

APPLIED RESEARCH SUMMARY

MIDDLE EAST

BEST PRACTICES FOR DOMESTIC WATER CONSERVATION

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PURPOSE

In support of USAID's strategic objective to conserve sustainable living resources, the objectives of the research are:

- ▶ To identify a list of Best Practices pertaining to domestic water conservation in seven sites: Jordan, Israel, West Bank/Gaza, Egypt, Oman, Tunisia and Morocco.
- ▶ To help design a regional communication strategy to increase public awareness of select regional Best Practices around efficient use of water.

BACKGROUND

In support of the Middle East Peace Process (MEPP), the State Department has requested USAID Assistance in the development of a Regional Public Awareness and Education Program around water conservation practices in the Middle East. This initiative falls under the aegis of the Multilateral Working Group on Water Resources (MWGWR), one of the five different Working Groups in that region.

GreenCOM has provided the assistance requested from USAID and has conducted research:

- ▶ To identify best domestic water conservation practices in antiquity in North Africa and the Middle East;
- ▶ To identify best current domestic water conservation practices in all sites but Tunisia; and
- ▶ To determine the awareness the public has about the Middle East Peace Process (MEPP) and the MWGWR in five of the seven sites (Israel, Jordan, the West Bank/Gaza and Tunisia); and
- ▶ To provide a baseline assessment against which to assess the impact of a regional campaign.

Research findings will be presented at a technical meeting on water conservation and public awareness that will bring together experts in environmental education and communication and

representatives from the United States, Israel, Jordan, the West Bank, Oman, Tunisia, Morocco, Egypt and Non-Regional Parties. An expected product of this meeting is the development of a regional strategy for public awareness and communication highlighting Best Practices around water conservation.

“Best Practices” are defined as:

Existing programs or initiatives promoting water efficiency at the household level that: have a track record of success; are being implemented by public or private organizations; and that local authorities at each site agree they would like to share with other countries in the Middle East region to help foster regional cooperation around water issues.

The idea is to focus on the positive by building on Best Practices (Programs) already established in each site and promoting them regionally across the several sites. The communication strategy will promote water efficiency while recognizing that water scarcity is an age-old problem.

RESEARCH METHOD

- ▶ In the case of Northern Africa, best practices in antiquity covered primarily urban uses roughly for the period between 1C-11C AD. For that part of the world, the review covered two to three sites for both Tunisia and Morocco. The sites at each country were selected based on several factors: historic and cultural importance to the country; differences in water systems based on civilization, water availability and climate; and visual remains. Site selection at each country was based on interviews with university and museum experts and site visits.
- ▶ Best practices in antiquity for the Middle East included water practices in Egypt, Israel, West Bank/Gaza, Jordan and Oman. The focus of that research was on water systems integrated into wider systems related to urban planning and to the agricultural/economic base for the populations living in those areas. The review for this part of the world included both early and late antiquity. Early antiquity includes long prehistoric periods. Late antiquity extends to the coming of Islam going from the Islamic caliphates through the Mamluks which ended in 1516 AD.
- ▶ Qualitative data was gathered on Best Practices around water efficiency at the household level implemented over the last 20 years. Institutions implementing household water conservation programs were identified at each site, documents pertaining to those programs were reviewed, and program descriptions and evaluation findings of the impact of those programs were summarized. In-depth interviews with program implementers also took place.
- ▶ Six questions were added to omnibus surveys regularly carried out in four sites: Jordan, Israel, West Bank/Gaza and Tunisia. Sample sizes range from 1000 to 2092 and

constitute probability samples for each one of those sites. Generally, in all sites, half of the sample is male and the other half is female.

VALUE

- ▶ Identifies Best Practices around water conservation in each site to share with the Middle East region as a whole.

STATUS

- ▶ Best practices reports both for antiquity and modern times completed.
- ▶ Baseline data collected in four sites.

