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STRENGTHEN SECURE SUSTAIN

2011 ANNUAL REPORT

WATER PARTNERSHIP PROGRAM

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An interactive version of the report is available on the WPP website (http://water.worldbank.org/wpp/AnnualReport2011.html). This version contains many links to WPP reports and other sources with more information on WPP activities that are highlighted in this report.

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PROGRAM

July 2012

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FOREWORD

When I took on the role of Director of the Transport, Water, and Information and Communications Technology Department in the Sustainable Development Network in the World Bank, I knew I had to pay special attention to water. Water is unique as it runs through everything we do and no other sector can be managed effectively without taking it into account.

Countries are going through unprecedented pressures as growing populations and economies demand more water. Increasingly, more countries realize that successfully addressing the joint challenges of energy security and food security requires a dramatic shift in the way they manage water. Climate change is already causing more droughts and floods, and groundwater is being depleted faster than it is being replenished. If countries do not manage water adequately they will not be able to achieve inclusive green growth.

The World Bank is helping clients strengthen mechanisms to manage water sustainably across all economic sectors. As an institution, we have enormous potential to promote better water management by increasing support for infrastructure investments, providing technical advice, expanding partnerships, and producing the data and knowledge necessary to influence decision making at the highest levels. The Water Partnership Program (WPP) - a longstanding alliance between the World Bank and the governments of the Netherlands, United Kingdom, and Denmark - combines all of these elements to help shape the way that developing countries use and protect their resources.

I am pleased to present the 2011 WPP Annual Report that summarizes the Program's results and demonstrates its contribution to inclusive green growth. The report's title, *Strengthen, Secure, Sustain*, encompasses everything that the WPP is about. The Water Partnership Program brings new tools and knowledge to the water security challenge. It enables Bank teams to explore the linkages between water, energy, and food. And it assists countries and communities in building resilience to climate change and improving access to water supply and sanitation for the poorest populations, especially in Africa.

The world is recognizing the centrality of water in development and prosperity. The World Bank and its partners stand ready to assist countries in realizing water-enabled inclusive green growth, and the WPP provides the flexibility and sector expertise needed for us to succeed.

Jose Luis Irigoyen
Director
Transport, Water, and Information and Communications Technology Department
Sustainable Development Network
The World Bank Group

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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
AFR	Africa Region, World Bank
AgWA	Agricultural Water for Africa
AGWA	Alliance for Global Water Adaptation
ANA	National Water Agency of Brazil
APDAI	Andhra Pradesh Drought Adaptation Initiative
AWM	Agricultural Water Management
BiH	Government of Bosnia and Herzegovina
BNWP	Bank-Netherlands Water Program for Water Supply and Sanitation
BNWPP	Bank-Netherlands Water Partnership Program for Water Resources Management
BRIC	Bangladesh Rivers Information Conservation
CAR	Central African Republic
CI	Conservation International
CWRAS	Country Water Resources Assistance Strategy, World Bank
DANIDA	Danish International Development Agency
DfID	United Kingdom Department for International Development
DGA	National Water Department of Chile
DGIS	Netherlands Directorate-General for International Cooperation
DRC	Democratic Republic of the Congo
EAP	East Asia and the Pacific, World Bank
ECA	Europe and Central Asia Region, World Bank
EIB	European Investment Bank
ESMAP	Energy Sector Management Assistance Program
ESTs	Expert Support Teams
ET	Evapotranspiration
FAO	Food and Agriculture Organization of the United Nations
GCM	General Circulation Model
GEF	Global Environment Facility
GFR	Grant Funding Request
GMISA	Groundwater Management Institute for Southern Africa
GP	Global Projects
GPOBA	Global Partnership on Output Based Aid
GTZ	German Technical Cooperation
GW-MATE	Groundwater Management Advisory Team
GWP	Global Water Partnership
HCWW	Holding Company for Water and Wastewater, Egypt
HEF	Hydrology Expert Facility
ICID	International Commission on Irrigation and Drainage
IDA	International Development Association
IDB	Inter-American Development Bank
IDIP	Irrigation and Drainage Improvement Project
IE	Impact Evaluation
IEWE	Institue of Energy, Water, and Environment, Albania
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IMAWESA	Improved Management of Agricultural Water in East and Southern Africa
INDRHI	National Water Resources Institute, Dominican Republic
IPCC	Inter-governmental Panel on Climate Change
IWMI	International Water Management Institute
LCR	Latin America and the Caribbean Region, World Bank
LKHP	Lower Kihansi Hydropower Project
M&E	Monitoring and Evaluation
MCIPR	Mid-Cycle Implementation Progress Report
MDGs	Millennium Development Goals
MIS	Management Information System
MNA	Middle East and North Africa, World Bank
MoU	Memorandum of Understanding
MSIOA	Multi-Sector Investment Opportunity Analysis
NEPAD	New Partnership for Africa's Development
NTF-PSI	Norwegian Trust Fund for Private Sector Investment
PER	Public Expenditure Review
PM	Program Management
PPP	Public Private Partnership
QMRA	Quantitative Microbial Risk Assessment
RRFP	Hydroelectric and Multipurpose Project in Rusumo Falls
SADC	Southern Africa Development Community
SAR	South Asia Region, World Bank
SDN	Sustainable Development Network, World Bank
SHS	State Hydrometeorological Service of Moldova
SWAT	Sanitation, Hygiene and Wastewater Support Service
TTL	Task Team Leader
TWIWA	Transport, Water and ICT Department, Water Anchor Unit
UNICEF	United Nations Children's Fund
WA	Water Anchor, World Bank
WA/GP	Water Anchor/Global Projects window
WBI	World Bank Institute
WET	Water Expert Team
WPP	Water Partnership Program
WRM	Water Resources Management
WSB	Water Sector Board
WSP	Water and Sanitation Program
WSS	Water Supply and Sanitation
WUA	Water Users Association

EXECUTIVE SUMMARY

GLOBAL WATER CHALLENGES

While economic development continues to pull countries out of poverty, current growth patterns have proven to be unsustainable and inefficient, and are increasing inequality rather than reducing it. The path to sustainable development is inclusive green growth.[1] But green growth requires water security[2] (that is, the maintenance of an adequate quality and quantity of water) as an input to human and economic development.

Water security remains elusive for many countries. At the local level, recent changes in demography and landscape, from urbanization to climate change, have increased the demand for water and, at the same, degraded water supplies. At the global level, ongoing financial, food, and energy crises have amplified local water challenges.

Today, 80 percent of diseases in the developing world are preventable because they are caused by unsafe water, poor sanitation, and a lack of hygiene education. The Global Monitoring Report 2010 estimates that as a result of the financial crisis, 100 million people may lose access to drinking water by 2015.[3]

By 2050, feeding a planet of 9 billion people will require a doubling of current water inputs to agriculture while increasing water efficiency. Much of the population growth will take place in the developing world, with urban populations in Africa and Asia doubling between 2000 and 2030. Another impact of global expansion in poor and emerging economies will be the doubling of energy demand over the next quarter century. In addition, extreme weather will continue to destroy local economies (weather-related losses in 2010 were nearly $48 billion).

The ability of developing countries to secure water for industrial, environmental, agricultural, and domestic uses will depend on better management of water resources and more cross-sectoral planning and integration. Many of the world's largest water systems are shared by more than one country, requiring cooperative water resource management and coordinated investments.

The poorest countries also face the largest risks. They have lower capacity to predict and recover from floods and droughts, and they are often the hardest hit by volatile food and energy prices. Water security is part and parcel of building the resilience of these countries to global crises.

THE BANK'S RESPONSE

The World Bank Group understands that water is at the core of poverty reduction, development, and growth. The Bank's 2003 Water Resources Sector Strategy already described some of the current water challenges and prescribed steps the Bank could take to remedy the situation, including efforts to integrate water with energy, climate, agriculture, land use, and overall economic development. This was reaffirmed in the 2010 Mid-Cycle Implementation Progress Report (MCIPR) for the 2003 strategy ("Sustaining Water for All in a Changing Climate"). Responding to the continuously changing landscape and based on these strategies, the World Bank is planning to develop a new framework for water in 2012, to prioritize and focus its efforts on the most important and new challenges.

The implementation of these strategies is reflected in the breakdown of the Bank's water portfolio. In 2011, lending approvals for water by the World Bank stood at $7.5 billion, up 30 percent from 2010. Lending to water resources management totaled $1.76 billion.[4] Of total annual water lending, 53 percent was for water supply and sanitation, 13 percent for irrigation and drainage, 24 percent for hydropower and 10 percent for flood protection. Steady lending levels in these areas demonstrate a consistent demand from client countries for Bank support.

Despite these commitments, the demand continues to grow and a broader response is required. Traditional approaches need to be adapted to respond to the growing complexity of the water sector. Innovation needs to be promoted, bringing new ideas, research, and analysis to the table. The linkages between water and other sectors (such as food, energy, environment, and health) call for the mainstreaming of water-related analysis in these sectors to help countries make informed decisions about strategies, plans, and investments for a more water secure future.

THE WPP - STRENGTHEN, SECURE, SUSTAIN

The Water Partnership Program (WPP), a multi-donor trust fund administered by the World Bank, contributes to the Bank's efforts to reduce poverty. Under Phase I (January 2009 – June 2012), this is accomplished by mainstreaming pragmatic and principled approaches to water resources management, and by expanding and improving access to water supply and sanitation.

The WPP supports technical assistance and analytical work, and bolsters project preparation and implementation across all water sub-sectors. The Program's support is provided via individual activities that are coordinated through six regional and one global window, as well as an Expert Support Teams and a World Bank Institute window (see box 1). This enables Bank teams, working with long project cycles and static budgets, to provide new, innovative, and timely support to clients that otherwise would not have the resources to deal with emerging challenges as they arise. As such, WPP activities aim to (see figure 1):

STRENGTHEN ...

…the World Bank's water lending portfolio through new, innovative, pragmatic approaches and designs;

… sector, regional and national strategies as well as social and environmental policies through cross-sector analysis and technical assistance; and

… institutions and stakeholder capacity for improved and more 'water-informed' actions and decisions.

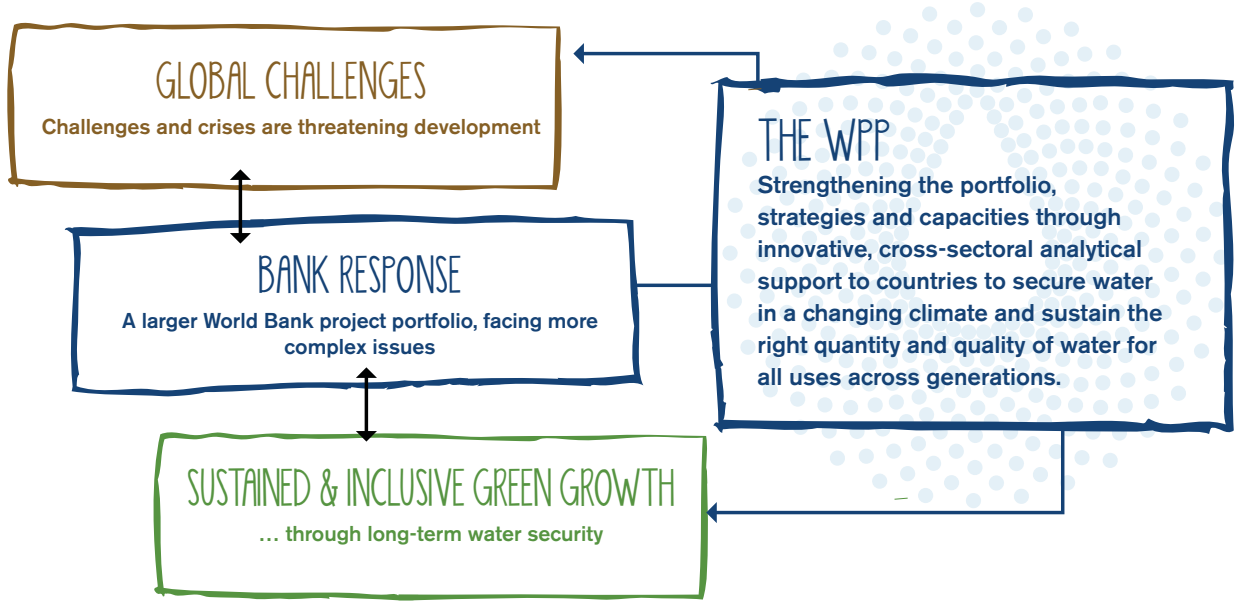
SECURE ...

…access to water for human consumption and sanitation, food, energy, economic activities, and environmental services, while protecting human, physical, and natural capital from water-related extremes such as floods and droughts.

SUSTAIN ...

…long-term water security, and availability and quality of both water services and water resources, and their contribution to inclusive green growth.

FIGURE I - THE WATER PARTNERSHIP PROGRAM: STRENGTHEN, SECURE, AND SUSTAIN



RESULTS, INFLUENCE, AND IMPACT

This year's report presents the outcomes of selected activities that contribute to four key themes: water resources management, climate change, food security, and energy security. Combined, these themes demonstrate the WPP's contribution to the green growth agenda. The Program provides incentives for Bank teams to go the extra mile by tackling water challenges at the confluence where water meets climate, food, and energy. The result is more integrated, more resilient, and more sustainable solutions to complex development challenges.

The Water Partnership Program is helping Bank clients approach *water resources management* (WRM) at the local, national, and transboundary level by spearheading activities that link water management to service delivery. Experts have assisted countries in Africa, Asia, and Latin America to assess their human and water capital endowments as a means to bolster growth. The WPP's sanitation experts are helping two governments in South Asia clean up a major water lifeline. Legal experts are discovering the keys to country cooperation over shared water, and assessing whether transboundary institutions will be able to survive the test of climate change.

WPP activities demonstrate how better information and the right tools can reduce the uncertainties posed by *climate change,* so that instead of reacting to climate change countries can begin to prepare for it. Teams are using state-of-the-art models to forecast floods, generate early warning systems, and analyze alternative investment options that promote climate resilience. The WPP is also helping the Bank bulk up its own capacity to help clients incorporate climate considerations into investment planning.

The Partnership is approaching *food security* from several angles. In support of the Bank's Agriculture Action Plan, the WPP promotes improved agricultural water management to drive economic growth. It supports partnerships for learning between the private and public spheres, between countries, and among experts. Technical assistance is helping farmers to manage dwindling resources and helping countries to use groundwater to improve crop yields. Key analytical studies are demonstrating how to improve productivity in rainfed agriculture and reuse wastewater in irrigation.

The WPP is influencing the *energy security* debate from a green growth perspective. In water-scarce areas, energy efficiency in water supply is proving that mitigation incentives can yield adaptation results. From developing new hydropower sources, to ensuring the sustainable operation of existing dams, the WPP is offering its technical and policy expertise to clients looking for solutions to their energy challenges. The Program is helping Europe, Central Asia, and Africa re-engage in hydropower by demonstrating how socially and environmentally sound investments can generate enormous benefits that spill across national boundaries.

Finally, this report spotlights *Africa's* progress. From analyzing sustainable sanitation in West Africa, to building institutions for groundwater management in southern Africa, the WPP is influencing major Bank-funded projects throughout the continent. Specialists have improved habitat restoration following a hydropower installation, conducted multi-sector investment analysis at the basin level, and sustained a partnership that addresses food security needs across the region.

The WPP measures its influence and impact through its major contributions to improving Bank-financed projects, and the resulting number of people receiving benefits from these projects. The Program is providing support to lending for *water supply and sanitation* (WSS) that benefits the lives of nearly 52 million people in 26 countries. More than 17 million of these beneficiaries are in Africa. The WPP portfolio of activities for 2009 to 2011 is influencing and supporting almost $11.5 billion in Bank financing. This figure almost doubles to $20.1 billion when total project costs are included. Each dollar of WPP funding has an impact on $710 in Bank lending and $1,240 of total project costs (including the borrower's counterpart contributions and any other sources of financing).

The WPP also influences decision making and brings benefits to the poor by sharing new knowledge, building capacity, fostering innovation, and strengthening partnerships.

WPP PORTFOLIO AND FINANCIAL OVERVIEW

A total of 214 activities (amounting to $19.6 million) have been approved since the WPP's inception. When program management activities are included, approved and proposed activities reach $22.5 million, representing 96.1 percent of the total grant.

The WPP is active in 62 countries, and supports 27 regional and 25 global initiatives (see figure 2). Among the regions, Africa receives the largest allocation of WPP funds (well over 30 percent) and has implemented the largest number of activities. While the Program supports Bank work across 5 water themes (see

FIGURE 2 - COUNTRIES TARGETED BY WPP ACTIVITIES

*This world map includes WPP activities approved between 2009 and 2011 and does not include regional activities. The remainder of the 2011 Annual Report details only those activities that were active in 2011.

box 1), the largest share of activities support water resources management (53 percent) and water supply and sanitation interventions (34 percent). One of the WPP's major contributions is to bring water resources considerations into planning for water services, including water supply, sanitation, and irrigation projects.

In 2011 alone, 56 new activities were approved, and 125 were completed and closed out. The pace of disbursements and commitments increased slightly in 2011 to $6.7 million compared to $6.2 million in 2010. To date, the Program has disbursed or committed $17.1 million. Program management (PM) costs remained at a low level in 2011,[5] reflecting an effective and efficient administration.

LOOKING TOWARD THE FUTURE: A SECOND PHASE OF THE WPP

The WPP is planning for a bigger and bolder Phase II. The Program will continue supporting innovations in water resources management and water service delivery, and will broaden its scope in five major ways.

- (A new objective will be added to its framework; namely, that of achieving climate resilience and green growth;
- (A new, programmatic window will be created to support larger activities that contribute to strategic topics in key river basins and mainstream water in other sectors;
- (The WPP will create a new program on remote sensing and water to provide technical assistance to project managers on how to incorporate this technology into project design and implementation;
- (A comprehensive monitoring and evaluation M&E) framework will be applied to assess overall Program impact, as well as activity level results; and
- (The Program will foster greater partnerships with donors, external platforms, internal networks, and technical agencies.

CHAPTER ONE
INTRODUCTION

The World Bank addresses some of the world's complex water challenges by promoting inclusive green growth in developing countries. In line with Bank and donor strategies, the Water Partnership Program (WPP) is a key mechanism for providing flexible, innovative, and fresh approaches in support of green growth pathways. In December 2011, the third year of Phase I of the Program was completed. This Annual Report showcases the results of WPP activities in 2011 that strengthen water policies, strategies, and users' capacities; enhance water security; and ensure the sustainability of water resources and services.

1.1. THE STRATEGIC IMPORTANCE OF WATER

The World Bank Group sees water at the core of poverty reduction, development, and growth. The Bank's 2003 Water Resources Sector Strategy describes some of the main global water challenges and prescribes steps the Bank could take to remedy the situation (such as integrating water with energy, climate, agriculture, land use, and overall economic development). This was reaffirmed in the 2010 MCIPR for the 2003 strategy.

The MCIPR suggested strengthening some areas to address increasingly complex water challenges. These include: (1) A more integrated approach to infrastructure projects in an effort to link water resources with water services; (2) Improving client access to new technologies that support results-based decision making; (3) Managing water for climate change adaptation and mitigation by strengthening sector links with environment, energy, and agriculture; (4) Scaling-up support to hydropower and water efficiency improvements; and (5) Supporting low-cost, on-site sanitation to help get the Millennium Development Goals (MDGs) back on track.

The recommendations in the MCIPR will continue to guide the Bank's water strategy until the end of 2012. But much has changed over the course of seven years. Client country needs have changed with economic growth, middle classes emerging across the developing world, and pockets of poverty appearing in otherwise well-off societies. The climate adaptation imperative has highlighted the need for greater integration and more urgency, as well as the need to protect the most vulnerable. New players (traditional and nontraditional) have emerged in the field of international development and the financial crisis has altered the lending environment.

To respond to the changing landscape, the World Bank is planning to develop a new framework for water to prioritize and focus its efforts on the most important challenges. The new vision will take the Bank beyond business as usual in the water sector by highlighting examples of leadership roles that it can take. The Bank will deliver on this vision by integrating water across sectors with a special focus on the food-energy-water nexus, acting in concert across the Bank and at the cutting edge of innovation in policy.

Building on sector strategies such as the MCIPR, the World Bank launched its new flagship report on green growth (titled: *Inclusive Green Growth - The Pathway to Sustainable Development*) in May 2012. Despite the gains from growth, evidence suggests that it has not been inclusive enough. Still, 2.6 billion people lack access to sanitation, and 900 million lack safe, clean drinking water. Higher incomes and larger populations have stretched water supplies. Water withdrawals have tripled in the past 50 years, leading to water scarcity and groundwater depletion. Withdrawals are projected to increase in developing countries by another 50 percent by 2025, by which time roughly 5.5 billion people (two-thirds of the projected global population) will live in areas facing moderate to severe water stress.

There are two main components to greening growth through water:

- Integrating water in low carbon planning such as solar, geothermal, biofuel, clean coal, and carbon capture storage technologies by, for example, quantifying impacts on water, understanding tradeoffs, exploring technologies to reduce impacts, and designing policy instruments.
- Optimizing environmental, hard and soft infrastructure in water by investing more in behavior change and incentive systems for communities and institutions, and by helping countries capitalize on new technologies through collaboration with non-traditional players in the private sector.

The central role of water in development is underlined by the attention it is getting in global and regional strategies across sectors. Examples of this are:

- The emphasis on improving crop yields and their climate resilience, water resources management, and climate smart agriculture in the pending *Agriculture Action Plan FY13-15*;
- The focus on natural resources management linked to land degradation and international waters in the pending *environment strategy*;

- The *Urban and Local Government Strategy* ("Systems Of Cities: Harnessing Urbanization For Growth and Poverty Alleviation"), which describes the real economic consequences of inadequate or unequal provision of basic infrastructure (water, waste disposal, and power) to the urban poor, and the need to expand access and improve the quality of water and sanitation services in urban areas;
- The pending *energy strategy*, which notes that multipurpose development and management of water resources can strengthen water and food security, and reduce the risks associated with water- and climate-related disasters and shocks to the economy;
- The updated *World Bank Group Infrastructure Strategy FY12-15* ("Transformation through Infrastructure"), which builds on the transport, water, energy, agriculture, environment, and urban sector strategies, but is more than the sum of these because it emphasizes the need for a cross-cutting approach, and in some cases, integrated infrastructure solutions looking for synergies and strategic complementarities among sectors; and
- *The Africa Infrastructure Country Diagnostic* (2008), which concluded that optimizing economic productivity and environmental sustainability requires managing rivers as hydrological units at the basin level.

BOX 1- THE WPP AT A GLANCE

The Water Partnership Program is a $23.8 million multi-donor trust fund, established in January 2009 with funding from the governments of the Netherlands, the United Kingdom, and Denmark. The WPP consolidates two previous water programs funded by the Dutch government: the Bank-Netherlands Water Program for Water Supply and Sanitation (BNWP) and the Bank-Netherlands Water Partnership Program for Water Resources Management (BNWPP). The first phase of the WPP ran through June 2012, and a second 4-year phase (larger in scope and size) is being planned.

The WPP's goal is to enhance the World Bank's efforts in reducing poverty through two overarching objectives:

1. Sponsoring and mainstreaming pragmatic and principled approaches for water resources management development; and
2. Improving the quality and effectiveness of water service delivery.

Activities financed by the WPP are also linked to at least one of the five lines of action/themes identified in the 2003 Water Resources Sector Strategy:

- Water Resources Management (WRM);
- Water Supply and Sanitation (WSS);
- Agricultural Water Management (AWM);
- Water for Energy; and
- Environmental Services.

The WPP is administered by the Bank, with oversight from the Water Sector Board (WSB). It is coordinated by a Program Management Team based in the Water Anchor Unit of the Transport, Water and ICT Department (TWIWA). As seen in the diagram, activities are coordinated through ten windows, encompassing six (geographical) Regional Windows, a Global Projects/Water Anchor Window, a World Bank Institute (WBI) window, an Expert Support Teams Window,* and a Program Management Window.

* Comprising the Water Expert Team (WET), established on January 1, 2011 as a consolidation of the three previous ESTs: the Sanitation, Hygiene and Wastewater Support Service (SWAT); the Hydrology Expert Facility (HEF); and the Groundwater Management Advisory Team (GW-MATE).

1.2. THE WPP: A STRONG PARTNERSHIP IN CRUCIAL TIMES

The World Bank's current and pipeline portfolio as well as its strategies are consistent with the priorities of the governments of the Netherlands, the United Kingdom and Denmark. They focus on Africa and the poor, on green growth, climate change, and food and energy security.

The World Bank and the Water Partnership Program donors have a strong and longstanding partnership focused on cooperation, an alignment of priorities, and a commitment to leverage each other's knowledge and expertise for better results. The Bank and its client countries are very grateful to the donors for their substantive and generous financial support for the first phase of the Program, which ended June 2012 (see box 1). The WPP is envisioning a scaled up Phase II, through which it will continue supporting innovations in water resources management and water service delivery, but will broaden its scope by adding a third objective; namely, climate resilient green growth.

The Water Partnership Program is one of the Bank's most important tools for helping countries develop innovative and flexible approaches to tackle their complex challenges. The Program does not replace the Bank's ordinary functions, including standard project preparation activities, but supports activities with a clear added value. Knowledge generated by WPP activities allows Bank teams and client counterparts to change course of action, reform policies, consider new approaches and tools, and improve project design and implementation.

The 2011 Annual Report presents the outcomes of selected undertakings that were active during the year, and that contribute to four key themes: water resources management, climate change, food security, and energy security. Combined, these themes demonstrate the WPP's contribution to the green growth agenda. The report illustrates how, throughout each of these distinct themes, the WPP is working to: strengthen the Bank portfolio and strategies as well as client capacities; secure the right quality and quantity of water resources for all water users; and ensure sustainable water management and water service delivery for long-term and inclusive green growth.

CHAPTER TWO

STRENGTHENING THE PRACTICE FOR WATER SECURITY

Sufficient water endowments and good water management pave the way for a strong economy, a sustainable development path, and a secure future. But, from aquifers to rivers, harnessing the potential of a resource that knows no boundaries is one of the world's greatest challenges. People must conserve the resource, protect it from pollution, and decide where and when to use it.

