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IDARA (INSTITUTING WATER DEMAND MANAGEMENT IN JORDAN)

Final Report

(March 2007- March 2012)

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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ABBREVIATIONS AND ACRONYMS

| | |
|---------|--|
| ASEZA: | Aqaba Special Economic Zone Authority |
| AW: | Aqaba Water |
| AWE: | Alliance for Water Efficiency |
| ANSI | American National Standard Institute |
| BMP: | Best Management Practice |
| CAQA: | Center for Accreditation and Quality Assurance |
| CBO: | Community Based Organization |
| CSR: | Corporate Social Responsibility |
| DOS: | Department of Statistics |
| DZC: | Distribution Zone Commission |
| E-TVET: | Employment and Technical and Vocational Education and Training |
| GAM: | Greater Amman Municipality |
| GBMS: | Groundwater Basin Monitoring System |
| GDA: | Global Development Alliance |
| GIS: | Geographic Information System |
| GOJ: | Government of Jordan |
| HUDC: | Housing and Urban Development Corporation |
| IAPMO: | International Association of Plumbing and Mechanical Officials |
| IC: | Institutional and Commercial |
| ITM: | Illustrative Training Manual |
| JEA: | Jordan Engineers Association |
| JOHUD: | Jordanian Hashemite Fund for Human Development |
| JSMO: | Jordan Standards and Metrology and Organization |
| JNBC: | Jordan National Building Council |
| JU: | Jordan University |
| JUST: | Jordan University of Science and Technology |
| JVA: | Jordan Valley Authority |
| KACE: | King Abdullah II Center for Excellence |
| KPIs: | Key Performance Indicators |
| MOA: | Ministry of Agriculture |
| MOTA: | Ministry of Tourism and Antiquities |
| MOL: | Ministry of Labor |
| MOU: | Memorandum of Understanding |
| MPWH: | Ministry of Public Works and Housing |
| MWI: | Ministry of Water and Irrigation |
| NWMP: | National Water Master Plan |
| NGO: | Non-governmental Organization |
| NGWA: | Northern Governorate Water Authority |
| PMU: | Planning and Management Unit |
| PPP: | Public Private Partnership |
| RSS: | Royal Scientific Society |
| SABEQ: | Sustainable Achievement of Business Expansion and Quality |
| UNRWA: | United Nations Relief and Works Agency |
| UPC: | Uniform Plumbing Code |
| USAID: | United States Agency for International Development |
| VTC: | Vocational Training Corporation |
| WAJ: | Water Authority of Jordan |
| WDM: | Water Demand Management |

WDMS: Water Demand Management System
WDMU: Water Demand Management Unit
WEPIA: Water Efficiency and Public Information for Action
WIS: Water Information System
WSDs: Water Saving Devices
WUE: Water Use Efficiency
YWC: Yarmouk Water Company

2. EXECUTIVE SUMMARY

Setting the Stage

The IDARA project started on March 28, 2007¹ for a two-year base-period, followed by a two-year option period, as well as an extension period to March 2012. During the first eighteen months, the project witnessed a successful participatory planning period that resulted in the development of the first year workplan. While initial implementation faced some challenges due to delayed staffing and difficulties in developing activities, once fully staffed, IDARA gained momentum by supporting stakeholders to develop the water demand management functions and a consensus model to institutionalize these functions, and draft the urban WDM Policy. In early 2008, IDARA went through a significant transition to enhance project management and technical support. This resulted in notable progress in activities, which enabled IDARA to accelerate advances. In addition, IDARA designed and implemented two tasks related to water use and reuse within high rise and high density buildings, which were not part of the original work plan but requested by counterparts.

Among the key achievements during this period is the development of the WDM policy, and its approval by the council of ministers, ahead of schedule, and the successful organization of workshops for high rise and high density buildings water use and reuse. This first year established productive working relationships with the Ministry of Water and Irrigation (MWI), Water Demand Management Unit (WDMU), utilities, Water Authority of Jordan (WAJ), Jordan Valley Authority (JVA), and external institutions such as Greater Amman Municipality (GAM), Ministry of Public Works and Housing (MPWH), Jordan Institute for Standards and Metrology (JISM), Ministry of Labor (MOL), Vocational Training Corporation (VTC), as well as the private sector.

Taking Action

During year two, the project continued strengthening the capacity of the WDMU staff including two new engineers, who received intensive formal and on the job training as part of coming fully on board. Support to the utilities moved progressively from introducing the WDM concept during the first year to developing tangible actions to institute WDM during the second year. IDARA went beyond the initial idea of refining the utility's strategic business plans to encourage the adoption of efficient equipment, and opted for the development of full fledged utility water use efficiency (WUE) plans, as part of the effort to institutionalization water efficiency. Taking advantage of the development of the WUE tracking tool by the North American Alliance for Water Efficiency (AWE) in 2008, IDARA worked with the utilities to develop models to forecast water demand over the next twenty years, and customized the tracking tool for each utility: Aqaba Water Company (AWC), Miyahuna, and the Northern Governorate Water Authority (NGWA). The tool serves as a planning instrument to identify and screen water WUE programs, as well as monitor and quantify water and energy saving, and economically evaluate existing WUE interventions at the utility and customer levels. AWC, Miyahuna, and NGWA are respectively the sixth, seventh, and eighth utility in the world to adopt the WUE tracking tool.

The development of the WUE plans and tracking tool were essential in defining data requirements to develop the WDM database, as well as clarify the flow of information between the utilities, WDMU, the

¹ Note that IDARA started on March 28, 2007, and the "first year" progress reporting period covered 1.5 years through September 2008, conforming to USAID's fiscal year. Subsequent annual progress reports covered from October 1st through the following September 30th. The last full year reported through September 30, 2011 (fourth year progress report). This final report includes activities through March 27, 2012. All activities in this report related to "Year One" refer to the period from March 28, 2007 through September 30, 2008, and activities related to "Year Five" refer to the period from October 1, 2011 through March 27, 2012.

Water Information System (WIS) at the MWI, and the National Water Master Plan (NWMP). In addition, IDARA worked hand in hand with the King Abdullah II Center for Excellence (KACE), WAJ, WDMU, JUST University, and the private sector to complete the preparation of technical material for the integration of water use efficiency into the KACE award. This paved the way for WUE to be adopted in more than a hundred institutions competing for this most prestigious prize in the country. Following the approval of the WDM policy, IDARA supported the WDMU and the utilities to assist four Ministries to develop action plans in implementing the policy items related to water use and reuse in their respective sectors. This period also witnessed the development of the standards for lavatory faucets and kitchen faucets, and their approval by JISM's board as technical regulations. This represented a major breakthrough for water use efficiency in Jordan. IDARA completed the technical specifications for construction of the Royal Scientific Society (RSS) laboratory for testing plumbing fixtures and appliances. Work to finalize the new water and sanitation plumbing code also neared completion.

Considerable field work was done during this year starting with the launch of the water saving devices residential pilot program in Abu Nseir in October 2008 in collaboration with Miyahuna, followed by a pilot metering program for residential end use and a large audit activity in November-December 2009 covering the five largest commercial and institutional water use categories, which are government buildings, hospitals, hotels, schools, and mosques. The final report of the high rise high density (HRHD) program was completed and presented to the High-rise committee during this period, addressing the serious water supply challenges posed by the new construction of HRHD areas. The report provides a best management practice (BMP) guide, and nineteen recommendations for planning and management of water supply and sanitation for HRHD buildings introducing the most effective proven water-efficiency and water reuse measures and practices.

Work on the six BMP guides continued during this period. The park landscape guide was completed in March 2009, the hospital and public information guides were also drafted and under review; while the residential, hotels, and offices were planned for 2010, after the end-use analysis. In addition, drought principles, guidelines, and messages were under preparation in collaboration with MWI, WAJ, and utility planners to assist them prepare their respective drought plans.

IDARA completed the water-wise planting designs for three parks in collaboration with supervising engineers from each municipality. IDARA also advanced efforts on water-wise landscaping curricula with four universities including JU and JUST, and on setting up an in house drought tolerant tree nursery in GAM. In September 2009, the work plan to launch a competition for the design of low-income water efficient houses in the highlands and Jordan Valley areas was completed.

Year two also included substantial formal and hands on training for staff at the WDMU and utilities on all project related activities. IDARA also provided capacity building for the private sector in providing water efficiency services, and training to 60 municipalities on water-wise landscaping.

Work on the WDM financial mechanisms yielded the first global development alliance (GDA) in water use efficiency in Jordan. This alliance was established between HSBC bank and Miyahuna to retrofit kitchen faucets, lavatory faucets and showerheads for 2,000 high water use residential units in Amman. Moreover, IDARA assisted 137 households from poor areas in the Governorate of Zarqa and Mafraq in improving water use efficiency and increasing water availability. The second year ended with assisting USAID and stakeholders to prepare to participate in the Efficient 2009 conference and study tour in Australia.

Focusing Efforts

During year three, the project continued strengthening the capacity of the WDMU staff in a broad range of policy, institutional and technical aspects. Support to the utilities included the development of water

use efficiency plans for Miyahuna, Aqaba, and NGWA; water audit training for hotels, schools, and offices; a field survey for residential end use, retrofitting of showers and faucets for residential units, leak detection and repairs; and development of the WDM database.

Work on the integration of water and energy efficiency into King Abdullah II Center for Excellence (KACE) award criteria was also completed. IDARA coordinated with the USAD Sustainable Achievement of Business Expansion and Quality (SABEQ) project to prepare and conduct the training of KACE staff in early 2010 on water and energy efficiency tips to assess public and private institutions on the adoption of the developed water and energy criteria. IDARA also supported the WDMU and the utilities to work with four Ministries, namely the Ministry of Tourism and Antiquities, Ministry of Public Works and Housing, Ministry of Environment, and Ministry of Industry and Trade to develop action plans to implement the WDM policy.

During this period, IDARA also continued to develop standards for efficient fixtures and equipment. Standards for lavatory and kitchen flow regulators and toilets were approved by JISM's board as technical regulations. IDARA worked with the WDMU to provide technical assistance to establish the RSS laboratory to test plumbing fixtures and appliances. Furthermore, technicians from RSS, JISM, WDMU, manufacturers, and importers were trained to operate the laboratory.

The final review of the new water and sanitation plumbing code started in March 2010. Also, the master plumber program progressed considerably during this year. IAPMO assisted the Employment and Technical- Vocational Education-Training (E-TVET) Council to institutionalize the master plumber certification, develop the training curriculum for semi-skilled, skilled, and master plumbers, and deliver a training of trainers (TOT) in August 2010.

Work on the BMP guides continued, with drafts of each one completed, except the one for residential, which remained under development. The water communication guide was combined with the energy communication guide under preparation by the USAID-Public Action Project.

The water-wise park activity completed one park at Manshiet Bani Hassan. Water-wise landscaping was integrated in the curricula of German-Jordan University, Jordan University, and JUST. The establishment of drought tolerant tree nurseries at GAM and Friends of the Earth Middle East progressed slowly but surely.

Participation in the competition for design of low-income water efficient houses was remarkable. The winning entries presented innovative solutions valued by MPWH, Housing and Urban Development corporation (HUDC), MWI, and professionals from the architectural and urban development sectors. Formal and hands on training continued in year three. Other notable achievements included the supervised audit training for hotels, schools, and offices; training of private companies on providing WDM services; training on WDM Database; training on the operation of the RSS water efficiency laboratory; and TOT for master plumber programs.

Work to support the organization of the Efficient 2011 conference advanced, and some 454 abstracts were received. In addition, IDARA was recognized by the Global Water Intelligence, receiving their Distinction Award for water efficiency project of year during the Global Water Summit 2010, on April 26, 2010 in Paris, France.

Putting Jordan on the Global Leadership Map in WDM

A significant achievement during year four was IDARA's organizational leadership with USAID, MWI, and the International Water Association (IWA) to host the Efficient 2011 conference at the Dead Sea in March 2011. The conference attracted record attendance, with 618 participants from 32 countries. Speakers submitted 110 papers and presentations covering a broad range of water efficiency topics,

including some of the most recent international advances, examples, and technologies. Preparation for this event was a major undertaking for the IDARA team during this year.

With regards to institutional strengthening, IDARA worked with the Director and staff of the WDMU to revisit and update the institution's five-year strategic plan, including the vision, mission, goals, strategic objectives, action description for each strategic objective, and organizational structure. IDARA also facilitated meetings with USAID's Public Action for Water, Energy, and Environment, and USAID's Water Conservation Project in the Industrial Sector. This will enable the WDMU Director and staff to understand and identify their role in the communication and industrial sectors.

The WDMU also advanced important efforts to collaborate with the Ministry of Tourism and Antiquities, Ministry of Public Works and Housing, Ministry of Environment, and Ministry of Industry and Trade to prepare and carry out their respective action plans for WDM policy related to their respective missions. In addition, IDARA supported and guided the WDMU to link with the Ministry of Awqaf and the Ministry of Education through the execution of the Memorandum of Understanding (MOU) signed by Sayegh Group and MWI to promote water-use efficiency in the education and worship sectors in Jordan.

With the water utilities, IDARA worked with the WDMU to support the utilities to finalize water use efficiency plans and begin implementation. IDARA also completed the GIS-based WDM Database System for the three water utilities and WDMU.

During this year, IDARA completed English versions of the water efficiency best management practice guides for Hotels, Hospitals, Office Buildings, Landscape, and Strategic Communications for Water and Energy Utilities. The first four were presented during the Efficient 2011 conference, and the best management practices guide for "Strategic Communication for Water and Energy Utilities" was tested by the PAP project during a workshop at the conference.

The Royal Scientific Society (RSS) completed preparation of the second draft of the modified water supply and sanitation plumbing code and presented it to the JNBC technical committee. IDARA provided technical assistance to the review committee in preparing and reviewing the code sections specific to rain water harvesting and gray water reuse in Jordan.

In addition, the National Law Center collaborated with IDARA and the WDMU to explore regulatory incentives and enforcement mechanisms for water demand management. IDARA coordinated with the USAID-Public Action project to complete the English version of the BMP guide "Strategic Communication for Water and Energy Utilities."

In May/June 2011, IDARA jointly with the International Association of Plumbing and Mechanical Officials (IAPMO), carried out training on the new plumbing code for five target groups with linkages to the plumbing and construction industries: architects, designers and university professors, government and municipal officials, plumbing contractors, and material suppliers and manufacturers. We also supported to finalize rainwater harvesting and gray water chapters of the Plumbing Code. Furthermore, IDARA continued working with the plumbing products technical committee to develop standards for bidets, water urinals, and waterless urinals.

Early in the fiscal year, USAID-IDARA supported the Employment and Technical- Vocational Education-Training (E-TVET)/Vocational Training Corporation (VTC) to develop and deliver a "Master Plumber" training program. Participants joined site visits and visited a plumbing fittings supplier to learn about the specifications of plumbing fittings according to the Jordanian Plumbing Code and the practical challenges plumbers and suppliers face to comply with the new code.

Finally, in the water-wise landscaping activity, grants from IDARA enabled the completion of five municipal parks: Karak, Hussainieh, Dier Alla, Al-Azraq, and Manshiat Bani Hassan. This completed activities to implement water-wise plants, trees and shrubs, as well as irrigation systems. Importantly for sustainability, IDARA handed over the water-wise landscape training course to the Agricultural Engineer's Association, which will be taught on a regular basis by the trainers certified under the IDARA project.

