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# ENHANCE CLIMATE RESILIENCY AND WATER SECURITY IN THE MALDIVES PROJECT

**FINAL REPORT**



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## FINAL REPORT

**Contract No. AID-EPP-I-00-04-00020, Task Order No. AID-383-TO-11-00001**

**Cover photo: A photography workshop held in January 2015 taught Hinnavaru youth methods to critically examine and capture environmental issues on their island. The cover photo is an output of that workshop. (Credit: Maldives GCC project)**

### DISCLAIMER

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# CONTENTS

<b>Acronyms</b> .....	<b>v</b>
<b>Executive Summary</b> .....	<b>1</b>
<b>Background</b> .....	<b>2</b>
<b>Technical Activities</b> .....	<b>4</b>
A. Task 1: Assessment, Design, and Mobilization .....	4
B. Task 2: Institutional Strengthening .....	6
C. Task 3: Enhancing Community Knowledge, Skills, and Attitudes .....	10
<b>Crosscutting Activities</b> .....	<b>17</b>
A. Communications .....	17
B. Monitoring and Evaluation .....	17
C. Environmental Compliance .....	20
D. Gender .....	20
<b>Financial Report</b> .....	<b>22</b>
<b>Best Practices and Lessons Learned</b> .....	<b>24</b>
<b>The Way Forward</b> .....	<b>26</b>
<b>Annex A. Summary of Deliverables</b> .....	<b>31</b>
<b>Annex B. Organizational Chart</b> .....	<b>34</b>
<b>Annex C. Key Public Events</b> .....	<b>35</b>

# ACRONYMS

EA	environmental assessment
EMMP	environmental mitigation and monitoring plan
EPA	Maldives Environmental Protection Agency
FENAKA	Fen Narudhama Karantu
FET	Faculty of Engineering and Technology (Maldives National University)
FSc	Faculty of Science (Maldives National University)
IEE	initial environmental examination
IR	intermediate result
IT	information technology
Maldives GCC	Maldives Global Climate Change
MEA	Maldives Energy Authority
MEE	Ministry of Environment and Energy
MNU	Maldives National University
MWSC	Male' Water and Sewerage Company
PAC	public awareness campaign
PAR	preliminary assessment report
PMES	performance monitoring and evaluation system
SWRO	saltwater reverse osmosis
UNOPS	United Nations Office of Project Services
USAID	United States Agency for International Development
WMP	water management plan
WQLP	water quality laboratory procedures
WSOM	drinking water system operations and maintenance



# EXECUTIVE SUMMARY

The primary objective of USAID’s Enhance Climate Resiliency and Water Security in the Maldives Project — also referred to as Maldives Global Climate Change (Maldives GCC) — was to build the resiliency of island residents in response to the significant challenges brought on by climate change. To achieve this, Maldives GCC worked to raise the public’s awareness about climate change, provide ways to adapt to its effects, and build the capacity and sustainability of stakeholders, including the Ministry of Environment and Energy (MEE), residents and the Island Council of Lhaviyani (Lh.) Hinnavaru, and the national utility company, FENAKA Corporation Limited.

At the institutional level, Maldives GCC assessed FENAKA’s billing and management systems, identified areas for improvement, and provided improved finance and accounting software and training, improving the utility’s financial sustainability. The project also developed two certification courses through Maldives National University (MNU), with practical instruction by the Male’ Water and Sewerage Company (MWSC), that laid a pathway to develop a cadre of fully trained and certified personnel to work in the water production sector. The MEE and the main utility companies have already expressed interest in continuing to send students to these courses on a regular basis. Additionally, at the request of the MEE, the project developed a public utility performance monitoring system to measure utility performance across four sectors and customer satisfaction. The MEE now owns this tool and is working to institute regular reporting requirements for the utilities.

Through training activities, site visits, and a robust public awareness campaign, Maldives GCC substantially increased public knowledge and awareness of water resource management, and demonstrated specific actions that will lead to better water conservation and management. Participants of these events often became inspired to create awareness within the larger Hinnavaru community, advocate for better waste management practices, and impart their new composting skills to others. The project also actively reached out to youth with videography and photography training courses and field trips focused on water and environmental management. By harnessing the optimism and energy of engaged youth, the project created advocates that translate knowledge into action.

The public awareness campaign produced dozens of informational materials — billboards, posters, TV spots, and factsheets — that improved residents’ understanding of the challenges of climate change and ways in which they can adapt. MEE, with which the project worked closely throughout implementation, recognized the value of the materials produced and plans to use them on other islands with similar projects.

In total, the activities of Maldives GCC have successfully laid the groundwork for the government, utility companies, and residents of Maldives to become better prepared to face the impacts of climate change.

## SECTION I

# BACKGROUND

Maldives is one of the countries most vulnerable to the impacts of climate change. It has a maximum natural elevation of only 2.3 meters above sea level and an average elevation of only 1.5 meters above sea level. More than 80 percent of the 1,192 islands that comprise the country are less than 1 meter above mean high tide. Sea level rise, increased storm and wave action, altered rainfall patterns, and changes to air and ocean temperature represent threats for which the country must prepare.

Due to a combination of natural and man-made factors, freshwater resources are especially at risk, and the provision of safe drinking water and environmentally sound sewage disposal are among the highest priorities for the government of Maldives. Changes in the timing and amount of rainfall and runoff are likely to increase flooding and add stress to near-shore marine environments. Sea level rise and more frequent storm and surge events will exacerbate coastal erosion and inundation. Higher water temperatures will accelerate biological productivity, increasing bacteria and viruses in the water and promoting algal blooms and coral bleaching that can have significant impact on the productivity of the marine environment. Together, these factors can have a profound effect on human and ecosystem health.

To address these challenges, USAID's Enhance Climate Resiliency and Water Security in the Maldives Project, or Maldives GCC, a five-year, \$5.3 million project, worked to demonstrate processes and outcomes that allowed island communities to increase their resiliency to the effects of climate change. Launched in October 2011, the project focused on climate-related risk reduction associated with the development, use, and conservation of water resources in ways responsive to the environmental, social, cultural, economic, and governance context of the islands, specifically focusing on two islands: Lh. Hinnavaru and Haa Alif (HA.) Dhidhdhoo (from 2011 to 2013). This required greater understanding, awareness, and personal and community commitment by island residents and facilitation of their decision-making responsibilities. It also called for the enhancement of public and private sector support needed to effect strategic climate change analysis and provide key service delivery and extension services to the islands.

Maldives GCC provided technical assistance to the government of Maldives, primarily through the MEE. Additional stakeholders included the residents and island councils of Lh. Hinnavaru and HA. Dhidhdhoo, which were targeted to become "climate resilient islands" with USAID assistance; the national water utility company, FENAKA; the Environmental Protection Agency (EPA); and local utility operators and managers.

Maldives GCC was the second major USAID initiative in Maldives. After the 2004 tsunami in the Indian Ocean, USAID provided approximately \$12 million in relief and reconstruction assistance, focused on improving water supply and sewerage services, harbor and breakwater construction, power systems repair, and public accounting



systems. Maldives GCC aimed to move from a focus on reconstruction toward sustainable operations for FENAKA — and a resilient population.

In June 2013, USAID issued a stop work order for the project to curtail all activities except for those related to minimal operating expenses. Through extensive negotiations, USAID and MEE agreed on a revised statement of work that removed all activities on the island of HA. Dhidhdhoo, focused activities to support water infrastructure improvement on Lh. Hinnavaru, and removed all engineering, construction, and procurement activities from the task order, with a corresponding budget reduction. The engineering, construction, and procurement activities were transferred to the United Nations Office of Project Services (UNOPS) through a public international organization grant. Maldives GCC then coordinated project activities with UNOPS for seamless implementation of deliverables to the island of Hinnavaru, and provided technical assistance to FENAKA, primarily to support the sustainability of island infrastructure and implement a robust public awareness campaign on topics of user-pay, climate change, and developing an island water management plan. USAID lifted the stop work order in March 2014, and the revised project activities commenced.



A GCC-produced billboard explains the integrated water system being constructed in Hinnavaru.

## SECTION 2

# TECHNICAL ACTIVITIES

The revised statement of work for Maldives GCC included the following three overarching tasks:

- Task 1: Assessment, Design, and Mobilization
- Task 2: Institutional Strengthening
- Task 3: Enhancing Community Knowledge, Skills, and Attitudes

This section describes the accomplishments of the project in achieving those tasks, and how the implementation of these activities helped the government and island communities become better prepared for climate variability.