Managing water effectively requires a bird's eye view of supply and demand across sectors and populations. A balance must be found between current and future water requirements for meeting social, environmental, and economic needs. Finding this balance becomes harder every day. Economies develop, people migrate, and weather patterns are altered over time and space. As a result, water availability changes while water requirements for producing food and energy grow.

Solutions to these challenges can only be found by working at the confluence where water meets its intended purpose for health, food, environment, and a host of other vital economic benefits. The World Bank's 2003 water resources sector strategy encouraged such an integrated view and the 2010 MCIPR reaffirmed it. In evaluating a decade of experience, however, the MCIPR also suggested strengthening a few key areas.

The Bank has heeded this advice and devised an inclusive green growth strategy for meeting the challenge. The inclusive green growth agenda encourages countries to consider how water impacts their human and economic development goals. In the aftermath of the global financial crisis, water targets are even farther away. According to the Global Monitoring Report 2010[1] the crisis left an estimated 114 million more people in extreme poverty at the end of that year. The report also estimates that with lower economic returns, an additional 100 million people may lose access to drinking water by 2015.

Green growth offers the development community the chance to make a paradigm shift toward more inclusive growth. But implementing green strategies requires changes in behavior, policy reform, and innovative investments, which in turn, necessitate more than what traditional donor programs (already taxed to meet soaring targets) can generally offer. The Water Partnership Program provides incentives that can help make this change a reality.

This chapter highlights how the Water Partnership Program supports green growth as a mechanism for achieving sustainable development and long-term security. This includes managing water across sectors, balancing current and future needs, and providing equitable allocations to all water users, including ecosystems and their services. The activities described herein demonstrate how the WPP's support for a principled but pragmatic approach to water resources management helps clients reduce risks associated with climate change, improve the outlook for farm production, and plan appropriately for energy development. Countries are learning the methods, using the tools, and planning the investments that will pave the way for a more secure future.

2.1 WRM AND THE SECURITY CHALLENGE

Competition for water for productive, social, and environmental uses is on the rise. The brunt of the rural-urban migration in the coming century will take place in the developing world, putting water stress on large cities and increasing their natural resource footprint. In Africa and Asia, the urban population will double between 2000 and 2030. In planning for these changes, countries and cities need to take an integrated look at water resources management. However, doing so requires working across sectors, and the impetus to do so is not always there.

The Bank has dramatically increased its support to *water resources management* approaches. In 2011, commitments totaled $1.75 billion, increasing nearly seven fold in the last 5 years. Despite this commitment, moving from theory to practice has not been without obstacles. Sectors within a country are naturally in competition for water. As a result, the government entities that represent them can face similar struggles.

The WPP is helping Bank clients approach WRM at the local, national, and transboundary level. From identifying available resources in Ghana, to recommending institutional reforms in Chile, the Partnership contributes to national planning for water resources management. It promotes river restoration for the Ganges by working with India and Bangladesh on industrial and municipal pollution. Dual activities in Indonesia are promoting the integration of planning for water resources and water services. And innovative research on transboundary institutions is looking at cooperation for climate resilience.

The WPP demonstrates how, with an integrated view, the right information, and working at the right scale, clients can develop advantageous policies, strong institutions, and resilient investments. The result is a more secure water future: one that enables growth while protecting human and environmental health.

2.1.1. CARVING COUNTRY-WIDE STRATEGIES

Water resources management has to be implemented from above and below. National plans must allocate water across sectors, while individual users at the local level actively participate in sustainable management. WPP-financed activities provide the information and analysis that countries need to make smart investment decisions that promote optimal use of the water they have available. Across the globe, the expertise of WPP-funded teams has contributed to physical and institutional assessments that help countries plan for the future.

In Africa, the Water Partnership Program funded an activity to assist the government of Ghana's Water Resources Commission and the Ministry of Water Resources, Works and Housing to assess the probability of meeting the country's water management objectives. Ghana has abundant water resources, but differences in rainfall between regions, as well as differences in water variability between seasons, pose challenges to achieving the country's goals.[2]

In accordance with Ghana's 2007 National Water Policy framework, the government intends to support future investments in three water-using sectors: irrigation agriculture, hydropower, and potable water supply. To gain an integrated perspective of the supply and demand of existing water resources, the WPP funded a water balance study for key sub-basins (the White Volta, Daka and Oti) where climate change may cause severe floods and droughts. The government and its donors now have better information with which to advance the dialogue on investment planning for water-related development.

In Latin America, the government of Chile asked the World Bank to work with its National Water Department (DGA) to conduct an assessment of the country's water resources as a first stage in developing a national strategy. Chile's economy relies heavily on water intensive exports (mining and irrigation), which put stress on available water resources. The WPP and the DGA funded the assessment, which recommends several management reforms, including strengthening water markets, protecting water rights and helping vulnerable groups register their rights, and allocating more water for environmental purposes.

The assessment was adopted by the government, posted to their website and disseminated through a national workshop with stakeholders, water experts,

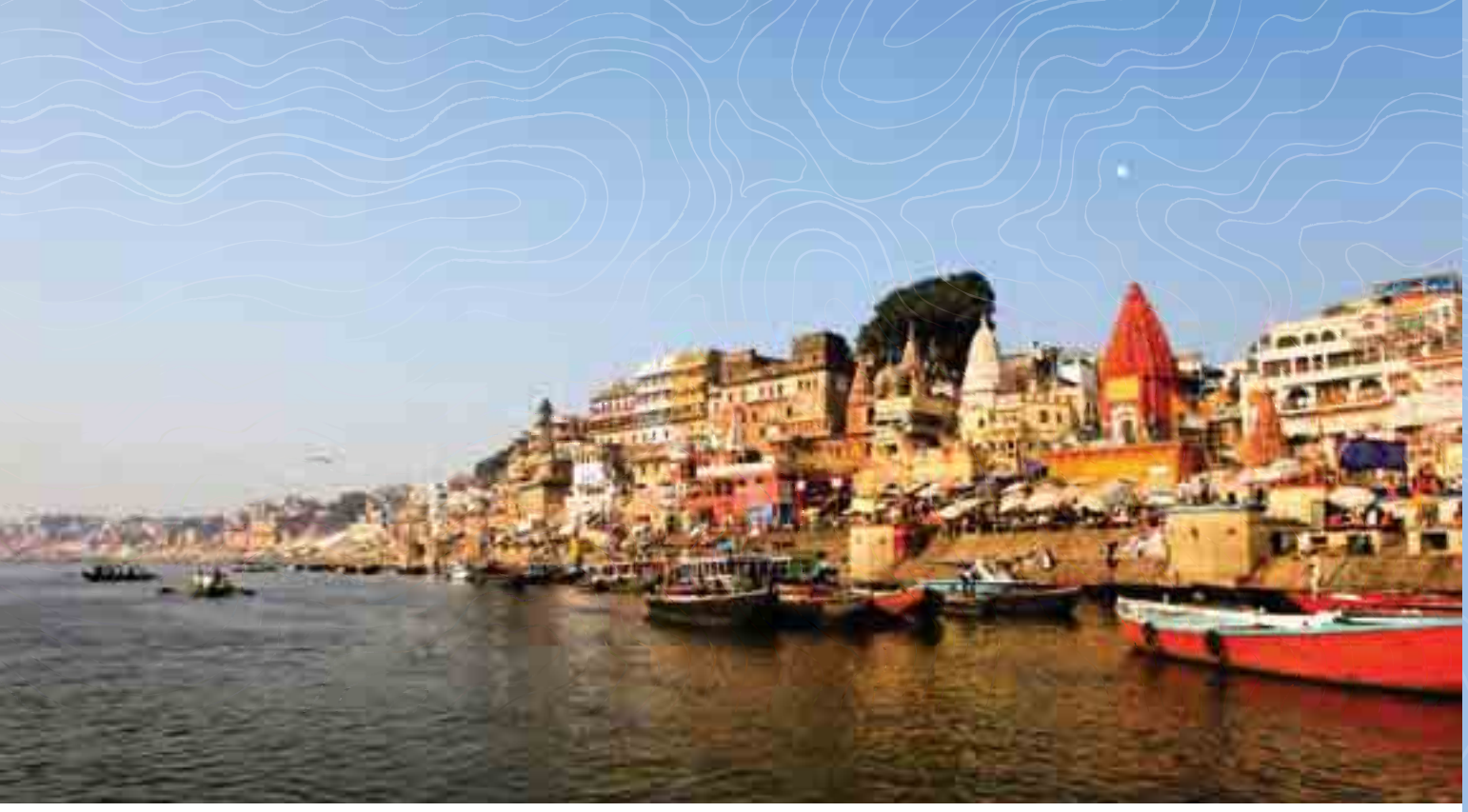
BOX 2 - WRM: LINKING MANAGEMENT WITH SERVICES

At the local level, WRM means managing resources in a way that enables good service delivery. Indonesia's diverse geography and expansive population make this easier said than done. The WPP had an opportunity to influence broad WRM and national water supply strategies through two parallel activities, shedding light on the importance of linking the two pieces for a more holistic approach.

The 2004 Law on Water Resources created provincial and basin councils to improve local engagement on water issues. The country was grappling with the institutional adjustments required to carry out new policy decisions, from decentralization to improved transparency and accountability.

In response, the Water Expert Team financed by the WPP, supported the second phase of a loan to improve national capacity for water resources management at the basin level, and to increase agricultural productivity in 18 river basins, 14 provinces, and 101 districts. The team developed and tested a matrix for benchmarking river basin conditions and monitoring change. The experts trained stakeholders in international best practices for river basin management, and provided their assessment of Indonesia's progress.

On the water supply side, there was a similar need to define a path for achieving the MDG target: providing 56 million more people with access to improved water supply by 2015. The WPP co-funded the creation of a Water Investment Roadmap (2011-2014), which proposes $7 billion in sector financing, using revolving funds, public-private partnerships, overseas funding sources, and local investment. Technical assistance programs are also needed to improve the capacity of local service providers to manage the influx of funds. The roadmap was introduced at a stakeholder meeting in June 2011 and will drive local and national decisions regarding water investments and regulation.



The Ganges River is a vital source of water for millions of people in the more than 27 towns and 12 cities that it runs through; nearly 400 million people depend on the resource for their daily needs. It is one of the world's top 20 rivers by discharge volume; its size makes resource management of the Ganges one of the most complex in the world. It is for these reasons that integrated management of the basin, including pollution control, is so crucial.

and the national press. It has provided the needed justification to increase the DGA's budget by 30 percent in 2011 to better manage water rights, authorize new projects, and conduct more impact assessments.

2.1.2. CLEANING UP A CULTURAL WATER ICON

The Ganga River basin is the most densely populated basin in the world. As a result, the Ganges River, despite being a cultural and holy landmark, is one of the most polluted. The government of India requested the Bank's assistance to improve river water quality in the Ganges. A nearly $200 million project is underway, supporting the National Ganga River Basin Authority. The project will help build institutional capacity to manage a long-term clean-up and conservation strategy for the entire basin.

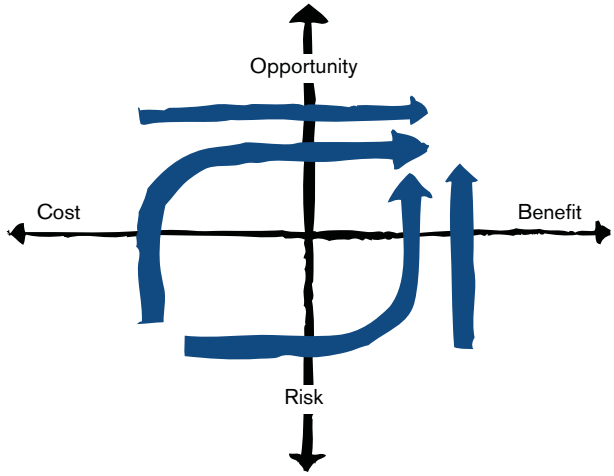
The WPP supported the preparation of two scoping studies on the institutional and physical challenges to reducing industrial and solid waste pollution flowing into the Ganges. The studies were used to design an additional program component for investing in infrastructure across myriad sectors that contribute to river pollution. These will include industrial and municipal wastewater management, and river front management (such as improvements at stairs for entering the river, called *ghats*, and crematoria), and preservation for ecologically sensitive sites. A large proportion of the people living in slums will benefit from better sanitation as a result of these basin-wide interventions.

Through a separate activity, the WPP is working across sectors in support of the $136 million Water Management Improvement Project in the Ganges-Brahmaputra River basin. The team is advocating for a greener supply chain in Bangladesh's thriving textile industry to reduce industrial pollution and promote energy efficiency. It is also developing new partnerships between the suppliers of major multinational apparel retailers, Bangladeshi textile industry trade associations, and the national government. This collaborative approach to the regulation of industrial water pollution, which relies on market forces rather than traditional command and control measures, has never been attempted before. The initiative could be scaled up in the forthcoming $130 million Dhaka Environment and Water investment project.

2.1.3. BASINS: THE BUILDING BLOCKS OF INTERNATIONAL COOPERATION

Water knows no boundaries. That is why the Bank advocates cooperation across countries to ensure optimal use of water resources and shared benefits within a river basin. To understand why countries do or do not cooperate over shared watercourses, the WPP funded a study that elucidates how countries perceive the benefits, costs, and risks of working toward common goals. The work examines the political economy associated with necessary and sufficient conditions for regional cooperation to take place. This global study includes historical examples from five major international river basins (Eastern Nile, Ganges, Niger, Syr Darya, and Zambezi).

FIGURE 3 - PATHS TO COOPERATION



The authors of the WPP-funded study *Reaching across the Waters: Facing the Risks of Cooperation in International Water* suggest that countries are positioned in one of the four quadrants on the Risks and Opportunities to Cooperation framework when costs, benefits, risks and opportunities are considered. To move to the northeast quadrant, a combination of factors, such as risk reduction, opportunity enhancement, and benefit expansion lead countries onto different action paths.

Findings from the analysis in all five river basins give some evidence of the role of opportunity in moving countries to cooperate, and in some, opportunity represented the driving force (see figure 3). Political opportunity and risk reduction are two of the leading factors to reach cooperation agreements. Yet, at times, political opportunity trumped residual risk. For example, agreement was reached in the Ganges Water Sharing Treaty, despite domestic resistance in India and Bangladesh. Similarly, Egypt and Ethiopia entered into a deal in the Eastern Nile basin despite remaining risks.

The WPP also provided funding for the analysis on the Niger and Zambezi river basins included in the global study (see figure 5). The Niger basin case identifies key aspects of cooperation following the formation of a permanent river basin organization to coordinate regional investment projects. The Zambezi case assesses the development potential of the basin in the context of basin-wide agreements. Project teams working in these basins have internalized some lessons from the analyses to improve their current operations.

The global study has helped shape the approach for an in-depth Bank-wide assessment of country decision making in shared international waters. These studies were collated into a formal World Bank publication, titled *Reaching across the Waters: Facing the Risks of Cooperation in International Water*, which serves as an evidence-based and applications-oriented research piece on cooperation in international waters.

2.2. CLIMATE CHANGE TOOLS

Small, unexpected changes in temperature and rainfall can quickly alter the amount of water available. In the worst cases, extreme weather events mean disaster for poor populations and significantly reduce economic output even in the wealthiest countries. In fact, economic damages from natural disasters in 2010 were over 2.5 times higher than in 2009, and amounted to nearly $50 billion. Many governments face these risks because they are unable to predict floods, droughts, and changes in hydrology.

The World Bank, with support from the WPP, is showing how the right tools and strategies can bolster a country's resilience to climate change. In India, Bangladesh, and Moldova, the Water Partnership Program is supporting activities that integrate climate considerations into investments to mitigate social, economic, and environmental impacts resulting from climate events. They also promote prompt, cost-effective, climate-resilient planning that will benefit vulnerable populations, reinforce growth, and preserve ecosystems. In Morocco and Colombia, experts are training government agencies to model future climate change impacts on water resources. In one of the driest parts of India, communal groundwater management is being pioneered to mitigate risks associated with climate change. The WPP is providing internationally renowned expertise to augment the climate and water information services of countries around the world and make disasters more predictable. Even within the Bank, the Program is identifying the best models for making projects more robust and resilient to climate change.

The Sundarbans has important protective and productive functions that are threatened by a combination of natural, man-made, and climate impacts. Urgent improvements in the management of the Ganges Delta are needed to preserve the ecosystem and its value for local communities.

2.2.1. RESILIENT DELTAS, RESILIENT PEOPLE

WPP-supported climate work in the Sundarbans shows how the Water Partnership Program has been instrumental in facilitating the kind of dialogue that will lead to greener policies and secure future investment. The Sundarbans, which covers parts of India and Bangladesh, is the world's largest mangrove ecosystem. The area has extremely high ecological value and is also home to about 4.1 million of the most impoverished and vulnerable people in India. Nearly 80 percent of the households pursue livelihood options that involve inefficient production methods in agriculture, fishing, and aquaculture. The people and the productivity of their holdings are under increasing threat from deltaic subsidence, sea level rise, and increased cyclone intensity.

The WPP funded a study to identify options for flood protection and climate change adaptation for the Sundarbans in Bangladesh and West Bengal, India.[3] The study models the impact of sea level rise on estuaries and embankments, predicting changes over the next 100 years. It also undertakes a cost-benefit analysis of alternative embankment interventions to adapt to climate change. The report estimates that the cost of environmental damage associated with ecosystem degradation and biodiversity loss is equal to about 5 percent of the gross domestic product of the area. Relying on this new information, the government of India has allocated $1 billion to assist the state government of West Bengal in the construction, restoration, and compensation efforts of embankment retreat initiatives in the highest-priority areas. A cooperative platform for Bangladesh and India has since been established to deal with common issues, like biodiversity conservation, environmentally sustainable ecotourism, and coordination of early warning systems for cyclones.

In addition to protecting vulnerable populations, early warning systems are imperative for sustaining growth. Moldova, an agricultural powerhouse due to its ideal conditions for year-round farming, has seen earlier frosts, flash floods, and droughts that have cost nearly $1 billion in GDP since 2007. The State Hydrometeorological Service (SHS), after years without any investments, relied on a manual observations system that yielded inaccurate forecasts. The Hydrology Expert Facility suggested the use

of early warning systems and provided technical expertise to Moldova to demonstrate how, in many countries, accurate forecasting and disaster risk management plans with sufficient lead times have reduced economic damage and loss of life. With new information about the benefits of early warning systems, the WPP support was used to develop a new component for the Bank-financed Disaster and Climate Risk Management Project. This new component will upgrade the SHS's data network through improved models, training, and enhanced computer capability, in order to predict small scale severe weather. A $10 million IDA loan has since been approved to carry out this upgrade.

2.2.2. CLIENTS MODEL THEIR WAY TO WATERTIGHT INVESTMENTS

Water is already a significant problem in Morocco, which is situated in a region that, according to the Intergovernmental Panel on Climate Change (IPCC), will only become hotter and drier over the 21st century. The WPP funded an activity to scale the IPCC's regional climate estimates down to the local level while training Moroccan institutions in the technique. The team used dynamic downscaling of general circulation models to predict temperature and precipitation for the entire country. Working with Morocco's Meteorology and Water Departments, the team trained staff on how to use the model developed in the study and then verify the data. The activity showed the two departments how they could provide complementary services and gave them a chance to collaborate.

One of the resulting data sets will be used for hydrological modeling of the Oum er Rbia basin, resulting in a list of adaptation options to inform the basin's water master plan. The remaining data can also be used to model all of Morocco's river basins. The activity is influencing a development policy loan with an initial investment of $205 million, as well as a $70 million irrigated agriculture project.

Water-abundant Colombia, on the other hand, is a model for water management in Latin America but struggles to deal effectively with devastating floods and landslides. The 2010 National Water Policy is receiving support from a $5 million component of the Bank's Sustainable Development Investment Project for Colombia. To assist in implementing the new policy, the Hydrology Expert Facility trained 30 local and national environmental authorities in modeling for water resources management. Together with partial funding from Colombia's Ministry of Environment, Housing, and Territorial Development, the Hydrological Expert Facility developed the final module in the three-part course and led the two and a half day session. Decision makers now have the tools to apply water availability indicators from climate models in the formulation of targeted policies and investments. The Ministry has since requested additional training on broader issues, including air quality management and valuation of ecosystems that generate hydrological services.

2.2.3. TAKING INNOVATION TO THE BANK

Bank teams and their clients have historically looked at static costs and benefits to select the most appropriate infrastructure investments. Recently, countries have wanted to consider long-term climate change impacts and potential adaptation plans when making these important decisions, but they lack the appropriate tools.

The Water Partnership Program is supporting an activity to identify the best tools for assessing climate change impacts in Bank operations on a global level. The team is assessing the dynamic social and economic impacts of adaptation in the water sector by using innovative models that can, for example, account for how an individual's choice to use water changes the availability of the resource over time. The team has solicited ideas from international experts for improving analysis in water projects, their practical applicability, and information requirements. Approaches already suggested include real options analysis, dynamic stochastic general equilibrium models, and Bayesian belief networks. These and other methodologies will be presented to Bank task team leaders (TTLs), who will assess the proposed approaches and identify opportunities for piloting their use in Bank projects.

2.2.4. WHEN WILL IT RAIN? UNCERTAINTY MAKES THE CASE FOR EQUITY

Andhra Pradesh, India is prone to both drought and unpredictable monsoons, impacting its high-value agriculture sector, from food to employment. Eight districts in the state suffer from disproportionately low rainfall, and as a result, are poorer than the rest of the state. These districts have been overexploiting groundwater resources and have less water for times of drought. Once farmers drill, competition rises; the more water one farmer uses, the less is available for his neighbor. In response, the Bank's Andhra Pradesh Drought Adaptation Initiative (APDAI) has piloted 19 drought adaptation programs.

The Groundwater Management Advisory Team helped develop the groundwater management framework for APDAI to ensure more equitable use of groundwater and to improve water productivity. Under APDAI, groundwater rights were re-instated as common property made available to all people, rather than to just those with physical access to the resource. This paradigm shift was implemented by connecting boreholes through a common pipeline and attaching sprinklers. Farmers with boreholes agreed to share their resources, and those without boreholes agreed to not open any new wells for 10 years. The system compensates for delayed rains and monsoons, increasing the resilience of farms to the impacts of climate change and reducing the incentive to use more water. The collectivization pilots were documented by the GW-MATE and the results are being used to scale up community-based groundwater management projects.

2.2.5. STRENGTHENING HYDROMET SERVICES

The Dominican Republic, which is situated on a shared island, faces many challenges resulting from erratic weather patterns. While the Bank was financing the rebuilding of irrigation infrastructure damaged by tropical storms Olga and Noel, the team realized that low client capacity was hampering project completion. The National Water Resources Institute (*Instituto Nacional de Recursos Hidráulicos*, INDRHI), a major provider of data and analysis supporting national early warning and preparedness, needed to coordinate with other entities in a timelier manner.

In response, the WPP supported an activity to strengthen and modernize the water resources monitoring and analysis system managed by INDRHI. The team developed an inventory of the hydromet stations in the country, identified where new stations were needed, and proposed a budget and technical specifications. The team also recommended bolstering staff, skills, and training at certain levels of the organization. The country has requested $5 million in additional financing under the existing Emergency Recovery and Disaster Management Project to implement the suggestions, from upgrading the observation network to bolstering its data processing capacity. INDRHI is becoming more integrated with the national early warning system network for disaster preparedness and response.

BOX 3 - THE HEF STRENGTHENS ALBANIAN INSTITUTIONS TO TAKE ON DISASTERS

Nearly 90 percent of Albanians live in areas prone to multiple hazards, but the government and local communities are not prepared to deal with unexpected disasters. The country's ability to collect inputs needed for daily forecasting is constrained by the deteriorated weather and hydrological monitoring network and deficient telecommunication capacity.

The Hydrology Expert Facility (HEF) supported a Bank-financed project by providing expert advice on strengthening Albania's hydrometeorological services. It prepared a series of realistic improvements for hydromet services, harmonized donor support (including from the Italian Civil Protection and CIMA Foundation), and brought international best practices for improved early warning systems.

With this support, Albania's hydrometeorological service has taken significant steps towards establishment of a functioning weather observation and forecasting system. Within the parameters of the Bank project, and taking into account support provided by other donors, the consultant designed and costed the project activities and their implementation, and provided advice to the Bank team and the client.

While still in progress, the project has already contributed to important achivements and results on the ground. Together with the CIMA foundation, the Institute of Energy, Water, and Environment (IEWE), the Albanian institution responsible for the hydrometerological services, has issued the first weather-related bulletin, which is a step toward a proper forecasting, monitoring, and early warning system mechanism benefiting other users. The upgraded weather monitoring center in IEWE was provided with communication and IT links to the national and local civil protection and emergency operation centers.

2.3 INVESTING TO FEED THE FUTURE

As countries develop, their people demand more and better food. Irrigation is by far the largest user of water. By 2050, food production will require twice as much water as it does today, or another 3,300 cubic kilometers. One-quarter of the world's food is grown using groundwater, which is difficult to measure, much less regulate. In the long run, climate change threatens to alter the rate of aquifer recharge, making the availability of the resource even less predictable. On the flip side, those that rely on nature to feed their crops will face similar challenges as rainfall and temperatures become more variable.

In support of multi-sector solutions that work at the nexus of food and water, the Bank has scaled up lending in irrigation and drainage projects. At nearly $1 billion in commitments, the subsector now comprises 13 percent of the Bank's total water portfolio.

The WPP is helping countries as diverse as Uganda, Mali, Nigeria, and Brazil to promote growth by investing in water for agriculture. Analytical work is supporting more productive uses of water at the farm level to generate food from rainfed agriculture and through irrigation systems that reuse recycled wastewater. The Water Partnership Program is also supporting irrigation schemes that will help restore the Aral Sea in Central Asia, and is piloting a water rights system in China based on remote sensing technology and evapotranspiration (ET) that is the first of its kind.

