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## Water Analysis, Innovations, and Systems Program (WAISP)

Final Report

February 2013



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*DISCLAIMER*

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## Abbreviations and Acronyms

<b>AIILSG</b>	All India Institute of Local Self Government
<b>CII</b>	Confederation of Indian Industries
<b>CMWSSB</b>	Chennai Metropolitan Water Supply and Sewerage Board
<b>DAI</b>	Development Alternatives, Inc.
<b>DFID</b>	Department for International Development (UK)
<b>FAO</b>	Food and Agriculture Organization (United Nations)
<b>GIZ</b>	German Technical Cooperation Agency
<b>GOI</b>	Government of India
<b>GOR</b>	Government of Rajasthan
<b>HUDA</b>	Haryana Urban Development Authority
<b>IIHMR</b>	Indian Institute of Health Management Research
<b>JDA</b>	Jaipur Development Authority
<b>JICA</b>	Japan International Cooperation Agency
<b>JMC</b>	Jaipur Municipal Corporation
<b>JNNURM</b>	Jawaharlal Nehru National Urban Renewal Mission
<b>KUWS&amp;DB</b>	Karnataka Urban Water Supply and Drainage Board
<b>MCF</b>	Municipal Corporation of Faridabad
<b>MNIT</b>	Malaviya National Institute of Technology
<b>MOWR</b>	Ministry of Water Resources
<b>NGO</b>	Non-governmental Organization
<b>PHED</b>	Public Health Engineering Department
<b>PMC</b>	Pune Municipal Corporation
<b>REDCOH</b>	Real Estate Development Council Haryana
<b>RUIDP</b>	Rajasthan Urban Infrastructure Development Project
<b>SIUD</b>	State Institute for Urban Development
<b>STP</b>	Sewage (Wastewater) Treatment Plant
<b>USAID</b>	United States Agency for International Development
<b>WAISP</b>	Water Analysis, Innovations, and Systems Program

## Executive Summary

Development Alternatives, Inc. (DAI) began implementing the Water Analysis, Innovations and Systems Program (WAISP) in October 2010 in support of USAID/India objectives in the water sector. The Program included two components:

- Component 1 focused on conducting a water sector assessment in India across nine priority states, examining linkages to food security, health, and climate change. WAISP identified and prioritized program activities for USAID in the water sector by analyzing cross sectoral linkages and long-term strategic intervention options. The outcomes considered Government of India (GOI) priorities in the sector as well, and recommended a focus on urban water use efficiency during the second component of the program.
- Component 2 analyzed the potential and feasibility of inter-sectoral water use, primarily providing municipal wastewater for use by industry/industrial clusters, and instituting more efficient water use practices in three cities – Faridabad, Jaipur, and Pune. This is expected to lead to the development of inter-sectoral water use models for diverse contexts.

During the scoping exercise consultations, members of the Planning Commission highlighted the need to increase the efficient use of water resources, and how this has become a priority under the climate change mission. The announcement by the government that it would create a National Bureau of Water Use Efficiency further reinforced this commitment. In addition, the Component One comparative matrix analysis conducted under this project also identified water use efficiency as the top concern and recommended issue for USAID intervention. Government of India hosted seminars and workshops also reinforced the need for decentralized systems for recycling and reusing water.

During the second component of the project, surveys in Faridabad, Jaipur, and Pune revealed that, despite a vast knowledge base, very little is happening in terms of recycling and reuse at the grass roots level. While lifestyles have changed and households are using more appliances for domestic purposes, like washing machines and reverse osmosis water filters, awareness about water consumption is severely lacking. A clear need exists for regulations and enforcement mechanisms to drive efficient water use at the municipal level.

Indeed, the planning commission understands that, in many places, building more infrastructure will not increase the water supply given increasing scarcity. Moreover, projected climate change impacts represent a real vulnerability. This has changed the paradigm from one of simply identifying more sources of water, to looking for ways to use water more efficiently. Among urban users, the WAISP surveys generally found that hotels and hospitals seemed relatively better at understanding and managing their water use, while government offices and educational institutions could do much more. The WAISP assessment found willingness and interest by end users to do more; technical capacity exists; the makings of appropriate legislation for water use efficiency are apparent. However, uncoordinated institutional efforts, unclear lines of authority,

and the lack of information and incentives all conspire to make success stories stand out as islands of excellence rather than serving as a true foundation from which to scale up best practices.

While the Water Use Efficiency Guidelines were written for the municipalities of Faridabad, Jaipur, and Pune, the opportunities are relevant for other cities. The Guidelines are designed to serve as a support resource for municipal, state, and national officials in India to better understand and address water resource constraints facing the country through deliberate actions that rely on increasing the adoption of innovative technical, legal, and institutional approaches.

## Introduction

The Water Analysis, Innovations, and Systems Program (WAISP), funded by the U.S. Agency for International Development (USAID/India), was implemented by Development Alternatives, Inc. (DAI) from 1 October 2010 through 15 February 2013. The overall goal of the program was to increase the security of potable water supply and sanitation services by building resilience to global climate change, and advancing sustainable approaches to urban water management.

WAISP began by conducting a water sector assessment in India, which looked specifically at water vulnerability in relation to climate change, food security, and health. The program then detailed three city-level analyses for ways to improve water efficiency in representative cities – Faridabad, Jaipur, and Pune – which were identified as having potential for national replication.

For USAID/India, the inter-linkages between water resources and climate change, food security, and health are of paramount importance. India faces multiple challenges relating to competing uses of scarce water resources—between household and municipal consumption, agriculture, industrial, and ecosystem services. Furthermore, projected impacts of climate change indicate a higher variability in precipitation, with more frequent droughts and floods, and general stress on the hydrologic regime. Unrestricted groundwater exploitation by all sectors in the absence of adequate regulation and pricing is already severely impacting water scarce areas.

Through Component One, WAISP conducted research and analysis, and interviewed sector experts and stakeholders as part of the water sector scoping assessment. As its point of departure, the team began building a network and reaching out to an extremely broad range of stakeholders, including Government of India (GOI), non-governmental organizations (NGOs), civil society, research institutions, private sector, other donors, etc. The team also held key informant interviews, focus group meetings, and conducted site visits to collect data and information relevant to the assessment. WAISP completed the Water Sector Assessment Report in June 2011, which contained background and analyses, spatial analysis for geographic prioritization, and an investment matrix representing top opportunities for future USAID support.

Component Two developed *Water Use Efficiency Guidelines* for three municipalities. In doing so, WAISP initially conducted a series of consultative meetings with USAID, the Confederation of Indian Industry's (CII) Triveni Water Institute, and officials within various municipalities, while considering the analysis performed in Component One. The program selected to work with Faridabad, Jaipur, and Pune given the following principles: (1) water scarcity concerns with high potential for growth; (2) feasible within a one-year time frame; (3) enables donors and the municipalities to follow-up with longer-term initiatives based on the results; (4) municipal interest to focus on the interface across the urban built environment and industry; (5) linkages with CII's networks for follow-up. The results of WAISP's second component is presented in three separate reports, one for each city—Faridabad, Jaipur, and Pune—as well as one national level summary report.

In this way, Component One informed USAID's priorities in the water and climate change arenas, identifying and recommending prioritized program activities, including long-term

strategic intervention options. Likewise, through Component Two, WAISP engaged with municipal officials and urban water stakeholders to push the boundaries of current thinking with respect to water management and planning, and thereby encourage more integrated approaches to rationalize water use and allocation. By the end of the project, as WAISP reported research results and survey findings, the municipalities were already demonstrating advances to implement key recommendations in greywater reuse and other water use efficiency measures.

## **Program Activities**

### ***Component 1: Assess Current Opportunities and Constraints in the Water Sector and Identify Areas for further Intervention***

During the first year, WAISP's primary objective was to undertake a water sector scoping assessment. Given the broad emphasis on examining water sector issues related to climate change, food security, and health, there was a clear challenge to bring all that is required into a logical perspective in a country as large and diverse as India. As a result, USAID agreed to focus the scoping assessment on USAID's own priority states and associated river basins. WAISP examined the situation, including a spatial analysis, of nine states: Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarkhand, Uttar Pradesh, and West Bengal.