### A. TASK 1: ASSESSMENT, DESIGN, AND MOBILIZATION

Task 1 was designed to facilitate the planning and collection of necessary data to enable the implementation of the technical assistance and communication activities of the other two project tasks. Below are notable results and accomplishments under this task.

#### *Assessments to inform project activities.*

During the first phase of project implementation, Maldives GCC completed more than 10 assessments, surveys and reports (see box), many of which fed into a comprehensive preliminary assessment report (PAR) that provided direction for the remainder of the project. The PAR outlined the linkages between project tasks, infrastructure interventions, and complimentary activities that together enhanced resiliency to key impacts of climate change and water security issues. The project used these assessments to inform interventions, and UNOPS and MEE used them as well.

#### *Develop environmental mitigation and monitoring plan for Hinnavaru water facilities.*

Maldives GCC developed an environmental mitigation and monitoring plan (EMMP) to address the potential negative

#### TASK 1 ASSESSMENTS, 2011-2013

- ✓ Climate Vulnerability Assessment – Islands of Dhidhdhoo and Hinnavaru
- ✓ Maldives Water and Sewer Tariffs: Current Framework and Policies
- ✓ Maldives Water and Sewer Tariff-Setting Policy and Procedures
- ✓ Financial Analysis of Water and Sewer Sector Infrastructure Alternatives – Islands of Dhidhdhoo and Hinnavaru
- ✓ Improving Water Security through Effective Rainwater Harvesting in Dhidhdhoo and Hinnavaru: Balancing Local Water Use with Rainfall for Sustainable Water Resources
- ✓ Assessment of 10 Mega Ton Salt Water Reverse Osmosis Plant in Dhidhdhoo
- ✓ Household Profiling Survey in Dhidhdhoo and Hinnavaru
- ✓ Survey of Public Rainwater Harvesting Systems in Dhidhdhoo and Hinnavaru
- ✓ Survey of Household Septic Tanks and Connections to Central Sewerage System In Dhidhdhoo and Hinnavaru
- ✓ Preliminary Assessment Report

impacts that could occur during the operation phase of the drinking water facility and the regional water quality laboratory being constructed by UNOPS.

The project's environmental compliance expert met with partners and stakeholders — including MEE, EPA, and FENAKA — to discuss environmental concerns, conduct site visits, review background documentation, and draft the final EMMP based on these inputs. The EMMP consisted of a comprehensive set of resources to ensure operation in compliance with environmental and safety regulations (see box) and the text is available in both English and Dhivehi. Although the EMMP was developed specifically for operation of the Hinnavaru water supply system and the regional water quality laboratory, it was designed to allow MEE and FENAKA to scale up the plan. FENAKA is planning to use the technical information contained within the EMMP to strengthen their health and safety manual for all the islands. This health and safety manual will be followed during daily operation and maintenance activities at water networks in Hinnavaru and all other islands. FENAKA is also incorporating elements of the emergency plan into their existing emergency response plan to make it more comprehensive.

#### EMMP RESOURCES PRODUCED

- ✓ EMMP for Hinnavaru Water Supply System (HWSS)
- ✓ EMMP for the Regional Water Quality Laboratory (RWQL)
- ✓ Mitigation Plan to Address the Possibility of Continued Use of Untreated Rainwater as a Drinking Water Source in Hinnavaru
- ✓ Training Agenda – Environmental Compliance for HWSS and RWQL
- ✓ Protocol for Safer Excavation Activities
- ✓ Illustrative Content to Select Information, Education, and Communication Materials for the HWSS and the RWQL
- ✓ Summary of Monitoring Responsibilities for the HWSS
- ✓ Summary of Monitoring Responsibilities for the RWQL
- ✓ Water Tests and Chemicals to be Performed at RWQL
- ✓ Material Safety Data Sheets for Chemicals used in the HWSS
- ✓ Material Safety Data Sheets for Chemicals used in the RWQL
- ✓ General Notes on Chemical Storage
- ✓ Notes on Dealing with Small Chemical Spills
- ✓ EMMP Budget Structure
- ✓ Assessment Test for Induction or Recurrent Training
- ✓ Induction Training
- ✓ Emergency Plan

*Value engineering review.* A primary objective of the revised project scope was to support UNOPS in constructing a reliable and sustainable water supply system for the island of Hinnavaru.

Maldives GCC subcontractor, CH2M HILL, provided support to UNOPS in its design of the Hinnavaru island water supply system by conducting a value engineering review of UNOPS' detailed designs. The resultant recommendations were based on a high-level quality review of the detailed design drawings and report, and identified opportunities to achieve operational efficiencies, maximize the life-of-project value, and reduce overall operations and maintenance costs for the life of the facility. The resulting report identified 78 recommendations for design improvement in process mechanical, electrical, and instrumentation/control systems.

*Communication and coordination.* To ensure all project partners remained attuned to the priorities and activities of the project, Maldives GCC maintained a communications log of all meetings and other substantive communications with all government of Maldives partners and UNOPS. The project led 83 weekly coordination meetings with USAID, UNOPS, MEE, EPA, and FENAKA, and recorded and distributed minutes of all meetings to all stakeholders on a weekly basis. The project also developed a “stop-light table” in April 2014 that was updated and circulated 91 times on a weekly basis. This table assisted in bringing unresolved issues — including construction delays — to the coordination committee members’ attention, allowing USAID and MEE senior management to collaborate and find solutions.

In addition, because of the importance of maintaining MEE buy-in for activity implementation, the project worked closely with MEE to receive concurrence for all technical activities, including annual work plans, PAC materials, and technical reports.

These measures ensured all project partners and stakeholders were fully aware of all activities and successes, strengthened the partnerships between all involved parties, and allowed all challenges to be quickly identified and addressed.

## **B. TASK 2: INSTITUTIONAL STRENGTHENING**

The strengthening of individual and institutional capacity was critical to project success and sustainability. Institutional strengthening activities focused on improving the capacity of the Island Council and utility company on Hinnavaru to provide water supply, sewerage, and solid waste management services to residents of Hinnavaru. Under this task, Maldives GCC also supported the strengthening of FENAKA, the utility company responsible for providing more than 150 island communities with water, sewerage and waste management services, and built the regulatory capabilities of the MEE and EPA.

Maldives GCC aimed to provide comprehensive training and operational and management tools to enable FENAKA to sustainably operate and manage its existing facilities, as well as new facilities being built by UNOPS. Using a variety of methods, the project developed in-depth training modules that can now be used in future training programs. In doing this, the project achieved its secondary objective: to build durable operator and laboratory technician certification programs, which provide a platform for training existing staff, and create a pool of trained personnel from which utility providers can recruit.

*Establish project coordination bodies.* To strengthen the coordination of all project partners, Maldives GCC sought out and achieved full cooperation of the other five entities — MEE, EPA, FENAKA, UNOPS, and the Hinnavaru Island Council — to provide representative members for a weekly project coordination committee. The project coordination committee also organized biannual meetings with the state minister of the MEE, the president of the Hinnavaru council, USAID, EPA, FENAKA, and UNOPS. At these biannual meetings, project staff and UNOPS presented project updates for their respective project components, provided a summary of upcoming

activities for the next six months, and answered questions from USAID and local partners.

*Operator and laboratory technical training and capacity building of FENAKA and Hinnavaru utility staff.* In partnership with the Faculties of Science (FSc) and Engineering and Technology (FET) at Maldives National University, Maldives GCC created drinking water system operations and maintenance (WSOM) and water quality laboratory procedures (WQLP) certificate level III programs, intended to develop a sustainable workforce for the current and future needs of the utilities in the country.

The project conducted extensive research into course requirements, including working with the National Health Laboratory, EPA, and FSc to compile a list of required lab tests and equipment for the regional Hinnavaru water quality control lab, which were later incorporated into the WQLP Program. The project also conducted numerous stakeholder meetings with MEE, EPA, FENAKA, MWSC, and FSc and FET to discuss course requirements, key subjects to include, graduate outputs, and course competencies. Two consultants through CH2M HILL developed class outlines, a course structure, and instructional materials, including presentations for each session, assessments, and recommended book lists. They also worked with the project to receive approval from MNU's Committee on Courses and ultimately, the Maldives Qualifications Authority, which provides internationally recognized accreditation.