Sustaining WDM in Jordan

A USAID-funded program evaluation of IDARA in spring 2011 recommended that the Mission continue support for a number of activities in order to better assure the sustainability of key achievements. Some of the main activities during the extension to March 2012 included:

- Assuring the ability of the WDMU and utilities to understand their own needs and gaps as part of the process to develop five-year strategic business plans.
- Designing and developing WDM systems with each utility to forecast water demands and calculate water savings from WDM programs with the water use efficiency tracking tool.
- Training the WDMU and utility staff on residential end-use metering data collection, analysis and interpretation using the data loggers and accompanying software.
- Supporting the utilities and WDMU in assessing the residential faucets and showerheads retrofit program.
- Disseminating best management practice guides to stakeholders.
- Supporting the Jordan National Building Council to finalize and approve the Water and Sanitation Plumbing Code, and finalizing the illustrated training manual.
- Assisting additional municipalities to design water-wise parks.

3. SUMMARY OF PROJECT ACTIVITIES AND ACCOMPLISHMENTS

Subtask 1.1: Build consensus on WDM functions and institutions as part of water sector reform and restructuring

During year one, IDARA supported a policy task force formed in October 2007 to develop and institutionalize water demand management (WDM) functions and prepare a WDM Policy, including urban and irrigated agricultural components. The task force represented a broad range of expertise from Ministry of Water and Irrigation (MWI), Water Demand Management Unit (WDMU), Water Authority of Jordan (WAJ), Jordan Valley Authority (JVA), Miyahuna, Northern Governorate Water Authority (NGWA, now Yarmouk Water Company), Aqaba Water Company (AWC), Planning and Management Unit (PMU) of MWI, Aqaba Special Economic Zone Authority, Jordan University for Science and Technology (JUST), Greater Amman Municipality (GAM), Jordan Engineers Association (JEA), Ministry of Planning and International Cooperation, The Jordanian Hashemite Fund for Human Development (JOHUD-NGO), USAID and GTZ (now GIZ).

The Task Force conducted highly participatory working sessions in October and November 2007 to develop and institutionalize WDM functions in Jordan. The outcome was a draft for WDM functions and institutions, with three scenarios presented as options to institutionalize the functions. During further stakeholder discussion in November, 28 WDM functions were identified and agreed upon, differentiating

between primary and supporting functions. A consensus model was developed to institutionalize these through the major water sector stakeholders. The model placed the WDMU as a coordinating body with specific lead responsibilities, and distributed most resource intensive operational functions and responsibilities for WDM to other lead institutions.

Subtask 1.2.1: Assess the organizational structure of the WDMU within the institution as a whole and propose operating procedures for linkages between the unit and other divisions in the Ministry and its two authorities

During the first year, IDARA closely cooperated with the WDMU to assess its organizational structure within MWI, identify linkages with other divisions, conduct a gap-analysis of the WDMU strengths and weaknesses, and develop guidelines to transform the unit. IDARA completed transformation guidelines in February 2008. Building on this work, and that performed under Subtask 1.1, IDARA collaborated with a task force formed to assist the WDMU to develop a strategic business plan, which was finalized and approved in February 2008.

IDARA developed job descriptions and training plans specifying responsibilities and skills required based on the WDMU strategic business plan. This was followed by a job mentoring program, and training for the WDMU on how to support water utilities, planners, regulators, and consumers in promoting water efficiency in Jordan. IDARA moved forward each year to support the WDMU in implementing its strategic plan, performing its primary and secondary functions, and in building the capacity of its staff to perform these functions. IDARA also supported the unit to build linkages with external organizations to assist the unit in further understanding its role. Throughout the project, IDARA also hosted change management workshops to improve the integration of WDM interventions by counterpart institutions.

During year four, IDARA revisited the WDMU strategic plan, and modified it for the next five years, leveraging staff experience to date. Based on their work with IDARA during the preceding four years, staff participated in the development of the vision, mission, goals, strategic objectives, action plan and organizational structure for the WDMU. For its part, MWI plans to use the WDMU strategic and operational plan as a model for strategic planning within all directors at the ministry.

The WDMU strategic plan will be instrumental in introducing the unit and its role as the center of WDM interventions in all sectors. As such, IDARA worked with the Director of the unit to present the strategic plan to donor agencies and other USAID projects such as Public Action for Water, Energy and Environment.

Subtask 1.2.2: Develop the WDM policy in close cooperation with the WDMU

In order to develop a WDM policy, the Ministry of Water and Irrigation formed two task forces in 2007, one to examine the urban component, and another for the irrigated agriculture component. IDARA supported MWI, and the task forces represented a broad range of expertise from the water sector including academics, non-government organization's (NGO's), and private sector.

The WDM policy was approved in 2008, and is a milestone for Jordan to support current MWI interventions in addressing the water shortage problem. The WDM Policy promotes effective water use efficiency to minimize waste and losses, and assure water conservation for social and economic development and environmental protection.

Subtask 1.2.3: Identify external linkages between WDMU and other organizations, propose mechanisms to build these linkages, and develop a workplan to be jointly implemented

In November 2007, the Institutionalization and Policy Task Force completed the identification of WDM-related external institutions with IDARA support. From its first year, and continuing through the end of the project, IDARA established and built upon linkages established between the WDMU and a wide array of external institutions. Apart from additional NGOs and private sector companies, these included:

| WDMU's External Linkages in Jordan | | |
|---|---|--------------------------------------|
| Aqaba Development Corporation | Jordan National Building Council | Ministry of Industry and Trade |
| Aqaba Special Economic Zone | Jordan Standards and Metrology Organization | Ministry of Labor |
| Chamber of Commerce | King Abdulla II Center for Excellence | Ministry of Municipal Affairs |
| Chamber of Industry | Ministry of Agriculture | Ministry of Public Works and Housing |
| Department of Statistics | Ministry of Awqaf | Ministry of Tourism and Antiquities |
| Greater Amman Municipality | Ministry of Education | Royal Scientific Society |
| Jordan Investment Board | Ministry of Environment | Vocational Training Corporation |

These linkages were further developed under task 2.1, whereby IDARA worked with the WDMU to prepare WDM action plans with four ministries (MOA, MOE, MPWH, Ministry of Industry and Trade) as part of the effort to implement the National WDM policy. The action plans presented specific WDM programs to be jointly implemented by the WDMU and each respective ministry. This task has been essential in introducing the National Water Demand Management Policy to a full range of stakeholders, and in equipping them with an understanding of how they can reshape their water use techniques to promote greater efficiency and conservation in Jordan. As an example, the collaboration with MPWH was instrumental in integrating water use efficiency standards and criteria in the tendering process for government construction contracts.

Separately, IDARA supported the WDMU in partnerships with the Ministry of Awqaf and Ministry of Education. An Memorandum of Understanding (MOU) was signed between the Ministry of Water and Irrigation and the Sayegh Group to promote water-use efficiency in the education and worship sectors in Jordan. IDARA facilitated the effort between the WDMU, Ministry of Awqaf, Miyahuna Water Company, and Sayegh Group to identify mosques with high water consumption, set roles and responsibilities of each partner entity, and develop an implementation plan.

In addition, IDARA supported Miyahuna, Aqaba Water Company and Yarmouk Water Company to join the Alliance for Water Efficiency (AWE) during years four and five of the project, and extended this membership to the WDMU in year five as well. As a result, the three utilities have been benefitting from new WUE tools, techniques, and contacts, including AWE's proprietary water use efficiency tracking

tool, and their wide network of US and Canadian water utility contacts to share experiences and stay informed about the latest developments in water use efficiency.

Finally, IDARA also initiated linkages outside of Jordan, engaging US utilities and organizations. Halla Razaq, Director of Colorado River Programs in San Diego, California, gave a presentation in November 2008 to Senior Decision Makers and Water Planners from MWI/WDMU, WAJ, JVA, and Miyahuna about Southern California's experience on drought response and water transfer from the agriculture sector to the urban sector.

Subtask 1.2.4: Ensure that demand and allocations data developed by units within the Ministry are linked to the National Water Master Plan and appropriate economic analysis is performed

During year one, IDARA completed a preliminary assessment of the type of water demand and allocation data that existed at the key water sector institutions in Jordan: WAJ, Yarmouk (at that time, NGWA), Miyahuna, AWC, PMU, WDMU, and National Water Master Plan (NWMP). As part of this, IDARA reviewed and proposed revisions to the data collection and exchange methods, including systems for data warehousing. Per the model, the NWMP directorate at MWI would review the water utility demand forecasts and determine both the sufficiency of the forecasts and the national water supplies to help set utility water allocations. In year two, IDARA completed the report "Assessment for Water Use Data, Collection and Warehousing Systems in Jordan."

IDARA then developed procedures for collecting WDM data and linking the WDMU, WIS and NWMP, under task 1.2.5 (providing technical assistance to streamline WDM data collection and data management, and to develop the Water Demand Management Database). IDARA also conducted economic analyses for the WUE programs at the utility level through the WUE tracking tool. The Best Management Practice (BMP) guides also include cost-benefit analyses for recommended practices.

Subtask 1.2.5: Design and build appropriate databases under WDMU as integral components of the Water Information System (WIS) deployed at MWI

The Water Demand Management System (WDMS) was developed by the IDARA project in cooperation with the Ministry of Water and Irrigation and the three Jordanian water utilities: Yarmouk Water Company (YWC), Jordan Water Company (Miyahuna), and Aqaba Water (AW), to improve knowledge of current water demand and support the development of effective demand forecasting and Water Use Efficiency Programs. It was also meant to support subsequent WDM program monitoring and impact assessment. The WDMS was designed to serve the planning and forecasting needs within the Ministry of Water and Irrigation (MWI), and the water utilities. The computerized WDM System facilitates the following:

- Collection and warehousing of water demand management data.
- Analyzing and forecasting water demand.
- Tracking and quantifying actual and potential savings before and after implementing water-use efficiency programs.
- Planning for the water use efficiency programs.
- Planning for the national WDM strategy

- Measuring the performance of water utilities with respect to water demand management through a set of key performance indicators

The WDM System Modules included several specific tools:

- **Water Use Efficiency Tracking Tool:** The WUE tracking tool was developed by the North American Alliance for Water Efficiency, and is a state of the art tool to assist utilities in screening water use efficiency programs during WUE planning. The tool includes an estimation of the water saving, avoided cost for additional water supply, and payback period for each water use efficiency program.
- **Water Demand Forecasting:** The Water demand forecasting module provided each utility with a demand forecast for the next 20 years. This model provided the water utilities with a practical and realistic tool to calculate future demand.
- **WDM Key Performance Indicators (KPIs):** KPIs were developed to promote Water Demand Management and improve the efficiency of customer water use.
- **Real Water Savings Module.** The total real savings amount of water use efficiency programs can be calculated through the system at a program level, utility level and national level.

IDARA held a training workshop on the WDM database in July 2010 for the three water utilities, WDMU, and NWMP staff, and also held hands-on training sessions for each utility. IDARA also prepared and delivered the WDM database user manual, and assisted MWI in providing suitable hardware and software to accommodate the Water Demand Management database. IDARA prepared a Geographic Information System (GIS) needs assessment and module design report in August 2010, which integrated the WDM GIS components in the real saving module. In addition, IDARA supported the WDMU in acquiring the necessary GIS data from the water utilities and WAJ. IDARA then completed testing, calibration, and validation of the WDM Database in the three water utilities and the WDMU. The WDM database design was further modified, and is now fully integrated with the Water Information System at the Ministry of Water and Irrigation and will be instrumental in supporting water resource planning and management with water demand management and forecasts.

Task 1.3: Strengthen the MWI Planning Directorate by establishing a national water use information program

This task began with the comprehensive assessment of current and available data previously referenced under Subtasks 1.2. The assessment also included a review of the consumption categories currently used in the water sector, a description of the existing water use data at the WDMU, utilities, WAJ, PMU, and the National Water Master Plan, and an analysis of the procedures for estimating the amount of water purchased via tankers. It also evaluated existing WDM data collected by the WDMU and USAID's Water Efficiency and Public Information for Action (WEPIA) project, in addition to current approaches used in forecasting water demand in MWI, and the water utilities including WAJ water administrations.

Through this process, IDARA identified data gaps and made recommendations for data needs to improve the accuracy of water consumption data and monitoring, as well as track impacts of various demand management scenarios on water savings and forecasting. IDARA provided recommendations on the forecasting methodology, and a model defining responsibilities between the utilities and MWI in data collection, analysis, forecasting, and database management related to WDM.

IDARA supported development of an action plan to implement the National Water Use and Demand Management Information Program (WUDMIP), and held a stakeholder meeting in August 2008 involving 27 participants from WDMU, NWMP, WAJ, NGWA, PMU, Miyahuna, and AWC. These participants represent the IT departments, subscription departments, wells subscription division, in addition to WAJ Groundwater Basin Monitoring System (GBMS), which is responsible for private wells. Stakeholders discussed and approved the responsibility model and agreed on the formation of an Information Management Task Force. They also endorsed the adoption of a consistent nationwide urban water use classification system, and expansion of the numbering system for billing in order to accommodate the WDM needs. IDARA then standardized the main use type categories in year two, and the Water Use Information Program was covered as part of the WDM Database task 1.2.5.

Several meetings were conducted with the NWMP, WDMU, Water Information System (WIS) and IDARA and resulted in generating the proper interfaces between the WDM database and system, and the WIS at the Ministry of Water and Irrigation. This achievement will be instrumental in supporting future water resource planning and management with water demand management and forecasts.

Task 1.4: Perform end-use analyses

During the first year, IDARA conducted an analysis of non-residential water consumption by use type in Jordan within the Miyahuna service area for 2006. Seven institutional and commercial (IC) categories were identified as targets for end use analysis. These included offices, health services, schools, universities, places of worship, hotels, and restaurants (listed in the order of highest to lowest consumption). From these main categories, seven subcategories were designed for end use analysis: government offices, hospitals, government schools and universities, mosques, 4/5 and 3/2 star hotels, in addition to hotel apartments. IDARA completed a comprehensive standardization of the urban end use classification in the water utilities.

In year two, IDARA introduced an advanced water use metering system to measure residential water consumption for all indoor end use categories (faucets, toilets, showers, clothes washers, others). The end use results for residential and IC were essential in order to identify programs for water use efficiency interventions included in the Utility WUE Plans, and to quantify saving and cost benefits of each measure that were the base for recommendations of water use efficiency best management practices for each of the above categories.

Subtask 1.5.1: Introduce regulatory incentive mechanisms to encourage utilities to adopt demand management measures

IDARA coordinated in year two with the WDMU and WSAU to prepare a list of WDM key performance indicators (KPIs). These were designed to monitor implementation of the utilities' WUE plans. The teams jointly reviewed financial incentives that include water savings, avoided cost, and computed payback period for WDM for each measure, using the WUE tool.