2.3.1. HOW WELL-MANAGED GROUNDWATER FEEDS DEVELOPMENT

Agriculture drives economic growth in Uganda. Food production, mostly fed by rain and surface water, accounts for 21 percent of GDP and employs 78 percent of the country's workers. However, much potential remains unused with only 10 percent of irrigable land developed. The country's agricultural strategy does not adequately address water, and its water plans do not comprehensively assess groundwater as a potential resource.

To ensure optimal use of water resources, the Groundwater Management Advisory Team developed a framework for the World Bank's Country Water Resources Assistance Strategy (CWRAS) for Uganda that demonstrates how farmer-managed groundwater systems could help it expand its irrigated areas and provide more water for livestock and domestic consumption in rural areas.

The study team assessed bottlenecks to appropriate management of groundwater, and suggested four priority action packages for financing. The proposed programs include promoting the private sector to develop shallow tubewells and learn new technologies, like hydrofracturing and improved well head protection. Suggestions for the government include decentralized licensing and expanded monitoring in urban well fields. At the local level, better mapping of shallow aquifers, and groundwater quality and catchment plans can help stakeholders manage groundwater resources for optimal use. These interventions influenced groundwater proposals in the CWRAS, which form the basis for the Bank's long-term investments in Uganda's water sector.

2.3.2. PARTNERSHIPS FOR PRODUCTIVITY

Brazil has 3.5 million hectares of land under irrigation. Half a million hectares are located in a semi-arid region, where 30 percent of the land is public and the remainder is privately owned. The government cannot afford to build, operate, and maintain additional public irrigation schemes. Looking to the private sector for additional resources, the Ministry of Integration is implementing its new National Program for Public Irrigation of the Brazilian Semi-Arid region, under which the government will grant concessions to private investors.

The Bank has provided technical assistance to CODEVASF, a public company that oversees development in the São Francisco and Parnaíba river basins, to devise a conceptual framework for public-private partnership (PPP) in the irrigation sector. Under this framework, the WPP helped establish a new irrigation management model with strong private sector participation. In parallel, the WPP supported the development of regulatory processes for the National Water Agency (ANA) and helped build its capacity to regulate pilot projects under the new model. The WPP grant has contributed significantly to the training of ANA staff through regular interactions with the Bank team, and helped in the design of irrigation PPPs in Nilo Coelho and Baixo de Irece.

2.3.3. SUSTAINABLE FARMING

For 50 years the Aral Sea has supported unsustainable cotton cultivation, mostly in Uzbekistan. The result has been a major environmental disaster; the sea is now 10 percent of its original size. In addition, over the last decade, Kyrgyzstan increased water use for hydropower generation, changing the flow of the Syr Darya River. Yet, the water is not used

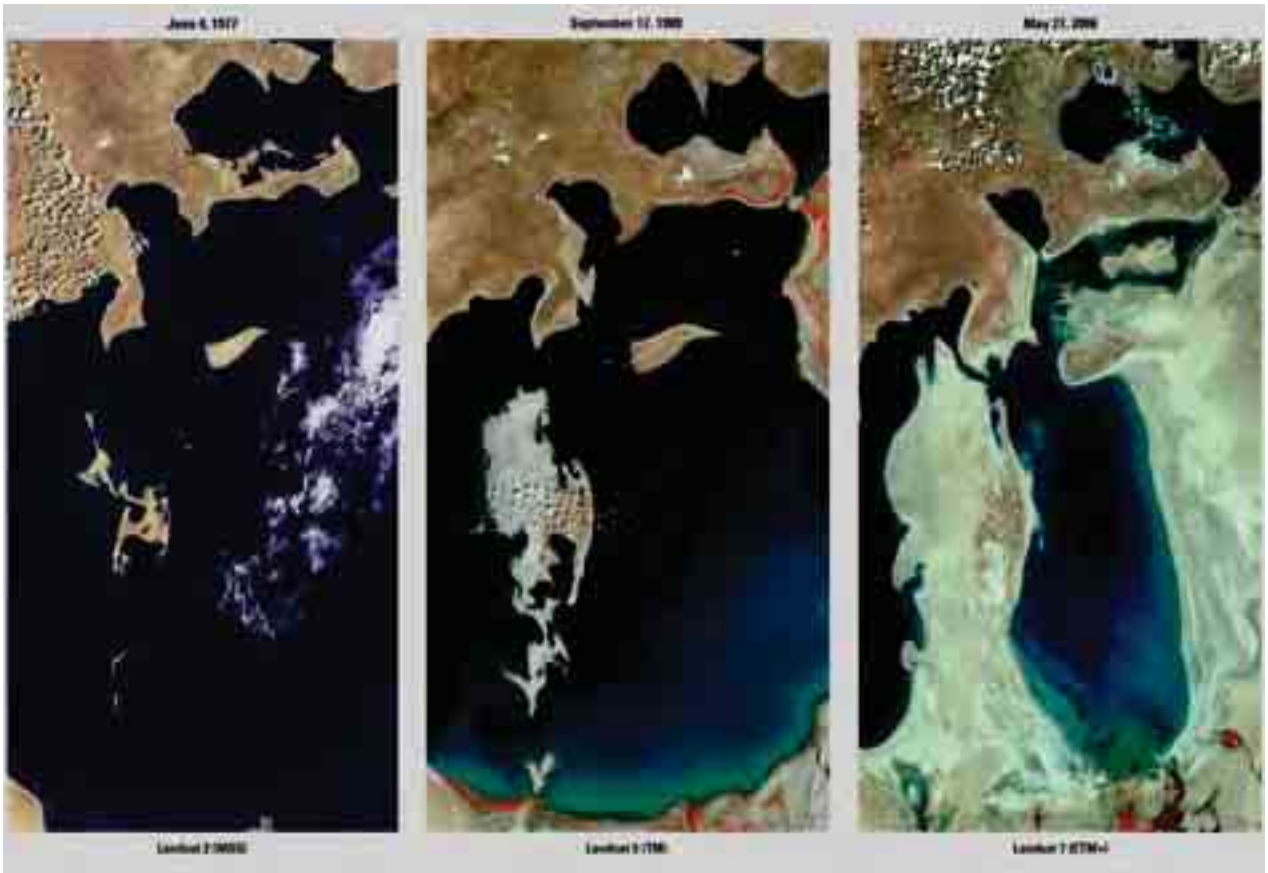
productively for agriculture or environmental services downstream. Unsustainable water practices wrecked the Aral Sea, leaving significant economic, social, and environmental implications (see images below). The World Bank is assisting the government of Kazakhstan in designing an integrated approach to restoring the Syr Darya River upstream of the North Aral Sea. This support is multi-faceted, realized through a series of projects, including the Irrigation and Drainage Improvement Project (IDIP), which seeks to secure water sources for irrigation.

The Water Expert Team provided support for IDIP-2 in Almaty, Kyzylorda, South Kazakhstan, and Zhambyl oblasts, in the southern part of the Republic of Kazakhstan. Experts provided support to water user associations to design projects under which they would bear the operation and maintenance costs to ensure sustainability. Taking into account international best practices, and customizing to local conditions, the team provided an institutional framework for irrigation management and replicable training material that can be used for similar projects across Central Asia. IDIP-2 will cover irrigation and drainage infrastructure rehabilitation activities for 113,000 hectares and will support the first basin-wide irrigation management transfer in southern Kazakhstan.

2.3.4. WHERE LAND MEETS WATER

In Africa, the WPP is funding work in sustainable land management practices to promote opportunities for growth through food production. Agriculture is part of the national strategies of Mali and Nigeria and is a key element of non-oil economic growth. However, the long-term productivity and sustainability of agriculture are currently threatened by inefficient, sometimes inappropriate, competing land uses across both countries. Inadequate uses have led to land degradation that becomes a barrier to agricultural development and affects farmers directly.

The governments of Mali and Nigeria, along with the Bank, agreed to prepare a freestanding technical assistance solution to propose efficient and sustainable land management options. The HEF prepared a study to quantify on- and off-site impacts from land degradation in the Niger basin, which covers



The Aral Sea was once one of the 4 largest in the world. As seen from this satellite view, water levels have quickly fallen over the last 5 decades. Poor environmental management and aggressive irrigation policies have resulted in the near evaporation of the sea, which today stands as four small, separate lakes.

parts of Nigeria and Mali. Impacts studied included eutrophication of downstream water bodies, changes in hydrological regimes due to loss of moisture retention upstream, groundwater depletion, soil erosion, and water course and reservoir conditions.

The Hydrology Expert Facility then provided various land management options using cost-benefit analyses to inform plans for the governments' multi-sector investment framework for land management. The activity reports are guiding two large-scale Bank operations providing advanced watershed modeling and sustainable land management services, and will feed into the World Bank Flagship on Agriculture in Africa. Demand for follow-on activities is being met by the Water Expert Team.

2.3.5. PIONEERING A MORE SUSTAINABLE WATER RIGHTS SYSTEM

In China, water permits are based on withdrawal amounts, and do not account for water consumed by evapotranspiration or the amount that is recycled through runoff or percolation. Such accounting is not accurate and can provide incentives for farmers to overconsume water. In recent years, remote sensing has allowed hydrologists to estimate ET at the farm level, making water consumption estimates more precise.

The Water Partnership Program assisted a Bank team in designing an innovative ET-based water rights administration system, which requires measurement and control of withdrawals, consumption, and return flows. The first of its kind in the world, the ET-based system is now being implemented in the Turpan basin under a Bank-financed project. Twenty water user associations (WUAs), managing nearly 5,000 hectares, are already piloting the system. Once rolled out to all 43 WUAs, water consumption is expected to decrease by 6.55 million cubic meters per year, which is an enormous benefit for this semi-arid region.

2.3.6. MAKING REUSE THE SMART AND SAFE DECISION

In 2006, the World Health Organization updated its *Guidelines for the safe use of wastewater, excreta, and greywater* to promote the beneficial use of nutrient-rich wastewater for irrigation. The new guidelines seek to protect consumers, farmers, and communities from health risks by recommending less strict water quality standards that are more realistic and will not be ignored by regulators. The updated guidelines support the use of tools such as Quantitative Microbial Risk Assessment (QMRA) to derive potential health risks for different reuse options.

In the Nile delta, water drives development through agriculture, but the informal reuse of untreated domestic waste is widespread. Many families in rural areas still rely on on-site septic tanks that are unregulated and often emptied into agricultural canals or directly onto farmers' fields. The resulting pollution presents a significant risk to human health.

The Bank is supporting the government of Egypt's Holding Company for Water and Wastewater (HCWW), which manages sanitation facilities throughout the country, to invest in infrastructure that mitigates these risks. A Bank team worked with the HCWW to carry out research on the most cost-effective strategies for providing sanitation that protects the public health of downstream communities. The study, partly funded by the WPP, assessed the health implications of pathogenic contamination of drainage water reused in agriculture, using QMRA. HCWW now has a list of realistic options for reducing the incidence of disease, with associated costs and benefits. The report is proving a useful contribution to the debate around appropriate wastewater discharge standards and investment planning as Egypt moves towards greater cost efficient use of resources. The activity has also pioneered QMRA assessment, in line with international reuse standards, which serves as an example for other countries.

"HCWW IS CONTINUALLY LOOKING FOR WAYS TO OPTIMIZE THE PLANNING AND DESIGN OF WASTEWATER MANAGEMENT SYSTEMS. MODERN STATISTICAL TOOLS, LIKE QMRA, ENABLE THE ASSESSMENT OF RELATIVE HEALTH RISKS WHEN EFFLUENT FROM TREATMENT PLANTS IS DISCHARGED INTO THE AGRICULTURAL DRAINAGE NETWORK IN LOCATIONS WHERE REUSE COULD HAVE VALUE IN THE AGRICULTURAL SYSTEM."

- Engineer Mamdouh Raslan, Deputy Chairman Holding Company for Water and Wastewater in Egypt

Throughout the world, wastewater is often applied to agricultural fields, providing nutrients that can increase crop yields. Developing countries need cost-effective ways to continue benefiting from wastewater use in irrigation while reducing the threat of disease.

2.3.7. IMPROVING MOTHER NATURE: RAINFED AGRICULTURE

The bulk of agricultural production in developing countries is rainfed, and rainfed regions are home to most of the world's poor. Especially in the water-constrained rainfed production systems of arid and semi-arid regions, facing recurrent droughts and floods often makes water management a key determinant for agricultural production and productivity.

The WPP financed a study on improving water management in rainfed agriculture. It provides a synthesis of the state-of-the-art thinking and experience on applying different approaches for improving water management. The study also reviews the Bank's portfolio, and estimates that, over ten years, less than 5 percent of the commitments to the agricultural sector addressed water management in rainfed agriculture.

Findings of the study were presented in different fora at the Bank, and contributed to the lead chapter in a forthcoming book on water harvesting for crop production in sub-Saharan Africa. The Bank's Independent Evaluation Group in a review of lessons from agricultural experience cited the study's portfolio review and recommended that the Bank separately track its water management activities in rainfed areas to take stock of what works and contribute strategically to the development of such activities.

2.4. ENERGY AND WATER: A RECIPE FOR GREENER GROWTH

Energy and water are mutually dependent; without one, the other cannot exist. Energy is one of the most costly inputs to water supply and pollution control, from collection to treatment to conveyance. Conversely, water is a major input in the production of energy, from the conventional to the renewable. Demand for both inputs is on the rise as global energy consumption is expected to double between now and 2035. If energy security is to be achieved, hydropower will need to make up a larger share of the global supply.

As water variability changes over space and time, countries need to adapt. More water for more people means greater amounts of energy going through inefficient pumps. Rising energy prices and a global concern for carbon emissions are making renewable energy a more practical option for fueling water systems. Hydropower is a low-carbon, renewable energy source that can be developed for multiple purposes and serve as a buffer in times of drought. In line with its current water sector strategy, the Bank is re-engaging in hydropower development, financing more than 50 active projects worth almost $6 billion.

Making efficient use of water and energy in parallel can transform development regimes and foster growth. The WPP is influencing the core of the water-energy nexus. The Program shows how mitigation incentives can bring energy efficiency improvements to water services in India and how solar-powered desalination can lead a region toward adaptation. It is also helping Central Asia and Africa re-engage in large-scale hydropower, and getting Bosnia and Herzegovina back on track to meet development objectives by securing energy sources.

2.4.1. MITIGATION DRIVES EFFICIENCY

Improving energy efficiency in water service delivery offers two benefits: it helps service providers cut costs and contributes to climate change mitigation and adaptation. Energy efficiency in the urban water sector has proven to be an effective way to drive greener practices.

The WPP supported a market scoping study to identify where and how energy efficiency improvements could be made in India's urban water sector. The urban water supply system is currently operating with low levels of efficiency. Electricity costs represent 50 percent of the total operation and maintenance expenditure, and nonrevenue water is as high as 45 percent for some utilities. The team identified the key market players, developed cost-effective technical solutions, and shared their results with water utilities across the country.

The report had a direct impact on the Bank-funded Karnataka Municipal Water Energy Project, which rolled out one pilot project in each of six municipalities. Under these pilots, funded by the state, utilities are replacing old pumps with more energy efficient models. The cost of the program was about $800,000 and is expected to lower operating costs by between 20 and 25 percent and save 16 million kWh per year. Over ten years, the pilot will offset CO_2 emissions by about 135,000 tons. The Bank is preparing a follow-on Urban Water Supply Project in Karnataka, which is being informed by the lessons learned on energy efficiency from this activity. The client is also interested in scaling-up energy efficiency program to other towns and to other sectors, like wastewater, street lighting, and government buildings.

Mitigation is also a promising avenue for developing countries in the Middle East and North Africa (MNA). The MNA region is facing real water security challenges. In arid, coastal cities, water demand is often met through large-scale desalination systems powered by fossil fuels. While groundwater and surface water resources are diminishing due to population growth and climate change, more desalination plants will be required to meet the water demand gap. The region is also oil abundant, and fossil fuels are often provided at little to no cost to water companies to run their treatment plants. With rising fuel prices, however, many countries are starting to look to solar power, another abundant resource, to run their massive water infrastructure. Desalination thus presents an opportunity for developing countries to meet their water supply needs while at the same time developing their renewable energy potential.

To support research on potential projects in this area, the WPP funded a study entitled *MNA Regional Water Outlook: Desalination Using Renewable Energy*. The study covers 21 countries and assesses water availability and demand projections, as well as implications of climate change impacts on water in the MNA up to 2050. The assessment focuses on the use of concentrated solar power as a reliable energy source for the region. By presenting information on the generation potential and associated costs of desalination, the study is the first step in helping countries determine whether to promote such strategies in the long term.

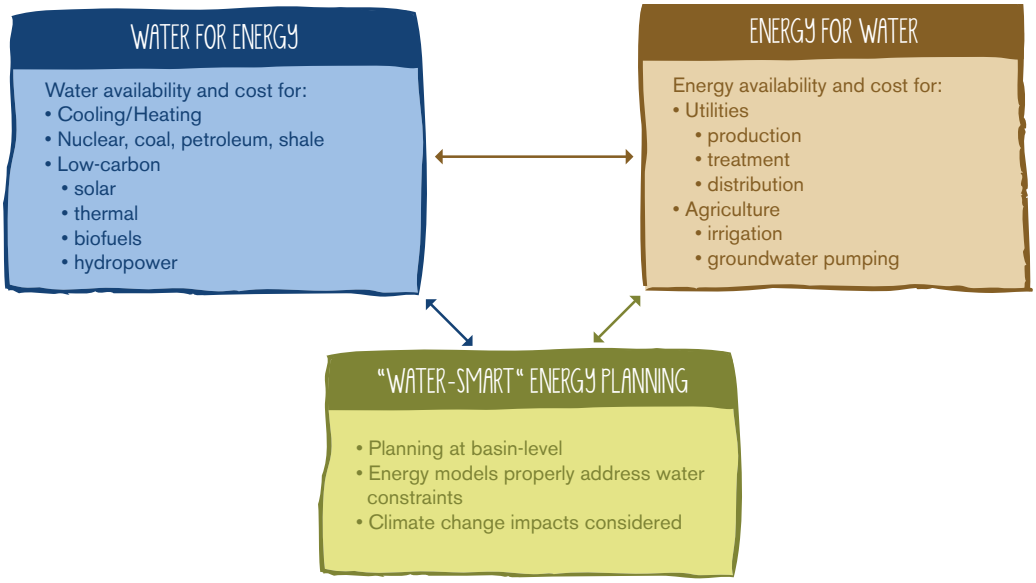
2.4.2. REGIONAL COOPERATION FOR SHARED SECURITY

Central Asia has historically used hydropower as a significant energy source, but water resources are drying up. Since the breakup of the Soviet Union, hydropower infrastructure has operated at the national, rather than the regional level. This scenario, along with a lack of regional trade mechanisms, has resulted in less optimal use of water for irrigation and for energy. An integrated understanding of energy and water variability, as impacted by climate change, is necessary to effectively allocate resources and drive future investments for joint resource optimization (see figure 4).

The Bank is embarking on a Central Asia Water-Energy Development Program under which an Energy Sector Management Assistance Program (ESMAP) for the region will be developed. As part of this program, the HEF supported a workshop in Kazakhstan, led by world renowned experts, to encourage dialogue among regional institutions responsible for WRM in the five Central Asian republics.[4] The workshop explored power and non-power operating constraints, and the challenges of hydrologic data generation.

HEF used the workshop as an opportunity to transform the way that practitioners approach the energy-water nexus. Experts demonstrated how, by using innovative

FIGURE 4 - ENERGY-WATER NEXUS



In development planning, the linkages and tradeoffs between water and energy need to be well understood. The availability and cost of water/energy at the local level has a large impact on the subsequent energy/water output. Water can be an energy enabler but must be managed properly. For example, expanding low-carbon energy sources will help mitigate climate change, but will use more water; solar thermal plants consume twice as much water as coal plants. Sustainable planning for energy is "water-smart": it considers the dynamic impacts of climate change, addresses resource constraints, and is done at the basin or local level.

instruments, countries could evaluate tradeoffs among sectors, and design policy interventions and financial investments to spur growth. The *Dynamic Information Framework* model presented at the workshop shows how a new generation of dynamic models facilitates the understanding of linkages between water and its multiple allocations, and provides quantitative forecasts of individual and combined impacts of demand. Practitioners can use satellite data and field data on climate and land use to evaluate basin dynamics and their implications for hydropower development. Such integrated thinking can help teams develop water-energy models that incorporate future needs across many sectors. The awareness raised at the workshop is expected to translate into regional development projects in the coming years.

2.4.3. UNLEASHING THE POWER OF AFRICA

The Kagera River, which forms the boundary between Tanzania and Rwanda, has the potential to generated 60-80 megawatts of power that can be shared between the countries and sold to neighboring Burundi (see figure 5). The Bank is assisting these three governments to secure co-financing for a Hydroelectric and Multipurpose Project in Rusumo Falls (RRFP). The HEF provided technical guidance on hydrology, morphology, sedimentation, and WRM design components for the installation of a dam and a power station under the proposed project. HEF experts helped the team define the full supply level for the reservoir and estimate impacts in the project area. The assessment will be incorporated into the pre-feasibility study that will be discussed by the three countries and used to select one preferred option for optimizing the available water resources. The study will also form the basis of the design strategy for the RRFP, and provide some information to be used by an independent team to undertake a full social and environmental impact assessment under later project stages. The expert team's contributions are influencing a $110 million project component.

The Water Expert Team has also contributed to RRFP by forecasting the expected lifetime of the dam given expected climate change impacts. The team integrated climate change information from various data sets to determine the change in river runoff due to changes in precipitation and temperature in Rusumo Falls through 2050. Dry, average, and wet scenarios are provided in the report. The study predicts an increase of 11 percent for average streamflow. This information could be used to calculate total energy generation from the falls. Such an assessment can help reduce the uncertainty for decision makers and weaken the risk associated with such a large investment.

Sustainable hydropower is a significant source of renewable energy and a stepping stone toward energy security. Sustainability can be achieved through hydraulic, mechanical and electrical efficiencies involved in the overall hydropower energy generation cycle. For example, in the Nurek Hydropower Station, sediment management is important for long-term hydropower operations and the collection of accurate and reliable hydrologic data to ensure the efficiency of the power generation system.

2.4.4. RECHARGING NATIONAL BATTERIES

The WPP, leveraging resources from the Bank's ESMAP and the Norwegian Trust Fund for Private Sector Investment (NTF-PSI), supported technical assistance for pre-investment in water and energy programs for the government of Bosnia and Herzegovina (BiH). BiH was looking to increase hydropower generation by 20 percent to meet growing demand, and to do so in line with energy sector strategies and regional regulations, including the EU Water Framework Directive. The country needed assistance in developing an integrated water resources management approach to both large and small hydropower development. Initial plans developed in 1987, however, had been postponed during the war, and were outdated.

The WPP and NTF-PSI are helping Bosnia and Herzegovina to set out a new official strategy for the Vrbas River basin, which is situated in the western part of the country. The Program funded a revised WRM study as well as a hydropower development study, which used a multi-criteria analysis tool to evaluate diverse development options and help decision makers prioritize investments. The methodology identifies the optimal financial, economic, environmental, and socioeconomic strategies while meeting the water resource development targets and objectives, including maintaining environmental flows. Six development options, with investments ranging from $155 million to $410 million, were evaluated.

The activity fostered participation of relevant stakeholders in the region, including a steering committee comprising all relevant national and state ministries, hydrometeorological institutes, and local power companies. Three workshops were held to discuss both draft studies, which are now being brought forward for public consultation. They will be finalized in 2012 through NTF-PSI funding.

In addition to helping countries develop new hydro sources, the WPP also supports the maintenance of existing dam operations. Tajikistan is a world leader in hydropower generation, but extensive long-term investment is required to maintain its power infrastructure. The Vakhsh River, near Dushanbe, hosts three hydropower plants. One of these plants, the Nurek Hydropower Plant, supplies 70 percent of total electrical power in the country. It also occupies a key position in the Central Asian power transmission grid.

One major impediment to the continued operation of Nurek's power generation system is reservoir sedimentation. Reservoirs have a limited capacity to trap sediment without affecting the plant's generation potential. Nurek's excess sedimentation is also a problem for the proposed Rogun dam site situated immediately upstream of the Nurek reservoir.

The WET conducted an assessment of sedimentation management as part of a feasibility study for rehabilitating the Nurek plant. The preliminary assessments identified critical data gaps on sediment concentration, outlined sedimentation strategies to maintain long-term hydropower operations, and evaluated the severity of sedimentation problems in the reservoir system. The team provided recommendations to the client, including how to collect the missing data, and options for releasing turbid density currents, which play a major role in sedimentation. Following up on these recommendations will help devise similar strategies in the design of the future Rogun dam.

2.5. SPOTLIGHT ON AFRICA

Africa receives nearly 34 percent of all WPP funds, and for good reason; the water challenges are as diverse as the continent itself. Bigger cities call for significant investments in sanitation and clean water. Droughts have instigated famine in East Africa and affected an international food crisis. Millions need access to energy, yet large hydrogeneration potential remains untapped.

To strengthen, secure, and sustain water resources in Africa for its growing population and promising future, the WPP supports a total of 42 activities in 24 countries, in addition to 10 regional activities. This section highlights a number of activities that were under implementation in 2011. For example, to strengthen institutions, the WPP assisted the government of Ghana compare its water availability with desired outputs for agriculture, hydropower, and potable water supply. To encourage sustainable water services, the WPP helped Uganda define opportunities for developing and managing groundwater to achieve long-term agriculture goals. And toward securing energy resources, Program experts furthered the technical design options for a multipurpose hydroelectric facility in the Kagera River basin, with potential benefits for three countries (see figure 5).

The region is making great headway on major regional challenges, from partnerships on groundwater and agriculture, to cooperation for basin-level development planning. Countries are also dedicated to learning from project implementation. They are looking back to learn what worked best for filling the sanitation access gap, and institutionalizing the evaluation of future project performance across water subsectors.

