



FURTHER ADVANCING THE BLUE REVOLUTION INITIATIVE (FABRI)

QUARTERLY PROGRESS REPORT NO. 12: JUNE 15, 2014 – SEPTEMBER 14, 2014

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COLLABORATING ENTITIES

Prime Contractor

DAI

Current Subcontractors

California Institute of Technology
ECO Consult (Jordan)
Middle East Desalination Research Center (MEDRC)
Stockholm Environment Institute – U.S. Center
Texas A&M University
University of California at Davis
University of Florida
University of Nebraska-Lincoln
University of Toledo
Utah State University

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DISCLAIMER

The authors' 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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ACRONYMS

ACWUA	Arab Countries Water Utilities Association
AFR	Africa
AfWA	African Water Association
AfWCCI	African Water Cycle Coordination Initiative
AfYWP	African Young Water Professionals
AGU	Arabian Gulf University
ALOS-PALSAR	Advanced Land Observing Satellite, Phased Array type L-band Synthetic Aperture Radar
AMCOW	African Ministers' Council on Water
ASA-CSSA-SSSA	American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America
AU	African Union
CA	California
CCS	Community Counselling Services Ltd
CO	Contracting Officer
COP	Chief of Party
COP18 / COP19	United Nations Climate Change Conference - Doha/Warsaw
COR	Contracting Officer's Representative
CV	Curriculum Vitae
DAI	Development Alternatives, Inc.
DCOP	Deputy Chief of Party
DEC	Development Experience Clearinghouse
ECOWAS	Economic Community Of West African States
ESTH	Environmental, Science, Technology, and Health Officer
EXCO	[AMCOW] Executive Committee
FABRI	Further Advancing the Blue Revolution Initiative
FOG	Fixed Obligation Grant
FPPO	Fixed Price Purchase Order
FVCOM	Finite-Volume, primitive equation Community Ocean Model
GJU	German Jordanian University
GMES	Global Management for Environment Services
GMS	Greater Mekong Sub-region
GWP	Global Water Partnership
GYGA-MENA	Global Yield Gap Atlas for the Middle East and North Africa
HAB	Harmful Algal Bloom
IAV	Institute of Agronomy and Veterinary Science Hassan II
ICA	Independent Consultant Agreement
ICBA	International Center for Biosaline Agriculture
IGAD	Inter-Governmental Authority on Development
IMU	Interim Management Unit
INRGREF	National Research Institute for Rural Engineering, Water, and Forestry
InSAR	Interferometric Synthetic Aperture Radar
IRS	Internal Revenue Service
IWA	International Water Association
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
JPL	Jet Propulsion Lab
JUST	Jordan University of Science and Technology

GPR	Ground Penetrating Radar
MEDRC	Middle East Desalination Research Center
ME	Middle East
M&E	Monitoring & Evaluation
MENA	Middle East and North Africa
MENA NWC	Middle East and North Africa Network of Water Centers of Excellence
MOU	Memorandum of Understanding
MRC	Mekong River Commission
NA	North Africa
NCARE	National Center for Agricultural Research and Extension
NGO	Non-Governmental Organization
NREM	[Institute of] Natural Resources and Environmental Management
NRW	Non-Revenue Water
NYU	New York University
ONEE – IEA	Office National de l'Électricité et de l'Eau - Institut International de l'Eau et de l'Assainissement (Morocco)
PO	[AMCOW] Programme Officer
REC	Regional Economic Community
RSS	Royal Scientific Society
SADC	South African Development Community
SAR	Synthetic Aperture Radar
SDG	Sustainable Development Goal
SEEG	Société d'Énergie et d'Eau du Gabon
SQU	Sultan Qaboos University
TAC	[AMCOW] Technical Advisory Committee
TAMU	Texas A&M University
TEM	Transmission electron microscopy
TFDD	Transboundary Freshwater Dispute Database
TOR	Terms of Reference
UJ	University of Jordan
UNESCWA	United Nations Economic and Social Commission for Western Asia
UNL	University of Nebraska-Lincoln
USAID	United States Agency for International Development
USG	United States Government
WACDEP	[AMCOW & GWP] Water, Climate and Development Programme
WASH	Water, Sanitation, and Hygiene
WEAP	Water Evaluation And Planning
WIF	Water Innovation Fellowships Program
WSTA	Water Sciences & Technology Association
YWP	Young Water Professionals
YWSP	Young Water Scientist Partnerships Small Grants Program

EXECUTIVE SUMMARY

FABRI's twelfth Quarterly Progress Report provides an implementation update on the six key activity results which support improved management of water in the Middle East and Africa, project management updates, and any major issues faced and how they were resolved.

TECHNICAL PROGRAM

Result 1: Middle East and North Africa Network of Centers of Excellence Established and Operating.

- The MENA NWC Interim Board of Directors met in London from June 21-22, 2014.
- The Board of Directors met in Lisbon, Portugal from September 23-24, 2014.
- Taoti Creative began design work on a permanent website that will replace the preliminary website at www.menanwc.org.
- Community Counseling Services (CCS), a London-based consulting firm, began work on a financial fundraising strategy for MENA NWC.
- The IMU submitted a complete package to the U.S. Internal Revenue Service (IRS) for tax exempt status for the MENA NWC as a 501(c)(3).
- The IMU began advertising for the Executive Director and Director of Policy, Research and Development positions.
- The Water Innovation Fellowships (WIF) program received 11 new proposals and the Young Water Scientist Partnerships (YWSP) program received two new proposals.
- On August 14, 2014, USAID signed a second modification to YWSP and WIF's Annual Program Statements which extended the submission date for proposals from July 31, 2014, through January 2, 2015, and extended the required completion date of all grants from July 31, 2015 to January 31, 2016.
- FABRI started planning for a meeting of MENA NWC's Center Directors. The meeting will be held in Sharm El Sheik, Egypt from 18-19 November.

Result 2: Integrated Water Resources Management (IWRM) Programming Strengthened.

- The research team for the IWRM project "Mitigating Environmental Risks of Wastewater Reuse for Agriculture" continued field work in Tunisia, Oman and Jordan.

Result 3: Access to Clean Water and Sanitation Improved in Target Countries.

- The Non-Revenue Water (NRW) Task Force Members conducted the final audit at the SEEG utility in Gabon.

- During this quarter, 13 of the 19 participating utilities submitted their draft Performance Improvement Plans (PIPs).
- During this quarter, 15 of the participating utilities submitted a list of improvements in the areas assessed during the audits: institutional, technical, commercial, and measurement and information system management.
- During this quarter, eighteen AfYWP proposals were received. Of these, seven are complete and ready for Selection Committee review.

Result 4: Research and Development Capacities in Irrigation, Groundwater Management, and Drought Risk Assessment and Mitigation Strengthened

- The PR&D projects relating to irrigation, groundwater management, and drought risk assessment and mitigation continued research activities.

Result 5: Transboundary Water Cooperation Strengthened in Key River Basins

- During this quarter, the Senior Mekong Affairs Advisor finalized a strategy for RDMA to promote fair and effective governance of water, food, and energy as it relates to development of hydropower on the Mekong by building on RDMA's unique position as a donor of the MRC.
- The Senior Mekong Affairs Advisor was invited by the Stimson Center to attend a workshop on "Finding Solutions to Equitable Hydropower Development Planning in the Lower Mekong Basin" which was held in partnership with the Institute of Natural Resources and Environmental Management (NREM), Mae Fah Luang University, Chiangrai, Thailand.
- The Senior Mekong Affairs Advisor participated in discussions with the USAID Global Development Lab team who came to RDMA to identify opportunities for a signature effort to address decision-making for a more sustainable Mekong.

Result 6: Technical and Outreach Capacity of USAID Staff in Water and Sanitation Programming Enhanced

- FABRI prepared for several important events, including the International Water Association World Water Congress and Exhibition in Lisbon in September 2014.

Project Management

- During this period, FABRI received modification number seven to the FABRI contract which extended the contract end date to March 31, 2016.
- The DCOP/Grants Manager, Ken Ludwa, left the project on June 20, 2014. Rather than recruit a new long-term team member, USAID and FABRI agreed to supplement the FABRI in-house team with Lina Sheqem, an engineer from ECO Consult, and Sara Hiller from the DAI home office.
- FABRI issued a subcontract to the University of Toledo to serve as a U.S. partner for a research project under the PR&D Grants Program entitled "The Use of Green Nanoparticles as a Biofouling-Resistant Agent in Reverse Osmosis Desalination."

- FABRI issued a subcontract to the Middle East Desalination Research Center (MEDRC) to lead a research project entitled “Combating the Emerging Impacts of Harmful Algal Blooms (HABs) on Desalination Plants: Bloom Detection, Forecasting, and Strategies for Impact Reduction.”
- FABRI issued a subcontract to Utah State University to serve as a U.S. partner on a research project entitled “Prospects of Utilizing Solar Energy for Water Pumping and Brackish Water Desalination in Agriculture.”
- FABRI also issued an Independent Consultant Agreement to Etienne Tchagole to serve as a Senior Non-Revenue Water Expert on the Africa program.

Issues and Remedies

Two issues faced by project management during this quarter include:

1. The MENA NWC Board of Directors approved the recruitment of the Executive Director and Director of Policy, Research, and Development. Their approval was an especially promising act, since it permits FABRI to proceed with plans for institutionalization of the Network. FABRI immediately subscribed to seven recruitment websites, three of which are based in the Middle East. Those efforts were disappointing. Although we received more than 400 responses, very few matched the requirements. We also received more than 300 CVs for the Director of PR&D. There were more qualified candidates in that pool.

Action: FABRI is now pursuing other avenues, including reaching out to subcontractors and hiring a headhunting firm to identify the Executive Director.

2. Under the Africa Program, FABRI has identified a mismatch between FABRI’s Performance Improvement Plan and USAID interim results indicators. Most of FABRI’s are self-constructed and are not merged into the Bureau’s reporting.

Action: FABRI will work closely with the Africa Activity Manager to revise the indicators in the PMP that are more suitable for the Bureau’s review.

1. INTRODUCTION

Water plays a pivotal role in the political, economic and social lives of nations and people. Many countries, including those in the Middle East and Africa, are facing common water challenges- drought, inefficient agricultural water use, groundwater management, inadequate or poor quality water supply, weak or absent mechanisms for sharing transboundary water, etc. Such challenges can lead to conflict within communities and among countries, as well as have negative health, financial and social impacts on populations.

To help respond to these regional water challenges, FABRI is providing technical support to USAID's Middle East and Africa bureaus, fulfilling all requests at the highest technical standards. In this capacity, FABRI has launched and established a new regional water network called the Middle East and North Africa Network of Water Centers of Excellence (MENA NWC), strengthened integrated water resources management programming, improved the long-term viability of water and sanitation service providers, rationalized water allocations and use, encouraged collaboration among riparians in transboundary river basins, and raised USAID visibility in water and sanitation.

Partnerships form the foundation of all aspects of this initiative. FABRI develops partnerships—between and among the scientific community, governments, universities and research institutions, the private sector, and civil society—to achieve the project's goals and to ensure that the water sector in the Middle East and Africa is capable of sustaining, and building on those achievements after FABRI has closed. We are forging intellectual and financial partnerships among the water sector's major players to create an integrated process that spans the identification and design of new approaches and technologies to their production and adoption. Continued investments and advances in the water sector will improve economic output, agricultural returns, and public health and ease economic burdens and alleviate human suffering.

