

WATER  
PARTNERSHIP  
PROGRAM

# Sharing Smart Solutions in Water

## 2012 ANNUAL REPORT & PHASE I SUMMARY



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1818 H Street NW  
Washington DC 20433  
Telephone: 202-473-1000  
Internet: [www.worldbank.org](http://www.worldbank.org)

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## 2012 ANNUAL REPORT & PHASE I SUMMARY

2012 ANNUAL REPORT AND PHASE I SUMMARY

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July 2013

Water Partnership Program (WPP)  
TWIWA - The World Bank  
1818 H Street, NW  
Washington, DC 20433

Contact:

Diego Rodriguez, Program Manager ([drodriguez1@worldbank.org](mailto:drodriguez1@worldbank.org))

Matthijs Schuring, Program Coordinator ([mschuring@worldbank.org](mailto:mschuring@worldbank.org))

Peggy Johnston, Senior Financial Manager ([pjohnston@worldbank.org](mailto:pjohnston@worldbank.org))

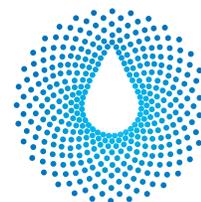
Nansia Constantinou, Program Officer - Communications ([nconstantinou@worldbank.org](mailto:nconstantinou@worldbank.org))

Amanda Goksu, Program Officer ([amcmahan@worldbank.org](mailto:amcmahan@worldbank.org))

Danielle A. Garcia Ramirez, Program Officer - Publications ([dgarciamirez@worldbank.org](mailto:dgarciamirez@worldbank.org))

Luisa Mimmi, Program Officer - M&E ([lmimmi@worldbank.org](mailto:lmimmi@worldbank.org))

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# Foreword

Water insecurity – the lack of reliable supply of an acceptable quantity and quality of water for health, livelihoods and production - has become one of the greatest risks facing our world today. At Davos this year, in their eighth annual survey of risks to the global economy, world leaders ranked “water supply crises” fourth in terms of likelihood and second in terms of impact – ahead of food shortages and fiscal imbalances. Global water use over the last century has been growing at twice the rate of population increase<sup>1</sup> and the gap between supply and demand will inevitably widen over the next few decades. Climate change is making water more unpredictable, and causing more frequent and intense floods and droughts. If not addressed now, water insecurity will place a drag on economic development and disrupt the livelihoods of millions of people, some of whom could be pulled further into poverty.

Today's water crisis is compounded by a *water management crisis*. The world as a whole might not be running out of water, but many countries and regions face serious water shortages. Around 1.2 billion people, or almost one-fifth of the world's population, live in areas of physical scarcity, and 500 million people are approaching this situation.<sup>2</sup> Given water's fundamental role in all aspects of life and development, managing water to respond to the dynamism of our times is imperative for helping countries develop sustainably.

Optimizing water management under these circumstances requires innovation and radical thinking. It involves developing the right information and institutions, and investing in smart water infrastructure. The good news is that demand for smart approaches is growing. Companies and farmers are exploring groundbreaking solutions to address the nexus of water, food, and energy. Governments are seeking advanced tools and information to guide water allocation decisions, provide adequate services to citizens, raise water productivity in agriculture, and manage water-related disasters to protect their people and economies.

The World Bank has responded to this emerging demand by packaging solutions that go beyond lending. We have backed our loans with cutting-edge knowledge that drives smarter infrastructure investment in developing countries. We have worked in partnership with global stakeholders to build local capacity and improve water practices. We make these critical contributions through platforms such as the Water Partnership Program (WPP), a program that brings the best knowledge available to help countries solve their uniquely complex water challenges.

I am pleased to present the 2012 WPP Annual Report, which summarizes the achievements and impact of the Program's Phase I. *Sharing Smart Solutions for Water* demonstrates how the WPP strengthens the quality of our projects and shapes policy dialogue in areas calling for immediate action—climate change, energy and food security, and urban water management. We would not have come this far without the support of our donors, the governments of the Netherlands, the United Kingdom, and Denmark who, having seen the change the WPP is driving in water, have committed to a larger and bolder Phase II for the next four years.

Safe, clean and reliable water supply is a fundamental component to achieve the World Bank Group's goals of ending extreme poverty and boosting shared prosperity - and to do so in a sustainable way. Together with our partners, we are committed to making water security central to the post-2015 sustainable development agenda.



Rachel Kyte  
Vice President, Sustainable Development Network,  
World Bank

<sup>1</sup> UN-Water/FAO. For data see the UN-Water Statistics website at: [http://www.unwater.org/statistics\\_use.html#sthash.1847loWa.pdf](http://www.unwater.org/statistics_use.html#sthash.1847loWa.pdf).

<sup>2</sup> UN-Water/FAO. 2007. Coping with Water Scarcity: Challenge of the Twenty-first Century.



# 1. Introduction

Water security, or having the right amount and quality of water in the right place at the right time, fosters social and economic progress. Where water is sufficient to meet demand, it can promote economy-wide growth and enable countries to reach their food security, energy security, and human development goals. Where it is scarce, excessive, or unclear it can exacerbate multiple dimensions of poverty.

Some countries have built robust economies on a foundation of low-cost water, but the underlying practices may not be sustainable for areas that will become drier or more populous in the future. Other countries have been unable to meet the daily water needs of their populations, and future water variability coupled with poor water management could, over time, push more people into poverty. Neither of these two worlds is protected from future water crises, which are heavily influenced by changing local circumstances.

To attain water security, water endowments - from abundant to scarce - need to be well managed. The World Bank supports clients in garnering the funds, capacity, and knowledge they need to properly manage water resources along this continuum. Investments in water infrastructure and systems are critical but insufficient. For clients to solidify the necessary physical, institutional and social changes that will promote long-term water security, an internal paradigm shift is also required. The quality of the institutions and policies through which water resources are developed and water services are delivered is paramount to the ability of a given country to provide its citizens enough water to fuel development. Moreover, the way individuals value and use water determines whether the behavior of the next generation will help or hinder progress.

Ensuring water security is everyone's business. Politicians, scientists, donors, civil society, and industry are all working to identify water challenges and promote solutions. The key is to bring these groups, with their different perspectives and interests, to the same table (whether that is at the local, national, regional or global level) for a synchronized response that leverages their expertise and influence. This is why the World Bank Group, through its \$30 billion active water portfolio, works in partnership with other

institutions to help countries provide water supply and sanitation services to all, especially the poor, and allocate water to highly productive uses in a sustainable manner.

The World Bank's Water Partnership Program (WPP) is a platform that brings the best knowledge, science, skills, and solutions to match the challenges at hand. The WPP is a trust fund supported by the governments of the Netherlands, the United Kingdom, and Denmark. The Program supports poverty reduction by bolstering the World Bank's operational and analytical work through the mainstreaming of pragmatic approaches for water resources management and improvements in water supply and sanitation service delivery. By sharing smart solutions among developed and developing countries alike, the WPP helps countries to leapfrog on proven approaches and tools and customize these to local needs and capacity to get better results for less money and time.

Over the course of Phase I, the WPP has enhanced the Bank's capacity to provide its member countries ever-more innovative, practical, and effective approaches across the water-food-energy nexus. Over the second, four year phase, the WPP will commit more resources to building partnerships that can reach the core of water security, produce the evidence that spurs ideas into action, and reinforce sound project design and implementation toward improved climate resilience.

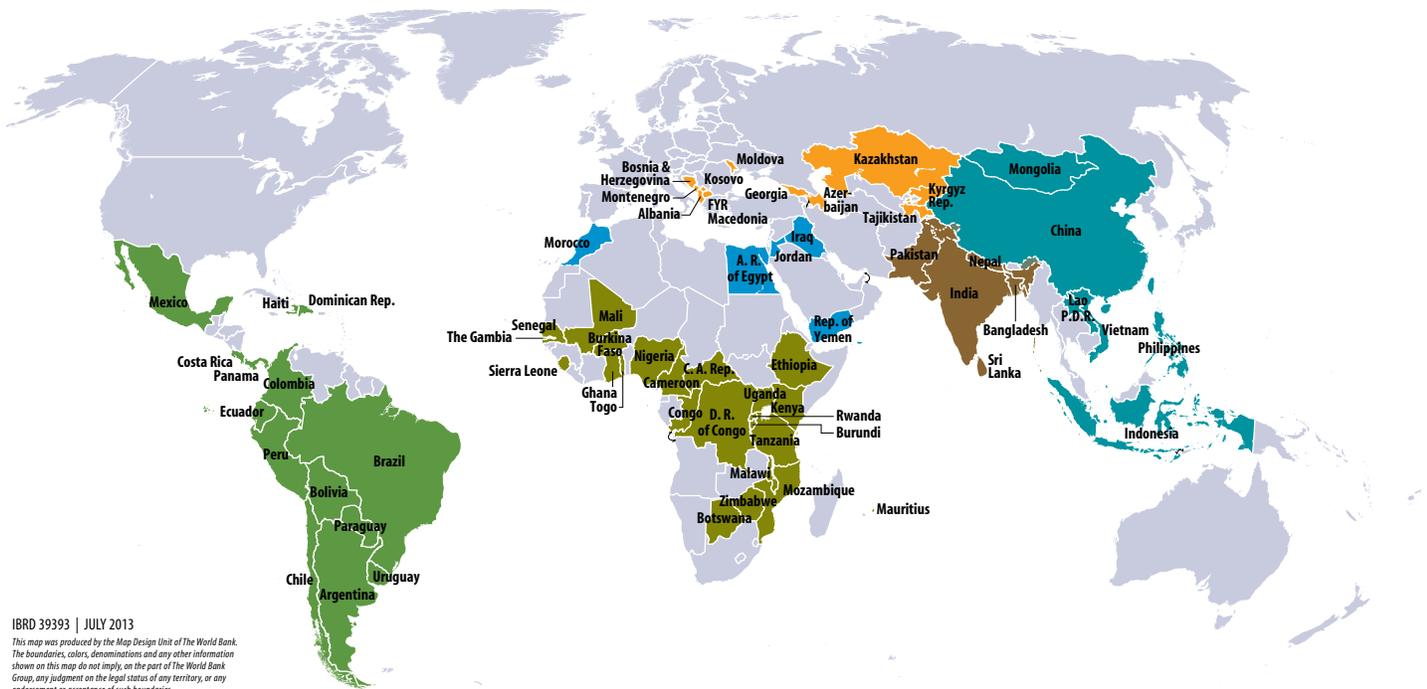
## REPORT SUMMARY

In 2012, Phase I of the WPP was closed out and Phase II commenced. This Annual Report showcases the major impact of WPP Phase I (2009 – 2012) in each of the Bank's six regions as well as its global impact on knowledge and innovation. WPP Phase I enabled Bank teams to better respond to changing client demands within the project cycle, and to integrate hard (infrastructure) and soft (institutional, policy, management) solutions that yield more sustainable outcomes.

## WPP PHASE I PROGRESS AND ACHIEVEMENTS (2009 - 2012)

- SUPPORT TO 225 ACTIVITIES DISBURSING \$19.1 MILLION
- ACTIVITIES IN 64 COUNTRIES, WITH 30 REGIONAL AND 27 GLOBAL INITIATIVES (SEE MAP BELOW)
- AFRICA RECEIVED 39% (THE LARGEST SHARE) OF WPP FUNDS AND HAS IMPLEMENTED THE LARGEST NUMBER OF ACTIVITIES
- PORTFOLIO OF ACTIVITIES HAS INFLUENCED AND SUPPORTED ALMOST \$11.7 BILLION IN WORLD BANK FINANCING (THIS FIGURE ALMOST DOUBLES TO \$21.2 BILLION WHEN OTHER FUNDING SOURCES ARE INCLUDED)
- EACH DOLLAR OF WPP FUNDING HAS AN IMPACT ON \$661 IN WORLD BANK LENDING, OR \$1,202 WHEN OTHER FUNDING SOURCES ARE INCLUDED

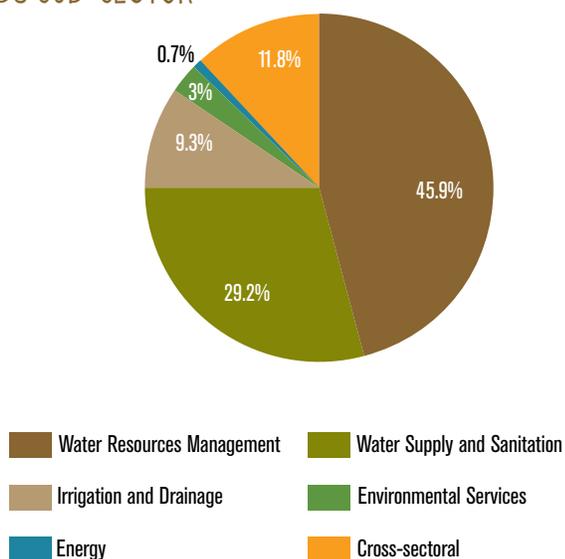
## WPP ACTIVITIES WERE IMPLEMENTED IN 64 COUNTRIES UNDER PHASE I (2009-2012)



As the examples provided in chapters 2 through 9 demonstrate, a large part of the donor contributions in Phase I (see figure 1) have been used to bolster water resources institutions and to promote projects and analysis that improve water resources management. For example, in Africa ([chapter 2](#)), the WPP provided the data and analysis needed to promote the use of multi-purpose infrastructure to control floods, and provide food and energy to more people. In East Asia and the Pacific ([chapter 3](#)), the Program helped countries integrate adaptation into projects to mitigate disaster risks from floods and droughts. In Europe and Central Asia ([chapter 4](#)), the WPP defined sub-regional strategies for irrigation investments that will help the region become a key global supplier of grain, fiber, vegetables, and fruits.