**CERTIFICATION PROGRAM SUBJECTS**

**WSOM:**

- ✓ Basic water chemistry, biology, and safety
- ✓ Rain water harvesting technology and equipment operations and maintenance
- ✓ Desalination technology and equipment operations and maintenance
- ✓ Disinfection and support systems
- ✓ Power generation/backup power operations and maintenance
- ✓ Water distribution system operations and maintenance

**WQLP:**

- ✓ Basic water chemistry, biology, and safety
- ✓ Water quality sampling methods
- ✓ Biological/bacteriological and primary nutrient analysis
- ✓ Physicochemical analysis
- ✓ Data analysis and interpretation
- ✓ Laboratory safety and maintenance

The certificate courses include classroom instruction and hands-on practice. Each program lasts for 15 weeks, for a total of 300 hours of instruction — 135 hours in the classroom and 165 hours of practical instruction at the training facilities of MWSC. The classroom component, delivered by MNU lecturers trained by the project, provides a comprehensive understanding of the key concepts and processes for each subject (see box). The hands-on training component, provided by Male' Water and Sewerage Company,

“The technical knowledge I have gained from this course will allow me to work with more confidence and assurance. I was promoted to a supervisor post just before I joined the course. Now I feel that I am more qualified to work as a supervisor, after completing the course.”

— ALI ADAM KOI,  
WSOM COURSE GRADUATE

includes demonstrating proper procedures and methods, discussion of safety concerns, troubleshooting steps for equipment failures, and extensive practical experience that allowed each participant to achieve a standard level of proficiency. Maldives GCC provided 115 new textbooks to be housed at the MNU library for lecturers and participants of the two certification courses.

In January 2016, 20 participants selected by FENAKA, EPA, and MEE enrolled and began attending the new certification course classes, and in May 2016, all 20 successfully completed the courses. Furthermore, in May 2016, EPA decided that the WSOM and WQLP courses will be the minimum requirement for certified RO operators and laboratory technicians.



Utility managers receive training on operations and maintenance of water supply systems at MWSC.

*Financial management system assessment.* Improving FENAKA's cost recovery capacity and overall financial sustainability represented a key project objective. To this end, Maldives GCC identified a consultant to support FENAKA with the development and rollout of new billing and collections software.

The CH2M HILL consultant met with the information technology (IT) and finance teams at FENAKA to review its billing and management systems. The consultant identified gaps in the billing system and platform rollout process, and compiled those needs with recommendations to improve the system. He also provided templates and guidance

documents for standard billing system requirements, revision control, and regression and user acceptance testing. The consultant then met with 14 key staff from FENAKA and covered 13 topic areas, including business strategy and planning, engineering, finance, human resources, and IT. The assessment covered more than 140 components of FENAKA's management system, and resulted in a detailed report that included the assessment results, recommendations for overall improvement, and a management systems improvement work plan.

Based on the report, FENAKA ranked upgraded finance and accounting software as its top priority to strengthen its management systems. In March and April 2016, the project provided 45 license keys of Microsoft Dynamics NAV 2016 software, along with technical assistance to activate the software. MS Dynamics is a business management solution for mid-sized organizations that automates and streamlines business processes, including finance, sales, supply chain management, project management, and services. Maldives GCC, through its local subcontractor, also provided an intensive six-day training by Microsoft certified trainers for 16 FENAKA staff, working with a test database to simulate exercises.



Staff from FENAKA Corporation learn the ins and outs of MS Dynamics NAV 2016 enterprise resource planning software.

*Supply chain management.* Getting supplies and materials to Maldives takes time due to the distance from suppliers and limited means of getting materials to the islands. To improve delivery and decrease wastage, Maldives GCC provided recommendations to streamline Hinnavaru supply chain management for laboratory and process chemicals.

This report explored the various considerations that FENAKA should take when setting up a laboratory and its inventory control programs. The report, submitted to FENAKA in January 2016, provided recommendations on supplier selection, inventory control parameters necessary to manage the supply and monitor the usage of testing chemicals, proper documentation for chemicals management, guidance on chemical inventory forms, regulatory requirements, restocking procedures and frequency, storage requirements, and quality control and assurance.

*Regulatory awareness.* The project expanded the concept of sustainable utility management to a nationwide level and provided MEE, EPA, and the Maldives Energy Authority (MEA) with a performance monitoring and evaluation system (PMES), which consists of sector-based management tools to monitor utility performance in a proactive manner that enables regulators to take corrective actions before issues become a serious problem. Project consultants met with the MEE, EPA, and the Maldives Energy Authority to understand specific needs for reports from the utilities and the type of decisions those reports would inform. The consultants also held an introductory meeting with the utilities by sector and conducted a workshop in which the regulators and the utilities identified the key operations and social, environmental, and economic indicators for the system. Based on the information gathered through the meetings and the workshop, the consultants submitted draft indicator tools for the electricity, sewage, water and waste management sectors to MEE, EPA, MEA, MWSC, State Electric Company, and FENAKA for review and comment.

In October 2015, the project completed a second consultation with the regulators and utilities on key performance indicators and the steps to follow for the rollout of the PMES. The project met with the MEE Permanent Secretary Ajwad Musthafa and MEE Water Department Assistant Director Mohamed Fazeeh to present the tools developed under the system to them and seek their approval. MEE approved the PMES and has begun institutionalizing the tool via a web-based platform.

### **C. TASK 3: ENHANCING COMMUNITY KNOWLEDGE, SKILLS, AND ATTITUDES**

Task 3 focused on social marketing to increase Hinnavaru residents' knowledge of three core objectives: user-pay principles, understanding the linkages between climate change and water resource and environmental management, and developing the skills to enable island leadership to develop an island water management plan. The project developed a public awareness campaign plan, which was a comprehensive strategy and set of activities aimed at raising public awareness about climate change, water resources, and environmental management issues. These activities helped to educate island residents about approaches to improve resource availability and publicized project-supported events to promote these objectives.

*World Water Day 2013.* World Water Day events were held in March 2013 in Hinnavaru and Dhidhdhoo, during which GCC communicated the objectives of the project and promoted the importance of water management through a variety of channels, including



traditional parades, locally composed songs, speeches, games, branded T-shirts and reusable aluminum water bottles, and prizes. World Water Day events were particularly visible, and engaged more than 650 people across the two islands.

*Public awareness campaign planning.* Careful planning was critical to the success of the public awareness campaign, and helped the project clarify key messages, determine the primary target audience for each message, and develop the most effective way to roll out activities to support each message. Maldives GCC carefully analyzed the objectives and social and technical capacity on the island to develop the public awareness campaign plan. Local subcontractor, Zebra Cross, developed branding, logo, and slogan options, which it presented to the project coordination committee. Zebra Cross also developed a set of graphic templates for the project to create social messages for dissemination on Hinnavaru.

The project conducted a series of focus group discussions and interviews on the island to understand island residents’ perceptions and attitudes about these issues before the messaging campaigns began. Maldives GCC deemed it important that Hinnavaru residents’ feelings, concerns, and level of understanding of the issues were appropriately incorporated into the public awareness campaign plan— maximizing message impact. Once the MEE approved the public awareness campaign plan, the project developed and circulated a detailed schedule of activities, finalized the graphic templates, and began using them in project communications activities.



GCC’s “Fen Fahi” awareness campaign included 24 individual awareness materials — including posters, billboards, TV spots, factsheets, and newsletters – covering seven topic areas.

*Public awareness campaign – user-pay principles.* To help island residents better understand user-pay principles, which detail why water usage fees charged by FENAKA are necessary and how they support system sustainability, Maldives GCC designed a user-pay factsheet. The project distributed the factsheet during the water management plan workshops in Hinnavaru in April 2016. The awareness building effort resulted in

670 water connection applications (out of 750 target households) being submitted to UNOPS by May 2016.

*Public awareness campaign – climate change.* In November 2014, Maldives GCC began implementing a series of youth activities designed to increase awareness of climate change, and link it to water and environmental management. In the first activity, 26 youth participants took part in a tour of Soneva Fushi Resort, a well-known, ecofriendly vacation destination with extensive environmental management programming. The youth learned about waste water management, rainwater harvesting and desalination, reuse, recycling and waste segregation, composting, biochar, raised-bed vegetable gardening, and solar power. During the second part of the trip, the participants toured the facilities of Felivaru Fisheries and learned about responsible fishing practices and Felivaru's innovative waste management and segregation practices. After the tour, participants formed a committee to identify practices that residents would like to replicate on Hinnavaru, which guided future community-led efforts.

