

**ANNUAL REPORT 2011**  
**THE SOUTH ASIA WATER INITIATIVE (SAWI)**  
**(JULY 2010 – JUNE 2011)**



**SAWI** SOUTH ASIA  
WATER INITIATIVE

# **South Asia Water Initiative (SAWI)**

## **Multi-Donor Trust Fund Report**

**Prepared by the World Bank  
for the 2011 Annual Donors Meeting**

**New Delhi, India**

**November 3-4, 2011**



# Table of Contents

---

<b>Acronyms</b> .....	<b>5</b>
<b>Foreword</b> .....	<b>7</b>
<b>Overview</b> .....	<b>8</b>
<b>The SAWI Portfolio</b> .....	<b>13</b>
<b>A. Regional Activities</b> .....	<b>13</b>
<i>The Abu Dhabi Dialogue (ADD)</i> .....	13
<i>The Abu Dhabi Dialogue Knowledge Forum (ADD-KF): Small Grants Program</i> .....	15
<i>Regional Communications and Knowledge Management</i> .....	17
<b>B. Basin Activities</b> .....	<b>19</b>
<i>The Ganges Basin</i> .....	19
The Ganges Strategic Basin Assessment (SBA) .....	19
Building Knowledge and Capacity for Co-Management of the Sundarbans by India and Bangladesh. ....	22
Building Water Management Systems in the Ganges Sub-Basin for Bangladesh .....	25
<i>The Indus Basin</i> .....	27
The Impacts of Climate Risks on Water & Food Security in the Indus Basin in Pakistan .....	27
The Social Dimensions of Climate Vulnerability in the Indus Basin .....	30
<i>Cross Basin Activities</i> .....	31
The Social Dimensions of Climate Change .....	31
The Ganges-Brahmaputra-Meghna (GBM) River Basin Groundwater Study .....	33
Feasibility Study for a Regional Monitoring Center for the Greater Himalayas .....	36
<b>C. National Activities</b> .....	<b>38</b>
<i>Bangladesh</i> .....	38
Improving Water Quality in Dhaka: the Responsible Sourcing Initiative .....	38
Improving Water Resources Management in the Gorai River Basin .....	40
<i>India</i> .....	42
Support for the National Ganga River Basin Project .....	42
Cumulative Impact Assessment of Hydropower Development in River Basin Planning .....	44
Good Environmental Practices in Hydropower Projects .....	46
<i>Nepal</i> .....	48
Water Resources and Climate Change .....	48
<i>Afghanistan</i> .....	51
Technical Support for Integrated River Basin Planning and Investment Prioritization .....	51
<b>Trust Fund Management</b> .....	<b>53</b>
<b>Governance</b> .....	<b>53</b>
<b>Staffing</b> .....	<b>53</b>

<b>Financial Reporting.....</b>	<b>54</b>
<b>Looking Forward.....</b>	<b>59</b>

## List of Tables

TABLE 1: OVERVIEW OF THE PROPOSALS RECOMMENDED UNDER THE ADD-KF SMALL GRANTS PROGRAM .....	16
TABLE 2: MOST PROMISING CLEANER PRODUCTION MEASURES FOR THE RESPONSIBLE SOURCING INITIATIVE .....	39
TABLE 3: TOTAL DONOR PLEDGES TO THE MDTF.....	54
TABLE 4: DETAILS OF NET AVAILABLE CONTRIBUTIONS .....	55
TABLE 5: DETAILS OF THE SAWI PORTFOLIO, AS OF JUNE 30, 2011 .....	56

## List of Figures

FIGURE 1: THE SAWI LOGO .....	19
FIGURE 2: PAID PLEDGES BY FISCAL YEAR.....	55
FIGURE 3: DISBURSEMENTS COMPARED TO TOTAL PLEDGES FY 2009-2011.....	56
FIGURE 4: FUNDING SOURCES OF NATIONAL SAWI ACTIVITIES.....	58
FIGURE 5: FUNDING SOURCES OF REGIONAL AND BASIN SAWI ACTIVITIES.....	58

# Acronyms

---

ADB	Asian Development Bank
ADD	Abu Dhabi Dialogue
ADD-G	Abu Dhabi Dialogue Group
ADD-KF	Abu Dhabi Dialogue Knowledge Forum
AWARD	Afghanistan Water Resources Development Project
BB	Bank Budget
BRIC	Bangladesh Rivers Information and Conservation Project
BWDB	Bangladesh Water Development Board (BWDB)
CDM	Clean Development Mechanism
CGE	Computable General Equilibrium
CP	Cleaner Production
DNA	Damage and Needs Assessment
DoE	Department of Environment
DPR	Detailed Project Reports
DRM	Disaster Risk Management
DSS	Decision Support System
EWS	Early Warning Systems
FFWC	Flood Forecasting and Warning Center
FY	Financial Year
GBM	Ganges-Brahmaputra-Meghna
GIS	Geographic Information Systems
GLOFs	Glacial Lake Outburst Floods
GoB	Government of Bangladesh
Gol	Government of India
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GW	Giga Watt
HHS	Household Survey
HKH	Hindu Kush-Himalaya
HKK	Hindu-Kush-Karakoram
IBIS	Indus Basin Irrigation System
IBMR	Indus Basin Model Revised
ICIMOD	International Centre for Integrated Mountain Development
IDI	Institution for Development and Innovation
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
IISS	International Institute of Strategic Studies
IIT	Indian Institute of Technology
ISI	Indian Statistical Institute
IWM	Institute for Water Modeling
IWMI	International Water Management Institute
MDTF	Multi-Donor Trust Fund
MEW	Ministry of Energy and Water

MoEF	Ministry of Environment and Forests
MW	Mega Watt
NGRBA	National Ganga River Basin Authority
NLTA	Non Lending Technical Assistance
NMCG	National Mission Clean Ganga
NRDC	Natural Resources Defense Council
POA	Program of Activities
PPU	Project Preparation Unit
RSI	Responsible Sourcing Initiative
SAARC	South Asian Association for Regional Cooperation
SAWI	South Asia Water Initiative
SAM	Social Accounting Matrix
SBA	Strategic Basin Assessment
SGP	Small Grants Program
SIDA	Swedish International Development Cooperation Agency
SIWI	Stockholm International Water Institute
SPMG	State Program Management Groups
TA	Technical Assistance
TAP	Technical Assessment Panel
TORs	Terms of References
US EPA	United States Environmental Protection Agency
WECS	Water and Energy Commission Secretariat
WRPU	Water Resources Planning Unit

# Foreword

---

The South Asia Water Initiative (SAWI) recognizes that water management is central to the lives, livelihoods and well-being of over 1.5 billion people who live in the region. Growing populations and economies put pressure on finite water resources, with potential implications at every level – raising regional tensions, constraining economies, and burdening households, in particular the resource dependent poor and women.

South Asia remains a region of rapid growth and enormous potential. It is also a region with high poverty, extreme population density, and pronounced vulnerability to climate change. In 2011, the global risk firm Maplecroft found that four of the ten most climate vulnerable countries were in South Asia.

The hydrology of the region - driven by the powerful South Asian Monsoon and the complex dynamics of the Himalayan glaciers - would prove a challenge for any set of countries to manage. In South Asia where cooperation is limited and the capacity of many countries is weak, the challenge is daunting.

To meet these challenges, some governments in the region have been making calls for enhanced cooperation. SAWI, currently the only region-wide initiative designed to promote cooperation on transboundary waters, strives to support such efforts. While real and enduring change can only come from within the region – from its leaders, opinion-makers, communities, and myriad stakeholders – we firmly believe that SAWI can contribute to creating an enabling environment.

This year's Annual Report demonstrates the progress that has been made over the period July 2010 - June 2011, the second year of full-scale SAWI activities. The report shares SAWI's successful efforts to generate new knowledge, sustain multi-stakeholder dialogue platforms, and enable significant innovative investments and institutional development. It also describes a range of innovative activities that remain ongoing. New opportunities are continuously arising, and looking forward, SAWI hopes to continue to contribute to the cooperative momentum in the region.

Claudia Sadoff  
SAWI Program Manager  
South Asia Region, The World Bank

Herbert Acquay  
Sector Manager  
Environment, Water Resources & Climate Change  
South Asia Region, The World Bank

# Overview

---

Water issues in South Asia have made news this year, as they often do. Thankfully, the region was spared the scale of devastation it suffered in the previous year's floods in Pakistan. Still, just under 33 million people in the region were affected by flood and drought in 2011,<sup>1</sup> with remarkably little note taken of their hardship. This year the news was filled with concerns over growing scarcity and growing tensions, particularly in transboundary waters. On the Indus, the current phase of arbitration over the Kishanganga Dam returned a decision that led to declarations of both victory and defeat for both parties. On the Brahmaputra, the papers were filled with concerns over the potential development of upstream dams and water diversions in China's 'big bend'. Though officials in China have now formally disavowed any plans for water diversions (hydropower development is still a goal), and Indian officials have stated that hydropower development is not expected to have significant adverse impacts downstream in India and Bangladesh, widespread concern remains. On the Teesta River, a major tributary of the Brahmaputra, many had hoped that this would be a breakthrough year. When the Prime Minister of India visited Bangladesh in September, 2011, a Teesta Treaty was to be signed. In the 11<sup>th</sup> hour – underscoring the complex political economy of transboundary water agreements – the treaty was taken off the table at the insistence of the leadership of West Bengal, the Indian state that would be most impacted by the treaty.

Within this inevitable mix of progress and setbacks, we see a tentative, positive shift taking place in the willingness of the countries of South Asia to engage in discussions of regional integration generally, and cooperative water management in particular. This shift, sensed during the reporting period of this report, was evidenced in September 2011, when the Prime Ministers of India and Bangladesh signed a Framework Agreement on Cooperation for Development Between Government of the Republic of India and Government of the People's Republic of Bangladesh, calling for enhanced efforts in cooperative water management and in regional and sub-regional cooperation broadly – a significant milestone even in the absence of a Teesta Agreement. In November, leaders at both the 2011 SAARC Meetings and the Climate Summit for a Living Himalayas also called for enhanced transboundary cooperation.

SAWI has sought to contribute to this shift by (i) creating new knowledge (generating information), (ii) supporting a unique multi-stakeholder platform (promoting dialogue), and (iii) enabling innovative investments and institutional development (facilitating action and investment).

## **Information**

Information sharing and knowledge management has been a major focus of SAWI's efforts this year. The Ganges Strategic Basin Assessment is a flagship effort to generate new knowledge,

---

<sup>1</sup> Source: EM-DAT: The OFDA/CRED International Disaster Database ([www.emdate.be](http://www.emdate.be))



filling a critical knowledge gap that was identified in early SAWI and Abu Dhabi Dialogue discussions. The complexity of the Ganges river system and the extremes of the landscape called for an evidence-based study of the entire basin, yet no common knowledge base or basin-wide model existed. Such a model would be very useful for riparian countries, allowing them to explore options and facilitate cooperative planning at the basin level. SAWI addressed this key information challenge through the Strategic Basin Assessment (SBA), a multi-year study carried out by a World Bank team in cooperation with several leading research organizations in the region, including the Institute for Water Modeling (IWM) in Dhaka, the Indian Institute of Technology (IIT) in Delhi, and Indian Statistical Institute (ISI) also in Delhi. The centerpiece of this work was the development of a set of hydrological and economic river basin models that examine alternative scenarios across a range of possible climate and development scenarios in the Ganges. The social implications of water variability in the basin were also explored. The purpose of the SBA exercise was to stimulate debate on evidence-based actions in the basin.

As a result of the work being carried out on the Ganges SBA, several questions arose that called for additional research efforts. Groundwater is an important example. The Ganges-Brahmaputra-Meghna River Basin Groundwater Study was launched, building on the SBA to gain a better understanding of the dynamics of groundwater in this basin. SAWI's current research suggests that, despite widespread groundwater over-exploitation in the region, significant under-utilized potential remains in some specific sub-basins. Sustainable, conjunctive use of groundwater and surface water could significantly increase the availability of dry season water without the need for surface reservoir construction. The use of groundwater for irrigation would leave additional flows in the river system for downstream water users and ecosystems where access tends to be less sufficient and less reliable. This potential justifies careful consideration.

The Ganges assessment also highlighted how little is known about the economic and social values of ecosystems management in the Sundarbans, the massive mangrove forest that fringes the Bay of Bengal at the mouth of the Ganges. Several activities were therefore launched this year, including Building Knowledge and Capacity for Co-Management of the Sundarbans by India and Bangladesh, Social Dimensions of Climate Change, and Building Water Management Systems in the Ganges Sub-Basin for Bangladesh. These efforts will help build a knowledge base and identify appropriate interventions to sustain this fragile ecosystem and its vulnerable population.

Research on the social dimensions of South Asia's water challenges is an area for enhanced SAWI focus, in particular regarding gender. It is clear that the issues SAWI focuses on – water security both in the sense of adequate clean water availability as well as protection from water related harm – have differential gender impacts and are of crucial importance to women. It is well understood that when water availability and quality are undermined, women are particularly vulnerable as they are traditionally tasked with obtaining water (i.e. fetching and boiling it), as well as for caring for the sick who succumb to water borne diseases. The impact of water related natural disasters (e.g. floods, drought, etc.) is similarly skewed. Studies in

Bangladesh have shown that women and children are 14 times more likely to die in the event of a natural disaster than men.<sup>2</sup> In South Asia, the region's extreme vulnerability to natural disasters and endemic floods and droughts make the management of water a key gender issue. A troubling imbalance in sex ratios<sup>3</sup> suggest that women are particularly disadvantaged in the region, and that attention must be paid to strengthening their voice through the dialogues and outreach activities SAWI supports.

