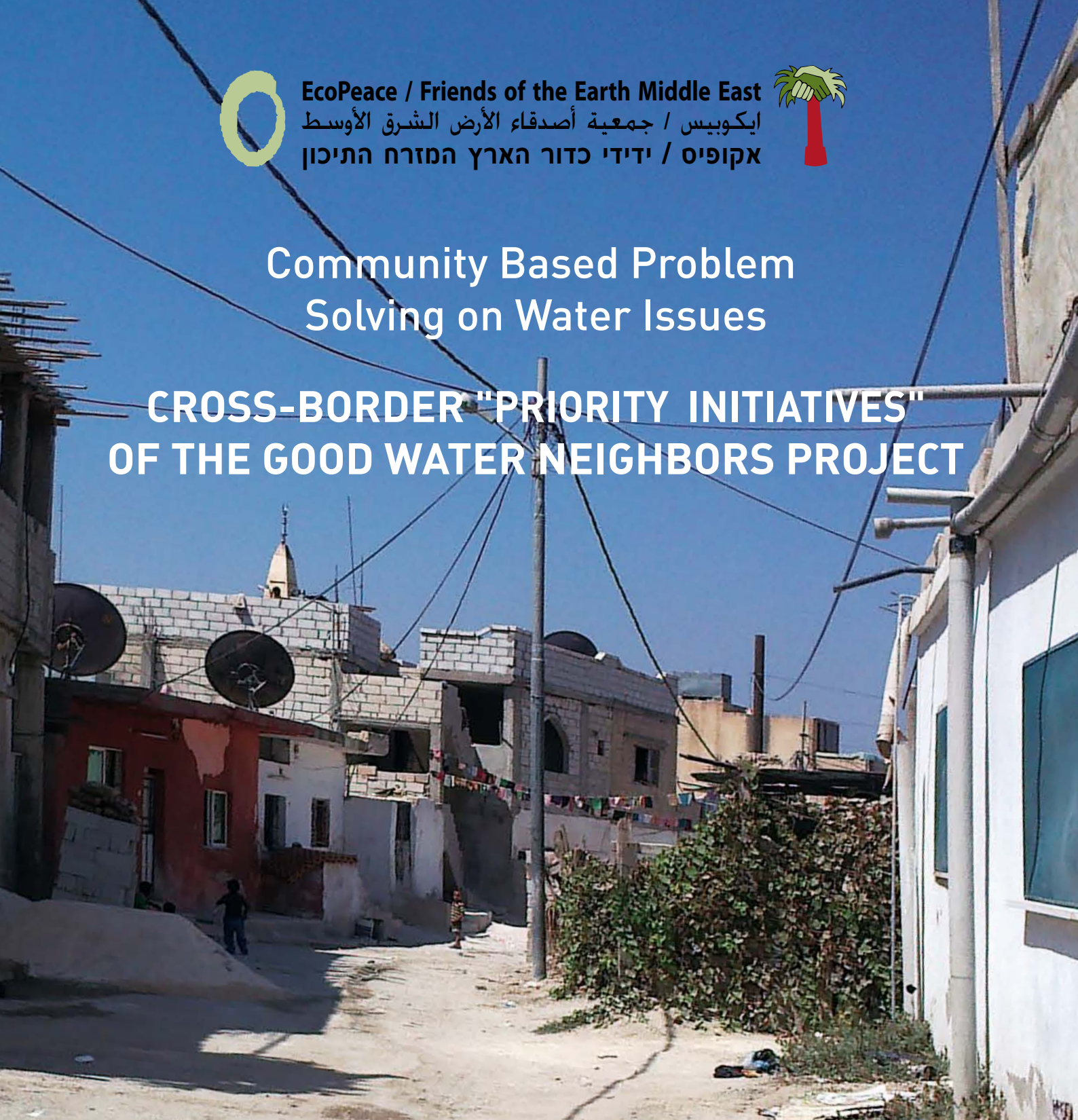
EcoPeace / Friends of the Earth Middle East
ايكوبيس / جمعية أصدقاء الأرض الشرق الأوسط
אקופיס / ידידי כדור הארץ המזרח התיכון

Community Based Problem Solving on Water Issues

CROSS-BORDER "PRIORITY INITIATIVES" OF THE GOOD WATER NEIGHBORS PROJECT



September, 2012

EcoPeace / Friends of the Earth Middle East
Amman, Bethlehem and Tel Aviv

Supported by:

USAID FROM THE AMERICAN PEOPLE
التعاون الألماني
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
SWEDEN

Map 1: FoEME's Good Water Neighbor communities share a common water resource (stream, spring or aquifer) with a community across a political boundary

EcoPeace / Friends of the Earth Middle East
ايكوبيس / جمعية أصدقاء الأرض الشرق الأوسط
אקופיס / ידידי כדור הארץ המזרח התיכון

Community Based Problem Solving on Water Issues

CROSS-BORDER "PRIORITY INITIATIVES" OF THE GOOD WATER NEIGHBORS PROJECT

September, 2012

FoEME GWN Priority Initiatives Team:

Michal Sagive, Israeli GWN Project Coordinator
Mohammed Obidallah, Palestinian GWN Project Coordinator
Hana Al-Asad'd, Jordanian GWN Project Coordinator
Faris Shalan, Jordanian GWN Youth Project Coordinator
Helaine Alon, Israeli GWN Project Assistant
Manal Al Khateeb, Palestinian GWN Project Assistant
Munqeth Mehyar, Jordanian Director
Nader Khateeb, Palestinian Director
Gidon Bromberg, Israeli Director

EcoPeace/ Friends of the Earth Middle East (FoEME)
is a unique organization at the forefront of the environmental peacemaking movement. As a tri-lateral organization that brings together Jordanian, Palestinian, and Israeli environmentalists, our primary objective is the promotion of cooperative efforts to protect our shared environmental heritage. In so doing, we seek to advance both sustainable regional development and the creation of necessary conditions for lasting peace in our region. FoEME has offices in Amman, Bethlehem, and Tel-Aviv. FoEME is a member of Friends of the Earth International, the largest grassroots environmental organization in the world.

Note of Gratitude
This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID), the EU Partnership for Peace program, the Swedish International Development Agency (SIDA) and the German Federal Ministry for Economic Cooperation and Development (BMZ). The contents are the responsibility of EcoPeace / Friends of the Earth Middle East and do not necessarily reflect the views of our above mentioned funders.

For more information on FoEME or to download any of our publications please visit: **www.foeme.org**

Cover Photo: FoEME
Inside back cover Photo: Itamar Grinberg
Graphic Design: Studio Hadar Selekter

TABLE OF CONTENTS

LIST OF PRIORITY PROJECTS BY CATEGORIES

Sanitation Solutions

Industrial Pollution Remediation

Stream Rehabilitation / Cross Border Parks / Open Spaces

Water and Other Projects

PRIORITY INITIATIVES OF THE "GOOD WATER NEIGHBORS" PROGRAM

A Decade of Problem Solving on Water Issues

In 2001, EcoPeace/Friends of the Earth Middle East (FoEME) launched the "Good Water Neighbors" (GWN) program to raise awareness of the water problems shared by Palestinians, Jordanians, and Israelis. The program identifies cross-border communities whose mutual dependence on shared water resources is utilized as a basis for cooperation on sustainable water management. The project has created real improvements in the water sectors of participating communities. A decade ago, the project struggled to identify 11 communities who would agree to work together. Today, it boasts 28 communities with further expansion requested but limited by financial constraints. Communities are grouped not only by a shared stream or spring, but also according to larger shared watersheds and aquifers, with 14 communities sharing the Jordan River / Dead Sea Basin, and 14 communities sharing the Mountain and Coastal Aquifer and Coastal Streams Watersheds.
(See Tables 1 and 2)

FoEME works with municipal staff and residents in each GWN community to identify and address sources of pollution, advocate for increased water supply, and to find ways to answer the needs of our cross-border communities through projects that protect the shared environmental heritage. The GWN project's constituency of community residents, including adult and youth activists, mayors, and municipal staff, exerts enormous 'bottom-up' pressure on national decision makers in order to generate the political will needed to advance solutions at the national and regional level.

The program's successes are testament to its sound rationale. In the last 5 years alone, FoEME's advocacy and partnership development helped leverage an estimated US$400 million of investments in GWN communities in Palestine, Jordan and Israel. An estimated US$160 million of this investment is currently building sewage treatment plants in the Jordan Valley GWN communities. This year, sewage treatment plants will be completed in the Jordan Valley Regional Council through Israeli Government loans, in North Shouneh in Jordan through USAID investment, and ground will be broken for a sewage treatment plant being built by JICA in Jericho, Palestine. Al Auja village, just north of Jericho, had its leaking water network replaced thanks to USAID funds, and new water reservoirs were built while a permit for a new water well was granted by the Joint Water Committee.

Investments totaling some US$240 million are helping our Mountain and Coastal Aquifer and Coastal Stream GWN communities. For the first time, Baka Sharqiya has a water network connected to every home, thanks to UNDP support in Palestine. The Nablus stream basin, through German KFW investment, will soon be collecting and treating the sewage of Nablus city and surrounding Palestinian communities down to Tulkarem. Finally, a comprehensive sewage solution is advancing for the Hebron Stream through World Bank, European Union and French Development funding.

The impacts of these investments, however, go beyond the direct benefits for the communities involved. FoEME's ability to help leverage these investments provides the evidence to convince mayors and municipalities that cooperation with the other side brings positive results. Thus, the experience gained from early phases of the GWN program led FoEME to conclude that investing more resources and project time to leverage funds would result in increased cooperation and positive relations between the cross-border GWN communities as well as concrete improvements for the region's water infrastructure and environment. This publication therefore describes the efforts of the GWN team to identify a new set of environmental challenges and provide feasible solutions for Priority Initiatives.

Advancing Priority Initiatives:

Consultations

Over the last ten months, FoEME staff reached out to stakeholders, decision makers and funding bodies to identify the priority projects needing advancement in each community. In the first stage of this process, FoEME brought together a core group of veteran adult activists in each community with other stakeholders to identify Priority Initiatives that respond to the most immediate water and environmental challenges facing the community. Special consideration was given to issues relating to cross-border water and environmental concerns and Initiatives that are likely to reduce sources of tension between neighboring communities and which promote efficient management of shared water resources.

The format of the consultations differed for each community but included open community forums, private discussions with decision makers, consultations with researchers, and meetings with groups of local environmental activists. All consultations aimed to identify the most immediate issues of concern for the local community and achievable, practical steps that can be taken to advance the kinds of initiatives that respond to these areas of concern. Finally, the Priority Initiatives were considered with respect to national priorities in Palestine, Israel, and Jordan.

Developing Project Briefs

With the above data gathered, FoEME staff investigated what actions had already been planned, conducted or launched and sought to identify practical next steps, resulting in the Project Briefs for each Priority Initiative as presented in this publication. Project Briefs outline the current state of affairs with respect to threats and opportunities to the environment and water supply, the objectives that each proposed response aims to achieve, and the steps required to advance each Priority Initiative. Each Project Brief is designed as a roadmap to guide the efforts of stakeholders through project activities and as a tool for informing government decision makers and international donor organizations about the Priority Initiatives.

Gaining Support for Solutions

Site visits have already taken place in several communities to highlight the need for solutions, and have included participation of the media, decision makers, international donor institutions and active residents. FoEME's Neighbors Path Trails, which were developed in earlier phases of the GWN program, are another tool to highlight the importance of the Priority Initiatives to visitors and residents who use the trails. Additional site visits between neighboring cross-border communities were held to emphasize the interrelated nature of water issues that the Priority Initiatives seek to address.

Decision makers on the national and regional level have been addressed by FoEME staff in several meetings, and many more advocacy meetings are planned for the coming year. Formal presentations about one or more of the Priority Initiatives have been delivered by GWN staff before Government Ministers, Parliamentary Committees and senior government staff. Additional high-level presentations are expected to take place. The Project Briefs will be publically released at FoEME's annual GWN conference, another important forum which brings together FoEME's regional network of stakeholders with decision makers.

Table 1: Partnering communities by country:

Israeli communities	Palestinian communities	Jordanian communities
Jordan Valley Regional Council		*Muaz Bin Jabal* *Himma*
Beit She'an	*Fasayel*	*Tabket Fahel* *Sharhabil bin Hassneh*
Gilboa Regional Council	*Jenin / Jalameh*	
Baka Gharbia	*Baka Sharkia*	
Emek Hefer Regional Council	*Tulkarem*	
Mateh Yehuda Regional Council	*West Bethlehem Villages*	
	Auja	*Dier Allah* *South Shouneh*
Tamar Regional Council	*Jericho*	*Safi* *Fifa*
Eshkol Regional Council	*Abasan (Gaza)* *Yatta*	

Table 2: Community cooperation by geographic / water basin orientation:

Jordan River / Dead Sea	Mt. Aquifer	Coastal Aquifer
Jordan Valley Regional Council (Is)	*Baka Gharbia (Is)*	*Eshkol Regional Council (Is)*
Beit She'an (Is)	*Emek Hefer Regional Council (Is)*	*Abassan (P)*
Tamar Regional Council (Is)	*Mateh Yehuda (Is)*	
Fasayel (P)	*Baka Sharkiya (P)*	
Auja (P)	*Tulkarem (P)*	
Jericho (P)	*West Bethlehem Villages (P)*	
Muaz bin Jabal (J)	*Yatta (P)*	
Himma (J)	*Jenin / Jalameh (P)*	
Tabket Fahel (J)		
Sharhabil bin Hassneh (J)		
Dier Allah (J)		
South Shouneh (J)		
Safi (J)		
Fifa (J)		

Abbreviations

APC – Arab Potash Company
BGU – Ben Gurion University
DSW – Dead Sea Works
FoEME – EcoPeace/Friends of the Earth Middle East
GIS – Geographic Information System
GWN – Good Water Neighbors Program
ISO – International Organization for Standardization
JICA – Japan International Cooperation Agency
JVA – Jordan Valley Authority
KFW - Kreditanstalt für Wiederaufbau/German Development Bank
LJR – Lower Jordan River
MCM – Million Cubic Meters
MoU – Memorandum of Understanding
MWI – Ministry of Water and Irrigation (Jordan)
NGO – Non Governmental Organization
PWA – Palestinian Water Authority
RC – Regional Council
USAID – U.S. Agency for International Development
UNESCO – United Nations Educational, Scientific, and Cultural Organization
UNDP – United Nations Development Programme
WAJ – Water Authority of Jordan
WWTP – WasteWater Treatment Plant

1 CROSS BORDER PRESERVATION OF TERRACED LANDSCAPES

Partnering Communities:

Mate Yehuda Regional Council – Israel: Located in the Judean / Jerusalem Hills along the Mountain Aquifer and home to over 40,000 residents living in 57 communities.

West Bethlehem Villages – Palestine: Situated west of Bethlehem, the five villages of Battir, Husan, Nahhalin, Wadi Fuqin, and Wallajeh have a total population of approximately 24,000.