The team conducted research and analysis, and interviewed sector experts and stakeholders, engaging a broad range of stakeholders including GOI, non-governmental organizations (NGOs), civil society, research institutions, private sector firms, other donors, among others. The WAISP team performed a document review to consider past and current donor programs, as well as data and analysis performed by government and organizations active within the sector. The team also held key informant interviews and meetings in person and by telephone to collect data and materials. In addition, the team conducted site visits within the prioritized states agreed with USAID to examine priority local water sector issues, and understand lessons from recent interventions. Finally, the team hosted focus group sessions as part of the information gathering effort. An initial workshop invited participants from a diverse range of backgrounds to help develop the assessment framework and create a better understanding of the challenges that India faces in the water sector, and identify USAID's potential strategic role.

This effort culminated with the submission of the draft Water Sector Assessment Report to USAID on 19 June 2011. The report included all three sub-tasks associated with Component 1: The background and analyses in support of the sector scoping assessment, including chapters assessing linkages between water and climate change, water and food security, and water and health (Task 1.1); the geographic prioritization (Task 1.2); and the long-term strategic investment options (Task 1.3). In addition, WAISP developed a PowerPoint presentation of the key findings and recommendations, and presented these to USAID on 23 June. Subsequent iterations of the report incorporated comments from USAID, and a final version was completed during the last quarter of 2011. More details around the component tasks as they relate to the Assessment follow.

### ***Task 1.1: Sector Scoping Assessment***

For the sector scoping assessment, the WAISP team compiled background information, interviewed experts, and analyzed information on climate change impacts on water resources, water security, food security and health. The team identified gaps and made recommendations for possible areas of support with Indian counterpart institutions and organizations. Summaries of the various focus group workshops, site visits, and summary findings are presented in this section.

**Focus Group Workshops.** The team hosted three Focus Group Workshops with sector experts:

- Assessment of the Water Sector in India, 16 December 2010
- Water in the Context of Health, 11 February 2011
- Water in the Context of Food Security and Climate Change, 10 March 2011

Through these workshops, WAISP engaged representatives from diverse organizations, including the Central Ground Water Board, Planning Commission, Ministry of Health, NGOs, World Bank, GIZ, USAID, among others, to deliberate on priority issues and possible interventions in water, food security, and health. In each meeting, the discussion was guided in part by key questions prepared in advance, and meetings later turned to consider potential priority options for USAID interventions.

The Assessment of the Water Sector workshop specifically guided the design of the assessment framework, and helped create a better understanding of the challenges that India faces. The second workshop on Water in the Context of Health afforded an opportunity for experts to consider linkages to water quality challenges, point of use treatment, sewage treatment, among other issues. The third workshop on Water in the Context of Food Security and Climate Change probed a range of topics including agricultural practices and on-farm water use, to water availability and extreme weather events.

**Site Visits.** The WAISP team conducted numerous site visits as part of the scoping assessment, and to validate ground level realities and reach broader stakeholder input on the desk research findings. Through these visits, the team learned about site specific initiatives, met with potential beneficiaries and partners, and consulted with local experts on key cross-sectoral water concerns. WAISP sought to explore and learn about grass roots level social sector activities to be able to build upon existing capacities for future interventions. With the government sector, the priority was to understand the existing situation and the priority interventions based on local challenges, successful approaches, and lessons learned. Site visits conducted are listed in Table 1.

Table 1: Site Visits	
Organization	Location
Jal Bagirathi Foundation	Jodhpur, Rajasthan
Indian Institute of Technology	Kanpur, Uttar Pradesh
Mr. Phanish Sinha – Independent	Lucknow, Uttar Pradesh
National Water Academy	Pune, Maharashtra
Pratinidhi Samiti	Lucknow, Uttar Pradesh
Central Ground Water Board	UP Jal, Nigam, Uttar Pradesh
District Administrative Office	Kanpur Rural, Uttar Pradesh
District Development Office	Unno District, Uttar Pradesh
CII Triveni Water Institute	Jaipur, Rajasthan

**Summary Findings.** Considering the focus groups, site visits, meetings, as well as other background research, one-on-one interviews, and data and information gathering, a brief synopsis of just some of the salient findings from the scoping assessment research includes the following:

#### Water and Climate Change

- There is a need for reliable, easily understood, and accessible data on climate change.
- There is a need for river basin planning in order to deal with the variability in rainfall and river flows due to climate change.
- There is a need for increasing the efficiency of water use across all sectors, including for the agricultural sector, industry and domestic use. Demonstration projects in these areas would help in establishing guidelines for good practices.
- There is a need to build capacity within communities in vulnerable areas. For example, interventions for monitoring and recharging ground water sources, water conservation efforts, drought proofing, and resilience to sea level changes.

#### Water and Food Security

- Because of depleting water tables, there is a need to educate farmers, promote groundwater monitoring, conservation, and groundwater recharge.
- There is a lack of information on water quality. This requires investments, such as creating databases on water quality and its impact on agriculture. It is necessary to demonstrate the remedial measures necessary for water quality improvement.
- There is a need to demonstrate and promote on-farm water use efficiency, and document this to increase awareness, understanding, and to promote further adoption.
- India has a great deal of potential to enhance agricultural output without degrading the environment, but this requires investments in research to enable farmers to optimize

production and better understand the principles of organic/inorganic farming, soil conservation, crop selection, among other factors.

### Water and health

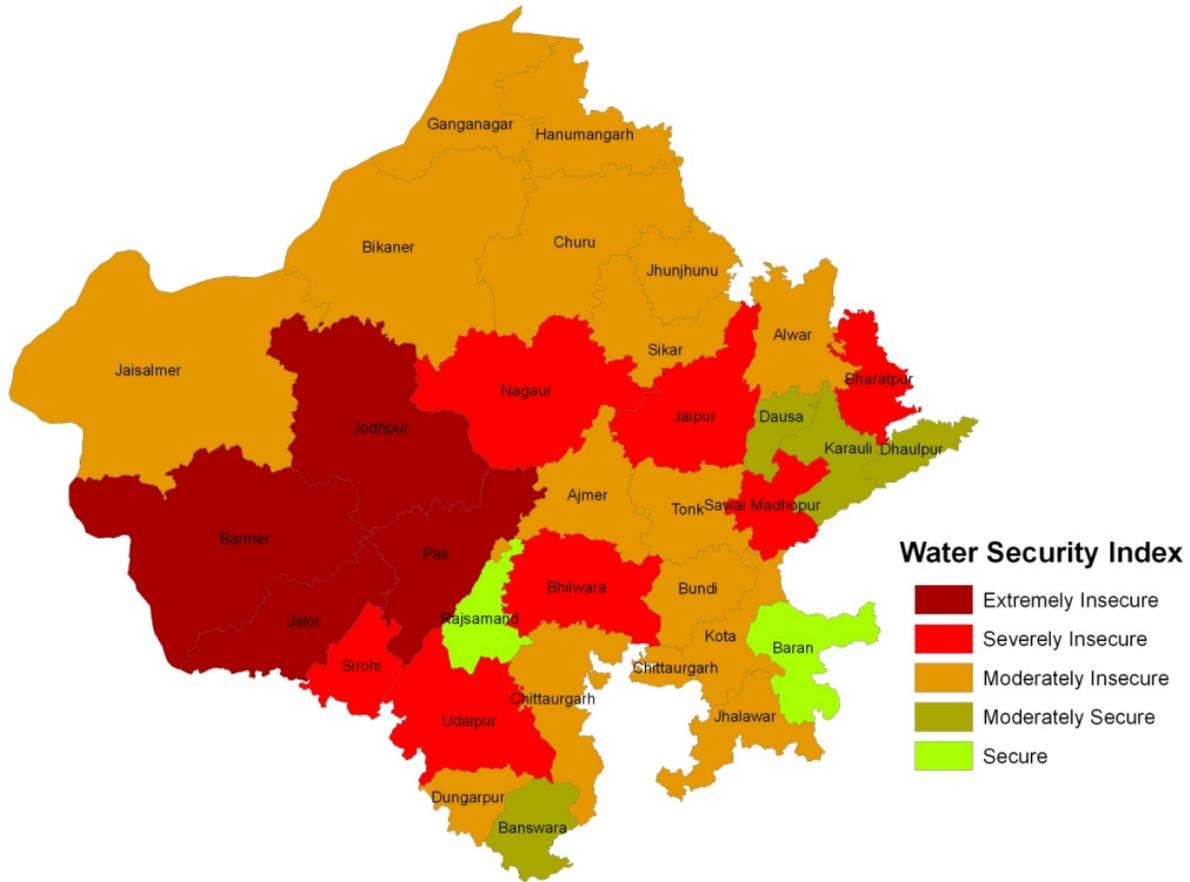
- Urban slums are often excluded from basic services, and when covered, the quality of service is poor. There is a need to invest in planning infrastructure support to expand access in these areas.
- Rain water harvesting could be promoted to recharge or supplement available water and deal with scarcity/shortages, as well as the cost of non-piped water.
- Public-private partnerships could encourage improved wastewater collection and garbage systems, and possibly promote recycling and reuse.
- Unregulated water use and over-exploitation for agriculture make evident the importance of enabling communities to monitor water consumption patterns and promote methods to improve water use efficiency.