### ***Institutions***

An additional priority for SAWI is that of institutions in their broadest sense; including not only organizations and agencies, but also mechanisms for dialogue, principles, and incentives. Institutional change and development lie at the heart of the enduring challenge of sustainability. To avoid the common backsliding that is seen following the completion of donor engagement, change must be institutionalized, and this requires genuine ownership. SAWI therefore emphasizes continuous engagement with stakeholder groups; particular emphasis is placed on the policy makers and opinion-makers who will either own or disown change.

To facilitate a candid, high-level dialogue on the shared risks and opportunities of the rivers of the Greater Himalayas, the Abu Dhabi Dialogue has been supported and expanded. The Abu Dhabi Dialogue Group (ADD-G) is a partnership of senior members of government, academia and civil society from the seven countries that share the Rivers of the Greater Himalayas, namely Afghanistan, Bangladesh, Bhutan, China, India, Nepal, and Pakistan. With the support of SAWI, the ADD-G has met five times since its inception in 2006. The ADD-G emphasizes the importance of cooperation to acquire the knowledge necessary to identify 'common solutions to common problems' related to changes impacting water resources in the region. To engage the broader community, an Abu Dhabi Knowledge Forum and collaborative Small Grants Program were initiated to provide a platform and resources for regional researchers to exchange knowledge.

Recognizing that the ADD-G is (by design) an exclusive rather than inclusive group, SAWI this year focused efforts on building up the more inclusive Abu Dhabi Knowledge Forum – specifically the Small Grants Program (SGP). The SGP provides competitive research grants to partnerships between research institutions of at least two countries. The SGP seeks to strengthen the knowledge base in the region, calling for proposals on topics that have been identified by the ADD-G as priorities from a transboundary or regional perspective. Moreover, the region has a wealth of research institutions and the SBP endeavors to strengthen this influential knowledge network. The SGP seeks to provide not just financial resources to the network, but also a platform for exchange and an opportunity to enable networking.

---

<sup>2</sup> Neumayer, E. and Plumper, T. (2007). "The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002". *Annals of the Association of American Geographers*, 97(3): 551–566.

<sup>3</sup> Sex ratios are calculated as the number of women per 1,000 in a particular population and are considered a broad indicator of gender parity.

The launch of the SGP this year was designed to encourage new partnerships. Rather than simply inviting proposals from research consortia, which presumably would have returned partnerships of researchers with pre-existing relationships, the launch workshop was structured to create new partnerships. After a series of plenary discussions, participants joined smaller break-out groups focused on specific areas of interest. In these break-out groups, self-selected to bring together researchers with similar interests, several new partnerships were formed.

Another innovative area of dialogue and engagement is the Responsible Sourcing Initiative in Bangladesh. Working with the US Natural Resources Defense Council (NRDC), the International Finance Corporation (IFC), major multinational apparel retailers and brands, Bangladeshi textile industry trade associations, and the Government of Bangladesh, its objective is to “green the textile supply chain” by identifying and encouraging the adoption of efficient and less polluting production practices.

### ***Investments***

Investments in institutional development and infrastructure can help consolidate change and deliver measurable development outcomes. The SAWI development partners recognize that in order to create an enabling environment to engage at the transboundary level, national institutions also need to be developed and empowered. Therefore, while continuously exploring and encouraging opportunities for cooperative regional investments; SAWI has also been active in supporting, leveraging and/or influencing national level investments.

The National Ganga River Basin Authority (NGRBA) Project is an example of a national initiative that will deliver important development impacts in India, and at the same time build an institution that could prove critical for international cooperation on the Ganges. SAWI supported some of the early analytical work on the institutional design of the NGRBA, the first national (inter-state) basin authority in India. The NGRBA is a flagship program of the Government of India that is designed to clean and conserve the Ganges River (“the Ganga”) in India. The basin as a whole, which extends to 11 states, accounts for 26% of India’s landmass, 25% of its water resources, and more than 40% of its population. The mainstem in particular is extremely polluted and has been the subject of decades of media attention as to the state of its water quality and inadequate Government clean-up efforts.

In addition to directly providing strategic supplementary support to key investments like the NGRBA, SAWI is also leveraging and positively influencing the design of investments in the region through the process of knowledge creation, dialogue and exchange with governments and development partners. For example, the findings and discussions surrounding the Ganges SBA have influenced the design of World Bank supported investments currently under development on flood management in Bihar and agricultural water management in Uttar Pradesh. The SBA findings and the efforts at capacity building and dialogue under the Nepal Water Resources and Climate Change activity have been instrumental in the design of the Climate Investment Fund’s Pilot Program for Climate Resilience in Nepal, administered by the

World Bank Group and the Asian Development Bank. The geo-referenced water resources knowledge base developed under the Nepal Water Resources and Climate Change activity is being used by the National Electricity Authority to help rationalize its licensing and by the Ministry of Environment to support environmental management. In India, SAWI support was instrumental in delivering a cumulative impact assessment of proposed hydropower development in two of the major tributaries of the Ganges (the Bhagirathi and Alaknanda Rivers). The report is India's first comprehensive cumulative impact assessment of hydropower development on a major river basin.

As the efforts of many stakeholders across South Asia continue to build the region's knowledge and facilitate a regional dialogue, it is hoped that the momentum for cooperative action will grow. South Asian governments and stakeholders are increasing calls for enhanced regional cooperation and there is a growing sense that the path to prosperity, security and climate adaptation must be a more integrated path. Water will be a key.

# The SAWI Portfolio

---

## A. Regional Activities

### *The Abu Dhabi Dialogue (ADD)*

#### **Background & Objectives**

The Abu Dhabi Dialogue Group (ADD-G) brings together senior members of government, academia and civil society from the seven countries that share the Rivers of the Greater Himalayas, namely Afghanistan, Bangladesh, Bhutan, China, India, Nepal, and Pakistan. The ADD-G maintains the Abu Dhabi Dialogue (ADD), a non-formal consultative process designed to promote greater cooperation and a better understanding of the risks and opportunities of these great rivers.

The Abu Dhabi Dialogue developed out of the ‘First International Conference on Southern Asia Water Cooperation’, a regional meeting convened in Abu Dhabi in September 2006 by the International Institute of Strategic Studies (IISS) with the support of the UK Foreign and Commonwealth Office and with the participation of senior political, government, academic, and civil society members from the seven countries. The recommendation of the meeting was for the dialogue to be sustained, and facilitated by the World Bank.

With the support of SAWI, the ADD-G has met four times since its inception in 2006, and maintains ongoing communication in between these high-level meetings. The ADD-G emphasizes the importance of cooperation to acquire the knowledge necessary to identify ‘common solutions to common problems’ related to changes impacting water resources in the region. The 10-year vision of the ADD-G is:

*“A cooperative and knowledge based partnership of states fairly managing and developing the Himalayan river systems to bring economic prosperity, peace and social harmony, and environmental sustainability from the source to the sea.”*

In its meetings, the ADD-G follows several ‘rules of the game’, including: non-representative and non-formal participation, no focus on particular disputes, no attribution, and no requirement for a consensus outcome. To date, ADD sessions have been designed to share the global experience on international waters and benefit-sharing, and to achieve constructive convergence.

The dialogue remains pertinent and critical. The Rivers of the Greater Himalayas are a vital life-sustaining resource for South Asia, supporting some 1.5 billion people who live in these basins. Over 50 percent of South Asians – more than 750 million people – have been affected by at least one natural disaster in the past two decades. Achieving water security for its people remains a key challenge for the region.

## Status Update

The *5th Abu Dhabi Dialogue on Water Cooperation in South Asia* was held in Bangkok from December 15-16, 2010. Participants engaged in discussions ranging from the importance of interacting with a broader range of stakeholders, to the potential for regional cooperation on information sharing, to the direction and priorities going forward for the Abu Dhabi Dialogue Knowledge Forum (ADD-KF). A key outcome of the meeting was the decision to support research through the Small Grants Program (SGP) (see next activity for details.)

The ADD-G reconfirmed the need for cooperative regional action, in particular to enhance water- and climate-related information sharing. The World Bank was encouraged to continue to explore opportunities to increase the availability and promote the sharing of sound, timely hydrological and climate information among the countries of the Greater Himalayas. Possible regional cooperative actions relating to data harmonization, disaster risk management, navigation and the development of river basin organizations were discussed.

ADD-G members stressed the importance of interacting with a broader range of stakeholders working towards regional cooperation on water resources and on related sectors, such as energy generation, economic development, and regional trade. The group also condoned more proactive outreach to other dialogues and related activities in the region.

Maintaining high-level engagement from countries, in particular China and India, will continue to be challenging. However, encouraging signs have been seen with the preliminary responses to the dissemination of findings of the Ganges Strategic Basin Assessment (SBA). Leveraging the strengths and networks of ADD members to encourage a regional perspective among national level policymakers will be critical.

## *The Abu Dhabi Dialogue Knowledge Forum (ADD-KF): Small Grants Program (SGP)*

### **Background & Objectives**

Following the deliberations at the 1st Abu Dhabi Dialogue Knowledge Forum (ADD-KF) in Singapore in 2008, and subsequent discussions during the 4<sup>th</sup> and 5<sup>th</sup> Abu Dhabi Dialogues in 2009 and 2010, a Small Grants Program (SGP) was established to support knowledge generation and dissemination activities on the Rivers of the Greater Himalayas.

The objectives of the Small Grants Program, which is entirely funded by SAWI, are to: (i) facilitate the quest to increase knowledge about water resources systems and their uses within the realm of the Greater Himalayas, which are under stress from climate change and other drivers including population and economic growth; (ii) facilitate collaboration among knowledge institutions from different countries sharing the rivers of the Greater Himalayas; and (iii) support their efforts to work together in a collaborative manner. The SGP is expected to initiate new knowledge generation, expand current national research activities to extend across boundaries, and disseminate knowledge within the region.

The International Centre for Integrated Mountain Development (ICIMOD) is the administrator of this program. The SGP was officially launched this year during a workshop held in Kathmandu on March 2-3, 2011. The workshop, which was jointly organized by ICIMOD and SAWI, brought together representatives of 40 research institutions from across the seven countries of the ADD-G. The launch was designed to facilitate the formation of new partnerships between research institutions and the development of proposals for collaborative research and knowledge sharing. Immediately following the workshop, ICIMOD issued a Call for Proposals on its website: [www.icimod.org](http://www.icimod.org).

### **Status Update**

Following the official launch, a total of 40 proposals were received. These proposals were subsequently ranked and reviewed by selected international technical experts (from Harvard University, the International Water Management Institute (IWMI), FutureWater, and INRM Ltd. (India)) and the Technical Assessment Panel (TAP) comprising the Deputy Director General of ICIMOD (chair), one additional representative from ICIMOD, one representative from the World Bank, and one representative from the SAWI donor partners.

The TAP recommended a total of seven proposals for funding. These proposals are of good quality and cover a wide variety of relevant topics that are fully in line with the objectives of the Small Grants Program. Moreover, the selected proposals facilitate unique partnerships between at least two knowledge institutions from different countries sharing the rivers of the Greater Himalayas, many of whom had no history of formal interaction prior to the SGP launch. The proposals were shared with ADD-G members for comments and suggestions and final clearance was given by World Bank and ICIMOD management. ICIMOD is now in the process of awarding

sub-grants to the primary research institutions. Research activities will be completed within one year after awards are granted.

The following table provides an overview of the seven proposals that have been recommended by the TAP for funding.<sup>4</sup> In the first year of the ADD-KF Small Grants Program, a total of 13 different institutions from five different countries in the region are represented in the selected proposals.

**Table 1: Overview of the Proposals Recommended under the ADD-KF Small Grants Program**

	<b>Title</b>	<b>Institutions</b>	<b>Budget (USD)</b>
1	Case studies of impacts of climate change on hydrological regime in Nepal, India, and Afghanistan	Kathmandu University / Sharda University	98,200
2	Climate change and adaptation through water resources management: comparative study between Yellow and Koshi river basins	Peking University / Central Department of Geography, Tribhuvan University	100,000
3	Vulnerability assessment of meteorological flash floods in Poiqu/Bhotekhosi/Sunkoshi watershed	Central Department of Geography, Tribhuvan University / Asian International Rivers Center, Yunnan University	79,266
4	The impact of climate change on water stress situations in the Yellow River Basin, China	The Chinese National Committee on Irrigation and Drainage / National University of Science and Technology, Pakistan	150,000
5	Impact of climate change on water availability for community managed irrigation systems for food security	International Network on Participatory Irrigation Management, Nepal / University of Engineering and Technology, Pakistan	97,000
6	Benefit sharing mechanism in storage projects: lessons for the region	Jalsrot Vikas Sanstha / Kabul University	62,120
7	Addressing the seasonal water scarcity in Indian Western Himalaya through integrated approach of isotope technique, remote sensing and GIS application	G.B. Pant Institute of Himalayan Environment and Development / Institution for Development and Innovation (IDI)	51,400
	<b>Total</b>		<b>637,986</b>

<sup>4</sup> The budget is still tentative and to be confirmed.



## *Regional Communications and Knowledge Management*

### **Background & Objectives**

SAWI is committed to engaging governments, research institutes, media and civil society in dialogue about water resource management in the region; to increasing research-based information on water resources in the Himalayan river systems; and to ensuring this information is publicly available and easily accessible. To achieve these objectives, SAWI is building an ambitious program of strategic communications, knowledge management, and multi-stakeholder dialogues. Effective two-way development communications is essential given that the process of dialogue is expected to shape the design and development of SAWI's activities, and because the uptake of any SAWI efforts requires broad stakeholder ownership and acceptance. The aim of these activities is "communication for change" at the social and policy level. This new activity supports three areas that are essential to delivering the SAWI agenda:

### **Approach and Status Update**

#### Communications, Dialogue and Deliberations

Communications, Dialogue and Deliberations at the regional, basin and national levels are essential to delivering the SAWI agenda, as well as mitigating the risks associated with high-level political dialogue and new forms of strategic engagement. SAWI seeks to utilize information technology, work with a range of media, and create platforms for multi-stakeholder dialogues and shared learning opportunities. In particular, strategic communications - whereby relevant messages related to the substantive issues at hand are developed with key stakeholders and widely discussed and deliberated - is particularly important at this stage in SAWI's evolution as new regionally significant information is developed. The new knowledge generated by SAWI has a broad audience and significant potential for policy impact.