In addition, IDARA contracted the National Law Center to review existing legislation and identify regulatory incentive mechanisms to encourage water utilities to adopt water demand management measures (task 1.5.1) and WDM enforcement mechanisms, and recommend the most feasible options (task 2.6). The National Law Center, in collaboration with IDARA and the WDMU conducted meetings and interviews with stakeholder representatives involved in the WDM regulation incentives and enforcement mechanisms. The stakeholders include, among others, Jordan Standards and Metrology

Organization (JSMO), Jordanian National Building Council (JNBC)/Ministry of Public Works and Housing, Ministry of Industry and Trade, Greater Amman Municipality, Development Zone Commission (DZC), Aqaba Special Economic Zone Authority, Jordan Engineers Association (JEA), Miyahuna, Aqaba Water, Yarmouk Water Company, Ministry of Water and Irrigation, Water Authority of Jordan, Program Management Unit (PMU), and Ministry of Environment (MOE).

In year five, IDARA presented a complete report of existing legislation with recommendations on potentially feasible WDM enforcement mechanism and regulatory incentives to high level officials from the water sector for future consideration.

Subtask 1.5.2: Assist the utilities in establishing WDM functions

This task was started upon the development of the WDM consensus model and the identification of roles and responsibilities of the WDMU and water utilities. During the first year of the project, IDARA held meetings with Miyahuna and Aqaba Water Company to identify priority consumers and suitable incentives to implement and institutionalize WDM. IDARA worked with three water utilities and developed a five year water use efficiency plan. IDARA also organized change management workshops to discuss water use efficiency plans and assess proposed programs. Change management models were utilized to identify driving and restraining forces for each of the programs in each of a utility service area.

In the summer of 2009 IDARA assisted AWC, Miyahuna, and Yarmouk to become members of the Alliance for Water Efficiency based in Chicago, and thereby gain access to use customized versions of the their WUE tracking tool. Demonstrating real leadership in WDM, AWC, Miyahuna, and Yarmouk were respectively the sixth, seventh, and eighth utilities in the world to adopt the WUE tracking tool. IDARA arranged to train all three utilities on the software tool and to support WDM and forecasting for the next 20 years. The forecasting models were built based on historical consumption data, as well as the development and investment plans in the utilities' service areas. The new forecasting method provided them with a practical and realistic tool to calculate and understand future demands, especially considering that these demands are high, and the gravity of the challenge of meeting them is enormous. The WUE plans and tracking tools are the backbone for institutionalizing WDM in Jordan. They drive all project activities related to planning, implementation, and monitoring WUE interventions.

Continuing through the last three years of the project, IDARA drew on the US experience, and further developed and refined the Water Use Efficiency Plans jointly with Miyahuna, AWC, and Yarmouk, in coordination with the WDMU. IDARA also worked with them to further update and customize the WUE tracking tool at all the three utilities. The tool includes an estimation of the water saving, avoided cost for additional water supply, and payback period for each water efficiency program.

In addition, in 2010 IDARA conducted a training on indoor and outdoor leak detection and repair for participants from the three water utilities, WDMU, WAJ, Vocational Training Center, United Nations Relief and Works Agency (UNRWA), National Employment and Training company, and Ministry of Education. IDARA also supported staff from water utilities, the WDMU, and private companies to conduct IC audits in Aqaba and Amman under the supervision of US consultants. The audited facilities included hotels, commercial offices, and schools.

As the program ends, it is worth noting that, while the WDMU and utilities have clearly benefited and welcomed the WUE plans, forecasting models, and tracking tools, the sustainability challenges remain – specifically, the availability of funding to implement WUE programs, and the commitment of utilities to provide staff dedicated to executing these plans.

Subtask 1.5.3: Assist the private sector in each utility area to establish WDM functions and services

During the first year, IDARA held numerous discussions with other USAID funded projects, GAM, and utilities to consider options for private sector support. At the beginning of year two, this evolved into concrete actions, starting with a workshop for 10 private Jordanian firms to present potential opportunities in water efficiency products and services. IDARA invited these firms to participate in an institutional and commercial water audit training held the next month, which ultimately attracted six environmental contractors and four energy audit companies. Two of the energy audit companies subsequently began offering water-energy audits and water-energy performance contracts to clients.

At the end of year two, with the USAID funded Aqaba Community and Economic Development program, IDARA hosted a one day Forum on water-energy efficiency for hotels in Aqaba. The forum brought together Hotel owners/managers, water-energy performance contractors, suppliers of water-energy conservation equipment, and lenders to discuss water-energy saving for the hotel industry with the objective of establishing business deals for water-energy retrofits.

In year three, IDARA offered a more comprehensive training for private sector companies on WDM services such as water audits and related retrofits for water use efficiency in residential, commercial and institutional facilities. The training also covered cost-benefit analysis and contracting, including performance contracting for water efficiency services. Six Jordanian private companies participated in the training and are now capable to provide WDM services. Other attendees included staff from hotels and hospitals associations, WDMU, and water utilities. IDARA also conducted studies to assess barriers and opportunities for key industrial and commercial associations, manufacturers and retailers, water and energy service providers, engineering firms and tradespersons, particularly women-owned businesses, to increase their participation in water-efficient markets.

Subtask 1.6.1: Develop Best Management Practice (BMP) guides on conservation of nonagricultural water

IDARA established a BMP Task Force to prioritize the planned BMPs. During the first year, IDARA developed initial guidelines, and then throughout the project ultimately completed seven BMP guides in all:

- Hospital BMP Guide
- Hotel BMP Guide
- Office BMP Guide
- Strategic Communication for Water and Energy Utilities Guide
- Landscaping BMP Guide
- BMP Guide for Residential
- High-Rise and High Density Developments

The Guides are intended to be used by the utilities and customers for the respective BMPs, and provide a how-to-guide for individuals and organizations to implement water use efficiency. For example, the Hospital BMP Guide is intended to be given to the facility manager of a hospital or a consultant hired to implement WUE measures at the hospital.

Each BMP Guide was reviewed by the BMP Task Force and revised according to the comments received. The Park Landscaping BMP guide was completed in March 2009, with support from a water wise task

force recruited for this purpose. IDARA developed the BMP guide Strategic Communication for Water and Energy Utilities in coordination with USAID's Public Action Project, completing it in 2010.

IDARA waited to develop the other guides – hospitals, hotels, offices, and residential – until 2010 in order to incorporate the results of the end use analysis. These were all presented at the Efficient 2011 conference on CD-ROM.

In 2012, IDARA organized two major training programs: 1) Training of Trainers, and Development of Instructional material to support the future planned training on the various BMP's. Participants trained included staff from the WDMU, Miyahuna, Aqaba and Yarmouk water companies, the Royal Scientific Society, Hospital and Hotel Associations, Ministry of Public Health, Amman Chamber of Commerce, and the Ministry of Municipal Affairs.

Subtask 1.6.2 & 2.2.2: High Rise BMP Guide, Code and GAM Recommendations

In the middle of year two, IDARA added two high rise building activities after meetings with stakeholders provided a broader understanding of the issues involved and demonstrated a genuine interest in the topic. The purpose of the activities was to prepare code recommendations and a BMP guide for water use and reuse efficiency in high rise and high density buildings. IDARA also developed specific associated recommendations for Area C, an area designated by GAM for high rise and high density building development. IDARA attracted over 70 participants to an initial workshop in July 2009, including the Secretary General of MWI, City Manager of GAM, and Director General of Miyahuna. Presentations included examples from international experience from the UAE and United States.

IDARA completed the BMP guide in English during year two, and translated it into Arabic the following year. IDARA also submitted code recommendations to the Water and Sanitation Plumbing Code committee and JNBC, which agreed to include them as an annex to the new plumbing code. The High-Rise technical committee representing GAM, WAJ and Miyahuna agreed on the water efficiency recommendations for area C and requested options to fund a satellite recycling plant and create a management company. IDARA developed and submitted these options for MWI, GAM, Miyahuna, and WAJ.

Task 1.7: Provide training and capacity building to promote WDM

Throughout the project, IDARA provided considerable training in a multitude of water demand management technical and management topics to the WDMU, MWI, WAJ, utilities, and other stakeholders. These included, for example:

- WDM policy
- WDM strategic planning
- Customer service
- Water saving devices installation and maintenance
- Change management
- High rise efficient water use and reuse
- Water use efficiency planning
- Public information and education
- Public-private partnerships
- WDM information management

- WDM best practices
- Labeling of water fixtures and appliances
- Water-wise landscaping
- GIS-enabled WDM database
- Residential audits and end-use analysis
- Loan management, proposal writing and technical training for community based organizations (CBOs)

During the second year, this included formal and hands-on training for the WDMU and utility staff on institutional and commercial water use audits, residential metering and end-use analysis, retrofitting residential units, water demand forecasting, and introducing the water use efficiency tracking tool. Furthermore, IDARA trained six environmental contractors and four energy audit companies on institutional and commercial water use audits. Two of the energy audit companies started offering water-energy audits and water-energy performance contracts.

IDARA complemented this by working with the WDMU to develop WDM policy action plans with the Ministry of Tourism and Antiquities and Ministry of Environment. This exposed both WDMU and Ministry staff to concepts and potential programs, as well as opened the door for the WDMU to support their implementation. In addition, IDARA worked with the WDMU and local municipalities' staff to build their capacity to evaluate existing municipal park landscapes, and design their rehabilitation. This was done under subtask 3.1.2 for water-wise parks. IDARA held a training of trainers (TOT) on the Master Plumber program for instructors from VTC, UNRWA, National Training and Employment Project, and Ministry of Education, and also trained RSS, JSMO, and WDMU to operate the water efficiency testing laboratory.

Finally, IDARA directly worked with the WDMU and Ministry of Water and Irrigation staff to plan and organize the Efficient 2011 Conference. This major international event was instrumental in building the capacity of Ministry staff in planning future events and meetings to promote water demand management at the regional and international levels, as well as contextualize Jordan's water challenges and responses along with other water scarce nations and communities.

Subtask 1.8.1: Introduce and promote drought response principles in the water community

IDARA invited Halla Razaq, Director of Colorado River Programs in San Diego, California in November 2008 to give a presentation to senior decision makers and planners from MWI, WAJ, JVA, and Miyahuna to share the Southern California experience on drought management. Then, in January 2009 Mary Ann Dickinson of the newly formed Alliance for Water Efficiency in Chicago, Illinois led a meeting at the Ministry of Water and Irrigation with planners from MWI, JVA, WAJ, and the water utilities to introduce drought triggers and guidelines to be adopted. Those assembled agreed on three drought triggers, and Ms. Dickenson subsequently worked with the planners to develop drought response principles and guidelines for Jordan.

Subtask 1.8.2: Provide support and technical assistance to the MWI for the preparation and management of the Efficient 2011 Conference.

A significant achievement under IDARA was the organization of Efficient 2011 conference in March 2011 in cooperation with the Ministry of Water and Irrigation and the International Water Association (IWA). The conference was held under the patronage of His Majesty King Abdullah II and the

chairmanship of His Royal Highness Prince Faisal Bin Al-Hussein. Efficient 2011 attracted record attendance, with 618 participants from 32 countries. Speakers submitted 110 papers and presentations covering a broad range of water efficiency topics, including some of the most recent international advances, examples, and technologies. Preparation for this event was a major undertaking for the IDARA team. Participants represented some 27 water utilities, 77 government units, 47 NGOs, 45 academic entities, 72 consulting firms, and 48 exhibitors.

Task 1.9: Design, administer, and institutionalize a yearly event to recognize individuals, institutions, and industries that help advance water efficiency

Recognizing the need for institutional legitimacy and sustainability for a water efficiency award scheme, IDARA contacted the King Abdullah II Center for Excellence (KACE) to explore the opportunity of integrating water efficiency into their Award for Excellence. The KACE award could provide an exceptional platform for creating a culture of water efficiency in the private and public sectors. The process started by working jointly with the WDMU Director and KACE to form a high profile task force representing experts and academics to develop an action plan to integrate water efficiency into the King Abdullah II Award for the Public and Private sectors.

The task force identified the sub-criteria under which water efficiency questions would be integrated, then drafted questions addressing water efficiency under the selected sub-criteria, and developed case studies to train the institutions applying for the award. IDARA also prepared a glossary of water efficiency related terms to be used by KACE and applicants.

Ultimately, IDARA succeeded to support KACE in integrating water and energy use efficiency sub criteria in the public sector award, and in modifying the sub-criteria of the private sector award to address both water and energy. In addition, IDARA developed and delivered a two-day TOT program for KACE staff on water and energy use efficiency. IDARA provided KACE a grant to support the implementation of the integration of water-energy use efficiency within the sub-criteria of King Abdullah II Award for Excellence for the public and private sectors.

Task 2.1: Assist in creating a stakeholder-driven WDM program

At the outset of the project, IDARA delivered a presentation to the Royal Water Committee on the tools for implementing water demand management in Jordan. The objective was to embed WDM in the National Water Strategy. IDARA staff also met with the Royal Committee consultant and provided information for the development of Jordan's Water Strategy 2008-2022. IDARA designed activities to facilitate implementation of the approved WDM Policy with stakeholders.

In year two, IDARA provided logistical support for the stakeholder meeting to present the Water for Life Strategy 2008-2022 for high officials from the Government of Jordan and members of Parliament. In addition, IDARA supported MWI in refining and finalizing specific measures and tasks under the Water Demand Management Section in the strategy, in line with the National WDM Policy.

IDARA subsequently supported the WDMU to introduce the WDM Policy to broader commercial, environmental, and tourism sectors, as well as utilities. IDARA conducted a series of workshops to develop action plans for implementation of the WDM Policy in four ministries, namely: Ministry of Tourism and Antiquities, Ministry of Public Works and Housing, Ministry of Environment, and Ministry of Industry and Trade. IDARA and the WDMU worked with task forces from each ministry on these

action plans, which were then presented for approval to decision makers within each ministry. During years four and five of the project, IDARA continued working with the WDMU to support them in securing public private partnerships to sponsor implementation of WDM programs in the various sectors. For example, IDARA facilitated the signing of MOU between Sayegh Group and the Ministry of Water and Irrigation to support the implementation of retrofit programs at schools and mosques. In addition, IDARA initiated a program with the International Islamic Arab Bank and the Arab bank to support the WDMU in its future programs.

Another notable achievement under this task is the integration of WDM policy into the National Agenda for Jordan, which is currently being reviewed and modified by high officials at the Ministry of Water and Irrigation

Subtask 2.2.1: Develop a National Standardized Plumbing Code

In the first year of the project, IDARA reviewed the existing plumbing codes in Jordan and recommended adopting the Uniform Plumbing Code (UPC) of the International Association of Plumbing and Mechanical Officials, which is considered an international code and is regularly updated every three years. Through the Jordanian National Building Council (JNBC), a plumbing code Technical Committee was formed, and IDARA, Royal Scientific Society (RSS) and MPWH-JNBC signed an agreement in July 2008 to develop the code. IDARA provided technical support and shared the cost with JNBC. RSS led the drafting of the code, and IDARA provided a supporting grant to RSS for this purpose. A thorough and detailed review of the code lasted for two years, and around 100 meetings were conducted by the code technical committee to review and update the water and sanitation plumbing code for Jordan. Given that the UPC was updated in 2009, IDARA worked to benefit from this and ensure that the new Jordanian code was based on the most recent code. In addition, and based on a request from the Ministry of Water and Irrigation, IDARA provided technical assistance to review and modify grey water and rain water harvesting chapters of the plumbing code. As a result, the new draft plumbing code was completed in March 2010. In May 2010, the modified water and sanitation plumbing code was approved by JNBC technical committee and was released for public review and comments.