Also in November 2014, Maldives GCC began a series of community discussion nights, at which the project hosted a presentation about a particular subject, followed by a discussion and brainstorming session on the subject's local relevance. Presentations included information about coral reefs, followed by a discussion of why coral reefs are important to Maldives, the effects of climate change and human activity on coral reefs, and what can be done locally to protect the reefs. After these discussion nights, project staff followed up with participants to engage interested and motivated students and youth to become leaders for translating knowledge into action.

The project engaged the youth of Hinnavaru with videography and photography workshops, enabling participants to develop videos and photographs that visually conveyed the importance of environmental and water management practices.

In February 2015, the project conducted a field trip to Alif Alif (AA.) Ukulhas, sponsoring 11 Hinnavaru residents interested in learning about the Ukulhas Council's experience in composting. The participants included community leaders and representatives from the island utilities, Island Council, Women's Development Committee, police, school, NGOs, Maldivian Red Crescent, and Health Centre. As a result of this trip, the group developed a plan to start composting activities in Hinnavaru and each participant committed to train at least five more island residents in composting. The group also took the initiative to sensitize government institutions, island utilities, and school children on the importance of separating waste and carrying out community composting as a move toward proper waste management practices on the island.



A youth group from Hinnavaru engaged in learning the best practices of composting at AA. Ukulhas (located in south Male' Atoll) during a field trip organized by the Maldives GCC Project.

In April 2015, the project hosted another training activity on composting for students in Hinnavaru. Participants from the Ukulhas field trip facilitated the training, during which they instructed students on the advantages of composting and organic waste management, and provided practical, hands-on training — for instance, participants prepared compost piles at the island waste management center.

In addition to training activities, Maldives GCC prepared dozens of awareness materials — posters, billboards, TV spots, factsheets, and more — on composting, groundwater recharge, rainwater harvesting, groundwater and marine pollution, and water conservation (see exhibit below). All of these materials, created in consultation with the MEE and USAID, substantially increased residents' understanding of climate change and its impact.

#### EXHIBIT I. PUBLIC AWARENESS MATERIALS PRODUCED

THEMATIC AREA	TYPE OF TOOL	SUBJECT
Composting	Poster	Waste — a hidden treasure
	Factsheet	Good and bad practices of water management
	Factsheet	Aid to composting
	Billboard	Waste — a hidden treasure
	Booklet	Composting handbook

THEMATIC AREA	TYPE OF TOOL	SUBJECT
<b>Groundwater Recharge</b>	Poster	Groundwater lens
	Factsheet	Groundwater recharge options
	Factsheet	Groundwater depletion
	Billboard	Groundwater depletion and recharge
<b>E-newsletter</b>	E-newsletter	Design elements and template for e-newsletter
<b>Rainwater Harvesting/ Climate Change</b>	TV Spot	Rainwater harvesting techniques
	Poster	Rainwater harvesting techniques
	Factsheet	Rainfall patterns and projected changes due to climate change
	Billboard	Rainwater harvesting techniques
	Factsheet	Rainwater harvesting techniques
<b>Groundwater Pollution</b>	Factsheet	Causes of water pollution
	Poster	Causes of water pollution
	Factsheet	How to safeguard water
	Poster	How to safeguard water
<b>Marine Pollution</b>	Factsheet	Causes and effects of marine pollution
	Poster	Causes and effects of marine pollution
<b>Water Conservation</b>	Poster	Water conservation
	Factsheet	Water conservation
<b>User-pay principles</b>	Factsheet	True cost of providing piped water to homes

*Public awareness campaign – island water management plan.* Developing an island water management plan was a key objective to ensure the Maldivian government and citizens can remain resilient in the face of climate change. Maldives GCC helped create and build support for this plan during its last year of implementation.

In June 2015, Maldives GCC met with the MEE and UNOPS to discuss the preparation of the island water management plan for Hinnavaru. The group consulted examples of water management plans from two other islands, and the project shared its water toolkit to decide on the best way to apply the toolkit for the development of the island water management plan. The project then produced an action plan for the preparation of the island water management plan to the coordination committee.

The project also met with the Island Council to collect its feedback. The council was clear that the objective of the island water management plan should be to provide clear information about the water system in Hinnavaru, allow for monitoring and proper maintenance of the water system, provide tools to conduct awareness sessions for the island community, and offer guidance on how to develop expansions of the water system to reach new users and demands. The project then identified a consultant to develop the plan. The consultant drafted a water management plan for Hinnavaru with input from the water management planning workshop participants. The plan was

reviewed and approved by the Hinnavaru council, and the WMP facilitation guidebook was submitted to MEE, with plans to use it nationally to develop WMPs for all islands.

*Other awareness activities.* The project’s public awareness campaign for the plan included working with the Maldives Environmental Management Project to organize a public community meeting, with the participation of FENAKA, to present the scope of the regional waste management center and to explain the types of waste the center will accept; an e-newsletter to communicate the project’s updates to stakeholders, the community, the Hinnavaru island council, teachers, and medical personnel; informational booklets; and a notice board for FENAKA’s offices, a location all homeowners visit at least once a month to pay their utility bills.

“After attending the awareness program by the USAID project (GCC), I have installed pipe connections to divert excess rainwater to the well, and since then I have noticed that the well water is fresher during the rainy season.”

— KHADEEJA ABOOBAKURU,  
HINNAVARU RESIDENT

Additionally, in December 2015, Maldives GCC hosted the FENFAHI exhibition at Hinnavaru’s educational center. The exhibition included a climate change cinema and stalls on groundwater recharge, composting, rainwater harvesting, groundwater pollution, marine pollution, and an audiovisual presentation showcasing art pieces, videos, and photographs prepared by school students. Among the 110 visitors to the exhibition were USAID Acting Mission Director Reed Aeschliman; Minister of Environment and Energy Thoriq Ibrahim; State Minister of Environment and Energy Abdul Matheen; USAID Office of Economic Growth Director Paul Richardson; Island Council president and members; project stakeholders; and island residents.

After the exhibition, the project handed over the models, canvases, and graphic materials to the Lhaviyani Atoll Education Center (Hinnavaru School) to replicate the awareness activities for students and community members in the next academic year.

The project also developed SMS messages to disseminate information and awareness activities, using a database of Hinnavaru school parents that ultimately reached 480 households. With the approval of the MEE and USAID, the project sent out five short messages to be included in this campaign (see box).

#### SMS MESSAGES

- ✓ “Separate organic waste at the household to help with community composting.”
- ✓ “Composting! A healthier, safer solution to waste management.”
- ✓ “Use of household groundwater recharge units helps with groundwater recharge and preservation.”
- ✓ “Increase the amount of water infiltration during the rainy season to help refresh the groundwater.”
- ✓ “Ensure safety of rainwater! Clean your roof with a broom and wash before harvesting the rain.”



**Students at the FENFAHI exhibition in Hinnavaru present principles of groundwater recharge to USAID Acting Mission Director Reed Aeschliman, Minister of Environment and Energy Thoriq Ibrahim, and State Minister of Environment and Energy Abdul Matheen.**

## SECTION 3

# CROSSCUTTING ACTIVITIES

## A. COMMUNICATIONS

The importance of communications for Maldives GCC was two-fold: to widely disseminate public awareness materials to increase the knowledge and capacity of island residents, and to keep open channels of communication with all project partners and stakeholders.

*Public awareness campaigns.* Through thorough analysis and a series of focus groups with island residents, Maldives GCC worked diligently to develop a public awareness campaign plan that took into account Hinnavaru residents' concerns and level of understanding of the issues. The MEE engaged subcontractor Zebra Cross to assist the MEE with publicity surrounding other water issues, and Maldives GCC coordinated all branding and templates with the national publicity campaign to ensure consistency of messaging. Once the public awareness campaign was approved, the project updated its branding and marking plan to include the management of the shared branding, rules for the use of social media, and the inclusion of the complementary work of UNOPS in all project messaging.

*Media coverage.* The national media covered two of the project activities: an awards ceremony to celebrate the agreements signed by MNU and Male' Water and Sewerage Company to deliver the two certification courses, and the FENFAHI exhibition. These features were broadcast through Television Maldives during the 8pm news, which is the most popular news program in the country. In addition, the MEE uploaded photographs from the FENFAHI exhibition to its Facebook page to celebrate its success, reaching more than 8,000 followers.