In this dynamic and politically fluid region, ongoing dialogue with diverse stakeholders will ensure that SAWI is able to not only seize new opportunities, but also remain strategically relevant. Regular meetings with key regional stakeholders to discuss potential new activities and engagement in international *fora* to bring global innovations to the region will be key. Innovative communications are essential to the deepening of knowledge that in turn allows for moving from information into action; it is envisioned that strategic communication will be a core component of the river basin level strategies.

Previous SAWI activities have demonstrated that dialogue throughout the research process is essential. To cite a specific example, the development of the Ganges Strategic Basin Assessment (SBA) study benefitted immensely from more than a dozen high-level consultations with policy-makers and opinion-makers in Bangladesh, India and Nepal, as well as the members of the ADD-G. Supported by a stakeholder analysis and in consultation with civil society organizations, a South Asia-wide dissemination plan is currently being undertaken that includes dialogue during the preparation of the study as well as extensive dissemination of the final report. The objective

is not only to influence future strategic investments and development work in the Ganges Basin, but also to highlight the importance of greater basin-wide information sharing, research, and modeling, and to encourage the use of relevant research.

Dissemination of the final SBA will include a variety of interpersonal, web-based and mass media-channeled communication tools. In 2012, the main report will be published in print and electronic formats; it will be shared during consultative sessions with key stakeholders across the basin including governments, civil society, development professionals, academia, research institutions, think tanks, and the media. To further the study's outreach, a stand-alone executive summary will also be published and disseminated in four languages – Bangla, English, Hindi and Nepali. Moreover, the findings will continue to be shared at regional and global meetings, and published in a peer-reviewed journal. Plans have begun to build a web-based knowledge portal, which would enable sharing of the information – social, economic, water resources -related, scientific, and strategic – developed by this study.

Global fora are also valuable avenues for SAWI's work. This year, SAWI organized a seminar at the Stockholm International Water Institute's (SIWI) World Water Week, the world's largest annual water conference. The seminar, entitled "Promoting Cooperation in the Ganges Basin through Dialogue, Analysis, and Projects" was held on August 21, 2011 and generated a great deal of interest. The objective was to showcase SAWI and its method of orchestrating support across development partners for building blocks (e.g. analysis, institutions, and investments) to improve regional cooperation on water. The Ganges Basin was taken as a case study, given its importance to several flagship activities supported by SAWI. The seminar also elaborated on how a similar concentration of activities at multiple levels in other basins could also bear fruit. Presentations were made by Bank staff on SAWI, the Abu Dhabi Dialogue, the Ganges SBA, and the National Ganga River Basin Authority in India; development partners joined the opening session and concluding panel. It was one of the most well attended seminars of the conference with notable participants including the new Director General of ICIMOD, the Chair of the World Water Week Scientific Panel, and the Chair of the Global Water Partnership. The session was featured in the World Water Week daily newsletter and reported on by the Third Pole Project.

### Knowledge Management

Knowledge Management is crucial to ensuring that the outputs of SAWI-funded activities are well targeted and accessible to key stakeholders in the region, including governments, policymakers, academics, specialists, and other donors, as well as the general public. This focus area is closely related to the strategic communications discussed above, and will support activities related to the creation and presentation of knowledge such as a SAWI website, a working paper series, peer reviewed journal articles, and online/open access knowledge bases. Particular attention will be paid to information accessibility including, for example, differentiated outputs for specific stakeholder groups and national language translations. Partnerships will be developed with civil society and media organizations to develop knowledge

collection and sharing platforms and products, such as web portals, email updates, orientation programs, and publications.

In this era of information and fast transformational changes, a website is an important and efficient tool to share information with a diverse set of stakeholders, who may be geographically distant and/or may not have the time or opportunity to directly interact with SAWI partners and staff. A website would also act as a repository of information accessible to all interested parties and may be highly effective to reach out to key audiences. It would highlight SAWI's portfolio of activities at three levels: regional, basin, and national. In addition, it would function as a resource for information on key areas such as transboundary waters, climate change, mountains and glaciers, regional information and forecasting, and water security. A draft version of the SAWI website has recently been prepared and will be further developed and launched in the coming year.

Figure 1: The SAWI Logo



SAWI has developed a logo and set of publication style guidelines that will provide a distinct visual identity for the partnership to use on its website, reports, presentations, etc. The logo shows the SAWI acronym and full name, and captures the key geographical elements of the Himalayan region, including the snow-capped mountains, the flowing rivers and the rich plains. It was designed to depict how these systems are interconnected - an indication of how SAWI's work is cross-sectoral and cross-basin, limited not by political boundaries but by geography and climate. In addition, the artistic design clearly reflects a distinctly South Asian influence.

## *B. Basin Activities*

### *The Ganges Basin*

#### *The Ganges Strategic Basin Assessment (SBA)*

##### **Background & Objectives**

The Ganges is the most populous river basin in the world, home to some 655 million people. It presents both great opportunities and complex challenges for its riparian countries: Bangladesh, India and Nepal. Currently, the development in this river basin is largely the result of incremental, project-by-project activities within each of these countries. However, the complexity of this river system and the extremes of the landscape call for an evidence-based study of the entire basin system. The presence of a very large, poor, and climate-vulnerable population in the basin further underscores this need.

Many common perceptions on the dynamics of the basin exist both within the countries and between the countries. However, to date, there has been no common knowledge base or basin-wide model that riparian countries can use to explore options and facilitate cooperative planning at the basin level. SAWI has addressed this need through the Ganges SBA, a multi-year study carried out by a World Bank team in cooperation with several leading research organizations in the region, including the Institute for Water Modeling (IWM) in Dhaka, the Indian Institute of Technology (IIT) in Delhi, and Indian Statistical Institute (ISI) also in Delhi. The centerpiece of this work was the development of a set of nested hydrological and economic river basin models that examine alternative scenarios across a range of possible climate and development Ganges futures; an important social component also studies the social implications of water variability in the basin.

### **Status Update**

The analysis behind the SBA has been completed, and the study is being finalized for dissemination. The findings of the study challenge conventional beliefs but present a sustainable way forward. Contrary to popular perceptions, the study shows that upstream dams alone will not control flooding but information-backed flood management will be more effective. Upstream dams could nearly double the low flows downstream in the dry season but the resultant economic value is unclear. The underground aquifers of the Basin could provide the same scale of water storage as the proposed upstream dams more immediately and most likely at considerably lower financial, social and environmental cost.

The results of the study also emphasize that hydropower realization and climate change present unique opportunities for regional cooperation. The net economic value of this potential hydropower due to upstream dams is estimated at some \$5 billion annually, in addition to providing an important source of clean energy in a region with high economic growth and rapidly growing power demands. Notwithstanding the climate change uncertainties in South Asia, the scale and focus of today's climate challenges – unpredictable and intense rainfall, alternating extremes of flood and drought – will continue to be the key climate challenges in the coming decades. Immediate action such as a focus on basin-wide information and institutions, in particular in regards to flood management and conjunctive use of groundwater and surface water, is therefore justified.

To ensure quality, an international Expert Advisory Group was constituted for peer review. The Group comprised a set of distinguished water sector experts and academics from Harvard, Oxford and Queens Universities. In addition, the research was submitted to the World Bank's quality assurance processes, involving review by a team of senior World Bank professionals and a final clearance meeting chaired by the South Asia Region's Chief Economist.

The study benefitted immensely from over a dozen high-level consultations with policy-makers and opinion-makers in Bangladesh, India and Nepal, as well as the members of the Abu Dhabi Dialogue Group, and draws upon a vast collection of regional and international literature that has been debating these crucial questions for many years.

Consultations over the early findings of the SBA were an important opportunity for the deliberation of new information. These findings could greatly influence the region's flood management strategy, and are already influencing the direction of some of the World Bank projects currently under preparation in Bangladesh, India and Nepal.

Initial findings were shared this past year during a second set of regional consultations, held in August 2010 with governments and stakeholders in Bangladesh and Nepal. Stakeholders consulted in Bangladesh included senior policymakers and decision-makers from the Ministry of Water Resources, the Joint Rivers Commission, the Water Resources Planning Organization, and the Meteorological Department, as well as a Member of Parliament and several eminent researchers. A briefing was also held for the Vice Chancellor of BRAC University.

In Nepal, senior-most policymakers from the Water and Energy Commission Secretariat, the Ministry of Energy, the Department of Irrigation, the Department of Hydrology and Meteorology, and several other associated government departments were consulted and contributed their views. An additional consultation session was held in Kathmandu with representatives from key civil society organizations, researchers and donor partners.

In India, where no earlier consultations had been possible, discussions on the report's early findings were held with senior-most policymakers at the Ministry of Environment and Forests, Ministry of Water Resources, the National Planning Commission, the Department of Economic Affairs, the Central Water Commission and the Central Groundwater Board.

Although some of the results were surprising to stakeholders, there was, overall, keen interest in the Basin and a demonstrated interest in similar research in other South Asian basins.

## Building Knowledge and Capacity for Co-Management of the Sundarbans by India and Bangladesh.

### Background & Objectives

The Sundarbans are the world's largest mangrove system and span the Indian state of West Bengal (around 40% of the 10,000m<sup>2</sup>) and Bangladesh (the remaining 60%). The area has been designated a World Heritage Site, as well as a Biosphere Reserve, in recognition of the unique multitudes of biodiversity and species living in the area. However, poverty in the Sundarbans also remains a key challenge. With limited livelihood opportunities and high social exclusion, around half the residents live below the poverty line. The challenges of socio-economic development and biodiversity conservation are further undermined by the growing risks of climate-induced natural disasters. Flooding and salinity intrusion alongside natural changes contribute to lower land fertility, a higher prevalence of disease, and growing risks and hardship.

In 2009, the World Bank initiated a series of studies on the West Bengal side of the Sunderbans through a Non Lending Technical Assistance (NLTA) project to identify priority issues and possible interventions for sustainable development of the Indian Sundarbans. Shortly thereafter, a similar program was initiated in Bangladesh. The parallel undertaking of these activities provides a unique opportunity to understand the Sundarbans as a region, facilitating the promotion of coordinated management and interventions on both sides of the border. A key impediment to regional cooperation and integration has been the lack of critical and complementary information in both countries.

Studies have now been completed for West Bengal and are ongoing in Bangladesh. Recent SAWI provided funding will be used to complete all of the analytical work needed to better understand the key priorities and issues in Bangladesh. Under the ongoing NLTA, consultants have been contracted to undertake: (i) a household survey of the area; (ii) biodiversity conservation studies; (iii) geomorphological, hydraulic, hydrology and estuaries management studies; and (iv) an institutional analysis.

Although this activity should be treated as a whole, specific SAWI funding will be used to complete studies on: (i) the cost of environmental degradation; (ii) benefit cost analyses on the reduction of vulnerability to natural disasters, natural resources management, and environmental health; (iii) livelihoods and socio-economic analyses; and (iv) Geographic Information Systems (GIS). The completion of these studies is critical to understanding the key issues and priorities in the Bangladesh Sundarbans and to provide a basis for regional cooperation and coordination between the authorities and governments of both countries.

### Status Update

The specific SAWI funded studies have just been recently launched and are still in the initial stages of development. The NLTA consultants have, however, already submitted inception and draft reports. The latest technical mission of the Bank task team took place in October 2011 to

review the progress of the socio-economic development studies, biodiversity study, and household survey, and to discuss the initial findings with the Government of Bangladesh (GoB) and local-based consultants. Preliminary results are summarized below. In the coming months, these studies will be finalized and the results shared and discussed with the GoB. Extensive consultations and dissemination of the findings are anticipated in specialized technical workshops.

Climate Change Adaptation and Disaster Risk Management (DRM): The results of flood-modeling demonstrated that climate change impacts result in incremental expected flood inundation of about 1-5 cm in a 24- hour period in the Sundarbans area. Greater attention should also be paid to cyclones and, to a lesser degree, to severe convective storms, since both phenomena have historically resulted in a significant number of deaths and economic damage. Impacts of tropical cyclones are potentially the most significant; their energy is expected to increase 11% with economic damage from any given storm increasing by 65% as a result of the higher projected energy levels. Although historically only 4% of the world's cyclones have formed in the Bay of Bengal, they are responsible for a disproportionately large number of deaths.

Storm and cyclone response and early warning systems (EWS) in Bangladesh have improved considerably over recent decades. Recommendations for improving the cyclone forecasting system include enhancing the ability to provide probabilistic information as to when and where a cyclone will make landfall, as well as its scale and intensity. Best practices of complex probability-based forecasting systems provide up to 15 days notice of landfall. Effective early warning systems have important implications; increased warning periods provide greater lead-times, enabling local residents to more effectively prepare and take measures to protect their lives and assets. Findings recommend the establishment of such a system, and associated programs might cost of about \$6.2 million over five years. Given that these forecasting systems also benefit other countries in the region, costs could potentially be shared.

Geomorphological Changes and Sea Level Rise: Preliminary findings from the study of geomorphological changes resulting from climate change reveal that the rate of sea level rise in the Bangladesh Sundarbans is rapid as a result of land surface subsidence. While the rate of sea level rise is rapid, the morphological impact has been less pronounced than expected.