Shared Waters:

The Judean / Jerusalem Hills are home to an exceptional landscape of ancient agricultural terraces that developed around available water resources in the form of natural springs. Mate Yehuda and the West Bethlehem villages both share the Mountain Aquifer, a principle water source for both Israelis and Palestinians. The Sorek / Al Sarar Stream starts in the Ramallah area and then flows through Israel; it has the largest watershed on the western side of the Hills. The ephemeral Refaim Stream / Wadi Es-Sikke emerges from the southern side of Jerusalem and briefly marks the 'Green Line' before it flows into the Sorek / Al Sarar Stream on its way to the Mediterranean Sea. Springs located in the hillsides have provided the foundation for traditional agricultural cultivation of olive groves, vineyards, fruit trees, and vegetables along the hillsides for generations. Terraces further increased the fertility of the land by capturing water and nourishing crops, making these hills one of the most ancient examples in the world of agricultural structures. Therefore, the terraced landscape retains remarkable environmental heritage, illustrating well the United Nations Educational, Scientific and Cultural Organization's (UNESCO) description of a cultural landscape as one which has "cultural properties that represent the combined works of nature and of man."

Figure 1: Wadi Refaim/ Wadi Es-Sikke, Photo: Giovanni Fontana

The hillsides are a direct outcome of both social and economic interactions of populations with the local hydro-geological system for over 3,000 years. However, at present, the integrity of this cultural landscape heritage, on both sides of the border, is severely at risk.

Problem Statement:

A number of factors, both internal and external, threaten the preservation of this terraced landscape on the Israeli and Palestinian sides of the 'Green Line'. Within the Israeli area, the pressure of urban development and the need for a growing transportation infrastructure conflict with the conservation of the terraced landscape. Since 1948, there has been an abandonment of the traditional terraced agricultural land use. Many springs are now dried up or polluted by runoff from agriculture, sewage, and gas infrastructure, as noted by a 2011 survey of the Judean Hills springs prepared by the Israel Nature and Parks Authority, the Israel Water Authority, and Hydrological Services.

Within the Palestinian area, illegal dumping of waste, urban development, the building of Israeli settlements, and their subsequent bypass roads are in direct competition with conservation of this landscape. A push towards modernizing the agricultural infrastructure in Palestine, away from traditional methods, leads to further degradation of this high valued landscape.

Figure 2: Building waste among the terraces, Photo: FoEME

Priority Initiative:

Preparation of an integrated cross-border Master Plan for the protection and enhancement of springs and terraced landscape that promotes community cooperation around ecotourism and sustainable agricultural development.

Objectives:

- Conserve terraces and springs by bringing national and international attention to the cultural and environmental significance of this landscape.
- Preserve knowledge of terraced agriculture and spring management by maintaining the agricultural system as a living, working ecosystem that is part of the surrounding environment.
- Empower and build capacity of local communities to act as advocates for their cultural landscape.
- Create income opportunities for Palestinian and Israeli neighboring communities based on the unique landscape values of the area, thereby creating shared incentive to safeguard it and opportunities for cooperation.

Background Issues Relevant to the Priority:

This Priority Initiative builds on past and continuing efforts of the Battir Village Council together with the UNESCO office in Ramallah to protect the landscape, a project that was awarded the 2011 Melina Mercouri International Prize for the Safeguarding and Management of Cultural Landscapes. Extensive mapping of the terraces has been conducted, restoration activities launched that include tree planting, extensive stone masonry work, and the cleanup of springs, eco-tours developed in Wadi Mahrur, and the creation of an Eco-Museum and guesthouse in the village. A consortium of UN agencies has joined UNESCO to propose an integrated program that would extend the efforts and achievements made in Battir to other west Bethlehem villages. In 2012 a proposed nomination document for UNESCO to recognize the area as a World Heritage site under danger was submitted.

On the Israeli side, several studies carried out by the Society for the Protection of Nature in Israel (SPNI) and the Nature and Parks Authority identified the area as housing outstanding cultural landscape and recognized the need for preservation. In 2010, Nekudat Chen, a program of the Yad Hanadiv Foundation, commissioned the preparation of a planning file to explore the possibility for Israel to propose that the area be listed as a UNESCO World Heritage Cultural Landscape site. The work emphasized the continuity of the landscape without recognition of political borders between the Israeli and Palestinian sides.

Since 2001, FoEME has an extensive history of involvement in the area, working with local residents, municipal representatives and youth. As an ecotourism project, FoEME led the creation of the Neighbors Path between Wadi Fukin and Tzur Hadassah in 2005. That path was extended to Battir in 2011. Some 3,000 people have navigated the trail to date, learning about the communities, the unique cultural landscape and the larger geopolitical complexities of the area. FoEME staff and local community activists on both sides were integral in preventing the construction of the Separation Barrier planned in Wadi Fukin. They used the hydrological framework to highlight the multifaceted importance of the landscape. FoEME has partnered with the Service Council on the Palestinian side to leverage investments in water supply and to study sanitation solutions for the 5 Palestinian villages concerned. With this strong base, FoEME seeks to expand its work in both com

Project Characteristics:

- Partner with the existing efforts of the local communities, the UN and others to create a comprehensive master plan with a transboundary vision of landscape conservation, green economies and cross-border ecotourism. The master plan should build on the work already undertaken by all parties. The plan will be based on public participation meetings to identify local community needs and constraints and include guidelines for conservation/development.
- Highlight the terraced landscape and springs as an anchor for community identity, pride and development. Support of continued traditional agriculture through training programs on organic farming, ecotourism and marketing.
- Develop cross-border farmers' markets and local value added agricultural products.
- Increase awareness of the cultural landscape's high value through training of youth and community members as "Terrace Trustees" and engage them in restoration and conservation workshops.
- Support green income generation by engaging residents in cross-border training around eco-tourism, agro-tourism, organic farming and marketing opportunities.
- Seek to prevent threats to the integrity of the landscape by gaining publicity through media outreach, community organizing, and information tours.
- Promote an information exchange between Mate Yehuda and the Palestinian villages to share knowledge and village experience in terrace preservation.

Cross-Border Impact:

The Judean / Jerusalem Hills spring and terraced landscape is a unique ancient eco-cultural system encompassing water sources, flora and fauna and archeological sites. The importance of the landscape as a whole is greater than the sum of its parts. Only when all pieces are preserved will the terraced landscape be truly conserved for the benefit of future generations.

Estimated budget needed: USD $2 Million

Figure 3: The village of Battir and the Refaim / Es-Sikke Valley, Photo: FoEME

2 ADVANCING SANITATION SOLUTIONS IN WEST BETHLEHEM VILLAGES

Partnering Communities:

West Bethlehem villages - Palestine: Situated west of Bethlehem, the five villages of Battir, Husan, Nahhalin, Wadi Fukin, and Wallajeh have a population of approximately 24,000 residents.

Mateh Yehuda Regional Council – Israel: Located in the Judean / Jerusalem Hills the regional council is home to over 40,000 residents living in 57 communities.

Shared Waters:

Half of the Palestinian population in the West Bank lives in villages. These villages are located above the Mountain Aquifer with no safe sanitation solutions in place. The five villages of Battir, Husan, Nahhalin, Wadi Fukin, and Walajeh (Figure 1) are no exception with regard to wastewater sanitation systems, and they face severe environmental and human health issues due to the pollution of springs by untreated wastewater. Spring water is therefore polluted by village sewage which threatens not only the shared water source of the Mountain Aquifer but also a major aspect of the villages' livelihood – agriculture.

Problem Statement:

There has been no investment in sewage treatment infrastructure in these villages due to their poor socio-economic conditions, a Palestinian national priority to focus first on water supply and sanitation solutions for large population centers and a reluctance by donor states to invest in areas C (where sanitation infrastructure would be located for these villages) due to the difficulties in getting permits from the Israeli Civil Administration. Currently, every home has a cesspit with concrete walls to the side but open to the ground allowing sewage to percolate into the groundwater and nearby springs. Investment is urgently needed for a sustainable sewage solution.

Priority Initiative:

Attract funds to implement a Palestinian Water Authority / Joint Service Council for a comprehensive sewage solution for the 5 villages, based on a study funded by the World Bank.

Objectives:

- Continue to facilitate water supply investment and completion of the sanitation study.
- Attract the funding required to implement the results of the sanitation solutions study currently being undertaken.
- Exemplify a positive and successful advancement of water infrastructure solutions in areas B and C of the West Bank.

Background Issues Relevant to the Priority:

The project concept originates from an earlier phase of the ongoing Good Water Neighbors (GWN) project. FoEME, together with residential and municipal support of both Palestinian and Israeli neighboring communities, approached all relevant Palestinian and Israeli authorities - including the

Figure 1: West Bethlehem Villages, Photo: HWE

Civil Administration - to seek their support for meeting the water supply and sanitation needs of the area. FoEME then approached the local office of the World Bank, which approved investment of $3.6 million for a two- stage project that would deal with water supply and a study of sanitation solutions.

Stage I involves the replacement of the internal water supply networks in the five villages. The existing networks were built in the 1970s but are presently in such poor condition that they account for an estimated water loss of 40% of the total water consumption. This stage of the project is currently being implemented, and it includes:

a) Project management
b) Rehabilitation and improvement of the drinking water distribution networks
c) Capacity building
d) A feasibility study for wastewater management

Cross-Border Impact:

The Mountain Aquifer is a vital shared water source for Palestine and Israel. The West Bethlehem area is a part of the Mountain Aquifer recharge zone and is therefore vulnerable to groundwater pollution. Pollution sources are both Palestinian and Israeli, the threat to future water supplies is undisputed. This project:

- Provides tangible quality-of-life improvements to cross-border communities.
- Reduces groundwater and other pollutions.
- Reduces water leakage in order to increase available water.
- Strengthens relationships between water technicians and municipal leaders.

3 CREATING GREEN SPACES FOR RAINWATER RECHARGE

Partnering Communities:

West Bethlehem villages - Palestine: Wadi Fukin, one of the villages in this area, has a population of approximately 1,300 residents.

Mate Yehuda Regional Council – Israel: Tzur Hadassah has a population of 6,000 residents.

Shared Waters:

Wadi Fukin is a small village bordering the Green Line, situated between the Israeli town of Tzur Hadassah to the west and the Israeli settlement of Beitar Elite (Figure 1) to the east. Eleven springs and an elaborate system of traditional terraced agriculture, including numerous irrigation pools and several kilometers of water canals, make Wadi Fukin unique. The ancient agriculture system supports a varied array of crops, especially vegetables, grapes and olives which provide both food and an income source for the village inhabitants. Though located on top of the Mountain Aquifer, the springs of Wadi Fukin (Valley of Thorns) are fed from a very shallow perched aquifer whose small recharge basin is a mere six square kilometers in size and includes areas of Tzur Hadassah, Wadi Fukin and Beitar Elite.

Problem Statement:

The water recharge basin of Wadi Fukin is rapidly being covered by asphalt, concrete and buildings. Beitar Elite is the fastest growing Israeli settlement in the West Bank. All the western neighborhoods of the settlement have been built over the recharge basin of the Wadi Fukin shallow aquifer and already dramatically impacts spring water outflows. There are plans to build a new western neighborhood in Tzur Hadassah which would also cover large areas of the recharge basin. New building taking place within Wadi Fukin village itself, roads, and the building of the proposed Separation Wall / Barrier through the area would all have additional negative impacts threatening to fatally damage the spring outflow and the unique agricultural way of life that the village represents. Residents and municipal leaders from Wadi Fukin and Tzur Hadassah, alert to the dangers ahead, proposed the creation of designated green areas in Wadi Fukin village and close to the green line. These green areas would help educate residents of the need to limit building and to maximize preservation of the recharge area to protect the shared water basin.

Priority Initiative:

Creating Green Spaces for rainwater recharge education by

- Rehabilitating Ein al-Balad spring in the center of Wadi Fukin village.
- Creating an outdoor recreation area near the Green Line towards Tzur Hadassah.

Background Issues Relevant to the Priority:

Wadi Fukin was among the first communities chosen to participate in FoEME's GWN Project. The primary shared water issue is the urgent need to protect the unique spring system of Wadi Fukin. According to a hydrological survey carried out by residents of Tzur Hadassah, the only source of water for the springs is rainfall that falls within the six square kilometers of the Wadi Fukin valley. Together with residents from Wadi Fukin and Tzur Hadassah, FoEME led the effort to oppose Israeli military plans to build the Separation Wall / Barrier to the west of the village, citing the hydrological study undertaken and its conclusion that the building of the Wall /Barrier could be the final nail in the coffin of the shallow aquifer. The hydrological findings were accepted by a military appointed hydrologist. The objection lodged has never been rejected be the military. As an effort to foster understanding by all residents of the valley's vulnerability to inappropriate development, FoEME further commissioned an alternative master plan for the basin area.

Figure 1: Map of Wadi Fukin

Objectives:

- Rehabilitation of Ein Al-Balad spring as the focal point of environmental education for the protection of recharge areas in the village.
- Creation of an open space educational facility, cross-border gathering space and children's playground near the green line to educate on recharge issues and promote community links between residents of Wadi Fukin and Tzur Hadassah.
- Be a model of cross-border community best practices

Project Characteristics:

- Create a cross-border residents Committee to advance the projects.
- Clarify land ownership issues and location to be chosen.
- Hire a landscape designer, hydrologist, educator and community facilitator to prepare plans for presentation to the committee, municipalities and residents.
- Advance permissions needed from authorities, and implement the master plan for protecting the recharge area.

Cross-Border Impact:

This project aims to educate all residents of the need to promote sustainable planning that will safeguard the Wadi Fukin shallow aquifer. It will strengthen the existing relations between the neighboring communities of Tzur Haddassa and Wadi Fukin by creating a unique meeting place that would be an example for all other communities in the region.

Estimated Budget: USD $500,000

4 ADDRESSING CROSS BORDER AIR AND WATER POLLUTION FROM INDUSTRY

Partnering Communities:

Emek Hefer Regional Council – Israel: Spreading over an area of 130,000 dunums (about 32,500 acres) in central Israel, Emek Hefer Regional Council is home to 30,000 residents, living in 44 communities.

Tulkarem – Palestine: The northern West Bank city of Tulkarem is home to 80,000 residents, living in the City and in the surrounding villages of Shweikah, Thenabah, Irtah, and Tulkarem Refugee Camp.

Shared Waters:

The partnering communities of Emek Hefer Regional Council and the district of Tulkarem are located directly along the Green Line and the physical Separation Barrier. Despite these divisions, they nevertheless share a number of water sources. Both communities are located over the western basin of the Mountain Aquifer, a key source of drinking water for both Israelis and Palestinians. The Alexander stream and its tributaries, the Zomar stream and the Teen/Teenim stream, originate eastward in the West Bank near the city of Nablus, and then flow through the Tulkarem district and across the Green Line into the Emek Hefer Regional Council. In Emek Hefer all the tributaries meet and flow westward to the Mediterranean Sea.