2.5.1. WATER EXPERTS PROMOTE REGIONAL SECURITY

The Southern Africa Development Community (SADC) comprises 14 member states that cooperate with one another toward shared socioeconomic, political, and security objectives (see figure 5). For more than 10 years SADC has had an agreement on shared watercourses, which has guided regional integration and cooperation on the use and development of surface water. Groundwater, however, is just beginning to surface as a vital resource for development and a critical buffer against climate change.

GW-MATE and the WET supported the $7 million SADC Groundwater and Drought Management Project, to promote adaptive management of groundwater, by advising local stakeholders and regional leaders. At the local level, groundwater experts conducted quality reviews of community groundwater management plans, vulnerability mapping, and resource valuation reports. These were used to develop pilot infrastructure projects (e.g. monitoring boreholes, sand dams, windmill driven plots, and reservoirs) to improve resilience in seven communities, benefiting 100,000 families in the area. The pilot projects then informed the development of Decision Support Guidelines, which were adopted in May 2011 by the Water Resources Technical Committee and disseminated to member states. These guidelines can be used by local and national policy makers to design similar climate-smart investments.

At the regional level, the team provided technical assistance to the SADC Water Division to strengthen drought management policies across all states. Inputs helped shape the form and function of the Groundwater Management Institute for Southern Africa (GMISA), launched in 2010, which will be the institutional anchor for ensuring sustainable resource management. GMISA will monitor groundwater changes in pilot areas to provide information for better community decision making. The success of the project led to heightened demand from member states and approval of a $12 million project funded by the World Bank's Global Environment Facility (GEF) to begin in 2012. The WET activity team members contributed significantly to the design of the follow-on work.

2.5.2. SUSTAINING A FRAGILE ECOSYSTEM

The Lower Kihansi Hydropower Project (LKHP) produces nearly 30 percent of Tanzania's electricity, but presents risks to the unique Kihansi Gorge ecosystem downstream from the dam. In 1996, when construction of the LKHP was well underway, the affected ecosystem was found to be more fragile than had been previously understood. The pivotal issue was the discovery of the Kihansi spray toad, a rare species that depends upon microclimate produced by spray from the Kihansi River's fall.

The WPP provided funding to help restore the Lower Kihansi Gorge ecosystem by studying the environmental water needs (quantity and quality) required for the successful reintroduction of the toad into the gorge. The team prepared release and post-release monitoring procedures by researching the animal both in situ and in captive conditions at the University of Dar es Salaam. The team studied the availability of food for the spray toad, as well as fungus and disease control and other risks that might prevent its successful reintroduction.

The WPP helped re-introduce 300 Kihansi Spray Toads to their natural habitat in the Lower Kihansi Gorge Ecosystem.

"WPP HAS BEEN A BIG SUPPORT TO THE RESTORATION EFFORTS OF THE KIHANSI HABITAT AND THE CONSERVATION OF BIODIVERSITY AND MOST IMPORTANTLY TO THE ONGOING REINTRODUCTION OF THE KIHANSI SPRAY TOAD."

– Jane Kibbassa, TTL, Lower Kihansi Environmental Management Project

A first batch of 300 toads was transferred from the Toledo and Bronx zoos in the United States to captive breeding facilities at the university and in Kihansi. The facilities are the first of their kind in East Africa. Technicians at these facilities received advanced training in amphibian husbandry. A GEF-funded project is being designed to continue the reintroduction and monitoring activities.

The WPP also supported curriculum development for conservation biology and water engineering for the University of Dar es Salaam to ensure that future generations of project engineers would understand the full impacts of hard infrastructure on natural ecosystems. More than 40 students have completed or been admitted to the Master's program.

2.5.3. VALUING THE BENEFITS OF COOPERATION

The WPP supported the development of a Multi-Sector Investment Opportunity Analysis (MSIOA) for the Zambezi River basin. The aim of the MSIOA is to illustrate the benefits of cooperation among the riparian countries in the basin through an economic evaluation of water resources development, management options, and scenarios from both national and basin-wide perspectives. The analytical framework was designed in consultation with the riparian countries, SADC Water Division, and development partners in line with the Zambezi Action Plan Project 6, Phase II.

The report concluded that cooperation of existing hydropower facilities could increase generation by 7 percent, and that future hydropower development, if done in accordance with the Southern Africa Power Pool, would meet most of the estimated 48,000 GWh/year demand of the basin's riparian countries. Coordination by the power pool will yield 23 percent more generation than unilateral operation. In addition, by moving irrigation development further downstream, firm energy generation could increase by 2 percent.

The findings, together with the Integrated Water Resources Management Strategy and Implementation Plan for the Zambezi River basin that was developed under a donor-funded project implemented by SADC (2008), will contribute to development, environmental sustainability, and poverty alleviation in the region. The methodology can also be replicated in other river basins.

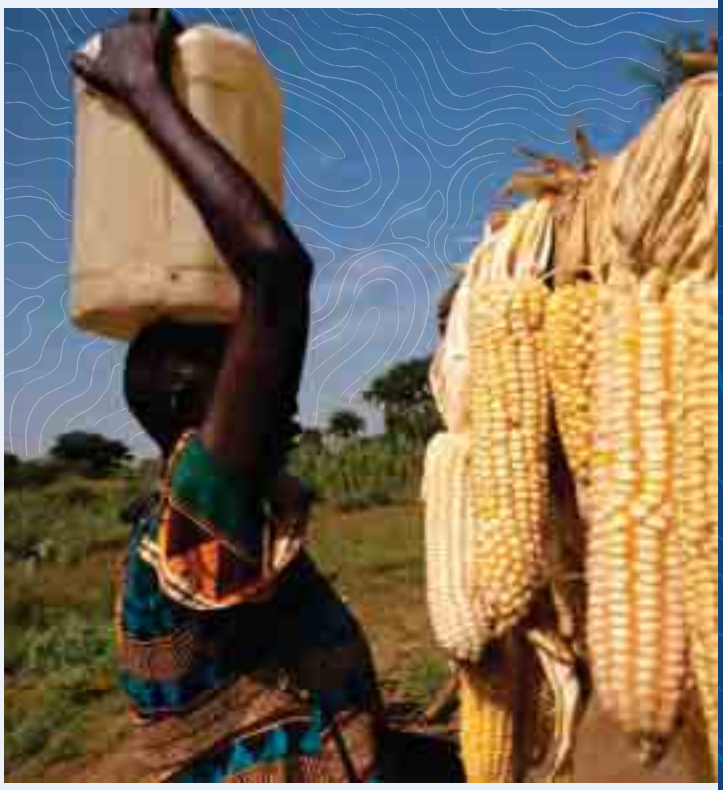
2.5.4. A PARTNERSHIP FOR FOOD SECURITY

The WPP's support to the Agricultural Water for Africa (AgWA) partnership has opened the door for countries working to improve agricultural water management. Working in sub-Saharan Africa, AgWA integrates efforts across countries, international organizations, and donors to coordinate investments, knowledge sharing, and advocacy.

WPP funds have supported south-south learning, improved country investments, and helped develop AgWA's institutional framework. The activity is influencing a $9 million irrigation and market infrastructure grant from the IDA, and a pipeline of $500 million for an irrigation project in the Shire Valley in southern Malawi.

The WPP also sponsored two Comprehensive Africa Agricultural Development Program workshops in Mali and Tunisia, which resulted in the finalization of the AgWA 2010-2011 work plan that outlines the contributions of agricultural water management to economic growth in the region. New regional members, and global partners like the Global Water Partnership (GWP) and the International Food Policy Research Institute, joined the partnership during the workshops.

The WPP filled key gaps in activity implementation for promising countries. For example, an irrigation component was included in the Agriculture Diversification Project in Benin. The WPP also assisted Bank task teams managing agricultural projects to learn more about investing in agricultural



In sub-Saharan Africa, female farmers play an important role in the value chain of crop production, doing a major share of the seeding, harvesting, and post-harvesting work. In addition, 31 percent of rural households in the region are headed by women. Achieving food security requires equitable access to resources and designing policies that take into consideration the fact that women are the backbone of food production and provision for their families.

BOX 4 - AgWATER FOR AFRICA

AgWA, endorsed by the Africa Ministerial Conference in Sirte in 2008, is a partnership of the principal actors* in Agricultural Water Management in Africa.

AgWA seeks to improve AWM in an effort to eradicate hunger through increased food production, and alleviate poverty by generating wealth. The organization connects partners, provides advocacy, mobilizes resources for the sector, shares knowledge, and promotes donor harmonization.

The WPP has contributed significantly to both Phase I and Phase II of the partnership. Its support has leveraged an external grant that will sustain AgWA for the next two years.

*AgWA emerged in part from a collaborative program implemented jointly by AfDB, IFAD, FAO, NEPAD, ICID, IMAWESA, IWMI and the World Bank.

Much of sub-Saharan Africa is not on track to meet the MDG targets for sanitation. In many countries in the region fewer than 30 percent of people have sanitation coverage. With urbanization on the rise, countries should look to cities that have been able to improve and sustain sanitation services for growing populations, such as those in Senegal and Burkina Faso, where the urban access rates reach 70 percent and 50 percent, respectively.

water management by sharing guidelines on safeguards for the mid-term review of the Bank's Africa Irrigation Business Plan. As a result, AWM investments were made in Benin and Malawi.

The first phase of AgWA was successful in building partnerships throughout Africa. In response, the WPP is supporting a second phase of the partnership, which now has 18 members. Under Phase II, an internal governance structure was created and endorsed by all main partners in early 2011. AgWA has since created a steering committee and issued a report laying the foundations for a monitoring and evaluation system for agricultural water management. The new two-year work plan will be funded by the International Fund for Agricultural Development (IFAD), which has committed $350,000. This is a prime example of the Water Partnership Program's ability to leverage additional investments.

2.5.5. MONITORING SYSTEMS THAT AID EFFECTIVENESS

The WPP funded the development of a new implementation plan for monitoring and evaluating Tanzania's water sector. The M&E plan will assist the Ministry of Water and Irrigation to coordinate across 300 implementing agencies and nearly $1 billion in water sector projects over the next 5 years.

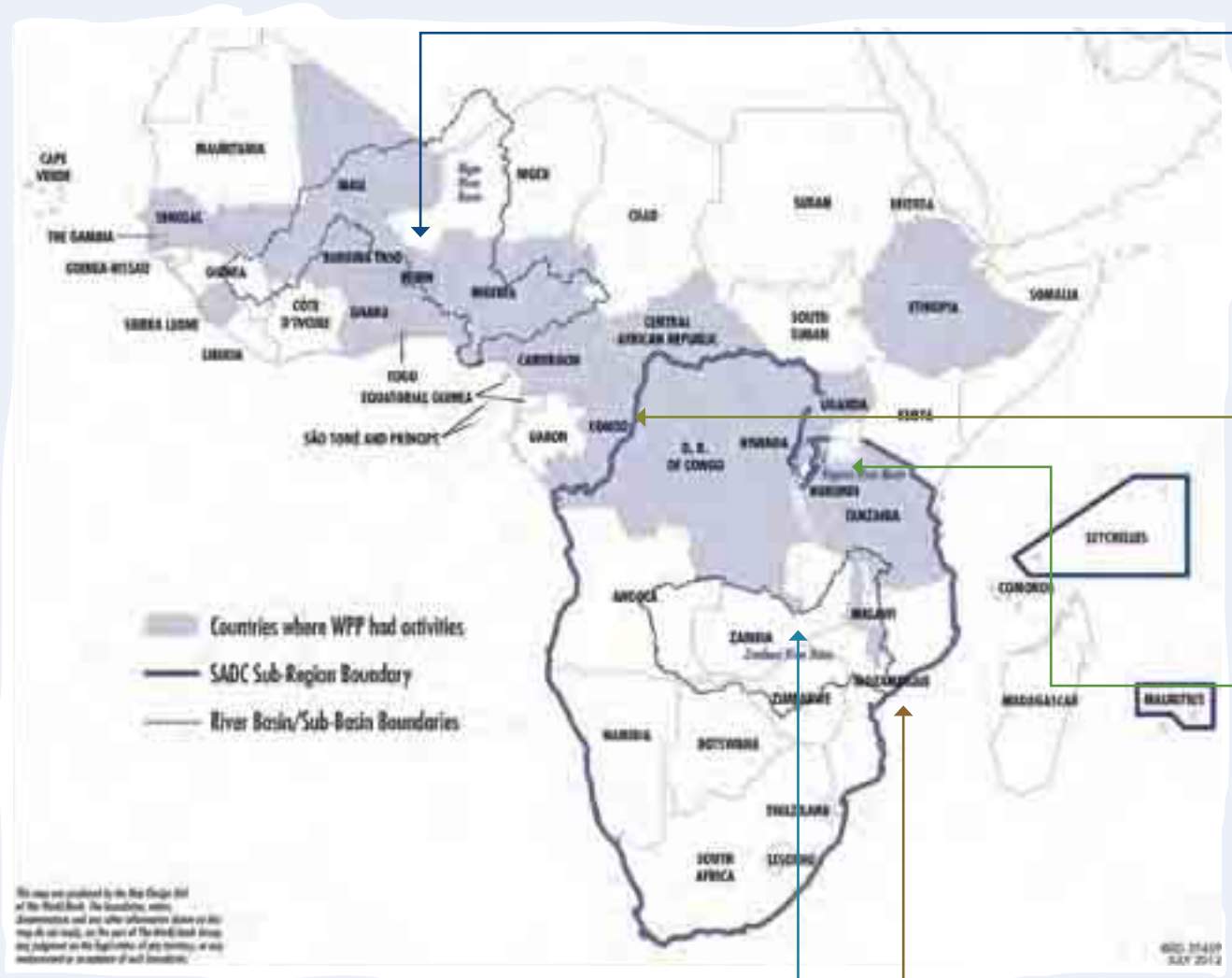
Under this activity, the Bank team provided a comprehensive management information system (MIS) and a resources plan for technology, staffing, and equipment needs for implementing the M&E plan. The activity supported parallel World Bank efforts to train ministry staff on the new management information system. The ministry is already looking to expand the MIS function by linking it with water point mapping and other new initiatives. This activity will influence the $200 million Tanzania Water Sector Support Project.

2.5.6. KNOWLEDGE: WHAT MAKES SANITATION SUSTAINABLE?

When it comes to meeting sanitation goals, large cities in West Africa face a moving target fueled by urbanization; even more reason to make sure that those who get access retain it for the long run. Client countries want to know what works. The WPP provided resources for a Bank team to go above and beyond project implementation by comparing the outcomes of two projects: the Ouagadougou Strategic Sanitation Plan in Burkina Faso and the Dakar Peri-urban On-site Sanitation Program in Senegal, funded by the Global Program on Output-Based Aid (GPOBA).

Accounting for differences in the project areas, the team discovered that both projects were able to meet their service targets through the leadership of public sanitation utilities, but in very different ways. Both cases demonstrate successful participatory and demand-based planning for on-site sanitation systems in urban areas. Demand was best met by offering mixed or customized technical options for dense areas. Access rates for poor households increased when flexible payment arrangements were allowed, and subsidies were high enough at the start of the program to boost demand. Senegal's systems were technically sustainable due to a proper septage management plan. In the case of Burkina Faso, on the other hand, the utility achieved financial sustainability through cost recovery targets, mostly paid by beneficiaries. The findings of this research will serve as valuable lessons for numerous future WSS plans and policies in African cities facing similar challenges.

FIGURE 5 - A SNAPSHOT OF WPP IN AFRICA



* This map showcases select WPP activities in Sub-Saharan Africa that were under implementation in 2011, including those at the national, regional and basin levels.

Cooperation in Transboundary Waters: Niger Basin

- Report assesses economic growth opportunities in irrigation, hydropower and navigation for Mali, Niger and Nigeria over the 1998-2004 period under the Niger Basin Authority
- The Niger case is a positive example where opportunities for development outweighed risks, and where strong institutions and regional leadership led to cooperation
- The case study has been published as part of a water paper entitled *Reaching across the Waters*, in which risk and political economy are studied across five trans-boundary river basins.
- The paper recommends forging cooperation in order to face problems of water scarcity, floods and droughts

WPP Funds Five Water Public Expenditure Reviews (PERs) in Central and West Africa

- Analysis of sector expenditures for Sierra Leone, Togo, DRC, CAR, and the Republic of Congo
- CAR: PER was used to mobilize a €14 million grant from the European Commission's MDG Initiatives
- Togo: Report is informing dialogue on public finance and influencing a future urban development project
- Findings were key inputs to the Ministerial Dialogue on Sanitation and Water and the 4th African Water Week
- Conclusions influenced a public spending Op-ed article in newspapers in Ghana, Kenya and Liberia

WET Expertise in the Rusumo Falls Multipurpose Project

- Expert teams contributed to the Hydroelectric Multipurpose Project to generate between 60-80 MW of power. It is influencing a $110 million project component
- A General Circulation Model (GCM) provides substantial information about the potential future climate change impacts on runoff regimes. The analysis based on a GCM analysis of the Kagera basin, where the falls are located, elaborates three future climate scenarios that contribute to the robustness of the RRFP
- Comparing the base case with the present (1970-2009) hydrology, the average future scenario is a 10 percent increase in annual runoff

WPP Experts Support SADC's First Groundwater Institution

- GW-MATE and WET promoted adaptive management of groundwater in SADC's 14 countries
- Technical assistance was provided to help SADC Water Division to strengthen drought management policies
- Helped shape the framework for the Groundwater Management Institute for Southern Africa
- Pilot infrastructure to improve resilience to climate impacts has benefited 100,000 families
- Informed design of a $12 million project approved by the Global Environment Facility

Cooperation in Transboundary Waters: Zambezi Basin

- WPP supported a basin-wide risk-benefit analysis of riparian countries committing to ZAMCOM
- Lessons can be learned from the Niger Basin's Sustainable Development Action Plan and the related Investment Program to boost regional cooperation in the Zambezi basin
- Climate change is likely to represent a growing threat to the Zambezi. Cooperation and emerging new opportunities will also depend of new political alignments at the sub-regional level

CHAPTER THREE

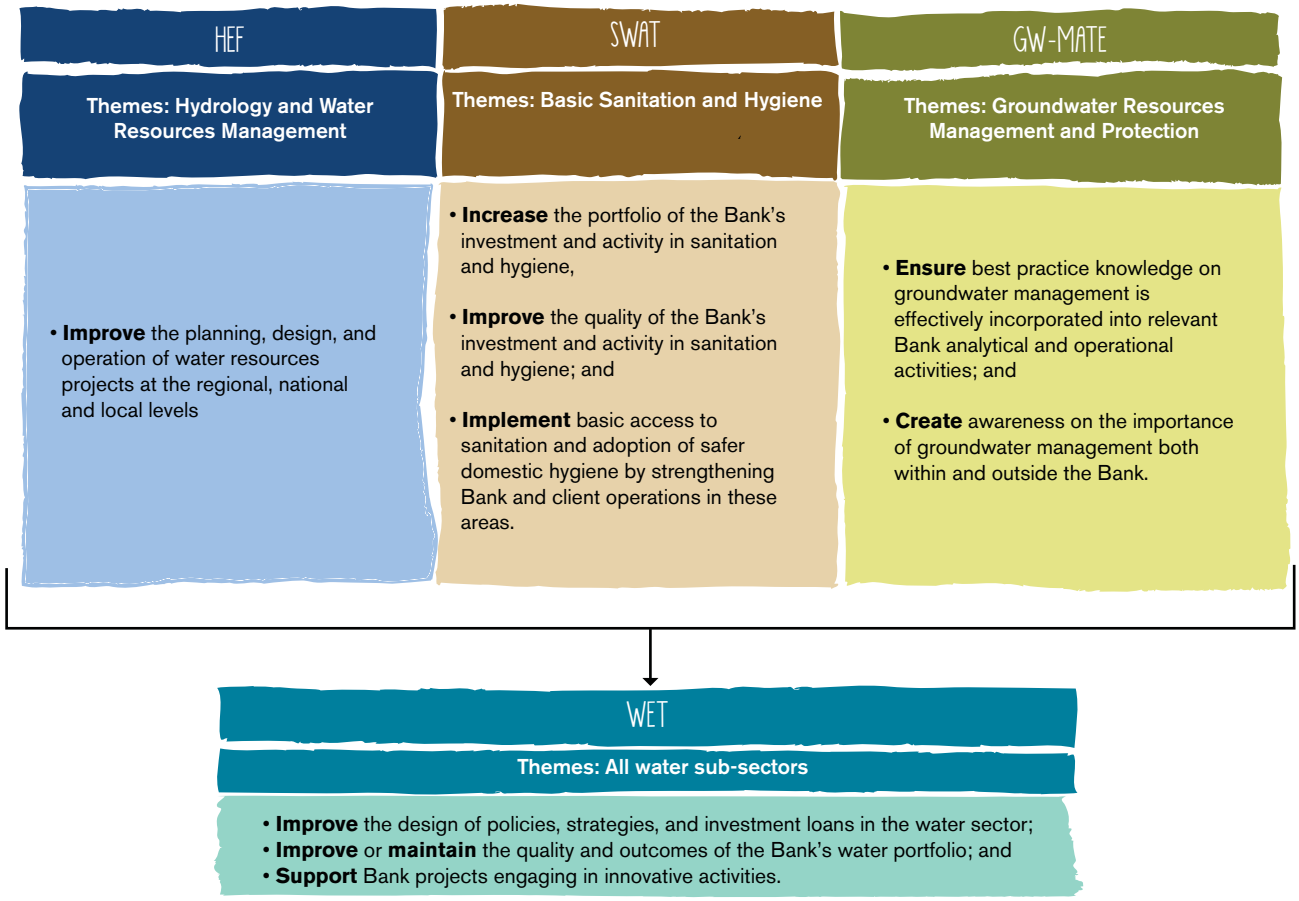
EXPERT SUPPORT TEAMS: GLOBAL KNOWLEDGE, LOCAL EXPERTISE

The Expert Support Teams (ESTs) that were active between 2009 and 2010 include the Sanitation, Hygiene, and Wastewater Support Service (SWAT), the Hydrology Expert Facility (HEF), and the Groundwater Management Advisory Team (GW-MATE). These three teams were a large asset to the Bank's clients, providing superior and timely technical support to major analytical and operational work. Each has been highly lauded by clients and Bank teams alike.

The ESTs were created to meet increasing demand for expertise in water supply and sanitation, hydrology, and groundwater management. The objective of the ESTs was concrete and flexible. International experts worked, in a narrow and cost-effective timeframe, to strengthen the Bank's and the clients' analytical and operational activities through direct assignments with project teams. Individual experts provided technical assistance to help design projects, study the feasibility of impending programs, and provide recommendations to those projects facing obstacles to completion.

The Water Expert Team (WET) was created in January 2011. It consolidates the three ESTs into one entity that supports a more responsive structure, and has an efficient and streamlined administration (see figure 6). The WET continues to serve as a flexible, just-in-time support mechanism fielding high quality expertise.

FIGURE 6 - EST AND WET THEMES AND OBJECTIVES



3.1. HEF: A MODEL FOR VERSATILITY

The Hydrology Expert Facility (HEF) provided assistance on intricate and complex hydrology and water management issues in response to requests from Bank teams. In accordance with its grant objectives (see box 5), the HEF provided prompt support to the regional, national, and local levels.

The HEF's model epitomizes efficient delivery of results using fast technical and administrative support and an easy-to-use application and reporting system for Bank teams. The team provided project-level support for the design, review, and monitoring of project components, as well as regional and global knowledge contributions on key hydrology and WRM issues. The HEF's administrative model was so successful that it was used as the platform for the WET service.

HEF has been the most versatile EST, providing expertise in several water subsectors. In Bolivia, India, and Central Asia, the HEF supported institutional strengthening activities to improve capacity and understanding of the climate-water nexus (see table 1). The HEF provided inputs to a hydropower project design and a sustainable land management policy in Africa. Experts have also been fielded to help develop early warning systems, train government officials in modeling for water resources management, and design hydrometeorology improvements for large Bank loans.

BOX 5 - HEF SUPPORT IN NUMBERS

30 The number of countries that have received HEF assistance in all World Bank regions since 2009

90% The portion of clients that rated HEF services as "highly satisfactory"

3.2 Billion dollars in Bank projects influenced by HEF activities

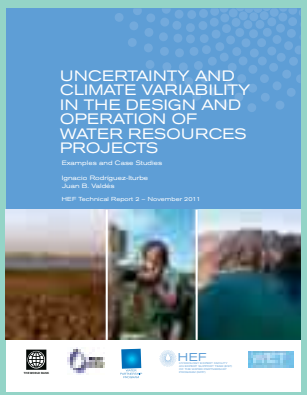
16 The number of services mobilized each year to improve hydrology and WRM project aspects

9 Total activities supporting Africa

HEF PROVIDED A GLOBAL TECHNICAL EXPERT WHOSE PRACTICAL EXPERIENCE REALLY RESONATED WITH OUR CLIENTS. AND THIS WAS ALL ARRANGED WITHIN A TWO WEEK TURNAROUND. THIS WAS OUTSTANDING SUPPORT.

– Claudia Sadoff, TTL, South Asia Water Initiative

BOX 6 - HEF'S KNOWLEDGE AND TECHNICAL CONTRIBUTION TO THE PRACTICE



Hydrology is becoming more complex in the context of climate change. Planning and design of new hydraulic infrastructure for water supply and sanitation, food production, hydropower generation, flood protection, and ecosystem restoration requires dealing with the interactions between land, water, vegetation, people and climate.

To provide insight on the latest analytical tools for assessing climate impacts in hydrological design, the WPP, WET and the Water Anchor partnered with the Alliance for Global Water Adaptation (AGWA), the Inter-American Development Bank (IADB), and Conservation International (CI) to organize a workshop in November 2011 to create awareness of the uncertainty challenges that practitioners face during the design and operation of water resources projects. A technical report with examples and case studies under the HEF was published as a result of this workshop and previous meetings between the HEF and the Water Resources and Watershed Management Thematic Group. The report gives special emphasis to the estimation of design floods and monthly flows in a river basin, and the effect of climate variability in ecosystem response of dry and humid areas. The report will be disseminated broadly to water experts and practitioners to support water projects in these areas.