The findings question the generally accepted theory that sediments in the Sundarbans' estuaries are derived from a transport pathway down the Meghna into the sea and landwards into the estuaries. Instead, it is possible that sediment accreting in the Pussur is derived from the Gorai River and therefore any increase in fresh water flow in the Gorai river could increase sedimentation in the Pussur and, importantly, at Mongla port. This hypothesis should be carefully tested.

Household Survey: The objective of the household survey (HHS) was to provide a baseline assessment to develop a better understanding of: (i) the demographic and economic profile of households in the Sundarbans, including education attainment rates, health and sanitation,

employment levels, and livelihood activities in the region; (ii) how households respond to salinity intrusion and frequent natural disasters like cyclone and storm surges, including migration patterns; and, (iii) how household strategies could be strengthened to reduce the impact of cyclones and storm surges and future environmental changes. The scope of the work included collecting information on: household characteristics (such as demographics, health, education), assets, consumption, agriculture, livestock, aquaculture, forestry, migration and emigration patterns, nature of climate-induced cyclones, storm surges, water logging and salinity intrusion impacts on households, household adaptation decisions, social networks, solidarity mechanisms, public sector responses, and social conflicts due to limited common property resources.

Socioeconomic Development: Socioeconomic analyses are being conducted for the categories: (i) agriculture and fisheries; (ii) small-scale rural and community infrastructure; (iii) livelihood options; and (iv) human development (health and education). Preliminary findings reveal that the extent of saline-intolerant mangrove species of Sundri (which is a valuable source of timber) has been declining over time, and that increases in sea level rise have negative impacts on crop cultivation in the region. The following work is in progress: a literature review, discussions with experts, preparation of a checklist for focus group discussion, formulation of a study team to assist experts, preparation of a draft checklist for an institutional survey and a tentative work plan. The inception report is currently being prepared.

Biodiversity Conservation: The scope of work for biodiversity conservation includes: (i) an assessment and mapping of threats to biodiversity to identify vulnerable regions within the Sundarbans to determine areas that may require special attention and conservation management measures; (ii) identification of all stakeholders at different levels and their actions using the 3Rs (Role, Responsibilities, and Relationships) framework to identify the positive and negative impacts of stakeholders in the Sundarbans; and (iii) collaboration with WWF-India on regional dialogue. Major threats to biodiversity in the Sundarbans include, among others, land-use changes (shrimp cultivation), overexploitation of natural resources, pirating, climate change (including sea level rise and increases in storm activity), and industrial development.



## Building Water Management Systems in the Ganges Sub-Basin for Bangladesh

### Background & Objectives

Integrated water resources planning and management in Bangladesh is essential for the socio-economic development of the Gorai sub-basin population. One of the emerging lessons from the Ganges Strategic Basin Assessment (SBA) is that dry-season flows can be addressed (at least partially) more cost-effectively at the sub-basin level. This activity seeks to build on the initial findings of the Ganges SBA by focusing on the implications for the basin's lowest riparian, Bangladesh. The Ganges Dependent Area, which is principally fed by the Gorai River and its distributaries, is one of the poorest regions in Bangladesh and is home to 40 million people and the world's largest mangrove forest, the Sundarbans, also shared with India. Water shortages in the dry winter season has lead to river sedimentation and increased salinity of the surface water, soils and groundwater, which, in turn, affects rural and urban water supplies, crop and fish production, and the fragile mangrove ecosystems.

Increasing the dry season discharge of the Gorai River would increase the volume of fresh water entering the Ganges Dependent Area and mitigate some of these adverse impacts. Initial feasibility studies suggest that the dry season discharge of the rivers in the Ganges Dependent Areas could be augmented through a combination of continuous dredging and river structures such as a flow divider to divert flows from the Ganges into the Gorai river system. The studies undertaken with SAWI support will explore how the productive uses of the dry-season flows currently allocated through the 1996 Ganges Treaty could be enhanced through the restoration of the Gorai river systems within the Ganges Dependent Area.

In order to further strengthen water resources management in the sub-basin, this study will also assess ways in which hydrological information and flood forecasting systems can be better strengthened and harmonized at the basin level in order to ultimately support a broader regional hydrological data sharing platform. Indeed, according to the Ganges SBA, cooperation on data collection, monitoring and use between the basin countries (Nepal, India, Bangladesh and China) rather than joint-infrastructure development is likely to be the key in addressing sub-basin management issues such as flood management and early warning systems.

The sub-activities funded through the SAWI grant are two-fold:

1. The development of mathematical models to assess the effectiveness of various management structures in augmenting the flow in the Gorai sub-basin and reducing salinity in downstream areas. This will include:
  - the review, development, and updating of existing mathematical models;
  - an assessment of the effectiveness of different off-take management structures in augmenting dry season flow in the Gorai river system; and

- an evaluation of the downstream impacts of augmented flow through the Gorai River on flow availability and salinity reduction in the south west region of Bangladesh using a suite of dynamic mathematical models.
2. The development of a framework and design of hydrological information systems for the Ganges sub-basin. The scope of work includes:
- a review of existing data collection, transmission, and management systems;
  - an assessment of present and future water management information needs in the context of climate change; and
  - development of a detailed plan to rationalize/upgrade the network.

### **Status Update**

This activity was approved at the end of the financial year and has just begun: the contracting of institutions to undertake the studies is presently underway.

## *The Indus Basin*

### **The Impacts of Climate Risks on Water & Food Security in the Indus Basin in Pakistan**

#### **Background & Objectives**

Pakistan relies on the largest contiguous irrigation system in the world, namely the Indus Basin Irrigation System (IBIS) for basic food security and supply of water for all sectors of the economy. The IBIS consists of the Indus River and its tributaries, three major multi-purpose storage reservoirs, 19 barrages, 12 inter-river link canals, 43 major irrigation canal commands (covering over 14 million hectares), and over 120,000 watercourses, delivering water to farms and other productive uses. The IBIS is the backbone of the country's economy. The agriculture sector that is supported by this system continues to play a critical role in the economy and the livelihoods of rural communities. Agriculture contributes 22% to GDP, accounts for 60% of its exports, and provides livelihoods to almost 70% of the rural population. Providing sufficient food to a growing population is a major development challenge for the country. The total cultivated land area is about 22 million hectares of which almost 2/3 is irrigated from surface water and 22% from groundwater. Agriculture in most areas is not possible without irrigation because the climate is arid to semi-arid with low and variable rainfall.

Climate change may impact the overall water availability and agriculture yields in this system. Currently, about 50-80% of the total average river flows in the Indus system is fed by snow and glacier melt in the Hindu-Kush-Karakoram (HKK) part of the Himalayas. The remainder is from the annual monsoon system. It is reported that glaciers in this region are receding at rapid rates. Changes in the distribution and timing of snowfall and snowmelt are also of concern. These changes may have significant impacts on the available supplies entering the Indus system. This has implications on the overall ability to manage scarce and variable water resources. Moreover, changes in temperature, precipitation, and atmospheric CO<sub>2</sub> concentrations may also have a direct impact on agricultural yields. These potential changes, in addition to the various climate risks that the country already faces, may place additional challenges on water management over the next 20-30 years.

The World Bank is currently undertaking a major study to examine how various drivers (at the 20-30 year planning horizon) will impact allocations across various water-related sectors in the Indus Basin system and result in changes in food and water security in the Indus Basin in Pakistan. A better understanding of these tradeoffs will help to guide the prioritization and planning of future investments, ultimately strengthening overall water and food security. Specific objectives of this large study are to build upon the existing literature and previous modeling efforts, and do the following:

1. Review the current water and agriculture challenges and investment plans, and identify key areas that are dependent on climate uncertainty and risks;

2. Improve upon an existing optimization-allocation basin model of the Indus river basin by (a) better characterizing agricultural production, (b) including other water-dependent competing sectors (e.g. hydropower, municipal supplies), (c) better characterizing glacial contributions to the Indus system, (d) reexamining the allocation rules, and (e) including additional direct and indirect climatic impacts (e.g. extreme events);
3. Improve existing estimates of impacts of climate variability and change on agriculture supply/production for a variety of critical crops (e.g. rice, wheat), incorporating both direct precipitation and temperature effects in addition to water availability impacts; and
4. Assess the implications of a variety of physical (e.g. climate change) and socio-economic scenarios on agriculture growth and impacts on rural households and, in this context, review the economics of various options and investments under currently discussion (both in the agriculture and water sectors).

The objective of the particular SAWI-funded portion of the larger study is to update an existing social accounting matrix (SAM) and computable general equilibrium (CGE) model for Pakistan, and to explore how various scenarios of climate variability (e.g. floods), agriculture and water policies will impact the macro-economy and different households. This activity is linked to the on-going water modeling (i.e. update of the Indus Basin Model Revised (IBMR) optimization model) and glacier modeling work that is being conducted in parallel. This will then feed back into the larger overall study on Pakistan and water and agriculture to determine the impacts of climate risks on future food security.

The International Food Policy Research Institute (IFPRI) team conducting the work will use the new SAM as the database for a CGE analysis based on an existing IFPRI CGE model for Pakistan. This baseline model will be modified as needed to take into account the regional disaggregation needed for the water simulations in this analysis, in connection with the IBMR. Various climate and development scenarios will be identified.

Using information about the range of possible production changes due to climate change and changes in demands, the study will estimate a range of impacts on the economy (e.g. price) and households (e.g. consumption, distribution). Potential scenarios could include: (i) improved distribution of water in ways that increase agricultural productivity and incomes by easing water constraints (e.g., increasing on-farm water use efficiency or providing more water to farm plots at the tail-end of canals); (ii) decrease of water availability in the regions dependent on flow from snow and ice melt; (iii) increase in foreign savings; (iv) increase in world cotton and textile prices; (v) increase in production subsidies; and (vi) increase in total factor productivity, among others. Scenarios may also include, inter alia, how various world price movements and Pakistan trade policies may influence these results.

### **Status Update**

The updates to the SAM and CGE have been completed, and an approach to integrating the results from the water model to the CGE has been devised. Outputs from the water model have recently been shared with IFPRI; draft contributions are anticipated in early 2012.

## The Social Dimensions of Climate Vulnerability in the Indus Basin

### Background & Objectives

The floods that surged through Pakistan in July and August 2010 destroyed homes, livelihoods and devastated communities. An estimated 20.25 million people were affected nationwide in 79 out of 127 districts. At the height of the floods, one fifth of the country was under water. Almost 2,000 people lost their lives, and an estimated 10 million people were left homeless. Estimates from a Damage and Needs Assessment (DNA) conducted in August 2010 indicate that livelihoods of around 5.1 million were affected. About 3 million women, over 770,000 pregnant women, and an estimated 9.5 million children under the age of 18 were directly impacted. The floods also disrupted assistance to 2.5 million conflict-affected internally displaced persons.

In Sindh Province, the floods affected 19 out of 23 districts, and heavy monsoon rains further exacerbated the extent of the damage. Moreover, while the floods were some of the worst Pakistan as a whole, and Sindh in particular has experienced in nearly 100 years, they were also indicative of inundations that affect the province every year. In future, environmental degradation and climate change may only further exacerbate these recurring problems. The Government of Sindh has initiated a Non-Lending Technical Assistance (NLTA) project supported by the World Bank to better understand, prioritize and address recurring environmental issues, one of which is the cost of natural disasters.

SAWI is leveraging this project by providing supplementary resources to strengthen the social and gender aspects of the work to better understand: (i) how households and communities affected by the 2010 floods have coped with and recovered from the impacts of the floods; and (ii) which types of recovery strategies have best aided households in flood affected districts in restoring their assets and livelihoods. In order to better understand the effects and responses, the key questions to be asked are: (i) what have the effects of the floods been on household assets, consumption/income, debt levels, and livelihood strategies one year after the floods?; (ii) which types of policies or programs have been most effective in helping households restore livelihoods one year after the floods?; (iii) what existing kinds of traditional or informal mechanisms have helped facilitate recovery?; (iv) what have the impacts of the floods been on women, female-headed households and other vulnerable groups?; and (v) what sort of feedback and proposals can communities provide for improved recovery efforts?

### Status Update

The questionnaire that will be used in a survey of around 1,000 households in Sindh Province is currently being prepared. It aims to answer questions on the impacts of the floods and government responses, as well as to collect information on the costs of natural disasters. The survey will also place a strong emphasis on disaggregating impacts and recovery patterns by gender and other social groups.

## Cross Basin Activities

### The Social Dimensions of Climate Change

#### Background & Objectives

The Ganges River Basin covers an area as large and as geographically varied as South America, and spans four countries: rising in the Himalayan border regions of China and Nepal, and running 2,500 km through India into Bangladesh to the Bay of Bengal. The Ganges River is a monsoon river system; around 80 percent of the annual precipitation in the Basin occurs in three short months, from July through September. In conjunction with glacial runoffs from the Himalayas, the timing and intensity of this rainfall recharges aquifers and groundwater, completes eco-hydrological cycles, revives fish populations, sustains biodiversity, and feeds agricultural production. The timing of these events is in delicate balance with human needs, and slight variations in river flows can be destructive, causing devastating floods, or long periods of drought. The impacts of this variability on the over 650 million people of the Ganges Basin are wide-ranging, depending in part on physical location and exposure to extreme events. But everywhere in the Basin, these impacts are embedded in social structures and institutions, with the poor and socially marginalized facing the greatest risk to water variability, and with the least recourse to recovery.