Subsequently, in January 2011, MWI, the JNBC, and RSS signed a memorandum of understanding to develop the Illustrative Training Manual (ITM) for the modified Water Supply and Sanitation Plumbing Code. JNBC awarded the development of the ITM to the RSS, and an ITM review committee was formed. In May/June 2011, with IAPMO support, IDARA organized training on the new plumbing code for five target groups in the plumbing and construction industries: architects, designers and university professors, government and municipal officials, plumbing contractors, and material suppliers and manufacturers. In March 2011, IDARA conducted two retreats for the technical committee of the Illustrated Training Manual and completed a review of all chapters. The WDMU will continue coordinating with JNBC to print and disseminate the ITM to its target audience.

Task 2.3: Implement a Plumbing Materials Certification Program

In 2007, IDARA held a launch meeting for this task at the Jordan Institute for Standards and Meteorology in August 2007 to clarify the approach and mechanism to develop and update Jordanian Standards, especially those related to plumbing fixtures and appliances. A later meeting was held with the JISM Equipment & Electrical Apparatus Committee, to develop technical specifications and standards for washing machines and dishwashers.

IDARA began the process by researching international and local technical standards related to plumbing products, home appliances, and sanitary installations. International standards included the International Organization for Standardization (ISO), British Standards Institute, European Committee for Standardization, and German Institute for Standardization, in addition to the US testing procedures for water efficient products. IDARA staff also reviewed water and energy efficiency programs (e.g. energy star, water sense program, etc.) and prepared a table of water efficient standards. In addition, the team reviewed existing Jordanian inspection laws and procedures on imported and exported products as well as World Trade Organization and Technical Barriers to Trade agreements. Additional meetings were held with related stakeholders at JISM, customs department, and WAJ. A summary of the existing enforcement mechanisms for banning non-compliant products from Jordanian markets was completed. IDARA and WDMU became members of the technical committee for plumbing products, and attended all meetings. IDARA drafted proposed faucet (flow regulator) and toilet technical standards for review by the JISM Technical Committee.

During year two, IDARA conducted a water efficiency assessment of the existing toilets and water using appliances in Jordan. The assessment included visits to toilet manufacturers, clothes washer manufacturers and toilet retail stores. As a result, IDARA recommended to JISM major changes to the existing toilet standards. The Flow Rate Regulators Standard was approved by the JISM technical committee, and the standard was officially passed to JISM board members who endorsed it as a technical regulation.

Parallel to the above activity, IDARA assessed the RSS space designated for the water equipment testing lab in March 2009, and led training sessions on its operation with RSS engineers and technicians, as well as broader stakeholders. During this period, a toilet testing demonstration was carried out using a sample of toilets representing the range of products from various manufacturers and importers in Amman. IDARA completed reference standards for the proposed water using products list submitted to JISM in December 2008, and an official letter was sent to JISM requesting that they establish an agreement with the American National Standard Institute (ANSI). This was an important step to assist in implementing the new plumbing code given that many of the standards are based on ANSI.

IDARA completed a Final Report on Technical Standards for plumbing products and water using electrical appliances in December 2009, and worked with the plumbing products technical committee to develop standards for toilets, flushing valves for WC and urinals, plumbing supply fittings, and bidets.

The JSMO board reviewed the toilet standard issued it as a technical regulation. The bidet and urinal standards were issued by JSMO. IDARA collaborated with JSMO to combine all available standards of WC pans into one technical regulation to include all performance and quality tests. The clothes washer standards review committee completed their review of the clothes washer standard in year four, and worked on developing energy labeling standards for clothes washers.

Finally, IDARA joined the JSMO review committee of the Grey Water Standard in April 2011. A reclaimed grey water standard for toilet flushing use was introduced. The committee also finished the revision of this standard for approval by the JSMO board.

Task 2.4: Establish a “Master Plumbers” Vocational Training Program at the VTC.

IDARA initiated this activity by conducting site visits for several facilities at the Vocational Training Corporation (VTC), including Irbid and Ein Al-Basha centers, in order to assess their capability in

implementing advanced level plumbing training and a master plumber program. The assessment report included the following recommendations:

- Upgrade the VTC plumbing training facilities in order to improve basic plumbing training courses.
- Implement the proposed master plumber program independently from existing plumbing training available at the VTC.
- Consider experience from Texas while designing the proposed master plumber program.

IDARA also supported the program by upgrading the VTC facility at Ein Al-Basha, and the renovation was completed in March 2009. The training center was officially inaugurated in November.

During IDARA work on the “master plumbers” program with the VTC, various institutional changes were taking place at the Ministry of Labor, and the responsibility of accrediting and certifying skilled workers including plumbers was moved to the Employment-Technical and Vocational Education and Training Council. The E-TVET Council was established under Law No 46, enacted in June 2008. Following this institutional change, IDARA conducted several meetings with the Ministry of Labor (MOL). The E-TVET Council agreed to consider “master plumbers” program as a pilot program for the council and MOL to establish an advanced certification for all trades. The subsequent establishment of the Center for Accreditation and Quality Assurance (CAQA) under the E-TVET Council paved the way to then launch the master plumber certification and training activities through IAPMO. A Memorandum of Understanding between IDARA, E-TVET and VTC was signed in early October 2009.

To facilitate the institutionalization of the certification program, IDARA worked with a career development expert at IAPMO and conducted field visits and interviews with stakeholders in Jordan, in addition to collecting data on plumbing training and education programs. These efforts resulted in the development of a draft framework for the master plumber program that was presented by IAPMO’s representative to all stakeholders in March 2010. Based on feedback received from all stakeholders, IDARA submitted the Master Plumber program modules and course material for semi-skilled, skilled and master plumber levels to E-TVET and VTC in May 2010. Subsequently, IDARA conducted a one-day workshop in June 2010 for all the stakeholders to present the master plumber program timeline. In August, IAPMO led a training of trainers TOT on the Master Plumber program, with 17 participants from VTC, UNRWA, NET, Ministry of Education, RSS, JSMO, and WDMU. Course lectures and site visits were conducted under the supervision of an IAPMO expert. Participants also visited a plumbing fittings supplier to learn about the specifications of plumbing fittings according to the Jordanian Plumbing Code and the practical challenges plumbers and suppliers face to comply with the new code.

In December 2010, IDARA supported the E-TVET/VTC in developing and delivering a “Master Plumber” training program. In addition, IDARA supported the WDMU and VTC in delivering training to women plumbers.

Task 2.5: Prepare a work plan to implement a labeling program

IDARA developed surveys and conducted informative interviews and discussions with the leading local manufacturers and importers of water-using plumbing products and appliances. In May 2008, IDARA conducted a workshop to solicit stakeholder feedback on the work plan. A draft copy of the work plan was prepared and discussed with stakeholders, and submitted in August 2008. A market survey report was submitted the following month.

Following the review of the work plan report and the Market Survey Report, USAID/Jordan recommended soliciting customer opinions regarding the establishment of a recognized label on water efficiency for specific plumbing products and appliances. This would allow for perspectives regarding customer motivations beyond those conveyed by sales agents. IDARA conducted this market survey and presented the results to public and private stakeholders in April 2009, hosted by the Amman Chamber of Commerce. IDARA incorporated feedback from the presentation and shared the completed report with USAID and MWI in July 2009.

Task 2.6: Identify WDM enforcement mechanisms and recommend the most feasible

This task has been combined with task 1.5.1.

IDARA reviewed and assessed the existing WDM policies, laws/bylaws, instructions and enforcement mechanisms set by the different ministries, and gave a presentation at the Water Law Conference, held in June 2008. During the conference, IDARA presented the draft WDM policy, and assessed the limitation of the current laws in addressing the various policy statements. The presentation illustrated the need for Jordan to develop a law for the water sector. IDARA submitted a final WDM legal assessment report in September 2008. It presented the limitations of the current laws and provided recommendations to address WDM policy.

Follow-up activities on this task were combined with task 1.5.1 and also relate to recommendations presented in the BMP guides. Some of the policy tools and approaches discussed include tax incentive schemes and enforcement mechanisms to promote WDM technology and encourage best practices.

Task 2.7: Develop mechanisms to finance the implement WDM projects²

Recognizing that one of the major challenges in implementing utility water use efficiency plans is how to fund programs under these plans. IDARA explored various options. Specifically, IDARA made substantial efforts to reach potential private partners to identify tangible funding mechanisms. Models principally explored included USAID's Global Development Alliance (GDA) through corporate social responsibility (CSR) programs, and performance contracts for water and energy conservation.

Global Development Alliance and Corporate Social Responsibility

In May 2008, IDARA conducted a training session to introduce GDA and public-private partnership principles and tools applied to water use efficiency to the Ministry of Water and Irrigation, WDMU, Miyahuna, private companies and non-governmental organizations. IDARA also identified potential private company partners to work with the utilities to implement and promote Water Demand Management in Jordan. These included PepsiCo, Coca-Cola, Zain, Orange, HSBC Bank, and Nuqul. Based on consultation with these firms and the utilities, IDARA selected two models for Global Development Alliance and Public-Private Partnership (PPP) opportunities. The first model was for an Integrated Water Audit for Water Efficiency and Sustainability. It targeted high water users in

² IDARA originally planned to consider funds from the World Bank's Global Partnership for Output Based Aid. However, we learned that Jordan is not an eligible country, thus USAID cancelled this assignment.

manufacturing, processing, and tourism to improve water efficiency and contribute a portion of the value of water savings for sustainable funding streams in support of water saving retrofit programs for households, schools, and health care facilities in poor urban neighborhoods.

The second model followed Pooled Corporate Social Responsibility for Water Demand Management among the Poor. It targeted private companies with CSR programs to establish partnerships with utilities to fund water devices and equipment retrofits in poor urban areas. At the time, CSR programs in Jordan were mainly focused on education and health. IDARA worked to consider innovative approaches to raise the profile of water issues with the private sector, linking it to the scarcity challenge in Jordan, as well as being a vital element for health and sustainable development. To this effect, IDARA started a pilot program in the Abu Nseir area, in collaboration with Miyahuna and the WDMU to demonstrate the effectiveness of water saving devices to the public as well as the potential private partners for PPP.

IDARA proceeded with programs that included auditing Pepsi Co, Orange Telecommunication Firm, and HSBC, and assisting EDRAK Institution for Special Needs (one of HSBC's CSR beneficiaries) by installing water saving devices (WSDs) at their facilities. With Pepsi, IDARA also supported MWI to partner with PepsiCo Jordan by developing a "Water Strategy for PepsiCo." IDARA worked with the WDMU to link the PepsiCo water strategy to policy objectives listed under the Water Demand Management Policy for Jordan approved in 2008. Specific WDM programs for the urban and agriculture sectors were suggested for implementation and financing by PepsiCo.

In July 2009, IDARA succeeded to bring together HSBC Bank and Miyahuna to forge the first public-private partnership in water use efficiency in Jordan. This alliance implemented the *Let's Save Water* initiative as part of Miyahuna's summer water conservation program. The initiative included a communication campaign followed by a plumbing fixture retrofit for around 2,000 homes. The retrofit concentrated on lavatory and kitchen faucets, and showerheads. HSBC covered the cost of the communication campaign and the purchase of the WSDs for faucets and showerheads, while Miyahuna covered the cost to install the WSDs through an IDARA grant. This alliance is qualified as a GDA since both partners, Miyahuna and HSBC, co-designed the initiative and provided a one-to-one match in funding. The *Let's Save Water* initiative was well received by Amman residents and got the attention of the media. HSBC initially agreed to continue funding this initiative, if proven successful, though the economic recession in Jordan has not made this possible.

In year four, IDARA facilitated a partnership agreement between MWI and Sayegh Group, a local manufacturer of faucets and water saving devices. The objective was to promote water-use efficiency in the education and worship sectors in Jordan. IDARA also facilitated follow-on meetings with the various partners to identify roles and responsibilities of each, develop a work plan to execute this agreement, and build a link between the WDMU and external organizations such as the Ministry of Awqaf, Ministry of Education, and Miyahuna.

Grant Pool

Early in the program IDARA drafted a grants manual, which was approved by USAID. IDARA proposed a list of grants linked to IDARA's objectives of seeking the highest impact in saving water and instituting WDM measures and functions. Grantees included:

- Royal Scientific Society: IDARA issued a grant to RSS to support drafting the new plumbing code for Jordan (under Task 2.2.1).
- Mercy Corps: Retrofitting and conducting plumbing maintenance activities in poor households of Zarqa and Mafraq Governorates (under Task 3.3).
- Miyahuna: In support of the *Let's Save Water* campaign jointly funded by HSBC Bank.

- Miyahuna, Aqaba Water, and Yarmouk Water: To support the WDMU and the three utilities to design, plan, implement and manage programs proposed under their water use efficiency plans. This grant also enabled the WDMU to provide support to each utility to implement a residential retrofit program. Finally, it supported the WDMU and utilities to develop and deliver a training program to train meter readers, plumbers, and door-to-door staff members. Around 3,600 households were retrofitted in the Miyahuna service area, 2,500 in Aqaba, and 3,510 in Yarmouk service area.
- Municipal Parks: Under Task 3.1.2 IDARA has been implementing best management practices for water-wise landscaping in public parks through the grants program. IDARA signed six grant agreements to introduce water-wise landscaping practices and measures in municipal parks. The parks have included sites in Mafraq, Karak, Deir Alla, Husseinieh, Al-Azraq and West Irbid.
- KACE: IDARA issued a grant for training related to the integration of water and energy use efficiency in the sub-criteria of the King Abdullah II Award for Excellence.

Development Credit Authority

IDARA explored Development Credit Authority (DCA) opportunities, particularly with potential manufacturers of water-efficient equipment. IDARA completed a broad assessment of barriers and opportunities to increase participation in water efficient markets, with consideration for the potential to utilize credit guarantees. Further consultations focused on discussions with a Jordanian bank and a water and energy efficiency consultancy to explore the market. Ultimately, IDARA completed a DCA concept paper which analyzed the financial market conditions to consider the potential for a loan portfolio guarantee with a financial institution, or portable guarantee with one ESCO. The concept was submitted to USAID for consideration and follow-up.

Performance Contracts

A performance contract is a form of partnership where a private audit/retrofit company retrofits a high water user facility to improve water efficiency and receives an agreed portion of the value of water saving. The retrofit is more attractive when the partnership targets both water and energy since more savings are generated by considering both resources. Performance contracting is already practiced in the energy sector in Jordan. IDARA co-hosted a one day Forum on water-energy efficiency for hotels in Aqaba in September 2009 along with the Aqaba Community Economic Development Project. The forum brought together hotel owners/managers, water-energy performance contractors including those trained by IDARA on water audits, suppliers of water-energy conservation equipment, and lenders to discuss water-energy saving for the hotel industry. The objective was to establish business deals for water-energy retrofits to assist the hotels in obtaining green certification (namely, Green Key).

Task 3.1: Documentation of urban landscape concepts

Subtask 3.1.1: Explore public conceptions of culturally desirable park space use to inform water-wise landscaping efforts

During the second quarter of the project, IDARA conducted surveys in six geographic locations: Irbid, Aqaba, Karak, Madaba, Mafraq, and Kafraïn to assess public conceptions of culturally desirable park space use. The team completed a total of 132 interviews. IDARA compiled, analyzed, and evaluated the data and submitted a survey report to USAID in June 2008.