### ***Task 1.2: Geographic Prioritization for Program Activities***

The WAISP team examined various parameters to develop a list of vulnerable river basins, and identified specific sub-basins worthy of further consideration by USAID. The scoping assessment report presents the preliminary conclusions of this analysis, providing a brief summary of three specific groups of sub-basins (consisting of seven sub-basins overall). Building from the spatial analysis, the identification of these sub-basins also took into account additional, more qualitative parameters such as the progressiveness and receptivity of state and local governments, the potential for leveraging corporate social responsibility and other private sector funds, and opportunities to build upon previous USAID efforts. Thus, as USAID considered future interventions, WAISP recommended the identified sub-basins as a starting point for a more in-depth, site-selection process. The team selected seven of some 30 vulnerable sub-basins for further USAID consideration. These sub-basins are: the Sankh, South Koel, and Baitarani (Brahamani Basin); the Gomiti (Ganges Basin); and the Luni, Bandi/Sukri, and Jawai (Sabarmati Basin).

WASIP developed a list of spatial indicators to assess vulnerable regions, and presented and discussed the criteria with USAID. The vulnerability was computed around three broad indicators of concern to the project – food security, health security, and water security. Each security index also contained a subset of indicators. The criteria was tested on pilot states and presented to USAID prior to conducting the full analysis across all USAID priority states. Figure 1 shows the visual example of the water security index. It should be noted that data availability and variability were two major constraints in this exercise.

**Figure 1: Water Security Index for Rajasthan**



***Task 1.3: Identification of Long-Term Strategic Investment Options***

The team developed a list of 15 design criteria that it believed accurately and efficiently characterized the attractiveness of a development investment, including criteria important to USAID/India as well as the Government of India. The assessment team then used these weighted values as one element in prioritizing possible USAID interventions in the water sector. The team developed a list of 12 options based on the findings from the Assessment Report. These activities were meant to set a direction for WAISP to develop, pilot, and scale-up Component 2 in the priority states. The team then evaluated each project option against the fifteen design criteria, one by one, to determine the extent to which each was responsive. Each option was treated and graded from one through five on the basis of the strength of the connection. Depending on how the project concept was thought to support or strengthen a design criterion, WAISP scored each factor as follows: five for highest, four for high, three for moderate, two for low, and one for weak. The one to five scores were then multiplied by the weighted value of each design criteria to get a composite rate for that project concept. Finally, each investment option was ranked in order of the total rate. Table 2 below presents the final top 12 options as detailed in the report.

The assessment team judged that the leading six options were most worthy of USAID consideration for future programming.

<b>Table 2: Priority Investment Options Ranking</b>			
<b>Topic Area</b>	<b>Intervention</b>	<b>Score</b>	<b>Rank</b>
Climate Change	Support GOI initiative increasing water efficiency	505	1
Climate Change	Capacity building of local community in climate vulnerable areas	463	2
Climate Change	Water augmentation for agricultural needs	459	3
WATSAN	Management of water service including water quality	424	4
WATSAN	Support source protection	401.5	5
WATSAN	Support PPP for water management	399.5	6
WATSAN	Support drinking water initiatives	397.5	7
WATSAN	WATSAN in drought and flood prone areas	390.5	8
R&D	Water research studies (quality)	388.0	9
WATSAN	Household level point of use	340.5	10
Policy	Support development of regulatory mechanism	306.0	11
R&D	Support knowledge network	232.5	12

WAISP made revisions to the report based on presentations and discussions with USAID Mission staff, particularly as they relate to the long-term priority investments. The WAISP team also presented the project and sector assessment outcomes to numerous USAID, embassy, and stakeholder audiences as part of the consultative process to finalize the report. Table 3 lists the presentations delivered regarding the Component 1 findings.

<b>Table 3: WAISP Presentations</b>	
<b>Audience</b>	<b>Topic</b>
REDCOH (Builders association)	National Bureau for Water Use Efficiency
USAID	Unique water sector needs and approaches in Rajasthan
US Embassy stakeholder workshop	Water Issues in India: Opportunities and Challenges
World Water Day (US Embassy, New Delhi)	Sector Assessment and challenges
USAID Food Security, Clean Energy, and Health Offices	Sector Assessment and challenges
USAID Water and Energy Teams	Findings from the sector assessment
USAID Mission Director	Findings from sector assessment

## ***Component 2: Analysis of the Potential and Feasibility of Inter-sectoral Water Use and Institute More Efficient Water Use Practices***

Subsequent to the Assessment Report, WAISP developed and presented concept notes based on the original work plan for potential pilot activities, and discussed numerous intervention options with USAID/India. However, USAID determined to issue a Change Order to redirect the scope of the work based on numerous factors: (1) Change in the development assistance scenario in India; (2) Shift in focus within USAID from Water, Sanitation and Hygiene (WASH) to a broader climate change agenda; and (3) A realistic assessment of what was achievable within the limited time frame remaining for the program. The draft work plan with changed scope of work, redefined deliverables and realigned budget was sent for approval to USAID in December 2011.

WAISP engaged in discussions with USAID (and one meeting with GOI) between January and March 2012 to refine the Annual work Plan for 2012. Based on these discussions, the revised plan was submitted to USAID on 16 March 2012, which was approved on 19 March. The broad approach was to study overall municipal water management, water use patterns, and wastewater recycling in three identified municipal-industrial conglomerations, so as to make recommendations regarding water use efficiency options and inter-sectoral water reuse. USAID redirected a portion of WAISP funding to the Confederation of Indian Industry's (CII) Triveni Water Institute to conduct water sector interventions with industries in the same cities, while WAISP focused primarily on domestic and institutional users. After numerous field visits conducted with USAID and CII in early 2012, Faridabad, Jaipur, and Pune were selected as the three municipalities for Component 2. As noted previously, the selection rationale was based on the following criteria: (1) water scarcity concerns with high potential for growth; (2) feasible within a one-year time frame; (3) enables donors and the municipalities to follow-up with longer-term initiatives based on the results; (4) municipal interest to focus on the interface across the urban built environment and industry; (5) linkages with CII's networks for follow-up.

All of the new Component 2 tasks were designed in such a way as to link closely and provide a comprehensive look at the state of urban water use in the three target municipalities. WAISP implemented each task along semi-parallel efforts, ultimately combining the deliverables into *Water Use Efficiency Guideline* reports tailored for Faridabad, Jaipur, and Pune. In addition, WAISP consolidated the information to develop a summary document to compare and contrast the water situations, and share urban water use trends and tendencies more broadly.

### ***Task 2.1: Background paper on current status of water usage, and climate change impact analysis***

WAISP developed background papers on the current status of water usage, wastewater treatment, and extent of reuse (including inter-sectoral reuse) in Faridabad, Jaipur, and Pune. Also for this same section of the municipal guidelines document, WAISP prepared high level summary reports on climate change vulnerabilities related to water resources in the three cities. WAISP shared these documents with USAID and CII for comment in September 2012, and incorporated these as Chapter 2 of each Guideline report. This section describes the hydrologic setting of each city, and presents the existing water supply and delivery and wastewater infrastructure.

The climate change section focuses on the potential short and long-term impacts on water resources for each city. In this sense, it places emphasis on existing analyses with regards to the potential and likelihood of future water resource challenges due to reduced rainfall during the rainy season, increased rainfall during the dry season, hotter summers, accelerated glacier melt, and more severe or intense rainfall events. The principle impacts, therefore, relate to the vulnerability of reduced groundwater recharge, droughts, floods and water logging.