*Coordination.* With five main project partners — MEE, UNOPS, FENAKA, EPA, and the Hinnavaru Island Council — maintaining clear, concise, and consistent communications was of paramount importance to keep all parties abreast of in-progress and upcoming project activities. In addition to weekly coordination committee meetings and biannual review meetings for all project stakeholders, including USAID and local representatives, Maldives GCC submitted 50 weekly bulleted reports with brief descriptions of project progress and highlights from that week. As of June 2015, the project also sent this weekly report to the USAID Communications Office.

## B. MONITORING AND EVALUATION

The project's monitoring and evaluation plan was developed as a flexible tool to monitor and report on the project's impacts. After the stop work order and the redesign of the project, Maldives GCC worked with USAID to rewrite its monitoring and evaluation plan to include a revised results framework, including updated IRs and new sub-IRs, along with relevant indicators to capture the results of the revised project

activities. The project also aligned the revised results framework with the work of UNOPS and larger combined project goals. Once the monitoring and evaluation plan was finalized and approved, the project reported on the progress of results in quarterly reports submitted to USAID. The final performance results can be found in Table B.1 on the next page.

The project met all of its targets, exceeding some by a wide margin, in particular under standard indicators 4.8.2-26 (exceeded target by 49%) and 4.8.2-6 (exceeded target by 84%). As a result, through the project, 521 stakeholders have increased capacity to adapt to the impacts of climate change, and 14 organizations have increased capacity to address climate change issues. The project's public awareness campaign provided climate change and water management information to 1,952 Hinnavaru residents, directly reaching almost half of the island's population. The project also developed and provided a wide range of climate change and water management tools, from utility performance monitoring systems to informational materials, producing 15 tools and 24 informational materials for service providers and island residents. Lastly, the project's focus on long-term capacity building, in particular through the certificate programs, benefited 542 people through 9,311.50 person-hours of training. In this regard, the project went above and beyond as demonstrated in custom indicator 4, in which the project exceeded the target for number of person-hours of training provided by 467%.



## BI. FINAL PERFORMANCE INDICATORS AGAINST TARGETS

Standard Indicator Number	Indicator	Agreed Program Targets		Previous Results (Year 1 – Year 2)		New Baseline Value		Actual Cumulative Targets Achieved	
		Male	Female	Male	Female	Male	Female	Male	Female
4.8.2-26	Number of stakeholders with increased capacity to adapt to the impacts of climate change as a result of U.S. government assistance	Male	Female	Male	Female	Male	Female	Male	Female
		175	175	83	87	0	0	237	284
Custom 1	Number of island residents receiving information about global climate change and water resource management best practices	Male	Female	Male	Female	Male	Female	Male	Female
		804	804	521	457	0	0	823	1,129
4.8.2-6	Number of people receiving training in global climate change as a result of U.S. government assistance	Male	Female	Male	Female	Male	Female	Male	Female
		148	147	37	40	0	0	268	274
Custom 2	Number of climate adaptation and water resource management tools and technologies developed and tested for island residents	Adaptation	WRM	Adaptation	WRM	Adaptation	WRM	Adaptation	WRM
		13	14	1	1	0	0	12	18
4.8.2-14	Number of institutions with improved capacity to address climate change issues as a result of U.S. government assistance	GOM	NGO/Local	GOM	NGO/Local	GOM	NGO/Local	GOM	NGO/Local
		4	9	1	2	0	0	6	8
Custom 4	Number of person hours of training completed in water resource management processes	Male	Female	Male	Female	Male	Female	Male	Female
		1,791	200	541	0	0	0	7,438.25	1,873.25
Custom 5	Number of climate adaptation and water resource management tools and technologies developed and tested for service providers	Adaptation	WRM	Adaptation	WRM	Adaptation	WRM	Adaptation	WRM
		1	9	0	4	0	0	1	14

### **C. ENVIRONMENTAL COMPLIANCE**

The initial scope of work for Maldives GCC included infrastructure construction and procurement activities. USAID issued an initial environmental examination (IEE) based on that scope of work and the project began preparing an environmental screening manual and procedures to implement the specific conditions included in the IEE. Small-scale infrastructure construction activities fell under the “negative determination with conditions” threshold determination in the IEE, requiring mitigation and monitoring through an EMMP. Large-scale construction fell under the “positive determination” threshold determination, requiring preparation of an environmental assessment (EA). During this phase, due to local law, the project prepared to complete an environmental impact assessment study to adhere to EPA standards.

After the stop work order, the construction component was removed from the Maldives GCC scope of work and transferred to UNOPS. In support of UNOPS’ construction and its own environmental impact assessment, the project developed an EMMP to address the potential negative impacts that could occur during the operation phase of the drinking water facility and the regional water quality laboratory being constructed by UNOPS.

The project produced the EMMP, translated the plan into Dhivehi, and provided training to UNOPS, MEE and FENAKA on how to use it. MEE is currently in the planning phase to develop the EMMP into a template for other islands and utilities, and FENAKA using the technical information contained within the EMMP to strengthen their health and safety manual for all islands.

### **D. GENDER**

For all activities, training courses, and outreach campaigns throughout the life of the project, Maldives GCC sought to reach equal numbers of men and women. The project worked closely with the Hinnavaru Women’s Committee, and continually sought to identify and bridge gaps in relation to women’s access to information, women’s voices in community decisions, and women’s needs with respect to access to and use of water resources. The project provided social messaging through women’s groups and social media communication accessible by women. The project also supported FENAKA and the Island Council to recruit women’s participation in the workforce and in leadership positions in the community.

Records of attendance at meetings and all project-supported training sessions were disaggregated by sex to help the project measure and report the extent to which both men and women benefited from training opportunities, and to help the project make adjustments to more effectively reach women. The project also disaggregated data collected from all other project interventions by sex (as appropriate) to measure and ensure gender balance in project impact.

In discussions with Island Councils, schools, and island residents, Maldives GCC persistently sought strategies to reach women, which resulted in the active involvement

of many women. The youth-focused activities under the public awareness campaign for climate change (Task 3.2) offered the opportunity to reach out to young women on the island to involve them in environmental activities and to challenge them to think critically about their island environment. To further ensure gender balance participation in the public awareness campaign activities, the project held community sessions in the afternoon and evenings. This approach resulted in predominantly female participation in the afternoon, while men made up 90 percent of the participants during the night sessions.



Hinnavaru residents participate in a focus group with GCC staff.

SECTION 4

# FINANCIAL REPORT

EXHIBIT 2. FINAL FINANCIAL REPORT (THROUGH JULY 31, 2016)

LINE ITEM	TOTAL ESTIMATED COST	TOTAL FUNDS EXPENDED	PIPELINE (FUNDS OBLIGATED – EXPENDED FUNDS)	PIPELINE AS PERCENTAGE	PROJECTED FUNDS REQUIRED
1. Total Salaries	████████	████████	████████	██	████████
2. Total Fringe Benefits	████████	████████	████████	██	████████
3. Total Overhead	████████	████████	████████	██	████████
4. Travel and Transportation	████████	████████	████████	██	████████
5. Allowances	████████	████████	████████	██	████████
6. Other Direct Costs	████████	████████	████████	██	████████
7. Equipment, Vehicles, and Freight	████████	████████	████████	██	████████
8. Commodities/Construction/Other Plug Total	██	████████	████████	██	██
9. Salaries	██	████████	████████	██	██
10. Fringe Benefits	██	████████	████████	██	██
11. Overhead	██	████████	████████	██	██
12. Travel and Transportation	██	████████	████████	██	██
13. Allowances	██	████████	████████	██	██
14. Other Direct Costs	██	████████	████████	██	██
15. Subcontractors	██	████████	████████	██	██
16. General and Administrative	██	████████	████████	██	██

LINE ITEM	TOTAL ESTIMATED COST	TOTAL FUNDS EXPENDED	PIPELINE (FUNDS OBLIGATED – EXPENDED FUNDS)	PIPELINE AS PERCENTAGE	PROJECTED FUNDS REQUIRED
17. Training	██████	██████	██████	█	██████
18. Subcontractors	██████	██████	██████	█	██████
19. Grants	█	█	█	█	█
<b>20. Subtotal (1-8)</b>	██████	██████	██████	█	██████
21. General and Administrative	██████	██████	██████	█	██████
<b>22. Subtotal (9-16)</b>	██████	██████	██████	█	██████
23. Fixed Fee	██████	██████	█	█	██████
<b>Total</b>	██████	██████	██████	█	██████

\*Areas in blue denote activities discontinued after Year 2

### EXHIBIT 3 FINAL EXPENDITURES BY TASK (THROUGH JULY 31, 2016)

TASK ORDER COMPONENT	BUDGET	CUMULATIVE EXPENDITURE	BALANCE
Task 1: Assessment, Design, and Mobilization	██████	██████	██████
Task 2: Institutional Strengthening	██████	██████	██████
Task 3: Enhancing Community Knowledge, Skills, and Attitudes	██████	██████	██████
Task 4: Service Delivery and Technological Innovation	█	██████	██████
Task 5: Expanded Focus on Provincial Utility Capacity	█	██████	██████
Task 6: Expanded Focus on Utility Regulatory Oversight	█	██████	██████
<b>Total</b>	██████	██████	██████

\*Areas in blue denote activities discontinued after Year 2

## SECTION 5

# BEST PRACTICES AND LESSONS LEARNED

The implementation of Maldives GCC required careful and consistent coordination and communication with numerous partners and stakeholders: MEE, the residents and Island Council of Hinnavaru, FENAKA, UNOPS, EPA, and MNU, among many others. As such, the project gained valuable insights that can aid future programming efforts, not only in Maldives, but for other projects that must maintain steady organizational processes among a large group of partners.

