THE CASE FOR INTEGRATED URBAN WATER MANAGEMENT

Water supply and sanitation play an integral role in the green growth agenda as fundamental requirements for human health, economic development, and environmental sustainability. It is impossible to imagine a green future without clean drinking water, sanitation for all, water for commerce and industry, protection against urban flooding, vibrant rivers, lakes, wetlands, and marine coastal areas. This vision of the water sector is achievable for most Latin American countries within a generation—if they make sound decisions on institutional reforms and if investments are made now. The challenges confronting this vision of the future, however, are daunting and include:

- **Rapid urbanization:** Growing water demand, disorganized land use and unchecked contamination threaten water supply, increase flooding risks and affect life quality of urban dwellers;

- **Climate change vulnerability:** Water management must take into account water stress stemming from rising temperatures, changes in precipitation patterns, and weather variability; and

- **Inefficient water management:** Current approaches are predominantly local and sector-specific, lacking the innovation and scope to address cross-cutting challenges. Watershed approaches, when they exist, are not well coordinated with urban realities.

Fortunately with economic growth, sound legal systems, democratic political systems, and flourishing environmental movements, most countries in LAC are well positioned to address these challenges. Adopting a more integrated and watershed based approach to these water challenges will be pivotal to achieving these goals.
INTEGRATED URBAN WATER MANAGEMENT FOR GREEN CITIES

PHASE I: 2009 - 2012

Initiative Activities
Phase I of the Blue Water Green Cities Initiative started in 2009 and culminated in a large regional workshop in Sao Paulo, Brazil in December 2012. The Initiative was generously funded by the Water Partnership Program, a multi-donor trust fund managed by the World Bank that aims to improve water resource management and water service delivery. The Initiative was seamlessly incorporated into the World Bank's operations and technical assistance to help leverage the impact of the trust funds. All of the documents produced by the Initiative can be found at the Initiative website (http://www.worldbank.org/laciuw). The key products are the following:

Analyzing Good IUWM Experiences in the Region: Case studies of the following cities were analyzed and documented: Medellín (Colombia), Monterrey (Mexico), and Sao Paulo (Brazil). This provided a baseline for practices in cities that are renowned in the region for their water management and general good governance.

Working in Flagship Cities: Seven cities were identified as candidates for more intensive support and technical assistance, often accompanied by World Bank loans for infrastructure investments: Buenos Aires (Argentina), Bogotá (Colombia), Sao Paulo (Brazil), Tegucigalpa (Honduras), Aracajú (Brazil), Vitória (Brazil) and Asunción (Paraguay).

Summary Note: The Initiative produced a summary note which serves as its guiding document and lays out the water management challenges for cities; presents in detail the concept, process, and practices of IUWM; and provides some lessons based on the Initiative's experiences.

Regional Workshop on Integrated Urban Water Management: A regional workshop, convening over 100 participants from throughout the world, was held in Sao Paulo in December 2012 to share and disseminate experiences of the four cities: Sao Paulo, Bogotá, Buenos Aires, and Seoul. The workshop was organized and jointly funded by the State of the Sao Paulo State Secretariat for Sanitation and Water Resources, the Water and Sanitation Program (WSP), the Water Partnership Program, and the World Bank Latin American and Caribbean Sustainable Development Department.

Lessons Learned
A few basic principles emerged in the process of analyzing the literature, examining best practice throughout the world, and engaging in IUWM activities in the region:
• **IUWM needs to be tailored to the specific and dynamic challenges of each urban area.** IUWM approaches can vary greatly depending on the institutional arrangements of urban and water management in a particular urban area as well as the specific water challenges.

• **IUWM involves a set of participatory approaches and instruments** to help relevant institutional and non-institutional stakeholders develop an agreed diagnostic of urban area challenges as well as a shared vision of future development on the urban area of influence.

• **IUWM is not a one-time action, but an iterative, long-term process.** The characteristics and challenges of urban areas are bound to change with time. This is why planning becomes a cyclical process that continuously revisits urban area challenges and priorities, as well as means and actions to address these challenges.

• **IUWM is as much about institutions and processes as it is about infrastructure and investments.** Integrated management of water in an urban setting tends to be challenging since it involves a wide array of systems and institutions, both within the city and at the river basin level.

• **IUWM must be informed by sound science and technical analysis.** Although IUWM is highly political by nature, decision-making by key stakeholders must be informed by sound technical analysis.