TABLE 1 - HEF KNOWLEDGE PRODUCTS AND SUPPORT

Knowledge Service Product	Support	Examples
Technical seminars and presentations	Presented and managed events in collaboration with Bank regions, Water Thematic Groups and Communities of Practice	Training Days of the SDN Week 2010: "Putting in Practice the Eco-Hydrological Approach - Some Ideas" Technical seminars (e.g.): • "Taking into Account the Floods of the Future, Towards No Regrets Hydrology: Including Climate Variability and Change in Design and Operation of Water Resources Projects" • Working session on "Climate Change and Variability Impact on Design and Operation of Water Resources Projects and Remote-sensing technology for producing ET data"
Support to Regions	Facilitated the participation of renowned global/regional experts	Hydrology Project: • The India Hydrology 2 Project. Expert stressed the importance of modernization and strengthening hydrologic and climate networks and information systems and tools; implementing water legislation and instruments in water resources management; or the water-energy nexus issues. Capacity Building on Climate Modeling and Climate Prediction: • Bolivia. The participation of a high-level resource person to assist the project team and the government in the preparation of these dissemination and capacity building activities, providing guidance and helping to carry them out. • Central Asia. HEF worked with regional institutions in a workshop to build their capabilities in analysis, especially the interface or linkage between water and energy, which had largely been analyzed separately.
Publications	Disseminated technical experience mined from HEF activities, and of high importance to Bank teams	Technical reports: • "A review of selected hydrology topics to support Bank operations" • "Uncertainty and climate variability in the design and operation of water resources projects" Briefing note: • "Supporting Integrated Water Resources development in Tana and Beles, Ethiopia"

3.2. SWAT: PROMOTING SANITATION FOR ALL

The Sanitation, Hygiene and Wastewater Support Service (SWAT) offered services to Bank staff and country clients to improve the quality of projects that supported basic access to sanitation and adoption of safer domestic hygiene. The SWAT was also engaged in generating demand for sanitation programs from both Bank clients and Bank teams in response to the mounting global access gap.

The SWAT filled the expertise gaps needed to trigger investments and improve the quality of operations in sanitation and hygiene at the regional, national, and local levels. Expert field support also enabled the dissemination of a significant number of knowledge products targeted to the global development community.

BOX 7 - SWAT SUPPORT IN NUMBERS

10 The number of SWAT-supported activities implemented over 20 months

1.9 billion dollars in loans influenced, of which $1.2 billion was financed by the Bank

100% The proportion of outputs rated by clients as "satisfactory" in fulfilling the Terms of Reference

≥4/5 Average overall service rating as rated by the Task Team Leaders

BOX 8- SWAT KNOWLEDGE EXCHANGE HIGHLIGHTS

- Two knowledge exchange sessions supported at the Bank's Sustainable Development Network (SDN) week
- Co-sponsored four technical seminars
- Contributed to Water Orientation Course for new water staff at the Bank and published lessons learned on sanitation in Georgia
- SWAT management team inaugurated a series of websites to provide a comprehensive overview of basic sanitation in 2008

The SWAT's support has led to increased investments in sanitation by the Bank, client governments and other donors, and to improvements in development of plans and strategies.

What Bank teams often see as complex sanitation obstacles, the SWAT seized as opportunities. In rural and urban areas, SWAT activities proved that sustainable sanitation is possible. Supply and demand side interventions were supported, from hand washing campaigns to a basin-wide clean-up program to improved regulation at the household level (see table 2).

TABLE 2 - INSTITUTIONAL DEVELOPMENT AND LEVERAGE/IMPACT OF SELECTED SWAT ACTIVITIES

	Institutional Development	**Leverage and Impact**
Haiti	A rural sanitation strategy was developed with government agencies, providing an opportunity for sector knowledge to be passed down to new leadership.	Improved specific sanitation interventions implemented under the $5 million Haiti Rural Water Supply and Sanitation Program.
Cameroon	The team supported the Ministry of Energy and Water in devising a national strategy and leading donor coordination in sanitation.	The activity led the foundation for the development of a national sanitation strategy to be implemented, in part, by a $30 million Bank fund already approved for the first phase. More than a million new sanitation facilities will be built under the project.
Georgia	Recommendations provided new approaches and technological advice to the agencies responsible for water and sanitation investments; SWAT convened sector stakeholders and international donors toward development of a national strategy.	SWAT recommendations have led to a redirection of investment priorities toward rural sanitation. The government financed the development of a $45 million Bank-financed wastewater management strategy based on the report produced by SWAT and another prepared by the HEF.
Morocco	SWAT created a manual for the National Water Supply Organization (ONEP) to improve the design and operation of waste stabilization ponds. Cost-effective measures for odor control and improved water quality in summer months were provided.	SWAT developed comprehensive design calculations that incorporate water reuse for agriculture, in line with new WHO guidelines, to provide co-benefits to the agriculture sector.
India	SWAT supported the National Ganga River Basin Authority in developing a plan to clean up the Ganges River, to include improved wastewater and solid waste management for multiple sectors.	Influencing a $200 million Bank-funded project. The government has also asked for additional support to prepare a financial plan under the program.
Ecuador	A report evaluating the success of a rural sanitation program was used to provide authorities from other countries a best practice model. The team looked at the technical and financial sustainability of the model and whether it was replicable.	Panama and Nicaragua both showed interest in replicating the success of Ecuador through their rural investments. In Panama, the model has already been mainstreamed.

BOX 9 - SWAT MEETS URGENT SANITATION NEEDS IN POST-EARTHQUAKE HAITI

Conditions after the 2010 Haiti earthquake enabled the rapid spread of cholera throughout the urban population less than a year later. Resources were drained from rural areas to deal with the outbreak. Before these catastrophes, the rural water sector in Haiti was already struggling to reform itself, and the experience and capacity of rural institutions in sanitation services lagged far behind that of water supply.

The SWAT team worked closely with Haiti's National Sanitation Advisor to frame a Provisional Rural Sanitation Strategy. Initially, the government had assumed that it could only afford building latrines at 100 percent subsidy for a small portion of the population, in the hopes that the economic recovery would allow for expansion in future years. With SWAT's assistance the government looked at other options and proposed offering limited subsidies for more people to access rural sanitation. The ultimate goal is now to help develop the market for private, local sanitation technologies and services.

The team then developed a procurement package for the recruitment of a sanitation implementation partner to help direct the Bank-financed Rural Water Supply and Sanitation Program. The influence of the SWAT team will have a long-term impact on policy and practice of sanitation in Haiti.

"CONSULTANTS WHO CAN EARN THE TRUST AND RESPECT OF CLIENTS ARE WORTH INFINITELY MORE THAN ANY OTHERS. THE CONSULTANT HERE QUICKLY GAINED THE TRUST AND RESPECT OF "THE CLIENT" AT ALL LEVELS, FROM FIELD WORKER TO NATIONAL SANITATION ADVISER."

- Pete Kolsky, TTL , Haiti Rural Sanitation

3.3. GW-MATE: THE KNOWLEDGE EXPERTS

Established in 2000, the Groundwater Management Advisory Team (GW-MATE) was the longest running of the three ESTs. During its 10-year implementation, GW-MATE experts were able to study critical groundwater cases in countries in all Bank regions, influencing policies, sector plans, and large loans. The Water Partnership Program took over the operational side of GW-MATE's expert support from 2009 to 2011. The work of GW-MATE under the Water Partnership Program continued transforming the way the Bank and its clients consider groundwater in development planning.

GW-MATE teams worked in a given country for several years to study the dynamics of changing groundwater systems. They looked at hydrogeological realities and resource use dynamics to identify the proper institutional arrangements, necessary demand and supply side interventions, and resource administration and regulation requirements. In southern Africa, GW-MATE was key to building the regional institution that will manage groundwater for 14 countries. Another groundwater team devised a plan to help ensure sustainability for Uganda's irrigation sector as part of long-term economic growth. In India, the service provided a unique solution to a groundwater crisis by promoting farmer equity. In Bangladesh, water management planning in the contexts of rapid urbanization, climate change and pressure on groundwater resources built upon the integration of the Dhaka watershed into the national water framework (see box 9).

BOX 10 - INTEGRATED KNOWLEDGE IMPROVES GROUNDWATER MANAGEMENT

GW-MATE was asked to provide direction for integrating the Dhaka watershed into Bangladesh's national water framework. GW-MATE provided a clear blueprint for better integrated groundwater management network systems between multiple, overlapping institutions by highlighting the comparative advantage of each institution: the Bangladesh Water Development Board; Dhaka Water Supply and Sewerage Authority responsible for monitoring the productivity of its own wells, in terms of yields and drinking water standards; and the DOE (Department of Environment) for monitoring anthropogenic pollution sources.

GW-MATE then brokered the signing of a Memorandum of Understanding (MoU) for the proposed framework, which will improve the quality of the revamped DOE pollution control database and the use of the web portal by partner institutions. Encouraging these agencies to collaborate more actively, the MoU provides a foundation for the group to better articulate policy messages.

This activity influenced the design of the Dhaka Environment and Water Project and the Bangladesh Rivers Information Conservation (BRIC) Project, with a combined value of $300 million. These projects now support the development of an integrated knowledge portal to monitor groundwater trends at the national and local level. The BRIC project includes a $50 million component to upgrade the national hydromet network, upon GW-MATE's advice. This will ensure that decisions on both what to measure (salinity, heavy metals) and where to measure (densification of network in urban and coastal areas) will give Bangladesh the cost-effective, accurate data with which to enhance its water resources planning in the context of climate change/ rapid urbanization and pressure on groundwater resources.

Overall, experts have developed groundwater management plans for 30 countries and worked in all six Bank regions. GW-MATE supported 17 Bank operations and large analytical pieces, including four in sub-Saharan Africa (see table 3). In addition, an important number of case profiles and briefing notes formed a wealth of groundwater knowledge and experience throughout GW-MATE's history (see also box 12).

GW-MATE's work reached to wider communities across the globe. Most of the products were translated into different languages and disseminated through internal events (e.g. WB Water Week 2009, SDN Week 2010) as well as at external events (Stockholm Water Week 2010, Africa Water Week 2010). All GW-MATE products are available on the World Bank's Water website, and have been collated onto a CD and disseminated to a large group of global water practitioners.

TABLE 3 - GW-MATE ACTIVITIES & PRODUCTS

Activities	Number	Country/Region – Description
Operations (Lending)	8	**Brazil** – Improving groundwater management in the states of Rio Grande do Norte and Ceara. Interstate dialogue and management of shared Apodi aquifer **Brazil** – Provision of a critical review of the risks and benefits of urban groundwater use in Brazil as a basis for policy definition **Ethiopia** – Support the development of a national and regional groundwater management strategy in Ethiopia **Peru** – Improving groundwater management in Peru: Support to the national Peruvian water agency through pilot management projects **Senegal** – Support for strategic groundwater management: National development framework for monitoring of groundwater in Dhaka **Yemen** – Expert review and advice regarding the Sana'a Groundwater Management Studies commissioned by the government of Yemen **Yemen** – Strengthening groundwater management in Yemen multi–donor Water SWAP **India** – Enhancing in–country dissemination and impact of the WB flagship "Deep–wells and Prudence on the management of groundwater over–exploitation in India"
Analytical Work	9	**MNA Region** – Session showcasing groundwater management and water scarcity. Conference on integrated WRM and sustainable development in Morocco **Uganda** – Strengthening groundwater considerations into the WB Uganda Water CAS. Promoting rural water supply and small scale irrigation **SADC** – Southern Africa Development Community groundwater and drought management program. Establishment of a regional training center **SADC** – African Groundwater Policy Dialogue and Awareness Program on national Southern African governments agendas for managed groundwater development **Mongolia** Strengthening groundwater management in Southern Mongolia: Support for a groundwater management center in southern Gobi **Morocco, India, Tanzania, South Africa, Peru** – Support to the flagship, multi–donor Groundwater Governance and Policy initiative and GW–MATE experience country case studies as input to the initiative **India** – Contribution to the Andhra Pradesh Drought Adaptation Initiative "Barefoot Hydrologists". Support to communities and women for better management of their groundwater and crop production **China** – Piloting groundwater management best practice in China. Support for a Groundwater Center **Argentina, Brazil, Paraguay, Uruguay** – Provision, management options, and GEF closure for the transboundary Guarani aquifer in South America
Case Profiles	21	**Thailand** – Strengthening capacity in groundwater resources management **Yemen** – Rationalizing groundwater resource utilization in the Sana'a basin **Paraguay** – Actual and potential regulatory issues relating to groundwater use in Gran Asunción **Argentina**– Mitigation of groundwater drainage problems in the Buenos Aires Conurbation: technical and institutional way forward **Brazil, Kenya** – Subsurface dams to augment groundwater storage in basement terrain for human subsistence **Argentina** – Integrated approaches to groundwater resource conservation in the Mendoza aquifers **Venezuela** – Yacambu, Quibor: a project for integrated groundwater and surface water management **China** – Towards sustainable groundwater resource use for irrigated agriculture on the North China Plain **Brazil, Paraguay, Uruguay, Argentina** – The Guarani aquifer initiative for transboundary groundwater management **Mexico** – The 'Cotas': progress with stakeholder participation in groundwater management in Guanajuato **India** –Tamil Nadu: resolving the conflict over rural groundwater use between drinking water and irrigation supply **Nepal** – Approach to mitigation of groundwater arsenic contamination including new groundwater legislation

Activities	Number	Country/Region – Description
Case Profiles (continued)	21	Kenya – The role of groundwater in the water supply of Greater Nairobi Brazil – Groundwater use in Metropolitan Fortaleza: evaluating its strategic importance and potential hazard Sub–Saharan Africa – Groundwater development: a strategic overview of key issues and major needs Brazil – Promoting management of an interstate aquifer under development for irrigated agriculture: the case of the Chapada do Apodi in Northeast Brazil Bangladesh – Managing the sustainable development of groundwater for arsenic–safe water supplies India – Confronting the groundwater management challenge in the Deccan traps country of Maharashtra India – Addressing groundwater depletion in the drought prone weathered granitic basement aquifer of Andhra Pradesh
Briefing Notes	16	Groundwater Resource Management. An introduction to its scope and practice Characterization of Groundwater Systems. Key concepts and frequent misconceptions Groundwater Management Strategies. Facets of the integrated approach Groundwater Legislation and Regulatory Provision. From customary rules to integrated catchment planning Groundwater Abstraction Rights. From theory to practice Stakeholder Participation in Groundwater Management. Mobilizing and sustaining aquifer management organizations Economic Instruments for Groundwater Management. Using incentives to improve sustainability Groundwater Quality Protection. Defining strategy and setting priorities Groundwater Monitoring Requirements. For managing aquifer response and quality threats Groundwater Dimensions of National Water Resource and River Basin Planning. Promoting an integrated strategy Utilization of Nonrenewable Groundwater. A socially sustainable approach to resource management Urban Wastewater as Groundwater Recharge. Evaluating and managing risks and benefits Groundwater Resource Development in Minor Aquifers. Management strategy for village and small town water supply Natural Groundwater Quality Hazards. Avoiding problems and formulating mitigation strategies Groundwater Dependent Ecosystems. Characterization procedures and conservation measures Groundwater Resource Accounting
Courses	1	"Groundwater Management Course"
Seminars	+5	Technical presentations on groundwater management
Strategic Overview Papers	5	The "Strategic Overview Series" Launched in 2009, represents a milestone on knowledge generation and diffusion along the 10–year timeline. The series provides policy guidance at the regional and global level in five areas: (i) groundwater governance; (ii) conjunctive use of groundwater and surface water; (iii) urban groundwater use policy; (iv) sustainable groundwater irrigation; and (v) appropriate groundwater management for sub–Saharan Africa
High-Profile Presenta-tions	11	Presentations around the world including SDN Week 2010, and congresses/workshops in Germany, Australia, San Francisco, Morocco, Spain. A particular emphasis was made in Africa during the Africa Water Week
Manuals	1	A "'Training the Trainers' Groundwater Management Manual" co–produced with UNDP–CAPNET

*Activities include the total number of activities and products within GW-MATE 10 years of operations, including the work under the WPP (2009-2011).

3.4. THE WATER EXPERT TEAM (WET)

A consolidated WET brings the very best in advisory services to the most pressing water challenges. Clients continue to receive high-quality technical advice at critical stages in the project process. The transition from Expert Support Teams to the WET has been seamless for the client, as many activities that began under an EST have already started implementation of a second phase under the Water Expert Team (see box 11).

The Transition:

- SWAT's legacy will allow the WET to build on some of the Bank's first large sanitation loans, such as those in Haiti and Cameroon.
- GW-MATE unlocked demand in underrepresented hotspots, particularly, Africa and East Asia, by raising awareness among TTLs working in both regions.
- HEF's roster of world-class experts on hydrology and water resources has been transferred to the WET to respond to the demands from project teams in a variety of subsectors.
- The WET will continue to support sustainable development interventions that reduce poverty, support vulnerable populations, promote innovation, and strengthen partnerships in line with the Bank's MCIPR and water strategy (see table 4).

BOX 11 - FROM HEF TO WET: SEAMLESS SUPPORT TO BOLIVIA

The HEF provided advice to the government of Bolivia to bolster its climate modeling and prediction capacities. HEF experts provided information to aid decision makers on interpreting and applying data from climate change models. The activity supported a GEF-funded project on glacier retreat and water-related adaptation to climate change and variability.

WET has expanded this work by supporting a similar activity in the Rio Grande basin that incorporates climate resilience into development planning. At the national level, the WET team conducted a rapid assessment of hydromet services and analyzed current generation and dissemination of climate change information. Recommendations for improving both fields, and their associated costs, were developed.

At the sub-basin level, WET is also providing local expertise for the Santa Cruz flood management program, and helping the Pirai and Mizque sub-basins incorporate climate consideratons in their river basin planning processes. Together, these tasks are influencing $65.5 million in Bank lending.

"THE WET TEAM DID AN OUTSTANDING JOB. THE TEAM MUST BE COMMENDED FOR ITS EFFICIENCY AND RESPONSIVENESS AND UNDERSTANDING OF THE TTL NEEDS. USING WET WAS A REFRESHING EXPERIENCE. THIS IS A VERY GOOD EXAMPLE OF WHAT "PEOPLE IN OPERATIONS" WOULD LIKE TO GET MORE OFTEN FROM PROGRAMS SUCH AS THE WPP."

– Christophe Prevost, TTL, WET Support for Urban Water Utilities Performance Monitoring in Paraguay

In addition, the WET is responding to requests for support in areas not traditionally a focus of the Expert Support Teams. In Paraguay, for example, the WET is supporting the national water utility to develop a vision and step-by-step plan for performance improvement, including organizational restructuring and technical efficiency gains.

The value-added to Bank projects is evidenced by the high ratings of its predecessor programs, and of the continuous positive feedback received from the WET's clients. The facility is able to meet complex and urgent requests that keep projects on path to meet their poverty reduction goals.

The WET has supported more than 25 client countries across the six Bank regions. A single window has enabled an efficient and streamlined administration that strengthens the support to the Bank's operational teams. The WET fields activities across all water sub-sectors, including those supported previously by the ESTs, in addition to emerging demands in areas like wastewater treatment and water utility management. (see figure 7).

FIGURE 7 - WET ACTIVITIES IN 2011 BY THEMATIC AREA (% OF APPROVED BUDGETS)

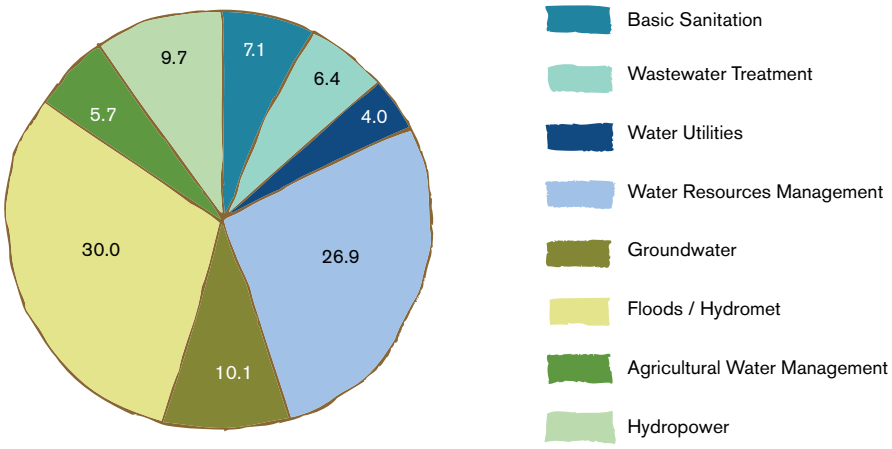


TABLE 4 - EST SUPPORT TO SUSTAINABLE DEVELOPMENT (SELECTED EXAMPLES)

	Poverty Reduction	Vulnerable Populations	Innovation	Partnerships & Donor Coordination
SWAT	Supported a national plan to clean up the Ganges river that will eventually improve the quality of life of millions of people living in the river basin, most noticeably the urban poor, who suffer disproportionately from inadequate sanitation	In Haiti, women were targeted in sanitation promotion campaigns, leading to demand for new sanitation facilities	A best practice model for sustainable sanitation transferred from Ecuador to Nicaragua	"Panama Handwashing Initiative" particularly aimed at fostering public-private partnership in handwashing with a special focus on local suppliers of soap and other hygiene products
HEF	Supported one of Ethiopia's top five agro-ecological zones targeted for economic growth for poverty reduction. The HEF helped improve integrated water resources management through creation and implementation of community watershed plans	In Georgia, the direct benefits of tackling sanitation and hygiene problems at the household level through a better design of water and sanitation projects in twelve towns that potentially improve the health of the family	The HEF provided expertise on hydrological modeling in karstic/limestone ecosystems. The expert support will build local capacity to assess the environmental tradeoffs of various development plans for the largest lake in the Balkan peninsula. The work is influencing a Bank-funded project targeting more than 180,000 people	The HEF coordinated with the Bank's Water Resources Management Thematic Group and Watershed Management Community of Practice to share knowledge gained through specific activities
GW-MATE	Supported a number of activities aimed at improving the resilience of local communities to groundwater overexploitation and specific interventions that also provide support to improved and more sustainable income generating activities, like in SADC at the regional level or Yemen at the national level	Downstream analytical work concentrated on a number of individual activities with a strong gender component particularly in community user groups involved in decisions concerned with GW management	The phase of GW-MATE under WPP increased the demand for more comprehensive groundwater considerations in Bank projects in underrepresented hotspots (Africa and East Asia) by raising awareness among Task Team Leaders	External partners have incorporated GW-MATE materials in their own curricula, such as the Oregon State University's Water Institute "Water Science and Policy" courses and UNDP-CAPNET's groundwater training program
WET	Supported the Peruvian National Water Authority and the Ministry of Agriculture to increase efficient water use and conflict management to reduce rural poverty levels. Recommendations provide an irrigation-agriculture strategy to inform decision makers on the legislation of decentralization; water rights regularization; financing; water efficiency; and conflict resolution	The WET assistance on gully erosion control designs caused by runoff and percolation will inform the government of Nigeria to provide safety designs on eventual landslides and prevent evacuation of families that live in perilous locations in southeastern Nigeria	In India, WET supported the second phase of an hydrology project with the participation of an expert to stress the importance of modernization and strengthening of hydrologic and climate networks and information systems and tools	In Cameroon, a workshop set out IWRM planning strategies for the Sanaga River basin, the Ministries of Energy and Water and 25 different stakeholders devised an action plan for data management and the composition, mandates, and financing of an emergency basin management body based on IWRM principles

CHAPTER FOUR

BEYOND RESULTS: KNOWLEDGE, CAPACITY BUILDING, PARTNERSHIPS, AND PROGRAM IMPACT

Achieving water security will require managing water more wisely. Countries need to think out of the box; collaborate across public and private spheres; and bolster their capacity to govern water users and promote conservation. The Water Partnership Program helps countries do this by providing technical assistance, generating new data and information, fostering innovation and strengthening partnerships.

The overall impact is beyond the contribution of individual activities; the WPP is driving change in water. The Partnership helps clients to face the facts, learn how to use the tools, and build the networks they will need to tackle new challenges. In the end, the WPP's impact can be found in the value of investments it supports throughout the world and the number of people who benefit from those investments.

4.1. CAPACITY BUILDING AND KNOWLEDGE FOR ACTION

Governments, civil society, development organizations, and communities are increasingly called upon to change behavior, mentalities, and policies related to water, and they need coherent and reliable information to do so. Whether it is presenting data on informal water markets, or evaluating the exact impact of a government policy, imparting new knowledge can lead to better decisions and help clients take much needed action.

4.1.1. EXPANDING THE ROLE OF SMALL-SCALE WATER PROVIDERS FOR LARGE-SCALE RESULTS

The WPP helps provide information to support the most fundamental water challenge; namely, bringing basic and sustainable water and sanitation services to the poor. For example, in an effort to help Yemen achieve the Millennium Development Goals, the Program made funds available for activities to provide a better understanding of the informal water market in Sana'a. It also provided guidance to small water services providers in the Philippines.

In Yemen, small-scale private water enterprises were believed to be the predominant water source in lower-income areas, but the government did not have the data necessary to determine the existing level of service. The WPP supported an assessment and survey of private water provision. The assessment provides a starting point for formalizing and regulating private water provision. The results were shared widely and are contributing to the policy analysis conducted by the Ministry of Water and Environment with the support of GTZ and the World Bank.

According to WaterAid, many women in developing countries walk more than 10 miles a day to fetch water. The distance and time can grow during the dry season, especially in water stressed countries, like Yemen.[1]

In the Philippines, the WPP supported a similar activity to study the provision of water services to poor households by small companies. The team produced a series of three rural water supply design manuals that will strengthen the domestic design capacity of small waterworks facilities. The information in the manuals is helping these groups to better understand the nature of the water supply business, its responsibilities to stakeholders, and the role of government agencies and regulatory bodies in sustainable operations. Endorsed by the President of the Philippines, the manuals are facilitating participation in the decisions and planning for more effective water systems in rural areas and small towns. The government is supporting further dissemination efforts among high-level stakeholders in several water-related forums taking place in 2012.