In addition to the high levels of variability that exist, global climate change models estimate that the region's average annual temperature will rise 2.3 C to 4.8 C (depending on location) between 1980 and 2040. This is expected to lead to more erratic weather patterns, including rainfall, which could increase the frequency and intensity of floods and droughts in the region. Furthermore, sea level rise and extreme weather events such as cyclones and floods compound the development challenges of the Sundarbans, the largest single mangrove system in the world. The increasing volatility and unpredictability of rainfall and weather events are expected to exacerbate the deterioration of livelihoods in the Basin, with a particularly detrimental effect on those living below the poverty line and who are otherwise socially vulnerable. In order to better understand the human dimension to water variability in the Ganges Basin, the South Asia Region's Social Development Unit has initiated a multi-year study that aims to provide key inputs in the short term to ongoing Bank work, as well as to provide an overview of how key social vulnerabilities intersect with physical vulnerabilities in the Basin.

The main objective of the SAWI grant is to support analytical work on the social dimensions of water variability in the Ganges Basin. This analytical work aims to develop a better understanding of: (i) the potential social impacts of hydrology regimes and local economic conditions – whether resulting from policy/investment decisions or climate variability/change; and (ii) the effectiveness of current coping and adaptation strategies, at household and community levels, with a particular focus on early warning systems and other community-based measures. In addition, climate change is expected to have a disproportionate effect on women,

female-headed households, and other vulnerable groups. The analytical work will focus on disaggregating findings by gender and social groups so as to highlight these differences.

### **Status Update**

To date, SAWI support has assisted in the delivery of the following:

- (1) The design and execution of a micro-level analysis in the Ganges Basin to investigate the social dimensions of flood, drought, low flows, water quality issues and salinity intrusion. The aim of this work is to establish themes and commonalities in understanding how physical vulnerabilities are embedded within key social institutions, as well as how “soft” responses (both coping and adaptation initiatives), most notably community-based early warning systems, could be strengthened. The data collection for this analysis was completed in 2010 in flood and drought prone areas of Bihar (Madhubani, Muzzafarpur, Kosi area for floods, and Gaya for drought), as well as in the Sunderbans area of West Bengal, and on water quality in Allahabad and Kanpur. Additional fieldwork was conducted in the drought-prone area of Rajshahi-Godagari Upazila in Bangladesh, the flood prone area of Rajbani Upazila in Bangladesh, and the Bangladesh Sunderbans. This analytical work distinguishes between men and women in an attempt to capture the gendered dimensions of adaptation. The output of this work will contribute to papers and reports on the social dimensions of climate change, and has contributed to the socio-economic sections of the Ganges SBA.
- (2) The design and implementation of two household surveys in the coastal areas of the Sundarbans, both on the India and on the Bangladesh sides. The main issues that these household surveys sought to understand were: (i) the nature of climate-induced flooding, waterlogging and salinity intrusion impacts on rural households in the Sundarbans; (ii) the social and economic factors contributing to adaptation decisions in response to rapid onset weather events such as floods, or slow onset events such as waterlogging and salinity intrusion; (iii) social norms and social preferences and how they differ across social groups, most notably gender categories, and how these differences shape adaptation decisions; (iv) policies and institutional responses and other forms of solidarity mechanisms or social capital that effectively assist households in adapting to flooding, water logging and salinity intrusion; and (v) gender differences in the impacts of and responses to climate change. Analysis is currently underway for the survey in West Bengal, with an expected output of a series of papers. The outputs of the survey are also expected to inform ongoing work on the Sundarbans through an ongoing NLTA in West Bengal as well as the new NLTA in Bangladesh.



## The Ganges-Brahmaputra-Meghna (GBM) River Basin Groundwater Study

### Background & Objectives

Groundwater is a critical resource supporting economic activity and livelihoods in the Ganges-Brahmaputra-Meghna (GBM) Basin. Providing drinking water for rural communities and irrigation during the dry season, the importance of groundwater is clear. Groundwater storage plays an important role in defining the characteristics of the floods in the basin.

This activity follows on the recently completed Ganges Strategic Basin Assessment (SBA) and an earlier SAWI-funded activity that examined coastal salinity issues given changing sea levels. It aims to build upon earlier groundwater modeling work in the Ganges River Basin to better understand the complex processes between surface and groundwater in the region and to illustrate key issues and concepts critical to the Basin.

The Ganges SBA briefly explored the concept of the ‘Ganges Water Machine’ (Revelle, 1975, and Revelle and Lakshminarayana, 1975.) This activity focuses on examining the practical implementation of this concept using numerical groundwater modeling.

For the past few centuries, irrigation in the Ganges Basin has been practiced by diverting water from rivers to irrigated fields through a large network of canals. Over the last few decades, an increase in water demand coupled with population increase has resulted in the development of groundwater-based irrigation to supplement existing surface water irrigation. However, uncoordinated use of surface and groundwater has in some areas resulted in a rise in the water table (water logging), and in other areas an excessive lowering of the water table (utilizing shallow tube wells during the dry season when groundwater is most needed). Increasing irrigation in the dry season, using either surface water or groundwater, reduces dry season flow in the Ganges. This could have important implications both for Bangladesh and for downstream states in India such as West Bengal.

The ‘Ganges Water Machine’ hypothesizes that irrigation in the GBM Basin can be developed to its full potential without affecting dry season flow within the rivers if a portion of the excess monsoon water can be stored as groundwater and utilized during the dry season. Surface storage is not possible due to the very flat nature of the plains, but storage as groundwater should be possible if appropriate schemes are employed. The concept suggests that pumping groundwater along the river during the dry season can lower the water table close to the river, increasing recharge from the river during the following wet season. Since pumping close to the river during the dry season will also capture water from the river, reducing dry season flow, a portion of the pumped water must be returned to the river to maintain this flow. The remaining groundwater can be supplied to the irrigation fields through canal networks. The authors have shown (using quantitative analytical methods) that after 12 years of pumping, the system will reach a steady-state condition and thereafter it will be possible to store 60 BCM of water each year. Later research developed a model to represent this concept, and also proposed schemes

for pumping along non-perennial rivers and conjunctive use of surface and groundwater in areas away from the rivers.

Funded by SAWI, the GMB River Basin Groundwater Study has developed some preliminary numerical models to test these concepts further and to explore management options to minimize water logging in canal head areas and to raise water tables in canal tails. It is expected to result in general (not site-specific) answers to the following questions:

- How much system storage can be created by heavy dry season pumping along rivers and by distribution of excess monsoon season flow to wide areas by canals (to increase storage in groundwater beyond mere riverbank filtration);
- How different the well capacity and well field configuration should be for perennial and non-perennial rivers;
- What an appropriate irrigation scheme would be in areas distant from the river so that there will be no excessive water table rise or fall;
- What the flood benefit would be from heavy pumping along rivers; and
- How sensitive results are to various hydro geological parameters (how appropriate are particular management schemes for various types of hydro geological systems).

### **Status Update**

A preliminary review of groundwater issues has been prepared for the Ganges Basin, as well as an initial numerical modeling document illustrating key concepts behind the Ganges Water Machine. Moving forward, the work plan for continued activities has been broken down into two phases.

The first phase focuses on controls, namely the evaluation of the mechanics of the 'Ganges Water Machine' concept. Beginning with a model most-similar to the analytical solution proposed by Revelle, the spatial dimensionality and realism will be increased, determining which added factors have the greatest influence on the amount of water that can be stored. Factors include: pumping distribution, timing, and rate, recharge rate, presence of canals, and perennial vs. ephemeral rivers.

For the most-representative model (in 2D), the primary hydrogeologic parameters/factors that control the amount of water stored will be determined. These factors include aquifer permeability, permeability anisotropy, and river bed permeability and thickness. The optimal spatial/temporal arrangement of pumping to maximize storage in a system most similar to the original Water Machine will be determined for a range of parameter values (perhaps two extremes and a mid-value); optimization will be manual. Other typical arrangements of river/canal/irrigation area will be evaluated in the similar manner. The ensuing results will be instrumental in the identification of a few, distinct 'management types' that require different

optimal arrangements and amounts of storage. This will enable the respective amounts of possible storage, per area or length of a region where the type is implemented, to be determined.

The Second Phase focuses on application, specifically estimating water storage below rivers/canals within large areas of the upper Ganges Basin. Several 'type areas' that describe unique combinations of hydrogeology and river/canal patterns will be defined. Using the data and hydro geologic information, GIS maps of the defined 'type areas' in important part(s) of the Ganges Basin (e.g. in Uttar Pradesh) can then be mapped. For the selected region(s), GIS can also be used to estimate the amount of water storage (also as a percentage of flood quantity) and determine achievable quantities of other objectives (e.g. irrigation water, reduction in area of water logging, etc). Time allowing, a 3D model of the Water Machine will be generated to evaluate the impact of lateral spacing of well fields on quantity stored.

## Feasibility Study for a Regional Monitoring Center for the Greater Himalayas

### Background & Objectives

Water is becoming an increasingly critical factor in Asia and the catchments of the Himalayas are the source of a significant portion of this water. Glaciers are a component of the Himalayan water cycle. There is general agreement that a widespread retreat of the global ice cover has been occurring since at least the late 1800s. However, no consensus view on the significance of this retreat has been reached – neither with regard to the factors determining glacier mass balance nor the resulting impacts on water resources and the environment. Recent concerns related to the relationship between Himalayan glaciers and global and regional climates, as well as the potential impacts of the retreat of these glaciers on the hydrology of rivers originating in the catchment basins of the Himalaya, have not yet been thoroughly analyzed.

This is, at least in part, a result of the relative inaccessibility of the glaciers of the Himalaya. At altitudes generally between 4,000-7,000 m, impediments include the extreme logistical difficulties of: 1) reaching the glaciers; and 2) conducting meaningful research once they have been reached. It is apparent that an alternative to traditional “Alpine” glaciology is required in the mountains of the Hindu Kush-Himalaya (HKH) region. Baseline information on glacier mass balance, the local and general mountain climate(s), the hydrologic regime, and resulting volumes and timings of water resources in the HKH mountain region is required before implications of climate change on the rivers of south Asia can be assessed realistically.

While it is generally agreed that increased monitoring of the glaciers, climate, and hydrology of the HKH region is required, the way in which this monitoring could be best undertaken is less certain. Some areas of improved measurement capacity could be the following:

Glacier Mass Balance: Glaciers exist as a result of complex interactions between the processes of mass gain – in the form of snow – and melt, primarily produced by short- and long-wave radiation and sensible heat. These interactions determine the mass balance of a glacier. Glaciers may advance, or retreat, from either an increase or decrease in energy availability, an increase or decrease in snow accumulation, or some combination of the two. Mass balance measurements involve the direct field measurement of mass added as snow during an accumulation season, and mass loss as melt, during an ablation season.

Glaciers and Climate: In all large mountain ranges, glaciers grow or shrink, in response to the interaction between the regional climate and the topography of the mountains. The glacier climates of a large mountain range reflect the regional climate in which the mountains exist. The regional climate is modified by the topography of the mountains into a three-dimensional environmental mosaic, referred to as “topo-climates.” At a local, intermediate or meso- scale, glacier topo-climates are determined by interactions between regional air masses and variations in terrain altitude, aspect and slope. Critical climate factors are air temperature, precipitation, humidity, wind speed and direction, and solar radiation.

Glaciers and Stream Flow: The relationship between fluctuations in mass balance and stream flow volume and timing varies with location downstream from the glacier terminus. With increasing distance, the importance of the glacier's contribution to total stream flow volume and to timing of flow decreases, as other sources such as snow melt, rainfall or groundwater increase in importance. This may also have implications for estimating glacial lake outburst floods (GLOFs).

The objective of this SAWI funded activity is to present a first-order synthesis of the quantity and quality of the existing monitoring already occurring in the HKH region and to recommend future monitoring investments. Key questions to be answered by this study are: (i) What types of investments are required?; (ii) Where should they be located?; (iii) How much will they cost?; and (iv) Who will operate and maintain the system? The final report will carry out the following tasks:

- 1) Summarize current monitoring (hydrology, climate, glacier, etc) in the HKH mountain chain, with specific emphasis on Pakistan, India and Nepal;
- 2) Assess the quality and sustainability of current monitoring;
- 3) Identify relevant institutions and capacities for monitoring and data archiving;
- 4) Recommend procedures in the Himalaya for data collection;
- 5) Identify realistic glacier monitoring objectives and data needs to achieve those objectives;
- 6) Outline a comprehensive monitoring program based on assessed requirements;
- 7) Identify specific sites, topographic elements (e.g., altitudinal belts, aspect classes, glacier segments) or geographic regions where monitoring will be most useful or challenging;
- 8) Outline logistics, equipment and personnel requirements, accessibility considerations, and technical procedures for hypothetical HKH hydrologic monitoring;
- 9) Propose practical monitoring procedures, methodologies and instrumentation for the Himalayan conditions;
- 10) Assess existing level of national and regional organization and collaboration, and procedures by which this might be improved; and
- 11) Provide recommendations on the costs and benefits of a regional monitoring program.

### **Status Update**

The lead consultant has been contracted for the primary deliverable: a report describing, to the extent possible, the existing climate monitoring programs in the Himalayan countries of Pakistan, India and Nepal, together with a discussion of practical procedures and instrumentation for improving or modifying these existing programs. TORs have been drafted for the remaining experts to be contracted.

## *C. National Activities*

### *Bangladesh*

#### **Improving Water Quality in Dhaka: the Responsible Sourcing Initiative**

##### **Background & Objectives**

The Bangladesh Responsible Sourcing Initiative (RSI) is a joint initiative with the US Natural Resources Defense Council (NRDC) and the International Finance Corporation (IFC). The objective is to green the textile supply chain by identifying efficient and less polluting cleaner production best practices for the Bangladesh textile industry. It also encourages adoption of these best practices through the use of market mechanisms and new partnerships between the suppliers of major multinational apparel retailers and brands, Bangladeshi textile industry trade associations, and the Government of Bangladesh (GoB).