### ***Task 2.2: Water Use Efficiency Guideline***

While the goal of developing a manual for water management in the municipal sector, including inter-sectoral water usage, was specific to Task 2.2, the Guideline evolved to encompass all sub-tasks under Component 2. In this way, the emphasis under this subtask became an urban water use survey in each city. WAISP designed and implemented a primary survey to supplement other primary and secondary data and qualitative information collected on water and wastewater trends in each city. The surveys assessed the pattern of water use within each city area across 14 different segments of water users, including domestic and institutional users, and covered 1,576 users. While it had a limited reach in total size, the survey yielded valuable reinforcing information that, when taken in concert with other data sources, studies, and priorities, suggested trends helpful to decision-makers interested in identifying opportunities for water use optimization.

The survey questionnaires used by the team during interviews were designed separately for each category of water use and in different sections of the city (inner core, peri-urban, periphery or new growth areas). The survey was designed by the WASIP team and carried out by the All India Institute of Local Self Government (AIILSG). Across the three cities, we found more similarities than differences with regards to general water use practices, and all cities indicated a very broad scope to improve urban water use efficiency. The surveys reinforced recommendations supported by other conclusions drawn from the reviews of climate change vulnerabilities, strengths and weaknesses of the legal and policy framework, and other studies. The results of surveys are presented in Chapter 4 of each Guideline.

In terms of the final water use efficiency guideline under this task, the actual documents printed and incorporating all inputs from Component 2 were:

- *Municipal Water Use Efficiency Guideline: Jaipur*
- *Municipal Water Use Efficiency Guideline: Faridabad*
- *Municipal Water Use Efficiency Guideline: Pune*
- *Municipal Water Use Efficiency Guideline - A Review of Three Cities: Faridabad, Jaipur, and Pune*

### ***Task 2.3: Municipal Legal Framework Directive***

The objective of this task was to develop a detailed report on the state level municipal legal and policy framework for water management and use in the states of Haryana, Maharashtra, and

Rajasthan, and specifically for the Municipal Acts of Faridabad, Jaipur, and Pune. The study, incorporated as Chapter 3 in the Guideline reports, analyzes the legal considerations relating to municipal water use efficiency, including provisions for water recycling and reuse.

Water is a state subject in India, but related legislation and policies span many institutions at the national, state, and local levels. For their part, of the three cities reviewed, all have progressive policies and laws of various kinds that encourage water use efficiency and conservation, such as rainwater harvesting, for example. However, despite the many existing measures to promote water use efficiency, the lack of a holistic regulatory and institutional framework leads to an ad-hoc and uncoordinated implementation approach. Moreover, enforcement to assure effectiveness is generally quite weak, which led the WAISP team to outline a number of recommendations for regulatory improvements, including through economic instruments as well as standards and labeling.

#### ***Task 2.4: Identification and Analysis of Technology Options***

As part of the urban water use review, WAISP assessed the available technology in the marketplace through meetings with architects and builders in each of the three cities, supplemented with site visits. The WAISP team identified several business opportunities for water recycling and reuse for the three cities, which was shared at close down workshops with stake holders in Faridabad, Jaipur, and Pune during December 2012. This included opportunities for water recycling at bus and train washing stations, wastewater reuse for co-located printing and dyeing industries in Jaipur, decentralized wastewater treatment systems, including root zone and other eco-friendly approaches, as well as more effective rainwater harvesting for groundwater recharge.

WAISP also met with a number of water equipment retailers, and investigated the availability of water efficient fittings and appliances in local markets, and their demand compared to conventional products. In Chapter 5, the report outlines opportunities and recommendations to improve the potential for more efficient technologies, including those relevant to water conservation, water reclamation and reuse, as well as through enabling environment reforms (the use of legal and economic instruments).

#### ***Task 2.5: Opportunity Mapping***

This subtask comprised two essential components, one outlining implementable wastewater recycling projects in the target cities, and the second presenting national and international best practices in water use efficiency, recycling and reuse. As mentioned and linked with Task 2.4, the specific opportunities and recommendations for each city are presented in Chapter 5 of each Guideline report. In Faridabad, for example, these include recommendations to promote decentralized water recycling, such as with the textile and dyeing shops that are large water consumers; decentralized sewage treatment coupled with water reuse to irrigate municipal parks; further studies on the potential for rainwater harvesting given very poor uptake to date; promote

standards and labeling for water fixtures and water-using appliances to better inform consumers about the performance differences of these products.

In addition, WAISP prepared and documented national and international best practice case studies, examples of regulations advancing water efficient technologies and labeling, and reference examples of water reclamation and reuse. These are presented in Annex 1 of each Guideline report. Examples include case studies from the Pune Marigold Housing Society on direct potable reuse, and water use efficiency by Mahindra World City Special Economic Zone in Jaipur. International case references include, for instance, a description and link to the U.S. Department of Housing and Urban Development's Water Conservation Benchmarking Tool, and California Urban Water Conservation Council's Water Saver Home tool, among others. These provide water utility and homeowners alike important information about how to analyze water consumption and improve efficiency.

Given the importance of promoting awareness and encouraging behavior change among end users, best practices in regulatory approaches – including economic instruments to influence decision making – are also presented within Annex 1. This sub-section of the Guideline includes examples and references to legislation in the United States, Australia, the United Kingdom, and elsewhere related to mandates for efficient fixtures, voluntary conservation measures, and labeling programs to facilitate consumer awareness for appliances, among others. The final sub-section of this Guideline Annex presents an annotated bibliography of water reclamation and reuse resources and materials, including website links. Some of the relevant materials include, for instance, *Water Reuse: Potential for Expanding the Nation's Water Supply through Reuse of Municipal Wastewater*, by the National Research Council – highly relevant as a premise for WAISP's Component 2. Also, *Water Conservation in the Professional Car Wash Industry*, from the International Car Wash Association, given the relevance to the bus depots in the cities studied.

### ***Task 2.6: Dissemination***

As WAISP began to implement Component 2 activities, the team held direct consultations with the Municipal Commissioner's offices in Faridabad, Jaipur, and Pune to fully explain the scope of work, obtain approval, and plan a local stakeholder consultation. We intended the stakeholder consultation to be combined as a launch event coordinated with CII, but this was ultimately not possible due to the increasing divergence of CII's activity timeline. Therefore, WAISP hosted the consultations in each city in September 2012 with support from AIILSG, and engaged architects, builders, engineers, consultants, and others. These consultations afforded an opportunity to present and validate the project objectives, methodology (including for the water users survey), and the expected outputs from Component 2. The meetings catalyzed discussions regarding the potential areas for improving water use efficiency, strengths and weaknesses of current approaches, and what is really needed in order to sustain gains and leverage successes.

Specifically, in Pune, the Municipal Commissioner chaired the consultation workshop, and in Jaipur, the Principal Secretary of the Urban Development Department, Government of Rajasthan (GOR) chaired the meeting. The Secretary, Local Self Government of GOR also participated in

Jaipur. Senior officials from Jaipur Nagar Nigam (Municipal Corporation), Jaipur Development Authority and the Public Health Engineering Department (PHED) – the three principal agencies involved in managing water resource and waste water in the city – participated actively to refine the survey methodology. In Faridabad, the Joint Commissioner, Municipal Corporation of Faridabad (MCF) chaired the consultation. The key officials from MCF and Haryana Urban Development Authority (HUDA) participated and endorsed the methodology adopted.

In addition, in the Pune and Jaipur consultations, Ms. Emily Waytoti, USAID/India's Energy and Environment Officer, made opening remarks regarding USAID's priorities under WAISP. In Faridabad, Anand Rudra, Project Management Specialist from USAID, presented the USAID perspective. In addition, at the same meeting, representative from the Population Foundation of India (USAID's implementing partner for the Health for Urban Poor project) also participated. In all three consultations, representatives from CII participated and presented their perspectives and planned contributions through their own program.

In December 2012, WAISP hosted three Close-Down Workshops, one in each city, to present the findings from the surveys and analyses performed, which was a summarized briefing of each *Municipal Water Use Efficiency Guideline* report. The team developed presentations on the program background, climate change vulnerabilities related to water resources, legal and policy framework, water use survey results, and associated opportunity mapping for water use efficiency. The team incorporated feedback and took note of updates from the municipalities regarding measures already underway. The Guideline reports were finalized and printed in early February 2013, and hard copies submitted to USAID/India for dissemination.

At the Jaipur and Faridabad Close-Down Workshops, Ms. Emily Waytoti provided an opening welcome for the events on behalf of USAID. The Jaipur Consultation was chaired by the Chief Engineer from the Jaipur Development Authority, while in Pune the Superintendent Engineer chaired the event. The Commissionaire and Mayor, as well as Deputy Mayor and Deputy Commissionaire chaired the Faridabad close-down workshop. Also, CII again presented their perspectives and shared information about their parallel activities with USAID at the Jaipur and Faridabad events.