4.1.2. HOW DO YOU MEASURE IMPACT?

Complex challenges require smart and skilled teams of experts to formulate solutions. An important aspect of development is to evaluate the impact of a policy or

project toward achieving expected outcomes. Impact evaluation (IE) is considered the gold standard for identifying the causal impact of a specific intervention on a target community. This science-based method uncovers the direct consequences of development projects by determining what would have happened to the same communities had the project not existed. If implemented as part of a pilot program, the government can use the data to decide where to invest limited resources and how to design effective water policies and programs for long-term sustainability.

In 2011, the WPP co-sponsored a 5-day training workshop on Impact Evaluation in Dhaka, Bangladesh (with the Bank-Netherlands Partnership Program and the Spanish Impact Evaluation Fund). Sixteen project teams were trained at the workshop, which offered separate learning tracks for technical specialists and policy makers, including introduction to four statistical approaches for IE, software training, and a case study exercise where participants critiqued a specific evaluation plan. During the training participants were exposed to real IE success stories, from social programs in Mexico to girls' education in Pakistan. Teams then used what they had learned to devise their own impact evaluation, tailored to local conditions and capacities in their project area. Through the workshop, government officials from five countries learned more about IE as a tool for measuring policy and projecting impacts, and technical experts improved their capacity to design and implement IEs. Several teams, including one working on a water supply project in India, have committed to funding an IE as a result of what they learned in the workshop.

4.1.3. NOVELTY IN KNOWLEDGE

The WPP funded five water sector Public Expenditure Reviews (PERs) in Central and West Africa (see figure 5). The data collection and analysis has provided ministries of finance with new knowledge about the status and impact of their sector contributions. The PERs have shown how public funds are used for water supply connections at the expense of cheaper alternatives, and how subsidies for water and sanitation services often do not reach the poor.

The governments of Sierra Leone, Togo, Republic of Congo, Democratic Republic of Congo (DRC), and the Central African Republic (CAR) have each endorsed their respective PER. In CAR, the PER has mobilized a $14 million grant from the European Commission. In Togo, the work is influencing additional financing for urban development and promoting dialogue on public financial management.

The PER findings were key inputs to the Ministerial Dialogue on Sanitation and Water and the 4th Africa Water Week. In addition to the country reports, the WPP financed the publication of an overview paper synthesizing lessons learned across the region, a version of which has been submitted to the journal Water Policy for publication. The PERs also provided the impetus for the publication of an Op-ed in several newspapers, including *Modern Ghana*, the *West Africa Democracy Radio*, the *African Standard* (Kenya), and six papers in Liberia.

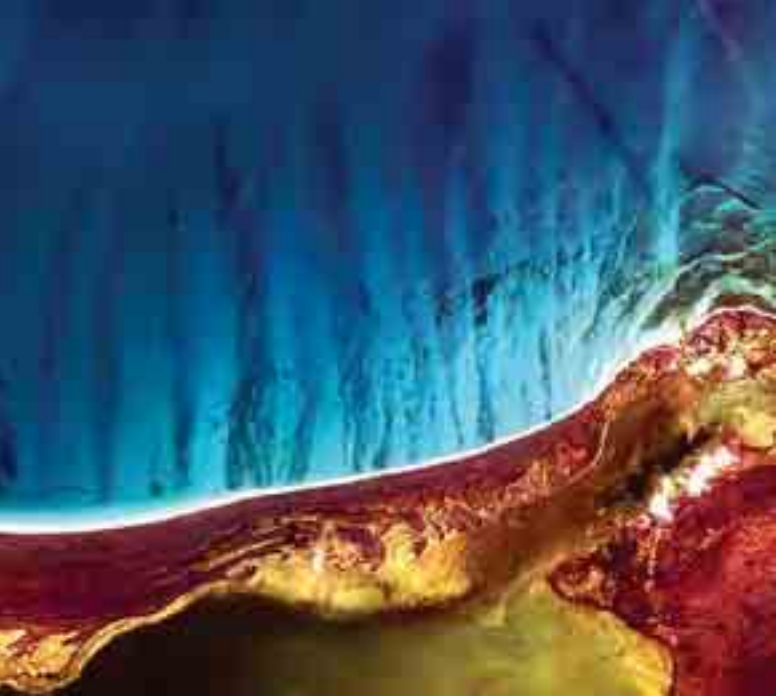
4.2. STRENGTHENING PARTNERSHIPS AND ESTABLISHING NETWORKS

Partnerships and networking help bridge knowledge, institutional, and financial gaps to address complex, inter-sectoral issues. They can also advocate better global policies by contributing to important international dialogue. The WPP brings expertise and knowledge from partners and peers, connecting even more people and ideas to the global water network.

4.2.1. SOUTH-SOUTH KNOWLEDGE TRANSFER

The WPP facilitated a south-south learning exchange between Morocco and Brazil to improve wastewater collection and treatment in seven small towns in Morocco. Eleven Moroccan professionals from three ministries and the national utility, ONEP, made a 10-day visit to Brazil. The delegation travelled to three cities to see a range of sanitation options, including a number of condominial systems being used successfully throughout Brazil. The Moroccan officials saw first-hand the level of commitment required to expand access and how to anticipate some potential challenges posed by growing towns.

Based on the experience in Brazil, ONEP will pilot one condominial system and one treatment plant using Upflow Anaerobic Sludge Blanket technology. The utility has also budgeted $400,000 for formal technical assistance under a twinning partnership between ONEP and a utility in Brazil, to gain similar know-how. This WPP support directly improved the design of the $43 million Bank-financed Oum Er Rbia Sanitation Project. The project design now includes new technologies that could save up to $1 billion in costs by using condominial systems rather than conventional lagoons in each of the seven small towns. As a result of lower costs, utilities will be able to reach previously un-served populations. All ONEP staff were briefed on the results of the study tour, and the utility shared their findings with a broad audience of consulting engineers,



Earth observation can help uncover environmental impacts over time in key ecological zones, such as the deep waters off Mexico's Yucatán Peninsula.

BOX 12 - SUSTAINING PARTNERSHIPS FOR GLOBAL KNOWLEDGE

GW-MATE renewed its partnership with the Global Water Partnership in Stockholm during International Water Week. Under the renewed commitment, GWP agreed to continue to disseminate GW-MATE materials through their global and regional hub networks. Materials are also being incorporated into the GW-MATE toolkit and disseminated broadly to stakeholders through various events.

preparing the private sector to potentially offer similar technologies to the expanding sanitation market.

4.2.2. A VIEW FROM SPACE: REMOTE SENSING TOOLS FOR WATER, FOOD AND FLOODS

Remote sensing tools, or Earth observation tools, are becoming a more viable option for helping developing countries make decisions regarding water resources management. The Netherlands has pioneered the use of remote sensing and its experts are global leaders in applying such tools for multiple water-related applications. The technology offers developing countries a sound way to verify ground data on precipitation and temperature for a host of applications, including climate modeling and forecasting.

In April 2011, a Dutch Mission Delegation on Water and Climate Services[2] hosted a two day workshop at the Bank on remote sensing applications. Technical experts presented on two main topics: (1) water, agriculture, and food security, and (2) flood protection and risk management. Experts in water, agriculture, and food security discussed two technologies for determining the best irrigation scheme (as already applied to the Nile basin) and for forecasting crop yields. They also discussed the cost of satellite data and how such tools can be applied to the developing country context. The second session on flood protection and risk management included information on tools that have informed river flow forecasting in China, micro-insurance systems for African farmers, and early warning systems for fires in Indonesia.

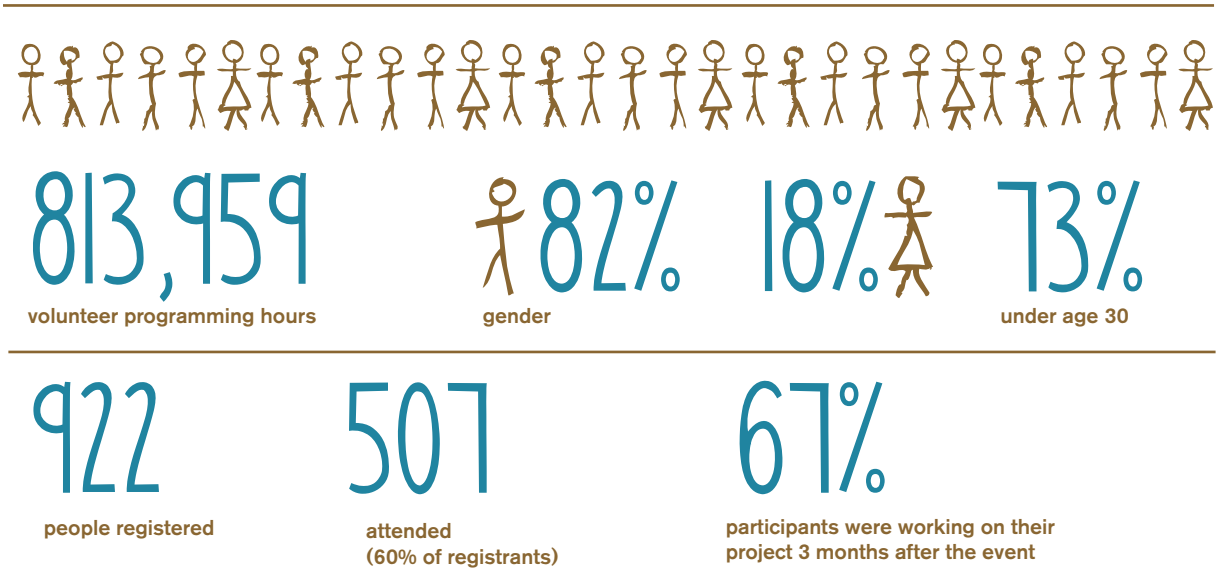
The morning workshop was well attended by Bank staff and connected to offices in Yerevan and Lusaka. The evening workshop connected 30 participants in Beijing, Hanoi, and Jakarta, including Bank staff, government officials, and researchers. Both sessions resulted in a rich exchange of information and a lively discussion on prospective uses of Earth observation tools in Bank-funded projects.

4.2.3. WATER AND ICT: CALLING ALL HACKERS

Green growth requires innovative thinking. Promoting low-cost technology that yields great benefits becomes imperative for scaling up green growth strategies. The WPP fosters innovation by providing incentives for water teams to work with technology gurus to find new solutions.

To find innovative solutions to water and sanitation development challenges, the World Bank relied on the support of the WPP and other partners to reach out to new and rather unlikely partners. Computer programmers, designers, and other information technology specialists were invited by the World Bank and various technology partners to compete for 48 hours in 10 cities around the world. Their aim was to create the easily deployable, scalable, and sustainable technological tools that respond to specific water and sanitation challenges in developing countries. The Water Hackathon was the first-ever convening of software developers and designers focused on addressing real life water, sanitation, irrigation, flood, and water resource management challenges. These

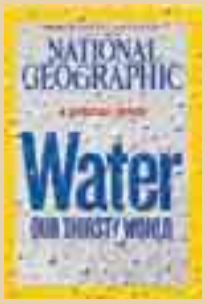
FIGURE 8 - WATER HACKATHON STATS



challenges were defined by water specialists from inside and outside the World Bank as well as utilities, civil society groups, citizens, and other stakeholders. This effort demonstrated the ability of the Bank to work with stakeholders in a different way, as a matchmaker of real time innovation to solve problems directly. The openness of the approach attracted considerable attention, from within the water community and from the press, blogs, and social media that traditionally do not feature water content. Half of the more than 900 attendees participated virtually, and 70 percent of them were under the age of 30 (see figure 8).

Several concerted follow-up activities were planned to support winning teams with incubation and further opportunities to engage with their water counterparts. In some cases, this has led to financing for start-ups and the recruitment of local developers by governments. These early successes raise several questions about which partners need to be involved in tackling the water challenges of the 21st century, the value of open data, and the process by which the sector can attract new innovation.

BOX 13 - WPP OUTREACH



The WPP partnered with National Geographic for an event to educate participants about National Geographic's experience in putting together the 2010 Special Issue on Water. One of the biggest challenges in the sector is communicating the right messages to the right audiences and inducing changes in behavior. About 150 World Bank staff, including communicators and project managers, took part in a presentation illustrating which communication techniques and graphic representations were most appropriate for specific messages and audiences. The WPP plans to strengthen its collaboration with the National Geographic team to develop appealing ways of communicating water messages for larger Program activities such as those working at the nexus of water, food, and energy.

4.3. WPP IMPACT: INFLUENCING PROJECTS, BENEFITING PEOPLE

The Water Partnership Program's portfolio of activities for 2009 to 2011 is influencing almost $11.5 billion in Bank financing.[3] This figure almost doubles to $20.1 billion when total project costs are included. Each dollar of WPP funding has an impact on $710 in Bank lending and $1,240 of total project costs (including the borrower's counterpart contributions and any other sources of financing).[4] A complete list of all Bank projects influenced by WPP funding is included in annex VI.

Table 5 provides a regional breakdown of the WPP's support to lending. Thirty-two percent of Bank loan amounts influenced by the WPP relate to projects in South Asia. WPP activities support the highest number of investment projects in Latin America and the Caribbean (27), with an average loan amount of $83 million. In Africa, the Program is influencing 19 projects with an average loan amount of $131 million, while the 14 influenced projects in South Asia show the largest average loan amount of $265 million.

BOX 14 - $1 MILLION LEVERAGED FOR SANITATION IN CAMEROON

In Cameroon, the WPP leveraged a partnership with the Bill and Melinda Gates Foundation, which is likely to result in a $1 million fund to strengthen the sanitation market in Douala. The WPP-funded Cameroon sanitation strategy formed the basis for stronger government-led donor coordination in the sanitation sector in that country, and is likely to attract additional donor financing to this underserved sector.

The Water Partnership Program impacts the lives of the poor by supporting projects that expand and improve access to water supply and sanitation. Between 2009 and 2011 WPP support has influenced projects that have or will benefit nearly 52 million people in 26 countries, more than 17 million of whom live in Africa. This estimate reflects only those beneficiaries with improved access to, or improved quality of, water supply and sanitation services as a result of Bank project implementation. It includes only those projects linked to WPP activities that are considered to have a downstream impact on Bank lending.[5] About 39 percent of the 96 loans linked to WPP activities track indicators and targets for improved water supply and sanitation services (see annex VI for a full list of linked projects).

TABLE 5 - WPP SUPPORT TO WORLD BANK PROJECTS BY REGION

	Bank Lending Amount			Total Project Costs		
Region	Loan amount influenced ($ M)	% of total amount influenced by WPP	Dollar support per WPP dollar	Project amount influenced ($ M)	% of total costs influenced by WPP	Dollar support per WPP dollar
AFR	2,494	22	487	3,987	20	779
EAP	1,396	12	607	2,677	13	1,165
ECA	625	5	321	1,220	6	627
LCR	2,244	20	837	3,504	17	1,307
MNA	1,012	9	525	1,710	9	887
SAR	3,717	32	1,688	6,954	35	3,159
Program Total	**11,487**	**100**	**710**	**20,051**	**100**	**1,240**

* Total project costs may be covered by several sources in addition to World Bank resources, including funding from other donors and trust funds, as well as the country's own budget.

CHAPTER FIVE

WPP PHASE II: TOWARDS A SUSTAINED AND WATER SECURE WORLD

The first phase of the Water Partnership Program was successful in meeting donor and client objectives. The second phase will continue to make vital contributions toward improved water resources management and water services delivery. The scope of work undertaken in Phase II will be different from that of Phase I in five systematic ways.

First, Phase II will add a third objective: the mainstreaming of water services and management in climate resilient, green growth. This objective complements the Program's current demand-driven approach by bringing a new vision to better address the changing global landscape. Activities will support green growth as a strategy for achieving water, food, and energy security.

Second, a new, programmatic window will be added to the Program's seven regional windows and the Water Expert Team. Activities under the new window will enable longer-term, larger, and more focused interventions in key areas and on key topics. These activities will follow one of two tracks. Track 1 will support water-enabled growth in other sectors by ensuring that water considerations are mainstreamed into strategies or project designs in agriculture, urban development, energy, and disaster risk management. Track 2 will be used to pilot strategic activities in key river basins, deltas, and countries in anticipation of future investments needs. Longer timeframes for activities and more financial resources will allow for better and more comprehensive data collection and analysis, which will lead to better investment planning and more robust decision making.

Third, the new phase will institutionalize a comprehensive monitoring and evaluation framework that will enhance the Program's accountability for results. The team is developing a database and M&E plan that will more accurately capture the results and impacts of the activities and of the overall program. This will allow the World Bank and the WPP donors to assess how the Program succeeds in achieving its overarching goal. At the same time, it will facilitate internal monitoring of WPP operations to guarantee that its activities are implemented in a timely, efficient, and effective manner.

WPP will also implement a comprehensive results framework that encompasses a variety of measurable indicators to track various outcomes and impacts. A database is being designed to capture, in a standardized and systematic way, the impact of WPP activities as well as the impact of World Bank projects that were influenced by those activities. Another important step in the design will be optimizing the technical interface between the WPP database and other existing Bank data repositories. The database will facilitate the summation of heterogeneous indicators across subsectors, showing how the Program achieves targets for water resources management, water supply and sanitation, and green growth. This exercise will be instrumental in helping the task team leaders of the projects that receive WPP support to identify concrete and measurable indicators. Ultimately, it will provide incentives for the design of results-driven projects.

Fourth, this new phase will also promote the design of particular global programs to strengthen the use of innovative methods, tools, and technologies in Bank lending. A program on remote sensing is envisioned that will partner global experts with Bank teams to implement the use of this technology in Bank lending for floods, water resources management, and agricultural water management.

Finally, Phase II will foster greater and stronger partnerships with donors, external organizations, and internal networks. This partnership strategy seeks to leverage the unique knowledge and resources of myriad sector practitioners who have much to offer at the level of the Water Partnership Program as well as at the level of individual activities. The WPP will broker knowledge exchanges, introduce clients to private sector technologies, and improve aid effectiveness by coordinating its activities with others in and outside the Bank. The WPP will leverage:

- Donor Knowledge: The WPP will engage its donors as partners in developing solutions to water challenges. The Partnership will ensure that bilateral programs funded by donor organizations are informed about its activities. This will enable the sharing of data, experiences, and knowledge tools that will support greater aid effectiveness and more efficient, projects. The WPP will bring in this expertise to conduct joint workshops in client countries.

- External Platforms: The WPP will leverage external platforms and knowledge. The Global Water Partnership has a skill set that complements the work of the WPP. While the GWP has a comparative advantage in advocating for policy reform and improved governance in the water and environment arenas, the WPP provides more on-the-ground support to specific Bank interventions at the project level. WPP will continue to support the Alliance for Global Water Adaptation (AGWA), which aims to assist countries in building resilience to climate change impacts in water. AGWA works to operationalize and implement climate change adaptation in water through support to capacity building, international policy, and adaptation finance.

- Technical Partnerships: In March, the Bank signed a Memorandum of Understanding with the U.S. Department of State to support developing countries in fighting water scarcity and poor water quality. Six working groups have already been formed, including for remote sensing, water supply and sanitation, and water resources management. The United States is engaging a cadre of technical organizations to take part in the planned efforts. At the WPP activity level, the MoU will have an impact on translating international expertise on earth observation systems into better Bank projects. The WPP will form partnerships with groups like the European Space Agency and Australia's National Science Agency to integrate remote sensing data into Bank projects. This information will complement ground data so that more accurate models can be developed for water, climate, and food applications. The WPP will also use the MoU as a platform for capacity building events at the program level.

- Internal Networks: The Program will promote results-based financing in water through linkages with the Global Partnership on Output Based Aid (GPOBA)[1] and private sector participation through coordinating with the Public Private Infrastructure Advisory Facility. The Water and Sanitation Program (WSP) and WPP will continue to coordinate their activities in countries where the WSP is active. The WPP will also work across sectors to avoid overlaps with groups like Cooperation in International Waters in Africa, the Global Agriculture and Food Security Program, the South Asia Water Initiative, the Cities Alliance, and the ESMAP, among others.

ANNEX I

PORTFOLIO OVERVIEW: GEOGRAPHICAL AND SECTORAL DISTRIBUTION OF WPP ACTIVITIES

Now in its third year of operations, the Water Partnership Program has approved 214 activities, of which 125 have been completed.[1] WPP is currently financing activities in 62 countries, in addition to its 27 regional and 25 global initiatives. Although the geographic distribution of WPP activities is widespread across the Bank's regions, regional demands have led to more activities in a select number of larger client countries.[2]

As shown in table I.1 and figure I.1, Africa receives both the largest allocation of WPP resources and has the greatest number of activities. The regional activities in Africa have grown from 4 in 2009 to 8 in 2010, and 10 in 2011. As in the previous years, the WPP exceeded its target for Africa; from inception until 2011, 33.9 percent of funding was approved for activities in, or affecting, Africa. The overall allocation of the WPP budget is shown in table I.1.

In line with the original strategic work plans prepared by every window in the beginning of the Program, WPP financial resources are fairly equally distributed between water supply and sanitation and water resources management, which account for 34 percent and 53 percent of approved budgets, respectively. The sectoral distribution of WPP activities approved since inception is shown in figure I.2. In comparison with approved activities until December 2010, activities for water resources management and urban water supply and sanitation increased in 2011, while the four WSS subsectors combined show a relative decrease. This is in line with the increased attention for managing water resources including the effects of climate change, both inside and outside the World Bank.

FIGURE I.1- GEOGRAPHIC DISTRIBUTION OF WPP ACTIVITIES THROUGH 2011 (NUMBER OF ACTIVITIES)[3]

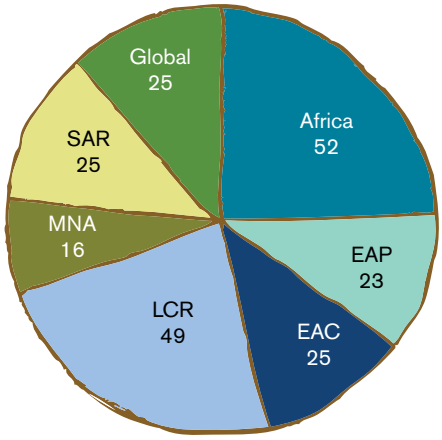
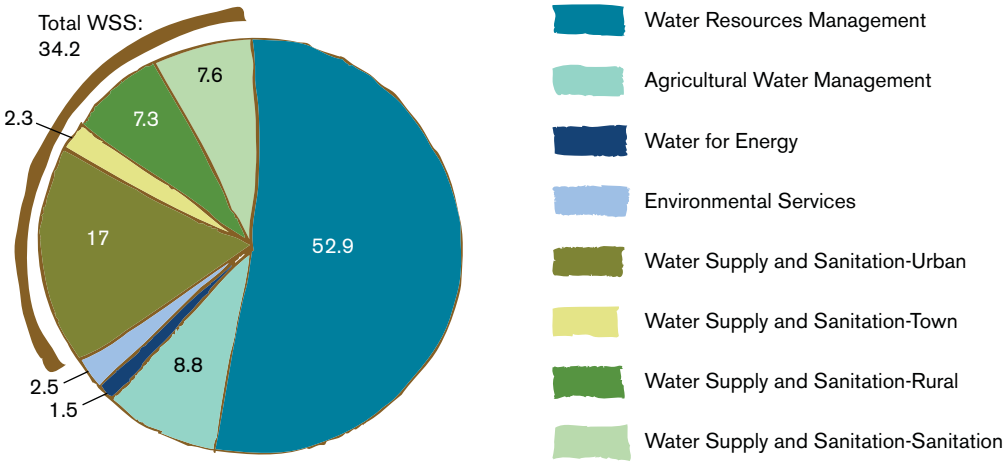


TABLE I.1 - TOTAL BUDGET ALLOCATIONS PER WPP WINDOW THROUGH 2011

Window	Budget allocations ($ M)	%
AFR	4,548,250	19.4
EAP	2,151,250	9.2
ECA	2,019,375	8.6
LAC	2,106,806	9.0
MNA	2,019,375	8.6
SAR	1,942,875	8.3
WBI	400,000	1.7
WA/GP	2,139,583	9.1
ESTs (incl. WET)	4,099,748	17.5
WPP PM	2,000,000	8.5
Grand Total	**23,427,262**	**100**

FIGURE I.2- SECTORAL DISTRIBUTION OF WPP ACTIVITIES (% OF APPROVED BUDGETS)



* This figure does not include $235,000 for cross-sectoral knowledge products.

ANNEX II

FINANCIAL SUMMARY

This annex provides financial information on donor contributions, activity approvals, disbursements and commitments, and program management costs. A detailed description of the finances of the Expert Support Teams (ESTs) is provided as well. A total of 214 activities (including 92 for ESTs) were approved from Program inception to December 2011, totaling $19.6 million. One hundred and twenty-five of those activities have already been closed. Fifty-six new activities were approved in 2011. When program management activities are included, approved and proposed activities increase to $22.5 million, representing 96.1 percent of the total grant.

II.1 DONOR CONTRIBUTIONS TO THE WPP

Total contributions from the three WPP donors (the Netherlands' Directorate-General for International Cooperation, DGIS, the United Kingdom's Department for International Development, DfID, and the Danish International Development Agency, DANIDA) amount to $23.8 million (see table II.1). In addition to these direct contributions, the WPP also received $2.7 million from two water trust funds managed by the Bank and supported by the Netherlands (BNWP and BWNPP) that were closed in 2009.