Activities in water supply and sanitation comprise a quarter of all WPP funding, and have secured water and sanitation services for more than 50 million people, mostly in South Asia and Africa, where the access gap is the largest. In Latin American and the Caribbean ([chapter 5](#)), the WPP promoted the use of ICT platforms for better monitoring of water supply and sanitation services. In the Middle East and North

FIGURE 1. WPP PHASE I DISBURSEMENTS BY SUB-SECTOR



Africa ([chapter 6](#)), the WPP demonstrated low-carbon options for developing new sources for water supply, and supported better performance of service providers to ensure long-term sustainability, even in conflict-affected countries. In South Asia ([chapter 7](#)), the Program supported the design of tools to measure the progress of rural and urban service delivery in order to inform future projects.

In addition to strengthening project results in the Bank's six Regions, the WPP supports global analytical work ([chapter 8](#)) that responds to the need for more cross-sector planning and integration. The Program advances knowledge across a wide range of water-related topics, bolstering internal dialogue on issues like groundwater governance and public expenditure to help Bank teams do water better. The WPP also promotes new knowledge for sector practitioners across the globe on topics like water management for agricultural productivity, integrating climate change into water planning, and using integrated urban water management as a paradigm for cities. A list of selected WPP-funded knowledge products can be found in [annex 1](#).

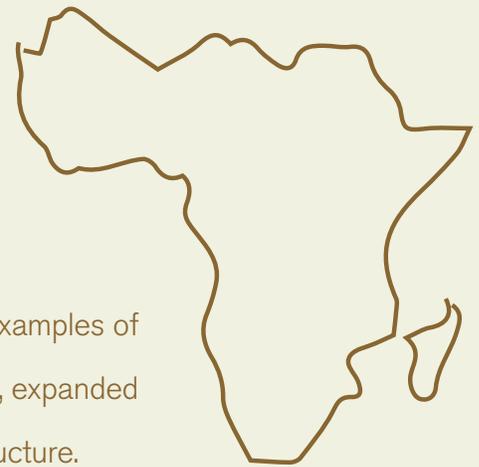
The WPP also brings global best practices to local challenges ([chapter 9](#)). Highly technical, country-specific support is provided through the WPP-funded [Water Expert Team \(WET\)](#). WET specialists have helped Bank teams provide support at critical stages of project implementation, from the most basic sanitation improvements to highly technical expertise on topics like land erosion, aquifer development, utility risk management, and climate change impacts on water.

As detailed in [chapter 10](#), WPP Phase II aims to further increase the added value of the Program by helping water abundant and water scarce countries define their long-term paths to [climate-resilient green growth](#). This will be achieved through the expanded size and scope of the Program and by concentrating more resources in key geographic areas.

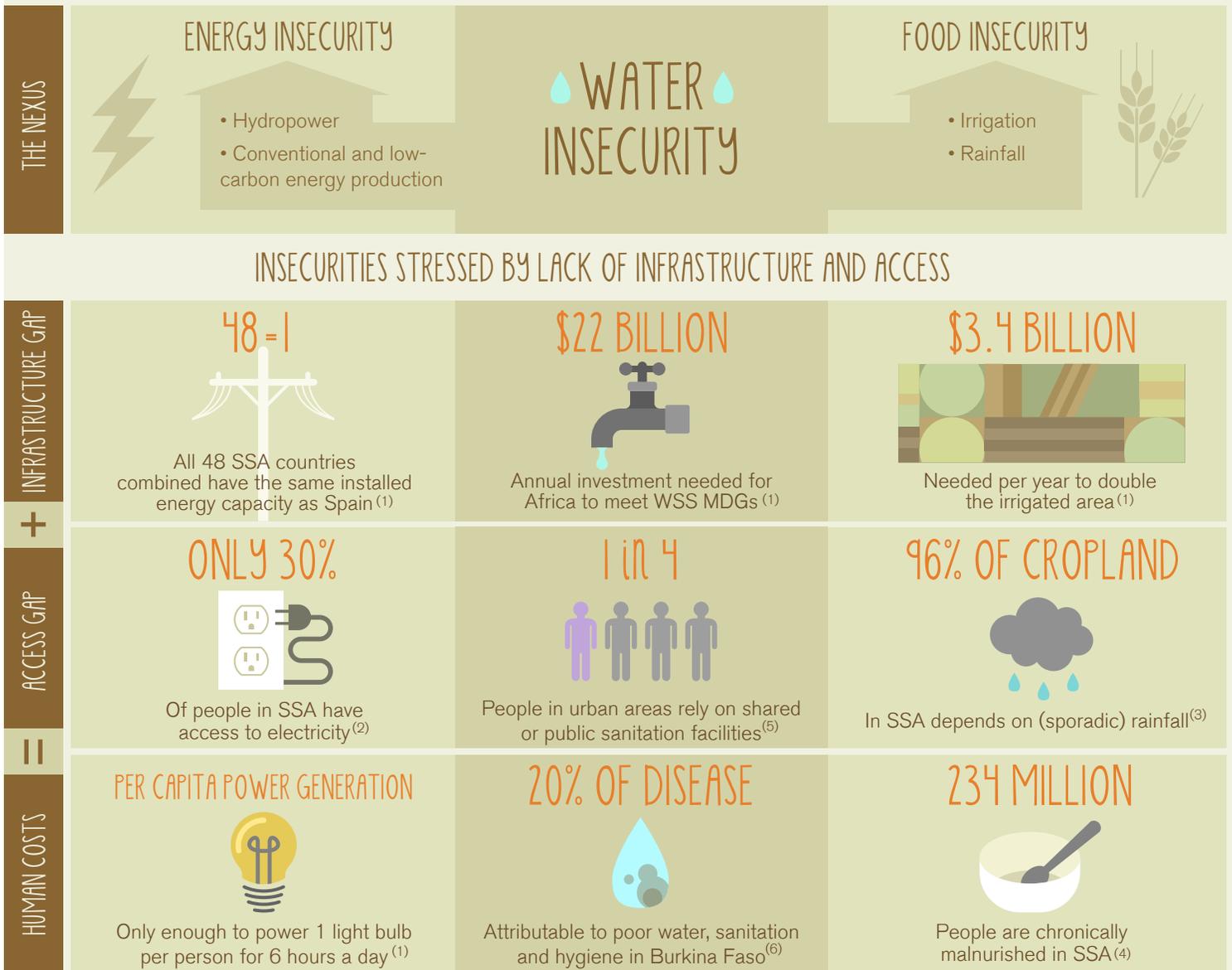
For more information on the financial details of WPP Phase I and the bridging period toward WPP Phase II, please see [annex 2](#).

# 2. Africa

The WPP assists countries in achieving progress toward their human development goals by planning for infrastructure and policies that translate into improved services for more people and higher economic growth. Examples of WPP activities include outlining the benefits of multipurpose dams, expanded irrigation, and more and better water supply and sanitation infrastructure.



## REGIONAL CHALLENGE: THE COSTS OF WATER INSECURITY IN SUB-SAHARAN AFRICA (SSA)



**Access to improved water supply and sanitation is a significant problem in sub-Saharan Africa. Indeed, nearly all countries in the world where less than 50 percent of the population has access to improved WSS are in the region.**

## THE WPP SUPPORTS THE DELIVERY OF IMPROVED WATER SUPPLY AND SANITATION SERVICES BY BOLSTERING SECTOR POLICIES, INFRASTRUCTURE, AND PERFORMANCE.

### POLICIES

**Cameroon:** Access to sanitation for the poor is a government priority after a WPP-funded study set the framework for a new national sanitation policy that was adopted by the government. A \$30 million credit was secured from the World Bank to carry out the strategy, which included providing access to sanitation in selected rural and urban areas, building capacity for better local planning, and carrying out financial and technical studies.

### INFRASTRUCTURE

**Zimbabwe:** The WPP helped identify priority medium- and long-term WSS interventions for small towns and rural growth centers. A WPP report recommended emergency works to restore services and avoid a repeat of the 2008 cholera crisis that killed 4,300 people. It also proposed a \$10 million investment in infrastructure in ten priority towns; filling the skills gap for services providers; and introducing management models that achieve economies of scale. The preliminary cost estimates for urgent rehabilitation needs will be used as a basis for budgetary allocation requests for small towns from the Ministry of Finance.

### PERFORMANCE

**Malawi:** A Water Sector Investment Plan (WSIP) provides a cost-benefit analysis of options for improving water services. The WSIP recommends universal access to water by 2025 and 87 percent access to sanitation by 2030 at a cost of \$1.8 billion (4 times current annual investment). The activity is informing the 2013-2014 budget and a \$450 million National Water Development Program supported by 8 development partners. \$100 million of this is designated to help Water Boards become financially sustainable by replicating performance improvements from Niger, Gabon and Senegal. These improvements will enable the Water Boards to secure the required investments.

“THE WPP-FUNDED ACTIVITIES HAD HIGH CLIENT OWNERSHIP. THE GOVERNMENT OF CAMEROON HAS OFFICIALLY ADOPTED THE SANITATION STRATEGY AND SIGNED A SECTOR POLICY LETTER. UNDER THE GOVERNMENT’S LEADERSHIP, OTHER DONORS ARE FOLLOWING THE PRINCIPLES AND PRIORITIES OF THIS STRATEGY TO ALIGN EFFORTS AND GUIDE FUTURE INVESTMENTS.”

- Meike van Ginneken, Task Team Leader, Cameroon Sanitation Strategy

WPP PHASE I RESULT: 17 MILLION BENEFICIARIES WITH IMPROVED WSS ACCESS IN AFRICA



## HOW THE WPP SUPPORTS WATER, FOOD AND ENERGY SECURITY FOR ALL

### Shared Hydropower Benefits

- A financial and economic analysis of the Kariba Dam fed into a \$13 million grant to explore shared hydropower potential between Zambia and Zimbabwe. The analysis helped the Bank break an impasse with the client countries on future infrastructure development, including dams.
- An approach to Integrated Water Resources Management was developed for Cameroon's Sanaga River Basin to include energy and water requirements of mining and agro-industry users who will benefit from the Lom Pangar hydropower project. Part of a \$393 million project funded by the African Development Bank will be used to support cooperation among institutions and to resolve conflicts between upstream and downstream users.

### WSS Services and the Poor

- A [report on Trends in Public Expenditure on WSS in sub-Saharan Africa](#) demonstrated how no country has been able to expand access without increasing public spending, yet public budgets for WSS are low and only two-thirds of the dedicated money is spent. Lessons learned, like the impact of public spending on reducing inequality, provide governments with the data needed to make tough investment decisions.
- A [comparative study of different private and public water service delivery models in Dar es Salaam, Tanzania](#), used beneficiary surveys, interviews, and performance data to demonstrate the models' relative impact on the poor.

### Human Water Security

- A [spatial accounting and forecasting tool called Africa RIMS \(Rapid Indicator Mapping System\)](#) has been developed for the Niger Basin. The tool provides metrics to evaluate planning scenarios to compare alternative water investments. The website, which provides custom maps and datasets, has been viewed 5,000 times in the first three months after it became public.
- An experiment using Africa RIMS looked at converting the large wetland in the Inner Niger Delta to non-irrigated or irrigated crop land. Results show that while both options increase run-off in the wet season (more shallow roots yield lower water storage), irrigation combined with a reservoir almost eliminates potential flooding and slows the on-set of floods compared to non-irrigated plots.
- With this tool, policy makers can more easily visualize the size, location, and impact of competing scenarios.



