaa kombe? (in Bengali)	Blog	Public
Biodiversity of Indian Sundarbans (January 2018)	Database	Public
Biodiversity of Bangladesh Sundarbans (January 2018)	Database	Public
Database of Cyclonic Storms (Landfalls, Tracks and Wind-speed Along the Tracks) in Bangladesh, West Bengal and Odisha, 1877-2016)	Database	Draft
Database of Erosion and Accretion of Bangladesh and Indian Sundarbans: (1904-2016)	Database	Draft
Regional Cross-Cutting Focus Area		
South Asia Climate Change Risks in Water Management: Climate Risks and Solutions: Adaptation Frameworks for Water Resources Planning, Development and Management in South Asia, Hirji, Nicol and Davis, 2017	Report	Public
Status of Aquatic Biodiversity in Bhutan, prepared in collaboration between the Royal Government of Bhutan and the World Bank, July 2017	Report	Public
Integrating Cultural Landscape Considerations in Large Infrastructure Planning in Bhutan, World Bank and Vrije Universiteit Amsterdam, January 2018.	Report	Public
Guidelines for the Development of Hydropower	Report	Public
Hydropower Sector Climate Resilience Guidelines (Final Report), Mott MacDonald, September 2017	Report	Internal
Potential Health Risks from Inorganic Chemical Contamination of Groundwater in Punjab, India. Kumar and Correll, August 2017	Report	Public
IUCN Training Module Course	Web	Public
IUCN Training Module Course Video	Video	Public

Note: These knowledge products will be available for viewing in FY19, once the new SAWI MIS is live.

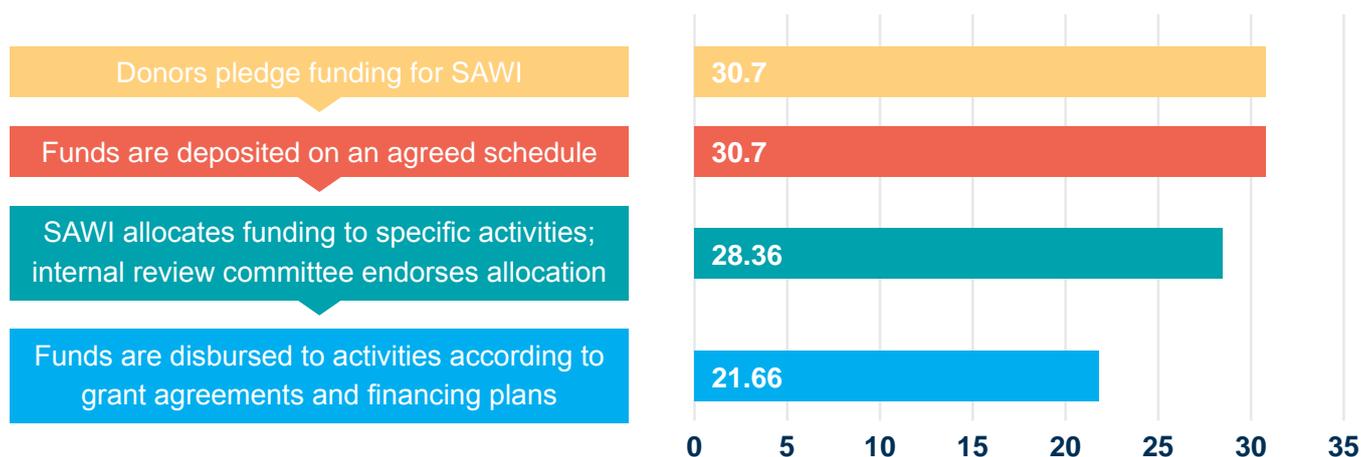
ANNEX 4: PROGRAMME AND FINANCIAL MANAGEMENT



The SAWI program is supported by a Multi-Donor Trust Fund (MDTF) administered by the World Bank on behalf of contributing development partners. This specific type of MDTF is known as a “Programmatic Trust Fund” to which donors commit funds designed to support a thematic framework rather than financing a specific project or activity. Within this framework, SAWI supports activities executed by recipient organizations as well as activities directly executed by the World Bank.

Consistent with standard World Bank Trust Fund practices, donors pledge funding for SAWI (current pledges total US\$30.77 M) and funds are deposited on an agreed schedule (current deposits total US\$30.77 M). Then, in accordance with SAWI’s strategic planning efforts, funding is allocated to specific activities (at the close of FY18, allocations were US\$ 28.36 M). Allocations are approved by the SAWI Internal Review Committee. SAWI works with clients (for recipient-executed (RE) activities) and World Bank Task Team Leaders (for Bank-executed (BE) activities) to develop Grant Funding Requests (GFRs) and related activity documentation. The World Bank then follows technical, legal and fiduciary procedures to establish activities and commits funds through its standard processes. Funds are disbursed according to the grant agreements and financing plans (cumulative disbursements are US\$ 21.66 M).

Current Funding Status



Cumulative Financial Summary (as of June 30, 2018)

Focus Areas	Grant Amount as of June 30, 2018	Cumulative Expenditure since Inception	Contractual Commitments	Available Balance
	A	B	C	D=A-B-C
Indus	2,720,519	2,427,368	108,870	184,281
Ganges	7,764,633	4,551,636	1,903,517	1,309,480
Brahmaputra	4,861,360	3,707,769	421,757	731,834
Sundarbans	3,210,748	2,578,604	217,168	414,976
Regional Cross-Cutting Program	7,345,410	6,048,327	246,161	1,050,922
	3,009,145	2,349,644	4,257	655,244
TOTAL	28,911,815	21,663,348	2,901,730	4,346,737

Disbursements by Activities Under Implementation in FY18

	Activity Name	Grant Amount US\$	Expenditure for FY18 US\$	Cumulative Expenditure Since Inception US\$
Program				
TF014265	SAWI II Program Administration and Management	2,109,145	289,289	1,540,279
TF017869	Strategic Communications	700,000	177,506	663,313
TF0A2363	Achieving Results	200,000	124,678	146,052
Total Program		3,009,145	591,472	2,349,644
Indus Basin Focus Area				
TF018455	Indus Dialogue	800,000	183,183	777,570
TF0A0640	Kabul/Kunar Basin Development	600,226	95,499	600,226
TF0A7388	Indus Basin (Pakistan) Groundwater Analysis	295,000	24,279	24,279
Total Indus Basin		1,695,226	302,961	1,402,075

Ganges Basin Focus Area				
TF018129	Sustainable Water Resources Development for HEP in Nepal (BE)	720,000	144,472	463,266
TF018488	Water Resources Management in Transboundary Basins; India	700,000	54,226	434,840
TF015480	SAWI Ganges FA Engagement	348,611	0	348,611
TF018509	Ganges Dialogue	251,308	491	150,870
TF018570	Sustainable Water Resources Development for HEP in Nepal (RE)	500,000	0	0
TF018717	Strategic Basin Planning	4,050,000	559,627	2,401,537
TF0A1269	Strengthening Flood Modelling Capacity in Bihar (RE)	475,000	54,791	269,930
TF0A1373	Bihar FMIS Flood Forecasting	500,000	147,520	262,868
Total Ganges Basin		7,544,920	961,127	4,331,923
Brahmaputra Basin Focus Area				
TF018849	Brahmaputra Dialogue	947,000	244,368	774,150
TF0A2312	Basin Modelling and Analysis	1,450,000	329,567	680,710
TF015001	Concept Note Development Brahmaputra FA	195,808	0	195,808
TF0A3513	Bhutan Hydro-met Services and Disaster Resilience Regional Project	500,000	76,523	288,549
TF0A1154	Delta Management Investment Planning and Basin Analysis	798,000	228,050	798,000
TF018637	Hydromet Modernization in the Brahmaputra Basin	243,728	1,016	243,728
Total Brahmaputra Basin		4,134,535	879,525	2,980,944
Sundarbans Landscape Focus Area				
TF0A0121	Targeted Environmental Studies	1,050,000	91,326	814,454
TF0A0122	Sundarbans Dialogue	955,000	95,604	733,461
TF0A0986	Landscape Hydro-met Design	400,000	143,798	264,649
TF0A2516	Landscape-scale Joint Environmental Plan	300,000	153,277	260,292
TF0A1366	Delta Management Investment Planning	178,299	44,000	178,299
Total Sundarbans Landscape		2,883,300	528,005	2,251,156