Subtask 3.1.2: Train personnel from at least 70 of the 99 municipalities on water-wise landscape principles

In December 2007, IDARA hosted a one-day seminar for mayors to introduce *Water-Wise Landscaping in Jordan*, under the patronage of the Mayor of Amman. A total of 163 participants attended the seminar, 65 representing GAM, and 77 representing another 58 municipalities. Presentations in the seminar included the following topics: An introduction to water-wise landscaping; GAM's practices in water-wise landscaping; a briefing on IDARA's activities; water-wise parks established under USAID's WEPIA project; and a briefing on IDARA's municipal training and park implementation programs. Field visits to the WEPIA-established parks were conducted, and an assessment report was completed and submitted.

IDARA also provided training in water-wise landscape principles to six JOHUD employees participating in an awareness project called the "Water-Wise Women's Initiative." The participants (four women and two men) were given a condensed version of the municipal training course that covered the following topics: Landscapes in history; the seven principles of water-wise landscaping; drought tolerant plant materials; drawing techniques and graphic communication; and planting design. This training was an in-kind exchange of services between IDARA and JOHUD. In exchange, JOHUD set up the logistics for IDARA through their outreach centers in order to reach urban stakeholders in different geographic areas, assisting IDARA to conduct the surveys under Task 3.1.1.

By year two of the project, IDARA successfully completed training of 62 municipalities on water wise landscaping, drought tolerant plant materials, and planting design for municipalities in Amman, Irbid, Zarqa, Tafila, Karak.

IDARA also completed the water-wise planting designs for three parks in collaboration with supervising engineers from each municipality, and reviewed designs for neighborhood parks as proposed in Aqaba, providing comments to ASEZA. IDARA will hold another training session and invite other municipalities.

By June 2010, IDARA completed the installation of water-wise plants and an irrigation system in the Manshiet Bani Hassan Park. By the following year, June 2011, the Azraq park water-wise landscaping installation was completed, and five parks had been implemented through IDARA's grants program (Manshiet Bani Hassan, Karak, Husseiniah, Deir Alla, and Azraq). In addition to parks rehabilitated under IDARA's grant task, the IDARA team provided support to rehabilitate a park in al-Sareeh municipality, demonstrating real traction with this local government. In addition, IDARA completed five additional parks designs: Ardah, Malahat (Deir Alla), Madaba, and two in Ramtha.

In April 2011, IDARA hosted a competition between municipalities for the best water-wise park, done in collaboration with the Ministry of Municipal Affairs. Five entries were received, including Manshiet Bani Hassan, Ministry of Municipal Affairs, Greater Irbid, Mazar, and Zarqa. A joint committee consisting of IDARA's technical team, and representatives from the Ministry of Municipal Affairs evaluated the entries. Three winners were selected and an award ceremony was conducted at the Ministry of Water and Irrigation to distribute awards. The ceremony was attended by high officials from MWI and USAID and the press. Further negotiations are being held between MWI and USAID to provide funds to implement the first winning design.

Critical to the sustainability of these efforts, IDARA worked closely with the WDMU to hand over the water-wise landscape training course to the Agricultural Engineer's Association. The course will be taught on a regular basis by the trainers certified under the IDARA project, and hosted by the Association.

Subtask 3.1.3: Introduce water-wise landscaping principles in the curriculum of agricultural faculties in at least two universities

Early on, IDARA conducted a preliminary survey of landscape courses at Jordanian universities to examine the potential to introduce a water-wise landscaping curriculum to the departments of architecture at five different universities. By year two, IDARA provided technical support to Jordan University (JU), Jordan University for Science and Technology (JUST), Petra University, and the German Jordanian University to train faculty members, assess current curriculum, provide course materials syllabi, samples lectures, and reading materials.

In year three, IDARA completed the integration of a water-wise landscaping module in the curriculum of Jordan University's School of Agriculture. IDARA also held a seminar on xeriscaping in May 2010 for eighty students and two faculty members at German Jordan University. The following year, IDARA conducted a workshop for students enrolled in the landscape course at Petra University (May 2011). The water-wise landscaping module was presented and handed over to the supervising faculty there. The module presentation workshop has been held at a total of 4 universities: Jordan University of Science and Technology, Jordan University, German Jordanian University, and University of Petra.

Subtask 3.1.4: Expand work with nurseries

IDARA conducted an assessment report on USAID's WEPIA-established nurseries and proposed a revised strategy and schedule for completion of this task. Accordingly, IDARA planned to concentrate efforts in providing technical assistance to large government and/or large private sector nurseries. A check-list for potential new sites that are interested in becoming nurseries was developed. The check-list was sent to JOHUD for potential sites under their supervision. IDARA held a meeting with JOHUD regarding potential CBOs interested in becoming nurseries as well. A JOHUD biodiversity site in Ajlun was identified as a suitable possibility. IDARA visited the GAM nursery in Ain Ghazal in order to get an overview of their production facilities and product range, and to further explore the potential for technical support in establishing an in-house drought tolerant tree nursery.

IDARA hosted a brainstorming session with GAM's Director of Nurseries and nursery consultant to discuss this further. GAM's nursery director has been approached to further explore the potential for technical support in establishing an in-house drought tolerant tree nursery. IDARA also engaged a nursery consultant to prepare a business plan for the Productive Women's Cooperative Society Nursery in Marka. Finally, IDARA established contact with ASEZA's Planning and Studies Department. The Planning and Studies Department sent IDARA copies of the Gensler guidelines (Masterplan guidelines for Aqaba), and the plant list adopted by the Saraya project. These lists have been reviewed for use later in the project as potential product lines for new nurseries.

In year two, IDARA explored technical assistance opportunities with GAM and a local NGO to establish an in-house drought tolerant/native tree nursery. This was initiated in year three with Greater Amman Municipality and Friends of the Earth Middle East. Peter Gierlach, a nursery specialist from Arizona, gave technical lectures to the nursery staff and conducted on-site assistance at the various nursery locations. IDARA also designed a demonstration plant display at a private nursery. In June 2011, IDARA completed the installation of a water-wise demonstration plant display at a private nursery. IDARA provided the design/technical assistance while the nursery supplied the materials and covered the cost of installation.

Subtask 3.1.5: Determine incentives for water-wise landscaping

Beginning in year two, IDARA provided marketing support for this activity by designing a water-wise demonstration garden at a local private sector garden center that specializes in drought tolerant plants. IDARA also designed a demonstration garden for Miyahuna headquarters. In addition, IDARA provided technical support to design a water-wise children's park in Jabal al-Qala in collaboration with a local NGO. Finally, IDARA also supported the NGO in fundraising, targeting the public and private sectors.

Task 3.2: Host a competition for best design of low-income water efficient houses in the highland and the Jordan Valley areas

In coordination with the Housing and Urban Development Corporation (HUDC), IDARA conducted a competition for the best designs for a water and energy efficient low-income house for government supported housing projects. An Advisory committee including members of HUDC was formed to guide the design brief and select members for the evaluation jury. Money was raised to cover half of the expenses for the competition, which was launched in January 2010. Thirteen submissions were received and evaluated by an independent jury committee. An award ceremony to recognize the first three winners was conducted in September 2010. IDARA also delivered a lecture on the integration of water-harvesting techniques/systems in building design in collaboration with MWI and GAM.

As a follow-up to the low-income efficient house competition, IDARA held a seminar for developers, architects, engineers, and technical staff at HUDC in order to disseminate the creative water and energy-efficiency ideas proposed by the competition winners. They presented the designs and technologies proposed, along with an exhibition of each competition entry.

During the extension period in year five, IDARA produced a guide for developers on designs for water and energy efficient low income housing projects.

Task 3.3: Provide plumbing services to poor rural areas.

This task originally entailed distributing 20,000 school bags in poor rural areas. During the Project Management Committee meeting on November 15, 2007, the Committee voted to revise this task to provide plumbing services in poor rural areas. In April 2008, IDARA signed a grant agreement with the CBIWDM project—Mercy Corps—to provide these plumbing services. Mercy Corps received 26 proposals for plumbing services, of which 14 were screened to be potential grantees. Based on the selection criteria, the Advisory Committee selected seven CBOs. An award ceremony for the seven CBOs was conducted in August 2008 at the Ministry of Water and Irrigation. Mercy Corps conducted three training workshops for these community organizations covering:

- Loan management training
- Technical training
- Proposal Writing

During year two, IDARA completed all activities stipulated in the grant agreement signed in April 2008 with Mercy Corps. This activity benefited five CBOs in Zarqa Governorate, namely Ajjour for Social Development: Beer Al-Sabe Voluntary Society, Northern Azraq Women Society for Social Development, Al-Hashimiyya Society for Society Development, Environmental and Economic Investment Cooperative. In addition, to two CBOs in Al-Mafraq Governorate, namely Aal Al-Bait

University Employees Cooperative and Sharq Al-Mafraq Cooperative. This task was implemented in partnership with two local partners: The Jordan River Foundation conducted field performance supervision of CBOs in Zarqa Governorate; and the Royal Scientific Society supervised the work of CBOs in Al-Mafraq Governorate. The grant directly benefitted 137 households (of which 28% were women-led households), and had an impact on more than 700 people by improving water use efficiency and increasing water availability in the targeted areas. The total funds awarded from the project to the CBOs was JD 49,000 (USD 69,209) to be used for the following plumbing maintenance and retrofit activities inside households:

- Water tanks/float valves
- Piping network
- Plumbing fixtures such as toilets, faucets, and showers
- Installation of water saving devices

Furthermore, activities were expended to reach female students living in dorms in the neighborhood of Aal Al-Bait University, through providing them with over 100 WSDs to enhance water-use efficiency in the dorm facilities – notably kitchen, bathroom faucets, and showers. The administration of the dorms was impressed with the success of this initiative, a saving of some 30-35% as against the baseline water bill. They used to run out of water around mid-week, but after the intervention the same supply now lasts for two weeks. The grant has also supported a school within Sharq Al-Mafraq Cooperative to install a new fresh-water drinking facility with 10 automatic shut-off faucets outside. The administration is also now pleased since children can drink and use water more judiciously. The school is also part of the Madrasati initiative, and has recently been awarded the Healthy School Certificate.

In year four of the project, the team has conducted more than 77 follow-up field visits with informal training to CBOs. Two of the awarded CBOs completed their first lending cycle and started a new one. The average loan size given to beneficiaries was JD 333 (USD 545), and the average payback percentage was 95%.

Task 3.4: Implement Best Management Practices in pilot areas

Late in the first year, IDARA developed a concept paper to implement a pilot program in a residential area in Abu Nuseir Housing Complex. The paper detailed the objective of the pilot program and its linkage with other IDARA tasks, such as the grants, and the formation of a Global Development Alliance to replicate the program with Miyahuna, in collaboration with the private sector. Sample residential units were selected based on water consumption data provided by Miyahuna Customer Information System department. A preliminary verification visit was made to cross match meter numbers and customers with that of the tables and GIS maps.

In year two, IDARA proceeded with efforts, collaborating with the WDMU and Miyahuna on a WSDs pilot program in Abu-Nuseir with fifty residential units. In year three, IDARA completed a final data analysis for the retrofitted subscribers, and submitted a report documenting the Abu Nuseir pilot retrofit program. In addition, a thorough assessment of water saving device types was conducted for use in the HSBC retrofit campaign and planned retrofit programs under the IDARA project. IDARA also designed the roof top pilot program.

IDARA collaborated closely with the WDMU, Miyahuna, and Aqaba Water on a rooftop tank pilot program in Amman and Aqaba service areas respectively. The program aimed at evaluating water losses due to roof-top tank overflow. In addition, IDARA sought to highlight the need for more careful

investigations by water utilities regarding under-registered water supply by residential water meters through the use of Unmeasured Flow Reducers (UFR) technology. Twenty-five residential units in each service area participated in the program.

ANNEXES

ANNEX I- MONITORING AND EVALUATION PLAN

| Performance Indicator | Definition of Indicator | Justification/ Management Utility | Unit of Measurement | Achieved in year 1 | Achieved in year 2 | Achieved in year 3 | Achieved in year 4 | Total achieved (LOP) | Target for extension period | Disaggregate | Data Source | Method of Collection | Schedule of Collection | Link to USAID PMP Indicator |
|---|---|---|---------------------|--|--|--|--|--|--|---|--|---|------------------------|-----------------------------|
| Program Objective-Level: Instituting Water Demand Management in Jordan | | | | | | | | | | | | | | |
| Total number of people trained (Management indicator) | People trained are those who have participated in project training activities. | This will allow the USAID-IDARA to monitor how many people have been trained through the project. | Number | Yr 1:549 | Yr 2: 614 | Yr 3: 437 | 409 | 2182 | 200 | Gender, type of participant (MWI, utilities, private sector, plumbers, etc.), location, topic of training | Project records | The Chief of Party and Activity Leaders will review project records | Annually | 11 |
| Number of beneficiaries (Management indicator) | Beneficiaries are those Jordanian citizens who have been assisted by the USAID-IDARA anywhere along the water demand supply chain | This will allow the USAID-IDARA to monitor total number of people who have been assisted by the USAID-IDARA. | Number | Yr 1: 977 | Yr 2: 4987 | Yr 3:2500 | 11900 | 15400 | 100 | Location, gender, sector, services area | Project records | The Chief of Party and Activity Leaders will review project records | Quarterly | 3 and 11 |
| Activity 1: Institutional Capacity for Water Demand Management | | | | | | | | | | | | | | |
| Score on the Water Organization Capacity Assessment Tools (WOCAT) ³ | | | | | | | | | | | | | | |
| Task 1.1: Build consensus on WDM functions and institutions as part of the water sector reform and restructuring | | | | | | | | | | | | | | |
| No performance measures needed, work plan milestones instead | | | | | | | | | | | | | | |
| Task 1.2: Institute planning, allocation, and monitoring functions at the WDMU | | | | | | | | | | | | | | |
| WDM Functional Operations Milestone scale score ⁴ | The Functional Operations Milestone tracks the capability of key water demand functions, focused on planning, regulatory, and operational functions. The Milestone lists 10 stages, and progress from each stage is weighted according to importance. | This indicator will measure the process of effective functioning of WDMU operations in order to better manage water demand in Jordan. | Score | Refer to Task 1.5 WOCAT assessment below | Function, level of decentralization | IWDMJ staff, USAID SO team staff, and WDMU staff | The IWDMJ team, along with WDMU key staff, the USAID SO team, and other stakeholders, will score each key function along the milestones, tracking progress from year to year. It is suggested | Annually | |

³ This indicator was used to measure the performance of USAID-IDARA under Task 2.5

⁴ The assessment of WDMU functions and operations has been included as part of the WOCAT assessment tool under Task 2.5 in the second year work plan of USAID-IDARA. Therefore, this indicator has been removed from year 2 work plan.