1 World Bank. 2009. "Power, Catching up" In Africa Infrastructure Country Diagnostic.

2 International Energy Agency (IEA). 2011. World Energy Outlook 2011. Paris, France: OECD/IEA.

3 World Bank. 2010. Improving Water Management in Rainfed Agriculture: Issues and Options in Water-Constrained Production Systems. Washington, DC: World Bank.

4 FAO, WFP and IFAD. 2012. The State of Food Insecurity in the World 2012. Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition. Rome: FAO.

5 AMCOW (African Ministers Council on Water). 2012. A Snapshot of Drinking Water and Sanitation in Africa – 2012 Update. AMCOW in collaboration with the WHO/UNICEF JMP for Water Supply and Sanitation.

6 Prüss-Ustün A, Bos R, Gore F, Bartram J. 2008. Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health. Geneva: WHO.







# PROMOTING WATER SAVINGS IN CHINA'S TURPAN BASIN

HOW THE WPP SUPPORTS INNOVATION AND ADAPTATION

## THE CHALLENGE

- China's arid Turpan Prefecture is water-scarce
- Farmers use groundwater to irrigate crops and extraction has been rising
- Commercial irrigated areas are expanded despite lower groundwater tables

## THE SOLUTION

- Account for crop consumptive use in water allocations
- Develop approaches to minimize evapotranspiration (ET) (losses to the atmosphere from evaporation/plant growth)
- The WPP supported the design of a new ET-based water rights system to quantify this use and thus save groundwater from over-exploitation



1988

The Water Withdrawal Permit System is introduced in China, supporting water conservation



2002

China adopts Water Law requiring water allocation based on consumptive use



2004

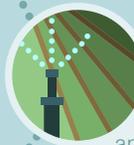
GEF finances the Hai Basin Integrated Water and Environment Management Project, through which the "water resources savings" concept is developed



2010

\$100M

The WB approves 7-year Xinjiang Turpan Water Conservation Project incorporating ET experience in the Hai Basin



2012

The WPP supports a framework for implementing an ET-based system, the first in the world, in the Turpan Basin



2011 - 2020

The Bank will support a country-wide Water Permit System by scaling up consumption-based water management strategies in other basins

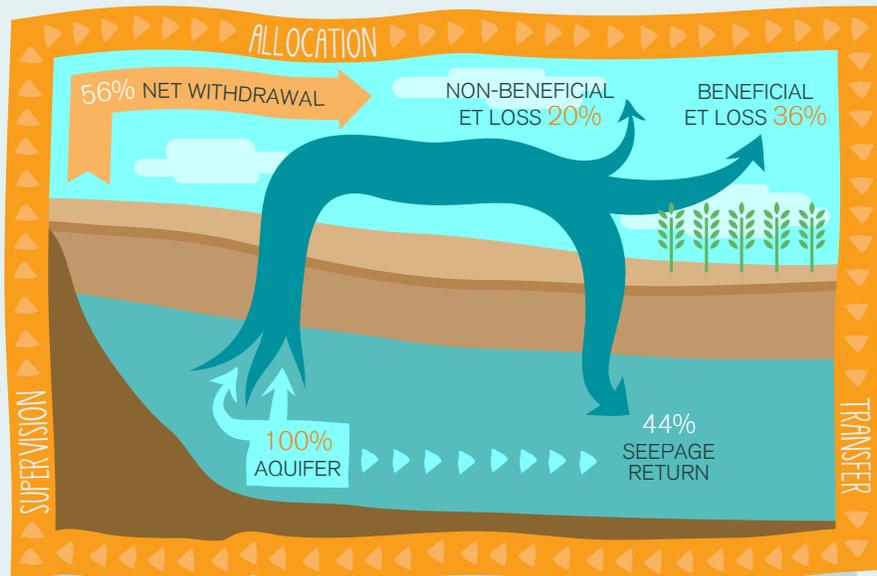


66% of annual water withdrawn in the Turpan Prefecture is groundwater



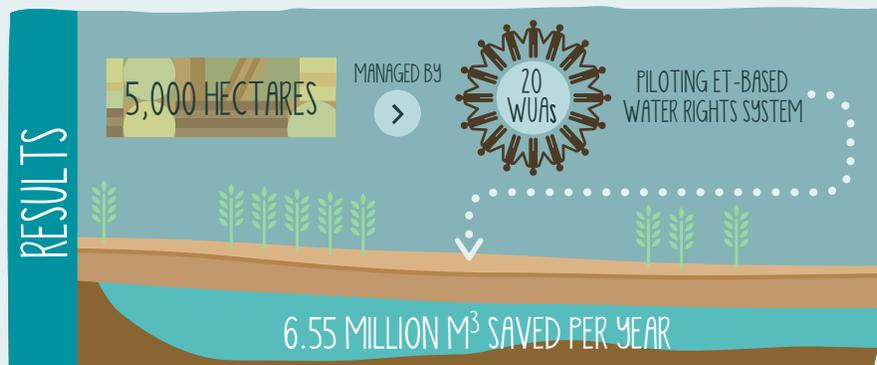
96% of water in the Turpan Prefecture is used for agriculture

## WHAT IS AN ET-BASED WATER RIGHTS SYSTEM?



Reproduced from: World Bank. 2012. Evapo-Transpiration (ET) - using ET to manage water. Washington DC; World Bank Institute.

The allocation of water from a river basin to a Water Users Association (WUA) accounting for all water uses, including ET. The system includes management, monitoring and supervision to optimize the allocation of water and specifies rights to withdrawal, use and return flows.









# POLLUTION CONTROL IN THE ADRIATIC SEA: HOW THE WPP ADVANCES LARGE-SCALE REGIONAL INVESTMENTS



## THE CHALLENGE



The Adriatic Sea faces important pollution challenges which cannot be addressed by countries acting alone

Four EU candidate countries must comply with environmental regulations<sup>1</sup>

## SAFEGUARDING THE BENEFITS OF THE ADRIATIC SEA:



### TOURISM

15 million visitors per year  
= €14 million in revenue

### MARITIME

19 seaports handle 1 million+ tons of cargo per year

### ECOSYSTEM

7,000 animal and plant species many of which are endemic

## THE SOLUTION:

### STEP 1: PROJECT APPRAISAL 2011

- A) A WPP study identifies 6 hotspots in the Eastern Adriatic where pollution loads are highest



- B) The total cost to meet EU standards is found to be:

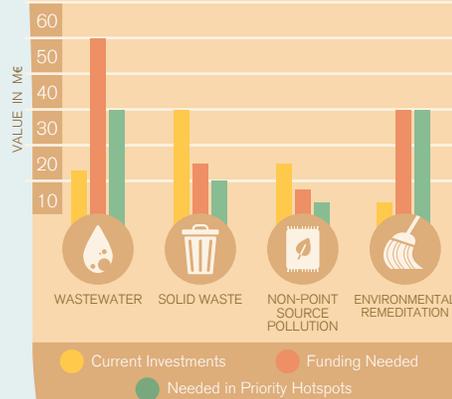
€1.76 B

Of which €404 M is for hotspots

### STEP 2: PROJECT PREPARATION 2013

- A) Croatia and Bosnia & Herzegovina design pilot projects with \$79 million in donor funding including \$6.8 million from the World Bank

#### BOSNIA AND HERZEGOVINA



- B) World Bank develops Adriatic Sea Environment Program (ASEP) for all Eastern Adriatic riparian countries

**ASEP**

### STEP 3: PROJECT IMPLEMENTATION 2013-2018



<sup>1</sup>Albania, Bosnia & Herzegovina, Croatia (which joined the EU on July 1, 2013), and Montenegro.



# AN IUWM DIAGNOSTIC FOR TEGUCIGALPA

HOW THE WPP SUPPORTS SUSTAINABLE CITIES

## WHAT IS IUWM?

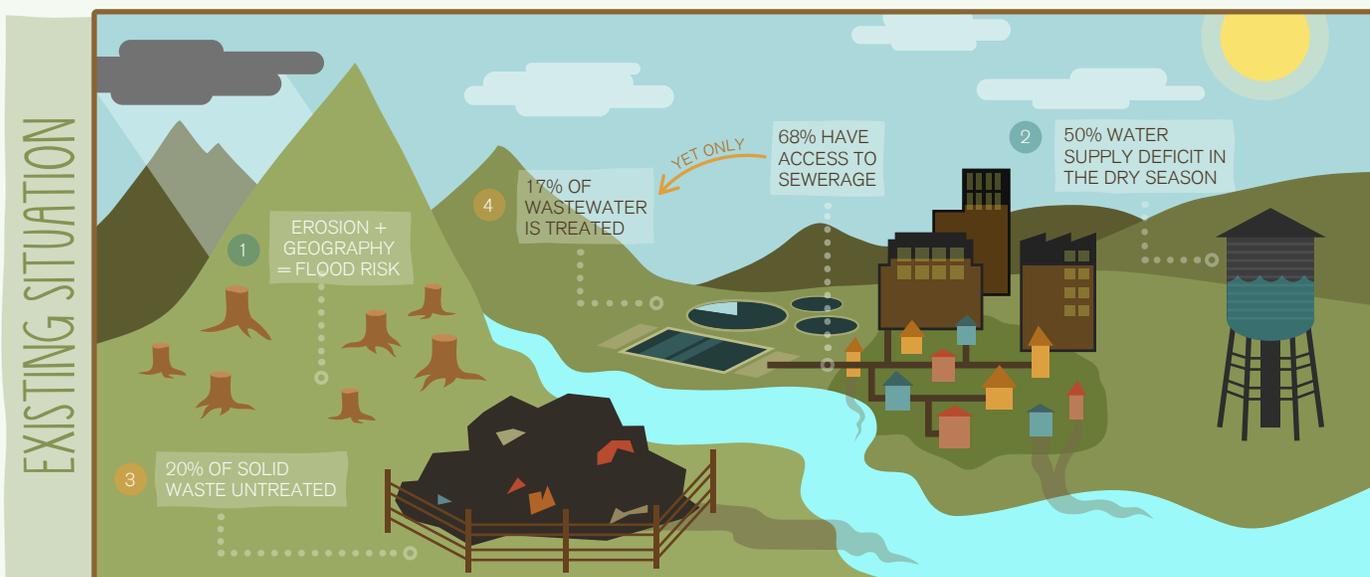
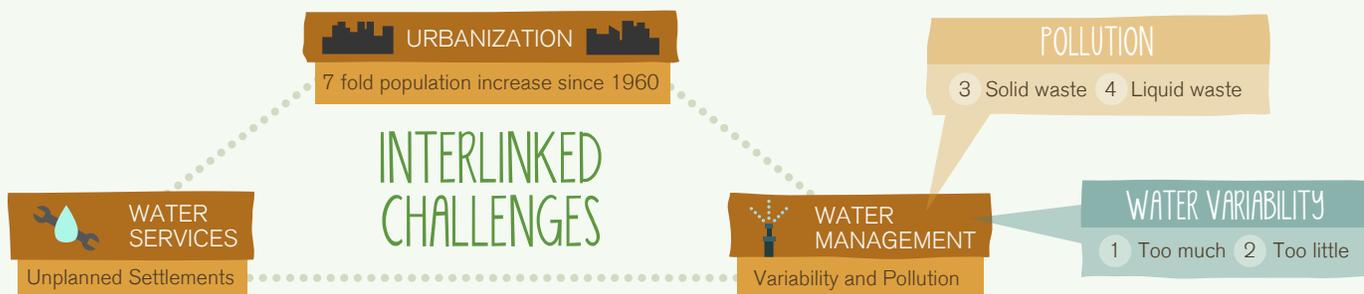
Integrated Urban Water Management (IUWM) is an approach that helps municipal actors assess the tradeoffs between water uses for urban development and water resources management at the river basin level.

## WHAT KIND OF SUPPORT DOES IUWM PROVIDE?

It helps to identify cost-effective technologies, policies, and tools to improve sustainable provision of water services, reduce disaster vulnerability, and protect the environment.

## WHAT COMPONENTS DOES IUWM ENTAIL?

The IUWM framework requires collaboration across sectors and municipalities. Partners create institutional setups, investment strategies, and mechanisms for water management, treatment and service provision systems as a whole, while synchronizing elements of the urban water cycle, land use, and basin management.