KEY FINDINGS

Best Practices: Antiquity

The identified best practices were grouped by the Middle East and Northern Africa and included the following:

Middle East

Bath complexes with water supplied by wells, cisterns and reservoirs

Public fountains (nymphaeums)

Wells constructed below the water table

Shadufs (pole with counterweights at one end to lift water from wells)

Canal of the Pharaohs linking Nile to Red Sea

Terra cota pipes placed above ground to transport potable and waste water

Dams

High and low aqueducts

Bed-rock cut channels to reach water sources

Plaster-lined sewers flushed by sea action

Collection of rain water run-offs in streets through street drainage ditches permitting water to be collected in underground cisterns

Guiding water from Nile River inundations to earthen basins acting as irrigation canals and cisterns

Local management of water regulation for irrigation purposes

Wadi system

Falaj system

Northern Africa (Tunisia and Morocco)

Aqueducts and cisterns
Underground or covered cisterns and aqueducts
Bottle-necked wells, opening to a large storage area
Reuse of private fountain water
Diversion of contaminated water until contaminant was flushed out
Public fountains and baths (*hammam*)
Collection of rainwater from rooftops
Use of underground pipes to transport water from cisterns and separate pipes to transport water out of the city
Water delivery men (*saqqa*); delivered water to residents for a fee
Water carriers (*guerrab*)

Best Practices: Modern Times

Best domestic water practices were identified for all sites except Tunisia, including the following prominent examples:

Israel:

Water conservation programs related to testing the impact of water saving instruments in domestic use (i.e., flow controllers, apartment pressure regulating device, leak prevention devices)
Use of electronic operated automatic taps
Using various means for water-leak prevention in the domestic water supply system
Water saving devices for the home gardening sector (i.e., drip irrigation, controlled irrigation)
Home-scale compact wastewater treatment facilities for the recycling of domestic wastewater for home gardening

West Bank:

Water and sanitation services project in Gaza Strip
Rehabilitation of water distribution networks in West Bank
Rainwater harvesting in West Bank
Development of springs in West Bank
Municipal infrastructure development project for West Bank and Gaza Strip
Service improvement for water and wastewater in 16 municipalities of Gaza Strip
Public awareness campaign for water and wastewater in West Bank and Gaza Strip
Water tariff study in Palestinian territories

Jordan:

Government maintenance of existing water supply networks
Rationing of water by municipalities in the summer time
Rainfall harvesting from household roofs

Development of new toilets

The environmental education program at RSCN supported by GreenCOM
Awareness Project in Water

Oman:

Participatory efforts with residents prior to installing water and sanitation systems

Municipal planning initiatives that impact consumption and re-use of water

NGO and Government educational efforts in the schools

Programs with households to change behavior

Technological improvements (i.e., improved water meters)

National policies that impact domestic water consumption

Treatment and recycling of gray water

National community water conservation program

Efficient agricultural/irrigation practices (i.e., irrigating at night)

National desalinization program

National hotline (attends to emergencies like water leakage from pipe burst)

Egypt:

Improving the efficiency of water carrying systems and reducing losses

Raising efficiency and water saving practices on the user level (i.e., encouragement of cropping patterns to provide high return of water, promotion of water saving devices at the household and industry level)

Raising public awareness of the importance of water conservation

Rainfall runoff water harvesting (practice from antiquity)

Rehabilitation program by the Water Authority of Jordan aimed to reduce the high percentage of water currently being lost through leakage

Municipal wastewater reuse for irrigation purposes (currently 70% of wastewater collected is treated and used for irrigation)

Water Conservation Education Project developed by the Royal Society for the Conservation of Nature

Awareness Project in Water, funded by USAID and the Government of Jordan to improve the quality and quantity of water in Jordan

Morocco:

Awareness campaigns on topics such as water saving and repairing household water leaks

Water conservation advocacy programs for young people

Government education efforts on water conservation

Benslimane city used water treatment plant

Two plants for seawater desalination supplying water to the population

Heightening of Lalla Takerkoust Large Dam on N'fis river

Stocking surface water during the winter season using an artificial recharge method

Baseline Data

- Jordanians are generally more aware of the MEPP and of the Multilateral Water Working Group (MWWG) than any of the other nationalities interviewed. Tunisians, on the other hand, are least aware of the existence of MWWG. Palestinian women are generally better informed than their male counterparts.
- Activities of the MWWG reported unprompted by study participants at all sites include: water resources in general, water distribution issues, and Israel-Jordan water rights. Israel-Jordan water rights is the topic most frequently mentioned by both Jordanians and Israelis. The most commonly mentioned topic among Tunisians was water distribution, however.
- The most frequently reported source of information for MEPP and MWWG activities is television. The second most frequently source of information mentioned was print among Jordanians and Tunisians, and both print and radio among Israeli and Palestinians. Electronic media (e.g., e-mail, internet) was mentioned as a source of information in all sites by a minority of respondents. However, electronic media was more frequently mentioned among Palestinians than any of the other nationalities considered.

PROGRAM IMPLICATIONS

Program implications will be discussed in the meeting bringing together all parties plus the donor community.