The RSI is using Bangladesh as a case study, along with earlier experience in China, to identify the "Top-Ten Best-Practice" Cleaner Production (CP) processes in typical textile mills, which are: (i) low cost; (ii) energy, water and chemical efficient; and (iii) less polluting. By reducing energy use and carbon release from one of the biggest industrial emitters in Bangladesh, this activity will also demonstrate effective climate change mitigation measures. The Bangladesh and China RSI findings will be shared with key retail brands interested in greening their supply chain, including Wal-Mart; Gap; Levis; H&M; Marks and Spencer; and Li and Fung.

##### **Status Update**

After the initiation of this activity, first an assessment of approximately thirty factories in Dhaka was undertaken to screen suitable top and medium performing factories that could become part of the RSI best practice study. Of the thirty, seven factories were selected for in-depth audits: (i) three top performing factories to determine what their strengths were; and (ii) four medium performing factories to determine which low-cost practices were most applicable.

In May 2011, a high-level workshop jointly hosted by the Government of Bangladesh, the World Bank, IFC, and NRDC was held in Dhaka to discuss: (i) the preliminary findings of the cleaner production audits based on existing best practices in leading textile factories in Bangladesh; and (ii) opportunities and challenges for scaling up the adoption of such measures in lower performing factories. This multi-stakeholder workshop helped bring together the Director General of the Department of Environment (DoE) and other senior officials from the Ministry of Environment and Forests (MoEF), with the heads of national business associations, regional buyers, participating factories, and interested Development Partners (e.g. GIZ and SIDA). A training course for MoEF and DoE staff on monitoring and compliance was also held by the NRDC and the US EPA's Office of Enforcement and Compliance Assurance.

Table 2: Cleaner Production Measures for the Responsible Sourcing Initiative with Most Demonstrated Potential

<b>WATER</b>
<b>Eliminate water leaks in taps and pipes</b>
<b>Reuse steam condensate</b>
<b>Reduce hose pipe use</b>
<b>Sort and reuse minimally waste water after filtration</b>
<b>ENERGY</b>
<b>Steam management (including steam trap maintenance)</b>
<b>Insulate steam pipes</b>
<b>CHEMICALS</b>
<b>Reduce chemical spillage</b>
<b>Use magnetic device to reduce scaling</b>

Some of the key lessons to date have been:

- Case studies have shown that the top 10 CP practices appear applicable globally;
- In-country differences can nevertheless distort the cost-benefit equation (e.g. significant differences in the cost of water, fuel, and meters), although potential barriers to CP can be addressed through government policies (e.g. removing duty on imported meters);
- Quick RSI pilots can help identify country-specific policy options through rapid identifications of deviations from the norm;
- Financial savings from CP are greater once the costs of treated wastewater are factored in, moreover there is a strong case for linking CP pilots to larger wastewater operations;
- Factory user groups have emerged as a powerful tool for encouraging factories to adopt CP measures, with participating factories calling for the establishment of a sustainable communications platform/CP center to facilitate "peer to peer" CP learning.

## Improving Water Resources Management in the Gorai River Basin

### Background & Objectives

The main objective of this activity is to strengthen institutional capacity for improved water resources management at the national and sub-national levels in Bangladesh, and to promote regional cooperation between Bangladesh and its neighboring countries on water resources management. This will be done by carrying out several analytic and consultative activities on the Gorai River, a key distributary of the Ganga in Bangladesh. These activities will directly inform Bank operations, in particular the Bangladesh Rivers Information and Conservation (BRIC) Project, a 5-year project<sup>5</sup> currently under preparation. It is envisioned that the activities will also have broader regional significance in terms of: (i) identifying innovative means of promoting regional cooperation on water resources management issues between India and Bangladesh; (ii) synthesizing and scaling up lessons from activities carried out in other countries; and (iii) generating new knowledge on institutional design and water sector governance issues that can be replicated in other countries in the region.

Funding from SAWI will support carrying out analytic work in three broad areas:

(1) Lessons and experience with modernizing the hydromet network: The main focus of this activity will be to undertake analytic work to learn from and to design synergies with proposed regional hydromet projects, as well as other national hydromet projects. Bangladesh's hydrological network, built over the period 1960-1980, is old and ill-equipped to manage one of the most complex river systems in the world. The existing network needs to be upgraded and automated in an integral platform. Lessons from what has worked or not worked in other regional projects can provide valuable information in terms of modernizing Bangladesh's hydrology network, which can then be operationalized through the BRIC program.

(2) Design options for a Gorai River Basin Authority: Funding from SAWI will also be used to assess the effectiveness of sub-national level water policies and institutions, identifying areas of organizational reform and strengthening, and carrying out analytic work to inform the design of a potential river basin authority, using international experience and in coordination with other Development Partners.

(3) Economic costs-benefits analysis of increasing low-flows in the Gorai: Economic analysis of improved water flow in the Gorai River will be undertaken to help identify priorities for intervention. Analysis will include an estimation of the benefits for the Sundarbans region and the coastal areas of Bangladesh, which are most likely to benefit from flow augmentation in the Gorai. Both direct and indirect benefits will be assessed. The analysis will provide information to both the BRIC program and the broader regional dialogue.

### Status Update

---

<sup>5</sup> Estimated cost of US\$160 million



Support from SAWI enabled the hiring of a consultant to provide expert advice and a technical review of all activities related to the feasibility analysis for the Gorai River off-take works and related to the project design. This grant also enabled the World Bank team to hire a second consultant to carry out an economic and financial analysis of the BRIC project.

A draft note on Early Warning Systems on Bangladesh has been prepared, based on desk review and interviews with experts from the Asian Development Bank (ADB), Institute for Water Modeling (IWM), Flood Forecasting and Warning Center (FFWC) and the Bangladesh Water Development Board (BWDB). The draft report identifies key gaps that the proposed BRIC project would bridge, especially as related to data collection and effective warning dissemination at the grassroots level.

## India

### Support for the National Ganga River Basin Project

#### **Background & Objectives**

Launched in February 2009, the National Ganga River Basin Authority (NGRBA) is a flagship of the Government of India (GoI) to clean and conserve the Ganges River (“the Ganga”) in India. This mighty river -- of great cultural, religious, and hydrological significance -- runs for more than 2,500 km in India through the five states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal. The basin extends to 11 states, accounts for 26% of India’s landmass, 30% of its water resources, and more than 40% of its water resources. The mainstem in particular is extremely polluted and has been the subject of decades of media attention as to the state of its water quality and of the Government’s inadequate attempts to clean it so far. The new Authority, hailed as a potential game changer in how water quality is addressed in India, is composed of state Chief Ministers and key Union Ministers, and is headed by the Prime Minister. It has resolved that by year 2020, no untreated sewage or industrial effluent will be discharged into the Ganga.

The World Bank is supporting the NGRBA and its associated NGRBA Program through the National Ganga River Basin Project, a \$1.5 billion<sup>6</sup> project delivered to the Bank’s Board in May 2011. The project’s development objectives are: (i) to establish and support NGRBA’s national and state operational-level institutions, such that they are capable of planning and implementing a multi-sectoral river water quality improvement program in a basin context; and (ii) to reduce pollution loads into the Ganga in selected investment locations through sustainable interventions. There are two components to the project: (i) institutional development, and (ii) infrastructure investments. The first component entails building the necessary basin and state institutions needed to operationalize the program, including a new, state-of-the-art Ganga Knowledge Center, and to increase the capacity of the existing environmental regulators (e.g. the Pollution Control Boards) and urban service providers (e.g. the water and sanitation boards of cities). The second component will fund priority infrastructure investments in four sectors: (i) wastewater collection and treatment; (ii) industrial pollution control; (iii) solid waste management; and (iv) river front management.

In the first year of project preparation and general World Bank support to the GoI in the design of the NGRBA Program, SAWI supported analytical work on the institutional development needed to improve the resilience and engagement of the program. In particular, SAWI supported the delivery of a workshop on international experiences with river cleaning in a basin context, and the implementation of a targeted TA program on institutional development relying on the advice and expertise of national and international consultants (including the former CEO of the Murray Darling Basin Commission). SAWI funding was instrumental in enabling the Bank to go beyond normal preparatory activities and engage on difficult issues, such as the creation

---

<sup>6</sup> Of which US\$1 billion is a loan from the World Bank

of new institutions, was possible. These new institutions, including the National Mission Clean Ganga (NMCG) at the Center and the State Program Management Groups (SPMGs) in the States, form the operational core of the new program. Currently being launched and staffed, they represent the organizations dedicated to implementation of the NGRBA Program on a day-to-day basis, and the key to its success.

In FY11, a second phase of SAWI support was given to the task team to design very specific activities under Component One of the project, namely: the Water Quality Monitoring Program, the Ganga Knowledge Center, and the Capacity Building of Environmental Regulators. Support was also provided through SAWI to support innovations in the project, such as the design of the first Clean Development Mechanism (CDM) carbon credit program for river clean-up and piloting of net energy generating sewage treatment plants in the basin.

### **Status Update**

The associated project was delivered to the World Bank's Board in May 2011 and remains a flagship of the India portfolio. It has now entered the first year of implementation, with a total of 8 years. During presentation to the Board, SAWI and its development partners were specifically thanked and the instrumental nature of the support provided during project preparation was strongly acknowledged. The Ministry of Environment and Forests (MoEF) and the new Ganga specific institutions have also expressed their appreciation of the additional funding provided by SAWI.

The detailed project reports (DPRs) for the three sub-components recently supported by SAWI (i.e. the Water Quality Monitoring Program, the Ganga Knowledge Center, and Capacity Building of Environmental Regulators) have since been prepared by Bank staff, dedicated expert consultants, and the MoEF. These DPRs will be put forward to the NGRBA's Empowered Steering Committee in its next meeting, and are expected to be approved. A CDM Program of Activities (POA) is currently being prepared to design a programmatic approach to obtain carbon credits for all wastewater investments supported through the NGRBA Program.

## Cumulative Impact Assessment of Hydropower Development in River Basin Planning

### Background & Objectives

Inadequate electricity supply has long been a constraint to economic and human development in India. The Government of India has a strategic focus on improving the power supply to the economy and ensuring universal access to electricity. Currently, more than 400 million people in India are without reliable access to electricity.

Hydroelectric power has an important role to play in meeting the Government's ambitious development targets, as only about 30 percent of the country's estimated hydroelectric power potential has been developed. As concerns grow in India, as elsewhere in the world, over the high cost of fossil fuels and the global as well as local environmental impacts of their widespread use, hydropower is increasingly seen as an economic and potentially sustainable alternative to fossil fuels for the generation of electricity.

Hydropower offers numerous advantages over other types of electricity generation, including: (i) its system stabilization benefits that are central to efficient management of the daily surges in the demand for power (resulting from the large number of households in India whose demand is concentrated in morning and evening hours); (ii) the abundance of undeveloped hydropower potential in the country; (iii) low operating costs relative to fossil fuel plants; and (iv) the important contribution to India's energy security and low-carbon growth strategy.

At the same time, these attractive qualities are diminished by a legacy of large cost- and time-overruns, which are the result of the numerous obstacles faced by hydropower development, including geological, technical, project management, financial, social and environmental aspects. Moreover, as construction is begun on more and more hydropower projects, there has been an increasing awareness, in government and in the public at large, of the great need for a more informed understanding of the likely cumulative and induced impacts of large-scale hydro development. In the public discourse over hydropower development in Uttarakhand and, more generally, at the national level in India, the question of ensuring adequate river flows downstream of dams has emerged as a particular concern.

The Ministry of Environment and Forests (MoEF) has taken the lead in assessing these aspects of hydropower development on the river basin level (as distinct from the project level). In July 2010, MoEF commissioned the Indian Institute of Technology-Roorkee (IIT-Roorkee) to carry out a cumulative impact assessment of proposed hydropower development in the basins of the two major tributaries of the Ganges in India: the Bhagirathi and Alaknanda Rivers. At the request of IIT-Roorkee, the World Bank participated in an international workshop sponsored by IIT-Roorkee in October 2010.

### Status Update

With the just-in-time support provided by SAWI, the World Bank brought two international experts on cumulative impact assessment to the workshop and to meetings with the IIT-Roorkee team. In addition, SAWI support provided ongoing technical assistance, including expert commentary, throughout the preparation period of the cumulative impact assessment. The assessment was submitted to MoEF in April 2011 and has since been acknowledged as India's first comprehensive cumulative impact assessment of hydropower development on a major river basin.

## Good Environmental Practices in Hydropower Projects

### Background & Objectives

Abundant renewable hydropower resources in the mountainous regions of South Asia could prove to be a transformative solution to the region's chronic energy and water shortages, both of which are major impediments to economic growth and human development. The hydropower potential of Bhutan, Nepal and India is estimated at around 200 gigawatts (GW), of which less than 20 percent (mainly in India) has been developed so far. These countries have more than 600 million people without access to electricity and face significant energy and peaking shortages. To meet energy demands, these three countries have designed ambitious hydropower development programs: Bhutan plans to add 10 GW of hydropower capacity by 2020 (compared to 1.4 GW at present); India plans to exploit the remaining 110 GW of untapped potential in the next 20 years (compared to 38 GW added over the last 60 years); and Nepal plans to add 10,000 megawatts (MW) by 2020 (compared to less than 700 MW at present). In addition to energy generation, hydropower projects can also support drinking and irrigation requirements by providing freshwater storage for snowmelt and rainwater.

Water storage also replenishes groundwater aquifers and reduces vulnerability to floods and droughts. While hydropower development is an integral part of energy and development strategies in the region, the sustainable development of such projects is inherently challenging. One such challenge is to assess the environmental and social impacts of hydropower projects and adequately mitigate these impacts. Recently, hydropower development in the region has seen an improvement in understanding and addressing these impacts; comprehensive environmental and social impact assessments, consultation with civil society, and support for local area development programs are becoming increasingly common. The proposed study aims to: (i) identify and document good environment and social management practice across the three countries; (ii) gain a better understanding of key factors that influence performance; and (iii) disseminate and promote adoption of good practice across the sector.