## STRENGTHENING AND MODERNIZING HYDROMET SYSTEMS

**Dominican Republic:** The WPP helped to strengthen and modernize the water resources monitoring and analysis system managed by the Dominican Republic's National Water Resources Institute (INDRHI). It also helped develop an inventory of the hydromet stations in the country. The activity identified where new stations were needed, and proposed a budget and technical specifications.

This activity leveraged \$5 million in additional financing under the existing Emergency Recovery and Disaster Management project to implement recommendations that ranged from upgrading the observation network to bolstering its data processing capacity. As a result, INDRHI is becoming more integrated with the national early warning system network for disaster preparedness and response.



## HOW THE WPP SUPPORTS SUSTAINABLE WATER SERVICES IN LCR

### **Technology and Rural Development**

In Central America, the WPP helped to create the Rural Water and Sanitation Information System (SIASAR), an innovative information system to monitor rural water and sanitation development and service quality through performance indicators that are aggregated at several geographic levels and implemented in three countries: Honduras, Nicaragua, and Panama.

SIASAR will also support the upcoming rural infrastructure project in Honduras, a multi-sector infrastructure project to improve the access, quality, and sustainability of WSS services. This \$47 million project will benefit 70,000 people.

The WPP implemented the first phase of the SIASAR initiative influencing three World Bank projects (\$99 million in lending) and benefiting more than 222,000 people in the three countries.

### **Tapping into effective wastewater reuse for irrigation**

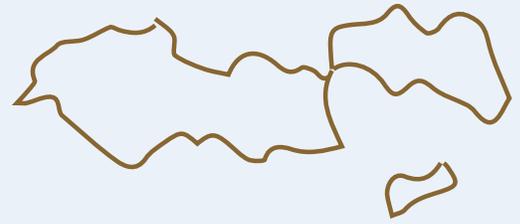
Through the development of a national environment strategy, the World Bank, with the support of the WPP, is helping the government of Bolivia to identify the potential of developing country-wide effective and reliable wastewater reuse systems and technologies for irrigation.

The WPP supported a national economic and technical feasibility study of various technologies for wastewater reuse for agriculture. As a result, two case studies in the urban areas of Cochabamba and Tarija generated the design and development of reservoir storage systems for several crop options.

The activity is already informing the Bank's Lake Titicaca Sustainable Development project (\$1.5 million) at the identification stage and similar technology could be implemented in Viacha.

The activity is also helping to scale-up the wastewater reuse agenda in Bolivia by facilitating coordination of stakeholders at the national and local level. As part of the scaling-up process, the government, in partnership with the World Bank's Water and Sanitation Program, will work to strengthen the institutional capacity for wastewater management in peri-urban areas and small towns in Bolivia.

# 6. Middle East and North Africa



The WPP helps countries improve their understanding of current and future water resources availability. Through an array of activities, clients and Bank staff explore options for overcoming the most pressing supply and demand management challenges to help guard against an uncertain future.

## A REGIONAL SNAPSHOT

The WPP supported a comprehensive, regional study that assesses water availability and demand projections up to 2050. The analysis includes the impacts of climate change on water resources, the identification of various options to meet supply needs and the associated marginal costs. The gap between the supply of and demand for water is expected to increase five times by 2050, from today's 42 km<sup>3</sup> per year to approximately 200 km<sup>3</sup> per year (see figure 3 and 4). The cost for closing the water gap is estimated at \$104 billion per year and could go as high as \$420 billion a year if no demand management options are adopted.

THE GAP BETWEEN THE SUPPLY OF AND DEMAND FOR WATER IS EXPECTED TO INCREASE **5X**

FIGURE 3: REGIONAL UNMET WATER DEMAND PROJECTIONS BY USE, 2000-2050

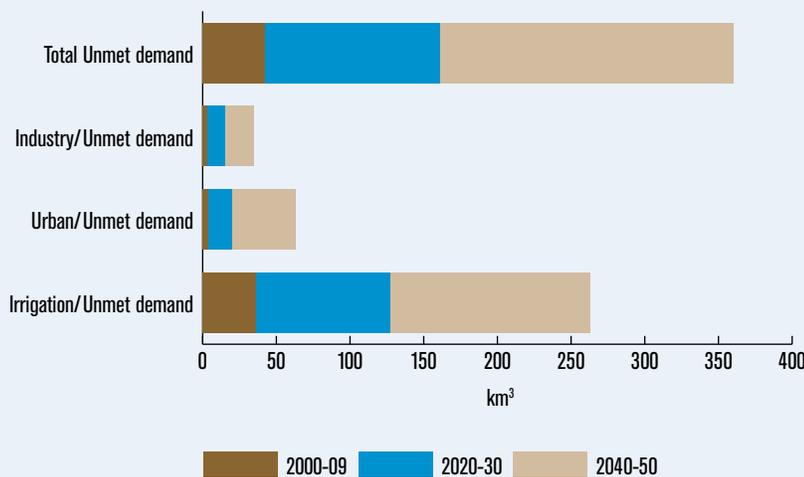
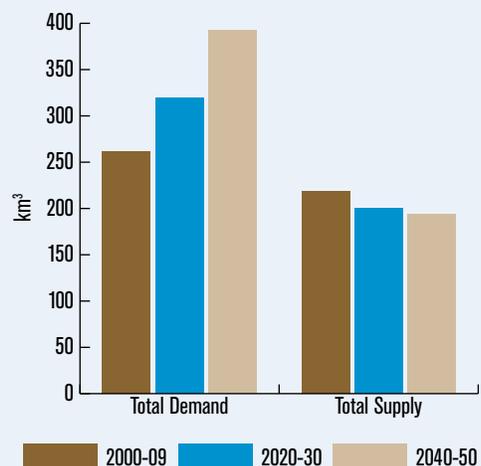


FIGURE 4: REGIONAL WATER SUPPLY AND DEMAND PROJECTIONS, 2000-2050



Source: FutureWater. 2011. Middle-East Northern Africa Water Outlook. Final Report, W. Immerzeel, P. Droogers, W. Terink, J. Hooogeveen, P. Hellegers, and M. Bierkens (auth.). Future Water Report 98. Wageningen, the Netherlands; FutureWater.

As water scarcity increases, countries must find new, unconventional ways of meeting the water supply gap.

## LOW-CARBON DESALINATION PROVIDES NEW WATER SOURCES

Renewable energy desalination is one solution for adapting to the changing climate while meeting growing water demands. A WPP study proposes closing the region's water gap through desalination run on renewable energy rather than conventional fossil fuels. The strategy seeks to promote both energy and water security by capitalizing on two of the region's abundant resources: solar energy and seawater.



## WATER REUSE FOR AGRICULTURE

The WPP supported the Bank's task team working in the Nile delta and the government of Egypt's Holding Company for Water and Wastewater (HCWW) to assess the most cost-effective strategies for providing sanitation that protects the public health of downstream communities. As part of this effort, a WPP-funded study explores the relative health impacts of different wastewater management strategies to shift from on-site to networked sanitation in four governorates where the Bank has wastewater operations. The methodology used in the study, the Quantitative Microbial Risk Assessment (QMRA), provides realistic options for reducing the incidence of disease with associated costs and benefits. The report is already helping the team to apply 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.

## IRRIGATION MODERNIZATION AND WATER AVAILABILITY

All agriculture in Egypt is irrigated, providing employment for 30 percent of the workforce. Climate change and rising demand for water from agriculture and other sectors are putting increasing pressure on the flows of the Nile, Egypt's only renewable water resource. As input to an ongoing Government program on irrigation modernization supported by the World Bank, a WPP-financed study assessed the effects of modernized water conveyance and distribution systems, including modernized farm-level canals, on water availability (including quantity, quality, reliability and equity) and crop yields in selected areas of the Nile delta. The study's approach consisted of an innovative combination of field-based observations, remote sensing, and hydrological modeling. Based on the available data, the study concluded that farm-level modernization did not necessarily lead to substantial improvements in water availability and yields. More farm-level monitoring of key parameters will be needed, in particular with regard to canal flows, groundwater levels, water quality, and other factors (besides irrigation water) affecting crop growth.



## COUNTRY SPOTLIGHT: JORDAN

Countries with severe water scarcity have less than 500 m<sup>3</sup> of water available per person per year. People in Jordan have only 110 m<sup>3</sup> cubic meters of water available. Over time, the country's agricultural sector has been consuming more of the resource yet contributing relatively less to economic growth.

### STRENGTHENING IRRIGATION WHILE PROTECTING THE POOR

**Challenge:** The Jordan Valley Authority (JVA) manages irrigation service delivery throughout Jordan. As with many irrigation service providers in other parts of the world, water tariffs are not high enough to allow the JVA to recover its operation and maintenance costs. Jordan's Ministry of Water and Irrigation approached the World Bank for assistance in determining the tariff levels needed to ensure that the JVA could cover its costs.

**Solution:** The WPP funded a study to determine the cost of water for irrigation in the Jordan Valley and estimate the impact of increasing water prices (based on different levels of cost recovery) on farm incomes. The study team made a number of recommendations to improve the financial sustainability of the JVA, including ways to improve revenues and efficiencies in irrigation water service delivery, as well as improving the environment in which farmers in the Jordan Valley operate.

## PRICING IRRIGATION WATER IN THE JORDAN VALLEY – WPP STUDY OVERVIEW

### Findings

- ▶ No tariff adjustment since 1994
- ▶ Revenues are unpredictable; JVA is highly dependent on government transfers
- ▶ 2010 revenues covered 20% of operating and maintenance (O&M) costs
- ▶ O&M costs are on the rise due to delayed investment, higher energy costs, and JVA's new responsibilities for pumping water to Amman
- ▶ Improved billing and collection will help, but tariff and/or government subsidy increases will be necessary to cover the current shortfall

### Impacts on Agricultural Productivity

The low tariffs on water for irrigation as well as the decline in real tariffs over the past two decades have affected farmers' decisions regarding the crops they plant in the Jordan Valley. In general, agricultural productivity has increased rapidly in the past two decades by expanding the area planted in the Jordan Valley as well as relying increasingly on new farming and irrigation technologies (most notably the introduction of greenhouses and drip irrigation technologies). Yet, cropping patterns have changed relatively little over time, and in the case of vegetables (the area's main crop) a trend towards less diversification has been noted.

### Developing a Pro-Poor Strategy

**17 percent of farmers in the area are poor.** If irrigation water subsidies are dismantled, the WPP study recommends measures to protect the poor from financial losses, such as cross-subsidies or direct income support. However, the design of such policies will have effects on water use and productivity in the Valley, and their potential long-term distortions should be carefully considered and compared.



India's rice yield per hectare is just 45% of China's and the rate of growth in agricultural productivity is falling.<sup>1</sup> Assessing the impacts of productivity interventions, such as more efficient water allocation, will help support the 75 percent of families in India that depend on rural incomes.

<b>Bank Project Evaluated with WPP Support</b>	<b>Uttar Pradesh Water Sector Restructuring Project</b>  <b>Component Value: \$150 million</b>	<b>Tamil Nadu Irrigated Agriculture Modernization and Water Bodies Management Project</b>  <b>Component Value: \$52 million</b>
<b>World Bank Project Objective</b>	Sustainable improvements in irrigation and drainage infrastructure and agricultural productivity with an aim to increase agricultural output by 68% in the project area.	Increase productivity in irrigated agriculture; Change management process in order to help sector officials to better consult with water users associations for improved decision making
<b>WPP Evaluation Tool</b>	Remote Sensing	Impact Evaluation: randomized control trial in 40 villages, 500 farmer interviews
<b>WPP Findings</b>	Before and after data showed increased crop productivity at specific locations, which is key information for garnering political support for future projects.	Villagers perceived that project officials who had training were more likely to: visit villages more frequently; meet more stakeholders, including small and marginal farmers; spend more time answering questions; provide more information; and listen and respond at higher levels to inputs from women.
<b>Impact</b>	The methodology was provided to the State Remote Sensing Department and other state authorities for future analysis. Results were used to design a new project component estimated at \$350 million; 5 Bank teams will use the approach in ongoing and pipeline projects.	This pioneering work has systematically assessed the impact of change management interventions on human behavior and how it is perceived by end users of public services. The evidence was presented at an international workshop, prompting several other states in India to request support for applying this model.