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| | | | | | | | | | | | | that this be done at the same time as the portfolio review process within the Mission. | | |
| WDMU Policy Milestone Scale Score | The Policy Milestone tracks the progress of key water policies, from the provision of input by water entities including NGOs, to the drafting of policy language, through the approval process, to the promulgation of the new policy(ies), to the training of WDMU and others on the policy(ies), and finally to the corrective actions taken in response to the new policy(ies). The Milestone lists 8 stages, and each completed stage is assigned 1 point, and maximum possible points= | This indicator will measure the process of passing and enforcing WDMU policies needed for improved management of water demand in Jordan. | Score | Yr 1: 6 ⁵ | Yr 2: 7 ⁶ | Yr 3: 7 | Yr 4: 7 | 7 | 7 | Policy Topic | USAID-IDARA Staff, USAID SO team staff, and WDMU staff | The USAID-IDARA team, along with WDMU key staff, the USAID SO team, and other stakeholders, will score each key policy along the milestones, tracking progress from year to year. It is suggested that this be done at the same time as the portfolio review process within the Mission. | Annually | 2 |

⁵ In year 1, USAID-IDARA accomplished 6 stages of the 8 stages mentioned below with regards to the WDM Policy.

Stage 1: Interested groups propose that legislation is needed on a particular issue. Stage 2: Issue is introduced in the relevant legislative committee or ministry. Stage 3: Legislation is drafted by relevant committee or ministry.

Stage 4: The legislature debates the legislation. Stage 5: Legislation is passed by full approval process needed in legislature. Stage 6: The executive branch approves the legislation (where necessary). Stage 7: Implementing actions are taken.

Stage 8: No immediate need identified for amendments to the law. **Source:** *Handbook of Democracy and Governance Program Indicators*, (1998).

⁶In year 2, USAID-IDARA accomplished the seventh stage.

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| | 8. | | | | | | | | | | | | | |
| Number of types of members on the National Water Alliance ⁷ | | | | | | | | | | | | | | |
| Number of linkages formed to support WDM functions and programs ⁸ | Linkages, between organizations such as committees, working groups, task forces, etc., can be formal or informal, but must meet regularly or as triggered by an agreed-upon event. Linkages are formalized to bring together staff from a variety of groups within | As linkages bring about collaborative problem solving on water issues, better decisions and processes will be developed within the WDM community. In addition, trust between the WDM groups will improve. | Number | Yr 1: 31 ⁹ | Yr 2: 33 ¹⁰ | Yr 3:35 ¹¹ | Yr 4:37 ¹² | 39 | 39 | Private institutions, public institutions, and NGOs | WDMU Project records | USAID-IDARA team WDMU staff | Quarterly | 2 |

⁷ This indicator has been found not applicable. Therefore, it has been removed from the second year work plan.

⁸ During implementation of USAID-IDARA, this indicator has been slightly changed

⁹ Linkages formed with: Ahmad Badaweih Est., ASEZA, AW, Bitar Office for Engineering Consultation, GAM, GTZ, JOHUD, JCCA, JEA, JFBPW, JSMO, JUST, JVA, Legal Department/MWI, MOA, MOE, MOPIC, MPWH, Miyahuna, municipalities, NCARE, NGWA, NWMP, Orange, Pepsi Co., PMU, RSS, Segura IP3 Partners LLC, University of Jordan, WAJ, WAJ Labs

¹⁰ Linkages formed with: ACED, ASEZA, AW, DZC, DOS, GAM, GTZ, HSBC, HUDC, JEA, JFBPW, JSMO, JUST, JVA, KACE, Legal Department/MWI, MOE, MOL, MPWH, MOTA, MOIT, Miyahuna, MWI IT Department, NCARE, NGWA, NWMP, Orange, Pepsi Co., PMU, RSS, Saraya, University of Jordan, WAJ.

¹¹ MOE, MOIT, MPWH, MOTA, municipalities, JNBC, JSMO, RSS, MOEd, UNRWA, VTC, CAQA, NET, MWI, WAJ, Miyahuna, Yarmouk Company, AW, RIAL Project, DZC, GAM, JEA, HSBC, KACE, PMU, NWMP, Hotels Association, Hospitals Association, Restaurants Association, Private sector consultancy companies, DOS, JREDS, ASEZA, ACED, JUST

¹² MOE, MOIT, MPWH, MOTA, municipalities, JNBC, JSMO, RSS, MOEd, Ministry of Awqaf, UNRWA, VTC, CAQA, NET, MWI, WAJ, Miyahuna, Yarmouk Company, AW, RIAL Project, DZC, GAM, JEA, HSBC, KACE, PMU, NWMP, Hotels Association, Hospitals Association, Restaurants Association, Private sector consultancy companies, DOS, JREDS, ASEZA, ACED, JUST, Sayegh Group

| | | | | | | | | | | | | | | |
|---|---|---|--|--|---|---|--|----|----|---|-------------------------------|--|----------|----|
| | the WDM community to conduct collaborative problem solving together. | | | | | | | | | | | | | |
| Number of institutions with improved water-use and demand management information ¹³ | Data related to WDM requires to be collected and integrated into existing systems at MWI and the utilities through the development of appropriate database tables | As the water community adopts, integrates and learns to effectively utilize databases and exchange information, it will allow improved planning and allocation of resources at the planning level and improve operations and decision making. | Number of database tables updated, or designed and implemented | Yr 1: 0 | Yr 2: 4 WDMU, Miyahuna, AW, NGWA | Yr 3: 5 WDMU, Miyahuna, AW, NGWA, NWMP | Yr 4: 4 WDMU, Miyahuna, AW, NGWA | 5 | 5 | Type of database (end-use, billing, demand forecasting, GIS data tables), type of information managed | Utilities and/or MWI systems | Team leader/ WDM monitoring and forecasting will review and assess score | Annually | 10 |
| Task 1.3: Strengthen the MWI Planning Directorate by establishing a national water use information program | | | | | | | | | | | | | | |
| Number of sources included in national water use information systems | Sources are those water demand entities that generate data that are critical to WDMU's capability of producing accurate reports. Sources can include water users | This will directly measure whether the WDMU is using data from all available and relevant sources. | Number | Yr 1: 11 (2 external, 9 internal) ¹⁴ | Yr 2: 17 (8 external, 9 internal) ¹⁵ | Yr 3: 18 (8 external, 10 internal) ¹⁶ | Yr 4: 20 (10 external, 10 internal) ¹⁷ | 20 | 20 | Internal and external institutions | Project records, WDMU records | The Chief of Party and the Team Leader/ WDM monitoring and forecasting will review | Annually | 10 |

¹³ During implementation of USAID-IDARA, this indicator has been added to track the number of institutions with improved water-use and demand management information.

¹⁴ **Internal:** WAJ Subscription Directorate incl. tankers, WAJ IT Department, WAJ O&M, WAJ GBMS, NGWA IT, Subscribers incl. tankers water, annual water budgeting Departments, Miyahuna IT, Subscribers including tankers water and annual water budgeting Departments, AW IT, Subscribers including tankers water and annual water budgeting Departments, MWI Planning Directorate, MWI NWMP
External: GAM (GIS, Amman Metropolitan Plan), DOS (GIS, Family Expenditure and Census divisions).

¹⁵ **External:** hotels, hospitals, schools, mosques, universities, offices, GAM (GIS, Amman Metropolitan Plan), DOS (GIS, Family Expenditure and Census divisions)

Internal: WAJ GBMS, NGWA IT, Subscribers including tankers water and annual water budgeting Departments, **Miyahuna** IT, Subscribers including tankers water and annual water budgeting Departments, AW IT, Subscribers including tankers water and annual water budgeting Departments, MWI Planning Directorate, MWI NWMP, WAJ Subscription Directorate incl. tankers, WAJ IT Department, WAJ O&M

¹⁶ **External:** hotels, hospitals, schools, mosques, universities, offices, GAM (GIS, Amman Metropolitan Plan), DOS (GIS, Family Expenditure and Census divisions)

Internal: WAJ GBMS, NGWA IT, Subscribers including tankers water and annual water budgeting Departments, **Miyahuna** IT, Subscribers including tankers water and annual water budgeting Departments, AW IT, Subscribers including tankers water and annual water budgeting Departments, MWI Planning Directorate, MWI NWMP, WAJ Subscription Directorate incl. tankers, WAJ IT Department, WAJ O&M, WAJ GIS

¹⁷ **External:** Ministry of Awqaf, Ministry of Education, hotels, hospitals, schools, mosques, universities, offices, GAM (GIS, Amman Metropolitan Plan), DOS (GIS, Family Expenditure and Census divisions)

Internal: WAJ GBMS, NGWA IT, Subscribers including tankers water and annual water budgeting Departments, **Miyahuna** IT, Subscribers including tankers water and annual water budgeting Departments, AW IT, Subscribers including tankers water and annual water budgeting Departments, MWI Planning Directorate, MWI NWMP, WAJ Subscription Directorate incl. tankers, WAJ IT Department, WAJ O&M, WAJ GIS

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| | such as hotels, households, and water suppliers, etc., as well as metered data. The information system is the collection and analysis process within the WDMU. | | | | | | | | | | | project records | | |
| Task 1.4: Perform end-use analyses | | | | | | | | | | | | | | |
| Number of stakeholders involved with the end-use analyses | End-use analyses are equivalent to water audits conducted within key industries/users groups. Stakeholders include the hotel industry, hospital industry, etc., as well as the WDMU, utilities, and other water entities. | This indicator measures the extent to which stakeholders reference and apply end-use analysis data. The more the stakeholders participate in end-use analyses, the more likely they will implement water savings and better management practices. | Number | Yr 1: 0 | Yr 2: 11 (6 external, 5 internal) ¹⁸ | Yr 3: 10 ¹⁹ | Yr 4: 4 | 4 | 4 | Internal and external institutions | Project records | The Team Leader/ WDM monitoring and forecasting will interview key stakeholders | Annually | 11 |
| Number of information gathering or research activities related to profiling water users and analyzing municipal consumption patterns ²⁰ | Water users include industries, municipalities, etc. | This indicator measures the number of activities focused on profiling water users and analyzing municipal consumption patterns. | Number | Yr 1: 1 (customer demand profile for Miyahuna, AW, NGWA) | Yr 2: 1 | Yr 3: 2 (Profiling of consumers for Miyahuna, AW, NGWA), and baseline survey | Yr4:4 | 4 | 4 | Stakeholders (industry, municipality, etc.) | Project records, MWI and utility records | The Team Leader/ WDM monitoring and forecasting will review with MWI, utilities and municipalities | Annually | 12 |
| Number of end-use analyses carried out independently by MWI and utilities | End-use analyses are equivalent to water audits conducted within key industries/users groups. Carried out independently means that the MWI and/or utilities conduct their own end-use analyses without funding by | This indicator measures the progress USAID-IDARA is making in conducting end use analysis of customer categories. | Number | Yr 1: 0 | Yr 2: 18 (10 Government offices, 2 universities, 6 commercial) | Yr 3: 24 (8 hotels, 8 offices, 4 schools, 4 universities) | Yr 4: 17 | 24 | 10 | User categories and service areas (utilities) | Project records, MWI and utility records | The Team Leader/ WDM monitoring and forecasting will review project and other records | Annually | 7 |

¹⁸ **External:** hotels, hospitals, schools, mosques, universities, offices

Internal: NGWA IT, Subscribers including tankers water and annual water budgeting Departments, **Miyahuna** IT, Subscribers including tankers water and annual water budgeting Departments, **AW** IT, Subscribers including tankers water and annual water budgeting Departments, MWI WDMU, WAJ

¹⁹ NGWA, Miyahuna, AW, WDMU, hotels, hospitals, schools, mosques, universities, offices.

²⁰ During implementation of USAID-IDARA, this indicator has been added to track the number of information gathering or research activities related to profiling water users and analyzing municipal consumption patterns

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| | donors. | | | | al) | | | | | | | | | |
| Task 1.5: Assist in the establishment of a decentralized system for water demand management functions | | | | | | | | | | | | | | |
| Score on the Water Organization Capacity Assessment Tool (WOCAT) | The WOCAT scores water entities along 7 dimensions that are critical to effective operations of organizations (governance, management practices, human resources, financial resources, service delivery, external relations, and sustainability). Each dimension is scored along a 7-point scale, where 0 = N/A, 1 = needs urgent attention, all the way to 6 = acceptable, needs maintaining. Then all the dimension totals will be added together to get the water organization's final score for the year. | In order to measure our progress in creating effective organizations, we will use the assessment tool to evaluate their capacity by looking at governance, management practices, human resources, financial resources, service delivery, external relations, and sustainability. | Score | Yr 1: Miyahuna score: 12 out of 42. AW score: 12 out of 42. NGWA score: 9 out of 42. WDMU score: 15 | Yr 2: Miyahuna score: 15 AW score: 14. NGWA score: 11. WDMU score: 19 out of 42. | Yr 3: Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 26.6 out of 42. | Yr 4: Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 32.5 out of 42. | Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 32.5 out of 42. | Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 32.5 out of 42. | Institution | Project records, organization records | The Chief of Party will review and assess the scores | Annually, to be completed for project's annual report | |
| Number of training participants ²¹ | | | | | | | | | | | | | | |
| Task 1.6.1 Develop BMP guides on conservation of nonagricultural water | | | | | | | | | | | | | | |
| Number of best management practices (BMP) guides developed on water conservation and non-agricultural water ²² | A best practice is defined as the optimum possible way of doing something. A best practice is formulated after the study of specific business or organizational case studies to determine the most broadly effective and efficient means of organizing a system or performing a function. | This indicator will measure the identification of best practices that will help improve water demand management and conservation in selected non-agricultural sectors. | Number | Yr 1: 0 | Yr 2: 2 Park BMP Implementation Guide, Public Information BMP Implementation Guide | Yr 3:1 High-rise and high-density building BMP Guide | Yr4:3 (Offices, Hotels, Hospitals BMP Guides) | 7 | 1 (residential BMP Guide) | Topic of best practice | Project records | Number of BMP guides submitted to USAID | Annually | 2 |
| Task 1.6.2 Develop BMP Guide for High Rise Buildings | | | | | | | | | | | | | | |
| Number of stakeholders involved in the development of | Developing a sense of ownership by stakeholders is important to successfully | This indicator measures the extent to which stakeholders reference and apply BMPs. The more the | Number | Yr 1: 73 (56 external, 17 | Yr 2: 73 (56 external, 17 | Yr 3: 73 (56 external, 17 | NA | 73 (56 external, 17 | NA | Internal and external institutions | Project Records | The Senior Technical Advisor will review sign in | Annually | 4 |

²¹ This performance indicator has been removed from the second year work plan as it is already included under Task 1.7.