The primary objective of SAWI support is to identify, analyze and document good practice examples, in particular through the following activities:

- (1) A study to identify the good practices in environmental and social management in hydropower projects in Bhutan, Nepal and India. The study includes primary and secondary research, site visits, and discussions with project developers to determine causal factors associated with successful good practice implementation;
- (2) Collection of documentation on each of the identified and verified good practices, and assessment of the potential for replication in upcoming hydropower projects in the region; and
- (3) Initial dissemination of findings.

### Status Update

At the beginning of the activity, WWF-India consultants shared an inception report for the study in line with the agreed Terms of Reference (TORs) that defined their approach, methodology, and work plan for the assignment. An Initial desk study was then conducted, including a review of literature, annual reports, journals, and websites, along with open ended discussions with individuals and groups working on the social and environmental aspects of hydropower projects. A list of hydropower projects with self-reported records of good practice was then drawn up and a selection was made for further investigation. In-depth analysis included field visits to the identified projects to collect more information from the project developers, hold discussions with the different stakeholders, and to collect ground-level data (including photographs). An interim report with initial findings was drafted and is currently under review by the task team.

## Nepal

### Water Resources and Climate Change

#### **Background & Objectives**

Nepal has a wealth of water resources, with more than 6,000 rivers including the four major basins of the Mahakali, Karnali, Gandaki and Kosi. The country sits at the headwaters of the most populous basin in the world, the Ganges Basin, which is home to about 650 million people and some of the richest agricultural lands in South Asia. Given its geographical position and immense water wealth, Nepal is central to water management and adaptation strategies for the region as a whole. Hydromet information systems, water storage, and mountain and forest ecosystem services can provide benefits across the Gangetic plains.

To date, Nepal's natural resource wealth remains largely untapped. Only 2% of the country's economically feasible hydropower has been developed, and only 17% of cultivated areas are irrigated year round.

In addition, the country is extremely vulnerable to water-related hazards. Nepal's hydrology is highly variable, with the monsoon bringing 80% of Nepal's rainfall in just a few months during the summer. Nepal's terai (lowlands) and India's downstream states routinely suffer from devastating floods affecting large, poor populations. Climate change will amplify these risks.

In 2011, Nepal was ranked the 4th most climate vulnerable country in the world. Several of Nepal's most important development opportunities (i.e., hydropower and agriculture) are highly susceptible to climate change, and its most extreme development risks (i.e., drought, flood, GLOFs, waterborne disease) may be heightened by it. The vulnerability of communities and the economy, given their heavy dependence on natural resources, means that small changes in climate can have severe development consequences.

This SAWI supported activity was developed to support dialogue with the Government of Nepal and to provide demand-responsive "just in time" technical inputs to help the Government define its priorities pertaining to water resources management and climate change. A series of activities have been delivered over the past two years, and reported on in previous Annual Reports. As the activity drew to a close this year, discussions regarding a possible second phase effort have been initiated. Specific activities over the past three years have included:

#### *Water Resources Management*

- Creation of a National Water Resources Knowledge Base
- Capacity Building for River Basin Modeling and Development of River Basin Models for the Babai and West Rapti Rivers
- Capacity Strengthening Support for Transboundary Waters Cell

#### *Climate Change*



- Climate Change Conference: Kathmandu to Copenhagen
- Summiteers' Summit to Save the Himalayas (COP 15 side event)
- The Mountain Alliance Initiative

## **Status Update**

A brief description of two activities that were undertaken during this reporting year is provided below.

### Water Resources Knowledge Base

The Water and Energy Commission Secretariat (WECS), the government body mandated to implement river basin management and to guard against conflicting uses of water within basins, requested support for the development of a GIS-based spatial knowledge base of water resources. The knowledge base will facilitate rapid access to key data and information for an improved understanding of water supplies and demands, as well as risks and opportunities in the basins of Nepal. It will serve as a fundamental tool for decision-support as well as an advocacy tool for WECS, facilitating communications and knowledge dissemination to stakeholders inside and outside government who need to understand the opportunities and weigh the trade-offs inherent in water resources development.

The information management system will be the main knowledge platform of the Water Resources Information Center that is being established in parallel at WECS under the ongoing World Bank-financed Irrigation and Water Resources Management Project. A consulting firm was contracted to work closely with WECS staff to develop the database, geo-information and management system, water resources atlases, a web-portal, and to train WECS staff. The consultancy was undertaken between April – November 2010, and the results were presented during a final dissemination workshop at the end of November 2010. The Web-Portal can be accessed through the following: <http://www.wecs-wrkb.gov.np/en/map/>.

Several stakeholders are already making use of the knowledge base. In addition to WECS, the National Electricity Authority is using the knowledge because it is the only existing geo-referenced data base of hydropower licenses in Nepal. The database is also being used by the World Bank Country Office to map Bank-financed projects in Nepal. In the future, the Bank plans to enhance donor coordination by offering to map the projects of all interested donors in this system.

The Government of Nepal has demonstrated its interest in the database and is contributing to its further development, in particular with regard to environmental information. A request has now been received from WECS, Ministry of Energy and Ministry of Environment, to expand the existing GIS based water resources information system into a water-environment and natural resources database by including environmental and natural resource related data for Nepal's river basins in the GIS system. This follow-up work will be undertaken through a World Bank-financed technical assistance activity with possible co-financing from SAWI.

This small SAWI investment in information management has been extremely effective in raising awareness, creating demand among stakeholders and leveraging multiple uses of information.

#### Mountain Initiative

Following the successful Kathmandu to Copenhagen Conference and the Summiteers' Summit, the Prime Minister of Nepal has continued to be an outspoken advocate of high mountain states in global climate change discussions. The Prime Minister announced the launch of the Mountain Initiative during the Copenhagen COP15 meetings by calling on all mountain countries and stakeholders to come together to, *"form a common platform and make sure that mountain concerns [receive] ... due attention in the international deliberations."* He went on to stress the importance of representation in future COP negotiations in order to garner appropriate international support.

The Mountain Initiative has since delivered two well-received side events at the UNFCCC meetings in Bonn, and is planning a global, Ministerial-Level conference of mountainous countries in early 2012. SAWI, along with a consortium of development partners, is providing support for these efforts.

## Afghanistan

### Technical Support for Integrated River Basin Planning and Investment Prioritization

#### **Background & Objectives**

The World Bank's Afghanistan Water Resources Development (AWARD) Project aims to build the capacity of the Water Resources Planning Unit (WRPU), set up by the Ministry of Energy and Water (MEW) of Afghanistan to undertake strategic basin planning, water resources management and investments prioritization. SAWI is supporting the project, in particular with regards to institutional development and capacity building.

Specifically, the AWARD project is supporting MEW in: (i) developing and adopting a strategic water resources planning framework; and (ii) carrying out water resources investment preparation studies. These goals would be achieved through capacity-building of the Water Resources Planning Unit (WRPU) and Project Preparation Unit (PPU) established in the MEW under the AWARD project. Progress towards achieving these objectives is measured by the following key indicators: (a) WRPU and PPU staffed with adequately trained staff and consultants; (b) a knowledge base and analytical tools are developed for the Kabul River Basin and other targeted basins; (c) investment priorities in the Kabul River Basin and other targeted basins are identified; and (d) a number of preparation studies are completed for priority investment options (at least to pre-feasibility levels).

To support the overall AWARD activities, SAWI provides technical support for institutional development and capacity building of Water Resources Planning Unit. SAWI's technical support aims to (i) enhance knowledge and capacity on issues of regional, and in particular transboundary, water resources management and climate adaptation, (ii) facilitate multi-stakeholder dialogue and policy deliberation, and (iii) promote cooperative actions such as policy reforms, institutional development and investment.

#### **Status Update**

The WRPU has collected hydrological data for the past couple of years in the Kabul Basin, and prepared the Decision Support System (DSS). It is collecting data for the remaining basins, in particular the Panj Amu Basin. The WRPU staff attended training courses in China (Land Surface Observation and Modeling and Data Assimilation) and in Pakistan (Snow and Ice Glaciers Melt Models for the Indus basin).

The PPU has used the priority investments identified in the report entitled 'Scoping Strategic Options for Development of the Kabul River Basin' to plan various water development projects. Project reviews have been strengthened with guidance provided by an international civil engineer. These reviews include feasibility studies for the Gulbahar Storage Dam, Shatoot Storage Dam I, and the Kama Irrigation and Hydro-power Project. The objective is to maximize water development benefits from energy and irrigation projects in the Kabul River Basin. The

PPU is also reviewing technical proposals for water development projects in other basins; and is currently maintaining the water resources database for Afghanistan. The PPU's main task, i.e. the preparation of planning and design standards and guidelines for undertaking pre-feasibility and feasibility studies, is scheduled to commence soon.

# Trust Fund Management

---

## *Governance*

As in previous years, the Multi Donor Trust Fund (MDTF) remains managed by the World Bank. The SAWI core team, based in Washington and in the region, works very closely in this regard with the Donor Partners. The governance structure currently in place ensures that the Bank is responsible for day-to-day administration of the MDTF including (i) fiduciary obligations for management and financial reporting, (ii) strategic design of the program and allocation of funds across activities, and (iii) communication and reporting to Donor Partners at least four times a year.

The Trust Fund Committee, which consists of the three Donors Partners and the World Bank, reviews the program each year at the Annual Meeting. The proposed work plan and associated budget for the year ahead are presented and formally endorsed at these meetings. Informal periodic meetings and a mid-year virtual review are also held to sustain active communications among the partners. The Committee provides strategic oversight and inputs to substantive program design. It operates by consensus (i.e. not voting rights) and maintains an equitable and informal approach to governance. The Committee remains limited to the World Bank and current financing partners (Australia, Norway, and the UK) and will only be expanded if and when new Donors join the MDTF.

Although in previous years the possibilities of a 'Regional Consultative Committee' and an 'Advisory Group' have been discussed, these have not been created for the MDTF as a whole. During the previous Annual Meeting, all Partners agreed that the 'Regional Consultative Committee' remains a premature idea and that the 'Advisory Group' should be considered at a later date. As SAWI enters the final year of the three-year MDTF, it is unlikely new governance layers will be added in this phase, although new arrangements will be discussed during the design phase of the potential SAWI Phase 2.

## *Staffing*

SAWI is led by a program manager based in Bangkok, with a core team based in New Delhi, Kathmandu and Washington that manages and monitors the portfolio of activities, fiduciary responsibilities, donor liaison and communications. For specific SAWI-funded activities, water professionals, operations and research analysts, resource management specialists, lawyers, trust fund management specialists, and administrative assistants provide support from Washington and from the country offices of the World Bank in Dhaka, Islamabad, Kabul, Kathmandu, and New Delhi, as well as Beijing for China's engagement on the Abu Dhabi Dialogue.

In the previous Annual Meeting, it was agreed that the core SAWI team was short staffed in the areas of research support and strategic communications. To fill these gaps, new staff have been

hired to build and strengthen the research and communications pillars. Donor Partners and the World Bank agreed that strategic communications is an important part of SAWI and that engagement in this field will significantly boost deliberation with and influence on policymakers in the region. New sector professionals are currently being hired to support the core team and the implementation of some of the flagship activities, and the World Bank has committed to making the recruitment of staff a priority in the coming year.

### *Financial Reporting*

At the end of this Financial Year (i.e. June 30, 2011), approximately 90% of total pledges had been received. In other words, to date about US\$ 8.6 million has been paid into the MDTF, out of the total amount pledged of about US\$ 9.7 million. Norway will pay its remaining contribution of just over US\$ 1 million (6,000,000 NOK) in the coming FY after delivery of this Annual Report.

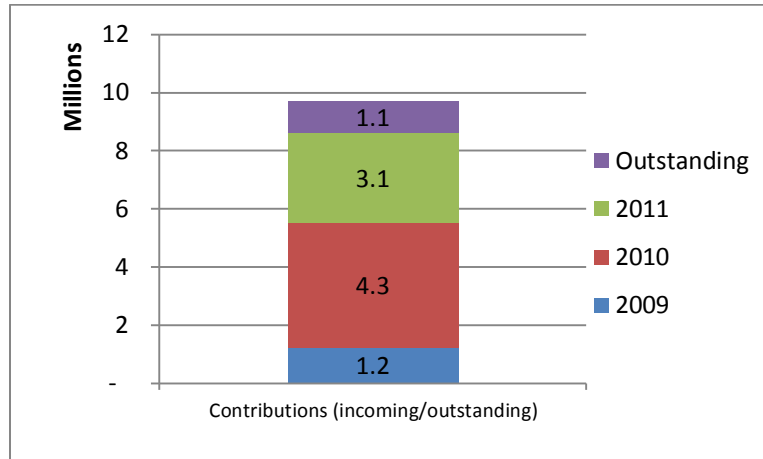
**Table 3: Total Donor Pledges to the MDTF**

Partners	Pledges			Deposits in donor's currency ('000)	Deposits in US\$ ('000)	Remaining balance in donor's currency ('000)	Remaining balance in US\$ ('000)	Remaining balance as % of pledges (%)
	Currency	Donor currency ('000)	Amount in US\$ ('000)					
<b>Ausaid</b>	AUD	3,000	2,831	3,000	2,831	0	0	0%
<b>DfID</b>	GBP	2,442	3,761	2,442	3,762	0	0	0%
<b>Norway</b>	NOK	18,000	3,150	12,000	2,043	6,000	1,106	33%
<b>Total</b>			9,742		8,636		1,106	11%

*Note: numbers may vary due to currency fluctuations.*

Pledges paid by FY are shown in Figure 2 below. Most of the pledges were received in 2010 (US\$ 4.3 million), with a second substantial portion (US\$ 3.1 million) received in 2011. Just over US\$ 1 million remains to be paid in. There have always been sufficient funds for new activities. However, with disbursements accelerating, the final amount will be transferred for allocation in FY12.