- The terms of reference developed with MEE, FENAKA, UNOPS, and the Hinnavaru Island Council defined the key roles and responsibilities of each party. This ensured effective coordination and eliminated any duplication of efforts. This was crucial to maintain dialogue with all stakeholders in planning and implementation of activities, which is necessary for project success.
- Seeking stakeholder buy-in for the tools and products produced by Maldives GCC led to acceptance and, in some cases, adaptation, replication, and/or continuation of the tools and products. MEE and FENAKA have expressed their interest in continuing the WSOM and WQLP certification courses developed by the project. MEE is also planning to roll out the public awareness tools produced by the project in other islands of Maldives, and has already started posting the materials to its official Facebook page. Additionally, MEE assured the project that it will adopt and then implement the PMES developed by the project.
- Community-level activities require an understanding of and sensitivity to daily and seasonal rhythms. To ensure maximum participation from community members, project staff and consultants must work around audience availability, scheduling activities at night or on weekends to accommodate work, school, religious and household responsibilities. Throughout the year, projects must be cognizant of periods during which island resident frequently travel to Male' or abroad (e.g. during school breaks), or when participation is low due to religious and family holidays (Ramazan and Eid in particular). Weather can also be a factor, especially for inter-atoll travel; activities that require travel for large numbers of people should be scheduled during traditional periods of calm to the greatest extent possible.
- Awareness tools and activities should highlight practical actions related to environmental management. Community groups need to witness and experience best practices in action. Hands-on engagement in practical activities helped participants to understand and replicate activities, and then apply them in their local context. Island schools are the best allies for an awareness campaign/activities.

Schools know the community they work with and can give valuable advise on how to address the community, how to work with children, and their schedules and habits. They could share resources, and have similar interests and areas for collaboration. Developing this relationship was one of the keys to GCC's success in Hinnavaru.

- To ensure the continuity of awareness efforts, the project invested in training older high school students, who can continue delivering the messages and train others on environmental subjects, and will help the knowledge remain within the community once the project ended. To the maximum extent possible, we provided opportunities for them to facilitate trainings and give presentations of technical subjects in lieu of project staff or consultants. Through training and coaching, these students demonstrated their capability and exceeded staff expectations.

## SECTION 6

# THE WAY FORWARD

Maldives GCC sought to help the country prepare for the impacts of climate change by building the central and local governments' capacity to undertake integrated, long-term planning of water resources, and developing the knowledge, skills, and attitudes of island residents to make rational and informed decisions on key climate change adaptation issues. The project achieved its goals and laid the groundwork for the government, utility companies, and residents of Hinnavaru to become better prepared to face the impacts of climate change. However, more remains to be done.

Hinnavaru was intended to be the national model of a climate resilient island: an island with an integrated water system, blending reverse osmosis water and publically harvested rainwater, to prevent water emergencies and improve the future resiliency of the island's population. That system, combined with the training provided by MNU, public awareness materials, the community water management plan, and other materials produced by GCC now needs to be scaled up and rolled out in the same fashion to other islands. With more than 190 inhabited islands, GOM, USAID, and other international donors will need to engage in significant efforts to provide the funding and expertise necessary to accomplish the ultimate goal of increasing all islands' resiliency.

The WSOM and WQLP courses were developed and successfully piloted by GCC, but additional support will likely be needed to formalize those courses meeting the minimum requirement for professional certification. Additionally, similar courses are required for sewage/waste water systems operators, as this operation and maintenance of these systems in outer islands continues to be a challenge.

Additional support will also be needed for GOM ministries (e.g. MEE) and public utilities, in particular FENAKA. MEE has a broad set of responsibilities, from developing policy to acting as a regulatory body. Support should be provided to MEE in three key areas: 1) improving their ability to develop policies and a national adaptation plan, as well as their capacity to assist other ministries in mainstreaming climate change into their work planning and budgeting; 2) building their capacity as utility regulators and project managers, and 3) improving their ability to write and submit successful proposals to multilateral climate change funds, such as the Green Climate Fund, Adaptation Fund, Global Environment Facility and others. Climate change financing is a key element to scaling up the GCC design.

Given that FENAKA is ultimately responsible for the operation and maintenance of water systems as well as service delivery throughout virtually the entire country, it is the key organization to target for additional capacity building and funding. GCC, through the management systems assessment conducted in 2014, identified dozens of areas for improvement, and made recommendations to address gaps and improve systems. Virtually all of those recommendations still apply today, and that single GCC assessment



could form the basis of a multi-year intervention to build capacity and provide FENAKA with the system improvement and tools it needs to serve customers.

Male' could also form the basis for an entire project. Male' was, at one time, planned for a maximum population of 100,000, and the supporting infrastructure was designed with this cap in mind. Subsequently, the island's population has reached over 150,000, and it is likely that the population will further increase beyond the design capacity of the utility systems, given recent plans for buildings exceeding 20 stories. To date, the utility providers attempt to do their own expansion forecasting to install future needed capacities. This lack of coordinated, formal future planning presents significant challenges for both MEE and the utility providers. The utility providers are beginning to embark on longer range service area expansion planning, and MEE recognizes the need for better planning and collaboration.

Finally, there remains a low level of knowledge and awareness about environmental issues, climate change impacts, and practical solutions to problems among many communities. Local communities must become empowered to identify and apply solutions that will work at the local island level. The community members showed enthusiasm and interest to learn about environmental issues and to learn about ways that they could contribute to environmental management at the household level. School-aged children are a vital target group to stimulate and revitalize. They act as "change agents" by taking the knowledge and skills they gain in school to their homes. They influence their siblings and parents in practicing what they learn and stimulate replication of positive behaviors.

## SNAPSHOT

# First Step Toward Community Composting

## Community composting for sustainable waste management solution



PHOTO: Maldives GCC

The GCC- sponsored Ukulhas field visit built Hinnavaru residents' confidence that a community composting program can be initiated in Hinnavaru.

*“Composting will reduce the amount of waste in the island and make the island environment cleaner.”*

— Adam Shafiu,  
Program Participant

Waste management is one of the most critical environmental problems faced by the Hinnavaru community. Hinnavaru is one of the most densely populated islands in the atoll and the issue of waste is significant. Approximately 4,800 kilograms of waste per day is produced in Hinnavaru, an island composed of slightly more than 750 households. It is estimated that about 60 percent of the waste generated in Hinnavaru is compostable waste.

To dispose of the solid waste, islanders bring it to the waste management center where it is burned in the open and without a sorting process for reuse or recycling. One problem the community has to live with is the unpleasant odor waste piles generate. Another more severe problem is that the waste piles have become breeding grounds for flies and crows. Because of these issues, the community must now combat associated environmental problems due to unsafe waste disposal practices.

In February 2015, Maldives GCC assisted a group of 11 community representatives from Hinnavaru, including members of the island utility, health center, Island Council, school, and Maldivian Red Crescent and Youth Center to visit Ukulhas Island in Alif Atoll to learn about their composting program. Ukulhas is the first island to start community composting in Maldives and has a well-organized and efficiently managed waste management center. The observations and knowledge gained from the Ukulhas field visit built participants' confidence that a community composting program can be initiated in Hinnavaru.

On the trip, the community representatives developed an action plan for Hinnavaru and returned home with enthusiasm to help initiate a composting program. Their goal was to demonstrate the composting process to the community and to assist the Island Council and utilities to initiate a similar community composting program in Hinnavaru.