FABRI's core result is the launch of the Middle East and North Africa Network of Water Centers of Excellence (MENA NWC). This initiative is an outcome of President Obama's call to establish Centers of Excellence in the Muslim World during his June 2009 "New Beginnings" speech in Cairo. Secretary Clinton also mentioned the initiative during her World Water Day speeches in 2010 and 2011.

MENA NWC links technical and research institutions across the region, encouraging them to work together and with outside counterpart institutions on critical water challenges. The Network strives to foster partnerships that build and exchange regional science and technology capacity to improve water resources planning and management; and develop and disseminate policy tools and technical and management interventions that expand water supply, manage demand, and dramatically increase its efficient and productive use.

A network of cooperating institutions are facilitating collaborative activities, including competitive grants programs, capacity building, institutional twinings, exchanges, fellowships, communications, and knowledge management. The Network is the main vehicle for FABRI's goal to strengthen the water sector in the Middle East and North Africa.

Additionally, FABRI is supporting innovative WASH activities in Africa, focusing on providing institutional support to two regional associations to test and share successful approaches in non-revenue water and on setting national policies to enhance sanitation programs throughout Africa.

FABRI's twelfth quarterly report outlines the program's achievements and plans to build regional capacity of various actors from the water sector in the Middle East and Africa.

2. PROGRESS DURING THE QUARTER

FABRI has six major objectives:

- **Result 1: Establish an operational Middle East and North Africa Network of Centers of Excellence (MENA NWC).** FABRI is supporting the creation of the MENA NWC by acting as the Interim Management Unit until a Directorate is established. The initiative will establish MENA NWC organization, leadership, and finances, as well as manage collaborative, technical, and capacity-building activities via Policy, Research, and Development (PR&D) Grants. Through the MENA NWC, FABRI aims to integrate research and development capacity in the member Centers with the development and dissemination of applied technologies and practices for innovative approaches, systems, and technologies to address water issues important to the region. An important piece of this work is the development of a communications and knowledge sharing plan to support the sustainability of the Network.
- **Result 2: Strengthen Integrated Water Resources Management Programming.** FABRI is strengthening the legal and regulatory framework for IWRM and implementing methodologies to improve and promote the efficient use of water resources through the MENA NWC IWRM Thematic Partnership.
- **Result 3: Access to Clean Water and Sanitation Improved in Target African and Middle Eastern Countries.** FABRI is strengthening the performance of water and sanitation service providers by working with regional “platforms” and associations. The goal is to provide them with innovative and tangible support to improve financial, economic, and operating efficiency, including development of association Business Plans, Non-Revenue Water (NRW) initiatives, capacity building, and communications and knowledge sharing programs.
- **Result 4: Strengthen Research and Development Capacities in Irrigation, Groundwater Management, and Drought Risk Assessment and Mitigation.** FABRI is working with one of the MENA NWC Thematic Partnerships to identify the most promising and regionally-relevant technologies and techniques for efficient, productive use of water in agriculture; engaging the leading experts in these technologies to transfer knowledge to MENA NWC institutions; and developing and presenting outreach activities in target countries to encourage government engagement and private sector partnerships around the most successful approaches.
- **Result 5: Strengthen Transboundary Water Cooperation in Key River Basins.** Through Oregon State University, FABRI is conducting an analysis of transboundary cooperation approaches and applying study findings to the Tigris-Euphrates basin. The results will be used to identify, design and implement one or two pilot projects. In addition, FABRI hired a Senior Mekong Affairs Advisor based in Bangkok, Thailand who began work in August 2013.
- **Result 6: Enhance Technical and Outreach Capacity of USAID Staff in Water and Sanitation Programming.** FABRI will strengthen USAID staff capacity in this area by providing materials and insights based on our non-revenue water and sanitation programs in Africa.

The following section describes the progress that FABRI has made on each of these objectives during the quarter.

RESULT 1: MIDDLE EAST AND NORTH AFRICA NETWORK OF CENTERS OF EXCELLENCE ESTABLISHED AND OPERATING

Requirement 1.1: Support Establishment of MENA NWC

This activity is completed.

Requirement 1.2: Design a Trust Fund or Endowment to Help Ensure the Sustainability of the Network

The Interim Board of Directors has discussed the creation of a trust fund or endowment for MENA NWC that could be used for contributions from strategic donors, above covering the projected costs of operation. However, FABRI has left the issue open until it receives the fundraising strategy and action plan from CCs..

Requirement 1.3: Support Operations of the MENA NWC Secretariat

During the period, MENA NWC made progress in a number of different areas:

Governance: The Interim Board of Directors met in London from June 21-22, 2014 (see Requirement 1.4 for a discussion of the meeting) and in Lisbon, Portugal from September 23-24, 2014 (a discussion of this meeting will appear in the next Quarterly Report). Preparation for the Lisbon meeting occurred during this period. The Interim Management Unit (IMU) prepared briefing books which included:

- Candidates for the Executive Director and Director of Policy, Research and Development positions
- MENA NWC's Five Year Strategic Business Plan
- MENA NWC's bylaws
- Responsibilities for the Officers of the Board and Corporation
- A plan for institutionalizing MENA NWC, including setting up a regional office and bank accounts
- Detailed County Assessments for Jordan, Morocco and Oman
- Updates on MENA NWC's research programs
- A Terms of Reference for the Scientific Advisory Council and CVs of proposed members
- Update on the MENA NWC website design
- Memo from Community Counseling Services (CCS) highlighting their strategy for fundraising and high-level recommendations

Knowledge Exchange: Taoti Creative, a Washington, D.C. based website development firm, began design work on a permanent website that will replace the preliminary website at www.menanwc.org.

During the quarter, DAI and Taoti completed the following tasks:

- Prepared and approved wireframes (layout) for the home page and all interior pages
- Completed programming to allow for single sign-on with third party platforms like LinkedIn, Facebook, and Twitter
- Developed user profiles
- Finalized graphic design of the home page and interior pages
- Prepared content, including written descriptions of MENA NWC's activities, research projects, funding opportunities, communities, member Centers and identified photos and graphics associated with each of these topics
- Migrated content to permanent website

Fundraising: Community Counseling Services (CCS), a London-based consulting firm, began work on a financial fundraising strategy for MENA NWC. Over the quarter they worked with FABRI to complete:

- 40 strategic interviews with Board Members, MENA NWC Center staff, U.S. university partners, and other industry leaders
- Benchmarking MENA NWC against similar organizations to calibrate realistic fundraising targets and identification of successful fundraising approaches
- Preparation of a background paper on MENA NWC

Legalization: According to the Institutionalization Plan adopted by the Interim Board of Directors in London in June 2014, the IMU completed steps to establish MENA NWC as an independent entity, including:

- Submitted a complete package to the U.S. Internal Revenue Service (IRS) for tax exempt status for the MENA NWC as a 501(c)(3)
- Advertised for the Executive Director and Director of Policy, Research and Development positions. As of 15 September, 462 applications were received for the Executive Director and 250 applications were received for the Director of Policy, Research and Development. Positions were advertised on global and regional career websites including the Economist, LinkedIn, Devex, bayt.com, middleastjobs.org, and monstergulf.com.
- Contracted with lawyers in Jordan, Morocco, and Oman to prepare detailed country studies in order to compare the countries as venues for the MENA NWC Directorate office. Criteria that were considered included overall political and economic stability, financial considerations, ease of access, communications, and cost of living.

Research Program: Ten research teams funded by the Policy, Research and Development (PR&D) grants programs are actively collaborating to achieve their research objectives. During the period, the Water Innovation Fellowships program received 11 new proposals and the Young Water Scientist Partnerships received two new proposals. Updates on MENA NWC's research activities are provided later in the Quarterly Report.

Planned Activities for the First Quarter of Year Four

- Launch the Network's permanent website along with technical and managerial Communities of Practice
- Technical and logistical arrangements to present MENA NWC at the WSTA 11th Gulf Water Conference in Muscat, Oman in October 2014
- Technical and logistical arrangements for a meeting of MENA NWC's Center Directors in Sharm El Shiek, Egypt in November 2014
- Facilitate the preparation and signing of the ACWUA-AfWA Cooperation Memorandum of Understanding (MOU) at Arab Water Week in Jordan in January 2015
- Orient new MENA NWC Centers to MENA NWC activities and programs
- Publicize the deadline for applications to the small grants programs to January 2015

Requirement 1.4: MENA NWC Founders Committee Established

The Interim Board of Directors met in London from June 21-22, 2014. During that meeting, Members agreed to the following:

Legalization

- Passed a motion approving the draft bylaws for submission to the Network's attorney to apply to the U.S. Internal Revenue Service for tax-exempt status as a 501(c)(3)

Upcoming Network Events

- Supported holding a meeting of Center directors in Sharm El Sheikh, Egypt in October 2014 to discuss internal and external changes in the Network and progress in governance and technical areas. The meeting will last two days, and FABRI will cover the costs of travel for all directors. A select few members of the Board will attend.
- Agreed to participate in a workshop at the International Water Association World Water Congress in Lisbon and to decide their role at the next Board meeting

Institutionalization

- Agreed with the plan for institutionalization of the Network in terms of administrative and operational functions
- Amended the country-level analytical matrix to include government incentives and disincentives in terms of policies, taxes, and other regulations
- Short-listed four countries as possible sites for the Directorate: Morocco, Tunisia, Jordan, and Oman
- Approved the terms of reference for three Directorate staff – Executive Director; Director of Policy, Research, and Development; and Operations Manager with the additional wording: “Competitive compensation package offered.”

Board of Directors Election

- By private ballot, selected the following candidates to be members of the full Board:
 - Lee Addams, Vice-President, Corporate Strategy, Valmont Industries, Inc, United States
 - Thameur Chaibi, Head of Department of Rural Engineering, National Institute for Research in Rural Engineering, Water, and Forestry (INRGREF), Tunisia
 - Manar Fayyad, Vice President, German Jordanian University (GJU), Jordan
 - Abdel Kawi Khalifa, Professor, Ain Shams University and former Minister of Water and Wastewater Utilities, Egypt
 - Ralf Klingbeil, Regional Advisor Environment and Water, United Nations Economic and Social Commission for Western Asia (UN ESCWA), Lebanon
 - Elisabeth Kvitashvili, Deputy Assistant Administrator, Bureau for the Middle East, U.S. Agency for International Development (USAID), United States
 - Harvey Perlman, Chancellor, The University of Nebraska-Lincoln (UNL), United States
 - Said Ouattar, Director General, Hassan II Agronomy and Veterinary Institute (IAV), Morocco
 - Muwaffaq Saqqar, Water and Environment Consultant Engineer, Arab Fund for Economic and Social Development (AFESD), Kuwait
 - Jill Smail, Science and Technology Advisor, Bureau of Near East Affairs, U.S. Department of State (DOS), United States
 - John Waterbury, Global Professor of Political Science, New York University in Abu Dhabi (NYU), United States
 - Hanna Zaghoul, Chief Executive Officer, Kawar Energy, Jordan
 - Waleed Zubari, Professor of Water Resources Management, Arabian Gulf University (AGU), Bahrain

New Centers or Affiliates

- Agreed that the following research entities were welcome to join MENA NWC
 - American University of Beirut
 - University Cadi Ayyad, Morocco
 - German-Jordanian University

- Mutah University, Jordan
- Tlemcen University, Algeria
- Water Research Center, Tunisia
- University of Basra, Iraq

Scientific Advisory Council

- Confirmed the creation of the Scientific Advisory Council to include renowned scientists and researchers, answerable to the Executive Director in shaping scientific research policy and strategy and serving as peer reviewers of research
- Developed the initial terms of reference for the Council

Planned Activities for the First Quarter of Year Four

- Continue to orient new Board of Director members to MENA NWC activities and programs
- Begin logistical and travel arrangements for the next Board Meeting in Muscat, Oman to coincide with the MENA NWC's first biennial Congress

Requirement 1.5: Technical, Demonstration Activities of the Network Launched

Policy, Research, and Development (PR&D) Grants and PR&D Research Projects Started. Activities on the five PR&D research projects relating to the Food-Energy-Water Nexus, Non-Conventional Water, and Water Supply and Sanitation Technical Communities are summarized below. PR&D projects relating to Integrated Water Resources Management are presented in Result 2, and projects relating to Irrigation, Groundwater Management, and Drought Risk Assessment and Mitigation are presented in Result 4.