Finally, WAISP hosted a National Level Consultation Workshop on Water Efficiency in Urban Areas on 28 January 2013 in New Delhi. The objective was to disseminate results of the WAISP Component 2 studies and surveys in Faridabad, Jaipur, and Pune to a broader audience. The agenda was designed to highlight priority issues in the urban water sector; share selected opportunities applicable beyond the three cities to optimize water use and improve climate resilience; and share national and international best practices in the area of water use efficiency. WAISP disseminated the *Municipal Water Use Efficiency Guideline – A Review of Three Cities: Faridabad, Jaipur, and Pune*, as a summary report of the individual city level Guideline reports.

The Director of USAID's Clean Energy and Environment Office, Jeremy Gustafson, offered opening remarks to the participants after a welcome address by Ashish Deosthali, Executive Director of AIILSG. Pankaj Jain, IAS Secretary, Ministry of Drinking Water and Sanitation with the Government of India, made the keynote address. Presentations were delivered by the WAISP team and consultants regarding the studies and finding, and importantly – showing the

buy-in and ownership of the results by each municipality – The Executive Engineers from each of the three counterpart municipalities presented the opportunity mapping for their city, guided by the results of the report. In all, the event brought together over 70 participants from 11 states across India, including Municipal Commissioners, Municipal Executive Engineers, NGO representatives, private sector representatives including from business associations, academia, and others.

## ANNEX 1: Results Reporting

Outputs (PMP/OP/COP) Indicators	FY 2012 Target	FY 2012 Actual	FY 2013 Target	FY 2013 Actual	FY 2014 Target	Date of Last DQA
No. of institutions with improved capacity to address climate change issues as a result of USG assistance.	4	0*	15	59	n.a.	n.a.
Number of stakeholders with increased capacity to adapt to the impacts of climate variability and change as a result of USG assistance.	160	0*	160	128**	n.a.	n.a.

\*The FY 2012 target was not met (reported as 0) for both indicators due to the extension of the task order through February 15, 2013. Results are therefore reported for FY 2013

\*\* The total number of individual stakeholders reported represents those attending city level or national level workshops hosted by the WAISP project. The total figure is less than the anticipated target for two reasons. First, as agreed with USAID, WAISP was to achieve this target by contributing to events hosted by the Confederation of Indian Industry (CII) per Task 2.6 "Contribute to sharing of experiences and recommendations through state level and national level events." CII's convening power was meant to generate high levels of participation and also engage industry leaders in each city, and a national level audience. However, CII is funded separately by USAID and had not advanced sufficiently in their programming to engage industry or host workshops. As a result, WAISP hosted several events directly on short notice, contracting with the All India Institute of Local Self Government (AIIILSG). This enabled WAISP to engage a more targeted audience relevant to the WAISP surveys and areas of research, including municipal decision-makers and selected urban water sector stakeholders, but not stakeholders within CII's sphere of influence with industry. The national level event was similarly convened by AIIILSG within a very short timeframe after USAID approval to proceed (approximately 5 weeks). It is worth noting that the deliverables produced from Task 2 are also being disseminated in hard copy reports to 78 additional individuals across the states of Haryana, Maharashtra, and Rajasthan, though these individuals did not participate in related workshops and are therefore not counted in the above reported indicator totals.

## ANNEX 2: Key Informant Interviews

The table below lists the persons and organizations WAISP met during the course of the program for key informant interviews.

NAME	INSTITUTION
<b>Government</b>	
S.K. Aggarwal	Executive Engineer, MCF
Ashok Arora	S.P.O., MCF
R.K. Arya	Executive. Engineer, HUDA, Faridabad
Vinay Bharadwaj	Hydrologist, Ground Water Department, Government of Rajasthan
Anil Bhargava	Chief Engineer, PHED (Urban), Rajasthan
D.R. Bhaskar	Executive Engineer, MCF
A.K.Bhatia	Regional Director, Central Ground Water Board (Faridabad jurisdiction)
T.D. Chopra	Superintendent Engineer, HUDA, Faridabad
Sudhir Garg	Ministry of Water Resources
Manish Goyal	Add. Director Local Body
P.K.Goyal	Secretary, LSG, Jaipur
Sushil Gupta	Central Ground Water Board
A.K. Gulati	Executive Engineer, HUDA, Faridabad
Anju Harsha	Assistant Engineer, PHED, Jaipur
I.C. Jain	Executive Engineer, HUDA, Faridabad
S.P. Jindal	Sub Divisional Officer, PHED, Faridabad
Mr Katara	Chief Engineer, Municipal Corporation of Faridabad
Pramod Katewa	Exec. Engineer, Jaipur Development Authority (JDA)
I.D.Khan	Add. Chief Engineer PHED, Jaipur
Jyoti Khandelwal	Mayor, Jaipur Municipal Corporation
Gopi Krishna Kumar	Department of Science and Technology
Mr. Krishnaswamy	Superintending Engineer CMWSSB Chennai
Lalit Kumar	Central Water Commission, MOWR
Mukesh Kumar Solanki	Joint Commissioner, MCF
S. Kumar	Junior Engineer, MCF
S.C. Kush	Chief Town Planner, Haryana Urban development Authority (HUDA), Faridabad
A.K. Mathur	Retired Hydrologist, Ground Water Department, GOR
N.C. Mathur	Director (Project), JDA , Jaipur
Kamal Mazumdar	Department of Drinking Water Supply
Tarachand Meena	Director, DLB, Jaipur
P.K. Mehrotra	Ministry of Water Resources (MOWR)
Anil Mehta	Executive Engineer, JNNURM, Faridabad
D K Meena	Exec. Engineer, Jaipur Municipal Corporation (JMC)

Mittal	Junior Engineer, MCF
Ms. Nivedita	Ministry of Urban Development
C. Prakasham,	Engineer Director, Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)
Anupam Prasad	River Data Directorate, Central Water Commission, MOWR
A.L. Radhakrishnan	Superintending Engineer CMWSSB (construction)
Roopa Ram	Chief Engineer, PHED (Special Projects), Rajasthan
Kuldeep Ranka	Commissioner, Jaipur Development Authority (JDA)
Bisweswar Rath	Rainfed Farming Systems, Ministry of Agriculture
J.S. Samra	National Rainfed Area Authority (NRAA)
G.S.Sandhu	Principal Secretary, Urban Development Department, Govt of Rajasthan
K.D. Shamra	National Rainfed Area Authority (NRAA)
B.D. Sharma	Superintendent Engineer, JDA, Jaipur
Dinesh Sharma	Superintendent Engineer, PHED, Jaipur
Yogesh Sharma	Superintendent Geohydrologist, Ground Water Department, Government of Rajasthan
Brijesh Sikka	Ministry of Environment and Forest
Avdesh Singh	Commissioner, JMC (HQ)
Nisha Singh	Joint Secretary , Ministry of Urban Development, GOI
Ombir Singh	Assistant Engineer, MCF
Satpal Singh	Executive Engineer, HUDA, Faridabad
N K Singhal	Superintendent Engineer, JDA, Jaipur
Sunil Singhal	Executive Engineer, JDA, Jaipur
Mr. Subrayamanyam	Executive Engineer, CMWSSB Chennai
Vivek Sukhija	Hydrologist, Ground Water Department, GOR
V. S. Sunda	Additional Chief Engineer, JDA, Jaipur
Mr Uppal	Planning Commission
Gyan Prakash Wadhwa	Assistant Engineer, MCF
<b>NGOs/Civil Society</b>	
Sara Ahmed	IDRC (former Gender Water Alliance)
Sharad Gaur	Center for Environmental Engineering, New Delhi
Ashok Jaitly	The Energy and Resources Institute
Kaushik	President, Residents' Welfare Association, Faridabad
Radha Khan	Jagori
Indira Khurana	Water Aid
Seema Kulkarni	Soppecom
Aparna Mahajan	Director-Institute of Rural Research and Development –Jey Sehgal Foundation.
Mukesh Mathur	National Institute of Urban Affairs
Kalpana Naidu	PATH
Sanjay Pande	Population Foundation of India
Atul Pandey	Center for Environmental Engineering, New Delhi
Kanu Priya	Jal Bagirathi
Suresh Rohilla	Center for Science and Environment (CSE)