Upon their return, the community representatives held a meeting with island leaders to share the experience of Ukulhas and to seek their support in initiating composting program activities. The community representatives also visited the Island Waste Management Center and made demonstration compost piles to show the public the correct method and provide evidence that composting can be carried out in Hinnavaru as well.

Though some of the participants feel that it will require time for the island community to understand the benefits of composting, they remain committed to introducing the program to Hinnavaru residents. Over the course of the next year, the participants developed and conducted a public awareness program to emphasize the benefits and uses of compost in gardening to encourage and enhance community participation and contribution to the program.

## SNAPSHOT

# Increasing Confidence In Hinnavaru's Desalinated Water

**Improved desalination networks and trained utility operators built residents' confidence in water supply in Hinnavaru**



PHOTO: Maldives GCC

**Utility operators from Lh. Hinnavaru and HA. Dhidhdhoo completing a training program on operation and management of water supply systems. (Maldives Water and Sewerage Company, June 2012)**

*“The management has confidence in me. They allow me to carry out maintenance work on my own, on my own initiative. This was not a chance I had before. I have also gained self-assurance about my own performance. Now I know what I am doing and I know how to do it properly.”*

— Ismail Ibrahim, Utility Operator

Ismail Ibrahim works on Lh. Hinnavaru island as a water service utility operator. He oversees operations and maintenance of the 30-ton desalination plant donated by USAID's Maldives Tsunami Reconstruction Program, which provides drinking water to 13 community taps and 50 household connections. Access to fresh, safe water is of particular concern during drought, as the duration of dry season has become more unpredictable and the storage of rainwater does not last the community through to the end of the drought. The community relies mostly on harvested rainwater and groundwater to supply most of the water demands. The community has a general perception that the groundwater quality is poor and that it is not safe to use even for bathing and cleaning purposes. A study conducted by Maldives GCC has confirmed that the ground water source in the island is contaminated. For this reason, the community is keen to get access to water from the desalination water distribution system.

According to Mr. Ibrahim, the operations staff had limited training and understanding of the technology and had very little ability to troubleshoot problems in the system. Previous problems also existed with the water supply since the utility operators did not know how to clean and change the membrane. Mr. Ibrahim participated in the water utility operator training program that was conducted by Male' Water and Sewerage Company with assistance from Maldives GCC. After the training course, he gained confidence in his capacity to remove the membrane and to clean it and replace it properly. Mr. Ibrahim noted: “I gained a lot of information from the training program. The lessons on desalination plant maintenance, for example, how to change the membrane, how to change seals of pump and motor is particularly useful since it helped me to gain confidence to carry out my work.”

Previous community consultations by Maldives GCC revealed that some community members were skeptical about the quality of the water delivered by the existing desalination water network, and did not like to use the desalinated water because of the perceived variations in quality. Quality has improved greatly as a result of improved operations and maintenance. Having trained operations and maintenance staff run the water utility is increasing the community's trust and confidence in the quality of the water.

## SNAPSHOT

# Community Composting Helps Island Residents Get a Grip on their Garbage

**Composting island organic waste is the first step in implementation of a new Solid Waste Management Plan that will help protect the island's groundwater from pollution**



PHOTO: Maldives GCC

**Maldives GCC conducting a training session in Hinnavaru to highlight that composting is a good and sound solution to manage organic waste. The session provided hands-on experience on how to prepare compost in a bin. (December 2012)**

*“Composting is a means to a safer waste management solution.”*

— Compost training participant

On Hinnavaru Island, residents are struggling to understand the impacts climate change is having on their communities. One area where this complex problem demands community attention: management of solid waste generated on the island. Residents on this small island with little open land realize that solid waste management impacts everything around them.

Typically in Maldives, waste is shipped by barge to the “waste island” of Thilafushi for processing. The cost of transport is onerous and most waste is burned, with negative consequences for both air and groundwater quality. It is estimated that 70 percent of the waste could be separated and composted. Hinnavaru, like all Maldivian islands, is composed primarily of coral sand with little organically rich soil available. If organic waste is separated and composted, island residents will greatly reduce the burden of shipping waste and help improve air and water quality, while generating a base for rich soil in gardens, open spaces, and other plantings on their island.

The community recently developed an island-wide Solid Waste Management Plan. With assistance from Maldives GCC, island residents are planning for sustainable management of the island's waste. In a recent workshop organized by the project, 32 residents learned how waste negatively affects their environment and the benefits of composting household organic waste, and participated in practical sessions to learn how to build a composting system in a barrel that can generate soil suitable for starting a small garden. The skills learned from this workshop will help support a community composting center that will be created in conjunction with a Community Solid Waste Processing Facility, planned for construction in 2013.

# ANNEX A. SUMMARY OF DELIVERABLES

## EXHIBIT A-I. MALDIVES GCC PRODUCTS

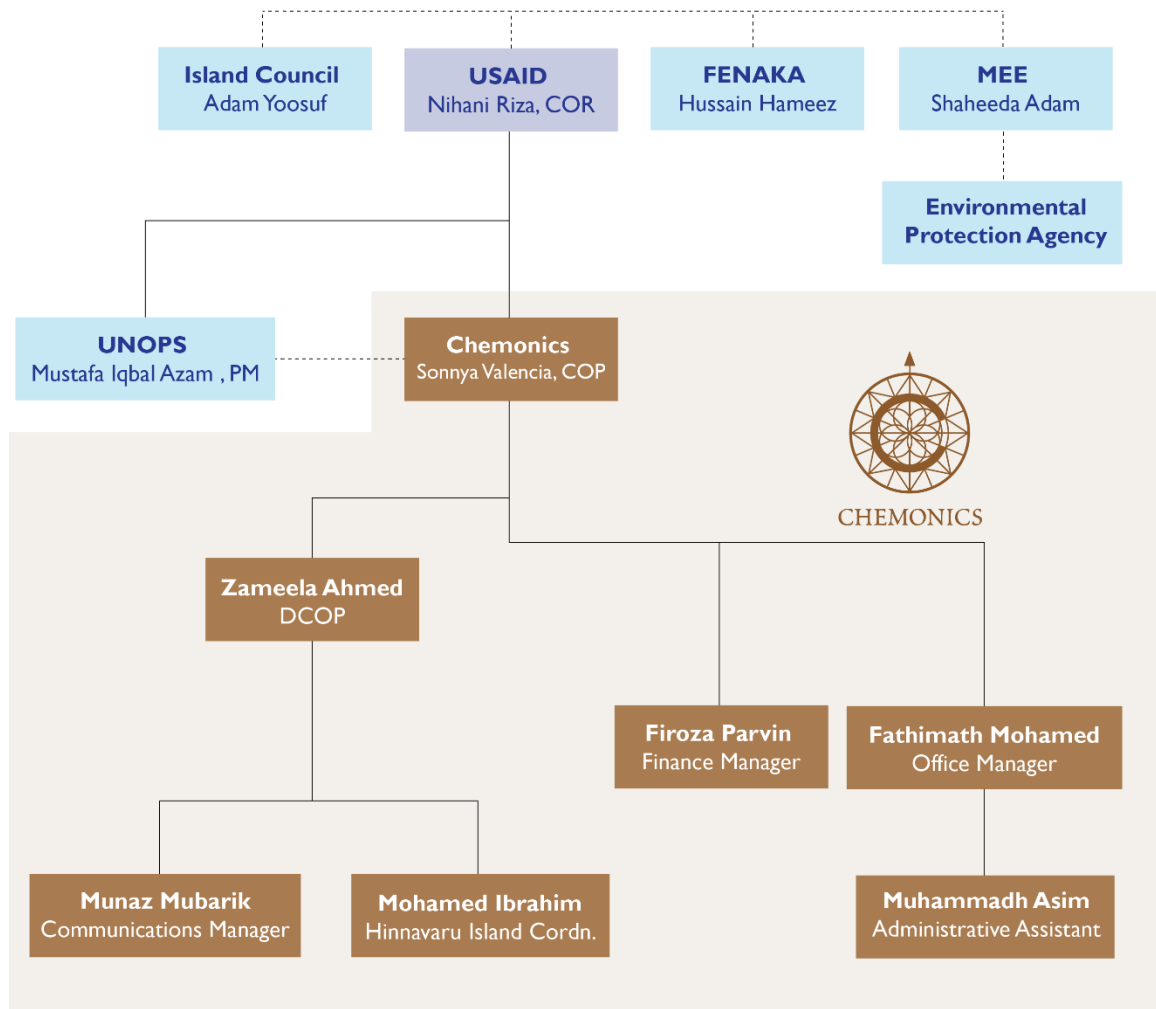
TITLE	TYPE	STATUS
<b>TECHNICAL</b>		
Climate Vulnerability Assessment – Islands of Dhidhdhoo and Hinnavaru, Maldives	Assessment	Approved, February 2012
Maldives Water and Sewer Tariffs: Current Framework and Policies	Assessment	Approved, June 2012
Financial Analysis of Water and Sewer Sector Infrastructure Alternatives – Islands of Dhidhdhoo and Hinnavaru	Assessment	Approved, June 2012
Utility Service Delivery and Institutional Capacity Assessment	Assessment	Approved, June 2012
Improving Water Security through Effective Rainwater Harvesting in Dhidhdhoo and Hinnavaru, Maldives: Balancing Local Water Use with Rainfall for Sustainable Water Resources	Assessment	Submitted, December 2012
Island Communication Strategy and Plans	Plan	Approved, August 2012
Preliminary Assessment Report	Assessment	Approved, December 2012
Assessment of SWRO Plant in Dhidhdhoo	Report	Approved, August 2012
Household Profiling Survey in Dhidhdhoo and Hinnavaru	Survey	Completed, October 2012
Survey of Public Rainwater Harvesting Systems in Dhidhdhoo and Hinnavaru	Survey	Completed, October 2012
Survey of Household Septic Tanks and Connections to Central Sewerage system in Dhidhdhoo and Hinnavaru	Survey	Completed, October 2012
Presentation to Maldives GCC Project Steering Committee (PowerPoint)	Presentation	Completed, June 27, 2012
Presentation at GIZ Workshop (PowerPoint)	Presentation	Completed, July 2, 2012
Presentation of Preliminary Assessment Report to Ministry (PowerPoint)	Presentation	Completed, December 17, 2012
Maldives Water and Sewer Tariff-Setting Policy and Procedures	Report	Approved, May 2013
Assessment of Management Systems - FENAKA	Report	Approved, February 2015
Assessment of New Billing System - FENAKA	Report	Approved, February 2015
Value Engineering	Report	Approved, July 9, 2015