NON-CONVENTIONAL WATER

Research Project	Research Team
Use of Green Nanoparticles as a Biofouling- Resistant Agent in Reverse Osmosis Desalination	<ul style="list-style-type: none"> • Jordan University of Science and Technology (JUST), Jordan • International Institute for Water and Sanitation, National Office of Electricity and Potable Water (ONEE-IEA), Morocco • University of Rhode Island, USA • University of Toledo-Ohio, USA • Georgia Tech, USA

During this reporting period, the research team:

- **JUST replicated Tollen's method to synthesize silver nanoparticles (AgNP) using maltose** as reducing agent following University of Rhode Island (URI)'s protocol. The replication was very successful with results similar to what have been reported before by URI. In addition, JUST **initiated biological synthesis of silver nanoparticles using plant leaf extracts**, specifically olive and rosemary leaf extracts, incorporating Tollen's approach. The trials were carried out at different concentrations and with/ without PVP, a coating agent/stabilizer. The result was better formation of silver nanoparticles in terms of size, size identification easiness and monodispersity at lower concentrations with PVP as coating agent. However, there is still a need for more investigations to obtain typical small-sized spherical silver nanoparticles.

- University of Toledo **fabricated low-biofouling (AgNP) nanofiltration (NF) membranes** using cellulose acetate for the membrane backbone and silver nanoparticles from URI. UT also characterized the AgNP NF membranes with respect to solvent and solute flux and rejections were conducted. The evaluation of CA and CA-AgNP membrane performance was conducted in biofouling conditions via dead-end filtration experiments monitoring flux and bacterial cell adhesion. As expected, the presence AgNPs (Casein and PVP coated) had a positive effect in higher initial flux values and lower flux declines during bacteria testing.
- The International Institute for Water and Sanitation, National Office of Electricity and Potable Water (ONEE-IEA) **investigated the practical conditions for membranes testing.** Investigations were conducted to identify a reliable sea water sampling point close to the city of Kenitra. The pilot will be hosted by the University of Kenitra. A coordination meeting was held in Kenitra on 9 September 2014 and agreed on analyzing the water quality at ONEE’s central laboratory and Kenitra Ibn Tofail University’s laboratories according to ONEE’s standard operating procedures for analysis. In parallel of this activity, many studies related to the biofouling phenomenon were conducted in the desalination plants managed by ONEE. Results of these investigations and lessons learned will be shared in the framework of this project

In the upcoming quarter, the research team will:

- Continue experiments to optimize synthesizing AgNPs using leaf extracts including olive and rosemary and begin a new investigation of AgNPs synthesizing applying citrus sinensis and citrus lemon peel extract.
- Test the fabricated AgNPs impregnated membranes by the Sterlitech membrane test cell at JUST and ONEE-IEA to evaluate its performance in resisting biofouling.
- The research team will meet 2-6 March at the American Water Works Association – Membrane Technology Conference in Orlando, Florida. The team reserved a whole session to share their progress.

Research Project	Research Team
Utilizing Solar Energy for Water Pumping and Brackish Water Desalination in Agriculture	<ul style="list-style-type: none"> • University of Jordan, Jordan • An Najah University, West Bank

During this reporting period, the research team:

- **Held a virtual Start Up Meeting** on 10 September 2014. The meeting was attended by all of the research partners. The team discussed the anticipated research activities and finalized the workplan.
- **Began data collection and literature surveys.** All partners started a marketing and industrial survey to collect updated information concerning the latest development in low energy consumption / energy efficient desalination and water pumping technologies and the prospects of utilizing PV power to drive these technologies. The University of Jordan collected data on brackish water resources and solar radiation. The University of Jordan and An Najah University started a literature review of photovoltaic reverse osmosis (PV-RO) systems.
- **Developed the preliminary modelling architecture of an integrated PV pumping and desalination system.** Work will continue to determine the final algorithm.

In the upcoming quarter, the research team will:

- Continue literature reviews of photovoltaic reverse osmosis (PV-RO) systems and PV solar water pumping systems.

- Continue a technology surveys of RO and nano-filtration desalination systems, and PV solar water pumping systems
- Continue to develop operational algorithms of systems components of an integrated PV pumping and desalination system.

WATER SUPPLY AND SANITATION

Research Project	Research Team
Expanding Access to Sanitation for Unsewered Communities in Morocco and Jordan	<ul style="list-style-type: none"> • International Institute for Water and Sanitation, National Office of Electricity and Potable Water (ONEE-IEA), Morocco • Royal Scientific Society (RSS), Jordan • University of Jordan, Jordan • Hassan II Agronomy and Veterinary Institute (IAV), Morocco • University Cadi Ayyad, Morocco

During this reporting period, the research team:

- **Selected research sites in Morocco and Jordan.** In Morocco, TlatMarghen village in Alhaouz region was selected. In Jordan, two clusters of households in Sakeb village in the Jerash governorate were selected.
- **Completed a technical visit to Japan.** Members of the Morocco research team visit the University of Shimane to further investigate the MLS treatment system, which is widely used in Japan.
- **Evaluated potential treatment technologies** including modified septic tank, constructed wetland, sequencing batch reactor, intermittent sand filter/percolating filters, drawer compacted sand filter, up-flow anaerobic sludge blanket, rotating biological contactor, multi-soil layering system, and membrane bio-reactor.
- **Selected the treatment technologies to pilot in each country.** In Morocco, a multi-soil layer system was selected. In Jordan, two technologies were selected: a modified septic tank and recirculated constructed wetland.
- **Built treatment technologies.** In Morocco, ONEE-IEA installed the sewerage network and MLS treatment system. The system serves 8 households (72 people) and water samples started to be collected. Results from the initial water testing is promising. After installation, ONEE-IEA organized a training for the LSC to review the operation of the system.
- **Began a study on household surfactant use.** In Jordan, data was collected on household surfactants through field visits with institutions, detergent companies and local community in the village of Sakeb. A questionnaire was prepared to distributed to households in Sakeb.
- **Continued engagement with the Local Stakeholder Committees.** In Jordan, the LSC participated in a visit to the SMART project demonstration site, where several decentralized treatment options are tested and demonstrated. The site visit to SMART project was shortly followed by meeting with the LSC. The LSC's perceptions of the treatment technologies were collected through a survey and the project team discussed the draft version of assessment criteria and received feedback from LSC.

Research Project	Research Team
Developing Diagnosis Techniques and Strategies to Reduce NRW in the Middle East Region	<ul style="list-style-type: none"> • Arab Countries Water Utilities Association (ACWUA) • Africa Water Association (AFWA)

A progress report was not submitted for the reporting period.

Young Water Scientist Partnerships (YWSP) Small Grants Program. The Young Water Scientist Partnerships stimulates collaboration between the Centers’ young water research scientists through small grant projects that address a policy, operational, technical, or managerial issue that is identified by stakeholders in government, business, NGOs, or civil society. The small grants program is open to full-time or part-time employees of MENA NWC Centers between the ages of 21 and 40. On August 14, 2014, USAID signed a second modification to YWSP’s Annual Program Statement. This modification extended the submission date for proposals from July 31, 2014, through January 2, 2015, and to also extend the required completion date of all grants from July 31, 2015 to January 31, 2016. During the quarter, DAI/FABRI submitted four proposals to USAID for review:

- Improving Economics of Using Saline Water in Arid and Semi-Arid Areas Through Integrated Aquaculture Systems (ICBA, IWMI)
- Improving Agricultural Soil Properties Using Soil Amendments to Enhance Water and Nutrient Use Efficiency for Crop Production in Dry Lands and Assessing These Efficiencies Via Remote Sensing Techniques (ICBA, AGU)
- Promoting Water Conservation in Schools (RSS, UJ)
- Minimizing Risk Hazard by using Nanotechnology for Water Disinfection (UJ, ONEE-IEA)

Water Innovation Fellowships (WIF). Water Innovation Fellowships research projects must address a policy, operational, technical, or managerial issue that is identified by stakeholders in government, research or academic entities, businesses, NGOs, or civil society. Applicants must be citizens of a Middle Eastern or North African country eligible for USAID funding, currently residing in the Middle East or North Africa, and be a full-time employee of an institution or entity based in the Middle East or North Africa. On August 14, 2014, USAID signed a second modification to WIF’s Annual Program Statement. This modification extended the submission date for proposals from July 31, 2014, through January 2, 2015, and also extended the potential completion date of all grants from July 31, 2015 to January 31, 2016.

Since the last Selection Committee meeting held on May 22, 2014, WIF has received 11 additional proposals, which are currently under review for responsiveness before being sent to the WIF selection committee. Of the seven proposals that were recommended for award and provisional award at the May 22nd WIF Selection Committee meeting, six are still in the budget negotiation process. One proposal, BIG Data for Water Management (IAV), received COR approval on September 12, 2014, and is now being prepared for final CO approval. In total, WIF has received 40 proposals to date.

Planning for Center Directors Meeting. FABRI started planning for a meeting of MENA NWC’s Center Directors. The meeting will be held in Sharm El Sheik, Egypt from 18-19 November.

Planned Activities for the First Quarter of Year Four

- Continuation of PR&D research project activities
- Continue planning for the meeting of Center Directors in November 2014
- Continue to negotiate grant awards with the selected grantees under the WIF and YWSP small grants programs

U.S.-Network Research Partnerships. All three of the U.S.-Network Research Partnerships had on-going research activities during this quarter.

Combatting the Emerging Impacts of Harmful Algal Blooms (HABs) on Desalination Plants: Bloom Detection, Forecasting, and Strategies for Impact Reduction (led by MEDRC). FABRI and MEDRC signed the subcontract to fund this research project on August 20, 2014. During this quarter, the following activities took place:

1. The work plan for the duration of the project was completed; including major objectives, deliverables, planned meetings and workshops, plans for stakeholder engagement, and schedule of activities.
2. MEDRC drafted and negotiated a research contract for Don Anderson, the Principal Investigator for the project, and Don Anderson began forming his team.
3. MEDRC drafted a research contract for Sultan Qaboos University.
4. MEDRC drafted a consulting agreement with the MEDRC HABs Technical Specialist for the project.