Shipra Saxena	Population Foundation Of India, HUP program partner of USAID
Jane Scheukoske	Board Member –Institute of Rural Research and Development – Jey Sehgal Foundation
Jey Sehgal	Institute of Rural Research and Development Jey Sehgal Foundation
Chetan Vaidya	National Institute of Urban Affairs
<b>Academic/ Research Institutions</b>	
Shyam Agarwal	Director, Greentech Solution, Jaipur
Nisha Desai Bidwal	Confederation of Indian Industries (CII)
Pranab Dasgupta	CII, Jaipur
Ashish Deosthali	Executive Director, AILSG
Sanjay Gupta	Executive Officer, CII, Jaipur
Tanuj Grover	Regional Director, AILSG
Dr Barun Kanjilal	Professor, Indian Institute of Health Management Research (IIHMR), Jaipur
Dr. Sanjay Mathur	Malaviya National Institute of Technology (MNIT)
Kavita Nair	Head , CII, Haryana
Kapil Narula	CEO, Triveni Water Institute, CII, New Delhi
Dr Sabyasachi Nayak	Executive Officer, CII, Jaipur
Atul Pande	Center for Environmental Engineering, New Delhi
Chetan Pandit	National Water Academy
Prof. Rakesh Pandey	MIT
Dr Sneha Palnitkar	Director, All India Institute of Local Self Governance (AILSG)
Anjal Prakash	SaciWaters
Dr. Goutam Sadhu	IIHMR, Jaipur
Sanjay Saxena	Technical service provider, Durga Associates
Sreekesh	Jawaharlal Nehru University
Dr Himani Tiwari	HUP, IIHMR, Jaipur
K.S.Venkatagiri	Principal Counselor, CII Sohrabji Godrej Green Business Centre, Hyderabad
<b>Donors</b>	
Lizette Burgers	UNICEF
Aidan Cronin	UNICEF
J.V.R. Murthy	World Bank (Water and Sanitation Project, WSP)
Dr. Satya Priya	UN Food and Agriculture Organization (FAO)
Clare Shakya	Department for International Development (DFID), UK
M.M. Singh	Japan International Cooperation Agency (JICA)
Dirk Walther	German Technical Cooperation (GIZ)

## Annex 4: Site Visits Conducted

The WAISP team conducted numerous site visits throughout the project as part of the process to understand national examples in municipal water use efficiency, identify candidate counterpart municipalities for DR 2 activity implementation, identify case studies, among other objectives related to sector priorities and task implementation processes. A summary of the site visits is presented in Table 3 below.

**Table 3: Summary of Site Visits**

Quarter	Description
2	<ul style="list-style-type: none"> <li>• Jodhpur: Jal Bagirathi Foundation</li> <li>• Kanpur: Rajiv Sinha, IIT</li> <li>• Lucknow: Phanish Sinha</li> <li>• Pune: Chetan Pandit, National Water Academy</li> </ul> <p>These visits were to attend a workshop on river dynamics and flood hazard assessment, and explore and learn about grassroots social sector activities and local government priorities, challenges, and lessons.</p>
3	<ul style="list-style-type: none"> <li>• Lucknow: Pratinidhi Samiti and Ujala, to explore slum level issues and ongoing water and sanitation awareness interventions.</li> <li>• Lucknow: With MOWR, visited the Central Ground Water Board and UP Jal Nigam to discuss water quality issues and MIS uses and needs.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Unno and Kanpur: With USAID visited District Administrative Officer, Kanpur Rural to discuss water quality and security. Also met Unno district development officer and Exec. Engineer, UP Jal Nigam.</li> <li>• Jaipur: With USAID visited CII Triveni Water Institute to discuss pilot studies and collaboration.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Jaipur: COP served as a judge for the CII - Sohrabji Godrej Green Business Centre National Award for Excellence in Water Management 2011.</li> </ul>
6	<ul style="list-style-type: none"> <li>• Faridabad: COP Renu Gera, G. Prasad Babu and Mr. Pranab Dasgupta from CII visited Faridabad Municipal Corporation to explore the possibility of taking up Faridabad for the pre feasibility study.</li> <li>• Chennai: COP Renu Gera, G. Prasad Babu and Mr. Pranab Dasgupta from CII visited Chennai Metro Water to have better understanding of the issues and the interventions which provided the desired results in enhancing water supply services for the city of Chennai</li> <li>• Jaipur: COP Renu Gera, G. Prasad Babu, Mr. Pranab Dasgupta and Sanjay Gupta from CII visited Jaipur municipal authorities to meet the senior Government officials for a better understanding of the issues related to water for the city</li> </ul>
7	<ul style="list-style-type: none"> <li>• Pune: Discussed program components with Municipal Commissioner and obtained approval for conducting prefeasibility study.</li> </ul>

	<ul style="list-style-type: none"> <li>• Hyderabad: Discussed program components with Municipal Commissioner to obtain approval for conducting prefeasibility study.</li> <li>• Faridabad: Discussed program components with Chief Engineer and Executive Engineer (Jawaharlal Nehru National Urban Renewal Mission, JNNURM) to obtain approval for conducting prefeasibility study. Followed-up for data collection, and meeting to discuss program with Municipal Commissioner to obtain approval for conducting prefeasibility study.</li> <li>• Pune: Meeting with potential local partners.</li> <li>• Jaipur: JDA, PHED, Chief Engineer, Ground water department to discuss program components and request permission for data collection.</li> </ul>
8	<ul style="list-style-type: none"> <li>• Jaipur: Rain water harvesting structures, to understand the GOR initiatives; Recycling of sewage at Jawahar Circle; Mahindra Special Economic Zone where treated waste for 200 KL sewage treatment plant (STP) is used presently for gardening, with plans for use in toilet flushing; Use of water in Sanganer handloom textile industries.</li> <li>• Pune: Fifty million liters/day STP at Erandwani, an extended aeration plant for secondary treatment outsourced to private vendors; Water treatment unit at Warge, maintained by private contractors. Visited a primary school and a wholesale dealer of sanitary fittings (TOTO) to pre-test the draft survey tools, and subsequently, to conduct a raw data review from the first day of survey implementation.</li> <li>• Faridabad: Discussions with Executive Engineer, Municipal Corporation and his staff on critical issues relating to water supply and sewerage systems, operation and maintenance and revenue/tariffs for the Background Paper.</li> </ul>
9	<ul style="list-style-type: none"> <li>• Jaipur: Meetings with government officials to discuss current water use; follow-up visit to Jawahar Circle sewage recycling and Mahindra Special Economic Zone; visit to Mansagar Lake PPP model.</li> <li>• Hyderabad: Participation in a national workshop for combined effluent treatment plants.</li> </ul>

## Annex 5: WAISP Deliverables

Task Number	Task Order Deliverable	Deliverable Submitted
<b>Component 1: Assess Current Opportunities and Constraints in the Water Sector and Identify Areas for Further Intervention</b>		
1.1	Synthesis of current sector status and trends at the national and regional/local scale, with a particular focus on climate change adaptation and food security.	Chapters 1, 2, and 3 of the <i>Water Sector Assessment</i> , June 2011
	Summary of government policy/legal structure and institutional framework, including GOI national, state and local levels	Sections 1.3, 1.5, and 1.6 of the <i>Water Sector Assessment</i> , June 2011
	Summary of recent and current USAID/India and other USG investments and lessons learned/best practices documented	Section 1.4 of the <i>Water Sector Assessment</i> , June 2011
	Summary of civil society, NGO/PVO, and private sector actors in the water sector	Section 1.6, 2.8, 3.14, and Annex D of the <i>Water Sector Assessment</i> , June 2011
	Donor mapping of current and planned investments in the water sector as a whole, specifically highlighting activities that may intersect with climate change adaptation and food security interests	Annex D of the <i>Water Sector Assessment</i> , June 2011
	Comprehensive analysis of transnational and transboundary water issues as they relate to water supply and management in India.	Chapter 1 of the <i>Water Sector Assessment</i> , June 2011
1.2	Finalization of site selection criteria in collaboration with USAID/India;	Chapter 5 of the <i>Water Sector Assessment</i> , June 2011
	Analysis and scoring of all final selection criteria for geographic prioritization drawing on secondary information sources, existing studies, USAID documents, 3 selected site visits, and interviews with key informants in USAID/India, the GOI, state and local governments, other donors, and NGO/private sector actors as relevant	Chapter 5, Annexes B, C and E of the <i>Water Sector Assessment</i> , June 2011
	Final report documenting analysis and outlining rationale for selection of at least two target geographic areas for this program, endorsed by USAID/India	Chapters 5 and 6 of the <i>Water Sector Assessment</i> , June 2011
1.3	Summary document outlining options for potential future areas of USAID investment in the water sector that highlight USAID/India's comparative advantage with respect to other donors and GOI interventions	Chapter 6 of the <i>Water Sector Assessment</i> , June 2011
	Identification of private sector investment opportunities including opportunities for strategic Global Development Alliances (GDAs) that mobilize private sector engagement in water resources management.	Sections 1.6, 3.14, 6.4 of the <i>Water Sector Assessment</i> , June 2011
<b>Component 2: Water Use Efficiency in the Urban Context</b>		
2.1	Brief background paper on current status of inter-sectoral water use, national trends on water use efficiency in the municipal sector	<ul style="list-style-type: none"> <li>- Draft background papers for Faridabad, Jaipur and Pune, submitted to USAID Aug/Sep 2012</li> <li>- Final background is the "City Profile" subsection of the Introduction of each <i>Municipal Water Use Efficiency Guideline</i></li> </ul>