TITLE	TYPE	STATUS
Environmental Mitigation and Monitoring Plan	Report	Approved, October 13, 2015
Emergency Plan for FENAKA Utility in Hinnavaru	Report	Approved, October 13, 2015
Recommendations for Supply Chain Management	Report	Submitted to stakeholders on March 18, 2016
Performance Evaluation and Monitoring System	Tool	Submitted to stakeholders on February 10, 2016
Water Management Plan for Hinnavaru	Tool	Submitted to stakeholders on May 21, 2016
Public Awareness Campaign Materials / Tools*	Tools	Approved, September 2015 - March 2016
<b>MANAGEMENT</b>		
Branding Implementation Plan and Marking Plan	Plan	Approved, April 2012
Performance Management Plan	Plan	Approved, March 2012
Performance Management Plan (Year 2 Revision)	Plan	Approved, December 2012
Performance Management Plan (Year 2 Update)	Report	Approved, December 2012
Grants Management Manual	Plan	Approved, February 2012
Year 1 Work Plan	Work Plan	Approved, March 2012
Year 2 Work Plan	Work Plan	Approved, January 2013
Memorandum of Understanding Between Maldives Environmental Management Project and Maldives GCC	Memorandum of Understanding	Final, July 9, 2012
Quarterly Performance Report for October – December 2011	Report	Approved, March 2012
Quarterly Performance Report for January – March 2012	Report	Approved, June 2012
Quarterly Performance Report for April – June 2012	Report	Approved, August 2012
Quarterly Performance Report for July – September 2012	Report	Approved, November 2012
Quarterly Performance Report for October – December 2012	Report	Approved, March 2013
Quarterly Performance Report for January – March 2013	Report	Approved, May 2013
Quarterly Performance Report for April - June 2013	Report	Approved, July 2013

<b>TITLE</b>	<b>TYPE</b>	<b>STATUS</b>
Quarterly Performance Report for July – September 2013	Report	Approved, October 2013
Quarterly Performance Report for October – December 2013	Report	Approved, January 2014
Annual Work Plan, Years 3 & 4	Report	Approved, August 2014
Quarterly Performance Report for January – March 2014	Report	Approved, April 2014
Quarterly Performance Report for April – June 2014	Report	Approved, November 2014
Quarterly Performance Report for July – September 2014	Report	Approved, November 2014
Quarterly Performance Report for October – December 2014	Report	Approved, March 2015
Quarterly Performance Report for January – March 2015	Report	Approved, May 8, 2015
Quarterly Performance Report for April – June 2015	Report	Approved, August 6, 2015
Annual Work Plan – Year 5	Report	Approved, November 19, 2015
Quarterly Performance Report for July – September 2015	Report	Approved, November 2, 2015
Quarterly Performance Report for October – December 2015	Report	Approved on March 27, 2016
Quarterly Performance Report for January – March 2016	Report	Approved on May 26, 2016

# ANNEX B. ORGANIZATIONAL CHART

## Organization Chart | USAID Maldives GCC Project



**MEE** - Ministry of Environment and Energy  
**Island Council** - Hinnavaru Island Council  
**USAID** - United States Agency for International Development  
**UNOPS** - United Nations Office for Project Services  
**FENAKA** - Maldives National Utility for Water (Fen), Sewage (Narudhama), and Electricity (Karantu)  
**COP** - Chief of Party  
**DCOP** - Deputy Chief of Party  
**PM** - Project Manager

Chemonics International
  Project Stakeholders



# ANNEX C. KEY PUBLIC EVENTS

## EXHIBIT C-I. KEY PUBLIC EVENTS – 2012-2013

ACTIVITY	MALE ATTENDEES	FEMALE ATTENDEES	TOTAL ATTENDEES	DURATION (IN HOURS)	MALE HOURS	FEMALE HOURS
<b>Hinnavaru</b>						
<b>October-December 2012</b>						
Solid waste management	5	16	21	8	40	128
<b>January-March 2013</b>						
Solid waste management for school	29	21	50	8	232	168
Champion Island Committee	11	8	19	12	132	96
Community members who carried out composting after training program	2	1	3	0	0	0
Water Day – March 2013	304	93	397			
<b>Total</b>	<b>351</b>	<b>139</b>	<b>490</b>	<b>28</b>	<b>404</b>	<b>392</b>
<b>Dhidhdhoo</b>						
<b>October-December 2012</b>						
Solid waste management	18	12	30	8	144	96
<b>January-March 2013</b>						
Solid waste management for school	16	14	30	8	128	112
Champion Island Committee	2	10	12	12	24	120
Community members who carried out composting after training program	0	5	5	0	0	0
Water Day – March 2013	n/a	n/a	250			
<b>Total</b>	<b>36</b>	<b>41</b>	<b>327</b>	<b>28</b>	<b>296</b>	<b>328</b>
<b>Grand Total</b>	<b>387</b>	<b>180</b>	<b>817</b>	<b>56</b>	<b>700</b>	<b>720</b>

**EXHIBIT C-2. KEY PUBLIC EVENTS – 2014-2016**

<b>ACTIVITY</b>	<b>MALE ATTENDEES</b>	<b>FEMALE ATTENDEES</b>	<b>TOTAL ATTENDEES</b>
<b>Direct Interaction</b>			
Field Visit to Soneva – Environmental Best Practices	14	12	26
Movie Night – Coral Reefs	7	30	37
Videography Workshop for School Students and Youth	3	6	9
Photography Workshop for School Students and Youth	6	6	12
EMMP Training	9	1	10
Performance Evaluation and Monitoring System Workshop I	29	9	38
Performance Evaluation and Monitoring System Workshop II	6	1	7
Presentation and Distribution of Awareness Material	21	88	109
Certification Courses	19	1	20
Water Management Planning Workshop	11	1	12
Training Presenters and Facilitators – Public Awareness Campaign Exhibition	10	10	20
Presentation and Distribution of Awareness Material	28	32	60
<b>Total</b>	<b>163</b>	<b>197</b>	<b>360</b>
<b>Indirect Interaction</b>			
Composting Plan Implementation Session I – 6	26	4	30
Public Consultation – Environmental Impact Assessment	7	8	15
Compost Training Program for School Students	5	9	14
SMS Campaign	20	322	342
<b>Total</b>	<b>58</b>	<b>343</b>	<b>401</b>

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