Planned Activities for the First Quarter of Year Four

During the next quarter, MEDRC will:

- Finalize and issue research contracts with Don Anderson and Sultan Qaboos University, and a consulting agreement with the HABs Technical Specialist.
- Contact a potential co-editor for the manual and contact potential authors of manual chapters. MEDRC plans to have a partial or complete list of committed editor and author chapters by the end of next quarter.
- Prepare and plan logistics for sampling site visits.
- Prepare a written report which will provide a knowledge base for remote sensing and environmental conditions
- Obtain bathymetry data using remote sensing and will create a graphic of new bathymetry.
- Collate satellite data for climatology and case studies. The report will include a summary of data statistics.
- Initiate bi-weekly sampling at Barka; conduct sample processing and analysis; and initiate opportunistic or adaptive sampling, if necessary.
- Define satellite algorithms.
- Define set-up for the particle tracker.
- Refine existing regional FVCOM including testing model stability and skill in both barotropic and baroclinic mode; developing regional meteorological model; and testing integration between the meteorological and hydrodynamic model.
- Complete agreements with all chapter authors and prepare chapter texts.
- Compile historical desalination plant data starting with 2008 and documenting any major disruptions due to HABs.

The Global Yield Gap and Water Productivity Atlas for Jordan, Morocco, and Tunisia (led by the University of Nebraska). For the GYGA project, the second half of 2014 marks a six month period of data collection for weather data, soil data, and crop yield and management data. The team in Morocco has collected weather data, soil data, and crop management of wheat for a selected region. The team in Tunisia has completed collection of weather data and crop actual yield data, and is working on data collection of soil and crop management information. The team in Jordan is also making process on data collection. The GYGA-MENA teams at UNL and Morocco are working together on a presentation titled “Effect of Different Soil Rooting Depths on Water Limited Yields and Yield Potential of Wheat in Morocco.” It will be presented at the upcoming 2014 ASA-CSSA-SSSA Annual International Meeting

from November 1 to 4, 2014 in Long Beach, CA. UNL has scheduled a field visit to the three countries (Morocco, Tunisia, and Jordan) from November 22 to December 5, 2014 with three UNL GYGA team scientists, including Drs. Haishun Yang, Patricio Grassini, and Kiran Pavuluri. The purpose of the visit is to assist the three teams in their data collection, data quality control, data processing and interpretation, and data use in crop simulations for estimation of crop potential yields. The visit is also an opportunity for networking towards capacity building for the three teams and their institutions, as well as for the UNL scientists to get familiar with the cropping systems and agro-ecological conditions in those countries. UNL has published a peer-reviewed book chapter that is related to the project. The title of the chapter is “Quantifying and Managing Corn Water Use Efficiencies Under Irrigated and Rainfed Conditions in Nebraska using the Hybrid-Maize Simulation Model” by Yang and Grassini, 2014. The chapter is in a book titled *Practical Applications of Agricultural System Models to Optimize the Use of Limited Water* Eds: Laj R. Ahuja, Liwang Ma, and Robert J. Lascano. *Advances in Agricultural Systems Modeling*, Volume 5.

Planned Activities for the First Quarter of Year Four

The major activity of the next quarter for UNL is data collection, including:

- Site visit to the three countries by UNL scientists
- Continue and complete data collection by end of 2014
- Prepare for data quality control, inspection, and processing
- Prepare for model simulations for potential yields

Radar Probing of Groundwater in Hyper-Arid Environments: Understanding Aquifer Dynamics in High Discharge Areas (led by the California Institute of Technology (Caltech) in association with the Jet Propulsion Laboratory (JPL) in Pasadena). In collaboration with the two USAID-MENA National Water Centers of Excellence in Morocco and Oman, Caltech proposed to substantially increase knowledge on the distribution and dynamics of the Al-Sharkia aquifer resource, which is Oman’s largest strategic water reserve. To accomplish this mission, Caltech will use satellite and surface radar data to augment the sparse data from the local existing wells. Specifically, they will use Caltech’s 40-MHz low frequency sounding radar to map the depth of the water table, hydraulic head and boundaries. That data will be combined with InSAR monitoring by ALOS L-Band SAR to assess the amplitudes and boundaries of the ground deformations induced by the rapid discharge of the aquifer. In addition to mapping the depth of the water table, they will attempt to explore the radar capability to monitor the water freshness from signal decay measurements combined with TEM measurements in the Al-Sharkia aquifer to understand potential seawater intrusion that can degrade the aquifer water quality.

During this quarter, Caltech has performed the following tasks towards achieving the study objectives listed above:

- Dr. Essam Heggy from Caltech visited IAV in Morocco from July 20-27 to deliver the SAR processing station, perform L-Band SAR training, and data analysis. IAVS, with the supervision of Dr. Essam Heggy and the collaboration of Dr. Muhamed Rouchdi, performed the inSAR deformation analysis, the temporal SAR backscatter variation study, and the polarimetric mapping of the Al-Sharkia survey site in this project.
- Dr. Essam Heggy from Caltech visited SQU in Oman from August 20-29 for the Radar Remote Sensing training, with the collaboration of Dr. Ali Al-Maktoumi. During his visit, they also determined the dates for the Oman survey, which will take place from October 11-23, 2014.
- Caltech organized the survey set-up and logistics for the survey in Oman. The site selection for the fieldwork was discussed and it will be formalized with the local collaborators during the first days in

Muscat. All the most important risks and challenges of the fieldwork risks have been discussed by the team so that they will be prepared to respond to any possible setbacks.

- Caltech produced polarimetric and interferometric coherence maps from the ALOS PALSAR radar images from which they sketched possible paleo-drainage buried ~2m under the dunes. According to the different types of sand in the area, they selected the optimal locations to perform ground validation with their 800Mhz MALA GPR antenna that should reach to 2 meters deep.
- Caltech also attempted a ground deformation analysis using SAR interferometry technic (inSAR) over the Al Kamil Wal Wafi water plant, located on the NE edge of the Wahiba sands.
- The Caltech team tested the radar sounding equipment on Caltech’s Campus to verify that the instruments were functioning properly and to mitigate any hardware problems prior to the survey. All of the antennas were tested both in monostatic and bistatic configurations. The measurement equipment has been properly calibrated so that it is ready for the survey.
- A domestic dune test was deferred until February to avoid any damage to the instruments that could compromise the timing of the Oman survey.

Planned Activities for the First Quarter of Year Four

- Caltech will perform the Radar Sounding Survey in Oman from 11-23 October 2014 together with their partners from SQU and IAV, under the supervision of USAID and with the participation of the Oman Ministry of Municipalities and Water Resources.
- Caltech will discuss and elaborate on the preliminary results of the Oman fieldwork.
- Caltech will take part in the AGU Fall Meeting 2014 and will present an abstract with preliminary results to underline the importance of the mission.
- Caltech will write an annual report that outlines the accomplishments of the first year of the project, and will submit it along with a budget update and a projection for the 2nd year.

Requirement 1.6: Network Strengthening Through Private Sector Participation

During this quarter, FABRI worked with USAID/ME and the International Water Association to develop a session at IWA’s World Water Congress and Exhibition. The session’s design is as follows, as it is to be presented to the Board of Directors for their agreement:

**IWA WORLD WATER CONGRESS & EXHIBITION
MEDITERRANEAN AND MENA FORUM**

THURSDAY, 25 SEPTEMBER 2014, AUDITORIUM 2

DRAFT AGENDA

SESSION 2: RESEARCH AND INNOVATION FOR LARGE SCALE APPLICATIONS (1330-1500)

1330-1335	Introduction to Session	Hanna Zaghloul
1335-1345	Overview of MENA NWC	Harvey Perlman
1345-1355	Instructions to Round Tables	Harvey Perlman
1355-1425	Round Table Discussions	<i>1. Water Efficiency/Productivity</i>

	<p>Discussion Questions:</p> <ul style="list-style-type: none"> • What are your company's research and development priorities (in your Round Table focus) over the next decade? • What incentives does the private sector need to actively engage in MENA NWC's policy, research, and development activities? • What are the challenges keeping the private sector from doing it? • What can the private sector gain? 	<p>John Wilson</p> <p>Waleed Zubari</p> <p><u>2. Groundwater</u> Ralf Klingbeil</p> <p>Said Ouattar</p> <p><u>3. Non-Conventional Water</u> Harvey Perlman</p> <p>Peter Reiss</p> <p><u>4. Water/Energy/Food Nexus</u> John Waterbury</p> <p>Hanna Zaghloul</p> <p><u>5. Water and Sanitation</u> Abdelkawi Khalifa</p> <p>Muwaffaq Saqqar</p> <p><u>6. Non-Revenue Water</u> Khalidon Khashman</p>
1425-1450	Round Table Reports (5 minutes each)	Hanna Zaghloul
1450-1500	Wrap-up and Way Forward	Abdelkawi Khalifa / John Wilson

COFFEE/TEA BREAK (1500-1520)

SESSION 3: BUILDING ON THE FORUM (1520-1545)

1520-1525	Overview of direction for IWA and MENA NWC collaboration with the private sector	Tom Williams
1525-1535	Upcoming events in 2015 to advance the partnerships -- with aspirational outputs and results	John Wilson
1535-1545	Questions and Answers with Participants	Tom Williams / John Wilson

Planned Activities for the First Quarter of Year Four

- Carry out the session at IWA World Water Week.
- Follow up with participants for the MENA NWC Congress in Muscat in May 2015.

RESULT 2: INTEGRATED WATER RESOURCES MANAGEMENT PROGRAMMING STRENGTHENED

FABRI is implementing Result 2, Integrated Water Resources Management (IWRM) Strengthening, through MENA NWC research projects. Activities for the IWRM project “Mitigating Environmental Risks of Wastewater Reuse for Agriculture” are summarized in the table below.

Research Project	Research Team
Mitigating Environmental Risks of Wastewater Reuse for Agriculture	<ul style="list-style-type: none"> • Sultan Qaboos University (SQU), Oman • National Research Institute for Rural Engineering, Water and Forestry (INRGREF), Tunisia • University of Jordan, Jordan • University of Florida, USA

In Oman, SQU **completed the first round of field work** with sweet corn, sweet melon, okra and maize at the Agricultural Experiment Station. SQU completed physical, biological and chemical analysis of soil and water samples from each of the twelve test plots. Preliminary results from the first series of experiments indicate the following:

- Soil physicochemical properties did not show significant differences with treated wastewater irrigation as compared to groundwater. On other hand, some chemical properties were significantly increased when treated wastewater was applied such as soil electrical conductivity, total carbon and some major elements (N, K, Mg).
- There was a small increase with some heavy in soil irrigated with treated wastewater compared to groundwater. However, heavy metals concentrations were lower than recommended concentrations in soil media. Soil biological analysis indicated that treated wastewater had no effect in contaminating soil horizons.
- Crop physical analysis showed significance increases in plant productivity when plant irrigated with treated wastewater compared to control. Chemically, there was an increase in chemical properties of plants irrigated with treated wastewater compared to control but all values were within the international standards. However, some elements were high and those values should be confirmed by next study.
- Biologically, all tested crops were free from any microbial contaminations. However, next study will show better data.
- Finally, treated wastewater is a good source of water and can supply soil and plant with many nutrients. However, monitoring soil and grown crops will be required to ensure safety and avoid any type of contamination.