Regional Cross-Cutting Focus Area				
TF018766	Regional Dialogue	1,041,000	119,340	823,126
TF0A2044	Capacity Building for Groundwater Management	805,000	96,805	558,747
TF0A3886	Capacity Building Water Governance (RE)	420,000	150,000	300,000
TF0A4131	Himalaya University Consortium Grant (RE)	1,020,000	965,302	965,302
TF0A3877	Bhutan-HEP Environmental and Social Planning	288,961	131,751	288,961
TF0A1491	Climate Change Risks in Water Resources Management	531,854	31,011	531,854
TF019090	Capacity Building - WQ Monitoring and Analysis	305,493	36,869	305,493
TF018768	Capacity Building - Transboundary Water Governance	363,657	16,193	363,657
TF018290	Improving Watershed Management; India	121,118	105	121,118
TF0A3996	South Asia HEP Resilience Studies	190,862	106,598	190,862
TF0A1367	Capacity Building - IWRM in Transboundary River Basin; India	200,000	0	188,022
TF0A7870	Glaciers of the Himalayas	450,000	181	181
TF0A7575	A Diagnostic Study on Groundwater-Energy-Agricultural Nexus	150,000	3,538	3,538
Total Regional Cross-Cutting		5,937,947	1,657,695	4,640,864
Ongoing Activities Total		25,205,072	4,920,786	17,956,607

ANNEX 4: PROGRAMME AND FINANCIAL MANAGEMENT

SAWI • 2017–2018

Closed Activities (Since TF Inception; Not Active in FY18)

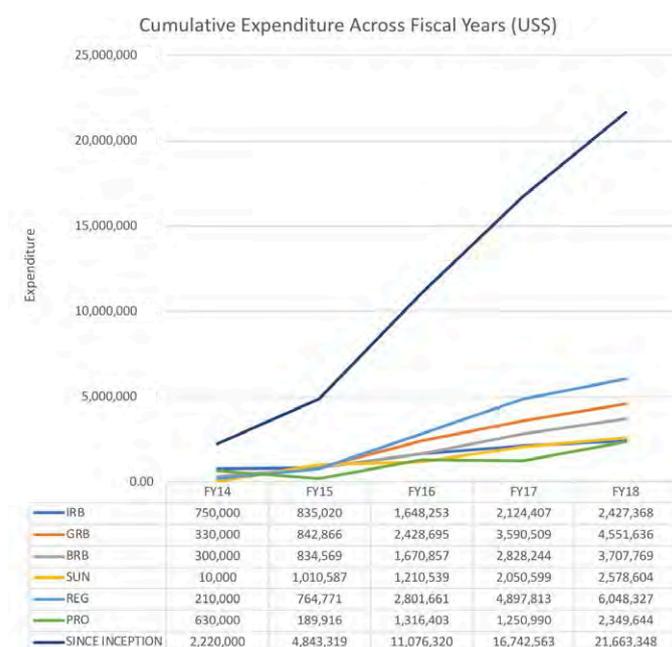
	Activity Name	Grant Amount US\$	Cumulative Expenditure Since Inception US\$
Indus Basin Focus Area			
TF014935	SAWI Indus FA Engagement	271,735	271,735
TF015737	Project Development: Glacier Monitoring in the Upper Indus Basin	101,825	101,825
TF016290	Learning Innovative Approaches to Glacier Monitoring to Address Climate Change	212,567	212,567
TF016430	Integrated Management of the Kunar River Basin	439,167	439,167
Total Indus Basin		1,025,293	1,025,293
Ganges Basin Focus Area			
TF0A0621	Managing Watersheds to Reduce Upstream Sediment for HEP: Nepal	219,713	219,713
Total Ganges Basin		219,713	219,713
Brahmaputra Basin Focus Area			
TF016291	Brahmaputra Basin Focus Area	40,218	40,218
TF016429	The Brahmaputra River Basin Assessment	35,526	35,526
TF017496	River Management Improvement: Bangladesh	268,213	268,213
TF017526	Brahmaputra Integrated Water Resources Management Study Tour	183,700	183,700
TF0A0642	Environmental and Social Management for Sustainable HEP: Bhutan	199,169	199,169
Total Brahmaputra Basin		726,825	726,825
Sundarbans Landscape Focus Area			
TF017032	SAWI Sundarbans FA Engagement	327,448	327,448
Total Sundarbans Landscape		327,448	327,448
Regional Cross-Cutting Focus Area			
TF015757	SAWI Cross-Cutting Knowledge, Dialogue and Consultation	252,366	252,366
TF016326	Transboundary Risk Management and Data Sharing	171,386	171,386
TF017907	Climate Change Impacts on HEP	337,045	337,045
TF018522	Snow/Glacier Contributions to Stream-flows and Climate	147,174	147,174
TF018731	Improving Flood Forecasting in South Asia	499,493	499,493
Total Regional Cross-Cutting		1,407,463	1,407,463
Closed Activities Total		3,706,742	3,706,742

Portfolio Spend and Efficiency

Financial Expenditure

SAWI resources have almost been fully allocated. In FY18, 39 activities were under implementation and 16 activities were completed. Cumulative disbursement stood at \$21.66M. Of this, disbursement in FY18 was \$4.92 M. Contractual commitments were \$2.9 M.

SAWI funds are almost completely allocated. Given the two time-only extensions, SAWI's resources are under constraint as some activities may not have sufficient resources to conclude, and there is little scope for the Trust Fund to take on additional activities. A summary graph of expenditure across fiscal years is presented below.



Value for Money

SAWI is administered in accordance with World Bank established procedures to ensure that the funds are spent efficiently and effectively to deliver Value for Money following transparent standards. The World Bank has demonstrated efficiency through timely decisions to top up, claw back, add or drop certain activities where the external environment or demand has changed, or where there is changed scope for their uptake, including through larger investments.

BOX 11: EFFICIENCY

Demand for SAWI funds remains strong. Proposals for more than US\$6.4 million were received, of which the SAWI Internal Review Committee approved funding of **US\$2.4M**. SAWI continues to strengthen its systematic adaptive management (initiated last year), which includes strategic reallocation of its spending priorities:

- **Priority Thematic Areas** under which proposals for new activities were invited include: (i) Indus: assessment of hydrological knowledge base; dam design and operation; social/poverty assessment; (ii) Inland navigation in BBIN; (iii) Hydropower development and power trade; (iv) Groundwater management; (v) Climate Change / Glaciers; and (vi) Non-monetary value of water (including gender)
- **Reallocation of funds:** reinstatement of funds under the Nepal hydropower (RE activity), based on WECS's improved progress and a financial commitment by the Ministry of Finance to ensure completion of studies; and a topping up of the work for North-East Water Resources Management (under – BRB-IN-Basin Modeling and Analysis) in response to Gol's request for additional work to support a roadmap for improving water resources management in the North-East.

SAWI maintains economy in its procurement, minimizing costs and ensuring high quality, by requiring that all RE activities finance goods, works and services in accordance with the World Bank's guidelines on "Procurement under IBRD Loans and IDA Credits" and the World Bank's guidelines on the "Selection and Employment of Consultants by World Bank Borrowers," jointly referred to as the "Procurement and Consultant Guidelines." For all BE SAWI activities, the World Bank is responsible for procurement of goods as well as employment and supervision of consultants in accordance with applicable policies and procedures, including travel according to established procedure. The guidelines provide specific instructions for use of World Bank documents (standard bidding documents, requests for proposals, contract forms), conflict of interest, advance contracting, co-financing, fraud and corruption.

BOX 12: ECONOMY IN DELIVERY

Training was conducted in Kabul to (i) maximize the number of Afghan participants; and (ii) limit many of the sessions to half-day events, thus better accommodating participant working schedules. Where possible, international experts were connected via videoconferencing equipment to keep travel costs to a minimum. At the same time, the core team of trainers alternated with its presence in Kabul in order to be available for follow-up meetings with senior government officials to brief them on the progress of the project and respond in more detail to any questions that arose.

SAWI is achieving **effectiveness** in a number of ways. Firstly, SAWI sits within the SARRP and is able to leverage technical expertise and draw on lessons from across different Global Practices within the Bank. Secondly, activities are closely aligned with larger World Bank investments (currently about US\$4 billion), and are leveraging the World Bank Group's wider partnerships in the region. Finally, a Trust Fund modality enables SAWI to use diverse entry points and deliver incremental results that contribute to a positive effort towards regional collaboration, and offers client governments the opportunity to access independent, international expert advice that would otherwise not be accessible.

BOX 13: EFFECTIVENESS, THROUGH WORKING WITH OTHERS

The study tour for Afghan officials to the Nile Region was co-financed by the World Bank and SIWI (who contributed USD \$25,000). The three members of the EU-MoFA project participated at their own expense. This was not only a cost-effective means to conduct a tour, but also provided for enhanced transition of capacity building activities under the EU-MoFA and SIWI initiatives and illustrated to the Afghan government the potential for collaboration between donors. As these two other initiatives will continue beyond SAWI, the collaboration with the EU and SIWI teams has ensured a seamless transition from one initiative to the other.

BOX 14: EQUITY

The World Bank's overall approaches are consistent with the principle of "leaving no one behind" in keeping with the Sustainable Development Goals. There are several ways in which SAWI's technical work is making efforts to contribute to equity. For instance, work in the Sundarbans offers value for money by bringing new evidence on climate change impacts for vulnerable groups, focusing on areas with high poverty. Furthermore, consultations at local levels in the Sundarbans have continued to include representative engagement with women's groups. SAWI's strategy of multi-stakeholder consultations and engagement with and through extended partnerships is enabling a broader representation of local and national voices into regional discussions and technical approaches.