	Assessment of specific climate change challenges for the 3 identified sites/regions	<ul style="list-style-type: none"> <li>- Draft climate change vulnerability reports for each city completed Nov 2012 (provided on flash drive to USAID in Jan 2013)</li> <li>- Final assessment “Summary of Climate Change Vulnerability” subsection of within Chapter 2 of each <i>Municipal Water Use Efficiency Guideline</i></li> </ul>
	Assessment of current wastewater treatment levels and downstream impacts in the 3 identified regions	Contained within Chapter 2 of each <i>Municipal Water Use Efficiency Guideline</i>
2.2	Manual/s for water management in the municipal sector, and inter-sectoral water usage	<i>Municipal Water Use Efficiency Guideline</i> reports (one for each Jaipur, Faridabad, and Pune, as well as one national Summary report), submitted Jan and Feb 2013
	Survey water-use efficiency standards for the municipal sector, especially for buildings	Chapter 4 of each <i>Municipal Water Use Efficiency Guideline</i>
2.3	Recommendations on the legal and policy aspects required to enable and encourage implementation of wastewater recycling projects	<ul style="list-style-type: none"> <li>- Draft <i>Report on the Municipal Legal and Policy Framework for Water Management and Use</i> for each city completed Nov 2012 (provided on flash drive to USAID in Jan 2013)</li> <li>- Final Legal and Policy Framework summary provided as Chapter 3 of each <i>Municipal Water Use Efficiency Guideline</i>, with recommendations contained in the “Opportunities for Legal and Economic Instruments” subsection within Chapter 5</li> </ul>
	New business opportunities for around 10 technologies/products in water sector pertaining to water use efficiency within the municipal sector are assessed and documented	Chapter 5 of each <i>Municipal Water Use Efficiency Guideline</i>
2.4	Results will be shared at national and regional symposia and next steps will be discussed with target service providers	<ul style="list-style-type: none"> <li>- Jaipur Close-Down Workshop, 5 Dec 2012</li> <li>- Pune Close-Down Workshop, 7 Dec 2012</li> <li>- Faridabad Close-Down Workshop, 19 Dec 2012</li> <li>- New Delhi, National Level Consultation Workshop on Water Efficiency in Urban Areas, 28 Jan 2013</li> </ul>
2.5	Mapping of at least 7 implementable wastewater recycle projects both large and pilot scales especially in climate vulnerable areas	Chapter 5 of each <i>Municipal Water Use Efficiency Guideline</i>
	Documentation of at least 10 existing national and international	Annex 1 of each <i>Municipal</i>

	best practices in water use efficiency/recycling and reuse in the national and international spheres pertaining to the municipal sector and intersectoral water useage	<i>Water Use Efficiency Guideline</i>
2.6	Contribute to sharing of experiences and recommendations through state level and national level events	<ul style="list-style-type: none"> <li>- Jaipur Close-Down Workshop, 5 Dec 2012</li> <li>- Pune Close-Down Workshop, 7 Dec 2012</li> <li>- Faridabad Close-Down Workshop, 19 Dec 2012</li> <li>- New Delhi, National Level Consultation Workshop on Water Efficiency in Urban Areas, 28 Jan 2013</li> </ul>

## Annex 6: Close-Down Event Workshop Participant Lists

Participant List – Faridabad Close-Down Workshop			
No.	NAME	DESIGNATION	ORGANISATION
1	Arvind Chauhan	Team Member	All India Institute of Local Self Government (AIIILSG)
2	Ashish Deosthali	Exec. Director	AIIILSG
3	Dhruv	Team Member	AIIILSG
4	Tanuj Grover	Regional Director	AIIILSG
5	Suresh	Team Member	AIIILSG
6	Bhuwan Tiwari	Team Member	AIIILSG
7	T.D. Chopra	Chief Town Planner	Haryana Urban Development Authority (HUDA)
8	Mahander Singh	Superint. Engineer	HUDA
9	Rajan Sharma	Sub-divisional Engineer	HUDA
10	Satpal Singh	Exec. Engineer	HUDA
11	R. K. Bansal	Exec. Engineer	Municipal Corporation of Faridabad (MCF)
12	D. R. Bhaskar	Exec. Engineer	MCF
13	Anand	Sub-divisional Officer (SDO)	MCF
14	Ashok Arora	Mayor	MCF
15	S. K. Arya	Exec. Engineer	MCF
16	Khem Chand	JE	MCF
17	S.C. Chawla	SE	MCF
18	B. K. Kardam	SDO/Assistant Engineer (AE)	MCF
19	O.P. Kardam	SDO/AE	MCF
20	Raj Kumar	SDO/AE	MCF
21	Vinod Kumar	JE	MCF
22	Anil Mehta	Exec. Engineer	MCF
23	Birender Pahil	SDO	MCF
24	Chandan Pal	P.A. to Mayor	MCF
25	Ramnik Passi	JE	MCF
26	Gyan Prakash	Assistant Engineer	MCF
27	Radheshyam	Assistant Engineer	MCF
28	Prem Raj	SDO /Assistant Engineer (AE)	MCF
29	Satish	Joint Commissioner	MCF
30	Hawa Singh	JE	MCF
31	Nawal Singh	SDO/AE	MCF
32	Shyam Singh	AE	MCF
33	Ravi Singla	District Town Planner	MCF
34	D. Suresh	Commissioner	MCF
35	Raj Pal Verma	AE	MCF
36	Lalit Arora	Exec. Engineer	Public Health Engineering Department (PHED)

37	S. P. Jindal	SDO	PHED
38	Pawan Kumar	SDO	PHED
39	Emily Waytoti	Energy & Environment Officer	USAID
40	Renu Gera	Chief of Party	WASIP
41	Dipak Roy	Technical Advisor	WASIP

<b>Participant List – Jaipur Close-Down Workshop</b>			
<b>No.</b>	<b>NAME</b>	<b>DESIGNATION</b>	<b>ORGANISATION</b>
1	Mr. Ashish Deosthali	Exe. Director	AILSG
2	Mr. Amit Jakhar	Team Member	AILSG
3	Mr. Pranab Das Gupta	Senior Counsellor	Confederation of Indian Industries (CII)
4	Mr. Sanjay Gupta		CII
5	Mr.S Nayak		CII
6	Mr.Omprakash kala	Additional Engineer	Directorate of Local Bodies
7	Mr. Shayam Agarwal	Director	Green Tech solution
8	Mr.Maya lal Saini	Additional Engineer	Jaipur Development Authority (JDA)
9	Mr. Pradeep Naithani	Superint. Engineer	Jaipur Municipalo Corporation (JMC)
10	Mr.Mukesh Goyal	Exec. Engineer	PHED
11	Mr. C. L. Jatav	Exec. Engineer	PHED
12	Mr. I. D. Khan	Additional Chief Engineer	PHED
13	Mr.Mohon Saini	Exec. Engineer	PHED
14	Mr.Dinesh Sharma	Superint. Engineer	PHED
15	Mr.Praveen Ankodia	Exec. Engineer	Rajasthan Urban Infrastructure Development Project (RUIDP)
16	Dr. Anil Sharma	Super. Engineer	Rajasthan Urban Infrastructure Development Project (RUIDP)
17	Mrs Emily Waytoti	Energy & Environment Officer	USAID
18	Mrs. Renu Gera	COP	WASIP
19	Mr. Dipak Roy	Technical Advisor	WASIP
20	Mr. Walter Weaver	Manager, Water	WASIP
21	Mr. Ajay Kumar Jangid	Architect	Xponent Design solutions
22	Mrs. Manisha Sharma	Architect	Xponent Design solutions