1. Oklahoma State University. 2009.

The quality of water supply, sanitation, and irrigation services is low and sector institutions are underperforming. The performance of service providers, policies and projects needs to be evaluated to identify bottlenecks and challenges.

### WSS INVESTMENTS

Government officials in Maharashtra, India, were interested in evaluating the effectiveness of their next investment project in the water supply and sanitation sector, which is estimated at \$225 million. The WPP funded a study to assess the feasibility of using impact evaluation (IE) as the primary tool for evidence-based results. A new road map will help integrate IE into program design, which will allow the team to develop a baseline against which performance targets can be measured.

### UTILITY PERFORMANCE

A study was commissioned to determine if ISO 9001 certification would be a compatible indicator for determining a water utility's institutional sustainability. Application of the theory to two utilities in South Asia demonstrates the limitations of ISO 9001, and has led the team to develop a conceptual framework for a new Water Maturity Model to be applied specifically to utilities in developing countries during future Bank projects.

### IRRIGATION SERVICE DELIVERY

A study on the use of public, private, and combined irrigation systems across 16 states in India revealed that, by increasing the number of cropping seasons, irrigation has a substantive impact on plot-use intensity, land prices, and land productivity. Plots with access to a combination of public and private irrigation fare better than plots with access to only one.

### WATER FOR SMALL TOWNS

Two million people living in Sri Lanka's 400 small towns need new or improved water supplies. The WPP funded a strategy and guidelines to direct small towns (up to 15,000 people) to design, build, operate, and maintain their own systems with financial and technical support from local governments. Historically underfunded, small towns provide a buffer against mass scale urban migration, reducing potential pressure on urban infrastructure.



## COUNTRY SPOTLIGHT: BANGLADESH

### PARTNERSHIPS FOR RESPONSIBLE SOURCING

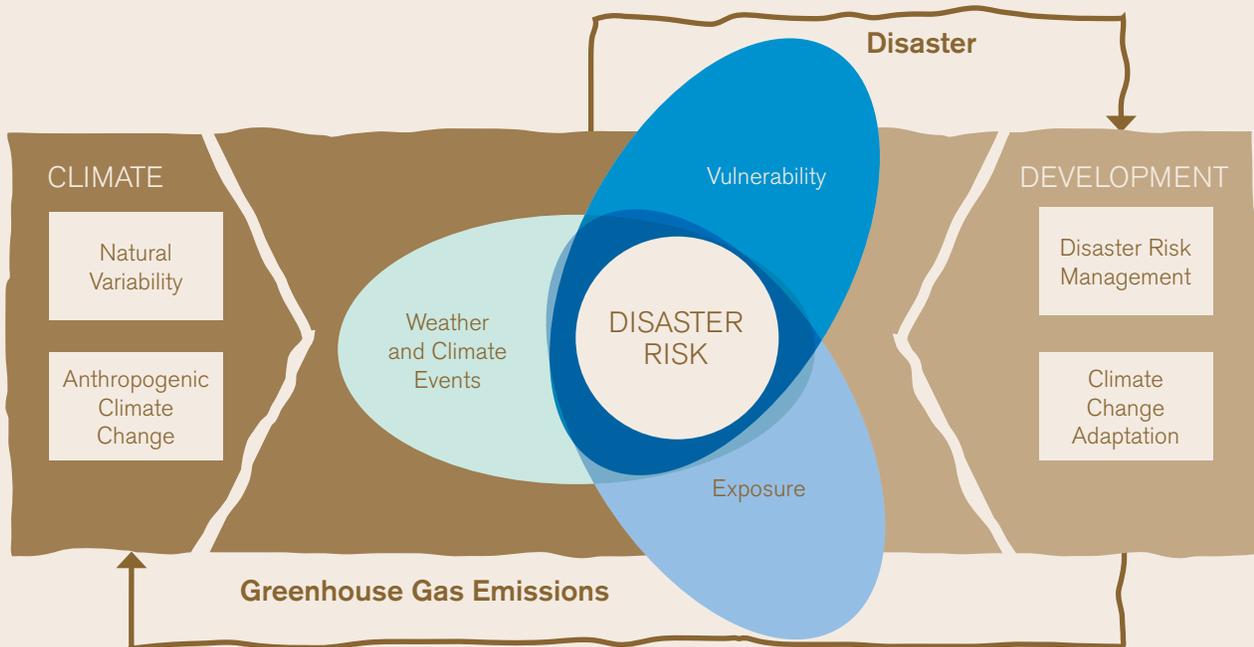
The government of Bangladesh is committed to promoting cleaner production in its textile industry through improved monitoring down the supply chain. China, which has been successful in ensuring more responsible sourcing by partnering with NGOs and multinationals (including Walmart, GAP, and Li Fund), shared its experiences with Bangladesh through a WPP-funded activity. By following in China's footsteps, Bangladesh could reduce water and energy used in a typical cotton dyeing mill by 25 percent and 30 percent, respectively. All costs for these initiatives would be recovered within eight months.

### ADAPTATION IN THE SUNDARBANS

Over the next 100 years, Bangladesh is going to experience several human- and climate-induced impacts. Among them is an estimated 3 to 4 meter rise in the coastal sea level. The WPP funded a study on the ecologically diverse Sundarbans to identify options for flood protection and climate change adaptation. The report estimates that the cost of environmental damage associated with ecosystem degradation in both Bangladesh and India is equivalent to 5 percent of GDP. The government of India has responded by allocating \$1 billion to assist the state government of West Bengal in construction, restoration, and compensation efforts in the highest priority areas.

The WPP report suggests reducing ecosystem and human exposure to hazards by improving disaster risk management and strengthening natural structures that provide adaptive services (see figure 5).

FIGURE 5: UNDERSTANDING DISASTER RISK



Source: Reproduced from: IPCC, 2012: Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 3-21.

# 8. Global Tools for Local Development

The WPP enhances the Bank's capacity to address global water challenges by promoting knowledge-based and cost-effective approaches in the urban, environment, energy, agriculture, climate change, water supply and sanitation and disaster risk sectors.

The Program has supported water practitioners in numerous ways. Internally, it has been instrumental in generating guidance tools to mainstream climate change into water projects and drive strategic work

to leverage the impact of the Bank's water portfolio. Externally, it has contributed to developing research and readily available tools to improve data collection as well as close knowledge gaps as a way to promote better project design. This chapter highlights WPP activities that address some of the global challenges related to climate change and climate variability, greenhouse gas (GHG) emissions, agricultural productivity, public spending on water supply and sanitation, groundwater governance, and urban water management.

## CHALLENGE

**Small changes in temperature can have a large impact on the hydrologic cycle and alter the availability of water resources. For some populations, weather extremes may lead to disaster.**

## WATER SMART SOLUTIONS TAKE CLIMATE VARIABILITY INTO ACCOUNT

Data and analysis of climate trends and adaptive capacity play a crucial role in screening climate risks and mainstreaming climate change adaptation into water policy and investment agendas. The WPP supported the World Bank in creating a [Climate Change Knowledge Portal](#), an online tool that provides access to readily accessible, comprehensive global and national climate-related data and development information. The main features of this tool include:

- Spatially referenced data built on a Google map interface that integrates historical climatology,

climate change projections, and other climate-related information; and,

- World Bank and external datasets related to agriculture, water runoff projections, natural disasters, socioeconomic indicators, and low carbon growth studies.

The portal allows a wide range of users to evaluate comprehensive scientific climate information and country risk and adaptation profiles to incorporate climate change considerations into water-related projects or policy planning and decision-making.



## CHALLENGE

**A decade ago, the contribution to greenhouse gas (GHG) emissions from reservoirs was estimated at up to 7 percent of total emissions from all sources. Today, approaches to measure the magnitude of GHGs released by reservoirs are highly heterogeneous yielding contrasting results on the net the GHG footprint.**

## HELPING BANK TEAMS ASSESS GHG EMISSIONS FROM RESERVOIRS

The WPP supported the World Bank in providing an interim guidance note for Bank staff to assess GHGs from reservoirs for the preparation of dam infrastructure projects. The research tool explores state-of-the-art knowledge with an emphasis on the major biochemical processes that are initiated in the construction of dams downstream and of reservoirs upstream.

The note aims to encourage further dialogue among the World Bank and other leading institutions (such as the International Energy Agency, the UNESCO/International Hydropower Association, and other multilateral development banks and research programs) in updating research and information as well as harmonizing guidance on biochemically generated GHGs from reservoirs. The interim technical note will also benefit Bank task teams working on dam infrastructure projects.

## CHALLENGE

**More than 80 percent of the world's cropped area depends on rainfall. Long dry spells and intense droughts and floods may stress crop productivity. Even in good rainfall years, water may be a key constraint for agricultural productivity.**

## SUPPORTING SMART WATER MANAGEMENT FOR SUSTAINABLE AGRICULTURE

The WPP supported the World Bank flagship report Improving Water Management in Rainfed Agriculture that comprises a set of broad approaches and a variety of measures to scale up improvements of in-field and structural soil and water management techniques. Other innovative approaches are covered in the report, such as payments for environmental services and risk-sharing strategies.

The report identifies the barriers to implementing the proposed approaches and suggests the use of watershed-based models combined with economic models to estimate the impact of interventions for designing cost-effective approaches.

## CHALLENGE

**Around 2.5 billion people still lack basic sanitation. Although large investments are required to tackle this problem, more spending does not necessarily translate into better WSS services.**

## IDENTIFYING THE CHALLENGES AND OPPORTUNITIES OF PUBLIC EXPENDITURES IN THE WSS SECTOR

The WPP supported the World Bank in preparing a guidance note with recommendations for Bank professionals conducting Public Expenditure Reviews (PERs). The recommendations helped to introduce consistency into the evaluation of public resources allocated to WSS services. It also helped to increase knowledge of public expenditure issues in the sector.

Drawing from a number of case studies, the note also provides practical recommendations made in WSS PERs across a range of contexts and national income levels. Identified challenges often involved in conducting PERs are also covered, including the methodological factors and data issues particular to the WSS sector, and the impact of PER findings on sector policy and reforms.

Today, 43 percent of global irrigation, 50 percent of the world's drinking water supply, and a substantial share of global industry depend on groundwater resources. Unsustainable exploitation of groundwater resources and poor governance represent a risk to the quality and quantity of these resources.

## MANAGING A SCARCE AND VALUABLE RESOURCE

The WPP supported analytical work regarding the political economy challenges that groundwater governance entails, while considering the complex and invisible nature of the resource. The study examines:

- The operationalization options and constraints around three governance approaches: rights and regulatory mechanisms; the use of the incentive system; and subsidiarity and support to local water management; and,

- Country and transboundary case studies drawn from a broad review of issues, challenges, and lessons in Morocco, India, and sub-Saharan Africa.

The report aims to inform the Bank's groundwater portfolio and be a source for policy makers and water practitioners to improve groundwater management with appropriate and specific governance options to specific country challenges.

Rapid and unplanned urban growth, climate change, and relatively poor water management practices impact a growing number of cities across the world generating problems from water scarcity and pollution to inadequate service provision and greater flood risk.

## PROMOTING INTEGRATED APPROACHES TO CITY WATER CHALLENGES

Integrated Urban Water Management (IUWM) is an emerging concept that seeks to resolve the myriad challenges that a city faces with regard to water quantity, quality, allocation, and use by various sectors. IUWM approaches include novel technologies for new urban clusters to decentralize infrastructure and diversify water sources. It also involves economic costs considerations, flexible, adaptive institutional and stakeholder participation frameworks, and models to improve institutional coordination across urban sectors.

The World Bank and the WPP have been instrumental in promoting IUWM through the piloting,

operationalization, and scale-up of IUWM activities in 38 cities across more than 27 countries in sub-Saharan Africa (AFR), Eastern Europe and Central Asia (ECA), and Latin America and the Caribbean (LCR). Although the scope of activities differs in each region, approaches complement each other to provide cross regional evidence-based knowledge on the advantages and potential challenges of conceptualizing and implementing IUWM (see box below). These efforts are now contributing to the inclusion of IUWM principles in current and future World Bank urban water development projects.<sup>1</sup>

1. For more information, please refer to the WPP's synthesis report "Integrated urban water management: lessons and recommendations from regional experiences in Latin America, Central Asia, and Africa".