TABLE II.1 - OVERVIEW OF DONOR CONTRIBUTIONS TO THE WPP

			Donor currency		USD
Contributions to the WPP	Date of tranche	Currency	Amt pledged	Amt received	Amt received
		Denmark (DANIDA)			
First tranche	12/15/08	DKK	7,250,000	7,250,000	1,331,423
Second tranche	07/15/09	DKK	7,250,000	7,250,000	1,375,607
Third tranche	11/18/10	DKK	7,250,000	7,250,000	1,324,322
Fourth tranche	08/26/11	DKK	7,250,000	7,250,000	1,406,347
DANIDA Total		**DKK**	**29,000,000**	**29,000,000**	**5,437,699**
		United Kingdom (DfID)			
First tranche	01/12/09	GBP	750,000	750,000	1,094,250
Second tranche	06/17/09	GBP	1,000,000	1,000,000	1,621,400
Third tranche	12/28/09	GBP	250,000	250,000	400,063
Fourth tranche	04/10/10	GBP	1,000,000	1,000,000	1,514,000
DfID Total		**GBP**	**3,000,000**	**3,000,000**	**4,629,713**
		Netherlands (DGIS)			
First tranche	01/27/09	USD	4,000,000	4,000,000	4,000,000
Second tranche	08/05/09	USD	7,000,000	7,000,000	7,000,000
Balance from BNWP/P	09/23/10	USD	2,734,759	2,734,759	2,734,759
DGIS Total		**USD**	**13,734,759**	**13,734,759**	**13,734,759**
Total contributions to the WPP					**23,802,171**
Admin fee (2% of contirbutions)					476,043
Investment income (as of January 2011)					342,874
Total budget available to the Program					**23,669,001**

II.2 OVERVIEW OF WPP ALLOCATIONS, ACTIVITY PROPOSALS, APPROVALS, AND DISBURSEMENTS

The Program has disbursed $12.8 million since it began. This amount increases to $15.9 million when commitments are included (disbursements for program management of $1.2 million are excluded). The pace of disbursements and commitments in 2011 has increased slightly compared to 2010, which had risen considerably compared to 2009 (see figure II.1). WPP disbursements in 2010 equaled $6.2 million, while 2011 disbursements reached $6.7 million. The pace of disbursement is expected to continue to grow until mid-2012 when the first phase of the Water Partnership Program comes to an end. The summer of 2012 might show a slower disbursement rate linked to the establishment of the second WPP phase.

Figure II.1 also shows the additional budget allocation to the WPP windows in October 2010 and the additional allocation to the WET in January 2011. The disbursement graph also reflects the yearly cycle in the World Bank, with less activity at the beginning of the fiscal year in July.

As of December 2011, the ESTs and Water Anchor/ Global Projects window (WA/GP), as well as the SAR, MNA, and LCR windows had disbursed and/ or committed more than 80 percent of the amount allocated to approved activities (see table II.3). The WBI windows clearly lagged behind in levels of commitments and disbursements. The largest disbursements were for the ESTs and for Africa.

As of December 31, 2011, 122 WPP activities and 92 EST activities totaling $19.6 million had been approved (see table II.2), and the pipeline of proposed activities equaled $0.9 million. All regions/windows have had their proposals approved and/or submitted proposals for a large portion of their allocations, ranging from 82 to 97 percent. Second and third in the ranking of activity by window are the Africa window (23) and the Latin America and Caribbean window (22).

FIGURE II.1 - MONTHLY BUDGET ALLOCATIONS, ACTIVITY APPROVALS, AND DISBURSEMENTS (USD MILLION)

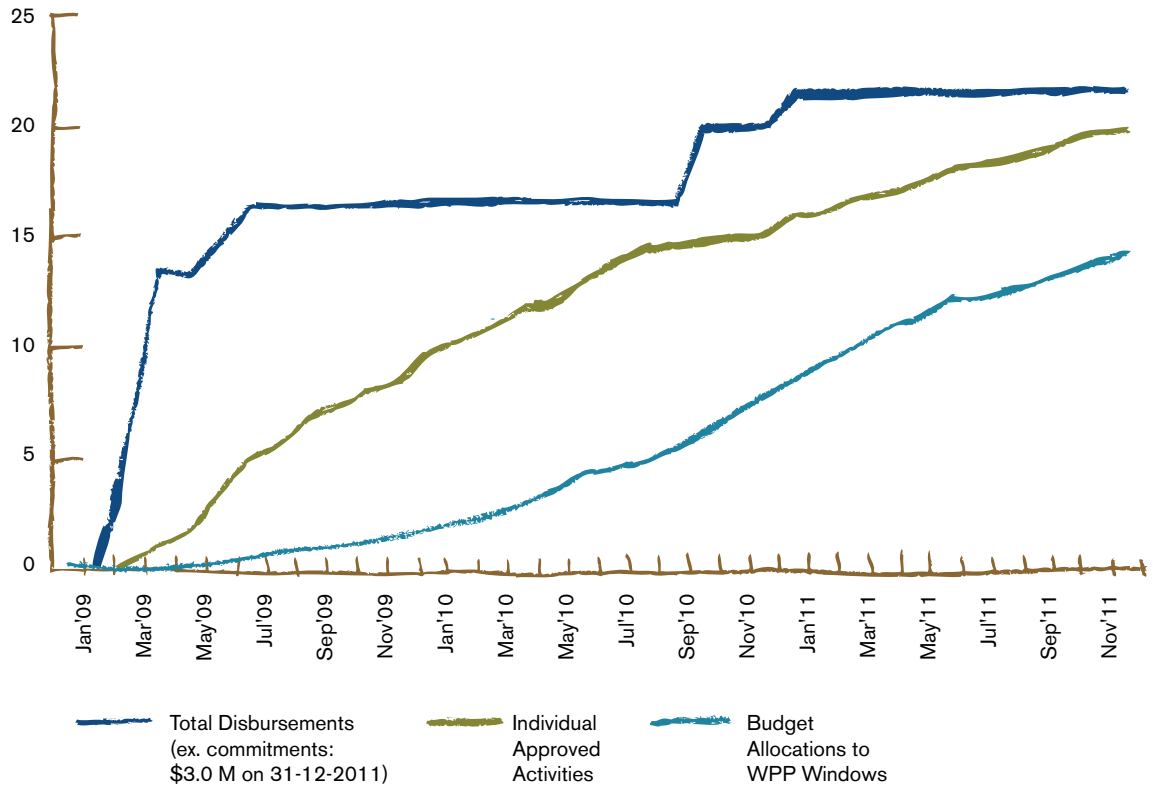
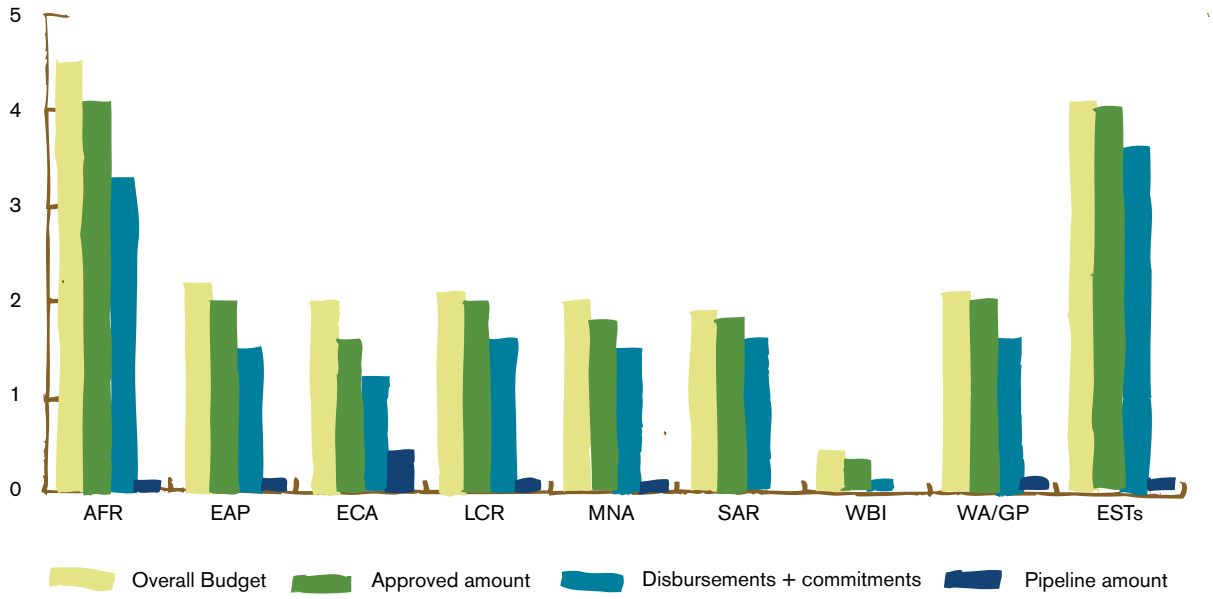


FIGURE II.2 - OVERALL BUDGET, APPROVED AND PIPELINE ACTIVITY AMOUNTS AND EXPENDITURES PER WPP WINDOW (USD MILLION)



*Pipeline activities are those for which an application has been initialed in the GFR system. This includes both draft proposals that have not yet been submitted to the WPP and proposals that have been returned for revision.

TABLE II.2 - APPROVED ACTIVITY BUDGETS, RECEIPTS, AND EXPENDITURES BY WINDOW

Window	Approved Amount (in USD)	Disbursements (in USD)	Commitments (in USD)	Disbursement + Commitments	
				USD	% of Appr. Amount
AFR	4,429,489	2,853,322	431,951	3,285,273	74.2
EAP	2,015,477	1,267,627	229,388	1,497,014	74.3
ECA	1,556,372	1,033,856	151,712	1,185,568	76.2
LCR	1,961,679	1,403,895	205,704	1,609,598	82.1
MNA	1,763,393	666,529	785,494	1,452,024	82.3
SAR	1,850,272	1,259,315	346,413	1,605,728	86.8
WBI	330,000	81,897	17,420	99,317	30.1
WA/GP	1,756,941	1,010,301	552,496	1,562,797	88.9
ESTs	3,979,942	3,271,945	368,169	3,640,114	91.5
TOTAL	**19,643,565**	**12,848,687**	**3,088,747**	**15,937,434**	**81.1**

Note: WPP PM disbursements amount $1,166,741 (8.3% of total disbursements)

TABLE II.3 - OVERVIEW OF WPP PROPOSALS AND BUDGET ALLOCATIONS BY WINDOW

Window	Proposals (in USD)				WPP Budget allocations (in USD)	Available amount (in USD)	% of budget subm/appr	No. of appr prop.
	Draft (a)	Submitted/under revision (b)	Approved (c)	Total (a+b+c)				
AFR	50,000	0	4,429,489	4,479,489	4,548,250	68,761	97.4	23
EAP	0	58,500	2,015,477	2,073,977	2,151,250	77,273	96.4	17
ECA	320,000	100,000	1,556,372	1,976,372	2,019,375	43,003	82.0	10
LCR	110,000	0	1,961,679	2,071,679	2,106,806	35,127	93.1	22
MNA	50,000	0	1,763,393	1,813,393	2,019,375	205,982	87.3	12
SAR	0	0	1,850,272	1,850,272	1,942,875	92,603	95.2	18
WBI	0	0	330,000	330,000	400,000	70,000	82.5	2
WA/GP	0	116,000	1,756,941	1,872,941	2,139,583	266,642	87.5	18
EST	77,000	0	3,979,942	4,056,942	4,099,748	42,806	97.1	92
Total	**607,000**	**274,500**	**19,643,565**	**20,525,065**	**21,427,262**	**902,197**	**93.0**	**214**
				WPP PM	**2,000,000**			

TABLE II.4 - DETAILED FINANCIAL OVERVIEW OF ESTS

	GW-MATE	HEF	SWAT	WET	TOTAL
Overall budget (in USD)	1,060,460	962,627	595,855	1,480,806	4,099,748
TOTALS APPROVED ACTIVITIES & PM					
No. of approved activities (in USD)	19	30	10	33	92
Total approved amt (in USD)	1,060,460	962,627	595,855	1,361,000	3,979,942
Total commitments + disbursements (in USD)	1,060,460	962,627	595,855	1,021,172	3,640,114
Total available budget (in USD)	0	0	0	119,806	119,806
% available budget of overall budget	0	0	0	8.1	2.9
% approved of overall budget	100.0	100.0	100.0	91.9	97.1
% comm+disb of overall budget	100.0	100.0	100.0	69.0	88.8
TOTALS PIPELINE ACTIVITIES					
No. of pipeline activities	0	0	0	1	1
Pipeline amt (in USD)	0	0	0	77,000	77,000

II.3 DETAILED OVERVIEW OF EST FINANCIALS

Ninety-two EST activities were approved as of December 31, 2011, for a total amount of $4.0 million. This includes both the three closed ESTs (GW-MATE, HEF, and SWAT) and the new WET (which resulted from the merger of the three existing services).

Of all the windows, the EST window has disbursed and/or committed the most: over $3.6 million since the start of the Program. This represents over 88.8 percent of the budget allocated to the ESTs. Table II.4 provides a detailed financial overview of all four ESTs (GW-MATE, HEF, SWAT, and WET) that received funding through the WPP.

Figure II.3 shows EST approvals, and commitments plus disbursement of funds by region. The differences are noteworthy: Africa and Latin America and the Caribbean account for over 20 percent of the approvals and commitments plus disbursements.

II.4 FINANCIAL SUMMARY OF PROGRAM MANAGEMENT

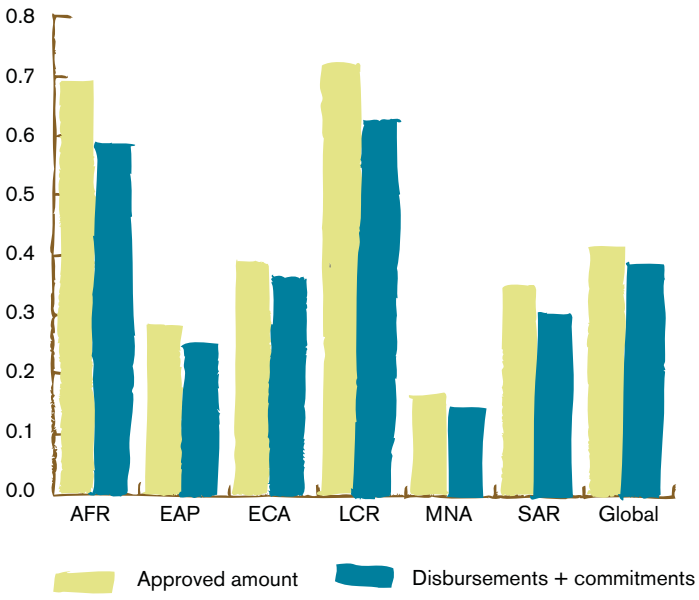
WPP management costs include costs incurred by the Program Management Team and the Bank's technical experts who provide strategic advice and support to the Water Partnership Program. In addition to staff and consultant costs, this category encompasses costs associated with WPP donor coordination, outreach and communications, monitoring and evaluation, and dissemination activities (website, brochure, publications, etc.).

Program management (PM) costs remained low in 2011. In total, 8.3 percent of all disbursements were related to PM, which is still well below the 9 percent cap.[4]

The WPP Legal Agreement establishes that Bank staff costs[5] under the Program should not exceed fifteen percent (15 percent) of total donor contributions. This includes staff costs for Program management, for supervision of WPP activities in the regions, WBI and the Water Anchor, and for technical review of work plans and proposals. From the beginning of the program, the Water Partnership Program has spent 14.3 percent of total disbursements on staff costs, which is well within the agreed range.

Overall, the Program has been very cost-efficient in its administration, benefiting from the solid management and monitoring systems put in place at Program inception.

FIGURE II.3 - EST APPROVALS AND EXPENDITURES BY REGION (USD MILLION)



ANNEX III

LIST OF WPP AND EST ACTIVITIES

WPP GFR #	Activity name	Country / region	Approved amount
	Africa (AFR) Region		
2829	Impact analysis of WSS policy and investments in Uganda	Uganda	$108,000
3001	Documenting the experience of public-private/public-public partnerships in urban water supply	Tanzania	$135,000
3017	Public Expenditure Reviews in WSS in West and Central Africa	Regional	$540,000
3121	Technical Support to Improve Monitoring and Evaluation of the SWAp Programs: Tanzania	Tanzania	$54,697
3144	Documenting Senegal and Burkina Faso Sanitation Successful Experiences	Senegal, Burkina Faso	$209,700
3229	Cameroon Development of Sanitation Strategy	Cameroon	$500,000
3355	Small Town Water and Sanitation Systems in Zimbabwe	Zimbabwe	$52,000
3546	Supply Chain study in Ethiopia	Ethiopia	$43,931
3692	Support to the Agriculture Water Partnership Program: Promotion and Investment Support	Regional	$229,964
4321	Support to Cooperative Management of Water Resources in Ghana	Ghana	$175,000
4431	Zambezi Basin - Risk-based Analysis of Water Investment Options	Regional	$81,691
4729	Southern Africa Water Resources Development Program	Regional	$100,000
5178	Kenya - Water Resources Assessment	Kenya	$123,600
5467	Restoration of a Fragile and Unique Lower Kihansi Gorge Ecosystem	Tanzania	$83,000
5904	Review of the implementing agencies for water sector support in Tanzania	Tanzania	$100,000
5923	Support to the Africa Agriculture Water Partnership Program 2	Regional	$150,986
5927	Documentation and Dissemination of RWSS Multi Village Schemes	Ethiopia	$135,096
6025	Transboundary River Basin Management: A review of selected cases in Africa	Regional	$54,940
6967	Malawi Water Sector Investment Program	Malawi	$354,760
6982	Regional ESW on Future Urban Water Management in Large African Cities	Regional	$300,000
7512	Cooperation in International Waters - Lessons from Africa	Regional	$192,300
9643	TA to Develop a River Basin Plan for Sanaga River Basin in Cameroon (scoping phase)	Cameroon	$100,000
8598	Gambia Basin River Project - Climate Change Adaptation	Regional	$150,000
	East Asia & Pacific (EAP) Region		
3481	China Country Water Resources Partnership Strategy	China	$152,000
3482	Revision of National Guidelines on Dam (Reservoir) Safety Management and Risk-Informed Dam Safety Management	China	$142,000
3490	China Rural Waste Water Management Study	China	$71,984
3491	Application of Consumption (ET)-based Water Rights System in Turfan River Basin in China	China	$70,620
3492	Study on Water Pricing for WUA Sustainability in China	China	$82,000
3494	Training Program on EIA of Cascade Dam	China	$32,000
3502	Non Revenue Water in China	China	$1,623
3504	Review and Upgrade of National Design Codes in relation to Urban Water Supply and Drainage	China	$117,000
3513	Protection of Groundwater in Southern Mongolia	Mongolia	$63,000
3567	Technical Assistance for water resources management adaptation to climate change in Vietnam Mekong Delta	Vietnam	$180,000

WPP GFR #	Activity name	Country / region	Approved amount
4005	East Asia and Pacific Regional Water and Wastewater Sector Review	Regional	$90,000
4581	Small Water Providers Work for the Poor	Philippines	$90,000
5876	Preparation for Water Supply Sector Investments Road Map	Indonesia	$135,000
7027	Update of Economic and Financial Review on China's WSS Sector	Regional	$72,500
7509	China - Water Sector from Middle to High Income Country	Regional	$247,500
7659	China Shaanxi-Yanan Water Supply and Integrated Water Resource Management	China	$72,000
7661	EAP - Vulnerability and WRM: Analytical Work on Green WRM	Regional	$181,125
	Europe & Central Asia (ECA) Region		
3704	Sava River Basin Water and Climate Change Adaptation	Regional	$100,000
3902	Developing Urban Water Resources Management Strategy for the ECA Region	Azerbaijan	$310,000
3946	Safety and Operational Efficiency of Dams in Central Asia (Dam Safety Assessment in AmuDarya Basin)	Regional	$105,150
4583	Developing an ECA Irrigation Strategy	Regional	$139,000
4588	Bosnia and Herzegovina - Vrbas Integrated Water - Energy Study	Bosnia and Herzegovina	$95,000
4603	Rapid Assessment of Pollution Hotspots for the Adriatic Sea	Regional	$150,000
4776	Kosovo Water Sector Assessment	Kosovo	$140,000
5012	Achievement of Water Security through Strengthening of so-called Water Economies	Macedonia	$100,000
5768	Albania Water Sector Assessment & Strategy	Albania	$99,285
8745	Lessons for successful reforms of urban water and sanitation sectors in ECA region	Regional	$120,000
	Latin America & Caribbean (LAC) Region		
2866	Interactive Management of Water Knowledge	Regional	$75,000
2985	Piloting Integrated Urban Water Resources Management in key Latin American urban areas	Regional	$410,000
3100	Potential for Wastewater Reuse in Bolivia: Pilot Case Studies and Lessons for National-Level Strategies	Bolivia	$68,182
3464	Strategic Regional Basin Planning for the Rio Bogota Project	Colombia	$30,729
3525	Strengthening municipal regulation of sanitation services in Sao Luis	Brazil	$11,336
3742	Supporting Integrated, Participatory, Basin-Scale WRM in Peru	Peru	$90,000
3864	Brazil Irrigation	Brazil	$113,663
4502	TA for the development of a rural information system in Central America - Components 5 and 7	Nicaragua	$92,000
4536	Disaster Risk Management for Water and Sanitation Systems in Costa Rica	Costa Rica	$90,000
4808	Cusco +10 - Challenges of Rural Water and Sanitation after a decade	Peru	$46,763
4908	DR Disaster Risk Management: Institutional Analysis and Development Support for Hydrological modeling and the National Hydrometeorological early warning network	Dominican Republic	$144,301
4937	Documentation and dissemination of proven management models for Multi Village/Small Town Schemes in Brazil	Brazil	$126,000
5027	Training Program for Water Resources Management Modeling in Colombia	Colombia	$45,155

WPP GFR #	Activity name	Country / region	Approved amount
5037	Mexico: Enhancing Capacity of Water Utilities for Integrated Water Resources Management	Mexico	$34,582
5125	Local Financing of Utilities Phase 2 - Improving capacity of Peruvian water utilities to access local financing	Peru	$45,491
5321	Development of a River Basin Management Framework for Climate Change Resilience in the Eastern Caribbean States (OECS)	Regional	$49,732
5407	Peru - Agricultural drainage - maintenance equipment and rehabilitation needs in selected valleys	Peru	$41,270
5566	Brazil WSS utility's regulation capacity assessment	Brazil	$100,000
6199	Workshop on Strengthening Risk Management in the Water Sector	Colombia	$22,954
6485	Chile - Water Resources Assessment: Groundwater regulations, Water Markets and Water Users Organizations	Chile	$48,242
8088	Workshops for hydro-climatic and water demand analysis in a Climate Change context in two pilot river basins of North East Brazil	Brazil	$100,000
9382	Litter management strategies and their application to integrated urban watershed management and drainage and flood protection investments	Colombia	$50,000
	Middle East & North Africa (MNA) Region		
3193	Egypt Groundwater Management	Egypt	$8,400
3310	South-south experience sharing between Morocco and Brazil in sanitation	Morocco	$65,191
3582	Survey and Assessment of private water providers in Sanaa, Yemen	Yemen	$41,190
3775	Strengthening Capacity to Adapt to Climate Change Impacts on Water Management - Morocco National Downscaling Study	Morocco	$100,000
3797	Water Resources Management Yemen	Yemen	$58,674
3839	Downstream impact of wastewater treatment systems: A study of Egypt	Egypt	$118,000
3895	Water and Wastewater Management in Iraq	Iraq	$105,000
4075	Assessing the effects of farm-level irrigation modernization on water availability and yields	Egypt	$200,000
5575	Middle East and North Africa Regional Water Outlook	Regional	$535,000
5853	NRW reduction in MENA	Regional	$125,000
7991	Pricing Irrigation Water in the Jordan Valley	Jordan	$155,000
8884	Performance Assessment in Water and Sewerage Utilities in MENA	Regional	$50,000
	South Asia (SAR) Region		
2930	Bangladesh Water Sector Institutional Assessment	Bangladesh	$119,999
3026	Modernizing Hydrologic Applications in India	India	$91,893
3115	Quantifying the Economic Returns to Reliable Irrigation Infrastructure Investments in Rural India	India	$50,700
3158	Sri Lanka - Technical Study on Water and Sanitation Services Delivery in the Plantation Estate	Sri Lanka	$95,237
3258	Maharashtra Urban Water Suply and Sanitation Reform Program	India	$36,756
3266	Improving energy efficiency in urban water sector: a scoping study for India	India	$80,000
3356	Reform of Punjab urban water sector	Pakistan	$48,430
3581	Review of Strategy for Small Town Water Supply in Sri Lanka	Sri Lanka	$33,279
3831	Water Sector Improvement in Maharashtra: Supporting Path-Breaking Reforms in Water Resources Regulation & River Basin Management in India	India	$132,040

WPP GFR #	Activity name	Country / region	Approved amount
5162	Irrigation Reform from Inside: Leadership Development and Change Management in IAMWARM Project	India	$60,000
5280	Support to NGRBA for Urban Investments, Services, and Institutional Arrangements	India	$89,652
5896	Water Resource Management in the Sundarbans	Bangladesh	$215,000
7516	Assessing the Value of ISO 9001 Quality Management Systems as a Framework for Evaluating Institutional Sustainability at the Water Utility Level and Prospects for Application to the Indian Context	India	$85,000
7520	Study on Improving the legal and organizational framework for Indian WSS service providers. Lessons from the electricity sector and best practices.	India	$120,000
7702	India Institutional Strengthening of Minor Irrigation Department in Orissa	India	$108,000
7720	Responsible Sourcing Initiative: Greening the Supply Chain of the Textile Industry in Bangladesh	Bangladesh	$120,000
7764	Quantifying Changes in Agricultural Intensification and Expansion in India	India	$80,000
7993	Strengthening water resource governance in Nepal	Nepal	$90,000
	Water Anchor / Global Programs (WA/GP)		
3225	Water and climate change: transboundary aspects	Global	$42,000
3440	Publications and Websites	Global	$235,000
3454	PER Mozambique	Mozambique	$9,097
3462	Lessons Learned PERs in Water	Global	$40,000
3531	Rural Private Operators	Global	$26,200
3569	Local Financing of Utilities - development of framework of options and recommendations for Peru	Peru	$5,907
3630	Groundwater Governance and Policy	Global	$135,000
3658	A framework for climate change adaptation at basin and planning levels	Global	$174,750
3734	Environmental Services KP (Management of Freshwater Ecosystems)	Global	$24,000
3811	Improving Wastewater Use in Urban Agriculture	Global	$46,639
3812	Improving Water Management in Rainfed Agriculture	Global	$25,000
6284	Mainstreaming Adaptation to Climate Change in the Water Sector	Global	$407,200
6917	Economics of Adaptation to Climate Change in Water Investment Projects: Approaches for Strengthening Project Analysis	Global	$63,890
7096	Africa Integrated Urban Water Management	Global	$100,000
7097	Human Water Security, Infrastructure Planning and Environmental Trade-offs in Africa	Global	$75,000
7736	Innovation and Technology in the water practice	Global	$54,000
9094	Interim guidelines on assessing GHG emissions from reservoirs	Global	$20,000
9313	Water Hackathon	Global	$70,000
	World Bank Institute (WBI)		
3833	Managing Agricultural Water under Climate Challenges	Global	$110,000
4479	Leading Change in Water Management and Governance WBI	Global	$180,000