In Tunisia, INRGREF:

- **Completed a study on the quality of wastewater effluent in the study area over the past 10 years** using historical data collected from the national wastewater utility (ONAS). The study showed that the quality of effluent used for irrigation has degraded substantially because lack of maintenance, an increase in illegal discharge in the sewer system, and utilities operating over capacity.
- **Obtained data** on well distribution and the groundwater table from the extension service.
- **Collected and analyzed water samples** the study area from three sources: treatment plants providing irrigation water, the storage basin where effluents are blended and 3 wells located in the irrigated area.
- **Completed a survey of 31 farmers on the joint use of groundwater and wastewater for irrigation.** The survey found that in the study area the joint use of groundwater and wastewater is in

wide practice. INRGREF is designing a more detailed survey to understand why farmers use groundwater and quantify costs and profits related to the joint use of wastewater and groundwater. The results will be used to develop a model to maximize farmer's revenue while optimizing the use of treated wastewater and groundwater at the farm level.

The University of Jordan:

- **Continued water sample collection and analysis.** Field work was useful to get a clear view about the location of water sources, mixing point for treated and ground waters and the surrounding land use.
- **Used the DRASTIC methodology to evaluate groundwater vulnerability.** DRASTIC is a method to provide a systematic evaluation of the potential for groundwater contamination. The DRASTIC parameters are the hydro geologic parameters which affect water transport from the soil surface to the aquifer. The DRASTIC parameters are weighted and then summed to come up with a vulnerability rating or DRASTIC index. DRASTIC assumes that all contaminants move with the water and are introduced at the soil surface.
- **Installed additional suction cups in selected farms and soil units in the target farms.** Samples were analyzed in terms of physical and chemical properties.
- **Met with the Ministry of Water and Irrigation** to discuss the decision support system and to receive their input on the data requirements and expected outcomes.

In the upcoming quarter:

- INRGREF will host the research team meeting in December 2014.
- INRGREF will make a poster presentation at the Second Arab-American Frontiers Symposium in Muscat, Oman.
- INRGREF will host a workshop for Tunisian farmers that will cover the blending wastewater and groundwater, health risks, and the long-term environmental and economic viability of this approach.

Planned Activities for the First Quarter of Year Four

- Continuation of PR&D research project activities

RESULT 3: ACCESS TO CLEAN WATER AND SANITATION IMPROVED IN TARGET COUNTRIES

Requirement 3.1: Water and Sanitation Service Provider Performance Strengthened

Non-Revenue Water Program. During the week of June 21, the Non-Revenue Water (NRW) Task Force Members conducted the final audit at the SEEG utility in Gabon. This finalized the first phase of the program; the audits. The second phase includes the development of the Performance Improvement Plans (PIPs) and implementation of some identified short-term actions, but not capital investments or equipment. During this quarter, 13 of the 19 participating utilities submitted their draft PIPs.

During the week of 21 July, AfWA and FABRI held a smaller Task Force group meeting in Kampala, Uganda. Some main actions/decisions from this meeting included:

- Replacing the NRW Task Force Chair during the next large group meeting, since he has been appointed as President of the STC of AfWA and will be unable to continue in his role as the Chair of the NRW Task Force
- Appointing additional Task Force members from Chad, Malawi, Guinea, Nigeria, Togo, and Zambia
- Finalizing and distributing the audit report synthesis report outline
- Finalizing and distributing the performance improvement plan (PIP) draft templates

AfWA/FABRI expects to complete the PIPs during the next quarter and begin the selection of short-term actions for implementation.

During this quarter, in addition to completing the draft PIPs, 15 of the participating utilities also submitted a list of improvements in the areas assessed during the audits: institutional, technical, commercial, and measurement and information system management. These were actions and significant improvements taken by the utility without any NRW implementation funding provided by the AfWA/FABRI program.

AfWA Grant. During this quarter, FABRI finalized the Scope of Work for the grant to AfWA and received COR approval for the grant. FABRI plans to request CO approval for the grant in the next quarter.

African Young Water Professionals Small Grants Program (AfYWP). During this quarter, eighteen AfYWP proposals were received. Of these, seven are complete and ready for Selection Committee review. As soon as the AfWA grant is awarded, the AfYWP small grants that were selected can be awarded.

Communications and Knowledge Exchange. During this period, FABRI decided to delay the contracting process with Taoti Creative on the AfWA website design to first evaluate their completed design on the MENA NWC website. Since Taoti Creative was competitively selected for both programs' websites, FABRI decided it would be better to see the quality of their work on one program, prior to awarding them a second contract. FABRI expects Taoti to complete the MENA NWC website during the next quarter so the contracting process can be initiated for the AfWA website design.

Planned Activities for the First Quarter of Year Four

- Complete the PIP stage of phase II and begin the implementation stage

- Receive CO approval and sign the institutional strengthening grant with AfWA
- Award the first round of AfYWP Small Grants
- Select additional Task Force Members
- Award the AfWA website design contract

RESULT 4: RESEARCH AND DEVELOPMENT CAPACITIES IN IRRIGATION, GROUNDWATER MANAGEMENT, AND DROUGHT RISK ASSESSMENT AND MITIGATION STRENGTHENED

Requirement 4.1: Conduct Identification and Analysis of U.S., Regional, and International Water Programs Aimed at Promoting Efficient, Productive Use of Water in Agriculture in the MENA Region

FABRI will implement Result 4 through MENA NWC research projects. Projects relating to irrigation, groundwater management, and drought risk assessment and mitigation are summarized below.

Research Project	Research Team
Efficient Treatment and Provision of High-Quality Reclaimed Effluents Suitable for Irrigation	<ul style="list-style-type: none"> • Technion - Israel Institute of Technology, Israel • National Center for Agricultural Research and Extension (NCARE), Jordan • Al Quds University (AQU), West Bank

Task I: Treatment of Secondary Effluents by Membrane Technologies

- **AQU installed and calibrated a filtration system.** To monitor its performance, AQU established a database for influent and effluent characteristics including BOD, COD, pH, EC, TS, TDS, TSS, and microbial characteristics. Samples are collected and analyzed. Filtration experiments were performed using bench top filters with flow rate of 55 ml/min on two antibiotic drugs (Amoxicillin and Cefuroxime Axetil). Finally, a scientific paper describing the removal of these two antibiotics was finalized and submitted to an international peer-reviewed journal.
- **GWRI established an autonomous water recovery system suitable for remote locations.** A series of experimental runs were performed with high recovery rate to characterize the performance of the process and quality of the water product. GWRI generated an operating map to control phosphorous scaling.

Task II: Use of Treated Effluents for Crop Production

- **NCARE built a greenhouse at Ramtha, Jordan to study the effect of four blends of UF and RO effluents on the yield and quality of cucumber.** An irrigation network was built and plant seedlings were planted. Membrane maintenance is expected to be done in early November (delayed due to technical problems) after which project treatments will be applied. Yield components will be measured and estimated. Effluent samples from each treatment will be collected and tested for, pH, EC, SAR, NO₃-N, Na, P, K, Zn, Ca, Mg, Cl, Cd, and Pb will be measured. Biological tests, like BOD and/or COD and pathogen will be executed.
- **GWRI made continued progress on the lysimeter experiment,** including i. Drainage collection and determinations of: drainage volume, EC, pH and once in 7-10 days, determination of chemical composition in drainage - Na, K, Ca and Mg (calculating SAR), B, P, Zn, Mn, Fe, NH₄, NO₃, NO₂; ii. Water consumption calculation based on water input and output in drainage, comparing lysimeters with Grapefruit plants to control lysimeters (no plants); iii. Soil sampling around July and end of October to determine composition in water extracts (Na, K, Ca and Mg (calculating SAR), B, P, Zn, Mn, Fe,); KCl extracts (NH₄, NO₃, NO₂) and Olsen extracts for phosphorus.

Several interesting observations were obtained – the increase of salinity (EC) in the sandy loam was higher than in the Grumosol due to better plant growth in the lighter soil. This may be attributed to boron (B) released from the Grumosol, which accumulated in the soil during the long time of its exposure to low-medium RWW in the past field experiments. This indicates that even after exposing such soil to high quality and low boron, the chances for facing boron problems due its desorption must be considered!

The SAR in the sandy loam incased fast with the beginning of the summer and particularly so in the sodified RWW treatment (H2 where RWW was enriched with Na). This implies the importance of considering the low concentrations of Ca and Mg expected in domestic use where desalination water in the main source (like in Israel), which if not corrected (i.e. – desalination post treatment) may lead to increased SAR values in the RWW despite of the improvements in technologies.

Task III: Management of the Wastewater Treatment and Reuse System

- **GWRI conducted an extensive literature review** to locate studies that provide a perspective, analysis and models for optimal management of wastewater treatment and reuse for irrigation. They formulated a questionnaire for eliciting information from the treatment and irrigation teams for structuring the management model and populating it with information and data, conducted the first interview with the treatment team, and produced a first formulation of the optimal management model.

Research Project	Research Team
Application of Near-Real Time Monitoring Systems for Irrigated Agriculture	<ul style="list-style-type: none"> • International Center for Biosaline Agriculture (ICBA), UAE • National Research Institute for Rural Engineering, Water and Forestry (INRGREF), Tunisia • Sultan Qaboos University (SQU), Oman • National Center for Agricultural Research and Extension (NCARE), Jordan • Sana'a University (SU), Yemen

During this reporting period, the research team:

- **Continued procuring research equipment.** As of the end of the quarter, NCARE, SQU and ICBA received the equipment, while procurement at INRGREF continues. In Oman, the equipment is installed on three different irrigation platforms: traditional surface irrigation (falaj), modern pressurized irrigation, and greenhouse production. In UAE, the technology platform at ICBA is almost complete. The platform for assessing date palm water requirements is operational and the new hydroponic greenhouse complex has now been completed and will be used to produce crops of cherry tomato and pepper during this coming winter season. Also, a weather station installed on a farm at Gayathi, in the Western Region of Abu Dhabi, with the same equipment as in the other centers, will be used to expand the network. Weather data is already shared on the following link: <http://biosaline.org/weatherdata.aspx>.
- **Began on-farm trials.** In UAE, the Ministry of Environment and Water identified farmers to participate in the on-farm trials. These will be located in the Central region, in the vicinity of the experiment station at Al Dhaid.

In the upcoming quarter:

- In Oman, SQU will host a technical workshop for farmers to demonstrate the research equipment and introduce them to the research project.
- In Jordan, NCARE will install the weather station at Deir-Alla Regional Center in the Jordan Valley in an open field experiment. Capacity building events for trainees, stakeholders, farmers associations and progressive farmers will be held, and there will also be training for young scientists and technical staff in sensor/communication techniques and technology. Additionally, field studies will begin on eight farms in the Jordan Valley that produce a range of crops.
- In Tunisia, INRGREF is still procuring the sensor equipment. Once the process is complete, the field equipment will be installed at two experiment stations and at the Technical Center for Potato and Artichoke. The two weather stations assigned to Tunisia will also be installed. During the implementation of the technology platform, training sessions on the use of the soil sensor technology for irrigation management will be organized for young scientists, technical staff, and farmers from the water use associations. Tunisia is not participating in the on-farm trial component of the project.