## IUWM ACTIVITIES BY REGION (SELECTED EXAMPLES)

Region	City/Country	Population	WPP Activity
AFR	Mbale, Uganda	91,800 population (2011); 200,000 estimated daytime population (2011); Projected population growth rate: 4% annual	Integrated Urban Water Management in Africa – In-Depth Analysis of Water Management Challenges in Selected Cities

### *Main Water Challenges at the Catchment Level*

- Lack of a strong watershed management strategy to secure the city's surface river sources
- Water scarcity and supply deficit during the dry season stressed by human activities in upstream catchments
- Unauthorized abstraction, pollution, and competition from upstream settlements along the Nabijo and Nabyonga rivers
- High risks of health and groundwater pollution due to inadequate sanitation and drainage

### *IUWM Opportunities*

- A structured approach to map boundaries of future urban clusters; identification and prioritization of additional water sources development; selection of appropriate treatment technologies promoting integrated solutions for water use; and assessment and balance of water flows and polluted fluxes within the IUWM strategy
- A roadmap for strategy implementation that includes steps to gather key information; create stakeholder platforms; identify champion projects; and design and develop demonstrations

Region	City/Country	Population	WPP Activity
ECA	Baku, Azerbaijan	3 million in Greater Baku Area (GBA) (2010); Population growth: half a million since 1998, approximately	Cost of IUWM Strategies for Baku, Azerbaijan

### *Main Water Challenges at the Catchment Level*

- Pollution from industrial, mining and municipal waste is degrading water supplies for 11 million people in the catchment area
- Low precipitation and high evaporation rates
- Heavy water demand from growing agricultural and industrial activities, which are also contributors of the basin's water pollution

### *IUWM Opportunities*

- Identification of potential economic benefits and proposed methodologies to developing the water sector and improving sector services in the GBA for 2012-2025
- Selection and sequencing of policy decisions and investment plans for closing the supply-demand gaps and alternatives for water allocation and drinking water based on the Water Evaluation and Planning System Model (WEAP)
- Ten development goals from four scenarios to be achieved by 2025 by prioritizing performance improvement of water services through the rehabilitation of the water distribution, sewerage and storm water networks

## IUWM ACTIVITIES BY REGION (SELECTED EXAMPLES) CONTINUED

Region	City/Country	Population	WPP Activity
LCR	Asuncion, Paraguay	2.2 million (2010) in Greater Asuncion	Piloting Integrated Urban Water Resources Management in Key Latin American Urban Areas - Case Study: Asuncion, Paraguay

### *Main Water Challenges at the Catchment Level*

- Lack of compliance with the existing Sector Legal Framework; lack of policy integration in the WSS sector; and rigid and overambitious environmental standards that constrain investment in sewerage
- Disparity of water supply coverage in the metropolitan area, ranging from 96.3% to 64%; and low sewerage coverage
- Lack of wastewater treatment with collected effluent being directly discharged into the Paraguay River
- Low efficiency in the collection and treatment of solid waste and drainage, associated problems contributing negatively to the quality of water resources

### *IUWM Opportunities*

- A proposed framework and an integrated strategy for urban water management in Metropolitan Asuncion that includes: the preparation of an urban development master plan; a drainage master plan development and a solid waste master plan to integrate water supply infrastructure expansion; and water losses reduction and institutional strengthening
- Leverage in funding under the Bank's Water Sector Modernization project with the National Water Utility (ESSAP) and the Japanese International Cooperation Agency on a water loss reduction program, an IDB-financed (\$4 million) drainage master plan project; and donors' contributions, such as the UNDP, UNICEF, and the Spanish Agency for International Cooperation to build a robust institutional strengthening program for the sector



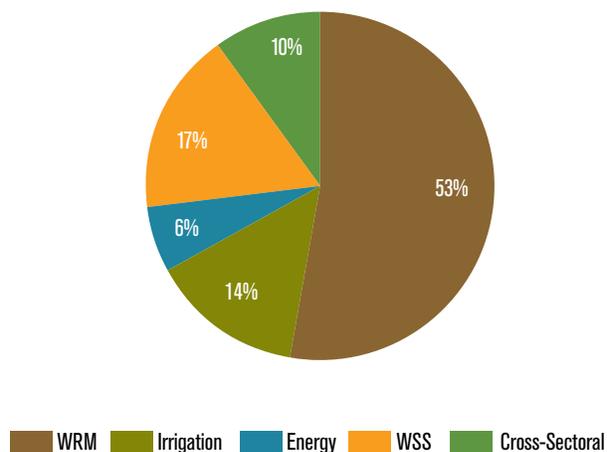
# 9. Water Expert Team

The Water Expert Team (WET) is a technical support service that mobilizes high-level expertise to support World Bank operations. During WPP Phase I, the WET supported 32 countries through 40 activities. Each activity was designed by the WET team in response to a client and Bank team request for expert assistance on a technical topic. The WET fielded dozens of experts across all six Bank regions in a variety of water-related specializations.

The WET has provided just-in-time transformative support to key World Bank projects, which has helped Bank teams respond to several critical water challenges, from supporting the most basic sanitation improvements to providing highly technical, forward-looking expertise in wastewater treatment, and surface and groundwater hydrology.

More than half of the \$870,000 budget was used to support general water resource management projects, with the remainder spread across irrigation, energy, water supply and sanitation, and cross-sector projects (see figure 6). Moreover, about 30 percent of WET funding requests identify climate change assessment

FIGURE 6 - PHASE I WET DISBURSEMENTS BY SUB-SECTOR



or technical support as a key objective of the proposed task.<sup>1</sup> This chapter provides illustrative examples from WPP Phase I activities across these sectors.

## CHALLENGE

**Bank clients need to focus on day-to-day operations and project progress while at the same time think about and plan for future water needs. Ministries and service providers often lack the time, personnel, and technical know-how to delve deep into new challenges.**

## WET EXPERTISE INFLUENCES \$500 MILLION LOAN FOR LAND AND WATER MANAGEMENT IN NIGERIA

Southeastern Nigeria suffers from severe gully erosion, a characteristic problem caused by surface runoff often aggravated by inadequate land-use practices that leads to soil degradation and loss of land. Erosion results in severe negative impacts on built and natural assets, requiring multi-sector solutions that take into account hydrology, engineering, soil science, climate variability, and agronomy, among others.

The Bank is supporting a \$500 million Nigeria Erosion and Watershed Management project to help address this issue. To assist the Bank project team, the WET provided a geotechnical engineer to work with the Ministry of Environment to ensure that engineering plans met international and World Bank standards. The expert reviewed the design and tender documents, provided suggestions for innovative approaches to improve slope stability, and developed an initial investment plan for \$150 million including cost estimates and proposed implementation arrangements.

1. Based on WET staff calculations. Climate change is a theme and not a sub-sector for the World Bank, and is therefore not included in figure 5.

The WET consultant also developed a Good Practice Guidance Note to direct the Ministry and consulting engineers in designing erosion control measures. The note is influencing the design of the Bank project, which is expected to benefit a rural and urban population of 4.2 million people through erosion interventions, soil and water conservation measures, and livelihood enhancement activities across 11 states in southeastern Nigeria.

## LINKING GROUNDWATER MANAGEMENT WITH SERVICE DELIVERY IN KENYA

An estimated 90 to 95 percent of Nairobi's population relies on surface water and chronic water shortages are common in many parts of the city. It has been estimated that groundwater might account for as much as 25 percent of Nairobi's water supply. The World Bank is working with other donors to develop a master plan to meet the growing water supply needs of Nairobi and its satellite towns through 2035. The plan will require more bulk supply to reach those poor people who are not part of the 5 million customers already served by the Athi Water Services Board (AWSB). Draft assessments indicated high groundwater potential in the Baricho and Tiwi aquifer systems near Nairobi, and recommended construction of two new wellfields, but the potential contribution of these systems to the city's supply was unknown.

The WET assisted the operational team in reviewing the options for developing and managing groundwater to feed the service area. The WET report includes potential areas for exploitation, a review of the estimated safe yields from the two identified well fields, recommendations for hydro-geological investigative work as part of a complete aquifer assessment, and preparatory works and schedule for aquifer exploitation.

The recommendations are being carried forward by the AWSB, and the use of groundwater to supplement urban water supplies will be further assessed under the \$155 million Kenya Water Security and Climate Resilience project. The project itself aims to reduce social vulnerability by cutting the amount of time girls spend fetching water for their households, and improving the amount and quality of water readily available for adequate hygiene and for human consumption.

## UGANDA USES NATIONAL DATA NETWORKS FOR LOCAL PLANNING

The government of Uganda is instituting an integrated approach to water resources management, which will require a comprehensive system for monitoring and forecasting local water availability to influence decision-making. In response, the World Bank is working with Uganda through the Water Management and Development Project (WMDP). Under the WMDP, the Ministry of Water and Energy (MWE) has proposed the creation of a new Water Information System (WIS) to be integrated with existing data platforms. The Ministry needed an implementation plan that would be based on international best practices and tailored to local conditions.

The WET helped conduct a rapid assessment of the current status of surface water, groundwater, meteorological, and water quality data collection networks. The WET, bringing international best practices from India and other countries, worked with a national consultant and government counterparts to recommend plans for upgrading the WIS for catchment planning and management for all of Uganda. The new system, along with proposed capacity building measures, will improve data validation, processing, and storage. The assessment also recommended user-friendly and quick data access, which will be crucial for effective water planning and management, in addition to supporting the regulatory functions of the MWE.

“THE WET FUND IS AN IMMENSELY HELPFUL TOOL FOR TASK TEAMS. BY ENGAGING BOTH AN INTERNATIONAL AND A LOCAL EXPERT, WE WERE ABLE TO EXPLORE TECHNICAL ISSUES ASSOCIATED WITH THE WATER INFORMATION SYSTEM IN GREATER DEPTH THAN OUR TIME AND RESOURCES WOULD HAVE OTHERWISE ALLOWED.”

- Mukami Kariuki, Task Team Leader, Uganda Water Management and Development Project

CHALLENGE

2.5 billion people worldwide still lack access to an improved sanitation facility and treatment systems, where they do exist, do not always ensure the safe and effective disposal of waste. Improving the functionality and operational performance of sanitation infrastructure will put service providers in a better position to reach more people over time.

## THE WET PROMOTES IMPROVED SANITATION AND WASTEWATER MANAGEMENT IN THREE REGIONS

Country	WET Activity Objective	WET Activity Result
Mauritius	Review feasibility study for wastewater treatment plant in Baie du Tombeau, focusing on the adequacy of the technologies proposed in view of environmental constraints.	The review underlined shortcomings in the proposed technology selection and design of pumping stations and connections in the treatment plant, and recommended further consideration for the project's design.
China	Assess sludge generation and plant management efficiency for wastewater treatment plants completed under the Bank-financed China Liuzhou Environmental Management Project.	Lessons learned will be used for other studies on plant efficiency and in future Bank projects; recommendations for reducing energy use and costs will be addressed by the client; guidelines for building technical capacity for improved operational performance have been provided to the client.
Paraguay	Identify sanitation options that match the needs of peri-urban indigenous communities in Asunción; scope was later expanded to include support for latrine construction and social promotion campaigns.	A new design for peri-urban indigenous communities has been developed, combining baths and latrines, which will be implemented under the Paraguay Water and Sanitation Modernization Project; social promotion activities are included in bidding documents for implementation of the project, which is expected to provide 28,000 people in rural areas and indigenous communities with improved sanitation.

CHALLENGE

World Bank clients face increased uncertainty with regard to whether and how climate change will impact their populations. Moreover, they are often not sufficiently equipped to estimate and integrate future change in water availability into existing plans and operations.

### URUGUAY: UTILITY RISK PLANNING

Uruguay's state-owned water utility (OSE), needed guidance on incorporating climate change considerations into utility operations and planning. The WET engaged the services of a global expert in utility management and climate change adaptation to assist OSE in strengthening its strategic investment planning capacity. The work program included analyzing OSE's strategic planning practices especially those related to risks associated with climate variability, implementing elements of integrated water resources management in planning, and preparing indicators and instruments to assist OSE's public communications efforts and managerial decision-making processes.



The WET successfully initiated discussion among top management about how to incorporate long-term, risk-based strategic planning into OSE's day-to-day operations and helped shape the "managing and planning for risk" subcomponent of a \$118 million project partially financed by the World Bank. The consultant analyzed OSE's current strategic planning and risk management actions and developed a step-by-step roadmap for OSE to begin systematically incorporating risk into planning. Workshops helped to build awareness on implementing a new strategic plan.

## KYRGYZSTAN: WATER FORECASTING

After hydrology experts in Kyrgyzstan showed that melting glaciers would have an impact on groundwater levels, the WET was asked to help determine the intermediate relationship between changes in climate parameters and changes in stream flow based on these trends and other data. They were also asked to paint a more holistic picture of future water availability and use in the country's capital, Bishkek.