Problem Statement:

The creation of an illegal industrial settlement zone officially called Mesilot Tulkarem (commonly known as Gishuri) dates back to the mid-1980's when Israeli-owned factories relocated across the Green Line to an area attached to the west Tulkarem neighborhoods. Tulkarem residents state that the factories relocated in order to escape increasingly stringent environmental regulations in Israel. The Israeli Civil Administration approved the industrial area plans officially only at the end of 1994, but without enforcement of Israeli environmental standards. Complaints of noxious odors, heavy emission of dust and groundwater pollution are routine, particularly from the side of Tulkarem and, depending on the wind direction, from the Israeli community of Nitzaney Oz. These pollutants are allegedly generated by the industrial zone. This situation has led FoEME and Tulkarem residents to identify this issue as a priority for 2012.

Priority Initiative:

Eliminate all sources of pollution originating at the Mesilot Tulkarem Industrial Zone, and ensure compliance with stringent Israeli Environmental Standards for Industries while recognizing that the industrial zone is an illegal settlement for all purposes.

Objectives:

- Protect the health of local residents on both sides of the industrial zone with special attention to the nearby and less empowered residents of Tulkarem.
- Ensure enforcement of the highest environmental standards that would protect public health and the environment.
- In no way give legitimacy to the industrial zone itself.

Figure 1: Map of Mesilot Tulkarem Industrial Zone, Source: Bimkom

Background Issues Relevant to the Priority:

Today, seven Israeli factories are operating in Mesilot Tulkarem. The largest and most veteran is the Gishuri factory, which produces food supplements, fertilizers and various cement mixtures. The other six factories are: Sol Or, producing and cleaning gas tanks; Tal El, recycling paper; Yamit, producing water filters; a plastic and metal recycling factory; a wood platforms recycling plant; and Lutar, a textile factory. FoEME identified two active chimneys on a recent site visit.

Israeli environmental laws today apply to all settlement industries, under the responsibility of the Environment Officer of the Israeli Civil Administration and with assistance from the Israeli Ministry of Environment (Central District). Following a site visit into the industrial zone with residents from Tulkarem and Emek Hefer and follow up communication, which included the Deputy Mayor of the Emek Hefer Regional Council, some actions were undertaken.

- The Ministry of Environment conducted an air pollution monitoring test within the industrial zone. It found that, except for Nitrogen Oxide (NOx), there were no deviations from the Israeli standard. Tulkarem residents remain unsatisfied with the test, which they claim would have produced different results had the prevailing easterly winds been taken into account and the test conducted in a more eastern zone of Tulkarem.

Figure 2 : View of Mesilot Tulkarem, Photo: FoEME

• According to Ministry of Environment's monitoring tests, industrial water effluent was no longer to be found along the nearby Road 6 drainage ditch or the nearby Teenim stream. However, a recent visit by FoEME staff noted stagnant pools of suspected sewage in the area.

Project Characteristics:

• An independent study is needed; testing air, water and soil quality on the Tulkarem side of the industrial zone.
• An epidemiological study should be conducted of residents living in the western neighborhood of Tulkarem.
• Public hearings and full data disclosure should take place, to best inform residents of results and discussions held on next steps.
• Undertake media and/or legal actions as required.

Cross-Border Impact:

While the communities of Emek Hefer and Tulkarem are divided by the Separation Barrier, pollution originating from the industrial zone does not recognize the border, having an alleged deteriorating effect on human health and on the environment.

Figure 3: Nearby polluted stream. Photo: FoEME

5 ADDRESSING CROSS BORDER INDUSTRIAL WASTEWATER POLLUTION OF THE ZOMER / ALEXANDER STREAM

Partnering Communities:

Emek Hefer Regional Council – Israel

Tulkarem – Palestine

Shared Waters:

As described above.

Figure 1: Effluents from Yad Hanna WWTP flowing into the Zomer/Nablus Stream. Source: Rehabilitation of Alexander Stream, DHV and Tsalul, April 2011

Problem Statement:

To date, sewage pollution originating from the West Bank is the main cause of environmental degradation along the Zomer/Nablus, Alexander and Teen/Teenim streams. While progress in treating domestic sewage from the Greater Nablus and Tulkarem areas is well in progress, as detailed below, further attention is needed to address the stream pollution from Palestinian industrial sewage.

The industrial sewage is mainly caused by Palestinian stone cutting, sesame, and olive mill industries in the area, which is channeled untreated into the natural streams and causes high levels of pollution. The wastewater of the olive oil production process (locally known as "akar / zebar") contains a high organic load and has a toxic effect on all life forms in the streams. There are 26 olive mills located within the Zomer/Alexander/Teen basin, all of which dump untreated akar / zebar into nearby streams between October and December each year. In addition, much of the stream's salinity is caused by the sesame industry, which dumps its waste into stream waters as needed. Finally, the stone cutting industry produces slurry consisting of lime powder and water that is also dumped into the streams. This dense wastewater cannot be treated in an intensive wastewater treatment plant (WWTP). Hence, in order to protect the streams and the groundwater, there is an acute need to implement an "at source" approach to all these forms of industrial wastewater, preventing all discharge into the natural environment.

Figure 2: Alexander Stream Watershed, WEDO and AIES, Final Report MERC (USAID)

Priority Initiative:

Advance coordination of an integrated solution for industrial wastewater pollution in the Zomer/Alexander/Teen basin.

Figure 3: Collection of olive mill wastewater akar / zebar, Tulkarem area, Photo: FoEME

Objectives:

- Promote 'at source' treatment of Palestinian industrial wastewater in the Zomer/Alexander/Teen basin.
- Implement an integrated plan that includes economic incentives and regulatory clarification and enforcement against all illegal wastewater disposals.
- Prevent loss of investments in domestic sewage treatment (avoid building of 'white elephant' infrastructure).
- Support cross border coordination at the municipal and residential level between upstream and downstream communities. .

Background Issues Relevant to the Priority:

The Palestinian Water Authority (PWA) is currently advancing a semi-regional program aimed at building and extending the sewage network for domestic sewage throughout West Nablus and the Greater Tulkarem area with the support and funding of the German Government Development Bank called the KfW. The building of the West Nablus WWTP is expected to be completed by the end of 2012. Meanwhile, sewage from the Greater Tulkarem area will continue to be channeled to the Yad Hanna WWTP adjacent to the Separation Wall / Barrier on the Israeli side in Emek Hefer.

Figure 4: Aeration ponds at Yad Hana WWTP with the city of Tulkarem in the background. Source: Rehabilitation of Alexander Stream, DHV and Tsalul, April 2011.

To date, the Yad Hanna WWTP has been failing to cope with the growing quantities and problematic composition of mixed industrial and domestic sewage that reaches the plant. This situation, coupled with the more stringent Inbar Standards introduced recently in Israel for sewage treatment and stream flow, require the upgrade of Yad Hanna. A pilot project is now being undertaken in Yad Hanna in order to identify the best technology for coping with the challenging composition of sewage and projected quantity of effluents flowing in the Zomer Stream.

On the Palestinian side meanwhile, the KfW project aims to enable collection of industrial sewage, although it remains uncertain what process will be applied. There is still a need to identify the best available solution both in terms of environment and finance. Because miscommunication and lack of coordination between the two sides on issues of pollution control leads to greater mistrust, the situation is pushing Israel to develop "end of pipe" solutions for Palestinian industrial sewage. This may lead to double investment in pollution control technologies (at source on the Palestinian side and then again on the Israeli side) and to smaller chances of success. Hence, FoEME sees its role in facilitating information flow and advancing pragmatic cooperation and problem solving.

Project Characteristics:

- FoEME will compile information on sources of industrial wastewater pollution in the Zomer/Alexander/Teen basin in an accessible manner (using GIS) to facilitate clear coordination and information flow.
- As the application of "at source" solutions would impose new costs on impacted industries, FoEME will work with the PWA, KfW's consultant and other economic experts to examine the promotion of economic incentives such as ISO Certification and/or market demand that could turn current waste products into commodities.
- FoEME will seek to clarify jurisdictional issues between various Palestinian Ministries and enforcement agencies, as well as with the Israeli Civil Administration where dumping takes place in Area C. At the same time, FoEME will seek to inform Israeli decision makers to avoid unilateral "end of pipe" solutions that overlook developments on the Palestinian side.
- FoEME will initiate and coordinate cross border field visits for relevant professionals, media and decision makers.

Cross-Border Impact:

Mitigation of cross border pollution stemming from industrial wastewater will lead to improved water quality of the Zomer/Alexander/Teen Streams and the Mountain Aquifer, water resources that are shared by both sides.

6 COMPLETION OF BAKA SHARKIA SEWAGE COLLECTION NETWORK AND ITS LINK TO THE ISRAELI SIDE TREATMENT PLANT

Partnering Communities:

Baka Al Gharbia - Israel: An Arab Israeli city situated at the north Sharon Region; home to approximately 26,000 residents.

Baka Al Sharkiya - Palestine: A Palestinian town situated in the northern Tulkarem region; home to approximately 5,000 residents.

Shared Waters:

Topographically, the two adjacent communities of Baka Al Gharbia and Baka Al Sharkiya are situated over a particularly vulnerable area of the Mountain Aquifer's western basin, a principle fresh-water resource for both Israelis and Palestinians. Another water source shared between the two communities is the Hedera/ Wadi Abu Naar stream that flows westwards from the Shomron / Nablus Mountains to the Mediterranean Sea, crossing on its way the Green Line and the two communities.

Problem Statement:

Until recently, raw sewage from both sides of the Green Line drained into the Hadera/Abu Naar Stream causing widespread health hazards to the local population and contaminating the groundwater of the Mountain Aquifer. The situation of neglect resulted in the river banks being turned into dumping sites for household, agricultural and livestock waste and a burning site for used tires. During winter, flood waters would carry the sewage and solid waste of both communities down the Hadera/Abu Naar Stream all the way to the Mediterranean Sea.

Figure 1: Memoradum of Understanding signing between the Mayor of Baka Al Gharbia and Baka Al Sharqiya, July 2007, Photo: FoEME

Objectives:

Reach a bilateral agreement on the charges to be paid for sewage treatment when undertaken across the border and complete the linking of the two sewage networks for the benefit of both communities and the environment.

Background Issues Relevant to the Priority:

In the framework of the GWN Project in July 2007, the mayors of Baka Al Garbiya and Baka Al Sharkiya signed a Memorandum of Understanding (MoU) agreeing to cooperate on cross-border water issues, aiming to advance shared sewage solutions and the rehabilitation of the Hadera/Abu Naar Stream. Following the MoU's signing, substantial investments were made in order to realize local environmental cooperation.

- Through Israeli government loans, Baka al Gharbia built its own WWTP and joined a local water and sewage corporation to operate and manage the facility. Currently, through additional loans and municipal funds, Baka Al Gharbia's sewage network is being extended gradually to connect all households in the city.
- The Joint Israeli-Palestinian Water Committee approved the FoEME-led idea to treat Baka Al Sharkiya's sewage in the new WWTP completed for Baka Al Gharbia.
- Under the implementation of the PWA and with the financial support of UNDP and JICA, a sewage collection system was planned and built for the city of Baka al Sharkiya.
- The actual connection of the two sewage networks is presently hindered due to several disagreements, mainly on the issue of whether or not to build an emergency sewage pond on Baka Sharkiya's side and the need to sign an MoU between the Palestinian and the Israeli water authorities on the costs to be charged for sewage treatment. The request for an emergency sewage pond is based on the need to protect the Israeli WWTP in cases of illegal industrial sewage flow into the Baka Sharkiya system, while the MoU signing would be a comprehensive and binding cross-border agreement for all cross-border sewage management between Israel and the Palestinian Authority.

Project Characteristics:

FoEME will conduct cross-border meetings, media tours and informative tours for decision makers, and facilitate communication and data transfer in order to facilitate an agreement to be reached between the respective Water Authorities.

Cross-Border Impact:

Success in linking the two sewage networks would result in removal of a severe threat to shared ground and surface water resources and to public health, on both sides. This would also mean that the ecological rehabilitation of the stream and its environment can be advanced.

Figure 2: WWTP Baka Al Gharbia, Photo: FoEME

7 DEVELOPMENT OF THE HADERA/ABU NAAR STREAM CROSS-BORDER PARK

Partnering Communities:

Baka Al Gharbia - Israel

Baka Al Sharkiya - Palestine

Shared Waters and Problem Statement:

As described above

Background Issues Relevant to the Priority:

The removal of Baka al Sharkiya's and Baka Al Gharbia's wastewater from the stream through the joint venture described above creates favorable conditions for moving forward with a precedent-setting project of cross-border stream rehabilitation and park development. A proposal for the planning and implementation of a Cross-Border Park, approximately 3 kilometers in length on each side, was submitted to the Israeli Ministry of Regional Cooperation which subsequently allocated 200,000 NIS towards the planning process. In addition to this funding, the Sharon Drainage Authority (in charge of the Hadera stream on the Israeli side) has already prepared an initial draft plan for the Israeli side of the project.

Objectives:

The project will be designed to provide services that are currently deficient on both sides of the border and to meet the following objectives:

- Restoring the eco-system of the stream and its environmental services.
- Creating a well preserved open green area, including recreation area with outdoor facilities.
- By transforming the stream area into an attractive landscape, the project will create a favorable environment for tourism and entrepreneurship that would increase services to the new park's visitors while providing new income sources to the local communities.
- The park will set a precedent for cooperation between Israel and the Palestinian Authority and will be held in particular high regard by the Arab sector in Israel.

Project Characteristics:

- Advance planning and implementation of a cross-border park along a rehabilitated segment of the Hadera/Abu Naar Stream, transforming what used to be a neglected backyard into the pride of the local communities and an anchor for socio-economic development.
- The proposed park area extends eastwards and westwards from both sides of the border and encompasses a public-use strip that would interface with the stream, agricultural areas, and the roads leading to the communities.
- It is proposed to develop the park in stages: on both sides of the border in a parallel fashion at first, and at later stage, to eventually alter the current security arrangements and allow free access from both sides, thus creating a cross-border Peace Park.
- The planning of the project will be carried out by a joint team of Palestinian and Israeli planners including the Sharon Drainage Authority from the Israeli side and the PWA on the Palestinian side.
- The design of the project will be subject to the guidance of a joint steering committee composed of local municipalities, environmental agencies, relevant NGOs and other relevant stakeholders.
- Community leadership and ownership is proposed by ensuring community participation in the planning process, the creation of a residents' stewardship program, environmental education for local youth, establishment of a cross-border stream committee to facilitate management and enhance cooperation on related tourism, environmental and educational programs.

Figure 1: Polluted waters of Hadera Stream / Wadi Abu Naar, Photo: FoEME

Cross-Border Impact:

The proposed cross-border park is designed to transform a gravely deteriorated environment into an attractive landscape and, through cross-border cooperation, to provide benefits that will accrue not only to the local communities but to the wider populations. The development of the park is a precedent-setting project between Israel and the Palestinian Authority and as such may provide an incentive for further cooperation on environmental issues.

Estimated Budget: USD $4 million

8 STREAM REHABILITATION AND CROSS BORDER PARK

Partnering Communities:

Gilboa Regional Council – Israel: is made up of 33 villages comprising some 25,200 residents, both Jewish and Arab.

Jalamehh (Jenin Governorate) – Palestine: The Jenin Governorate is home to approximately 256,000 residents. Jalamehh itself, has a population of 3,000 residents, and is adjacent to the main crossing point to Israel, known as "The Jalamehh Border Crossing".