Research Project	Research Team
Developing Partnerships and Innovative Technologies to Improve Water Use Efficiency at River Basin Scale in Jordan, Morocco and Tunisia	<ul style="list-style-type: none"> • National Research Institute for Rural Engineering, Water and Forestry (INRGREF), Tunisia • National Center for Agricultural Research and Extension (NCARE), Jordan • Hassan II Agronomy and Veterinary Institute (IAV), Morocco • Stockholm Environment Institute-U.S. Center (SEI-US), USA

During this reporting period, the research team:

- **SEI-USA led a WEAP Training Course at NCARE in Amman, Jordan** from 18-21 August for Jordanian researchers. Participants spent two days learning the WEAP model interface and data requirements and two-days on a case study focused on the Jordan Valley river basin. For the purposes of the research project, the team agreed to build a detailed model focused on Wadi Zeglab.
- **Continued stakeholder engagement and data collection.** In each country, researchers visited targeted watersheds to engage with stakeholders and to ground truth data. In Tunisia, data collection is 90 percent complete and the WEAP model is performing for almost all of the Mejerda's 15 sub-basins. In both Morocco and Tunisia, initial results from the WEAP models have been shared with regional counterparts for feedback that can be integrated into the models.
- **Characterization of target watersheds.** Each research team is preparing detailed technical reports that characterize each watershed. These reports consider hydrological features, water use in the river basins, agricultural production and irrigation practices, and climate and rainfall features. These reports will be completed during the upcoming quarter.

In the upcoming quarter, the research team will:

- Continue to build the WEAP models of the Zeglab (Jordan), Souss Massa (Morocco) and Mejerda (Tunisia) river basins.
- Travel to SEI-U.S.'s office in Davis, California to complete the WEAP models and determine outputs to inform decision-making.
- Finalize detailed reports characterizing the watersheds.

Research Project	Research Team
Managed Aquifer Recharge Using Treated Wastewater	<ul style="list-style-type: none"> • Sultan Qaboos University (SQU), Oman • University of Jordan, Jordan • University of Nebraska – Lincoln, USA

During this reporting period, the research team:

- **Field visits and data collection continues.** In cooperation with government counterparts, researchers completed a number of field visits to collect data from observation wells in the selected catchments.
- **Analytical modeling continues.** This work is focused on the spatial and temporal characteristics of infiltrated water, specifically the interface between tertiary wastewater and the host aquifer and the mounding of sloping aquifers. In Jordan, preliminary water table data indicates a sloping aquifer base, a situation where an analytical model does not exist. The research team is collaborating on a new analytical solution for groundwater mounds over the sloping aquifer base.
- **Numerical modeling continues.** In cooperation with government counterparts, researchers completed a number of field visits to collect data from observation wells in the selected catchments. Numerical simulations have begun for several sites in Oman and Jordan.
- **Finalizing several manuscripts** that will be submitted to peer-reviewed journals for consideration, including the Water Resources Management journal and the Eurasian Journal of Soil Science.

In the upcoming quarter, the research team will present at three international conferences:

- 10th International Hydrogeological Congress in Greece from 8-10 October 2014
- 9th International Soil Science Congress in Turkey from 14-16 October 2014
- American Geophysical Union Fall Meeting in San Francisco from 15-19 December 2014

In addition, the following activities are anticipated:

- The University of Jordan will host a training on Managed Aquifer Recharge (MAR) for Jordanian stakeholders from 4-6 November. Researchers from Oman and the U.S. will travel to Amman to participate. While together, the researchers will also carry out joint field-work and review research progress.
- SQU will co-organize with the Oman Water Society a workshop “Risk Assessments of Using Treated Wastewater” that will be attended by representatives of public and private organizations.

Planned Activities for First Quarter of Year Four

- Continuation of PR&D research project activities

RESULT 5: TRANSBOUNDARY WATER COOPERATION STRENGTHENED IN KEY RIVER BASINS

Requirement 5.1: Conduct Analysis of U.S. and Regional Transboundary Water Cooperation Programs, with a Focus on the Euphrates, Tigris, and Nile Basins

Oregon State University's Program in Water Conflict Management and Cooperation led by Prof. Aaron Wolf submitted a third draft of an assessment of regional transboundary water cooperation programs. The Program houses the Transboundary Freshwater Dispute Database (TFDD), the largest collection of information on transboundary conflict and cooperation in the world.

Planned Activities for the First Quarter of Year Four

- Finalize the final report from Oregon State University for submission to USAID and for widespread dissemination.

Requirement 5.5: Launch Pilot Project in Key River Basin

The Mekong River Commission (MRC) is the only regional intergovernmental body in the lower Mekong basin that acts as a forum for member countries to discuss transboundary water resources management. The US government has strong interest in strengthening the MRC. USAID asked FABRI to provide a full-time expert to assist it with Mekong River Commission (MRC) support and to prepare a comprehensive long-term, external engagement strategy for the USAID Regional Development Mission for Asia (RDMA) to promote fair and effective governance of water, food, and energy in the Greater Mekong Sub region (GMS) as it relates to development of hydropower on the Mekong River.

This reporting period coincided with the last three months of the consultant's contract with DAI/FABRI. The Senior Mekong Affairs Advisor's employment agreement with FABRI will come to an end on September 29, 2014. During this period, the consultant finalized a strategy for RDMA to promote fair and effective governance of water, food, and energy as it relates to development of hydropower on the Mekong by building on RDMA's unique position as a donor of the MRC.

The Senior Mekong Affairs Advisor coordinated with other donors on the MRC's Council (Ministerial) Meeting which was held in early July and was a resource person for the discussions among donors. The key message to MRC was still donors' concerns on hydropower development on the mainstream Mekong and on whether Laos would go through MRC's process for the second dam on the mainstream – Don Sahong, which is in southern Laos just above its border with Cambodia. Laos later announced that it would go through the prior consultation process.

In early September the Senior Mekong Affairs Advisor helped RDMA coordinate a meeting of MRC donors ahead of the planned annual meeting with MRC in early October. The discussion focused on MRC's reform efforts particularly on new funding mechanisms and MRC's members' difficulty getting consensus on when to officially "start the clock" for prior consultation on the Don Sahong dam.

The Senior Mekong Affairs Advisor was also invited by the Stimson Center to attend a workshop on "Finding Solutions to Equitable Hydropower Development Planning in the Lower Mekong Basin" which was held in partnership with the Institute of Natural Resources and Environmental Management (NREM), Mae Fah Luang University, Chiangrai, Thailand. There were substantive discussion of mail issues affecting the future of the river and MRC. Chatham House rules were applied. The Environmental, Science, Technology, and Health Officer (ESTH) for Thailand also attended and the consultant provided

information to him on a presentation about USG work on Mekong-related issues. The “donor session” focused on what can realistically be expected from the US and other “Friends of the Mekong”.

The Senior Mekong Affairs Advisor participated in discussions with the USAID Global Development Lab team who came to RDMA to identify opportunities for a signature effort to address decision-making for a more sustainable Mekong. A key challenge for the region is that the shared resources of the Mekong River are not being optimally managed to meet the growing energy demands in the region, take advantage of energy alternatives to building large hydropower, and mitigate future social and environmental costs.

Planned Activities for the First Quarter of Year Four

- Finalize the Senior Mekong Affairs Advisor’s final report and presentation.

RESULT 6: TECHNICAL AND OUTREACH CAPACITY OF USAID STAFF IN WATER AND SANITATION PROGRAMMING ENHANCED

Requirement 6.2: Increase USAID's Visibility and Outreach on Water Issues

The MENA NWC Interim Board of Directors has asked FABRI to design and convene several major meetings over the next 18 months, including the following:

- IWA World Water Congress and Exhibition in Lisbon on September 2014
- Meeting of Center directors in October/November 2014
- MENA NWC First Congress and two Thematic Partnerships meetings in Oman in April 2015
- IWA Development Congress in Jordan in October 2016

FABRI has begun planning for the IWA Congress in meetings with IWA and ACWUA. The following is a brief summary of the session that would be held jointly by the three parties.

MEDITERRANEAN and MENA FORUM IWA WORLD WATER CONGRESS AND EXHIBITION, LISBON 22-25 SEPTEMBER 2014

More than ever, significant improvements in water use and management across the Mediterranean, Middle East and North Africa regions require resource mobilization, leveraging funds, and commercialization, built on partnerships between the sector's traditional stakeholders and the private sector. The U.S. Agency for International Development (USAID), the Arabic Countries Water Utilities Association (ACWUA), the Mediterranean Water Institute (IME) and the International Water Association (IWA) will jointly convene a Mediterranean & MENA Forum.

The Forum will explore the challenges faced by water and wastewater utilities and the competing demands on water resources. Specifically there will be a focus on how to create and expand "water smart technologies" in the region. We welcome private sector partners based outside the region who want to gain a foothold or expand existing markets in the region. Also welcome are firms based across the Mediterranean and MENA regions that seek to expand their regional presence or want to form strong ties with new internal or external partners. The workshop will bring together the private sector with donors, governments, researchers, and other key water sector stakeholders to initiate a dialog that leads to concrete actions, partnerships, and eventual deal making.

Planned Activities for the First Quarter of Year Four

- Prepare for and hold the IWA session

3. PROJECT MANAGEMENT

During this period, FABRI received modification number seven to the FABRI contract which extended the contract end date to March 31, 2016. The period of performance for the FABRI task order is now September 15, 2011 through March 31, 2016. Modification number seven also provided a budget realignment and provided incremental funding in the amount of [REDACTED]

The composition of the FABRI team has changed during this reporting period. Ken Ludwa, the DCOP/Grants Manager, left the project on June 20, 2014. Rather than recruit a new long-term team member, USAID and FABRI agreed to supplement the FABRI in-house team with (1) Lina Sheqem, engineer of ECO Consult, to act as Grants Manager on a number of research projects from her home in Ontario; and (2) Sara Hiller from the DAI home office staff to manage the Water Innovation Fellowships (WIF) small grants program and assist with project logistics. In addition, the Senior Mekong Affairs Advisor, Klomjit Chandrapanya, based in Bangkok, will leave the project when her employment agreement expires on September 29, 2014.

During this period, FABRI began recruiting to fill two long-term positions for the MENA NWC; the Executive Director and the Director of Policy, Research, and Development. The positions are being advertised on several recruitment websites in the U.S. and the Middle East including www.bayt.com, www.monstergulf.com, jobs.economist.com, and www.devex.com. To date, FABRI has received over 500 applications for the Executive Director position and over 300 applications for the Director of Research.

During this period, FABRI issued a subcontract to the University of Toledo to serve as a U.S. partner for a research project under the PR&D Grants Program entitled "The Use of Green Nanoparticles as a Biofouling- Resistant Agent in Reverse Osmosis Desalination." FABRI issued a subcontract to the Middle East Desalination Research Center (MEDRC) to lead a research project entitled "Combating the Emerging Impacts of Harmful Algal Blooms (HABs) on Desalination Plants: Bloom Detection, Forecasting, and Strategies for Impact Reduction." FABRI issued a subcontract to Utah State University to serve as a U.S. partner on a research project entitled "Prospects of Utilizing Solar Energy for Water Pumping and Brackish Water Desalination in Agriculture." FABRI issued a Fixed Price Purchase Order (FPPO) to Community Councelling Service Ltd (CCS) based in London to design a fundraising strategy for the MENA NWC. FABRI also issued an Independent Consultant Agreement to Etienne Tchagole to serve as a Senior Non-Revenue Water Expert on the Africa program.