Financial Management and Fiduciary Risks

Ethics: All trust fund beneficiaries and bidders are required to observe the highest standard of ethics in World Bank-financed grants and contracts. SAWI grants are subject to the World Bank's Anti-Corruption Guidelines, the Procurement and Consultant Guidelines, and the Standard Conditions for Trust Fund Grants, which delineate standard operating procedures for any fraud issues. The Anti-Corruption Guidelines provide for certain actions to be taken by grant recipients to prevent and combat fraud and corruption, and the Standard Conditions provide for suspension and/or cancellation of disbursements, as well as the refund of disbursed grant proceeds in the event that fraud and corruption does occur.

Audits and Financial Management: The World Bank provides donors, within six months following the end of each World Bank FY, with an Annual Single Audit Report in respect of all cash-based trust funds, comprising: (1) a management assertion together with an attestation signed by the external auditors concerning the adequacy of internal controls over cash-based financial reporting for trust funds as a whole; and (2) a combined financial statement together with the external auditor's opinion thereon. The single audit reports are available at: www.worldbank.org/financialresults.

For RE trust funds, recipients are required to maintain adequate financial management systems, prepare annual financial statements in accordance with accounting standards acceptable to the World Bank, and to have these statements audited by independent auditors acceptable to the World Bank. The recipient is also required to submit interim financial reports acceptable to the World Bank. Each RE trust fund operation involves a Financial Management Specialist who reviews financial management compliance of the recipient and is responsible for reporting instances of non-compliance.

ANNEX 5: GENDER MAPPING



	Transboundary	National and Sub-National
Gender Analysis	<p>An activity on non-monetary value of water resources commenced in FY18. This activity will analyze social inclusion in transboundary water management, with a focus on gender. The study builds on ongoing work by the World Bank’s Water GP on social inclusion and water and is aligned with SAR Gender Action Plan.</p> <p>The Sundarbans Focus Area has initiated work on the valuation of climate-induced changes in water resources and implications for women’s welfare.</p> <p>Other studies under the Sundarbans Focus Area are assessing the ecosystem, fisheries and potential benefits, and the causal linkages between nutrition and health status of expectant mothers and children.</p>	<p>Gender disaggregation has been built into the Flood Risk Assessment, completed last year, and now being used internally by the Central Water Commission, India.</p> <p>Bihar flood modelling includes gender disaggregated data. This is informing the Bank-financed Bihar Kosi Development Project and is being scaled up under the National Hydrology Project.</p>
M&E	Regular M&E tracking, including monitoring gender disaggregated results, assessing progress and prioritizing gender approaches. All SAWI TTLs are now required to report on gender mainstreaming actions.	
Targeting & Participating	<p>The Brahmaputra River Symposium included a dedicated session on gender and transboundary water management. A considerable number of speakers, facilitators, organizers and active participants were women, as was intended in the design of the event.</p>	<p>The Northeast India Water Resources Workshop introduced the importance of having a gender approach.</p> <p>Gender considerations are included in the Ganges Strategic Basin Planning activity that works across 11 States of India.</p> <p>Consultations at local levels in the Sundarbans have continued to include representative engagement with women’s groups.</p>

Public Awareness & Social Marketing		<p>Women's important role in water resources management has been included in the Action Plan for the Northeast, India. This is planting the seeds to facilitate greater inclusion and engagement of women in campaigns, consultations, and local level governance of water resources. This is intended to create a vehicle for raising awareness and outreach.</p>
Capacity Building & Organizational Development	<p>So far 168 (38 in FY18) women have benefitted from capacity building and training under SAWI in a wide range of areas, from water diplomacy to river basin modelling.</p> <p>Female teachers and pilot testing participants were engaged to ensure priorities and gendered aspects are integrated in the training modules on water diplomacy and basin governance, developed by IUCN (RE grant).</p> <p>Under the ICIMOD (RE) grant, twenty-two full time faculty members and PhD scholars (all under 35 years old and eight women) from eight SAWI countries were admitted to a field school, titled HUC Academy on Disaster Risks and Water Management, which took place in July 2017.</p>	<p>Twenty-two women engineers (from a cohort of just over 120) have benefitted from formal training on river basin planning and management software this year, in addition to state-of-the-art hydrometric data acquisition and transmission networks: measurements and modelling.</p>

ANNEX 6: COUNTRY ACTIVITY PROFILES



Afghanistan

Summary

SAWI efforts in Afghanistan are pursued under the **Indus Focus Area**. Program activities are directed primarily toward: (1) strengthening capacity within the Government of Afghanistan for establishing institutional frameworks for transboundary water and infrastructure; (2) facilitating dialogue between Afghanistan and Pakistan to enhance coordination and reach cooperation on the development and management of the Kunar/Kabul River Basin; and (3) supporting a dialogue for Afghanistan and the other Indus Basin countries to build confidence and trust in order to establish an enabling environment for basin-wide cooperation.

Primary organizations SAWI is engaging with in Afghanistan: An inter-ministerial working group on transboundary waters, comprising technical-level staff representatives from the MEW, the MoF, the MoFA and the National Environmental Protection Agency.

Major Country-level Activities:

(Total Investment: ~US\$1.3M)

Kabul/Kunar Basin Development: \$0.6M

Indus Dialogue: \$0.7M

FY18 Key Outputs

- In July 2015, the Government of Afghanistan approached the World Bank to design and implement an extensive capacity building package for government officials to conduct meaningful dialogue with Pakistan and other riparian neighbors regarding the management and development of the water resources Afghanistan shares with these countries. It was determined that the government had some capacity in many areas, and this capacity needed to be harnessed, further enhanced, and made more cohesive and comprehensive in the short-term. After 19 workshops covering 150 hours of “in class” time in Kabul, and 54 government staff from MoFA, MEW and MoF receiving training on various aspects of transboundary water resources management, the two-year capacity building program came to a close. The materials generated in this capacity building program were developed into a training manual that could be used to develop curricula in Afghanistan. A study tour to the Nile Basin capped the capacity building program, allowing the participants to relate the theoretical knowledge base acquired throughout the training program directly to the Nile Basin as a real-life case study and to interact directly with experts who have been negotiating the Nile water resources over the past 15-20 years.

- The Indus Dialogue has expanded from a group of 15 riparian stakeholders to meetings that now regularly involve around 100 people from the Indus Basin countries, including Afghanistan. Two Indus Basin Knowledge Forums (IBKF) brought together Indus Basin governments, scientists, academics, the private sector, civil society and development partners, to build stronger collaboration among the science communities and those who make policy and informed decisions on the Indus Basin.
- The joint research proposal on climate change adaptation in the Indus Basin was presented at the 3rd IBKF. Researchers from each of the four riparian countries will conduct research activities within their respective national geographic domains, but will coordinate research plans with researchers from the other countries within the basin under each of the Work Packages (WP). WPs 1-3 focus on coordinating research activities among researchers to address the knowledge gaps pertaining to climate change impacts in the basin. WP 4 focuses on capacity building, training, networking and knowledge exchange among stakeholders from these four countries, as well as with the wider global climatological, glaciological and hydrological research communities.

Looking Forward

- **Climate Change Adaptation Research:** The outcomes of the proposed research packages will guide policymakers in the basin to devise an informed adaptation strategy for sustainable development of water resources.
- **Dialogue:** The next IBKF is anticipated to take place in 2020. Annual meetings of relevant research institutions, academia, government entities, policymakers and decision makers in the Basin will be held to enhance coordination, cooperation and cross learning.
- **Capacity Building:** With the capacity building program coming to a close, a donor coordination meeting, led by SAWI, was convened among those supporting transboundary water management and capacity building in Afghanistan moving forward. Donors and development partners are aware of ongoing and planned activities, and will be able to identify areas of potential overlap and opportunities for coordination. It was agreed that the Government will, in early FY19, appoint a focal ministry that will be responsible for coordinating donor capacity building support in the future.

Bangladesh

Summary

SAWI efforts in Bangladesh are pursued under the **Brahmaputra, Sundarbans and Regional Cross-cutting Focus Areas**. The program activities in Bangladesh (some of which are linked to activities in India) are directed primarily toward: (1) preparation of an Investment Plan for the Bangladesh Delta Plan 2100 and conducting an analysis of modelling platforms for the Brahmaputra Basin; (2) strengthening hydro-met modernization by informing the design of the Bangladesh Weather and Climate Services Regional Project; (3) undertaking targeted studies in the Sundarbans and designing a Sundarbans hydro-met system; (4) involving high level country delegations in SAWI-supported dialogue activities at the regional as well as basin (Brahmaputra and Sundarbans) scale; and (5) capacity building.

Primary organizations SAWI is engaging with in Bangladesh: Department of Water Resources, Bangladesh Forest Department, Joint Rivers Commission, Bangladesh, Bangladesh Fisheries Research Institute, Institute of Water Modeling, Bangladesh Soil Research Institute, General Economics Division, BISRCI.