The WET provided hydrology and climate change expertise to evaluate possible climate change impacts on the flow of the Ala Archa and Ala Medin rivers. The team was able to make short-, medium- and long-term projections for future summer and winter discharges. This was the first time that this type of analysis was undertaken to show the relationship between glacier mass reduction and stream flow over the next 10 to 20 years.

The work supports urban infrastructure projects in Bishkek and in Osh by making it possible to plan the conjunctive use of river water for irrigation and groundwater recharge, ensuring Bishkek's continued water supply. The project targets vulnerable populations in Bishkek. The beneficiaries, more than half of whom are women, are urban residents in the poorest areas of the city.



## SRI LANKA: PROTECTING THE CITY FROM FUTURE FLOODS

More than one million people in the Colombo Metropolitan Area were affected by back to back floods in 2010, and the local economy lost more than \$50 million. In response, the government and the Bank dedicated \$320 million for the Metro Colombo Urban Development Project (MCUDP), which includes both emergency interventions to reduce flood risk, and long-term flood control and drainage investments.

Given the immediate need for action, the WET helped the project team to fast-track project preparation by providing recommendations for investments and completing project documents in line with international best practice. To get the team up and running, a WET expert reviewed the Colombo Flood Mitigation Plan including hydrological studies, flood modeling, sea level rise and other climate change impact forecasts as well as the flood mitigation investments planned for the Colombo Water Basin. The expert then provided quality control of local team outputs and gave input on the economic and financial assessment of proposed investments, and a results framework for the project. He also developed the scope of work for a Colombo-based hydrologist to participate in the preparation and appraisal of individual investments. These contributions will greatly inform the direction of the MCUDP, from the design of the program's objectives and components, to the team's composition.

## COUNTRY SPOTLIGHT : BRAZIL

### THE WET AND THE WPP POOL SERVICES TO ADDRESS CLIMATE VARIABILITY AND CHANGE IN THE SEMI-ARID NORTHEAST

The Piranhas-Açu, Jaguaribe, and São Francisco river basins are located in Brazil's least developed, semi-arid northeast. This water-scarce region is piloting a Bank-funded program that supports federal and state governments in accounting for climate change in adaptation planning for the water sector. The program approach uses basin-wide stakeholder engagement to select tools for estimating climate change impacts, and allocate future water supply accordingly.

The Bank relied on the WPP to convene a series of decision-meetings, making it possible for water planners and water users from three states (Fortaleza, Natal, and João Pessoa) to agree on a climate modeling approach, share and discuss results, and devise policies for drought response mechanisms and preparedness planning.

An international and a local WET consultant helped guide the meeting participants in: selecting the methodology for the hydro-climate analysis for developing a water allocation model; creating hydro-climatic scenarios using statistical methods; and handling and interpreting uncertainty for water resources management when dealing with climate change. Together, these contributions are helping to advance the process of evidence-based decision-making for water allocation. The approach could soon be scaled up to the state level while findings will likely inform a drought management policy for the entire northeast of Brazil.

THE WPP ACTIVITY IS INFLUENCING A \$107 MILLION BANK PROJECT AND A TECHNICAL ASSISTANCE PROGRAM TO INTEGRATE CLIMATE CHANGE IN FEDERAL WATER POLICY PLANNING.



# 10. WPP Phase II

Funded by the governments of Great Britain, the Netherlands and Denmark, WPP Phase II (July 2012 - June 2016) provides close to \$40 million to help countries *improve water resource management and water service delivery, and to mainstream these improvements in climate-resilient, green growth*. Phase II has a similar organization to Phase I, including its administrative structure, systems, and procedures. However, the new Program has an expanded scope, a more robust results monitoring and tracking system, and more resources to address complex global and local water challenges.

## DEMAND FOR INTEGRATION AND INNOVATION

With a \$30 billion water portfolio, the Bank is heavily invested in water and water-related sectors to help countries achieve their development goals. However, both the Bank and its client countries are in need of more integrated analysis, planning, and implementation that spans across multiple sectors. There is also a need to expand the capacity of the WPP to promote innovation that responds to the Bank's high and unmet demand for addressing a variety of water challenges, including emerging issues related to climate change, water scarcity, disaster risk management, and the implementation of the green growth agenda. World Bank task leaders want to help their clients meet new challenges, such as assessing tradeoffs at the basin level, integrating risk and uncertainty into planning, or improving delta management. This will require additional support to identify available and successful tools and approaches.

As a result of this changing landscape, WPP Phase II has been designed with the addition of four new elements (see boxes 1, 2, 3, and 4).

## BOX 1. A NEW OBJECTIVE FOR CLIMATE-RESILIENT, GREEN GROWTH

*The mainstreaming of water services and management in climate-resilient, green growth* is a third objective that has been added to the two objectives of Phase I. The addition of this third objective is warranted by the global "inclusive, green growth" agenda, a sustainable development strategy that plays up the growth opportunities presented by improved efficiency and conservation in the use of natural resources, while protecting the most vulnerable. For the WPP, this means that activities will strive to promote designs and policies that advance growth and protect the environment, and assess tradeoffs between competing objectives. The WPP will help countries acknowledge that green growth is an economically, socially, and politically smart strategy for long-term sustainability, especially when it comes to dealing with water scarcity, water-related hazards, and managing the resource for all.

## BOX 2. A RESULTS FRAMEWORK FOR MEASURING IMPACT

The WPP and its donors have agreed on a results framework to monitor and track progress toward intended outcomes. The framework was designed around the Program's three objectives and captures two types of results: 1) WPP activity level; and 2) supported World Bank project level.

Target-setting for these indicators is based on Phase I experiences and the Program's strategic goals for Phase II, but also mirrors the outcomes pursued by each Bank project seeking WPP support. The benchmark used to define realistic targets was a July 2012 water portfolio review of Bank projects approved during FY11. Furthermore, a selective cross-check on relevant indicators was conducted on the entire portfolio of World Bank lending projects active as of July 2012 (2,005 projects).

Please refer to the **WPP Strategic Action Plan** to see the complete results framework.

## STRUCTURE

Under Phase I, the Program allocated funds through “windows”: six regional windows, the global Water Anchor window, and the Expert Support Teams (Water Expert Team) window. Under Phase II, the Program has added a programmatic window to help the WPP make strategic headway in selective geographic areas and in non-water sectors that depend on water resources to achieve growth (see figure 7). The programmatic window is meant to help the Bank leverage resources to generate a larger impact in priority countries and regions through longer-term, higher-level engagements.

### BOX 3. A PROGRAMMATIC WINDOW TO ADDRESS NEW GLOBAL CHALLENGES

Through the new programmatic window, the WPP helps countries promote cross-regional fertilization of successful development approaches, and encourages the use of innovative methods, tools, and technologies in World Bank lending. It is not meant to fund work that could be undertaken through other windows. The impetus for this additional window came from donors' effort to adapt to new priorities in client countries. The programmatic window has three components:

Component 1, Water in Other Sectors, supports clients to mainstream water considerations into planning and project implementation for other sectors, including energy, agriculture, the urban sector, and the environment.

Component 2, New Global Initiatives, responds to emerging client (as well as donor) demands for support on a number of topics, including remote sensing and disaster risk management.

Component 3, Strategic Support in Geographic Priority Areas, dedicates resources to key areas where water constrains growth or is a large challenge for poverty reduction and the achievement of other human development goals.

FIGURE 7: WPP PHASE II STRUCTURE



### BOX 4. A COMPREHENSIVE COMMUNICATIONS AND KNOWLEDGE MANAGEMENT STRATEGY

Under Phase II, the WPP will scale-up knowledge management and communications efforts for increasing the Program's visibility and to improve its effectiveness by facilitating knowledge sharing and global collaboration. The communications strategy aims to raise the visibility of the WPP among key audiences (clients, donors, partners, industry leaders, and Bank staff) by providing relevant information in a timely manner. Special emphasis will be placed on communicating the value of donor dollars to key audiences by highlighting the Program's progress and significant contribution to results.

The aim of the KM Strategy is to promote the dissemination of new knowledge and to facilitate technical discussion and policy debate on key topics supported by WPP activities. In order to manage sound knowledge creation and dissemination platforms, the WPP will build on the improved internal collection and tracking of its own documentation that was initiated under Phase I, to ensure the continuation of a strong institutional memory for WPP-funded work.

## PROGRESS IN THE PHASE II TRANSITION

During 2012, the Program closed out all Phase I activities and started implementing operational and administrative protocols and systems for Phase II. The WET continued operations during 2012, using remaining funds carried over from Phase I.

In preparation for start-up, the WPP Program Management team worked with the six regions and the Water Anchor to introduce the strategic work plan process for each window. As new priorities emerged from discussions with Bank regional units, client countries, and WPP donors, the WPP created space in the programmatic window for several new global initiatives, including:

**The Disaster Risk Management Facility:** In close coordination with the Global Facility for Disaster Risk Reduction (GFDRR), the WPP has started this initiative to focus on the water aspects of disaster risk management. The Dutch government has provided additional funding for this initiative. Activities will support the most at-risk clients in addressing water-related hazards. The facility will support mapping the risk of exposure of populations and economic sectors to floods and droughts. It also provides resources to task teams to build local capacity to forecast disasters and develop climate-resilient infrastructure, such as storage facilities or natural infrastructure. Climate tools include modeling of future climate scenarios, improvements in hydromet data collection and analysis, and use of existing data through the climate change portal and other public sources.

**The Remote Sensing (RS) Facility:** This initiative is dedicated to improving the quality and effectiveness of water resources management planning and project design through the potential use of RS tools and platforms, in combination with in-situ data, for comprehensive analysis. The facility will develop guidelines on different remote sensing platforms (terrestrial, airborne, and satellite) and products, how to use, validate and evaluate them, and how to assess their costs and limitations.

**The Cold Weather Sanitation Initiative:** Various countries with very cold climates, as well as many of the people living in them, are poor and vulnerable. They are in great need of improved sanitation but face unique and difficult challenges (e.g. freezing weather conditions) with regard to the management of wastewater and excreta. Through this initiative, the WPP aims to bring together tested, practical experience and skills from around the globe to increase the capacity of client countries for improving access to adequate sanitation, improve project performance, and contribute to global knowledge on the subject. The WET is currently working to transfer expertise from Alaska to Mongolia and has begun implementing activities to improve sanitation in small towns and rural areas of Tajikistan and Kyrgyzstan. These activities will provide the basis for case studies on how cold affects sanitation in those countries. Recommendations and lessons learned from these and future activities will be summarized and disseminated to improve sanitation in cold areas around the globe.

**The Results-Based Financing (RBF) Facility:** The objective of this facility is to promote the adoption and use of RBF approaches in water sub-sectors (other than in water supply and sanitation where RBF is already being applied) and climate change investment projects and programs. Phase I entails the development of a user guide to RBF for the water sector, which will be finalized in the second half of 2013. The guide identifies results-based instruments for current and future donor and/or country-financed programs across all water sub-sectors. Phase II involves the creation of an RBF Technical Assistance Window to support the design of RBF mechanisms in water sub-sectors in parallel with Bank operations. This facility is a joint initiative with the Global Program for Output-Based Aid (GPOBA) and is co-funded by both trust funds.

Please refer to the **WPP Strategic Action Plan** to see further details on the WPP New Global Initiatives.

# Annex 1 - WPP Publications

Outputs of WPP activities include technical reports, briefing notes, tools and manuals covering all water sub-sectors and World Bank regions. The WPP also selects specific activities for case study development, which document lessons learned and inform future operations and activities. Selected lists of those produced under WPP Phase I are provided below.