During the next period, FABRI plans to issue two additional grants under the PR&D grants program. FABRI also plans to begin issuing grants under the two small Middle East grants programs in the next period; the Young Water Scientist Partnerships Small Grants Program (YWSP) and the Water Innovation Fellowships Small Grants Program (WIF). The first eight grants under YWSP were sent to the CO for approval during this period. FABRI is also in the process of negotiating a Standard Grant with the African Water Association (AfWA) which will increase AfWA's capacity by allowing them to hire a Grants Officer who will oversee the disbursement of funds for the Young Water Professionals Small Grants program in Africa.

4. ISSUES AND PROPOSED REMEDIES

Two issues faced by project management during this quarter include:

Issue 1

The MENA NWC Board of Directors approved the recruitment of the Executive Director and Director of Policy, Research, and Development. Their approval was an especially promising act, since it permits FABRI to proceed with plans for institutionalization of the Network. FABRI immediately subscribed to seven recruitment websites, three of which are based in the Middle East. Those efforts were disappointing. Although we received more than 400 responses, very few matched the requirements. We also received more than 300 CVs for the Director of PR&D. There were more qualified candidates in that pool.

Remedy: FABRI is now pursuing other avenues, including reaching out to subcontractors and hiring a headhunting firm to identify the Executive Director.

Issue 2

Under the Africa Program, FABRI has identified a mismatch between FABRI's Performance Improvement Plan and USAID interim results indicators. Most of FABRI's are self-constructed and are not merged into the Bureau's reporting.

Remedy: FABRI will work closely with the Africa Activity Manager to revise the indicators in the PMP that are more suitable for the Bureau's review.

5. STANDARDS AND DELIVERABLES SUBMITTED

Requirement	Standard or Deliverable	Date of Submission to USAID
1.1	<ul style="list-style-type: none"> Acceptance letter from Sultan Qaboos University and other Centers 	During first period
1.1	<ul style="list-style-type: none"> Workshop to launch implementation of MENA NWC 	12/5-8/11
1.3	<ul style="list-style-type: none"> Conference proceedings and technical reports prepared and distributed to Network members 	1/6/12
1.4	<ul style="list-style-type: none"> List of candidates for Founders Committee prepared 	2/21/12
1.4	<ul style="list-style-type: none"> CVs compiled for each candidate and shared with nominating committee 	2/21/12
1.4	<ul style="list-style-type: none"> Founders Committee established 	6/17/14
1.5	<ul style="list-style-type: none"> Call for small research grants proposals developed and released 	8/3/12
1.5	<ul style="list-style-type: none"> Research grant proposals selected and funded 	Multiple in 2014
2.1	<ul style="list-style-type: none"> Plan for strengthening legal and regulatory framework for IWRM in target countries 	3/14/12
2.1	<ul style="list-style-type: none"> Draft plan for capacity building in IWRM for target institutions submitted within six months after award 	3/14/12
2.2	<ul style="list-style-type: none"> Plan for evaluating and testing methodologies to promote efficient use of water resources 	3/14/12
3.1	<ul style="list-style-type: none"> Draft plan for strengthening capacity and performance of water and sanitation providers in AFR and MENA target countries 	8/15/12
3.2	<ul style="list-style-type: none"> Draft plan for improving operating environment for water and sanitation providers in AFR and MENA target countries 	In process
3.3	<ul style="list-style-type: none"> Draft plan for improving financial sustainability of water and sanitation sector in AFR and MENA target countries submitted within nine (9) months after award 	Delayed at request of USAID/AFR
4.1	<ul style="list-style-type: none"> Plan for conducting the identification and analysis provided within thirty 30 days after the award 	10/14/11
5.1	<ul style="list-style-type: none"> Plan for conducting the analysis provided within 30 days after award 	10/19/11
5.1	<ul style="list-style-type: none"> Assessment of transboundary water cooperation programs 	Delayed due to political turmoil
5.4	<ul style="list-style-type: none"> Pilot project design for transboundary water activity 	Delayed due to political turmoil
Section F.2(b) Deliverables	<ul style="list-style-type: none"> 90 day work plan completed within 30 days of Task Order award 	10/14/11
	<ul style="list-style-type: none"> First annual work plan completed and delivered within 60 days of task order award 	11/11/11
	<ul style="list-style-type: none"> Performance Monitoring Plan 	3/15/12
	<ul style="list-style-type: none"> FABRI Year One Annual Progress Report 	11/1/12
	<ul style="list-style-type: none"> FABRI Year Two Work Plan 	11/1/12
	<ul style="list-style-type: none"> FABRI Year Two Annual Progress Report 	10/24/13
	<ul style="list-style-type: none"> FABRI Year Three Work Plan 	10/24/13

	• Quarterly Progress Report No. One	1/18/12
	• Quarterly Progress Report No. Two	4/10/12
	• Quarterly Progress Report No. Three	7/15/12
	• Quarterly Progress Report No. Four	10/19/12
	• Quarterly Progress Report No. Five	1/10/13
	• Quarterly Progress Report No. Six	4/8/13
	• Quarterly Progress Report No. Seven	7/10/13
	• Quarterly Progress Report No. Eight	10/17/13
	• Quarterly Progress Report No. Nine	01/11/14
	• Quarterly Progress Report No. Ten	04/23/14
	• Quarterly Progress Report No. Eleven	07/18/14

ANNEX A: FABRI SUBMISSIONS TO THE DEVELOPMENT EXPERIENCE CLEARINGHOUSE (DEC)

Deliverable	Date Submitted
Quarterly Progress Report No. One	12/11/12
Quarterly Progress Report No. Two	12/11/12
Quarterly Progress Report No. Three	12/11/12
Quarterly Progress Report No. Four	12/11/12
Quarterly Progress Report No. Five	3/12/13
Final Event Report - Nairobi Non-Revenue Water Conference	12/11/12
Final Event Report – FABRI/PEER Proposal Writing Workshop	12/11/12

ANNEX B: UPDATED PERFORMANCE INDICATORS

Intermediate Result (IR)	Sub IR	Indicator	ME or AFR	Standard Indicator Number	2014 Target	Final Target	Actual (Cumulative) as of March 14, 2014
1. Regional Science and Technology Capacity in Water Management Increased through Establishment of MENA NWC	1.1 MENA NWC Governance Structure Established	1.1.1 MENA NWC legally registered	ME	NA	yes	yes	Yes
		1.1.2 Number of essential governance structures established and operative (Founders Committee, Steering Committee, Board of Directors, Secretariat)	ME	NA	4	4	3: Founders Committee, Interim Board, Interim Management Unit
	1.2 MENA NWC Financially Sustainable	1.2.1 Business plan developed and approved	ME	NA	yes	yes	Business Plan developed and submitted to Founders Committee
		1.2.2 Financial support pledged from donors, private sector, and other sources	ME	NA	\$25M	\$25M	\$72,083 from Government of Oman
		1.2.3 Number of types of pledged donors (bilateral, multilateral, foundations, corporate, government, individual) demonstrates diversity of funding sources	ME	NA	4	4	2: Government, Foundation
	1.3 MENA NWC Technical Program Addressing Critical Regional Water Issues	1.3.1 Number of technologies or management practices under research as a result of USG assistance	ME	4.5.2-39a	10	10	13: As part of 9 PR&D Research Projects and 3 U.S.-Network Research Partnerships
		1.3.2 Number of technologies or management practices under field testing as a result of USG assistance	ME	4.5.2-39b	10	10	6

Intermediate Result (IR)	Sub IR	Indicator	ME or AFR	Standard Indicator Number	2014 Target	Final Target	Actual (Cumulative) as of March 14, 2014
		1.3.3 Number of technologies or management practices made available for transfer as a result of USG assistance	ME	4.5.2-39c	4	4	0
		1.3.4 Number of government agencies, private sector firms, and/or civil society organizations partnering with Network Centers on research and development projects	ME	NA	20	20	40 engaged in submitted proposals
		1.3.5 Number of young and women researchers engaged in MENA NWC supported research activities	ME	NA	40	40	53 on 9 PR&D Research Projects, 3 U.S.-Network Research Partnerships, 7 Young Water Scientists Partnership proposals, and 16 Water Innovation Fellowships Proposals
		1.3.6 Number of private enterprises, producers organizations, water users associations, women's groups, trade and business associations and community-based organizations that applied new technologies or management practices as a result of USG assistance	ME	4.5.2-42	12	12	0
		1.3.7 Number of visits to the MENA NWC website	ME	NA	25,000	25,000	Website development initiated. Expected launch in First Quarter of Year Four.
		1.3.8 Number of fans on the MENA NWC Facebook Page	ME	NA	5,000	5,000	0

Intermediate Result (IR)	Sub IR	Indicator	ME or AFR	Standard Indicator Number	2014 Target	Final Target	Actual (Cumulative) as of March 14, 2014
	1.4 MENA NWC Strengthened through Private Sector Participation	1.4.1 Number of private sector partners participating in MENA NWC	ME	NA	15	15	3
2. Integrated Water Resource Management Programming Strengthened	2.1 IWRM Legal and Regulatory Frameworks Strengthened	2.1.1 Number of government agencies, utilities, and service providers involved in IWRM research activities	ME	NA	8	8	3
	2.2 IWRM Methodologies Implemented	2.2.1 Number of private enterprises, producers organizations, water users associations, women's groups, trade and business associations and community-based organizations (CBOs) that applied new technologies or management practices as a result of USG assistance	ME	4.5.2-42	6	6	0
3. Access to Clean Water and Sanitation Expanded in Target Countries	3.1 Water and Sanitation Service Provider Performance Strengthened	3.1.1 Number of water operator partnerships facilitated	AFR	NA	9	9	In process through NRW program
		3.1.2 Number of private sector sanitation service providers that have improved management practices as a result of USG assistance	AFR	4.6.2-9	9	9	NRW program underway with audit as Stage I
		3.1.3 Number of service providers implementing water loss programs with USG assistance	AFR	3.1.8.1-2	50	50	26

Intermediate Result (IR)	Sub IR	Indicator	ME or AFR	Standard Indicator Number	2014 Target	Final Target	Actual (Cumulative) as of March 14, 2014
		3.1.4 Number of private sector sanitation interventions started with USG assistance	AFR	NA	15	15	0
		3.1.5 Number of visits to African water associations' newly designed websites	AFR	NA	25,000	25,000	Redesign in procurement
		3.1.6 Number of fans of the Facebook pages of the African water associations	AFR	NA	5,000	5,000	0
	3.2 Water and Sanitation Service Operating Environment Improved	3.2.1 Number of governments developing national sanitation strategies	AFR	4.6.1-17	15	15	0
	3.3 Water and Sanitation Sector Financial Sustainability Improved	3.3.1 Number of governments developing plans to obtain outside financing for utility investments	AFR	NA	9	9	Stage 3 of NRW program
		3.3.2 Number of innovative solutions or mechanisms for mobilizing financing for non-revenue water and sanitation programs	AFR	NA	5	5	0
4. Research and Development Capacities in Irrigation, Groundwater Management, and Drought Risk Assessment and Mitigation Strengthened	4.1 Best Practices for Efficient, Productive Use of Water in Agriculture Identified.	4.1.1 Number of technologies or management practices under research as a result of USG assistance	ME	4.5.2-39a	10	10	13: As part of 9 PR&D Research Projects and 3 U.S.-Network Research Partnerships
		4.1.2 Number of technologies or management practices under field testing as a result of USG assistance	ME	4.5.2-39b	10	10	6