²² During implementation of USAID-IDARA, this indicator has been slightly changed to cover the development of BMP guides

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| BMPs | implementing BMPs | stakeholders participate in BMP development, the more likely they will implement BMPs. | | internal) | internal) | internal) | | internal) | | | | sheets for workshops and meetings | | |
| Task 1.7: Provide training and capacity building to promote water demand management | | | | | | | | | | | | | | |
| Score on the Water Organization Capacity Assessment Tool (WOCAT) | The WOCAT scores water entities along 7 dimensions that are critical to effective operations of organizations (governance, management practices, human resources, financial resources, service delivery, external relations, and sustainability). Each dimension is scored along a 7-point scale, where 0 = N/A, 1 = needs urgent attention, all the way to 6 = acceptable, needs maintaining. Then all the dimension totals will be added together to get the water organization's final score for the year. | In order to measure our progress in creating effective organizations, we will use the assessment tool to evaluate their capacity by looking at governance, management practices, human resources, financial resources, service delivery, external relations, and sustainability. | Score | Yr 1: Miyahuna score: 12 out of 42. AW score: 12 out of 42. NGWA score: 9 out of 42. WDMU score: 15 | Yr 2: Miyahuna score: 15 AW score: 14. NGWA score: 11. WDMU score: 19 out of 42. | Yr 3: Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 26.6 out of 42. | Yr 4: Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 32.5 out of 42. | Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 32.5 out of 42. | Miyahuna score: 26.6 AW score: 26.6 NGWA score: 25.2 WDMU score: 32.5 out of 42. | Institution | Project records, organization records | The Training and Outreach Expert will review and assess the scores | Annually, to be completed for project's annual report | |
| Average score on individual skills assessment rating | Skills and knowledge are defined as those key areas that the trainings have focused on, to build the capacity of individuals within water demand institutions key to project results. The short skills/knowledge assessment tool will be based on the content of the training. | An increase in skills and knowledge will improve the ability of staff in organizations to better manage water demand. | Score | Yr 1: 0 (NA) | Yr 2: score=2-3 on average (2= some skills/ Knowledge, 3= Skilled/ Knowledgeable) | Yr 3: Avg. of 3 | Avg. of 3 | Avg. of 3 | Avg. of 3 | Location, gender, topic of training, participant type | Project records, organization records. This assessment tool may be used twice for each training participant: first, immediately before the training begins; second, immediately after the training ends. | The Training and Outreach Expert will review each organization | Annually | |

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|--|--|---|--------|---------------------------------|-----------|---------------------------|---------------------------|----------------------------------|---|--|--|---|----------------|-------|
| Number of training participants | Trainings are those training activities focused on water demand management and managed by USAID-IDARA, or by USAID-IDARA partners, or by other organizations using USAID-IDARA training curriculum. Participants are those people who have completed the training. | This will track the number of local and municipal water staff, and others associated with water demand management at the local level who have been trained. As the capacity of the local and municipal staff increases, their skills will improve, and the capability of their institutions to make decisions about water will be strengthened. | Number | Yr 1:102 (60 males, 42 females) | Yr 2: 614 | Yr 3: 437 | 409 | 2182 | 200 | Topic, gender, institution, location | Project records, institutional records | The Training and Outreach Expert will review each organization | Quarterly | 3, 11 |
| Task 1.8: Introduce and promote drought response principles in the water community | | | | | | | | | | | | | | |
| Number of information gathering or research activities related to drought response principles ²³ | Drought response principles are rules or standards for dealing with drought that have worked in other countries. | This indicator will track the number of research efforts to identify relevant principles from other drought responses throughout the world. | Number | Yr 1: 0 | Yr 2: 1 | Yr 3: 1 | 0 | 1 | 1 | Type of drought response principles (chronic, acute) | Project records, institutional records | USAID-IDARA will carry out the research | Once-in year 2 | 12 |
| Number of drought response principles that have been introduced and promoted by utilities and WDMU | Introduced means brought in and established from another country into Jordan. Drought response principles are rules or standards for dealing with drought that have worked in other countries. Promoted means that these principles are printed or used in media campaigns | This indicator will measure both the identification of relevant and possible principles from other drought responses throughout the world, and of the promotion of those introduced principles within the Jordanian context. | Number | Yr 1: 0 | Yr 2: 0 | Yr 3: 0 | 0 | 0 | 15 ones introduced and 2 used ²⁴ | Principles introduced and principles promoted | Project records, institutional records | The Team Leader/ WDM monitoring and forecasting will track the number of introduced and promoted principles | Annually | 12 |
| Task 1.9: Design, administer, and institutionalize a yearly event to recognize individuals, institutions, and industries that help advance water efficiency | | | | | | | | | | | | | | |
| Number of integrated events accepted by national water entities as part of a national campaign ²⁵ | | | | | | | | | | | | | | |
| Number of organizations who scored on the water efficiency sub- | Scoring on water efficiency sub-criteria will include retrofit, water saving devices, leak detection, | This indicator will track the number of organizations who implement water efficiency | Number | Yr 1: 0 (NA) | Yr 2: 0 | Yr 3:130 (80 Governmental | Yr 4:130 (80 Governmental | 130 (80 Governmental institution | TBD | Utilities, public, private entities | King Abdullah II Award for Excellence | The Training and Outreach Expert will track and review project | Annually | 5 |

²³ This indicator was added to year 2 work plan as it was found needed for assessing the progress of this task.

²⁴ The number of used drought response actions is based on approval of MWI

²⁵ This indicator has been removed from year 2 work plan, and replaced with the number of organizations score on the water efficiency sub-criteria under the King Abdullah II Center for Excellence Award

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| criteria under the King Abdullah II Center for Excellence Award | water harvesting, gray water reuse, recycling, etc. | measures. | | | | institution s and 50 private sector entities) | institution s and 50 private sector entities) | s and 50 private sector entities) | | | records | records | | |
| Activity 2: Enabling Institutional and Legal Environment | | | | | | | | | | | | | | |
| Task 2.1: Assist in creating a stakeholder-driven WDM policy program | | | | | | | | | | | | | | |
| Number of stakeholders involved in policy change | Stakeholders include utilities, Government of Jordan ministries, plumbing companies, and other water entities. Policy designates a process. This process includes the elaboration of programs by different, usually public and private collective actors and the way the programs are then applied as concrete programs and actions. | This indicator will measure the commitment of water entity stakeholders in changing and improving policy. | Number | Yr 1: 68 | Yr 2: 34 (25 external, 9 internal) | Yr 3: 134 | Yr4: 134 | 134 | TBD | Internal and external institutions | Project documents | The Senior Technical Advisor will review project documents | Annually | 4 |
| Task 2.2.1 Develop a national standardized plumbing code | | | | | | | | | | | | | | |
| Percentage of approved new standards that meet or exceed International Standards ²⁶ | | | | | | | | | | | | | | |
| Total number of public documents with new codes disseminated ²⁷ | | | | | | | | | | | | | | |
| Total number of people trained on the new codes ²⁸ | Once implemented, the new codes will need to be disseminated through public documents such as guides, checklists, manuals, as well as training and workshops. | This indicator will convey the extent of dissemination of the new codes implemented. | Number | Yr 1: 0 | Yr 2: 0 | Yr 3: 26 | Y4:140 | 140 | NA | Type (posters, handbook, guides, information packets, PSAs) | Project records, organization records | The Program Manager will review project documents | Annually | 11 |
| Task 2.2.2 Draft a report that recommends to the Ministry of Water and Irrigation the specifications on water that need to be incorporated into a potential High-rise Building Code | | | | | | | | | | | | | | |
| No. of recommended practices to include in High Rise Code | A recommendation is a practice that can improve water efficiency in a high rise building | Water efficiency will be improved as more recommended practices are identified | Number | Yr 1: 0 (NA) | Yr 2: 20 | Yr 3: NA | NA | 20 | NA | NA | Project records | The Senior Technical Advisor will review project | Annually | |

²⁶ During implementation of USAID-IDARA, this indicator has not been found adequate to assess the performance of USAID-IDARA on this task. Therefore, it has been removed from year 2 work plan.

²⁷ During implementation of USAID-IDARA, this indicator has not been found adequate to assess the performance of USAID-IDARA on this task. Therefore, it has been removed from year 2 work plan.

²⁸ Added to year 2 work plan to replace the originally proposed indicators

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| | | | | | | | | | | | | records | | |
| Task 2.3: Implement a plumbing materials certification program | | | | | | | | | | | | | | |
| Number of rules and codes identified ²⁹ | | | | | | | | | | | | | | |
| Number of technical standards drafted for Jordan ³⁰ | Plumbing materials to be certified means those water using products for which a JSMO technical committees have completed a draft standard | This indicator will measure the drafting of JSMO standards for water using products | Number | Yr 1: 1 | Yr 2: 1 | Yr 3: 2 | Yr4: 4 | 6 | NA | NA | Project records | The Senior Technical Advisor will review project documents | Annually | 12 |
| Task 2.4: Establish a “master plumbers” vocational training program at the VTC | | | | | | | | | | | | | | |
| Number of master plumbers trained in certification programs | Plumbers are those who are trained. | This will raise the quality of plumbing services. | Number | Yr 1: 0 | Yr 2: 0 | Yr 3: 25 | Yr4: 16 | 100 | 59 | Program, gender, location | Project records, program records | The Program Manager will review each program | Annually | 11 |
| Task 2.5: Prepare a workplan to implement a labeling program | | | | | | | | | | | | | | |
| Number of types of appliances and fixtures with labels in place in the market ³¹ | | | | | | | | | | | | | | |
| Number of research and information gathering activities to identify the types of appliances and fixtures with labels in place in the market ³² | Plumbing appliances and fixtures include: dish-washers, clothes washers, faucets, shower heads, etc. Labels indicate how much water the appliance or fixture uses. In the market means that it is available for sale (retail or wholesale). | This indicator will quantify the number of activities focused on the availability of types of fixtures and appliances that are labeled. | Number | Yr 1: 1 | Yr 2: 1 | Yr 3: NA | NA | 2 | NA | Type of fixture/appliance, Location of market, Type of label | Plumbing companies, markets, project records | The Senior Technical Advisor will review project documentation | Annually | 12 |
| Number of stores/shops that carry labeled appliances and fixtures ³³ | Plumbing appliances and fixtures include: dish-washers, clothes washers, faucets, shower heads, etc. Labels indicate how much water the appliance or | This indicator will measure the number of stores that sell labeled products. The more stores that sell labeled products, the larger will be the | Number | Yr 2: 0 | Yr 3: NA | Type of fixture/appliance, Location of market, Type of | NA | NA | NA | Plumbing companies, markets, project records | The Senior Technical Advisor will review project documentat | Annually | 5 | |

²⁹ This indicator has been replaced with “the number of technical standards drafted for Jordan”.

³⁰ This indicator has been added to replace the old indicator (i.e. number of rules and codes identified)

³¹ This indicator has been removed from year 2 work plan and is replaced with the “number of research and information gathering activities to identify the types of appliances and fixtures with labels in place in the market”.

³² This indicator is added to year 2 work plan to assess the performance of USAID-IDARA in Task 2.5

³³ This is not applicable as USAID-IDARA was only tasked to conduct a market survey and develop a workplan for labeling of water-using fixtures and appliances

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| | fixture uses. Store/shop means an entity that sells appliances at retail or wholesale. | availability of labeled products. This may be a proxy for demand among both the retailers and wholesalers, and for the ultimate customer for labeled materials. | | | | label | | | | | ion | | | |
| Task 2.6: Identify WDM enforcement mechanisms and recommend the most feasible | | | | | | | | | | | | | | |
| Percentage of plumbing code enforcement recommendations accepted by the Government of Jordan / MWI | Recommendations are those enforcement options that are most likely to work in Jordan, based on stakeholder assessments. Accepted means that the GOJ (and/or MWI) has reviewed and approved of the enforcement mechanisms recommended. | This indicator is a measure for the level of Government support for WDM. | Percentage | Yr 1: 0 (not applicable) | Yr 2:0 | Yr 3: 0 | Yr 4: 0 | 100% | 0 | Punitive/incentive | Project documentation | The Chief of Party will review acceptance process of GOJ and/or MWI | Annually | 2 |
| Task 2.7: Develop mechanisms to finance the implementation of WDM projects | | | | | | | | | | | | | | |
| Number of mechanisms to finance the implementation of WDM projects in place | Financial mechanisms can include grants, contracts, loans, joint ventures or other mechanisms that support water demand management projects. In place means that they have been approved (through a MOU or other agreement) that is binding. | This indicator will measure the number and types of financial mechanisms in place for WDM projects in Jordan. | Number | Yr 1: 0 | Yr 2: 3 Grant to RSS Grant to Miyahuna PPP between USAID-USAID-IDARA, HSBC and Miyahuna | Yr 3: 7 Grants to six municipalities to implement water-wise landscaping measures in public parks. Grants to KACE. | Yr 4: 8 Grant to four Municipalities. Grant to the three utilities to implement WDM initiatives in the residential sector in Jordan. GDA between the Ministry of Water and Irrigation and the Sayegh Group to | 18 | 2 | Type of financial mechanisms | Project documentation | The Chief of Party will review project documentation | Annually | |

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|---|---|---|--------|----------|-----------------|----------------|----------------|-----------|-----|-------------------------------|----------------------------------|--|----------|---|
| | | | | | | | retrofit | | | | | | | |
| Dollar value of financial instruments in place ³⁴ | Financial instruments can include: grants, contracts, loans, joint ventures or other mechanisms that support water demand management projects. In place means that they have been approved (through a MOU or other agreement) that is binding. | This indicator will measure the value and types of financial instruments for WDM projects in Jordan. | Number | Yr 1: 0 | Yr 2: \$233,840 | Yr 3: \$91,665 | Yr4: \$300,000 | \$625,505 | TBD | Type of financial instruments | Project documentation | The Chief of Party will review project documentation | Annually | |
| Activity 3: Demonstrate Selected Water Demand Management Initiatives to the Public | | | | | | | | | | | | | | |
| Task 3.1: Expand the urban landscape program introduced by WEPIA | | | | | | | | | | | | | | |
| Number of water-wise public parks landscaped designs developed for public parks | Water-wise landscaping is an environmentally friendly form of landscaping that uses a variety of indigenous and drought-tolerant plants, shrubs, and ground cover. Public landscaped designs are plans for public spaces/parks. | This measure will indicate the incorporation of water-wise landscaping principles in public parks. | Number | Yr 1: 0 | Yr 2: 3 | Yr 3: 3 | Yr 4: 5 | 7 | 2 | Location, size | Project records | The Landscape Specialist will review project documentation and interview notes | Annually | |
| Number of people trained in water-wise landscaping principles | Water-wise landscaping is an environmentally friendly form of landscaping that uses a variety of indigenous and drought-tolerant plants, shrubs, and ground cover. Trainings are those training activities focused on water-wise landscaping and managed by USAID-IDARA, or by USAID-IDARA partners, or by other organizations using USAID-IDARA approved training curriculum. Participants are those people who have completed the training. | This will track the number of people who have been trained in water-wise landscaping. As the knowledge and understating of water-wise landscaping principles increases, water management demand should rationalize. This indicator also measures the demand for water-wise landscaping among landscape professionals and organizations. | Number | Yr 1: 74 | Yr 2: 72 | Yr 3: 105 | Yr 4: 0 | 7 | 8 | Gender, location | Project records, program records | The Landscape Specialist will review each program | Annually | 3 |

³⁴ This number includes the grants provided by USAID-IDARA

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|---|--|--|--------|---------------------------|-------------------------------------|--------------------------------|---------|---|----|---|---|--|----------|--|
| Number of public parks converted/ or created based on water-wise landscaping principles that are maintained after project resources end ³⁵ | Public parks will be located in the larger municipalities within Jordan, and are free for the public to enjoy and visit. Water-wise landscaping is an environmentally friendly form of landscaping that uses a variety of indigenous and drought-tolerant plants, shrubs, and ground cover. Converted means that the parks were originally designed based on non-water-wise landscaping principles, and have been redesigned. Created means that no park and/or no water-wise landscaping existed previous to the project activity. Maintained means that the parks have the resources (financial and technical) to continue to exist after project resources end. | This indicator will track the number of completed parks water-wise landscaped through project efforts, and maintained by the municipalities and USAID-IDARA. This will measure the relevance and acceptance of water-wise landscaping principles at the local level by Jordanians. | Number | Yr 1: 0 (not applicable) | Y2: 0 (not applicable) | Yr 3: 1 | Yr 4: 5 | 7 | NA | Location | Project records, USAID-IDARA records, municipal records | The Landscape Specialist will review project records | Annually | |
| Number of institutions of higher- education adopting water-wise landscaping principles into their curriculum | Institutions of higher-education are those universities and colleges within Jordan. Adopting means that either an entire curriculum and degree program exists for water-wise landscaping, or that curriculum at the course level exists. Water-wise landscaping is an environmentally friendly form of landscaping that uses a variety of indigenous and drought-tolerant plants, shrubs, and ground cover. | This indicator will measure whether the principles of water-wise landscaping have been accepted within Jordanian higher-education institutions as a part of their curriculum. | Number | Yr 1: 0 (not applicable) | Yr 2: 1 German Jordanian University | Yr 3: 2 Jordan University JUST | Yr 4: 1 | | NA | Specific water-wise landscaping curriculum / inserted into existing agricultural curriculum, university | Project records | The Landscape Specialist will review each program | Annually | |

³⁵ This indicator has been changed to assess the number of water-wise public parks that have been converted or created by USAID-IDARA rather than assessing the percentage.