Shared Waters:

Both communities are located on the Mountain Aquifer and share the surface water Kishon/Naher al Mukataa Stream that flows in two tributaries. The first and main tributary flows to the north from the city of Jenin, then passes eastward under the Separation Wall / Barrier to the Israeli village of Ram On. Contrary to its ephemeral nature upstream, today the stream flows year round and carries effluents from the Jenin Wastewater Treatment Plant (WWTP). While some of the effluents are captured in the Ram On irrigation reservoir on the Israeli side, significant quantities flow further downstream in the Kishon/Mukataa Stream together with additional agricultural runoff collected along the way from the Taananim villages of the Gilboa Regional Council. A second, more eastern tributary - Al Kaslan/Mukebileh Canal - carries the agricultural runoffs of Jalamehh and crosses the Separation Barrier adjacent to the Israeli village of Mokebileh. Both tributaries meet about 4 km north of the Green Line at a site called Mapal Rosh within the Gilboa RC. Overall, the quality of the stream's water ranges from medium level sewage to medium level treated effluents, which varies according to season and the performance level of the Jenin WWTP.

Figure 1: Map of planned wastewater treatment plants

Problem Statement:

Currently, the stream's composition year-round is of low-quality treated wastewater, untreated sewage, and agricultural runoff. Jalamehh and the neighboring Palestinian communities of Dan and Burkin do not have sewage networks, relying instead on cesspits that overflow into the streets or leech into groundwater. This cumulative pollution source contaminates the shared groundwater, damages the ecosystems, creates noxious odors, and is the breeding ground for flies and health hazards. Currently, rather than being a valuable community resource, the stream is seen by both communities as a backyard site for illegal dumping of solid waste. In Jenin Governorate, where the shortage of public land is an acute issue, the absence of attractive, green open-spaces is prominent.

In order to address the wastewater flowing into the stream, an upgrade of the Jenin WWTP is in progress under the auspices of the German Development Bank (KFW).Over time this WWTP is expected to provide basic standard treatment of 8,000 cubic meters of sewage a day. On the Israeli side, plans were recently approved for the construction of the new Taananim WWTP that will treat both the sewage of the Israeli Taananim villages (49%) and upgrade the effluents of Jenin WWTP currently flowing in the stream (51%). Discussions are taking place whether some of the reclaimed effluents will be returned for irrigation purposes across the Green Line on the Jenin side.

Once completed, these plans create an important opportunity for cross-border pollution control and provide grounds for further cooperative steps towards the much needed stream rehabilitation process. At the same time, opportunities for reuse of treated effluents require further study.

Priority Initiative:

Cross-border rehabilitation of the upstream portion of the Kishon/Mukataa Stream and the development of a Cross-Border Park along its banks. At a second stage, a Peace Park is planned with open access from both sides of the border without the need for special permits.

Objectives:

- Prevention of pollution of shared water resources and removal of threats to public health
- Transforming the area into a healthy ecosystem and an anchor for community development
- Providing new sources of quality reclaimed effluents for the benefit of both communities
- Reinforcement of good neighborly relations by exemplifying the benefits of cooperation and providing an exterritorial venue for cross-border meetings and events
- Environmental education within the impacted communities
- Advancing economic development through tourism

Background Issues Relevant to the Priority:

Gilboa RC and the Jenin Governorate have a rich history of cooperation, with an agreement signed in 1994 between the Mayor of Gilboa, Danny Atar and the previous Governor of Jenin, Mr. Zufair Manasra, on building a WWTP that would supply treated effluents for agriculture to both sides. This project was endorsed by the late Governor of Jenin, Kadura Musa and resulted in the recently approved Taananim WWTP. As described above, the WWTP in Jenin is undergoing an upgrade to meet the baseline quality standard of 20/30 BOD5 /Suspended Solids (SS).

Figure 2: Polluted water of Kishon / Nahar al Mukataa, Photo: FoEME

Between December 18 – 19, 2011, FoEME and Gilboa RC hosted an experts workshop with representatives from Jenin and Israel, including planners, academics, and municipal staff. The event resulted in the development of a first draft for a cross border park and stream rehabilitation plan, which included two optional working models and a draft Terms of Reference for the project planning. Building on the approved plans for sewage treatment on both sides, the proposal for the Cross-Border project was submitted by the Gilboa RC to the Ministry of Regional Cooperation at the end of 2011. As of the time of publication, approval for funding is pending.

Furthermore, a cross-border workshop was held in Haifa at the initiation of the Union of Local Authorities in Israel, FoEME, the Municipal Alliance for Peace and the Tami Steinmetz Center for Peace Research at Tel Aviv University. The workshop brought together academics, mayors of communities along the Kishon/Mukataa Stream, and government agencies. The workshop was dedicated to the promotion of this project.

Project Characteristics:

• Creation of a joint Israeli-Palestinian steering committee made up of representatives from the local municipalities, water authorities, nature protection agencies, NGO's, and other community stakeholders. This committee would steer and oversee the work of a joint Israeli-Palestinian planning team over the different implementation stages.
• Undertake a study and prepare an initial plan followed by a detailed plan for the rehabilitation project. This stage would be carried out by a joint team of Palestinian and Israeli experts and would include a plan for effluent reuse.
• Planning of a Cross-Border Park, including landscaping, walking trails, bicycle lanes, recreational facilities and parking.
• Development of an environmental community education program around the rehabilitation project.

Cross-Border Impact:

The creation of a cross border park is a unique opportunity to establish a visible example of the benefits environmental cooperation and rehabilitation of natural areas can provide; it demonstrates the transformation of an environmental and public health hazard into one of enjoyment and regeneration. By focusing on the shared problem of water pollution on both sides, each community will be able to enjoy the ecosystem services that the healthy stream would provide.

The project's capacity to draw international/regional/local visitors would have a positive socio-economic spillover effect in both Jenin Governance and Gilboa RC. The Park itself may serve as a platform for cross-border cooperation projects centered on environmental and peace building themes.

Estimated Budget: USD $4 million

9 REMOVING INDUSTRIAL WASTEWATER FROM THE HEBRON STREAM

Figure 1: Pollution in Hebron Stream, Photo: FoEME

Partnering Communities:

Yatta – Palestine: Located in the south of the West Bank some 12 km south of Hebron, Yatta is home to 100,000 people who work mainly in construction and agriculture. The municipality covers 24,000 dunums, making it one of the largest in the West Bank.

Eshkol Regional Council – Israel: Eshkol RC is situated in the north-western Negev Desert and comprises 31 communities with mainly agricultural lands. It is one of the largest regional councils in Israel with over 760,000 dunams ranging from the west side of Be'er Sheva to the Gaza Strip.

Shared Waters:

The Hebron Stream basin is the largest of the cross-border streams, beginning in the West Bank and flowing through Israel, into the Gaza Strip and then into the Mediterranean Sea. The stream flows over an area of both the Mountain and Coastal Aquifers. A significant portion of the pollution currently flowing in the stream originates from the Hebron City area, the settlement of Kiryat Arba, and surrounding Palestinian villages. Wastewater currently flowing through Hebron Stream is a mix of domestic (94%) and industrial (6%) sewage containing a high level of solid waste and hazardous materials originating from the stonecutting, tannery, metal, and olive oil industries. Although the portion of industrial wastewater in the total discharge is relatively small, addressing this source of pollution emerges as a priority challenge. Until the recent intervention of USAID, industrial wastewater had been discarded directly into nature or into the Hebron City sewage network which later discharged into a stream channel leading to the Hebron Stream. The pollution severely impacts the shared ground and surface waters, the environment, and the lives of Palestinian and Israeli communities residing far down the Hebron Stream.

Problem Statement:

Stonecutting is the main industry of the Hebron District. The stonecutting process uses water which results in the production of a dense mixture made of water and stone dust, called slurry. On average, Hebron's stonecutting industry produces 400,000 cubic meters of wastewater per year. The density of the untreated slurry causes blockages when dumped by industry into the domestic sewage network, leading to the frequent flooding of residential neighborhoods in Hebron with raw sewage and an increased probability of spreading disease. Likewise, untreated slurry has led to clogging and the failure of the downstream Shoket WWTP built on the Israeli side of the Green Line. The leaching of sewage and industrial wastewater into the aquifer likely contaminate nearby wells, often the sole water source for local communities both Palestinian and Israeli. Chalk dust dumped on nearby road sides and sludge disposed in open areas clogs the soil pores resulting in soil and plant damage and hence significant economic damage to the local agricultural industry's use of otherwise productive land.

In addition to the stone industry, the Hebron tannery industry is yet another source for environmental and health risks. Wastewater from Hebron's 13 leather processing factories contains chromatic residues. In order to dissolve the chromium hydroxide sediment and reuse it in the tanning

process, industries worldwide are using sulfuric acid (H_2SO_4) and in 1998 USAID established a tannery WWTP using sulfuric acid in Hebron to bring the industry there up to standard. The plant's economic benefit derived from its ability to recycle the chromium for reuse. However, at some stage during the second intifada the plant ceased to function due to an Israeli ban on the import of sulfuric acid to the Palestinian Authority because of its potential use as an ingredient in bomb making. Consequently, wastewater containing chromium is discharged to nature along with arsenic and other heavy metals, penetrating groundwater. The flow of wastewater containing chromium in anaerobic conditions can lead to the conversion of trivalent chromium (Cr+3) to hexavalent chromium (Cr+6) which is a dangerous carcinogen. Accordingly, there is a need to prevent both chromium and arsenic from reaching groundwater.

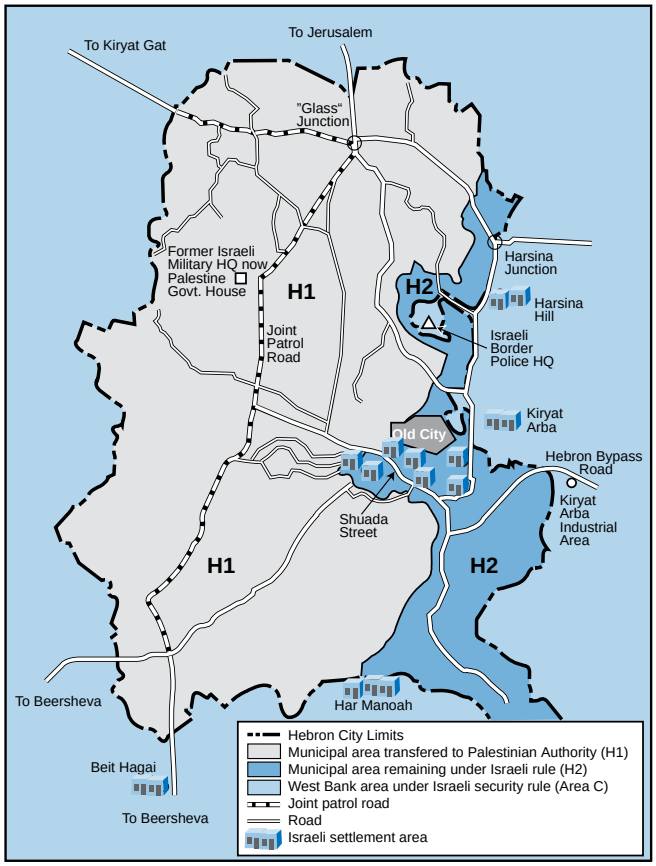


Figure 2: Map of Hebron areas, according to the Hebron Protocol, Source: Foundation for Middle East Peace

The Hebron Industrial zone is situated within area H2 in which entrance of Palestinian security forces is prohibited. The implication of this security arrangement, set up by the Hebron Protocol, is that the Municipality of Hebron and other Palestinian Ministries who have the responsibility to stop the illegal dumping of waste have in fact no enforcement capability.

Priority Initiative:

Removing industrial wastewater from the Hebron Stream.

Objectives:

- Raise awareness for the need for a long term solution to treat the industrial sewage of Hebron and to remove it from the Hebron Stream.
- Empower the relevant Palestinian authorities - the Hebron Municipality and the Water and Environment Ministries - to have the enforcement capability to prevent the illegal dumping of slurry and other hazardous waste into the environment. This requires an amendment to the Hebron Protocol regarding H2 that currently leaves Palestinian security forces out of the industrial zone.
- Advance the speedy passage of Palestinian bylaws specific to industrial sites, which cover such issues as the stonecutting industry and tanneries.
- Create economic incentives so that the stonecutting and tannery industries not only accept "the polluter pays" principle, but have business incentives to comply, such as ISO certification and selling their waste as a raw material to other industrial operations.
- Support a basin wide cross-border approach that involves the active participation of municipalities and residents along the whole length of the Hebron stream, from Hebron to the Mediterranean Sea.

Background Issues Relevant to the Priority:

In the absence of effective coordination on pollution control between Israel and the PA, Israel turned to "end of pipe" solutions in building the Shoket WWTP on its side of the border. This plant that has been expanded twice already and its capacity has doubled, yet still fails to cope with the growing quantities of high toxicity solids that characterize the Hebron Stream flow. Sedimentation pools built on the Israeli side were also expanded but these pools also have had very limited success. "End of pipe" solutions are problematic both technically and environmentally since they do not prevent pollution along the 43.5 kilometers of flow in the stream before it reaches the Green Line. On the economic side, the costs of establishing, expanding and maintaining these facilities are primarily financed by PA funds. Essentially, the Palestinian public pays twice: once for the facilities built on the Israeli side (from Palestinian taxes deducted by Israel) and a second time by donor financing, in this case, for the US$45 million facility now planned for Hebron City with donor World Bank, European Union and French Development Agency funds.

Figure 3: Disposal of stonecutting wastewater directly into Hebron sewage network, Photo: FoEME

Of the 172 stonecutting firms currently active in Hebron, 20 of the largest firms have an onsite treatment facility. However, only eight of these systems include "dewatering press filter units", which is a pretreatment technology that separates the liquid from the slurry for recycling and creates a solid byproduct called a 'waste cake.' This technology is the most effective way to separate the slurry and requires initial investment and ongoing maintenance. USAID is planning to purchase 30 to 35 additional press filter units to be installed on site at the larger

Figure 4: Truck disposing of stonecutting wastewater at Hagar Treatment Plant, Photo: FoEME

stonecutting factories at a cost of $100,000 a unit. The only facility currently available for use by the remaining factories that do not have the option of onsite treatment is the Hagar Treatment Plant, jointly funded as a pilot project by the EU, Hebron Municipality, and the Italian organization Agenfor, Italia. The Hagar plant includes two centrifuging tanks with a capacity to treat 150 cubic meters of slurry per day. Prior to recent USAID intervention, only one tank was functioning with the ability to treat only 70 cubic meters of slurry a day. USAID's subsequent repairs of the second unit and increase of the plant's operational hours from six hours a day to round-the-clock operation six days a week, has increased capacity significantly.

In December 2009 the Palestinian Water Authority (PWA) presented an emergency plan to prevent the illegal dumping of slurry into the municipal sewage system. Components of the plan included:

- Placing of sewage lines to bypass the Hebron Industrial Area in order to prevent the continued dumping of untreated industrial wastewater into the municipal sewage system by those factories that independently connected to the existing network.
- Increase of the capacity of the Hagar Plant or the creation of an additional facility. The Hebron Municipality, which favors this solution over the installation of industry-based dewatering press filter units, has not succeeded to date in fundraising for this addition.