Intermediate Result (IR)	Sub IR	Indicator	ME or AFR	Standard Indicator Number	2014 Target	Final Target	Actual (Cumulative) as of March 14, 2014
		4.1.3 Number of technologies or management practices made available for transfer as a result of USG assistance	ME	4.5.2-39c	4	4	0
5. Transboundary Water Cooperation Strengthened in Key River Basins	5.1 Analysis of Transboundary Cooperation Identifies Model Programs and Interventions	5.1.1 Number of transboundary water resources sustainability assessments undertaken	ME	4.5.2-41e	2	2	1 by OSU
	5.2 Transboundary Pilot Project Launched	5.2.1 Number of exchanges (government-to-government, non-government-to-non-government; non-government-to-government)	ME	NA	4	4	0
6. Technical and Outreach Capacity of USAID Staff in WASH Programming Enhanced	6.1 WASH Technical and Outreach Capacity of USAID Staff Increased	6.1.1 Number of WASH training events for USAID staff	ME/AFR	NA	3	3	0
		6.1.2 Number of USAID staff trained in WASH	ME/AFR	NA	90	90	0
		6.1.3 Number of WASH guidance materials updated or developed	ME/AFR	NA	6	6	0
	6.2 USAID WASH Visibility and Outreach Increased	6.2.1 Number of conferences and outreach events facilitated or supported	ME/AFR	NA	6	6	3: AWW 2012 AWW 2014 WWW2013

ANNEX C: AMCOW FINAL REPORT



AFRICAN MINISTERS' COUNCIL ON WATER

CONSEIL DES MINISTRES AFRICAINS CHARGES DE L'EAU



Special Technical Committee of the African Union

Technical Assistance for Strengthening the African Ministers' Council on Water (AMCOW) DAI Final

Report for the Period 03/01/2013 - 08/31/2014

During the DAI Grant period (03/01/2013-08/31/2014), the 2 Programme Officers (PO) have continued to strengthen coordination process across Eastern and Northern Africa sub-regions. They also support AMCOW Secretariat to organize major Africa's water events and strengthen coordination with AMCOW's partners for the implementation of AMCOW's Triennial Work Programme. This report is a summary of technical and management achievements under the DAI Grant, including lessons learned and next step recommendations for AMCOW behind the DAI Grant. Major achievements under DAI Grant can be summarized in the following:

1. STRENGTHENING AFRICA'S WATER MANAGEMENT FUNCTION AT SUB-REGIONAL LEVEL

1.1 STATUS IN EASTERN AFRICA SUB-REGIONAL UNIT

Based on the EXCO decision: "EXC0/11/2013/CAIR0/4: EXCO endorses the host arrangements for the AMCOW Secretariat's Regional Offices and directs the Secretariat to initiate discussions, prepare and finalize host agreements with the SADC, ECOWAS, ECCAS, IGAD, and the selected North Africa sub region REC, and subsequently operationalize the Regional Offices subject to availability of funds";

The Eastern Africa PO has initiated discussions during 2013, under AMCOW Secretariat guidance, and wrote official letters to the Eastern Africa Regional Economic Community (REC), regarding the implementation of strengthening Africa's water management function at sub-regional level. Discussions are on-going with IGAD.

1.2 STATUS IN NORTH AFRICA SUB-REGIONAL UNIT

Based on the above decision (EXC0/11/2013/CAI R0/4), North Africa PO has prepared on May 2013 a guidance note focuses on North Africa (NA) regional integration that can serve as a foundation for strengthening the processes for hosting the AMCOW regional unit/office in NA. The concept note namely "Concept Note for Establishing AMCOW

North Africa Sub-regional Secretariat" was prepared under AMCOW Secretariat guidance and submitted to the AMCOW President, Dr Mohammed Baha Eddine, Minister responsible for Water Resources and Irrigation, Arab Republic of Egypt; on June 2013 (the concept note was also submitted to DAI on August 2013 under Deliverables1). However, the progress on this process was arrested in July 2013, after the suspension of Egypt membership from the African Union (AU).

After the suspension of Egypt membership from AU, it was more realized that under the current political situation within North Africa Sub-region, it's very difficult to operationalize the unfinished process for establishing North Africa Sub-regional unit. Thus, North Africa Technical Advisory Committee (TAC) members have met in Dakar, Senegal, in 24 May, 2014 to discuss the establishment of the Regional AMCOW Unit in the NA Sub-region. The NA TAC decided to establish the temporarily Regional AMCOW Secretariat in the TAC vice Chair country during the 2 next years, until the coordination within the recognized REC for NA will be operational and functional.

2.1 STRENGTHENING COORDINATION FOR THE IMPLEMENTATION OF AMCOW WORK PROGRAMME 2011-2013

The 2011-2013 Work Programme outlines seven themes with targets formulated to respond to the Sharm- el-Sheikh Commitments on Water and Sanitation. The 2 POs have continued to strengthen coordination for the implementation of the 2011-2013 Work Programme, especially for the programme described in 2.1; 2.2; 2.3 and 2.4 sections (see below) .

2.2 THE PAN AFRICAN WATER SECTOR MONITORING AND EVALUATION MECHANISM

The Pan-African Water Sector Monitoring and Evaluation (M&E) Mechanism, conceived to facilitate preparation of AMCOW reports to the AU Summit on the progress made in implementing the Sharm-el- Sheikh Declarations, was jointly designed by AMCOW and AUC. Since 2012, AMCOW's Secretariat and AUC have undertaken further consultations through sub-regional workshops organised together with the RECs. The 2 POs represented AMCOW and attended all sub-regional coordination meetings.

Member States from Eastern and North Africa were mobilized to prepare and submit their reports in June 30th 2013. Inaugural African Water Report on the Implementation of the July 2008 Assembly Declaration on the Sharma el-Sheikh Commitments was compiled using data provided by the 42 Members States. The report was submitted to the Assembly of the Executive Committee and the Assembly of the African Union at its 22nd Ordinary Session in January 2014. The key progress reports and achievements under the Pan-African M&E were delivered to DAI.

2.3 THE WATER, CLIMATE AND DEVELOPMENT PROGRAMME

The Water, Climate and Development Programme (WACDEP) supports the implementation of the climate change related commitments in the Sharma el-Sheikh Declaration and contributes

to national adaptation processes. WACDEP is developed and implemented by Global Water Partnership (GWP) at AMCOW's request. It supports the implementation of the AMCOW work program 2011-2013 under Theme 4: "Global changes and risk management: climate variability and climate change". North Africa PO is coordinating the implementation of WACDEP; she represented AMCOW in the Technical Coordination meetings. The key progress reports and achievements under WACDEP were delivered to DAI.

2.4 AMCOW POLICY AND STRATEGY FOR MAINSTREAMING YOUTH IN WATER AND SANITATION SECTOR IN AFRICA

Under AMCOW Secretariat guidance, the Eastern Africa PO is coordinating the implementation of AMCOW policy and strategy for mainstreaming youth in water and sanitation sector, in close collaboration with Member States, RECs and partners including WaterAid, UN Habitat, GWP and AfWA. Some member states (including Nigeria, Kenya, South Africa and Malawi) have already started processes to institutionalize youth engagement in the water and sanitation sector by creating Youth Desks, while other countries have already some Youth Units which coordinate Youth related activities in the water and sanitation sector. The key progress reports and achievements were delivered to DAI.

2.5 SANITATION GOALS IN AFRICA

AMCOW Work Programme under theme 3 is mainly focuses on the water and sanitation goals and it expected to contribute towards achievement of the eThekweni goals on sanitation and hygiene in the whole of Africa. The secretariat of AMCOW with support from partners have organized in country planning meetings in the East, West, Central and Southern Africa sub regional processes for the review of countries performances and sharing of lessons in relation to the eThekweni commitments. The Eastern Africa PO is coordinating the process in Eastern Africa Sub-region. The secretariat has also developed the concept note for the AfricaSan 4 conference and organized meeting with members of the AfricaSan International Task Force in Lusaka, Zambia to deliberate on preparations for the conference. The key progress reports and achievements on Sanitation Goals lead by AMCOW were delivered to DAI.

2.6 WATER EVENTS

The 2 POs are supporting AMCOW for the organisation of Water events (Africa Water Week, World Water Week, World Water Forum, Post 2015 Development Agenda..).

Furthermore, during the grant period, the 2 POs represented AMCOW in the following meetings (the minutes of these meetings were delivered to DAI):

- Pan African Water Sector Monitoring and Evaluation Mechanism: Technical Coordination Meetings
- Youth Meetings;
- Gender Meetings;
- Water Cooperation Meetings;
- Climate Resilient Meetings and WACDEP Technical Coordination Meetings;

- United Nations Framework Convention on Climate Change Meetings : COP18 and COP 19;
- Post 2015 Development Agenda Meetings ;
- Water Governance Meetings.
- Global Management for Environment Services (GMES) Meetings;
- African Water Cycle Coordination Initiative (AfWCCI);
- Sanitation Meetings.

3.0 LESSONS LEARNED

Key lessons learned during the implementation period of the Grant can be summarized as:

- **Strengthening coordination at sub-regional level in Africa:** this requires specific financial resources, as well as sufficient information sharing between countries and sectors. Once the institutional framework is created, identifying **financial sustainability** and the best communication strategy to target **policy-makers** and other **stakeholders** at national and sub-regional levels becomes of paramount importance.
- **Finances and timing are limiting factors;** in addition, **frequent changes in political leadership** at national and regional level (Arab Spring) can hinder the coordination process within the sub-region.
- **Grant:** a **flexible management procedure helps respond** to demands of the Programme officers (travels, communication fees, housing charges ...). However a lack of sufficient funds is a potential factor hampering efforts at „making the case“ for action needed to strengthen coordination, bring all Stockholders and organise the sub-regional meetings.
- **Information collection and sharing** between countries within sub-region is a big challenges to be addressed under participatory approaches and strategies.

4.0 RECOMMENDED NEXT STEPS FOR AMCOW BEYOND FABRI/DAI GRANT

Generally the activities achieved by the 2 POs under DAI Grant have positive results; the grant offers an excellent opportunity to learn from strengthening sub-regional coordination exercise.

To reinforce the benefits of AMCOW/DAI collaboration, the recommended next steps can be summarized as follows:

- Set up a potential collaboration through short and long term **development programs** that contribute to strengthen AMCOW and ensure its role in water and sanitation sector in Africa.
- As AMCOW's partner, DAI can consider the **implementation of the 2014-2016 AMCOW Work Program.**
- More consideration of specialist areas of interest such as **sanitation, transboundary issues, and cross-cutting issues on gender mainstreaming and youth involvement.**

- Set up a potential collaboration through **capacity building programme**: DAI can integrate AMCOW's TAC in its short and long term capacity development programs in Africa (New Revenue Water, Youth Programs,.....).
- Possible linkages to the **SDG Solution** Network.