<b>Participant List – Pune Close-Down Workshop</b>			
<b>No.</b>	<b>NAME</b>	<b>DESIGNATION</b>	<b>ORGANISATION</b>
1	Ashish Deosthali	Executive Director	AILSG
2	Aniruddh Padale	Team Member	AILSG
3	Mr. Priya	Team Member	AILSG
4	Nikhil Vaiude	Team Member	AILSG
5	Sandeep Khardekar	President	Creative Foundation
6	Vishwas Yewale		Jaladini Pratishtan
7	Sharad Mahajan	Director	Mashal
8	Swah Mudane	Project Coordinator	Mashal
9	SNC Jathar		Nagrik Chetan Mancha
10	Vivek Velenkar		Nagrik Mancha
11	Sandeep Sonigra	Governing Body Member	Orange Country Foundation
12	Rajendra Holani	Director	PRIMOVE
13	Y.G. Deshmukh	Exec. Engineer, Garden Department	Pune Municipal Corporation (PMC)
14	M.A. Jagtap	Exec. Engineer, Water and Sewage	PMC
15	V.G. Kulkarni	Superint. Engineer Water work Department	PMC
16	Santosh Kumar Kambale	Dy. Garden Superintendent (Park)	PMC
17	Vinod Bodhankar	President	Setu
18	Sayali Joshi	Vice President	Shrishti Eco-Research Institute (SERI)
19	Renu Gera	COP	WASIP
20	Dipak Roy	Technical Advisor	WASIP
21	Walter Weaver	Manager, Water	WASIP

<b>Participant List – National Consultation Workshop, New Delhi</b>				
<b>No.</b>	<b>NAME</b>	<b>DESIGNATION</b>	<b>ORGANISATION</b>	<b>STATE</b>
1	Ajay Aggarawal	Executive Director	AILSG	Gujarat
2	Jatin Modi	President	AILSG	Gujarat
3	Nachiket	Executive Director	AILSG	Gujarat
4	K. U. Mistry	Chairman	Gujarat Pollution Control Board	Gujarat
5	Mahesh Singh, IAS	Additional Sec (Plan) & Member Secretary	Gujarat Water Supply and Sanitation Board	Gujarat
6	Jenu Devan	Deputy Municipal Commissioner	Vadodara Municipal Corporation	Gujarat
7	T.D. Chopra	Superint. Engineer	HUDA	Haryana
8	C.J.Guleti	Executive Engineer	HUDA	Haryana
9	Satpal Singh	Executive Engineer	HUDA	Haryana
10	S.K.Agarwal	Executive Engineer	Municipal Corporation Faridabad	Haryana

11	Rita Mehta		Municipal Corporation Faridabad	Haryana
12	Anil Metha	Executive Engineer	Municipal Corporation Faridabad	Haryana
13	D Suresh	Commissioner	Municipal Corporation Faridabad	Haryana
14	I B.M.Nagesh	Deputy Chief Engineer	Bangalore Division, Karnataka Urban Water Supply & Drainage Board (KUWS&DB)	Karnataka
15	K. L. Basavaraju	Municipal Commissioner	City Municipal Corporation Kollegala	Karnataka
16	M. A. Arif	Asst Exe Engineer	City Municipal Council, Gokak	Karnataka
17	M. H. M Sriprakash	Executive Engineer	Directorate of Municipal Administration	Karnataka
18	Sayyad Zahhar ul Haq	Executive Engineer	Gulbarga Division, KUWS&DB	Karnataka
19	H Honnegowda	Executive Engineer	Mysore Division, KUWS&DB	Karnataka
20	T.S. Nagaraju	Assistant Exec. Engineer/Faculty	State Institute for Urban Development (SIUD) Mysore	Karnataka
21	Triyambaka TP	Assistant Executive Engineer	SIUD Mysore	Karnataka
22	Puttaswamy	Executive Engineer	Tumakur Division, KUWS&DB	Karnataka
23	Chhavi Bhardwaj	Commissioner	Nagar Nigam Singrauli	Madhya Pradesh
24	Deepak Choudhari	Municipal Commissioner	Akola Municipal Corporation	Maharashtra
25	Aniruddha Padale	Program Officer	AILSG	Maharashtra
26	Ashish Deosthali	Executive Director South	AILSG	Maharashtra
27	Nikhil Vaiude	Project Officer	AILSG	Maharashtra
28	Mr. Chaityana Kalia	Partner	Ernst & Young	Maharashtra
29	Ramani Iyer	Corporate Manager	Forbes Marshall	Maharashtra
30	Rajendra Holani	Vice President	Indian Water Works Association	Maharashtra
31	Rahul Dhadphale	Director	Urjal Consultants P. Ltd.	Maharashtra
32	Jagdish Khanore	Executive Engineer	Pune Municipal Corporation (PMC)	Maharashtra
33	Suhas Kulkarni	Deputy Engineer	PMC	Maharashtra
34	Govind Rathod	Additional commissioner	Vasai Virar City Municipal Corporation	Maharashtra
35	Mr. Shyam Mehndiratta		CBUD project	NCT
36	Mr. Sunil Koul		CBUD project	NCT
37	R. K. Jain	Chief Engineer	Central Water	NCT

			Commission	
38	Navin Kumar	Director	Central Water Commission	NCT
39	Rama Chandra Sahu	Research Officer	CREDAI National	NCT
40	C S Gupta	Hon. Secretary	Indian Plumbing Association	NCT
41	Shipra Narang Suri		International Urban Consultant	NCT
42	M.K. Gupta	Chairman	IPA Delhi (Managing Director - MKG Consultants)	NCT
43	Anukta Das	Analyst	IPE Global Pvt. Ltd	NCT
44	N.K.Narang	Director	Meenaar (Global) Consultants	NCT
45	Vinita Yadav	Faculty	SPA Delhi	NCT
46	Atul Kaul		SPML Infra Ltd	NCT
47	Tariq Siddiqui	General Manager, Marketing Communications	SPML Infra Ltd	NCT
48	G.Prasad Babu		UNDP	NCT
49	Abha Mishra		UNDP	NCT
50	Jeremy Gustafson	Director, Office of Energy & Environment	USAID	NCT
51	Renu Gera	Chief of Party	WAISP	NCT
52	Dipak Roy	Technical Advisor	WAISP	NCT
53	Walter Weaver	Director of Environment and Health, Asia	WAISP	USA
54	R.S. Riat			NCT
55	Krishna Chandra Patil	Dy. Commissioner	Bhuvaneshwar Municipal Corporation	Odisha
56	Ashok Kumar Paridai	Executive Engineer	Bhuvaneshwar Municipal Corporation	Odisha
57	Chittanji Mohanty	Chief Engineer	PHED	Odisha
58	Sumit Singh	Regional Director	AILSG Jodhpur	Rajasthan
59	Sabyasachi Nayak		CII	Rajasthan
60	Sanjay Gupta		CII- Triveni Water Institute	Rajasthan
61	K. K. Sharma	Asst. Chief Engineer	Directorate of Local Bodies	Rajasthan
62	D. K. Mani	Superintending Engineer	Jaipur Nagar Nigam	Rajasthan
63	D.K Meena	Superint. Engineer	Nagar Nigam Jaipur	Rajasthan
64	Dinesh Sharma	Superint. Engineer	PHED Jaipur	Rajasthan
65	S. Kalaiselvan	Municipal Commissioner	Kumbakonam Municipality	Tamil Nadu
66	S.Sivasubramania	Municipal Commissioner	Tambaram Municipality	Tamil Nadu

67	Nazar Ali	Executive Officer	Nagar Palika Parishad, Nainital	Uttarakhand
68	Shadaf Shaha	Environmental officer JNNURM	Nainital Nagar Nigam	Uttarakhand
69	Apoorva Shukla	Regional Director	AIILSG	Uttar Pradesh
70	Heera Lal	Joint Director	Local body directorate Lucknow	Uttar Pradesh
71	Rajesh Kumar Yadav	Executive Engineer	Water Works, Gaziyabad Municipal corporation	Uttar Pradesh
72	Manjurani Gupta	Executive Engineer	Water Works, Municipal Corporation Saharanpur	Uttar Pradesh