Overall, pressure from the local communities and civil society has finally brought all sides to communicate and coordinate a joint effort to deal with the industrial pollution problem at least in the short term. Meetings between the Israeli Civil Administration, Palestinian Water Authority, Hebron Municipality, the Union of Stone and Marble and donors have led to some breakthrough. A Steering Committee of key Palestinian parties was established and, following a consultation process with USAID, has launched a temporary but extensive clean-up program. Starting July 1, 2012, the USAID funded emergency support program transports slurry from all stonecutting factories either to treatment at the Hagar plant or directly to the municipal landfill outside Yatta. In coordination with the Hebron Municipality, and in order to prevent illegal dumping of slurry to the sewage networks, manholes were bolted and welded shut and illegal connections to the sewage network were capped with concrete. In addition, weekly water samples at various locations along the Hebron stream are being tested to detect stone slurry dumping, with positive results already witnessed on the ground.

Cross-Border Impact:

As Hebron is situated at the head of the stream, pollution caused by the lack of proper wastewater treatment has acute impacts on large populations downstream. Failure to address the "root cause" of Hebron's wastewater adds to the lack of trust between the Palestinian Authority and Israel and has led to unilateral actions by Israel.

10 YATTA WASTEWATER COLLECTION SYSTEM AND COMMUNITY ECO CENTER

Figure 1: Site of proposed Eco-Center

Partnering Communities:

Yatta (Hebron Governorate) – Palestine: is located in the southern West Bank, 12 km south of Hebron with a population of 100,000 residents.

Eshkol Regional Council spreads between the west side of Be'er-She'va and the Gaza strip. It is one of the largest regional councils in Israel with vast agricultural lands and includes 33 communities - 14 Kibbutzim (collective villages) and 17 Moshavim (agricultural communities).

Shared Waters:

Yatta is one of the Palestinian communities located on the Mountain Aquifer. The Hebron Stream flows through Yatta and then continues down across the Green Line to merge with the Beersheba Stream in Israel that later merges with the Besor Stream before flowing into Wadi Gaza and the Mediterranean Sea. The Yatta community, downstream from Hebron, has suffered for years from the sanitation mismanagement upstream.

Problem Statement:

Having experienced the impacts of upstream pollution, the Yatta municipality is keen to invest in environmental education of its youth and residents so that the city can maintain pressure on Hebron to solve its sanitation issues but also as a means to improve its own environmental performance. Yatta presently has no wastewater collection network. Every home has a cesspit that contaminates groundwater, overflows into the street and pollutes the Hebron Stream.

Priority Initiative:

It is proposed to create an Eco-Center within a larger park already under construction by the Yatta municipality surrounding the area of an ancient water pool built during the Roman period. Once the domestic WWTP is built in Hebron a priority is to build a wastewater collection network in Yatta and bring the sewage for treatment in Hebron.

Objectives:

- Improve the environmental awareness and skills of local residents especially as regards rehabilitation of the Hebron Stream.
- Follow the Auja Eco-Center as a model for environmental education and ecotourism for the south of the West Bank.
- Build a wastewater collection system in Yatta.

Background Issues Relevant to the Priority:

The Mayor of Yatta and other municipal staff have worked closely with FoEME for several years as part of the GWN project to seek solutions to Hebron Stream sewage. They have also visited the Eco-Center FoEME built in Al Auja village. The municipality believes that if an Eco-Center was to be built in Yatta the community would greatly benefit from increased environmental awareness. The city is offering the land where the center will be built within a larger park already under construction.

The second stage of the World Bank, European Union and French Development Agency program following the building of domestic sanitary solutions for Hebron is to include Yatta into the solution.

Project Characteristics:

- Carry out a feasibility study.
- Design the Eco-Center project with assistance from international architects.
- Develop a business plan for the site.
- Follow Hebron sanitation solutions so that they expand also to Yatta in stage II

Cross-Border Impacts:

The Eco-Center at Yatta would be a magnet for environmental activity in Palestine, generating a strong civil society role in promoting the rehabilitation of the Hebron Stream. Yatta sanitation solutions will remove pollutants from the Hebron Stream and shared groundwater.

Estimated Budget: USD $500,000 for Eco-Center; USD $10 million for sanitation network

11 CONSTRUCTING A STORM WATER COLLECTION SYSTEM IN ABASAN

Partnering Communities:

Abasan - Palestine: Abasan is situated in the southern Gaza Strip, in Khan Younis Governorate with a population of approximately 23,000 inhabitants.

Eshkol Regional Council - Israel: spreads between the west side of Be'er-Sheva and the Gaza strip. It is one of the largest regional councils in Israel with vast agricultural lands and includes 33 communities - 14 Kibbutzim (collective villages) and 17 Moshavim (agricultural communities).

Shared Waters:

Abasan and Eshkol RC are located over the Coastal Aquifer. Recharge of the aquifer takes place from direct rainfall and from surface water streams and flood events. For Abasan as for the whole of the Gaza Strip, clean fresh water resources are extremely scarce. Residents are wholly dependent on the ground water aquifer for all of their water needs and this has led to the over-pumping of the aquifer. Most of the wells of the Gaza Strip are now too saline for domestic use though the population has no other resource to turn to. In Abasan, water for agriculture is supplied through 17 wells in addition to water imported by the Al-FAO Company. Wastewater is disposed through cesspits, which further pollute the groundwater. When emptied by municipal and privately-owned tankers, the sewage waste is dumped into nearby wadis.

Figure 1: Current situation of drain pipes

Problem Statement:

Abasan faces many problems involving water. An issue that the community has chosen to try to solve together with FoEME is to better manage storm waters, aiming to collect and store storm water for use in agriculture. The community has no storm water collection system and therefore suffers from serious flooding events. Due to Abasan's sloping topography, storm water floods from the north (102.0m above mean sea level) and collects in a natural valley in the southern part of the village (64.0m above mean sea level).

Figure 2: Abasan El Kabira is located in Khan Younis governorate at the southern part of the Gaza Strip, Source: Engineering and Management Consulting Center

Priority Initiative:

Constructing a storm water collection system in Abasan by assessing the feasible solution of the storm water problems and to find out the most efficient location of the available alternatives.

Objectives:

The main objective of this project is to construct a storm water collection system in Abasan.

Background Issues Relevant to the Priority:

Abasan municipality constructed drain pipes on the main roads in the city center to reduce the negative impact of floods in the city center. This had the impact however of directing even more water to the Wadi Saber area in the south where no flood controls measures exist. Flood waters can surround houses during the whole of the winter months, causing cesspits to overflow and creating significant health risks to the population.

Municipal leaders and residents propose directing the flood waters to a storm water collection pond in Wadi Saber in addition to the construction of drain pipes in the southern neighborhoods. According to the available topography and the metrological records, the pond needs to accommodate 80,000 m3 of storm water. In addition to flood management, the proposed project will also provide irrigation water for farmers in Abasan.

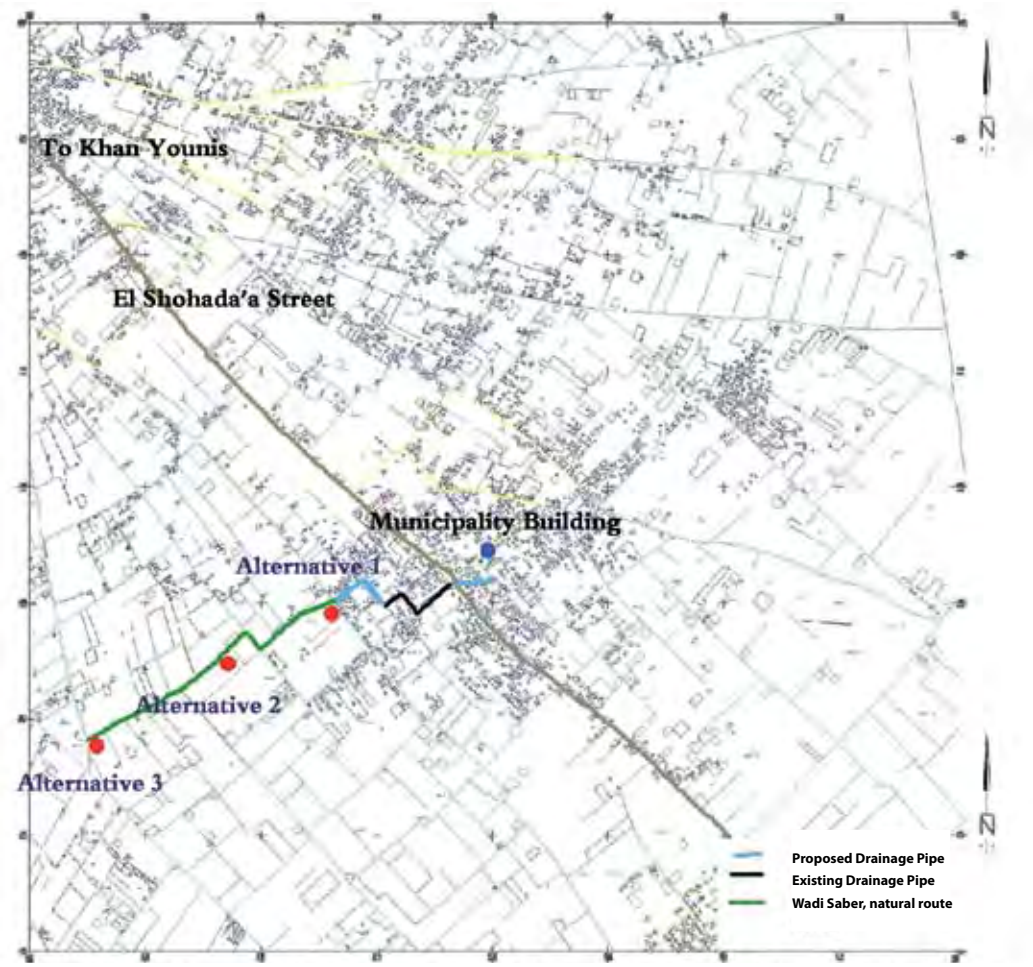


Figure 3: Proposed alternatives, route of the wadi, existing and proposed drainage pipe.

Project Characteristics:

• Design a flood and watershed management plan for Abasan.
• Conduct a feasibility study and carry out an Environmental Impact Assessment on a storm water pond.
• Propose water distribution to agricultural lands.
• Design a capacity building program for municipal staff on water management issues in general.

Cross-Border Impact:

The flood control measures will improve the health and livelihood of residents and also helps reduce even further pollution of shared groundwater.

Estimated Budget: USD $300,000

1 JORDAN RIVER PEACE PARK

Partnering Communities:

Jordan Valley Regional Council – Israel: Consists of 11,000 residents living in 22 rural communities around the Sea of Galilee and on both sides of the Jordan River until its confluence with the Yarmuk River.

Muaz Bin Jabal Municiality – Jordan: A medium sized cluster of towns and villages totaling approximately 25,000 residents on the eastern bank of the River Jordan.

Shared Waters:

While the River Jordan divides the valley in half, it has always been a meeting and crossing point for plants, animals, and people. This is depicted by the Old Gesher / Jeser Al Majama site where three adjacent bridges from the Roman, Ottoman, and British Mandate periods still stand. The 1927 construction of a hydroelectric power station at the confluence of the Jordan and the Yarmouk Rivers further epitomized the interconnectivity of the area. The plant was planned by Pinchas Rotenberg, founder of the Palestine Electric Company in an agreement with HRH King Abdullah I of Jordan. The flow of the two rivers at the time was harnessed at this site to produce electricity for both TransJordan and Mandate Palestine until operations ended in 1948.

Figure 1: Interactive map of proposed plan for Jordan River Peace Park, Source: FoEME

Problem Statement:

Less than 5% of the historical flow of the Jordan still flows presently, and even this severely diminished river flow is heavily polluted. Israel diverts some 50% of the river's water with Syria capturing most of the Yarmouk and Jordan whatever is left. On a positive note, substantial progress is being made on all sides to stop sewage flows, with the building of wastewater treatment plants in Israel and Jordan.

Furthermore, despite the special status given to the Peace Island in the 1994 Peace Treaty, tourism cooperation has been very limited and benefiting only the Israeli side. No investment has been made on the Jordanian side and much of the site is declared a closed military area.

Security fences and checkpoints on both sides block public access to the river. The public's lack of firsthand experience of the River Jordan's condition has resulted in a state of "out of sight, out of mind," with the wellbeing of the Jordan River not a major concern for the general population.

To address both the environmental degradation of the river and the lack of shared benefits of peace, FoEME has proposed the creation of a Peace Park which would encompass an area larger than the Peace Island on both sides of the border and enable Jordanians and international tourists to enter a defined area of the Park in Israel and vice versa without the need for a visa or passport .

Priority Initiative:

Development of the cross-border Jordan River Peace Park with a focus on attracting investments in Jordan to restore and renovate infrastructure.

Objectives:

- Promote sustainable tourism as an economic engine to both justify the return of fresh water to the river as well as to create jobs for local communities.
- Restoration of a pride of place to the valley.
- Protect biodiversity and natural habitat of the Jordan River.
- Be a concrete example of shared benefits.

Background Issues Relevant to the Priority:

In 2007 the mayors of the Good Water Neighbors communities – Jordan Valley Regional Council (Israel), Spring's Valley Regional Council (Israel), and Muaz Bin Jabal Municipality (Jordan) signed a Memorandum of Understanding to create a Peace Park.

Subsequent efforts to create the Jordan River Peace Park have included outreach to relevant communities, decision makers, and professionals both in Israel and Jordan. In 2008, plans for the park were developed at an international design workshop partnering local professionals with leading international architects and planners from Yale University. A pre-feasibility study was conducted giving a greater understanding of potential costs and revenues from the site and recommending

Figure 2: Memorandum of Understanding signing ceremony Israeli and Jordanian mayors, 2007, Photo: FoEME

that due to the political situation a two-phased development process take place. On the Jordanian side, constant dialogue and outreach efforts between Jordanian FoEME staff and military and political officials have been focused on declaring the Jordanian area as a national park. These attempts have been fruitful with the highest level of discussion held. Most recently, the Jordanian Army gave approval for FoEME to rehabilitate the old train station on the Peace Island. Endorsements from Israeli government officials including President Peres and the Ministries of Tourism and Regional Cooperation have resulted in commitments of 1.8 million NIS to be further invested in the Israeli portions of the proposed Peace Park.

Figure 3: Jordan River Peace Park Logo, Source: Yale Urban Design Workshop

Project Characteristics:

• Establish national parks and tourism operations on a parallel basis in Jordan and Israel.

• Undertake a study of existing infrastructure on the Jordanian side and evaluate the costs to renovate and re-use the former workers' homes as eco-lodges, the old power plant as a visitors' center and exhibition area, and the development of bird watching facilities and trails with the aim of attracting some of the over 60 million global bird watching enthusiasts.