## SELECTED ACTIVITY PUBLICATIONS

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- Guidance Note: Public Expenditure Review from the Perspective of the Water and Sanitation Sector
- More, Better, or Different Spending? Trends in Public Expenditure on Water and Sanitation in Sub-Saharan Africa
- Learning from Experience: The Case of Public and Private Provision in Dar es Salaam
- Indonesia Water Investment Roadmap (2011-2014)
- Investing in Water Infrastructure: Capital, Operations and Maintenance
- Private Providers of Climate Change Services: The Role and Scope for the Private Sector in the Provision of Non-Financial Climate Change-Related Services Relevant to Water Infrastructure
- Managing the Invisible: Understanding and Improving Groundwater Governance
- Reaching Across the Waters
- Urban Sanitation Experiences From Senegal And Burkina Faso
- The Future of Water in African Cities: Why Waste Water?
- Climate Change and Urban Water Utilities: Challenges & Opportunities
- Improving Quality of Life in Rural China through Better Wastewater Management
- Assessing Health Impacts of Water Reuse in Agriculture in the Nile Delta - Estimating Relative Benefits of Differing Strategies for Management of Wastewater in Lower Egypt
- Renewable Energy Desalination: An Emerging Solution to Close the Water Gap in the Middle East and North Africa
- Rural Water Supply in the Philippines – Volumes I, II, III
- Climate Variability and Change: A Basin Scale Indicator Approach to Understanding the Risk to Water Resources Development and Management
- Grow in Concert with Nature: Green Water Defense for Flood Risk Management in East Asia
- Grow in Concert with Nature: Sustaining East Asia's Water Resources through Green Water Defense
- Resilience to Climate Change-Induced Challenges in the Mekong River Basin - The Role of the MRC
- Mapping the Resilience of International River Basins to Future Climate Change-Induced Water Variability
- Modeling for Watershed Management: A Practitioner's Guide
- Water Security for Central Kosovo
- Water Hackathon: Lessons Learned

## SELECTED CASE STUDIES

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- WPP Briefing Note 1 – Supporting Integrated Water Resources Development in Tana and Beles, Ethiopia
- WPP Briefing Note 2 – Strategic Regional Basin Planning for the Rio Bogota Project
- WPP Briefing Note 3 – Towards Progress on Sanitation: The Case of Cameroon
- WPP Briefing Note 4 – The SIASAR Initiative: An Information System for More Sustainable Rural Water and Sanitation Services
- WPP Case Profile 1 – Integrated Urban Water Management - Lessons and Recommendations from Regional Experiences in Latin America, Central Asia, and Africa

# Annex 2 - Financial Summary

This annex provides financial information on donor contributions, window disbursements, and program management costs. A total of 225 activities (including 99 for ESTs) were implemented in 64 countries from Program inception - January 2009 - to closure in June 2012, disbursing \$19.1 million. Figure A shows the progress of the first phase of the WPP over its three and a half years of implementation. A short overview of the bridging period until the start of WPP Phase II in January 2013 is also provided in this Annex.

## 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 A)<sup>1</sup>.

FIGURE A: PROGRESS DURING WPP PHASE I

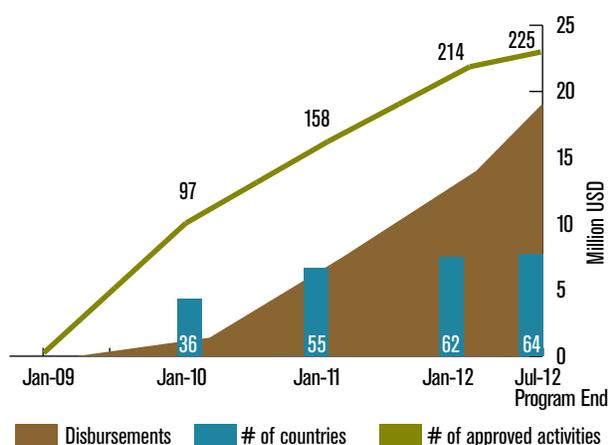


FIGURE B: WPP DISBURSEMENTS PER REGION

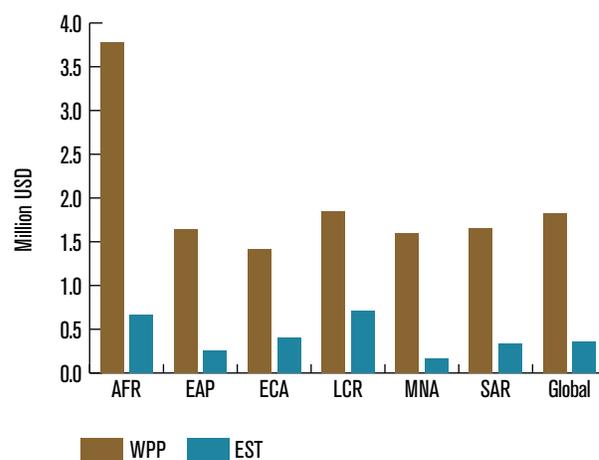


TABLE A - OVERVIEW OF DONOR CONTRIBUTIONS TO THE WPP

Contributions to WPP	Donor currency	Amt pledged (donor currency)	Amt received (USD)
DANIDA	DKK	29,000,000	5,437,699
DFID <sup>1</sup>	GBP	3,000,000	4,629,713
DGIS	USD	13,734,759	13,734,759
<b>WPP Total</b>			<b>23,802,171</b>
Admin fee (2%)			476,043
Investment income			360,180
<b>Net contributions to WPP</b>			<b>23,686,307</b>

1. The Dutch contributions to the WPP include \$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 B – WINDOW ALLOCATIONS AND DISBURSEMENTS<sup>2</sup>

WPP Window	Total allocation (USD)	Disbursements (USD)	% disb. of allocation	% of total disb.	No. of activities
AFR	4,548,250	3,777,634	83.1	19.7	23
EAP	2,151,250	1,642,895	76.4	8.6	17
ECA	2,019,375	1,409,886	69.8	7.4	12
LCR	2,106,806	1,848,911	87.8	9.7	22
MNA	2,019,375	1,600,260	79.2	8.4	12
SAR	1,942,875	1,650,580	85.0	8.6	19
WBI	400,000	298,891	74.7	1.6	2
WA	2,139,583	1,522,811	71.2	8.0	19
EST	4,099,748	3,903,157	95.2	20.4	99
WPP PM	2,000,000	1,473,116	73.7	7.7	-
TOTAL	23,427,262	19,128,143	81.6	100.0	225

## OVERVIEW OF WPP ALLOCATIONS AND FINAL DISBURSEMENTS

The Program has disbursed \$19.1 million from inception. As shown in Figure A, the pace of disbursements increased significantly in the last six months of Phase I. This means that a balance of \$4.6 million was remaining at the end of the first phase of the program. This amount has been partly used to bridge the period until the start of the second phase, while the rest has been allocated to Phase II implementation.

Table B shows the total allocations to the WPP windows as well as their final disbursements and number of activities. Analysis of these numbers shows that the EST, LCR, SAR and AFR windows performed well in terms of percentage of their allocations expended. Two of these (the EST and AFR windows) were also high performers in absolute terms. The EST window comprises the three ESTs (GW-MATE, HEF, and SWAT) that were closed half-way through the Phase I implementation period, and the new WET (which consolidates the three latter services). The average activity size per window ranges from \$80,000 to \$164,000 – \$40,000 for EST activities. The Africa Region has received the largest part of the WPP Phase I funding, as illustrated in Figure B, followed at a sizable distance by the LCR region and activities at the global level. Since various activities

under some other windows are also related to Africa, a total of 39.3 percent of all program disbursements affect the continent – well above the program target of 30 percent.

## PROGRAM MANAGEMENT AND STAFF COSTS

WPP management costs are costs incurred by the WPP Team and the Bank's technical experts who provide strategic advice and support, including costs associated with WPP donor coordination, outreach and communications, monitoring and evaluation, and dissemination activities. Program management (PM) costs total only 7.7 percent of all disbursements, well below the 9 percent cap set for PM related expenses.

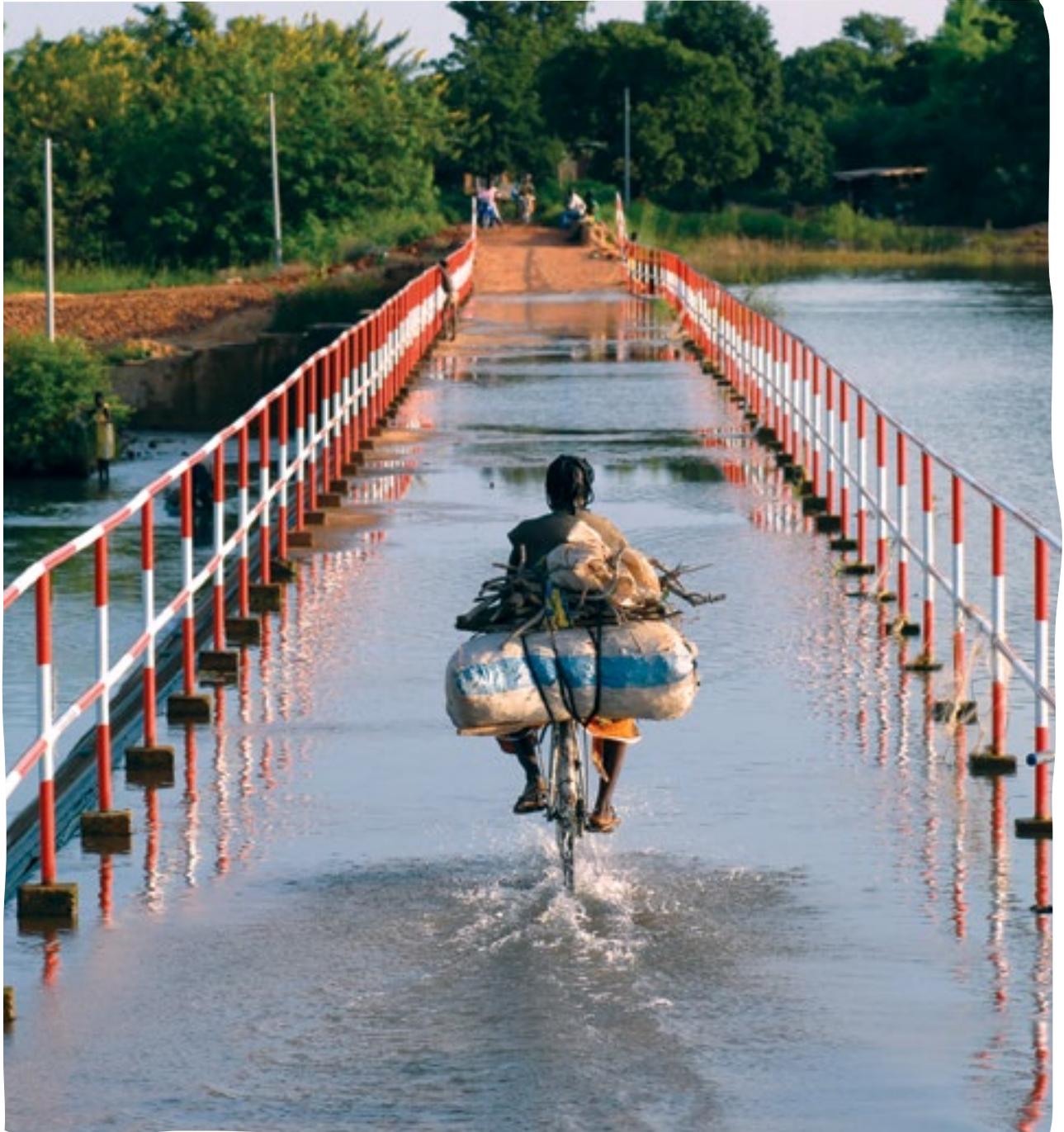
The WPP Legal Agreement establishes that Bank staff costs under the Program should not exceed fifteen percent (15 percent) of total donor contributions. This includes staff costs for PM, for supervision of WPP activities, and for technical review of work plans and proposals. In total, the WPP has spent only 12.2 percent of total disbursements on staff costs. These numbers show that the Program has been very cost-efficient in its administration, benefiting from the solid management and monitoring systems put in place at Program inception.

2. The numbers presented in this table reflect the final WPP Phase I financials, taking into account budgetary corrections and repostings that were needed according to the Bank's Trust Fund policies, as well as one activity in the MNA region that was extended beyond the Phase I timeframe for exceptional circumstances.

## BUILDING A BRIDGE TO WPP PHASE II

During the six months between June (the end of WPP Phase I) and December 2012 (the beginning of the second phase) the WPP team focused on financial closure of all first-phase activities as well as collection of activity outputs. Due to the specific nature of, and high demand from the Regions for support from the Water Expert Team, some of the remaining funds were made

available to ensure continuity of the services. At the end of December 2012, WET had approved nine activities for \$0.23 million, while there were 5 others in the pipeline (\$0.12 million). WPP PM expenditures in the same period amounted to \$0.20 million; \$0.13 million was spent on dissemination activities and donor coordination; and \$0.14 million on WET reporting and coordination. The activities and disbursements during the bridging period will be reported in the next annual report.







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