• **IUWM requires moving away from segmented, linear thinking to a more holistic approach.** A key objective of IUWM is to progress from a linear approach to water problems - which relies on an unrestricted availability of resources and is not able to tackle adverse impacts of waste and other outputs on the environment and society - to a cyclic metabolism aimed at avoiding, minimizing, cycling and transforming inputs within the city in order to reduce or eliminate outputs, i.e., negative impacts on quality of life of urban dwellers and the environment (Novotny, 2010).

• **IUWM seeks to address today’s challenges without losing sight of the future.** Many cities in Latin America are far from being able to realize the ideal vision of a Green City. However, it is important that today’s water challenges be addressed in a way that reflects an integrated approach, and keeps in mind the long-term vision towards which the city and region should move.

**PHASE II: LOOKING AHEAD**

**Initiative Activities**

Experience has demonstrated that the concept and application of IUWM has traction in the region and there is a growing demand for Bank support in this area. Depending on funding availability, the following types of activities are contemplated for Phase II of the Blue Water Green Cities Initiative:

1) Promote more city-to-city exchanges in LAC and with other regions.
2) Generate technical notes and training on specific best practices such as sustainable drainage, wastewater reclamation, watershed source protection, river and coastal zone restoration, etc.
3) Offer specialized technical assistance on an as-needed basis.
4) Organize another regional workshop focusing on medium-sized and less developed cities.
Drought: Water resources can be severely depleted, leading to shortages.

Sanitation: Lack of adequate sanitation facilities can lead to water pollution.

Erosion: The loss of soil due to water erosion can affect water quality and quantity.

Floods: Urban flood management becomes critical, and coordination with the urban planning system is essential.

Urban Water Management: The need for integrated water management becomes more apparent under these circumstances.

Examples of Integrated Urban Water Management

Please visit: www.worldbank.org/laciuwmc

Interrelations between the various urban water services

Water supply and other water services:
(a) Wastewater and stormwater discharges pollute the water supply source;
(b) Leachate from landfill sites pollutes groundwater and/or downstream rivers;
(c) Erosion may affect the quality of water supply sources;

Sanitation and stormwater:
(a) Combined networks for wastewater and stormwater affects the efficiency of treatment;
(b) In separate systems the major challenge is to avoid the connection of rain water in the sewer network and also of sewage in the stormwater network;
(c) Lack of sewage collection coverage will impact stormwater systems because they are likely to receive sewage through illegal connections;

Stormwater and solid waste:
(a) Stormwater network efficiency is affected by lack of street cleaning and solid waste services, since litter is the most common cause of contamination and clogging in stormwater pipes and channels;
(b) Drainage and erosion control require common strategies because sediments affect the performance of the drainage system.

Interrelations between urban planning and water services

- Zoning: Zoning is a key instrument in urban planning and should be coordinated with the provision of water services. Through zoning, floodplains can be maintained free of critical infrastructure; urban development can be directed to denser, easier and is more cost effective to serve users.

- Water-smart urban landscaping: Cities such as Las Vegas have adopted urban landscaping that minimize water consumption for green areas (public and private), going as far as paying private owners to replace their lawns with climate-appropriate landscaping; concepts such as Low Impact Development ensures the natural water cycle is maintained as natural as possible, for example by encouraging local infiltration or retention of rainwater.

- Urban water environmental assets: Cities as diverse as Sao Paulo, Bogotá or San Diego have recognized the significant urbanistic value of water bodies within the urban fabric and have sought to transform previously disconnected and polluted rivers, lakes and or ponds into urban spaces, often fulfilling public recreation functions as well as ecological, flood protection or stormwater management functions.

Interrelations between a city and its watershed

- Water resources to ensure supply: Large cities have a strategic interest in their watersheds. Mega-cities often represent a significant consumer of raw water in their watersheds and sometimes in watersheds further away. Sao Paulo, Mexico City and Monterrey all derive significant proportions of their water from external watersheds. As such, assessment of the available water resources on the one hand, both outside the city and (waste) water reuse within the city, and water users in the city and the watershed on the other hand, is a crucial part of IUWM. Cities generally seek to maintain water quality of their resources, often requiring trans-jurisdiction or watershed-wide mechanisms to do so. Watershed-level mechanisms are also essential in the face of climate uncertainty, to ensure adequate water supply in a drought situation, for example through water rights trading or emergency purchases from irrigation or other users.

- Pollution control: Conversely, cities also significantly affect downstream water bodies, generating very significant organic loads that often go untreated into nearby water bodies, severely limiting their usage for recreation, urban water supply and sometimes irrigation. Holistic water quality management, which looks at cost-effectively controlling all sources of pollution to meet water quality objectives, can only be done at watershed level.

- Regional flood management: Flood profiles of urban rivers can be significantly affected by developments in their upstream watersheds, whether through deforestation or urbanization.