• Establish meeting and educational facilities to promote youth encounters and programs for schools, as well as meetings and conventions.

• Establish opportunities for joint, cross-border research projects and nature-based tourism enterprises.

• Business plan development and legal planning for a long-term vision of cooperation with local communities.

Cross-Border Impact:

The creation of the Jordan River Peace Park with its ecotourism potential would increase incentives and opportunities for cross-border cooperation and collaboration. By jointly investing in such a shared project with opportunities for economic development, people from both sides would be able to travel freely to meet each other and to experience the way in which the environment can bring people together in working towards a common cause. The increased attention towards the Jordan River would lead to support of local tourism on both sides of the border. Thus, the project has the capacity to draw attention to the overall state of the Jordan River and can serve as a precedent for economic benefits that can be derived from its rehabilitation and tourism development.

Estimated Budget: USD $5 million towards infrastructure renovation and redesign

Figure 4: Roman bridge at Old Gesher/Jeser Al Majama, Photo: FoEME

2 REHABILITATION OF THE HAROD STREAM

Partnering Communities:

Beit She'an – Israel: Approximately 1,550 of the city's 7,000 dunum account for an archaeological national park. The city has a population of 18,000 residents.

Tabket Fahel – Jordan: A medium-sized cluster of towns and villages, Tabket Fahel is home to approximately 25,000 residents. The sister city to Beit Shean called Pella, also one of the Roman Decapolis cities, is located in Tabket Fahel.

Shared Waters:

The Harod Stream flows for a length of 35 km, from Israel's main water divide in the west, eastwards into the Lower Jordan River. Historically, the Harod drainage area has been known for its abundant waters flowing from the many springs located at the foot of Mt. Gilboa and the Beit She'an Valley. The springs, both fresh and saline water, have supported the flow of the Harod Stream all year round. Unfortunately, the Harod Stream, Beit She'an Valley's main water body and an important tributary of the Lower Jordan River, has undergone ecological degradation over time. Most of the springs' waters are currently captured and directed into agricultural pipes and canals used either for irrigation or for the valley's plentiful fish ponds. Moreover, decades of over pumping have led to an increasing rate of salinity in the spring's flow.

Figure 1: Map of Harod Stream/Wadi Ziglab, Source: Google Maps

Problem Statement:

At present, the Harod Stream waters are comprised of discharge from fish ponds, agricultural runoff, industrial and domestic sewage, and low quality effluents. Although a substantial improvement in water quality has been achieved with the building and operation of the new Beit She'an Wastewater Treatment Plant (WWTP) in 2009, the building of the basin sewage network has not been completed. To date, most households within Beit She'an and Spring Valley Regional Council are connected to the system, but the eastern villages of the Gilboa Regional Council that are situated within the Harod basin have yet to be connected to the network that would in turn connect them to the Beit She'an WWTP. Some villages in the Gilboa RC, such as Kfar Yehezkel and Gidona, are using inefficient local treatment plants that discharge low quality effluents to the Stream, whereas the "Northern Wing" of Spring Valley RC lacks the sewage infrastructure required in order to connect it to the Beit She'an WWTP. Industrial pollution reaches the stream on a regular basis, mainly from the Eastern Industrial Zone of the Spring Valley RC, where food processing factories fail to meet the required standards for on-site treatment and discharge their effluents into the main network. Furthermore, low quality effluents from the dairy factory Tnuva Tel Yossef are disposed of directly into the Stream.

Finally, the primary consumer of the Harod Stream's natural flow today is the fishery sector, which has established many fish ponds along the Harod Stream and uses approximately 60 mcm each year. To date, the output of the fish ponds, characterized by high loads of organic and inorganic materials, is discharged into the stream. This causes further degradation of its water quality, increases foul odors, and leads to other ecological drawbacks. An impending reform of the fishery sector would require higher standards of fish pond output and would limit the discharge period to the three months between October 15th and January 15th. However, while the timing of the discharge each year represents a compromise with the fishery sector's need for an early discharge, it means that fish ponds output would reach the Harod preceding winter floods, when the stream flow is at its lowest. Consequently, the level of salinity in both the Harod and the Lower Jordan River is expected to increase dramatically as a result of this reform, jeopardizing ecological restoration.

Figure 2: Pollution in Harod Stream, Photo: FoEME

Priority Initiative:

Ecological Rehabilitation of the Harod Stream

Objectives:

• Ecological rehabilitation of the Harod Stream including removal of domestic, industrial and agricultural pollutants, revival of adequate fresh water flow, and regeneration of biodiversity.

• Elaboration and implementation of a new and sustainable balance between agricultural and environmental needs for the stream's waters
• Enhancement of economic opportunities for local communities from eco-tourism development.
• Fostering of community accountability to its local water resources through a community stewardship program.

Background Issues Relevant to the Priority:

Over the past seven years FoEME has been involved in efforts to rehabilitate the Harod Stream, as well considering its role as a tributary of the Jordan River. Within the Good Water Neighbors program, a Memorandum of Understanding was signed in 2007 by the mayors of Beit She'an, Spring Valley RC, and the neighboring Jordanian community of Tabket Fahel, declaring their commitment to undertake mutual efforts to rehabilitate the Harod and Ziglab Streams crossing their communities on the way to the Lower Jordan River. Through many community participation meetings and tours, as well as cross-border visits and workshops, FoEME challenged the status quo of a polluted stream and inspired a forgotten vision of a clean river that supports a healthy environment and a healthy community.

The Water Planning and Evaluation (WEAP) Model, prepared for FoEME in 2011, enabled FoEME to scientifically evaluate different scenarios for both the Harod and the Lower Jordan River and set its recommendations accordingly.

All in all, concrete steps have already been taken in the right direction to further advance stream rehabilitation. The Harod stream rehabilitation Master Plan was completed in 2003 referring mostly to the architectural-landscape and touristic aspects of the basin.

Most importantly, the Lower Jordan Drainage Authority, in cooperation with the relevant Regional Councils, has elaborated a Water Plan for the Harod Stream. The plan, which is the major element in the stream's rehabilitation, would require the return of fresh waters that are currently allocated for local agriculture to the stream in order to support its rehabilitation. The Water Plan suggests the release of around 500cm per hour from several springs (Ein Harod, the Assi) and from drillings at the Ein Izrael area, while supplying farmers with reclaimed effluents in return. It also includes the implementation of the Fishery Reform as described above. However, the latest version of the reform package has yet to be approved in the Knesset Interior and Environment Committees. Concurrently, the Ministry of Agriculture and the Ministry of Environment, are funding a pilot project being implemented at the fish ponds of Beit Alfa and Ein Harod, which are two of the more ecologically problematic fisheries in the Harod Basin, in order to test the standards of the impending reform. The total implementation of the Fishery Reform in the Harod Basin is estimated to cost 120 million shekels.

Project Characteristics:

• Involving the wider community through a local outreach campaign to raise awareness of the project's vision and the challenges to its implementation. This would involve local media articles, booths in various community events, and initiated campaign actions.
• Forming a "Stream Watch"/ Forum of active residents committed to the Harod Stream restoration vision.
• Create accessible, updated GIS maps and data of current water pollutants in the Harod Basin. This can be used as a tool to inform, educate, and empower the wider community while also putting pressure on relevant authorities to act in order to mitigate threats.
• Involve active residents in meetings with decision makers at local and national levels, such as through relevant discussions at Knesset committees.

Cross-Border Impact:

The Harod Stream is one of the main Lower Jordan River tributaries. As such, the deterioration and diversion of the Harod's waters have a direct and adverse effect on the Jordan River, both in terms of quality and quantity. The rehabilitation of the Lower Jordan River can only take place through a cross-border, basin integrative approach that would entail sustainable management of its sources.

Figure 3: Pollution in Harod Stream, Photo: FoEME

3 SANITATION SOLUTIONS FOR AL AUJA VILLAGE

Figure 1: Wadi Auja, Photo: FoEME

Partnering Communities:

Al Auja Village – Palestine: Auja is located 10km northeast of Jericho city in the Jordan Valley. It has a population of over 5,000 residents.

Deir Allah – Jordan: Situated at the junction of main roads in the heart of the Jordan Valley, the community has approximately 60,000 residents.

Shared Waters:

Al Auja village is famous for the Auja spring that provided plentiful irrigation water for what was once a thriving agricultural community. The spring has witnessed a massive reduction in outflow due to long periods of drought and Israeli and Palestinian wells dug in its recharge basin. The Auja Spring is part of the out-flow of the Eastern Basin of the Mountain Aquifer. To the east of the village lies the Jordan River itself. Prior to 1967, village lands extended right to the waters of the Jordan, pumping water out of the river as an additional source of irrigation waters. Since the Israeli occupation of the West Bank, Auja has no access to the Jordan River or to its waters.

Problem Statement:

Auja village has no sewage network. Instead, families collect wastewater in cesspits next to each home. There are approximately 700 cesspits in the village that are not lined and allow the liquid waste to seep into the groundwater. The pits must be pumped out every few weeks by vacuum tankers, where the wastewater is often dumped in wadis leading to the Jordan River. The current practice of sewage disposal creates health risks for Auja's residents, groundwater pollution, contamination of agricultural lands and pollution of the River Jordan.

Due to the dramatic reduction in outflows of Auja Spring, only 10% of fertile lands are cultivated by Auja farmers. Until the community receives an equitable share of existing water resources denied by the Israeli occupation, the village seeks new water resources such as treated wastewater to irrigate its fields. The proposed building of a sewage network and treatment plant in Auja would provide additional water suited for agriculture and reduce pollution from cesspits and cesspit disposal. In addition, the community advocates to receive treated wastewater currently produced in the west from the Palestinian city of El Bira and have it piped down to the valley, stored and reused for agriculture in Auja.

Priority Initiative:

Improving sanitation services in Auja by creating a sewage network and treatment plant for the entire village.

Objectives:

- Improve human health by preventing seepage of sewage from cesspits
- Protect ground and surface waters, including the River Jordan.
- Provide additional water for agriculture and livelihoods in the community

Background Issues Relevant to the Priority:

FoEME has a strong partnership with and commitment to Auja. Together with the village council, FoEME built the Auja Environmental Education Center, the first of its kind in Palestine, promoting environmental awareness, sustainable agriculture and ecotourism for the Jordan Valley as a whole. What started as an ecological garden is today a four story

center with overnight accommodation, restaurant, outdoor educational groves and a state-of-the-art playground. Well aware of the issues facing the village, FoEME attracted the investment of USAID to replace the dilapidated drinking water supply network of the village, build a new water tank, and dig a new water well, all approved by the Joint Water Committee. Together, these measures have increased water supply rates by some 50% for the community.

Project Characteristics:

- Conduct a feasibility study of waste water solutions for Auja Village.
- Assess capacity building needs for council members on waste water system management.
- In later stages, leverage financing for construction of a sewage network, a wastewater treatment facility and wastewater reservoirs for the village and within the surrounding area.

Cross Border Impact:

An adequate sanitation solution will protect shared ground water and prevent pollution of the Jordan River.

Estimated Budget: USD $2.5 million

Figure 2: Environmental Education Center Auja, Photo: FoEME

Figure 3: Ecological greywater treatment system at Auja Eco-Center, Photo: FoEME

4 WATER SUPPLY AND SANITATION IMPROVEMENT IN FASAYEL

Partnering Communities:

Fasayel – Palestine: Fasayel is a Palestinian village in the Jericho governorate. It is located 23 km to the north-east of Jericho and is home to 1,132 residents.

Beit Shean – Israel: Beit Shean is located in the Jordan Valley and has a population of 16,000 residents.

Sharhabil ben Hassneh – Jordan: Sharhabil ben Hassneh has a population of close to 32,000 residents on the east bank of the Jordan River.

Shared Waters:

Fasayel is located in the Jordan Valley where natural springs from the Eastern Basin of the Mountain Aquifer seep out of the ground. Large collections pools from the Roman period provide evidence of how much water once flowed out of Fasayel springs. Fasayel is surrounded by agricultural lands where residents once grew vegetables and bananas. At present, little of these agricultural lands are cultivated since the springs in the area have been depleted by over-pumping from Israeli settlements around the village. Village farmers have no access to the Jordan River or its waters.

Problem Statement:

Water Supply

The lack of water access in Fasayel is due to three main causes. First, settlements in the region draw down aquifer levels and reduce spring outflows. Second, the existing domestic water supply network in the village is poor. The access pipeline providing water to the village from the Israeli water company Mekorot is allegedly only two inches in diameter, which is too small to transmit a sufficient amount of water. In addition, since the pipeline was built fifteen years ago and is not well maintained, water loss through leakage is extensive. Homes connected to the supply network do not receive a regular flow of water. Even more pressing, many homes in Fasayel al-Fouqa (Upper Fasayel) have no connection at all to the water supply network. The solution of pumping water to household reservoirs presents health risks and is a considerable financial burden on the population, especially the poorer families. Finally, several privately owned springs exist in Fasayel, and presently no mechanism exists for the fairer distribution of their waters amongst residents.

The people affected by poor water supply include families in need of water for domestic use and farmers which depend on irrigation water for their families' livelihood. Agriculture has been severely restricted by the water shortage; presently only 100 dunums are cultivated out of the village's 4,000 dunums of arable land.

Sewage Network

Fasayel village lacks a sewage network and relies instead on cesspits (Figure 3). Unlined cesspits leach contamination into surrounding soil and water. The pits that are lined with concrete require frequent pumping. Most often, the pumped waste is taken by tankers to nearby wadis and dumped into the environment towards the Jordan River.

Figure 1: Location of Fasayel in the Jordan Valley

Figure 2: Fasayel residents in consultation with FoEME team, Photo: FoEME

Figure 3: Cesspits in Fasayel, Photo: FoEME

Figure 4: Living conditions in Fasayel, Photo: FoEME

Priority Initiative:

• Replace, upgrade and extend the water supply network to the benefit of all 1300 residents.
• Conduct study for sewage solutions and construct sewage network and appropriate wastewater treatment facility for the village.

Project Characteristics:

• Undertake a feasibility study for the replacement, upgrade and extension of a water supply network to all residents of the community – with an access pipeline suitable to the population size.
• Assess what fee system would ensure efficiency and ecological and financial sustainability to maintain a new water supply system long-term.
• Assess capacity building needs to ensure that local officials are able to manage the network.
• Assess spring ownership rights and whether changes could be recommended to ensure more even and just distribution of the spring waters that are currently privately owned.
• Assess different types of sewage treatment systems and reuse possibilities for agriculture.

Cross-Border Impacts:

All residents have the human right to adequate water supply and sanitation services. It is of regional interest that Fasayel residents have reliable access to drinking water and adequate sanitation services. A fair access to shared ground water and water for agriculture from the Jordan River is required. An adequate sanitation solution will protect shared ground water and prevent pollution of the Jordan River.