Major Country Level Activities:

(Total Investment: ~US\$4.6M)

Delta Management Investment Planning and Basin Analysis: \$0.8M + \$0.2M

Sundarbans Landscape-scale Joint Environmental Plan: \$0.3M

Sundarbans Targeted Environmental Studies: \$0.8M

Sundarbans Landscape Hydro-met Design: \$0.4M

Sundarbans Dialogue: \$1.0M

Brahmaputra Dialogue: \$0.7M

Capacity Building—Transboundary Water Governance: \$0.4M

FY18 Key Outputs

- The JRC, Bangladesh capacity building program was completed. In early FY18, the activity supported one sub-divisional engineer from JRC, Bangladesh to attend the UNESCO-IHE Short Course on Watershed and River Basin Management in Delft, the Netherlands (July 2017). Seventeen government officials from JRC, Bangladesh and the Government of Bangladesh Ministry of Water Resources and Ministry of Foreign Affairs, participated in the two-year program. The personal interaction with other water professionals and government officials from around the world through this program has been considered critical to learning and understanding, and fostering personal connections that will lead to future knowledge exchanges. Participants noted that they would be able to use the knowledge attained to educate others within their respective government departments.
- The Joint Landscape Narrative describing, for the first time, the defining characteristics of the Sundarbans Landscape across the national boundary between Bangladesh and India was completed. Its objectives are to create a multi-layered and holistic understanding of the Sundarbans to initiate planning activities that transcend political boundaries and multiple scales; to align and analyze information of ecological, socioeconomic and cultural variables of the Sundarbans from different sources and records to support joint understanding of the Sundarbans; to synthesize current literature to identify effective management approaches and practices of the past; and to identify the gaps to learning, knowledge, data and information of the Sundarbans.
- A report titled “Toward a Blue Economy: Pathways and Prospects for Bangladesh’s Investments in Sustainable Growth” synthesizes current theory and practice on the application of the blue economy concept to govern economic activity linked to the ocean in Bangladesh, and on this basis, puts forward suggestions on what information the Government of Bangladesh would need in order to assess the blue economy concept’s potential to help the country achieve its sustainable development aspirations. This report is informing the design of the Bangladesh Sustainable Coastal and Marine Fisheries Project.
- SAWI supported Sundarbans stakeholders to attend a number of dialogue events to create and sustain a Joint Mechanism between Bangladesh and India on sustainable management of the Sundarbans.
- The BISRCI continued its regular interaction with senior policymakers and key influencers in Bangladesh and India, through approximately ten informal meetings.

- The activity-supported documentary on the Sundarbans, *Nature's Own People*, was screened at 11 international film festivals in FY18, including the Large Short Films festival in Mumbai in October 2017 and the CinemAmbiente Environmental Film Festival in Turin, Italy in May 2018.
- A social media strategy on the sustainable development of the Sundarbans, through Facebook and Twitter, along with higher engagement with media in the two countries, was under implementation.
- Several targeted environmental studies were published or finalized as drafts, including on the impacts of progressive salinization on mangrove species and on freshwater fish habitats, and the impacts of sea-level rise on habitats of amphibians, birds, mammals and reptiles of Bangladesh; *Cyclonic Storm Landfalls in Bangladesh, West Bengal and Odisha, 1877-2016: A Spatiotemporal Analysis*; *Sea-Level Rise and Species Conservation in Bangladesh's Sundarbans Region*; and *Socioeconomics of Fish Consumption and Child Health in Bangladesh*. SAWI has used the process and draft outputs to inform stakeholder deliberations.
- The draft Investment Plan was revised and finalized in July 2017. The Plan and its Investment Plan have formed the basis for the preparation of the Bangladesh Climate-Smart Agricultural Water Management Project (US\$170 M). The final report on basin modeling of the Brahmaputra River system in Bangladesh was also finalized and submitted to the GED in July 2017.
- The Brahmaputra River Symposium (BRS) was held in September 2017 in Delhi. It marked a major milestone in the SAWI-supported dialogue process that started in January 2016. The BRS brought together 150 delegates, including for the first time, prominent stakeholders from all four participant countries, exemplifying the strides this dialogue has made in terms of credibility and importance. The next phase of the dialogue, commencing at the end of the FY, aims to advance the agenda set at the BRS. This next phase will see the dialogue process institutionalized across the four riparian countries—co-implemented by the Institute of Water Modeling (Bangladesh).
- To enhance partnership of research institutions in the HKH Region, the HUC Secretariat visited existing and potential HUC members. A delegation visited vice chancellors, deans and heads of departments at the Bangladesh University of Engineering and technology in Dhaka and the University of Chittagong in Chittagong, to discuss ways to expand the HUC in Bangladesh. Some of the immediate outcomes of these interactions included the signing of the HUC Charter by the two universities at the HUC Annual Meeting in Chengdu in November 2017 and the subsequent active participation by the existing HUC members in Bangladesh in all HUC activities.

Looking Forward

- **Dialogue:** The Sundarbans Dialogue will continue with lower intensity and profile until the elections in both countries are completed. The media collaboration efforts, including development of a website and refinement of Facebook and Twitter pages, will be disseminated in mid-FY19. The Brahmaputra Dialogue will focus on four main activities: (1) knowledge products, including a power mapping study on decision making processes within the basin, and a capacity needs assessment for disaster risk reduction; (2) constructing a Brahmaputra Basin Knowledge Portal, which aims to collate and curate the currently dispersed information and data on the Basin for more informed decision-making, and build on the NEWRIB; (3) a workshop on the water-food-energy nexus in the Basin, taking place in China in September 2018; and (4) a high-level meeting on inland water transport in the lower Brahmaputra to identify capacity building needs on the subject, which is planned to take place back-to-back with the Regional Dialogue planned for December 2018 in Colombo.
- **Hydro-met Plan:** The final hydro-met plan for the Sundarbans Landscape will be handed over to the respective government agencies in both countries. Dissemination of other outputs and further work will be closely linked to the Sundarbans Dialogue.

- **Strengthening Hydro-met Services:** a new activity will support technical capacity and training in hydro-met data management and services delivery, including through enhanced cross-border collaboration in the Brahmaputra basin, while strengthening the hydrological knowledge base of Bangladesh.
- **Generating and Sharing Knowledge:** several knowledge products will feed into the Sundarbans dialogue, including: a technical paper on cyclone impacts and population changes in the Sundarbans region; a paper on the implications of these changes for poverty and social change; a comparative study of national and regional policies of India and Bangladesh that have affected household and community responses to cyclone impacts; a summary report and policy notes drawing on deliverables listed above to assess the future consequences of alternative policy regimes for coastal population change and cyclone vulnerability; and technical papers on maternal and child health risks from rising salinity; maternal and child health risks from reduced nutrients from freshwater fish.

Bhutan

Summary

SAWI efforts in Bhutan are pursued under the **Brahmaputra and Regional Cross-cutting Focus Areas**. The program activities are directed primarily toward: (1) strengthening Bhutan's capacity for hydro-met services and disaster preparedness; and (2) improving the design of Bhutan's hydropower projects by enhancing the environmental and social aspects. Bhutan has also been actively involved in SAWI-supported dialogue activities on the Brahmaputra Basin, in addition to regional dialogue events.

Primary organizations SAWI is engaging with in Bhutan: the Department of Hydropower and Power Systems, Druk Green Power Corporation and Bhutan Power Corporation, the National Center for Hydrology and Meteorology, Department of Hydro-met Services, Department of Disaster Management, Department of Agriculture, Royal Society for the Protection of Nature, Ministry of Agriculture and Forests, National Environment Commission, and Bhutan Water Partnership.

Direct Country Relevant Activities:

(Total Investment: ~US\$2.5M)

Bhutan Hydro-met Services and Disaster Improvement: \$0.5M

Bhutan-HEP Environmental and Social Planning: \$0.5M

South Asia HEP Resilience Studies: \$0.3M

Environmental and Social Management for Sustainable HEP: \$0.2M

Brahmaputra Dialogue \$0.7M

FY18 Key Outputs

- The Royal Government of Bhutan (RGoB) finalized its first ever Guidelines for the Development of Hydropower. The Guidelines were approved by the Minister of Economic Affairs in June 2018 and are in the process of being integrated into Bhutanese policies. The guidelines are instrumental to incorporating environmental and social and transboundary aspects, and cumulative impacts, into the RGoB's ambitious plans for hydropower expansion, estimated at 12,600MW of new capacity in the next decade. SAWI has also been instrumental to the build up of data repositories for crucial environmental and social data that are needed for effective implementation of the new national guidelines.
- A Status of Aquatic Biodiversity was developed as an important resource for hydropower developers and consultants involved in preparation of hydropower projects, summarizing the available data and information on aquatic biodiversity data in Bhutan, and where and how data can be accessed. This gap analysis was used to develop recommendations forming a plan of action/'roadmap' for the creation of a national repository (database) for aquatic biodiversity. The activity also supported preparation of a report, Integrating Cultural Landscape Considerations in Large Infrastructure Planning in Bhutan, and an online interactive map showing available georeferenced data on cultural heritage, which will inform planning of hydropower investments.
- Finalized Resilience Guidelines are designed to improve climate resilience for the hydropower and dams development community and to become a practical set of methods and insights that enable projects to be resilient to future climate change risks as they proceed to completion.
- See Bangladesh write up above for information on the Brahmaputra Dialogue. The next phase of the dialogue, commencing at the end of the FY, aims to advance the agenda set at the BRS. This next phase will see the dialogue process institutionalized across the four riparian countries, co-implemented by the Bhutan Water Partnership.
- SAWI continued to support the financing of the Bhutan Hydro-met Services and Disaster Resilience Regional Project component 3, which has the objective to strengthen the capacity of the National Center for Hydrology and Meteorology (NCHM) to improve hydro-met monitoring, forecasting and service delivery to priority sectors.
- The activity supported building the NCHM's capacity by enabling NCHM staff participation in highly technical trainings provided by the World Meteorological Organization (WMO) and partners in the region.