GW-MATE	Name of activity	Region	Country	Approved amt
GW-MATE 01	SADC GW and Drought Management Program	AFR	Regional	$54,674
GW-MATE 02	African Groundwater Policy Dialogue and Awareness Program	AFR	Regional	$52,811
GW-MATE 03	Groundwater Management Strategy	AFR	Ethiopia	$98,298
GW-MATE 04	GW Aspects of Uganda CWRAS, Uganda	AFR	Uganda	$39,922
GW-MATE 05	Strengthening Groundwater Management in Southern Mongolia	EAP	Mongolia	$62,371
GW-MATE 06	China, Piloting groundwater management best practice	EAP	China	$40,442
GW-MATE 07	Improving Groundwater Management in Peru	LAC	Peru	$64,816
GW-MATE 08	Post-GEF Project Review on Ways Forward	LAC	Argentina, Brazil, Paraguay, Uruguay	$11,997
GW-MATE 09	Improving Groundwater Management in the States of Rio Grande do Norte and Ceará, Brazil	LAC	Brazil	$21,307
GW-MATE 10	Urban Groundwater Use in Brazil: a critical review of risks and benefits as a basis for policy definition	LAC	Brazil	$15,181
GW-MATE 11	Review and Advice for Groundwater Management Studies, Sana'a Yemen	MNA	Yemen	$29,983
GW-MATE 12	Conference on Integrated WRM and Sustainable Devt, Morocco	MNA	Morocco	$14,807
GW-MATE 13	Support IDA in supervising groundwater management in Yemen Water SWAP	MNA	Yemen	$28,383
GW-MATE 14	Support for strategic groundwater management for Dhaka watershed within overall national framework	SAR	Bangladesh	$64,654
GW-MATE 15	Enhancing Dissemination and Impact of India Groundwater AAA findings	SAR	India	$345
GW-MATE 16	Andra Pradesh Drought Adaptation Initiative	SAR	India	$21,978
GW-MATE 17	GWMATE, Generic Knowledge Products, Strategy Papers and Dissemination	Global	Global	$176,388
GW-MATE 18	GW-MATE Business Development, outreach and coordination	Global	Global	$23,391
GW-MATE 19	GW Governance and Policy	Global	Global	$53,474

SWAT	Name of activity	Region	Country	Approved amt
SWAT 01	Cameroun SWAT III Urban Sanitation Support	AFR	Cameroun	$62,294
SWAT 02	Laos Hospital Wastewater Work	EAP	Laos	$13,287
SWAT 03	Mongolia Ger Sanitation	EAP	Mongolia	$53,546
SWAT 04	Tajikistan Secondary Town Sanitation	ECA	Tajikistan	$23,200
SWAT 05	Georgia - Rural Sanitation Consultancy	ECA	Georgia	$43,676
SWAT 06	Haiti SWAT III Rural Sanitation Support	LAC	Haiti	$57,148
SWAT 07	Ecuador Rural Sanitation Evaluation	LAC	Ecuador	$30,962
SWAT 08	Support for Panama Handwashing Initiative	LAC	Panama	$12,794
SWAT 09	Morocco Waste Stabilization Pond Review	MNA	Morocco	$31,321
SWAT 10	India Ganga Upstream Sewer Review	SAR	India	$38,392

HEF	Name of activity	Region	Country	Approved amt
HEF 01	Ethiopia Tana & Beles IWRM	AFR	Ethiopia	$96,229
HEF 02	Rusumo Falls water resources management	AFR	Tanzania, Rwanda, Burundi	$6,300
HEF 03	Mali and Nigeria watershed management	AFR	Mali, Nigeria	$18,170
HEF 04	Ghana Flood Hazard Assessment	AFR	Ghana	$15,021
HEF 05	Vietnam - Trung Son PMF calculation	EAP	Vietnam	$36,109
HEF 07	China sludge incineration plant	EAP	China	$5,288
HEF 08	Montenegro Lake Skadar Pipeline Assessment	ECA	Montenegro	$15,681
HEF 09	Montenegro-Albania Lake Skadar-Shkoder	ECA	Montenegro, Albania	$36,119
HEF 10	Albania disaster risk hydrometeorology	ECA	Albania	$28,100
HEF 11	Central Asia water-energy modeling and analysis	ECA	Kazakhstan	$23,306
HEF 12	Georgia regional wastewater management strategy for selected cities and towns	ECA	Georgia	$30,814
HEF 13	Moldova disaster risk hydrometeorology	ECA	Moldova	$43,320
HEF 14	Central Asia Hydrometeorology	ECA	Regional	$3,144
HEF 15	Bolivia Lake Titicaca outfall design	LAC	Bolivia	$56,747
HEF 16	Bolivia climate modeling and adaptation	LAC	Bolivia	$5,075
HEF 17	Rio Grande do Norte Integrated Water Resources Project	LAC	Brazil	$13,130
HEF 18	Brazil Federated Integrated Water Resources Project - Interaguas	LAC	Brazil	$45,062
HEF 19	Modernization of hydro-meteorological services in Mexico	LAC	Mexico	$56,901
HEF 20	Mexico climate change for the Yacqui valley	LAC	Mexico	$25,248
HEF 21	Colombia Water Resources Management Modeling	LAC	Colombia	$24,515
HEF 22	Yemen Water Sector Support Project (WSSP)	MNA	Yemen	$17,857
HEF 23	Morocco global climate change and hydrology modeling + HYDROMET	MNA	Morocco	$16,624
HEF 24	India - India hydrology 2 project	SAR	India	$33,479
HEF 25	South Asia Water Initiative	SAR	Regional	$10,161
HEF 26	India Ganges River Basin Authority Project	SAR	India	$32,828
HEF 28	HEF Seminars	Global	Global	$927
HEF 29	HEF Publications	Global	Global	$19,848
HEF 30	HEF Note: Watershed and Disaster Management	Global	Global	$30,493
HEF 31	HEF Note: Managing downstream impacts and externalities	Global	Global	$25,263
HEF 32	Mexico COP 16	Global	Global	$33,268

WET	Name of activity	Region	Country	Approved amt
WET 01	Uganda Water Mgmt & Dev.	AFR	Uganda	$30,000
WET 02	Tana & Beles Integrated Water Resources Development	AFR	Ethiopia	$25,000
WET 03	SADC Groundwater and Drought Management	AFR	"Botswana Mozambique"	$30,000
WET 04	Nigeria Erosion and Watershed Management Project (NEW-MAP)	AFR	Nigeria	$37,500
WET 05	Tanzania - Kimbiji Aquifer	AFR	Tanzania	$27,500
WET 06	Mauritius Infrastructure	AFR	Mauritius	$5,000
WET 07	Regional Rusumo Falls	AFR	Rwanda	$15,000
WET 08	Kenya WRM	AFR	Kenya	$30,000
WET 09	Cameroon Sanaga River Basin Plan	AFR	Cameroon	$45,000
WET 10	China Liuzhou Enviromental Management 2	EAP	China	$45,000
WET 11	China Guangdong	EAP	China	$27,000
WET 12	Lake Skadar-Shkoder Integrated Ecosystem Management	ECA	Albania, Montenegro	$25,000
WET 13	Aral Sea SYNAS-2 & IDIP-2	ECA	Kazakhstan	$46,000
WET 14	Tajikistan sedimentation management	ECA	Tajikistan	$40,000
WET 15	Albania HYDROMET	ECA	Albania	$30,000
WET 16	Mexico HYDROMET	LCR	Mexico	$40,000
WET 17	WRM and CC in NE Brazil	LCR	Brazil	$35,000
WET 18	Amazonas	LCR	Brazil, Peru	$50,000
WET 19	Panama Handwashing	LCR	Panama	$17,000
WET 20	Uruguay OSE	LCR	Uruguay	$45,000
WET 21	Argentina Water Sector Policy	LCR	Argentina	$10,000
WET 22	Mexico MoMet	LCR	Mexico	$20,000
WET 23	Bolivia Climate Resilience	LCR	Bolivia	$30,000
WET 24	Peru Irrigation Strategy	LCR	Peru	$15,000
WET 25	Colombia - Barranquilla	LCR	Colombia	$17,000
WET 26	Morocco HydroMet	MNA	Morocco	$20,000
WET 27	Morocco II Oum er Rbia CC	MNA	Morocco	$5,000
WET 28	Rajasthan Rural Water Supply	SAR	India	$25,000
WET 29	Sri Lanka: Metro Colombo Flood and Drainage Management	SAR	Sri Lanka	$35,000
WET 30	Bangladesh CC and Coastal Embankment Improvement	SAR	Bangladesh	$20,000
WET 31	Sri Lanka Dam Safety	SAR	Sri Lanka	$39,000
WET 32	Indonesia WRM	SAR	Indonesia	$30,000
WET 33	WET KM & Dissemination	Global	Global	$50,000

ANNEX IV

BANK PROJECTS INFLUENCED BY THE WPP

Project name	Region	Country	Primary sector	Bank lending / grants (in million dollars)	Total project costs (in million dollars)	Project Status
Third National Fadama Development Project (Fadama III)	AFR	Nigeria	Crops	250.0	425.0	Active
Irrigation and Drainage Project	AFR	Ethiopia	Irrigation & Drainage	100.0	115.0	Active
Lower Kihansi Environmental Management Project 2	AFR	Tanzania	General agriculture, fishing and forestry	3.5	3.5	Closed
GEF Groundwater & Drought Management TAL (FY05)	AFR	Africa	Central government administration	7.0	13.3	Closed
Cities and Climate Change	AFR	Mozambique	General water, sanitation and flood protection[a]	120.0	120.0	Active
Nigeria Scaling Up Sustainable Land Management Practice, Kno	AFR	Nigeria	Public administration – Agriculture, fishing, and forestry	6.8	6.8	Active
NELSAP: Regional Rusumo Falls Hydroelectric and Multipurpos	AFR	Africa	District heating and energy efficiency services	406.0	496.0	Pipeline
SVP-Additional Grant Financing Regional Power Trade - II	AFR	Africa	Power	4.1	4.1	Closed
Sanitation Project	AFR	Cameroon	Sanitation	30.0	39.3	Active
Dar es Salaam Water Supply and Sanitation Project	AFR	Tanzania	Water supply	61.5	164.6	Closed
Ethiopia Water Supply and Sanitation Project	AFR	Ethiopia	Water supply	100.0	120.0	Active
Water Sector Support Project	AFR	Tanzania	Water supply	200.0	951.0	Active
Second National Water Development Project	AFR	Malawi	Water supply	50.0	173.0	Active
Urban Water Supply and Sanitation Project	AFR	Ethiopia	Water supply	100.0	119.0	Active
Water Sector Improvement APL Phase II: Metolong Dam and Water	AFR	Lesotho	Water supply	25.0	31.8	Active
Nigeria Erosion and Watershed Management Project	AFR	Nigeria	Flood protection	500.0	650.0	Active
Tana & Beles Integrated Water Resources Development	AFR	Ethiopia	General water, sanitation and flood protection	45.0	70.0	Active
Kenya - Enhancing Water Security & Climate Resilience	AFR	Kenya	General water, sanitation and flood protection	350.0	350.0	Pipeline

Project name	Region	Country	Primary sector	Bank lending / grants (in million dollars)	Total project costs (in million dollars)	Project Status
Water Management and Development Project	AFR	Uganda	General water, sanitation and flood protection	135.0	135.0	Active
VN - Mekong Delta Water Management for Rural Dev	EAP	Vietnam	Irrigation & Drainage	160.0	206.6	Active
Water Conservation Project II	EAP	China	Irrigation & Drainage	80.0	160.0	Active
Water Resources and Irrigation Sector Management Program 2	EAP	Indonesia	Irrigation & Drainage	150.0	202.6	Active
Health Services Improvement Project	EAP	Laos	Health	15.0	15.0	Active
VN-Trung Son Hydropower Project	EAP	Vietnam	Hydropower	330.0	411.7	Active
Jiangxi Shihutang Navigation and Hydropower Complex Project	EAP	China	Ports, waterways and shipping	100.0	319.0	Active
MN-Mining Infrastructure Investment Supp	EAP	Mongolia	General transportation	25.0	25.0	Active
Second Ulaanbaatar Services Improvement Project	EAP	Mongolia	Water supply	18.0	23.0	Closed
China: Yan'an Water Supply Project	EAP	China	Water supply	60.0	147.4	Pipeline
Guangdong Pearl River Delta Urban Environment Project	EAP	China	Sewerage	128.0	432.4	Closed
Shanghai Urban Environment APL Phase 2	EAP	China	Sewerage	180.0	434.0	Active
Liuzhou Environment Management Project Phase II	EAP	China	Wastewater Collection and Transportation	150.0	300.0	Active
China: Establishment of Groundwater Management Center	EAP	China	General water, sanitation and flood protection	0.0	0.2	Active
Second Irrigation and Drainage Improvement Project	ECA	Kazakhstan	Irrigation & Drainage	131.0	438.0	Pipeline
EU Natura 2000 Integration Project	ECA	Croatia	Forestry	28.8	32.6	Active
Albania/Montenegro Lake Skhoder Integrated Ecosystem Management	ECA	SE Europe & Balkans	General agriculture, fishing and forestry[a]	4.6	19.8	Active
Disaster and Climate Risk Management Project	ECA	Moldova	Public administration– Water, sanitation and flood protection	10.0	10.0	Active
Energy Loss Reduction Project	ECA	Tajikistan	Power	18.0	30.0	Active

Project name	Region	Country	Primary sector	Bank lending / grants (in million dollars)	Total project costs (in million dollars)	Project Status
Municipal Infrastructure Development Project	ECA	Tajikistan	Water supply	15.0	16.5	Active
Water Sector Investment Project	ECA	Albania	Water supply	40.0	84.7	Pipeline
Regional & Municipal Infrastructure Development Project	ECA	Georgia	Water supply	40.0	65.4	Active
Syr Darya Control and Northern Aral Sea Project - Phase II	ECA	Kazakhstan	Flood protection	165.8	325.8	Pipeline
Disaster Risk Mitigation and Adaptation Project	ECA	Albania	Flood protection	9.2	10.2	Active
Central Asia Hydrometeorology Modernization Project	ECA	Central Asia	Flood protection	20.7	27.7	Active
Water Resources and Irrigation Project	ECA	Albania	Flood protection	50.0	50.0	Pipeline
Hovsan Wastewater Outfall Project	ECA	Azerbaijan	Wastewater Treatment and Disposal	92.0	109.0	Pipeline
Sierra Irrigation Subsector	LCR	Peru	Irrigation & Drainage	20.0	48.3	Active
Environmental Services Project	LCR	Mexico	General agriculture, fishing and forestry	45.0	141.6	Closed
Environmental Protection and Sustainable Development	LCR	Latin America	Other social services[a]	13.4	26.8	Closed
CO Sustainable Development Inv Project	LCR	Colombia	Water supply[a]	7.0	8.1	Active
Alto Solimoes Basic Services and Sustainable Development Project	LCR	Brazil	General water, sanitation and flood protection[a]	24.3	35.0	Closed
Water Resources Management Modernization	LCR	Peru	Public administration– Water, sanitation and flood protection	10.0	23.7	Active
BR Federal Integrated Water - Interaguas	LCR	Brazil	Public administration– Water, sanitation and flood protection	107.3	143.1	Active
National Rural Water Supply and Sanitation Project	LCR	Peru	Sanitation	50.0	80.0	Active
Ceara Integrated Water Resources Management Project	LCR	Brazil	Water supply	136.0	247.2	Closed

Project name	Region	Country	Primary sector	Bank lending / grants (in million dollars)	Total project costs (in million dollars)	Project Status
Water Supply and Sanitation in Low-Income Communities	LCR	Panama	Water supply	32.0	39.4	Active
Haiti Rural Water and Sanitation Project	LCR	Haiti	Water supply	5.0	5.3	Closed
Rio Grande do Norte Integrated Water Resources Management	LCR	Brazil	Water supply	35.9	59.8	Active
Nicaragua Rural Water Supply and Sanitation Project (PRASNIC)	LCR	Nicaragua	Water supply	20.0	23.1	Active
Rural Water and Sanitation Project - SPF	LCR	Haiti	Water supply	5.0	5.0	Active
Disaster Vulnerability Reduction First Phase APL	LCR	Colombia	Flood protection	260.0	401.0	Active
BR Municipal APL: Sao Luis Enhancing Municipal Governance	LCR	Brazil	Flood protection	35.6	59.4	Active
Regional Disaster Vulnerability Reduction APL1	LCR	OECS Countries	Flood protection	20.9	53.1	Active
Barranquilla Urban Flood Management	LCR	Colombia	Flood protection	150.0	250.0	Pipeline
Pernambuco Sustainable Water	LCR	Brazil	Sewerage	190.0	410.0	Active
Rio Bogota Environmental Recuperation and Flood Control Project	LCR	Colombia	Wastewater Treatment and Disposal	250.0	487.0	Active
Paraguay Water & Sanitation Sector Modernization	LCR	Paraguay	General water, sanitation and flood protection	64.0	83.5	Active
DO Emergency Recovery & Disaster Management	LCR	Dominican Republic	General water, sanitation and flood protection	80.0	80.0	Active
Costa Rica Catastrophe Deferred Draw Down Option (CAT DDO)	LCR	Costa Rica	General water, sanitation and flood protection	65.0	65.0	Active
OSE Sustainable and Efficient	LCR	Uruguay	General water, sanitation and flood protection	42.0	84.0	Active
Adaptation to Climate Change in the Water Sector Development	LCR	Mexico	General water, sanitation and flood protection	450.0	450.0	Closed
Modernization of the National Meteorological Service for Imp	LCR	Mexico	General water, sanitation and flood protection	105.3	171.3	Active
Lake Titicaca Local Sustainable Development	LCR	Bolivia	Sewerage[a]	20.0	23.0	Active
Sana'a Basin Water Management Project	MNA	Yemen	Irrigation & Drainage	24.0	30.0	Closed

Project name	Region	Country	Primary sector	Bank lending / grants (in million dollars)	Total project costs (in million dollars)	Project Status
EGYPT-Integrated Irrigation Improvement and Management Project	MNA	Egypt	Irrigation & Drainage	120.0	303.0	Active
MA-Modernization of Irrigated Agriculture in the Oum Er Rbia	MNA	Morocco	Irrigation & Drainage	70.0	115.5	Active
Yemen-Water Sector Support	MNA	Yemen	Irrigation & Drainage	90.0	340.6	Active
EGYPT-Farm-level Irrigation Modernization	MNA	Egypt	Irrigation & Drainage	100.0	180.0	Active
RY Urban Water Supply & Sanitation APL	MNA	Yemen	Sanitation	130.0	150.0	Closed
Integrated Sanitation& Sewerage Infrastructure Project	MNA	Egypt	Sanitation	120.0	201.5	Active
Morocco Oum Er Rbia Sanitation	MNA	Morocco	Sanitation	43.0	75.1	Active
IQ-Emergency Water Supply Project	MNA	Iraq	Water supply	109.5	109.5	Active
First Development Policy Loan in support of the Plan Maroc V	MNA	Morocco	Agricultural marketing and trade	205.0	205.0	Closed
Uttar Pradesh Water Sector Restructuring Project	SAR	India	Irrigation & Drainage	149.2	173.7	Closed
Hydrology Project Phase II	SAR	India	Irrigation & Drainage	105.0	135.1	Active
Maharashtra Water Sector Improvement Project	SAR	India	Irrigation & Drainage	325.0	393.8	Active
Tamil Nadu Irrigated Agriculture Modernization and Water-Bod	SAR	India	Irrigation & Drainage	485.0	566.0	Active
Orissa Community Tank Management Project	SAR	India	Irrigation & Drainage	112.0	127.8	Active
West Bengal Accelerated Development of Minor Irrigation	SAR	India	Irrigation & Drainage	250.0	300.0	Active
Andhra Pradesh Rural Poverty Reduction: Drought Adaptative I	SAR	India	General agriculture, fishing and forestry	65.0	1,701.0	Closed
Maharashtra Rural Water Supply and Sanitation Jalswarajya	SAR	India	Water supply[a]	181.0	268.6	Closed
National Ganga River Basin Project	SAR	India	Public administration– Water, sanitation and flood protection	1,000.0	1,556.0	Active
Karnataka Municipal Water Energy Efficiency Project	SAR	India	Water supply	1.3	1.3	Active

Project name	Region	Country	Primary sector	Bank lending / grants (in million dollars)	Total project costs (in million dollars)	Project Status
Andhra Pradesh Rural Water Supply and Sanitation	SAR	India	Water supply	150.0	180.0	Active
Rajasthan Water Supply and Sanitation Project	SAR	India	Water supply	180.0	230.0	Pipeline
Metro Colombo Urban Development Project	SAR	Sri Lanka	Flood protection	213.0	320.6	Active
Urban Water Supply & Sanitation Modernization Project	SAR	India	General water, sanitation and flood protection	500.0	1,000.0	Pipeline

a) For Bank projects, up to five sectors can be specified in the project database. Secondary sectors are indicated where the primary sector does not clearly specify a sector related to water.

ENDNOTES

EXECUTIVE SUMMARY

1. The World Bank's draft environment strategy states that green growth is growth that is efficient, clean, and resilient: efficient in its use of natural resources; clean, in that it minimizes pollution and environmental impacts; and resilient in accounting for natural hazards and the role of environmental management and natural capital in preventing physical disasters.
2. Two of the many definitions of water security are the following:
   - Water security relates to the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems, and production, coupled with an acceptable level of water-related risks to people, environments, and economies (Source: David Grey and Claudia Sadoff. 2007. Sink or Swim? Water security for growth and development. Water Policy 9. Washington, DC: The World Bank, p. 545–71).
   - Water security means ensuring that freshwater, coastal, and related ecosystems are protected and improved; that sustainable development and political stability are promoted; that every person has access to enough safe water at an affordable cost to lead a healthy and productive life; and that the vulnerable are protected from the risks of water-related hazards. (Source: Second World Water Forum. 2000. Ministerial Declaration of The Hague on Water Security in the 21st Century. The Hague, the Netherlands).
3. World Bank. 2010. *Global Monitoring Report 2010: The MDGs after the Crisis.* A Joint Report of the Staffs of the World Bank and the International Monetary Fund. Washington DC: The World Bank.
4. Water resources management (WRM) is a cross-cutting theme that can be part of any project in the water portfolio (water supply and sanitation; flood protection; irrigation and drainage; and hydropower). WRM is therefore not counted in the total $7.5 billion water portfolio.
5. Low level PM costs represent costs below the agreed 9 percent of the total PM-related disbursements.

CHAPTER 2

1. World Bank. 2010. Global Monitoring Report 2010: The MDGs after the Crisis. A Joint Report of the Staffs of the World Bank and the International Monetary Fund. Washington DC: The World Bank.
2. Ghana's "Vision 2020" plan includes vital targets, such as achievement of the Millennium Development Goals toward eradicating poverty and hunger and ensuring environmental sustainability.
3. As part of a series of 21 reports, the study identifies options for flood protection and climate change adaptation measures. It includes an assessment based on a cost-benefit analysis of alternative embankment interventions and policy options to inform decision making on socioeconomic and human development improvements.
4. Participants included representatives from the Executive Committee (EC IFAS) of the International Fund for Saving the Aral Sea (IFAS), the Scientific Information Centre of the Interstate Commission for Water Coordination (SIC-ICWC), Regional Center for Hydrology and national affiliates. Members of the donor community participated as observers.

CHAPTER 4

1. Source: "Problems for Women", WaterAid, http://www.wateraid.org/uk/what_we_do/the_need/206.asp
2. A new Dutch initiative, the Water and Climate Services Declaration aims to improve information chains on integrated water and climate services. It is signed by more than 30 organizations specialized in space, Earth observation, hydrology, food security, geomatics, and climate. These organizations share knowledge and experiences in different regions and discuss solutions to effectively address climate change challenges by developing the information chain using remote sensing techniques.
3. The figures presented include all active, pipeline, and closed projects that have been or are influenced by the WPP.
4. The total figure for support to lending is based on the linked Bank project numbers in WPP and EST proposals. Only activities that are at least partly downstream-oriented are included in these calculations.
5. The number of beneficiaries is calculated based on project numbers linked to activities whose impacts are considered downstream per the GFR. Data comes from Project Appraisal Documents and Implementation Status and Result Reports. Only water supply and sanitation improvements were counted because benefits of water resources management activities are larger and more difficult to quantify.

CHAPTER 5

1. Funded by Australia, IFC, the Netherlands, Sweden, and the United Kingdom

ANNEXES

1. This includes both WPP and EST activities.
2. WPP and EST program management activities (e.g., dissemination, publications, etc.) are not included in these numbers. Some activities are implemented in two or more countries—these activities are double counted in the total number of activities.
3. The number indicated in Figure I.1 refers to the number of WPP activities per region.
4. The 9 percent cap for program management costs differs from the staff costs cap of 15 percent because WPP donor coordination, outreach, M&E, and dissemination costs do not include staff time, and supervision of activities by regional staff does not count as program management.
5. The staff costs include salaries, benefits, and travel of World Bank staff and extended term consultants.

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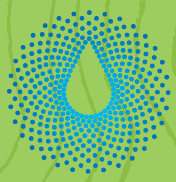

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