Estimated Budget: USD $1.2 Million

5 EXTENSION OF A WATER SUPPLY PIPELINE IN JERICHO

5a) Establishing New Extension Lines For The Water Supply Pipeline

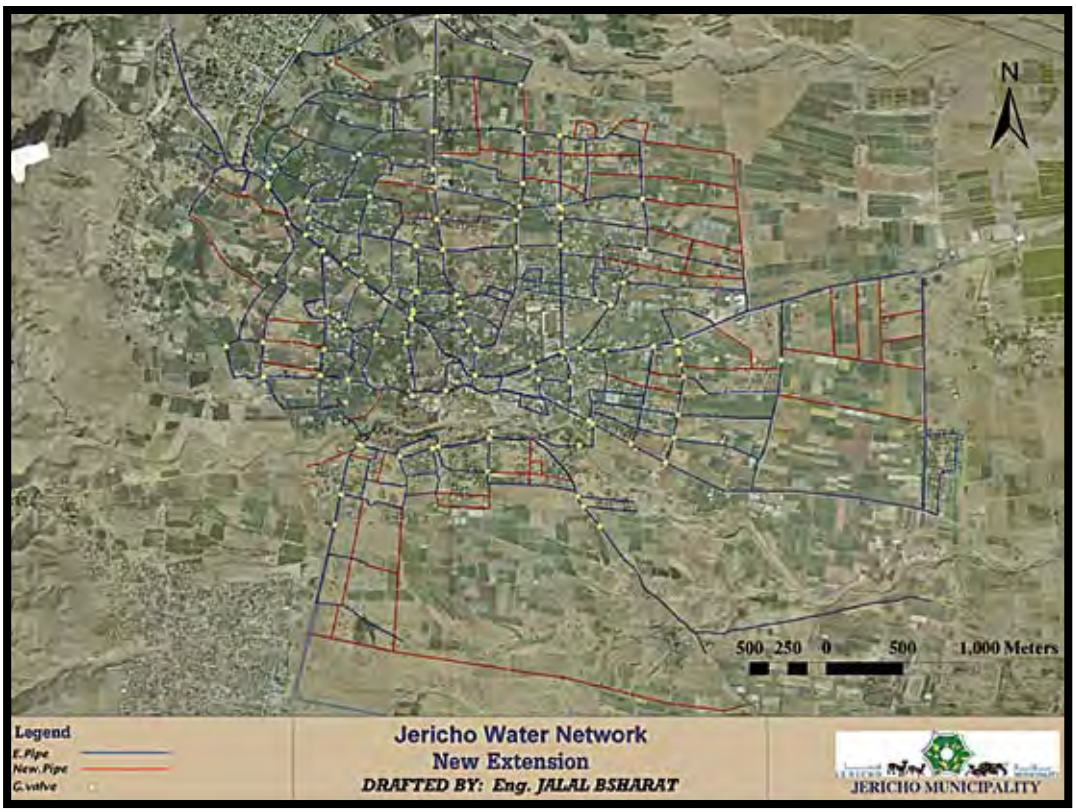


Figure 1: Jericho Water Network – new pipe extensions needed (marked in red), Source: Jericho Municipality

Partnering Communities:

Jericho- Palestine: Jericho lies 250 meters below sea level and is therefore the lowest city in the world. Jericho is home to approximately 40,000 residents.

South Shouna – Jordan: The district of Southern Shouna is situated in the Ghour area with a population of over 43,000 residents.

Shared Waters:

Jericho is located in the Jordan Rift Valley, approximately 8 km west of the Jordan River and 10 km north of the Dead Sea. The area within the municipality borders extends over 45 square kilometers, with an estimated population of 40,000. The average annual amount of rainfall is only 150 millimeter. Therefore the entire area relies exclusively on subterranean wells and springs for drinking and irrigation. The spring of Ein Al-Sultan, part of the eastern basin of the Mountain Aquifer, is the main source of water. It has an output of 680 cubic meters an hour and provides a steady output throughout the year. Jericho has no access to the River Jordan and residents are often denied access to the shores of the Dead Sea.

Problem Statement:

Due to the city's increasing population and people moving to new areas in Jericho, basic facilities and regular water supply are not provided for newly established homes.

Objective:

• Provide water as a human basic need and as part of the city development plan.

Project Characteristics:

Carry out a feasibility study and build new pipelines to connect Jericho's new areas with the main water supply network.

Cross-Border Impact:

Provides tangible right to water - quality-of-life improvements to a neighboring community.

Estimated Budget: USD $2,200,000

5b) Rehabilitation of Al Dyouk Neighborhood Water Network

Problem Statement:

The main water source for Al-Dyouk neighborhood is the Dyouk spring, which has an annual flow of approximately 4.4 MCM. Water distribution is determined according to a traditional agreement worked out between users. During the last five years the Al-Dyouk area has suffered domestic and agricultural water shortages, particularly in the summer. The Al-Dyouk region, like other Palestinian communities, is confronting a rapidly expanding population that raises water demand. Yet, from a technical and customer service perspective, Al-Dyouk's water problem differs from other Palestinian communities because the area has plentiful water. The region's shortages arise primarily from deficient infrastructure and inadequate management.

Furthermore, insufficient management of Al-Dyouk's water supply system has hampered distribution. The local water committee consists of just one employee who is responsible for both technical and administrative management, including maintenance, expansion projects, and revenue collection. Most consumers in the region have no water meters, water theft is common and makes it difficult for the local committee to manage consumption and control water supply. It will be necessary for any future project to include capacity building for the staff and logistical support.

Priority Initiative:

Rehabilitating Al-Dyouk's existing water network to decrease current water shortages, especially during the summer months, and meet the growing water demand in years to come.

Objectives:

Meeting the current water supply demands and rising requirements for the coming years.

Background Issues Relevant to the Priority:

The water supply network was constructed in 1998 without any central planning. A concrete water tank of 250 cubic meter capacity with a single booster pump (70 CM/h) for lifting the water from the spring to the tank was donated by the Jericho Municipality to provide back-up water storage. The current pumping capacity is no longer large enough to serve the growing community. To secure adequate supply in case of electricity or pump failure, both the tank and the pump must be upgraded to store a volume of water equal to twice the community's daily water consumption (800 CM). Many of the water system pipes must be replaced because the main pipes and house connections were made from below-standard materials and most have been compromised by corrosion within a few years of use. Concrete canals for agricultural irrigation leak and are cause for significant evaporation.

Project Characteristics:

- Rehabilitation of the existing water network.
- Customer service improvements through technical and administrative capacity-building of the local water committee.
- Improvement of the current fee-collection system.
- Improvement of the pumping station.
- Construction of a new water tank.
- Increasing public awareness and setting water conservation plans.

Cross-Border Impact:

Provides tangible right to water quality-of-life improvements to a neighboring community.

Estimated Budget: USD $500,000

Figure 1: Map of Al-Dyouk neighborhood, Source: UN OCHA

6 PUTTING A PRICE ON DEAD SEA WATER EXTRACTION & PROMOTION OF ALTERNATIVE MINERAL EXTRACTION TECHNOLOGIES

Partnering Communities:

Tamar Regional Council – Israel: Situated along the Dead Sea, Tamar RC is one of the largest regional councils in Israel (1,650,000 dunams) but has the smallest population (1,300 residents), residing mainly in the four communities of Ein Gedi, Tamar, Neot HaKikar, and Neve Zohar.

South Ghor Municipality – Jordan: Located in the Jordan valley along the Dead Sea and home to approximately 50,000 residents in three rural communities (Ghor Safi, Ghor Mizre, and Ghor Fifa), South Ghor is situated some 350 meters below sea level.

Shared Waters:

The Dead Sea is a sight for sore eyes in the desert, an oasis of blue in an otherwise brown landscape. For the GWN communities of Tamar Regional Council, Jericho and South Ghor, this body of water provides a sense of place and identity. For Israel and Jordan the Dead Sea area presents many economic opportunities that Palestinians too have the right to benefit from. Worldwide, the Sea is known for its mineral rich waters and mud, as well as its significance as the lowest place on earth.

Figure 1: Evaporation ponds on the Israeli side of the Dead Sea, Photo: Philip Reynaurs

Regrettably, the future of the Dead Sea for local and global populations to enjoy is under severe threat resulting from a process of accelerated drying due to human activities over the past 50 years. Today, the Dead Sea's primary source of water, the Jordan River, is flowing at less than 5% of its historic rate. Of the little waters that still flow into the Dead Sea, large amounts are being utilized unsustainably by Israeli and Jordanian Dead Sea industries that extract valuable minerals such as potash, bromine, and phosphates through intensive evaporation methods.

Problem Statement:

The Dead Sea is drying up at an increasing rate. While the average annual decrease was at 0.931 meters/year two decades ago and 1.034 meters/year in the last decade, on June 2012 the water level was measured at -426.02 meters, reflecting a record-breaking annual decrease of 1.44 meters/year[1]. The annual water deficit of the Dead Sea is estimated at 700 million cubic meters (mcm)[2], of which the annual industry share (of both the Israeli Dead Sea Works (DSW), and the Jordanian Arab Potash Company (APC)), is estimated to be 330 mcm of water loss through evaporation annually. This is a significant and increasing percentage of the annual estimated deficit of 700 mcm facing the Dead Sea[3]. The contribution of industry actions towards the demise of the Dead Sea according to these independent best estimates is therefore presently a noteworthy 47% of the total annual sea level decline.

Unlike any other water source in the region where consumers (in industry, agriculture or individuals) pay for the water that they consume, mineral extraction companies are able to freely pump water out of the Dead Sea and into evaporation ponds without the need to pay any fees. There is also no public monitoring of water quantities withdrawn or need for a water license. While both DSW and APC do pay a royalty for the minerals they extract, they have no incentive to conserve water as they extract those minerals, given that they have unlimited Dead Sea water access free of charge. On the contrary, the faster the rate of evaporation and production, the greater the profit margin for Dead Sea industries. This situation enables the industries to externalize the environmental costs of their operation which encourages further demise of the Dead Sea ecosystem.

Urgent measures are required to alter the operation of the mineral extraction industries in order to stabilize the Dead Sea and reduce the highly negative impacts of its demise.

Perpetuating the current situation reflects a clear lack of value (price) given to Dead Sea waters as a scarce natural resource. Since the industries have no interest to make public the information regarding the feasibility of alternative technologies for Dead Sea mineral extraction, FoEME asserts that the development of such technologies with potentially lower environmental costs is a public interest and should be led by the government.

Priority Initiative:

Putting a price on Dead Sea water extraction and promotion of alternative mineral extraction technologies.

Objectives:

• De-linking or considerably reducing present water withdrawals and mineral extraction by industry and thereby reducing the further demise of the Dead Sea.

[1] Water Level Watch 2012, Eli Raz

[2] Final Report: Red Sea - Dead Sea Water Conveyance Study Program Dead Sea Study, p.3

[3] Final Report: Red Sea – Dead Sea Water Conveyance Study Program, Dead Sea Study, August 2011, Tahal, GSI, conducted for World Bank

Figure 2: Dead Sea Works industry, Israel, Photo: FoEME

Figure 3: Sinkholes near Route 90 by the Dead Sea, Photo: FoEME

• Change of government policies in Israel and Jordan so that a water fee per cubic meter extracted is charged. Water fees charged to industry should consider costs of the environmental impact on the surrounding Dead Sea area stemming from the decreasing water level.
• Government licensing, metering and monitoring of Dead Sea water quantities pumped by industry with targets for reduction of pumping levels required by law.
• Promotion of research and development of alternative technologies for mineral production that minimize loss of sea water by creating a public led research and development fund for the purpose.

Background Issues Relevant to the Priority:

The issue of the Dead Sea has been one of national and international significance for years, leading to promotion of projects such as the World Bank led "Red Sea – Dead Sea Conduit" which a decade later has yet to finalize even the release of project studies. FoEME has always emphasized the importance of looking at the root causes for the decline of the Dead Sea and addressing feasible solutions that untangle these root causes through policy, best scientific practices, and economic incentives.

This Priority Initiative is the most recent effort by FoEME to identify and promote solutions for wise management of the Dead Sea. FoEME is aware that the DSW in Israel has commissioned research on alternative mineral extraction through the use of membrane technologies. The fact that research of alternative technologies is currently taking place is in fact welcomed. A level of industrial secrecy on the grounds of competition and possible intellectual property rights is well understood. However, lack of government and public oversight in long standing research taking place when there are possibly several alternative technologies that could be developed to reduce the impact of industrial activities on the Dead Sea itself, is reflective of a public policy void.

Project Characteristics:

• Promotion of responsible use of Dead Sea resources through extensive public education highlighting the market failure presently in place as regards to Dead Sea water not having any price.
• Creation of a Dead Sea Stabilization Research Fund (DSSRF) either nationally or preferably jointly between Israel and Jordan, which prioritizes research of alternative technologies for mineral extraction. FoEME emphasizes the importance of publicly led and funded R&D, with findings remaining in the public sphere.

Cross-Border Impact:

The Dead Sea is recognized worldwide as a unique site with outstanding significance for health, history, industry, and culture. Without reversing the root causes for the demise of the sea, future generations of Jordanians, Israelis and Palestinians will not have the opportunity to enjoy this precious resource.

Furthermore, FoEME seeks to bring public attention to the Joint Environment Committee created under the Israel-Jordan Treaty of Peace. The Committee has not met for over a decade, while the issues discussed above should be a significant cause for convening a Committee meeting so that an integrated cross border response is achieved for the benefit of all who live around the Dead Sea.

Figure 4: Evaporation ponds on the Jordanian side of the Dead Sea, Photo: FoEME

7 AGRICULTURAL AND ENVIRONMENTAL COOPERATION BETWEEN JORDANIAN AND ISRAELI FARMERS

Figure 1: Fertilizing practices in South Ghor, Photo: FoEME

Partnering Communities:

Tamar Regional Council – Israel

South Ghor Municipality – Jordan

Shared Waters:

As described above

Problem Statement:

Houseflies are a major nuisance on both sides of the southern Dead Sea within South Ghor Municipality and Tamar Regional Council. The problem is at its worst during the long summer months when residents cannot leave food outside without expecting it to turn black with flies within seconds. For both sides, the flies are a barrier to socio-economic development, especially within the tourism sector, as tourists are unlikely to want to spend time in such unpleasant conditions. The flies also lower productivity of area workers and may be a source of public health concerns.

Although Tamar RC spends a substantial amount of money on a yearly basis in order to alleviate the housefly problem, which is considered an issue of the highest priority, efforts have not been effective. An in-depth study by Ben-Gurion University (BGU) researchers identified direct application of

Figure 2: Map of Southern Dead Sea area, Source: FoEME

Figure 3: Cross border visit to South Ghor, 2011, Photo: FoEME

raw chicken manure to fields as fertilizer by Jordanian farmers as the primary source of the infestation, making additional funds invested on the Israeli side irrelevant.

At the same time, the highest priority for South Ghor residents is the improvement of financial security for the struggling agricultural economy. With an unemployment rate of 50.1%, South Ghor is considered one of the poorest communities in Jordan. The vast majority of households make their living from agriculture and employment opportunities are available only seasonally. Among residents there is a desire to transform the currently volatile, low income-generating agricultural industry into one that is more secure and profitable, making better use of dwindling water resources and improving infrastructure.

Priority Initiative:

The creation of a "model farm" that will promote sustainable agricultural cooperation between Jordanians and Israelis. The project will combine Israeli experience and technology with local Jordanian knowledge and available land and water resources in order to promote economic development and pest mitigation through sustainable agricultural methods.