Looking Forward

- **Dialogue:** Senior representatives from Bhutan are expected to participate in the Brahmaputra Dialogue meeting on inland water transport.
- **Hydropower Guidelines Application:** RGoB has identified the need to apply the new guidelines to hydropower projects in the pipeline, i.e. projects where studies have been conducted but construction has not started. SAWI will aim to increase the sustainability of hydropower projects in Bhutan through application of the new hydropower guidelines to pipeline projects.

China

Summary

SAWI efforts in China are pursued under the **Indus, Brahmaputra and Regional Cross-Cutting Focus Areas**. The activities in China are directed primarily toward knowledge sharing and dialogue for improved water resources management in the Brahmaputra and Indus River Basins.

Primary organizations SAWI is engaging with in China: Chinese Academy of Sciences, China Meteorological Division, Shanghai Institute of International Studies, Yunnan University, Fudan University, Beijing Institute of Contemporary International Relations, and China Reform Forum.

Major Country Relevant Activities:

(Total Investment: ~US\$1.4M)

Indus Dialogue: \$0.7M

Brahmaputra Basin Dialogue: \$0.7M

FY18 Key Outputs

- Given SAWI's activities in China are primarily through the basin and regional dialogue forums, the outputs also cut across engagements in other basin countries that have included participation of Chinese delegations.
- A delegation from Wuhan University, China visited Kathmandu University to deliver specialized lectures to engineering students from Nepal. Following a competitive process, ten Nepali students were selected for a student fellowship on hydropower and water resources at Wuhan University. The students began their tenure at Wuhan University in April 2018.
- The Brahmaputra River Symposium (BRS) was held in September 2017 in Delhi. It marked a major milestone in the SAWI-supported dialogue process that started in January 2016. The BRS brought together 150 delegates, including for the first time, prominent stakeholders from all four participant countries, including China, exemplifying the strides this dialogue has made in terms of credibility and importance. Preparing and organizing the BRS included holding meetings in China (at the end of FY17) with academics that have close ties to the government (e.g., act as advisors). The meetings helped to expand the network beyond Yunnan University—to reputed institutes in Shanghai (Shanghai Institute of International Studies and Fudan University) and Beijing (Peking University, Beijing Institute of Contemporary International Relations and influential think tanks such as China Reform Forum).

Looking Forward

- **Dialogue:** Delegates from China have committed to staying involved in the basin as well as regional dialogue processes, including the Indus Basin Knowledge Forum and Brahmaputra and Regional dialogues. A multilateral workshop on the water-energy nexus in the Basin will be hosted by China in Shanghai in September 2018. A delegation from China has been invited to attend the next Regional Dialogue on resilience through connectivity and Brahmaputra Dialogue on inland transport in Colombo in December 2018. The next phase of the dialogue, commencing at the end of the FY, aims to advance the agenda set at the BRS. This next phase will see the dialogue process institutionalized across the four riparian countries—co-implemented by Yunnan University (China).
- **Climate Change Impacts Research:** Academics from China continue to take a leadership role in mobilizing resources for the joint research work packages on climate change adaptation in the Indus Basin. Compared to other countries, China's involvement in SAWI has been relatively limited and primarily restricted to non-government actors, but there appear to be increasing opportunities for regional engagement.

India

Summary

SAWI efforts in India are pursued under the **Indus, Ganges, Brahmaputra, Sundarbans and Regional Cross-Cutting Focus Areas**. The program activities in India are directed primarily toward (1) scenario-based river basin modeling and participatory river basin planning; (2) informing the design of various investment operations in India through analytical work and exposure to international best practice; (3) improving climate risk assessment and flood forecasting; (4) improving groundwater management; (5) capacity building through training in issues related to water resources management, including water quality and basin planning; (6) targeted studies on the Sundarbans; and (7) participation in dialogue events on the Sundarbans, Brahmaputra Basin and regionally.

Primary organizations SAWI is engaging with in India: MoWR, RD&GR; CWC and CGWB; Ministry for the Development of the Northeast; Central Pollution Control Board; Water Resources Departments in Ganga and Brahmaputra Basin States.

Direct Country-Relevant Activities:

(Total Investment: ~US\$11.8M)

- Strategic Basin Planning for the Ganges in India: \$4.0M
- Water Resources Management in Transboundary Basin: \$0.5M
- Strengthening FMIS Capacity in Bihar (RE): \$0.47M
- Bihar FMIS Flood Forecasting (BE): \$0.5M
- Brahmaputra Basin Modeling and Analysis: \$1.2M
- Brahmaputra Basin Dialogue: \$0.7M
- Sundarbans Landscape-scale Joint Environmental Plan: \$0.3M
- Sundarbans Dialogue: \$1.0M
- Sundarbans Landscape Hydro-met Design: \$0.4M
- Sundarbans Targeted Environmental Studies: \$0.8M
- Capacity Building—Water Quality Monitoring and Analysis: \$0.3M
- Capacity Building for Groundwater Management: \$0.7M
- Improving Watershed Management: \$0.1M
- Indus Dialogue: \$0.7M

FY18 Key Outputs

- Recommendations from a technical report on potential health risks from inorganic chemical contamination of groundwater in Punjab, India were incorporated into the Punjab Rural Water and Sanitation Sector Improvement Project (\$248M).
- Technical assistance in scenario-based river basin modeling and participatory river basin planning for the Ganges Basin in India has acted as a demonstrator in participatory basin planning. The activity includes a comprehensive program of stakeholder consultation and technical training across 11 basin States. The customized and purpose-built Ganges River System Modeling Suite and associated Water Information Dashboard (to display and interrogate modeling data) were completed and transferred to the Central Water Commission (CWC). The suite can be utilized in guiding basin planning, conducting water resources assessments, and effectively carrying out other aspects of basin water management.
- SAWI is providing technical assistance, including capacity building and analytical work to inform the preparation of and support to the implementation of various investment operations in India, including NHP; NGMIP; NGRBP; Assam Integrated River Basin Management Project; UPWSRP; West Bengal Major Irrigation and Flood Management Project; BKDP; and the Neeranchal National Watershed Project.
- The preparation of a diagnostic study of drought resilience, groundwater governance reforms and groundwater management actions was underway. The work is developing a knowledge base that is currently incomplete and scattered, and compounded by diverse groundwater systems and usage across sectors, and management capacities across South Asia. This has the potential to guide ongoing regional dialogue, building on the South Asia Regional Groundwater Forum, and encourage more strategic utilization of groundwater resources to buffer against drought shocks in South Asia.
- See Afghanistan profile above for information on the climate change adaptation research proposal and work packages for the Indus Basin.
- See Bangladesh profile above for information on the Brahmaputra River Symposium and Brahmaputra Dialogue generally. This next phase will see the dialogue process institutionalized across the four riparian countries—co-implemented by IIT-Guwahati (India).
- See Bangladesh profile above for information on sustainably managing the Sundarbans Landscape.
- SAWI provided technical support to the Prime Minister’s initiative on water resources management in the North East of India, working closely with the High Level Committee and Expert Committee to conduct a rapid assessment of water resources with recommended actions and to build an interactive Northeast Water Information Base (NEWIRB). The exercise was highly consultative, including a tour of the nine riparian states, where over 100 in-depth multi-stakeholder meetings were held with all concerned departments.

- An advanced hydro-met manual was produced. The manual is intended to serve as an exhaustive reference for all implementing agencies/government agencies under NHP. It covers all aspects of hydro meteorological data and instrumentation, including basic concepts of data collection pertaining to weather, surface water, groundwater, water quality, sediment transport, data collection, transmission and management. A series of workshops aimed to build capacity in the model. The Integrated Water Resource Model pertaining to reservoir operations and management of the Damodar Valley Corporation (DVC), which had been previously prepared, was handed over to the client for further testing. The model will help better determined the optimum quantum for allocation for different uses and will also determine the amount of water to be released and their downstream impacts.
- A report was finalized on the implementation and operationalization of a customized meteorological framework in the Bagmati-Adhwara and Kosi Basins. An Interim Meteorological Report on Flood Forecasting Model Development was also developed. SAWI supported capacity building for Government of Bihar officials on flood forecasting technologies through targeted training and study visits, including to the Yellow River in China to gain first-hand knowledge of the institutional and technological aspects of real-time flood forecasting and management in the Yellow River Basin, and measures to control sedimentation.