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| Number of university agricultural students completing classes which include water-wise landscaping principles | Completing means that they have passed the water-wise landscaping class. Water-wise landscaping is an environmentally friendly form of landscaping that uses a variety of indigenous and drought-tolerant plants, shrubs, and ground cover. | This indicator is a proxy measure for demand for classes on water-wise landscaping at the universities. As well, it is an indicator that the university has adopted water-wise landscaping into the curriculum. | Number | Yr 1: 0 (not applicable) | Yr 2: 25 | Yr 3: 105 | Yr 4: 25 | | 70 | University of Jordan, Mu'tah University, JUST | Faculty records | The Landscape Specialist will review each program | Annually, probably only after year 3 of the USAID-IDARA team project | 3 |
| Task 3.2: Host a competition for the best low-income, water-efficient houses in the highland and Jordan Valley areas | | | | | | | | | | | | | | |
| Number of design entrants to competition | Design entrants are submitted by teams of architects, students, apprentices, engineers, master plumbers, landscapers, interior designers, etc. The competition is for the best low-income, water-efficient house design. | This indicator will measure the number of designs submitted, and is a proxy for the interest and demand for low-income water-efficient housing. | Number | Yr 1: 0 (NA) | Yr 2: 0 (NA) | Yr 3: 14 | Yr 4: NA | | NA | Team location | Project records | The Landscape Specialist will review project records | Annually | |
| Number of strategies developed to finance building of prototypes or mass construction based on designs | Financing strategy means any public-private partnership to provide financial assistance or support. Design means a plan developed for low-income water-efficient housing under the competition of this Task. | This indicator will measure the marketability of the winning design for a low-income water-efficient house. It is a proxy for the builders' expectation that such a model will be in demand by home buyers in Jordan. | Number | Yr 1: 0 (NA) | Yr 2: 0 (NA) | Yr 3: NA | Yr 4: NA | NA | NA | Location | Project records | The Landscape Specialist will review each program | Annually | |
| Task 3.3: Provide plumbing services and plumbing fixtures to rural areas | | | | | | | | | | | | | | |
| No of homes in rural areas provided with plumbing services and/or water saving devices or other plumbing equipment | Plumbing services are being provided through a grant to Mercy Corps | Plumbing services will reduce leakage and installing plumbing appliances will result in the more efficient use of water | Number | Yr 1: 0 | Yr 2: 217 | Yr 3: 100 | Yr4:60 | 377 | | Type of service or device provided | Project records, | The Program Manager will review each program | Annually | |
| Task 3.4: Implement best management practices in pilot areas | | | | | | | | | | | | | | |
| Number of BMPs implemented by | A best practice is defined as the optimum way of | This indicator will measure the number BMP's | Number | Yr 1: 0 | Yr 2: 1 | Yr 3: 1 | Yr4: 3 | 3 | 3 | Utility, subject matter of BMP | Utility records, | The Water Engineer will | Annually | 2 |

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|---|--|--|--------|---------|------------|------------|-----------|--------|-----|----------------------------|----------------------------------|--|----------|---|
| utilities | doing something. Implemented means the BMP is institutionalized by the utility. | implemented. | | | | | | | | | project records | review project records | | |
| Number of customers benefitting by implementation of BMPs ³⁶ | Individual customers receiving water efficiency services through audits, retrofits, training, etc. | This indicator will measure the number of beneficiaries from implementations of BMPs | Number | Yr 1: 0 | Yr 2: 2078 | Yr 3: 2400 | Yr4: 9500 | 14,118 | 140 | By utility and type of BMP | Utility records, project records | The Water Engineer will review project records | Annually | 3 |

³⁶ This indicator was added to the second year work plan.

ANNEX II- TRAINING DELIVERED

Below is a list of courses, workshops and seminars organized in Jordan during the life of the project.

| Task | Title | Dates | Number of Participants | Gender Disaggregation (Female : Male) |
|-------|---|-------------------|------------------------|---------------------------------------|
| 1.2.0 | Water Demand Management Training | 1/9/12-1/11/12 | 25 | 15:10 |
| 1.2.0 | Building Capacity TOT Training | 12/13/11-12/15/11 | 17 | 8:9 |
| 1.2.0 | Instructional National Design Training | 1/4/12-1/5/12 | 17 | 9:8 |
| 1.2.1 | Participants for the WDMU Restructuring and Operational Planning Workshop | 2/21/08 | 31 | 7:24 |
| 1.2.1 | WDMU Restructuring and Operational Planning Workshop | 2/21/08 | 30 | 5:25 |
| 1.2.1 | Change Management Workshop for Aqaba Water Company | 11/13/08 | 23 | 4:19 |
| 1.2.2 | Water Demand Management for Senior Officials and Decision Makers - Amman | 1/19/09 | 29 | 5:24 |
| 1.2.2 | Water Demand Management for Senior Officials and Decision Makers - Aqaba | 1/22/09 | 36 | 7:29 |
| 1.2.2 | WDM Policy Action Workshop - Ministry of Industry and Trade | 4/22/10 | 33 | 15:18 |
| 1.2.2 | WDM Policy Action Workshop- The Ministry of Public Works and Housing | 6/29/10 | 48 | 16:32 |
| 1.2.3 | WDM Policy Action Plan Workshop - Ministry of Environment | 1/21/10 | 46 | 18:28 |
| 1.2.3 | WDM Policy Action Plan Workshop- the Ministry of Tourism and Antiquities | 2/15/10 | 37 | 14:23 |
| 1.2.5 | Build and Design Appropriate Data Base under WDMU | 7/11/10 | 18 | 11:7 |
| 1.2.5 | Design and Build Appropriate Database under WDMU - GIS Training | 3/14/11-3/16/11 | 13 | 9:4 |
| 1.4.0 | Hospital End Use Analysis Workshop For Training Participants | 11/6/08 | 21 | 8:13 |
| 1.4.0 | Residential End Use Analysis - AWC | 11/15/08 | 16 | 0:16 |
| 1.4.0 | Residential End-Use Analysis Workshop | 11/11/08-11/13/08 | 16 | 7:9 |
| 1.4.0 | Residential End Use Analysis Training | 12/6/11-12/8/11 | 16 | 8:8 |

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| 1.4.0 | Aqaba Water Auditing Training | 4/24/10-4/29/10 | 11 | 1:10 |
| 1.5.1 | Regulatory Incentives and Key Performance Indicators Workshop | 9/17/08 | 7 | 1:6 |
| 1.5.2 | Preparation for Water Use Efficiency Plan; Water Conservation Workshop - Aqaba | 3/16/09 | 16 | 3:13 |
| 1.5.2 | Water Use Efficiency (Miyahuna and NGWA) | 3/19/09 | 17 | 9:8 |
| 1.5.2 | AWC Water Use Efficiency Plan Workshop | 6/1/09 | 18 | 5:13 |
| 1.5.2 | Water Use Efficiency Plan Finalization Meeting | 12/7/09 | 14 | 3:11 |
| 1.5.2 | Water Use Efficiency Plan for Jordan Water Company (Miyahuna) | 1/25/10 | 22 | 8:14 |
| 1.5.2 | NGWA Water USE Efficiency Plan | 3/25/10 | 29 | 8:21 |
| 1.5.2 | AWC Water Use Efficiency Plan Workshop | 5/31/09-6/1/09 | 20 | 7:13 |
| 1.5.2 | AWC Demand Forecasting Model and Water Use Efficiency Tracking Tool Training | 6/22/09-6/23/09 | 11 | 2:9 |
| 1.5.2 | Demand Forecasting Model and Water Use Efficiency Tracking Tool (Training Workshop for NGWA and Miyahuna) | 9/29/09-9/30/09 | 17 | 8:9 |
| 1.5.2 | Meeting for the AW AW | 2/4/10 | 10 | 2:8 |
| 1.5.2 | Leak Detection Training (Assisting the establishment of a Decentralized System for WDM functions) | 9/27/10-9/28/10 | 46 | 11:35 |
| 1.5.3 | Assessment of Barriers and Opportunities in the Water Efficient Market | 10/12/10 | 56 | 17:39 |
| 1.5.3 | Performance Contracting for Water Efficiency | 5/17/10-5/18/10 | 33 | 9:24 |
| 1.6.0 | How to develop Public Information and Outreach Campaign | 6/10/09-6/11/09 | 18 | 9:9 |
| 1.6.1 | BMP Task Force | 4/30/08 | 24 | 10:14 |
| 1.6.1 | Hotel BMP Training | 1/26/12 | 29 | 8:21 |
| 1.6.1 | Private Hospital BMP Training | 2/9/12 | 16 | 0:16 |
| 1.6.1 | Public Hospital BMP Training | 2/19/12 | 28 | 2:26 |
| 1.6.2 | Efficient Water Use and Reuse Strategies for High Rise and High Density Developments | 7/29/08 | 77 | 18:59 |
| 1.6.2 | Develop BMP guide for High Rise and High Density Residential Development | 5/21/09 | 14 | 9:5 |
| 1.6.2 | Water Efficiency Recommendations for HRHD including GAM Area C Meeting | 5/21/09 | 14 | 6:8 |
| 1.8.0 | Drought Meeting | 1/20/09 | 23 | 19:23 |
| 1.9.0 | Training of KACE Trainers on Water Demand Management | 2/14/10 | 9 | 3:6 |

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| 2.2.1 | Plumbing code Training: Architects (Group 1) | 5/22/11 | 38 | 23:15 |
| 2.2.1 | Plumbing Code Training: Governmental and Municipal Officials (Group 2) | 5/24/11 | 42 | 19:23 |
| 2.2.1 | Plumbing Code Training: Material Suppliers (Group 3) | 5/26/11 | 17 | 5:12 |
| 2.2.1 | National Standardized Plumbing Code | 3/13/11-3/15/11 | 12 | 3:9 |
| 2.2.1 | Plumbing Code Training: Engineering consultants and Designers and Engineering Professors (Group 4) | 5/29/11-5/30/11 | 26 | 4:22 |
| 2.2.1 | Plumbing Code Training: Plumbing Contractors (Group 5) | 6/1/11-6/2/11 | 18 | 2:16 |
| 2.2.2 | Drafting A Report to Recommend Specifications on EWU into a Potential High-Rise Building Code | 3/28/09 | 8 | 0:8 |
| 2.3 | Demonstration on Toilet testing | 3/10/09 | 8 | 3:5 |
| 2.3.0 | Hosted a Competition for Best Low-Income Water and Energy Efficient Houses in the Highland Areas | 5/18/11 | 112 | 41:71 |
| 2.3.0 | RSS Training | 6/15/10-6/16/10 | 39 | 34:5 |
| 2.4.0 | Master Plumber Training Program Certification Framework Workshop | 3/29/10 | 26 | 2:24 |
| 2.4.0 | Master Plumber Training Program Certification Framework Workshop | 3/31/10 | 11 | 1:10 |
| 2.4.0 | Establish a "Master Plumbers" Vocational Training Program | 6/21/10 | 14 | 2:12 |
| 2.4.0 | Master Plumber training - TOT Training | 8/1/10-8/12/10 | 16 | 1:15 |
| 2.5.0 | Presentation of Labeling Survey Findings | 4/9/09 | 30 | 7:23 |
| 2.5.0 | Water Use Efficiency Program in the Residential Sector in Jordan- IDARA's Grant Pool | 4/28/11 | 39 | 13:26 |
| 2.6.0 | Water Demand Management Enforcement - NLC | 7/21/11 | 20 | 7:13 |
| 2.7.0 | Training for HSBC and Miyahuna Retrofitting Program | 7/27/09 | 35 | 8:27 |
| 2.7.0 | Global Development Alliance Workshop | 5/28/08-5/29/08 | 18 | 7:11 |
| 3.1.0 | Introduction to Water Wise Landscape Design | 10/2/11-1/31/12 | 7 | 5:2 |
| 3.1.1 | Water Wise Landscape Training for Municipalities | 12/16/07 | 151 | 45:106 |
| 3.1.2 | Water Wise Landscape training for Municipalities- Karak and Tafileh | 8/17/08 | 16 | 8:8 |
| 3.1.2 | Training - Xeriscape Module | 5/5/10 | 32 | 23:9 |
| 3.1.2 | Training on Xeriscaping Principles - Jarash and Ajloun | 10/26/08-10/29/08 | 12 | 6:6 |
| 3.1.2 | Training on Xeriscaping Principles - Al-Mafraq | 11/23/08-11/26/08 | 19 | 9:10 |
| 3.1.2 | Training on Xeriscaping Principles - Amman, Balqa and Madaba | 2/22/09-2/25/09 | 21 | 16:5 |
| 3.1.2 | Training on Xeriscaping Principles - Aqaba and Muaan | 2/9/09-2/12/09 | 11 | 7:4 |

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| 3.1.2 | Water Wise landscape Training - Amman | 5/4/08-5/7/08 | 14 | 12:2 |
| 3.1.2 | Water Wise Landscape Training for Municipalities - Irbid | 6/16/08-6/19/08 | 26 | 11:15 |
| 3.1.3 | Training - Xeriscape Module | 5/4/10 | 82 | 54:28 |
| 3.3.0 | CBOs Training - Irbi Governorate | 4/3/08 | 41 | 9:32 |
| 3.3.0 | CBOs Training - AL-Mafraq Governorate | 4/7/08 | 56 | 43:13 |
| 3.3.0 | CBOs Training - Zarqa Governorate | 8/17/08 | 22 | 10:12 |
| 3.3.0 | CBOs Training - Al-Mafraq | 8/18/08 | 42 | 11:31 |
| 3.3.0 | CBOs Training - Zarqa | 8/20/08-8/21/08 | 20 | 9:11 |
| 3.3.0 | CBOs Training - Mafraq Governorate | 8/28/08-8/30/08 | 30 | 9:21 |