Figure 2: Paid Pledges by Fiscal Year (US\$)



At the end of the FY (i.e. June 30, 2011), just over US\$ 7 million had been allocated to SAWI activities, accounting for 73% of the net available contributions (see Table 4). Net available contributions are calculated by adding investment income (paid in by the World Bank) to the total pledges (both paid and unpaid) and subtracting the administrative fee (taken by the World Bank for all Trust Funds), calculated at 2% of total contributions. This currently leaves just over US\$ 2.5 million for new allocations in FY12.

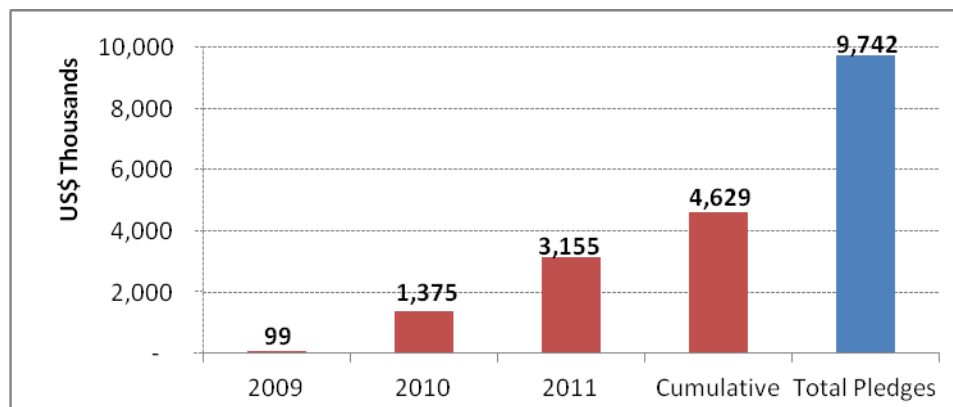
Table 4: Details of Net Available Contributions

Details	Holding Currency (USD 000s)
<b>Total Pledges, of which:</b>	<b>9,742</b>
(+) Unpaid Portion	1,106
(+) Portion Paid-in	8,636
(+) Investment Income	69
(-) Admin Fee (2%)	195
<b>Net Available Contributions</b>	<b>9,616</b>
<b>Activity Allocations</b>	<b>7,044</b>
<b>Available for Allocations</b>	<b>2,572</b>

*Note: numbers may not add exactly due to rounding.*

Building SAWI's portfolio has required some lead time. While disbursements started slowly, they have since sharply increased. In FY09 annual disbursements totaled US\$ 99,000; in FY10, annual disbursements reached almost US\$ 1.4 million; and this FY, disbursements have more than doubled to almost US\$ 3.2 million (see also Figure 3). Therefore, on a cumulative basis, across all the FYs, about US\$ 4.6 million or almost 50% of the net available contributions has already been spent – with 73% already allocated. At the end of reporting year, an additional \$400,000 had already been committed.

Figure 3: Disbursements Compared to Total Pledges FY 2009-2011



The details of allocations and disbursements by individual activities are presented in the table below (see Table 5). At the last Annual Meeting in 2010, all partners agreed to shift allocations towards a 40%:40%:20% ratio between the regional, basin, and national level, respectively. As a result, more allocations have been made to the regional and basin level in FY11 compared to national activities. As of the end of this FY, regional allocations totaled US\$ 1.425 million or 36%, basin allocations totaled US \$2.506 million or 37%, and national activities totaled US\$ 1.762 million or 26%. Further allocations in FY12 of the remaining \$2.5 million are intended to complete the shared objective of a final allocation ratio for the SAWI MDTF.

Table 5: Details of the SAWI Portfolio, as of June 30, 2011

ACTIVITY	Status	Start date	End Date	Allocation	Disbursed
<b>REGIONAL LEVEL</b>					
Regional Cooperation on the Rivers of the Greater Himalayas	Active	8/1/2009	12/31/2013	1,113,302	665,518
Regional Cooperation in Sediment Management in Hydro Projects	Closed	4/1/2009	02/28/2010	90,589	90,589
South Asia Climate Change: Kathmandu to Copenhagen Conference	Closed	08/01/2009	02/28/2010	55,167	55,167
Phase 1: Communications, Knowledge Management, Business Development	Active	6/1/2009	08/31/2014	166,215	166,215
<b>Total</b>				<b>1,425,273</b>	<b>977,489</b>
<b>BASIN LEVEL</b>					
Ganges Strategic Basin Assessment	Active	5/1/2009	1/29/2012	1,388,968	1,260,220
Social Dimensions of Climate Change	Active	3/1/2010	12/31/2011	149,016	5,640
Ganges-Brahmaputra-Meghna River Basin Groundwater Study	Active	6/1/2010	6/30/2012	168,580	41,250
Impacts of Climate Risks on Water & Food Security in the Indus Basin	Active	11/1/2010	10/29/2012	100,000	37,252
Feasibility Study for a Regional Monitoring Center for the Greater Himalayas	Active	6/1/2011	12/31/2012	250,000	-



ACTIVITY	Status	Start date	End Date	Allocation	Disbursed
Building Water Management Systems in the Ganges Sub-Basin for Bangladesh	Active	6/20/2011	6/30/2012	450,000	-
<b>Total</b>				<b>2,506,563</b>	<b>1,434,361</b>

ACTIVITY	Status	Start date	End Date	Allocation	Disbursed
<b>NATIONAL LEVEL</b>					
India: Good Environmental Practices in Hydropower Projects	Active	6/1/2010	1/31/2012	50,000	23,518
India: Cumulative Impact Assessment of Hydropower in River Basin Planning	Closed	9/14/2010	8/1/2011	35,936	35,471
India: Support for the National Ganga River Basin Project	Active	9/15/2010	12/31/2011	548,921	435,817
India: Groundwater in India	Closed	5/1/2009	6/30/2009	2,883	2,883
Bangladesh Improving Water Quality in Dhaka: the Responsible Sourcing Initiative	Active	9/27/2010	12/31/2011	250,000	134,138
Bangladesh: Improving Water Resources Management in the Gorai River Basin	Active	11/18/2010	4/23/2012	100,000	12,535
Nepal: Water Resource and Climate Change	Active	09/01/2010	6/29/2012	704,291	358,781
Afghanistan: Technical Support for Integrated River Basin Planning	Active	2/10/2011	6/30/2012	70,000	17,921
<b>Total</b>				<b>1,762,031</b>	<b>1,021,064</b>

ACTIVITY	Status	Start date	End Date	Allocation	Disbursed
<b>RECIPIENT EXECUTED ACTIVITIES</b>					
The ADKF Small Grants Program	Active	12/2/2010	8/31/2012	1,000,000	1,000,000
				<b>1,000,000</b>	<b>1,000,000</b>
<b>PARTNERSHIP COORDINATION &amp; SECRETARIAT</b>					
SAWI Program Administration	Active	6/1/2009	12/31/2011	350,000	207,469
<b>Total</b>				<b>350,000</b>	<b>207,469</b>
<b>Grand Total</b>				<b>7,043,867</b>	<b>4,640,383</b>

There are different ways in which SAWI funds have contributed to and leveraged various activities. In some instances, SAWI provides small supplemental contributions that *strategically leverage* activities. In other situations, SAWI provides the *crucial seed funding or full funding* necessary for an activity to be undertaken.

Figure 4: Funding Sources of National SAWI Activities

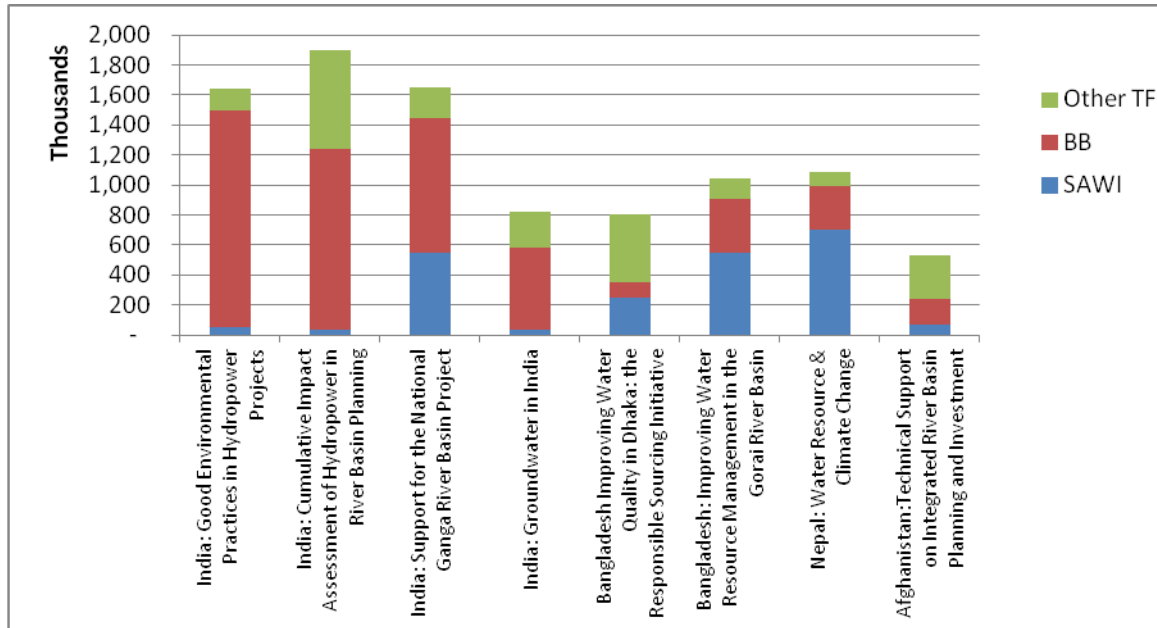
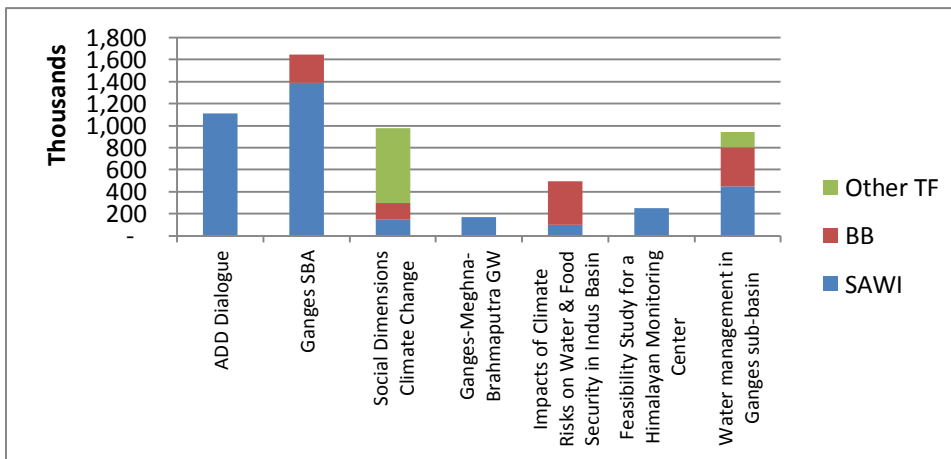


Figure 5: Funding Sources of Regional and Basin SAWI activities



# Looking Forward

---

This year we will see the culmination and early outcomes of some of SAWI's key Phase I activities. The National Ganga River Basin Project has been launched and the institutions that SAWI helped develop are now taking root. The Ganges Strategy Basin Assessment will be formally launched and a significant communications effort will be made to continue urging the uptake of its findings in basin development planning. Already its findings are reflected in the design of World Bank investments currently under preparation in both India and Nepal. Ideally, the Ganges riparians will take up this work and refine the models for further use. Building on the interest the Ganges assessment has generated, an assessment of the Brahmaputra will be launched to help inform a debate that has begun to heat up this year.

A host of ongoing activities will also progress, from the innovative Responsible Sourcing Initiative, to the range of activities focusing on the fragile ecosystem of the Sundarbans. The existing Abu Dhabi Dialogue, Knowledge Forum and Small Grants Program will be reviewed, restructured and enhanced, making them more strategic, consultative and outcome based. The complex realities of the region's political economy will play an important role in determining future activities as will the enduring challenges of sustainability and gender equity.

As the first phase of SAWI draws to a close in the coming year, discussions have begun around the design and support of a second phase. The objective of the 5-year second phase will be to facilitate trans-boundary and regional cooperation in the sustainable use and governance of the water resources in the region, addressing development challenges and the impacts of climate change.

Building on the achievements of SAWI Phase I, Phase II will seek to sharpen the strategic focus on promoting cooperative basin and landscape activities. Concretely, this means moving from a largely national or bilateral focus, to a more effective multi-lateral focus delineated by ecosystems, river basins and regional climate and weather systems. Emphasis will be placed on regional knowledge and ownership; building trust, inclusive dialogue, holistic analyses and the adoption of pragmatic activities to catalyze positive change.

The process will be more participatory in nature, emphasizing dialogue with governments, regional research institutes and civil society. Partnerships and communications will be an important focus in the coming year as well. Key partnerships with regional governments, SAWI and non-SAWI development partners, opinion-makers and knowledge institutions will continue to be strengthened. Concerted efforts will be made to extend the reach of SAWI's dialogue and to implement a communications strategy that will run the gamut from a website envisaged to host an open source data platform, to sustained basin-focused dialogues. Furthermore, venues such as the 6<sup>th</sup> World Water Forum will provide important opportunities to raise awareness of the South Asia's water challenges and progress.

This year we look forward to working with our partners in launching a new phase of the South Asia Water Initiative, and continuing to contribute to the positive momentum we see in the region.