Looking Forward

- **Groundwater Management:** The groundwater diagnostic study will be finalized. A final two-day dissemination workshop is planned for December 2018 in Colombo.
- **Dialogue:** India is expected to participate in the Brahmaputra Dialogue meeting on inland water transport, will send a high-level delegation to the regional dialogue on resilience through connectivity in December 2018, and is continuing dialogue processes with Bangladesh on the Sundarbans.
- **River Modeling:** The finalization of the DVC model will be carried out and will include stakeholder consultation and development of materials to strengthen technical capacity in model utilization. The hydro-met manual will be disseminated widely.
- **Water Resources in the North East:** A final study dissemination workshop is planned for early FY19. The NEWRIB will be made fully operational and handed over to the North East Space Application Center. Opportunities for providing follow-on support are being explored.
- **Strategic Basin Planning:** The surface-groundwater interactions assessments and the documentation of methods for environmental flows will be finalized. With the transfer of the modeling software to CWC, the activity has entered the transition period of transfer to the institutes that will be responsible for sustaining and maintaining activity results.

Nepal

Summary

SAWI efforts in Nepal are pursued under the **Ganges and Regional Cross-Cutting Focus Areas**. The program activities in Nepal are directed primarily toward: (1) strengthening transboundary climate change resilience and flood mitigation; (2) supporting development of hydropower taking into consideration transboundary considerations and future climate risks; and (3) strengthening transboundary water governance and technical cooperation.

Primary organizations SAWI is engaging with in Nepal: WECS, Department of Soil Conservation and Watershed Management (DSCWM); NEA; Independent Power Producers Association of Nepal, Himalaya University Consortium.

Direct Country-Relevant Activities:

(Total Investment: ~US\$4.2M)

Sustainable Water Resources Development for HEP in Nepal (RE+BE): \$2.2M

Strengthening FMIS Capacity in Bihar (RE+BE): \$1.0M

Himalayan University Consortium Grant (RE), US\$1.0M

FY18 Key Outputs

- SAWI is supporting the HUC, hosted by ICIMOD in Kathmandu, to enhance the partnership of regional research institutions for collaborative research.
- The WECS implementation of integrated water resource planning and management to guide sustainable hydropower development using a basin-wide approach continued, albeit at a pace that was significantly slower than planned. WECS was evaluating proposals of the firms shortlisted to carry out a strategic environmental and social assessment to support a basin-wide approach for hydropower development planning.
- An exposure visit to the Three Gorges Dam Project and Hubei Yiba Highway Project in China was organized for seven Nepalese Parliamentarians and a parliamentarian assistant, and two journalists, in August/September 2017 on the importance of river basin and hydropower planning.
- The approval of the Integrated Water Resource Management Policy and Water Resource Act was pending as the newly instated Government (March 2018) started the review and approval processes.
- SAWI supported participation of three NEA representatives in the three-week August/September 2017 Hydropower Development Management Course in Norway, to build their capacity for environmental and social safeguard management to facilitate technically, socially and environmentally sustainable and equitable water resources and hydropower development.

- SAWI facilitated a process by which Kathmandu University came on board, from February 2018 onward, to participate in a faculty exchange initiative on water resources and hydropower development. A delegation from Wuhan University, China visited Kathmandu University to deliver specialized lectures to engineering students from Nepal. Following a competitive process, ten Nepali students were selected for a student fellowship on hydropower and water resources at Wuhan University. The students began their tenure at Wuhan University in April 2018.

Looking Forward

- **Informing Investments:** SAWI activities will continue to inform the World Bank's Nepal Power Sector Reform and Sustainable Hydropower Development Project to support a basin-wide approach for hydropower development, and climate resilient planning and designs.
- **Generating and Sharing Knowledge:** SAWI also continues to support knowledge and data sharing through technical dialogue, collaborative research, communications websites, on critical areas of national and regional importance such as flood forecasting, climate change, and Himalayan mountain ecology through the HUC.

Pakistan

Summary

SAWI efforts in Pakistan are pursued under the **Indus Focus Area**. Program activities are directed primarily toward: (1) facilitating a national dialogue process in Pakistan to implement the recommendations from the 2013 Pakistan Water Summit with key stakeholders to identify specific opportunities for water reform and investment; (2) to facilitating dialogue between Pakistan and Afghanistan to enhance coordination and reach cooperation on the development and management of the Kunar/Kabul River Basin; and (3) supporting dialogue between Pakistan and the other Indus Basin countries to build confidence and trust in order to establish an enabling environment for basin-wide cooperation.

Primary organizations SAWI is engaging with in Pakistan: Pakistan Ministry of Climate Change and Water Environment Forum; Himalayan University Consortium.

Direct Country-Relevant Activities:

(Total Investment: ~US\$2.0M)

Indus Dialogue: US\$0.7M

Indus Basin (Pakistan) Groundwater Analysis US\$0.3M

Himalayan University Consortium Grant (RE), US\$1.0M

FY18 Key Outputs

- Activity preparation was initiated for a new activity analyzing groundwater. The activity aims to extract and synthesize knowledge of groundwater and its governance in the Indus Basin (Pakistan) and conduct an analysis of trends in available data. The work will contribute to an ongoing consolidation of the groundwater knowledge base in South Asia, and highlight opportunities for regional cross-learning on common groundwater management issues. It will complement the groundwater work already completed by the World Bank in the Indian Punjab portion of the Indus Basin. The work will also benefit from the current SAWI advisory work on managing groundwater for drought resilience in South Asia.
- See Afghanistan country profile above regarding the Indus Basin Knowledge Forum and the joint research proposal on climate change impacts in the Indus Basin.

- The HUC Secretariat administered a Conference Grant to a researcher in Pakistan to participate in an international conference to provide water and mountain-related policy and technical advice to the government. management to facilitate technically, socially and environmentally sustainable and equitable water resources and hydropower development.

Looking Forward

- **Analyzing Groundwater:** The groundwater analysis work will commence in FY19 with targeted (sub-Basin level) stakeholder meetings, followed by a collation and review of published and grey literature, identifying sources of archived and current data, and analyzing the status of groundwater in the study area. This will be done with reference to the physical/environmental condition of the resource, its connection to rivers and other surface water bodies, and the mechanisms of both formal and informal governance of this resource—including a review of institutional capacity. The work will include an assessment of resource sustainability and capacity for growth as well as an analysis of user groups and of the capacity for monitoring the resource condition.
- **Capacity Building:** SAWI could flexibly respond to a request from Pakistan for capacity building on transboundary and river basin management, similar to what was delivered for Afghanistan
- **Basin Development:** Should Pakistan wish to pursue development of the Kabul/Kunar River Basins with Afghanistan, SAWI could flexibly respond to continue with the technical assistance it conducted on Kabul/Kunar hydropower development potential in FY14-FY16.

ANNEX 7: PHASE II PARTNERSHIPS

SAWI activities are carried out with national, regional and global partners. These partnerships aim to ensure the sustainability of SAWI activities, including beyond the duration of the program. They also help in crowding in knowledge and disseminating knowledge to multiple stakeholder groups. Most events are organized in collaboration with partners. Policy think tanks, civil society organizations and academics are active participants in knowledge generation. Sometimes the modality of this is the execution of an activity through an external implementing agency. In other cases, knowledge institutions are contracted as consultants. However, the majority of partnerships are not contractual in nature but congregate partners around common themes and interests. National authorities in all SAWI countries are involved in all SAWI activities.

Government and Country-Specific Partners

Afghanistan

An inter-ministerial working group on transboundary waters, comprising technical-level staff representatives from the Ministry of Energy and Water, the Ministry of Finance, the Ministry of Foreign Affairs and the National Environmental Protection Agency.

Bangladesh

Dept of Water Resources; Bangladesh Forest Dept; Joint Rivers Commission, Bangladesh; Bangladesh Fisheries Research Institute; Institute of Water Modeling; Bangladesh Soil Research Institute; General Economics Division.

Bhutan

Dept. of Hydropower and Power Systems; Druk Green Power Co; Bhutan Power Co; National Center for Hydrology and Meteorology; Dept. of Hydro-met Services; Dept. of Disaster Mgmt; Dept of Agriculture; Royal Society for the Protection of Nature; Ministry of Agriculture and Forests; National Environment Commission.

China

Chinese Academy of Sciences; China Meteorological Division; Shanghai Institute of International Studies; Yunnan University; Fudan University; Beijing Institute of Contemporary International Relations; China Reform Forum.

India

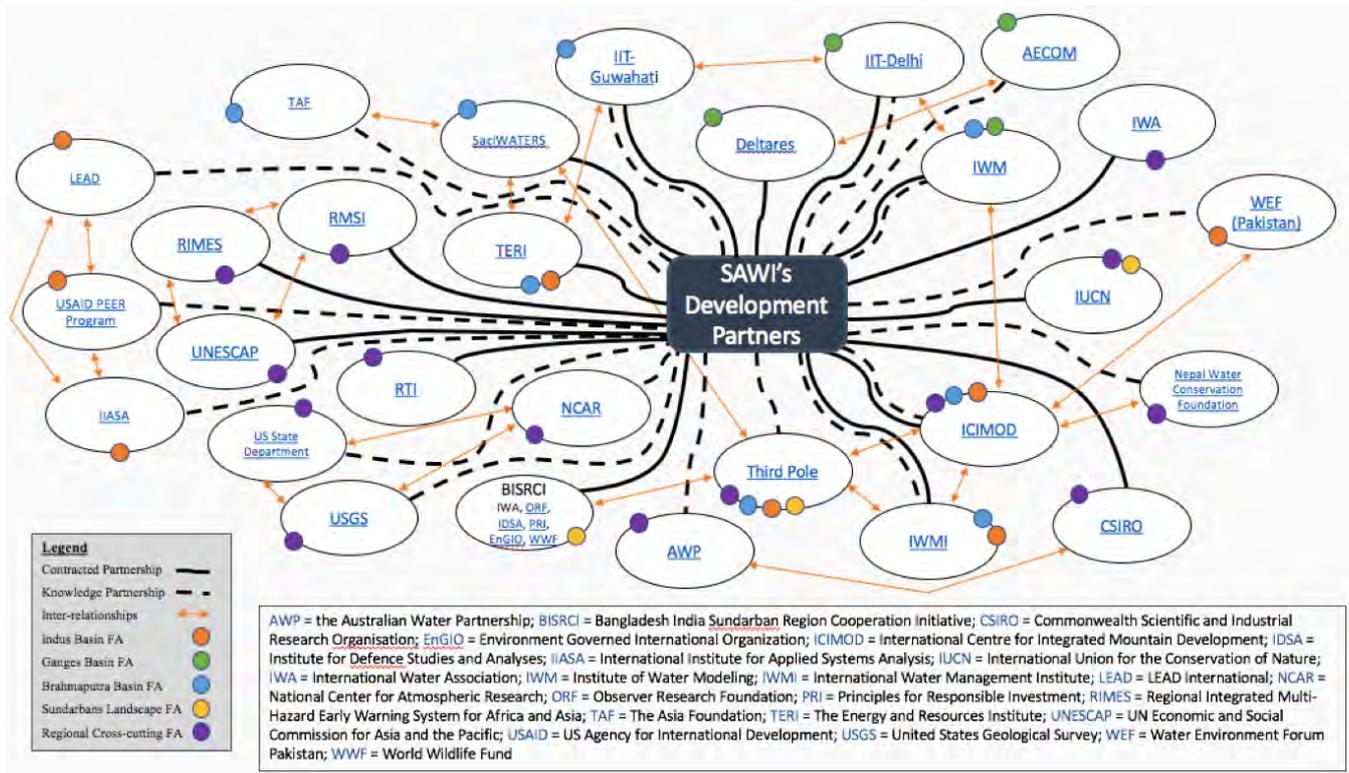
Ministry of Water Resources, River Development & Ganga Rejuvenation; Central Water Commission; Central Groundwater Board; National Institute of Hydrology; Brahmaputra Board; Central Pollution Control Board; State Governments (in Ganges and Brahmaputra Basins and West Bengal); TERI; University of Kashmir; IIT-Guwahati; IIT-Delhi; National Mission Clean Ganga; IIT-Roorkee.

Nepal

Water and Energy Commission Secretariat; Dept of Soil Conservation and Watershed Management; Nepal Electricity Authority; Independent Power Producers Association of Nepal; Nepal Water Conservation Foundation.

Pakistan

Ministry of Climate Change; Water and Power Development Authority; Pakistan Meteorological Department; Water Environment Forum.



ANNEX 8: NEW ACTIVITIES

Indus Basin Focus Area

Indus Basin (Pakistan) Groundwater Analysis

TF Number: TF0A7388
Budget Allocation: US\$0.3M

Scope: While the Indus region has a long history of major investment in surface water infrastructure, by contrast, the management of groundwater infrastructure has remained in private hands, contributing to uncontrolled expansion of access to groundwater. Poorly managed conjunctive use of the interconnected surface and groundwater systems has led to a corresponding deterioration of the groundwater resource. Institutional capacity for governance of these resources is weak and essential groundwater data that would facilitate improved governance are fragmented and not easily discoverable for a significant proportion of the Indus Basin. This activity aims to extract and synthesize knowledge of groundwater and its governance in the Indus Basin (Pakistan) and to conduct an analysis of trends in available data. The work will contribute to an ongoing consolidation of the groundwater knowledge base in South Asia and highlight opportunities for regional cross-learning on common groundwater management issues. It will complement the groundwater work already completed by the World Bank in the Indian Punjab portion of the Indus Basin. The work will also benefit from the current SAWI advisory work on managing groundwater for drought resilience in South Asia.

Brahmaputra Basin Focus Area

Non-Monetary Values of Water

TF Number: TF0A7705
Budget Allocation: US\$0.05M

Scope: This task will present evidence from selected South Asian countries that are riparian to the Brahmaputra River on the non-monetary values of water, and it will argue why attention to this aspect matters for policy design and practice in the water sector. To do so, it will draw on diverse sources of information, including historical accounts, religious texts and legal frameworks, for example, to show how water gained cultural, spiritual and legal significance in the region, given its agrarian context. It will also contrast the value water holds in South Asia against other regions, such as Africa and Latin America, where too water is used as a space to assert power and reinforce hierarchy, and is a significant resource around which entire communities are organized. Finally, it will present examples of successful policies, programs and projects worldwide that have focused on the non-monetary importance of water and in the process, changed norms, specifically around women's association with the resource.

Strengthening Hydro-met Services and DRM in Bangladesh

TF Number: To Be Determined

Budget Allocation: US\$0.25M

Scope: To support technical capacity and training in hydro-met data management and services delivery, including through enhanced cross-border collaboration in the Brahmaputra Basin, while strengthening the hydrological knowledge base of Bangladesh. While this effort will transform the scale of information availability in Bangladesh, support to address critical technical and capacity gaps is essential to ensure that the country is poised to utilize and translate the modernized infrastructure investments into improved and innovative service delivery. Given the institutional capacity issues and the highly technical nature of the BWCSR, this proposed activity would support the GoB with technical assistance, capacity building and training activities. In particular, the focus will be on documenting and applying regional and global good practices related to hydrological monitoring and forecasting, building capacity through regional training, twinning and consultative activities, as well as strengthening the hydrological knowledge base to better leverage the use of regional information resources available in the public domain, within its agencies. This activity will build on and link with transboundary WRM in the region and the Hydrology program in India, which has produced e-tools, guidelines and lessons and strengthen the collaborative dialogue on Hydro-met products and services for disaster risk management, and facilitate both training and collaborative interaction between hydro-met agencies in the countries of the region.

Regional Cross-Cutting Focus Area

Glaciers of the Himalayas

TF Number: TF0A7870

Budget Allocation: US\$0.45M

Scope: The purpose of this study is to identify the causes of glacier and snow dynamics in the Himalayas, Karakoram, and Hindu Kush; present scenarios of possible glacier and snow changes under different global and regional scenarios; and determine implications for water resources within the Indus, Ganges, and Brahmaputra Basins. This activity is a first of its kind, which will connect glacier science, black carbon, and hydrology with regional and global impacts. The science will look at how changes in glacier mass and seasonal snowpack affect the stability and reliability of regional water resources and global climate. The impacts will focus on implications of water availability for the various sectors and economies.

A Diagnostic Study of Groundwater-Energy-Agriculture Nexus

TF Number: TF0A7575

Budget Allocation: US\$0.15M

Scope: To consult the farmers and other stakeholders with the participation of villagers that have varied sub-surface geologic formation and water needs to design an alternative model of subsidy delivery to farmers in Rajasthan. The activity will review surface water, groundwater, energy and agricultural policies, schemes and associated subsidies with stakeholders, focusing on areas of convergence and conflicts between sectoral policies to identify opportunities for tapping into synergies for a virtuous nexus. It will engage closely with the Government of Rajasthan's departments of energy, groundwater and agriculture programs, projects and schemes in these sectors for planning and detailed design of subsidy delivery mechanisms in the State. And it will propose options of subsidy delivery, taking into account the current public policy choices of the government on concessional electricity tariff for agriculture, normative allocation of electricity instead of 'duration restricted' power supply, and monetization of energy savings from normative allocation to create incentives for the farmers to save both energy and groundwater. The activity will engage the farmers and other stakeholders in a meaningful consultation and participation to review and adapt the subsidy delivery model to the local context and design it for field testing to present "proof of concept" to the decision makers.

HEP Environmental and Social Planning

TF Number: On Hold

Budget Allocation: On Hold

Scope: RGoB has identified the need to apply the new guidelines to hydropower projects in the pipeline, i.e. projects where studies have been conducted but construction has not started. Indications from limited comparative exercises are that there exist gaps in preparatory studies compared to the new guidelines, e.g. related to cumulative impact assessments. Finding and filling these gaps would make these planned future hydropower projects more sustainable and better integrated in the basin development. This activity aims to increase the sustainability of hydropower projects in Bhutan through application of the new hydropower guidelines to pipeline projects.

ANNEX 9: **World Bank Investments Influenced by SAWI**

ANNEX 9: WORLD BANK INVESTMENTS INFLUENCED BY SAWI

Focal Area	SAWI-II Grant	Grant (\$USD)	World Bank Lending Informed	Development Objective of World Bank loan	Duration	Bank Loan (\$USD million)
Indus	Indus Basin Dialogue	700,000	1. Pakistan Water Sector Capacity Building and Advisory Services Project – Additional Financing (P155226)	To improve the country's management and investment planning of water resources in the Indus River system through: a) capacity building of and support to federal institutions in water resources planning and management, b) improvement in water resources management and development in Water and Power Development Authority and c) project management and additional studies.	June 2008 to June 2021	\$35M
	Kabul / Kunar Basin Development	600,000	2. Afghanistan Irrigation Development and Rehabilitation Project – Additional Financing (P152892)	To improve access to irrigation in targeted areas and strengthen capacity for water resources management.	April 2011 to December 2020	\$70M (plus \$1M Counterpart)
Ganges	Strategic Basin Planning for the Ganges in India	4,000,000	3. India National Ganga River Basin Project (P119085)	To support the National Ganga River Basin Authority in: (a) building capacity of its nascent operational-level institutions, so that they can manage the long-term Ganga clean-up and conservation program; and (b) implementing a diverse set of demonstrative investments for reducing point-source pollution loads in a sustainable manner, at priority locations on the Ganga.	May 2011 to December 2019	\$1000M (plus \$556M Counterpart)
			4. India National Hydrology Project (P152698)	To improve the extent, quality, and accessibility of water resources information and to strengthen the capacity of targeted water resources management institutions in India.	January 2017 to November 2024	\$175M (plus \$175M Counterpart)
			5. India Uttar Pradesh Water Sector Restructuring Project Phase II (P122770)	To strengthen the institutional and policy framework for integrated water resources management for the entire State and increase agricultural productivity and water productivity by supporting farmers in targeted irrigation areas.	August 2013 to October 2020	\$360M (plus \$155M Counterpart)
	Sustainable Water Resources for Development for HEP in Nepal (RE)	2,500,000	6. Nepal Power Sector Reform and Sustainable Hydropower Development (P150066)	To strengthen the capacity of the power sector agencies to plan and prepare hydropower transmission line projects following international standards and best practices. To improve the readiness of the power sector agencies for regulatory and institutional reforms	April 2014 to June 2020	\$20M (plus \$1.5M Counterpart)
	Sustainable Water Resources Development for HEP in Nepal (BE)	1,200,000	As above	As above		

ANNEX 9: WORLD BANK INVESTMENTS INFLUENCED BY SAWI

SAWI • 2017–2018

Ganges	Managing Watersheds to Reduce Upstream Sediment for HEP	220,000	7. Nepal Kali Gandaki A Hydropower Plant Rehabilitation Project (P132289)	To improve the reliability of power supply of Kali Gandaki A Hydropower Plant through rehabilitation and safety measures and to improve the response capacity of Nepal in case of an emergency.	August 2012 to June 2017	\$27M (plus \$3M Counterpart)
	Water Resources Management in Transboundary Basins	500,000	(also India National Hydrology Project; P152698)	See above		
	Strengthening Flood Modelling Capacity in Bihar (RE)	475,000	8. India Bihar Kosi Basin Development Project (P127725)	To enhance resilience to floods and increase agricultural production and productivity in the targeted districts in the Kosi river basin, and to enhance Bihar's capacity to respond promptly and effectively to an eligible crisis or emergency.	December 2015 to March 2023	\$250M (plus \$126.5M Counterpart)
	WRM in Transboundary Basins	500,000	9. India's West Bengal Major Irrigation and Flood Management Project	To strengthen Irrigation and Flood Management capacity in West Bengal	Under Preparation	\$145M
	Bihar FMIS Flood Forecasting	500,000	As above	As above		
Brahmaputra	Basin Modelling and Analysis; India	1,200,000	(also India National Hydrology Project; P152698)	See above	Under Preparation	\$200M (plus \$50M Counterpart)
			10. Assam Integrated River Basin Management Project (P158260)	To augment the institutional capacity for improved management of floods, erosion and sediments; and to support development and operation of integrated floodplain and catchment erosion management framework for Assam.		
	Hydro-met Modernization in the Brahmaputra Basin	250,000	11. Hydro-met Services and Disaster Resilience Regional Project (P154477)	To strengthen the Royal Government of Bhutan's capacity for improved weather and hydrological forecasting and disaster related early warning systems.	September 2016 to June 2020	\$4M
	Hydro-met Modernization in the Brahmaputra Basin	250,000	12. Bangladesh Weather and Climate Services Project (P150220)	To strengthen Bangladesh's capacity to deliver reliable weather, water, and climate information services and improve access to such services by priority sectors and communities	June 2016 to Dec 2022	\$113M

ANNEX 9: WORLD BANK INVESTMENTS INFLUENCED BY SAWI

SAWI • 2017–2018

Brahmaputra and Sundarbans	Delta Management Investment Planning	800,000	13. Bangladesh Delta Plan 21001	To realise a sustainable delta vision, long term strategy and plan, agreed with all stakeholders, for an optimum level of water safety and food security as well as economic growth and a framework for its implementation.	June 2015 to N/A	\$4B in total
	Delta Management Investment Planning	800,000	14. Climate-Smart Agriculture and Water Management Project (P161534)	To enhance productivity and climate resilience of irrigated agriculture, improve water management, build institutional capacity for water and agriculture service delivery, and improve market opportunities for farmers small-holder farmers, especially women.	Pipeline	\$120M
Sundarbans	All Sundarbans Activities	--	15. Bangladesh Sustainable Coastal and Marine Fisheries Project (P161568)	To increase coastal and marine fisheries' contribution to the economy, poverty reduction, and environmental stability.	July 2018 to N/A (in prep)	\$240M (plus \$42M Counterpart)
	All Sundarbans Activities	--	16. Sustainable Forests and Livelihood Project (P161996)	To improve collaborative forest management and increase benefits for forest dependent communities in targeted sites.	October 2018 to September 2023	\$175M (plus \$4M Counterpart)
	Targeted Environmental Studies	800,000	17. Coastal Embankment Improvement Project (P128276)	To (a) increase the area protected in selected polders from tidal flooding and frequent storm surges, which are expected to worsen due to climate change; (b) improve agricultural production by reducing saline water intrusion in selected polders; and (c) improve the Government of Bangladesh's capacity to respond promptly and effectively to an eligible crisis or emergency.	June 2013 to December 2020	US\$375M (plus \$25M Counterpart)

¹ Note: This is not a WB lending operation / loan (as is the case of the others). It is a plan that totals \$4 billion. The SAWI-financed Delta Management and Investment Plan activity supported the preparation of a shorter-term investment plan for the Bangladesh Delta Plan 2100.

ANNEX 9: WORLD BANK INVESTMENTS INFLUENCED BY SAWI

SAWI • 2017–2018

Regional Cross- Cutting	Capacity Building – Water Quality Monitoring and Analysis	310,000	18. Punjab Rural Water Supply and Sanitation Project (P150520)	To improve water and sanitation service levels, reduce open defecation, and strengthen service delivery arrangements in targeted villages in Punjab.	March 2015 to March 2021	\$248M (plus \$106M Counterpart)
	Capacity Building – Water Quality Monitoring and Analysis	310,000	(also India National Ganga River Basin Project; P119085)	See above		
	Capacity Building – IWRM in Transboundary River Basins	200,000	(also India National Hydrology Project; P152698)	See above		
	Capacity Building for Groundwater Management	400,000	19. Atal Bhujal Yojana - National Groundwater Management Improvement Program (P158119)	To improve management of groundwater resources in selected states of India.	June 2017 to June 2022 (in prep)	\$450M (plus \$550M Counterpart)
	Improving Watershed Management	125,000	20. India Neeranchal National Watershed Project (P132739)	To support the watershed development component of PMKSY through technical assistance to improve incremental conservation outcomes and agricultural yields for communities in selected sites, and adoption of more effective processes and technologies in participating states.	August 2012 to March 2022	\$178.5M (plus \$178.5M Counterpart)
	Improving Flood Forecasting in South Asia	500,000	(also India Bihar Kosi Basin Development Project; P127725)	See above		