Objectives:

- Improved economic profitability of agriculture in South Ghor.
- Exchange of appropriate agricultural technology and information between Israeli and Jordanian farmers.
- Identification of traditional crop strains that is particularly well-suited to the local environment.
- Overcome the housefly problem on both sides of the border by improving farming techniques and mitigating use of raw chicken manure on fields.

Background Issues Relevant to the Priority:

There is a rich history of cooperation between Tamar RC and their Jordanian neighbors in the South Ghor Municipality. Since 2007, FoEME facilitated the signing of a Memorandum of Understanding (MoU) by the respective mayor and governor of these two communities. In the MoU, the two leaders pledged to work together to promote sustainable development along the southern shores of the Dead Sea noting the importance of agriculture and tourism as the two primary sectors in the area. Furthermore, the MoU declared a determination to work cooperatively to "implement a concrete solution to the fly problem caused by poor agricultural practices."

With increased attention given to the cross border fly problem the Jordanian Ministry of the Environment passed a by-law banning the use of raw chicken manure as a fertilizer in agriculture and with donor support encouraged the building of a chicken manure factory in the Jordan Valley. The factory was built in the middle of the Jordan Valley and while the situation in the Jordan Valley has much improved, the distance of the compost factory to the southern Dead Sea area and the associated cost of transportation, together with a lack of enforcement, have resulted in little improvement in the fly problem for the southern areas of the Dead Sea.

In 2011, FoEME, in cooperation with the Dead Sea-Arava Science Center decided to approach the issue from a more comprehensive perspective and held three cross-border meetings to clarify the broader mutual interests and needs of each side. The result of these meetings is the subsequent identification of the model farm as a community priority.

In addition to agricultural cooperation, there have also been recent developments surrounding an initiative to open a border crossing between Tamar RC and South Ghor. Originally raised through the GWN project, this idea has progressed from local to national governmental agencies and is currently moving forward within diplomatic channels. The opening of such a border crossing would mean closer socioeconomic relationships and greater ease for cross border travel between the two communities in the future.

Project Characteristics:

• Establishing a model farm in South Ghor that will serve as an agro-educational center. The site will exhibit examples of agricultural technologies that are economically profitable and environmentally sound.
• The model farm will be located on privately owned farm land.
• Coordination of cross-border visits for both Jordanian and Israeli farmers to either side of the border to exchange ideas, experiences, technologies, and culture.
• Creation of an on-site compost facility to process the chicken manure before application on the fields.
• In order to leverage benefits from different stakeholders, there will be close cooperation between participants. Israeli agro-experts and trainers will work in close cooperation with local farmers' unions and government agencies to ensure the utmost efficiency and positive outcomes.

Cross-Border Impact:

Both sides of the border will benefit from the promotion of improved agricultural methods. This effort will both enhance the livelihoods of South Ghor farmers while at the same time alleviate the housefly problem, an issue that has been recognized for years as a public health hazard and barrier to socio-economic development.

Figure 4: Memorandum of Understanding signing between South Ghor and Tamar Mayors, 2007, Photo: FoEME

8 WASTE WATER SANITATION SOLUTIONS FOR THE GWN COMMUNITIES IN JORDAN

Partnering Communities:

Al-Hemma
Al-Hemma (Al Mkhaiba Al Fouqa) is located 40 km north of Irbid within the lower basin of the Yarmouk River. Approximately 300 families reside in Al-Hemma in 280 houses, forming a population of 2,500.

Area	8 km^2
Population	2,500
Economic Opportunities	Public sector, tourism and agriculture
Unemployment	43.5%
Partnering Communities	Jordan Valley Regional Council, Israel

Muaz ben Jabal
The Muaz Bin Jabal municipality consists of a total area of 40 km^2 but the population of 45,593 inhabitants live primarily within a 10.25 km^2 built-up area. Approximately 5,410 families reside in 6,677 houses, with an average of 6 persons per household[4].

Area	10.25 km^2
Population	45,593
Economic Opportunities	Agriculture and public sector
Unemployment	31%
Partnering Communities	Jordan Valley Regional Council, Israel

Sharhabil ben Hassneh
Sharhabil ben Hassneh Municipality is located southwest of Irbid on the East Bank of the LJR. The Municipality consists of two main residential areas, Al-Kraymeh and Wadi Al-Rayan. It has a total area of 65 km^2, a population of 31,934, and an average of 4.9 residents per household[5].

Area	65 km^2
Population	31,934
Economic Opportunities	Agriculture and Public sector
Unemployment	40.1%
Partnering Communities	Beit She'an City & Valley of Springs Regional Council, Israel

Tabkat Fahal
Tabkat Fahal (also known as Pella) is located South of Muaz bin Jabal, 130km north of Amman. The municipality is a medium-sized cluster of towns and villages (the largest two being Al Masharea and Sheik Hussein) with a built-up area of 6.03 km^2 and a total area of 62.5 km^2. The population of 29,144 inhabitants consists of 5,190 families residing in 4,768 houses.

Area	6.03 km^2
Population	29,144
Economic Opportunities	Agriculture
Unemployment	41%
Partnering Communities	Beit She'an City & Valley of Springs Regional Council, Israel

[4] Department of Statistics, 2010.
[5] Department of Statistics, 2010.

Deir Allah
Deir Allah Municipality is situated in the middle of the Jordan Valley. Deir Alla's population of 60,000 people live in 7,010 houses at an average of 6.1 people per household. These homes are clustered in towns and villages including Abu Obideh, Al Balawneh, Dirar, Sawlheh and Muadi[6].

Area	25 km^2
Population	60,000
Economic Opportunities	Agriculture
Unemployment	45.9%
Partnering Communities	Al Auja and Jericho, Palestine

South Shouneh
The South Shouneh Municipality is 30 km southwest of Jordan's capital city of Amman. 43,135 inhabitants reside within 300 km^2 with an average of 6.6 persons per household[7].

Area	300 km^2
Population	43,135
Economic Opportunities	Agriculture
Unemployment	51.4%
Partnering Communities	Auja, Palestine

Ghor Safi
Located on the southern coast of the Dead Sea and at 300-350 meters below sea level, the South Ghors Municipality (including Ghor Mazra'a, Ghor Haditheh, and Ghor Safi) had a population of 40,203 in 2007 and the municipality estimates it has since increased by 7,000. Residents live in approximately 6,000 houses with an average of 6.9 persons per household[8].

Area	375 km^2
Population	Approx. 47,200
Economic Opportunities	Agriculture & Potash industry
Unemployment	50.1%
Partnering Communities	Tamar Regional Council, Israel

Ghor Fifa
Ghor Fifa is located on the southern end of the Dead Sea in the South Ghor district, at 350 meters below sea level. Although rapidly increasing, the population currently consists of approximately 2,108 residents living in about 370 houses, 113 of which are tents[9]. The community draws its surface water from two wadis—Fifa and Numira—and pipes groundwater from the city of Karak.

Area	6.03 km^2
Population	2,108
Economic Opportunities	Agriculture
Unemployment	40%
Partnering Communities	Tamar Regional Council, Israel

[6] Deir Alla municipality, June 2012.

[7] Ministry of Planning and International Cooperation. "Poverty Pocket Study."Al-Balqa: January 2005. P 03.

[8] Directorate for Social Development. Study for South Ghor. South Ghor: 2007. pp 2.

[9] Directorate for Social Development, 2007. pp 2.

Problem Statement:

Building on more than a decade's experience with communities in the Jordan Valley, FoEME staff and field researchers conducted meetings and field visits in 2011 with the valley's eight Good Water Neighbors Communities to identify their most pressing environmental problems. Local political leaders, farmers, teachers, and other community members from all eight communities identified lack of wastewater management as their most urgent concern[10].

These communities do not have piped wastewater networks and most are far from existing wastewater treatment plants. They are among the LJR Basin's rural population of 660,000 residents who are not connected to wastewater plants, yet produce about 20 mcm/yr of wastewater[11]. Instead, residents rely on cesspits to handle their household wastewater.

Figure 1: Poorly covered cesspit, June 2012, Photo: FoEME

Cesspits are dug-out holes that store untreated wastewater. In the Jordan Valley, most houses have their own cesspit, though occasionally small clusters of houses share cesspits. Unlike septic tanks, which use anaerobic bacteria to partially decompose waste, cesspits simply store wastewater. They must be pumped out frequently to dispose the waste elsewhere. Most cesspits are lined with concrete on the sides but are unlined on the bottom. Some households use pits without any concrete lining or with holes cut into the concrete walls to allow water to empty out more quickly. This reduces the frequency with which families need to pump the pits but allows untreated wastewater to seep into the soils around the tank, polluting ground and surface water. In addition, many cesspits are inadequately covered with loosely fitting plastic or corrugated iron, which allows insects to breed in the liquid and allows emission of bad odors. Poorly-constructed cesspits are vulnerable to overflowing during rain because soils are too saturated for the normal seepage process to empty liquids from the pits. The effluents overflowing into the streets pose a public health hazard.

For example, Muhammed Sliman Alsaket, who has been living in Musharaa for 50 years and is the head of the local environmental society, reports that in many homes in his community, "holes are dug without any reinforcement or use of cement. The hole is supported by no more than dirt from all sides." Cesspits should be pumped at least once each month in order to function properly, however one resident of Himma reports that he has not pumped his cesspit in 6 years.

There is one wastewater treatment plant in the Jordan Valley (Tal Al Mantah) and one near Irbid (Al Akaider), with two additional plants under construction in North Shouneh and Ghor Safi. Some communities have access to these wastewater treatment plants (Tal Al Mantah for Northern communities and Al Akaider for villages surrounding Irbid). However, without a pipe network or any public service for wastewater management, households must voluntarily pay to have waste from their cesspits pumped out and taken by tanker truck to the treatment plants. Along the way, truck drivers frequently dump the waste illegally in wadis to save fuel costs.

The capacity of Tal Al Mantah Treatment Plant is low, at 400m^3/day and needs extensive rehabilitation. Al Akaider is located too far from these communities to provide water treatment.

Construction of two additional plants in Ghor Safi and North Shouneh has begun, but neither is operational as of this document's publication. The North Shouneh plant funded by the United States Agency for International Development (USAID) is expected to open soon, but the Ghor Safi plant has been delayed by funding shortfalls and equipment theft. Private contractors pump cesspits and dump the contents in nearby wadis. Though environmental police have been diligent in responding to alerts of unauthorized dumping, residents report ongoing dumping in Wadi Al-Arab and other wadis leading to the LJR and overlying aquifers.

There are presently no plans for new wastewater treatment plants servicing Jordan Valley Communities.

Priority Initiative:

Preparation of a sanitation master plan for the Jordan Valley with a particular focus on advancing waste water sanitation solutions for the eight GWN Communities in Jordan.

Background Issues Relevant to the Priority:

Impacts of Improper Disposal of Wastewater on Shared Waters Environmental and Economic Impacts

Soils in the Jordan Valley are predominantly sandy loams, which allow liquids seeping from cesspits to permeate underlying aquifers. Lying within the LJR watershed, these cesspits pass contaminants into the river. The pollution of groundwater threatens drinking water for a wide range of communities and the pollution of the LJR and its tributaries negatively impacts wildlife. Long-term use of cesspits threatens soil fertility by altering microbial activity and changing the Carbon-to-Nitrogen ratio[12]. In largely agricultural communities, this can be very detrimental over the long-term.

[10] Bromberg et al. Good Water Neighbors: Identifying Common Environmental Problems and Shared Solutions. Amman, Bethlehem, Tel Aviv: EcoPeace/ Friends of the Earth Middle East, 2007.

[11] Wolf, Leif, and Hotzl, eds. SMART - IWRM : Integrated Water Resources Management in the Lower Jordan Rift Valley; Project Report Phase I. KIT Scientific Publishing, 2011.

[12] S.Stamatiadis et al, "Field and laboratory evaluation of soil quality changes resulting from injection of liquid sewage sludge" University of Nebraska – Lincoln, 1999.

Figure 2: Tal Al Mantah treatment plant, August 2012, Photo: FoEME

This method of wastewater disposal poses a heavy economic burden for the community. For families earning an average monthly salary of 80 JD, such as in Ghor Safi, the pumping cost of 20 JD per month is prohibitive.

The Jordan Valley's religious significance, its unique location where the Great Rift Valley merges with the Fertile Crescent and its historical heritage make it a great candidate for tourism initiatives. However, the issue of poor wastewater management creates a major obstacle in tapping into this tourism potential in the area. When 10% of Jordan's Gross Domestic Product comes from tourism, this is a great loss of opportunity.

Public Health Impacts

Existing cesspits threaten the health of local residents and those sharing the underlying aquifers. On a local level, cesspits provide a breeding ground for pests that can act as vectors for diseases. Leishmaniasishas been identified as a significant problem in the mid-Jordan Valley region[13] and is spread by sandflies that breed in cesspits, among other places. Contamination of drinking water with high levels of nitrates and coliform bacteria endanger all those sharing the water source. For instance, researchers linked dangerous levels of these pollutants in Wadi Kufranja, a water source for Sharhabil bin Hassneh, to the use of cesspits in 1999[14].

Community members are deeply concerned about the health impact of these cesspits. For example, Nawaf Al-Shwahin of Hemma expressed his worries with FoEME researchers that cesspits cause Leshmaniasis, malaria, insects, and asthma. Because no viable alternatives exist, however, he and his neighbors continue to rely on leaking cesspits.

Responsible Authorities

The Ministry of Water and Irrigation (MWI) is the authorized party responsible for the monitoring and management of all water resources and wastewater in Jordan. As the overarching body related to all water resources' management, the ministry is also in charge of the research, planning, and development of water-related projects, formulation of national water strategies and policies, and the provision of information systems in the Kingdom. Finally, it provides the government with data about centralized water issues, and standardizes and consolidates this data.

Within the Ministry of Water, there is no distinct authority that has full jurisdiction over Jordan Valley wastewater management. The three main bodies whose roles overlap regarding wastewater management are the Water Authority of Jordan, the Jordan Valley Authority, and the municipalities themselves.

Water Authority of Jordan (WAJ)

Procedures that are assigned by MWI are executed by the WAJ. Localized divisions execute tasks assigned including decisions concerning wastewater projects.

Jordan Valley Authority

The Jordan Valley Authority (JVA) was founded in 1977 and was granted jurisdiction to oversee socio-economic growth encompassing water resource management as well as the spread, functioning, and maintenance of irrigation facilities in the Jordan Valley, under JVA Law No. 19 for 1988, last revised in 2001. The JVA Law does not directly mention wastewater services, although Art. 3.a. alludes to the preservation of water resources[15].

Summary of Impacts

While the full impacts are too numerous to detail, the impacts described in this document form the base of the argument to address the wastewater situation in the Jordan Valley.

1. Pollution of surface water including the LJR and its tributaries
2. Pollution of groundwater sources
3. Financial burden on residents to emptying cesspits
4. Missed economic opportunity through unattained tourism potential
5. Decreased soil fertility in agricultural communities
6. High risk of vector-borne diseases
7. Contamination of drinking water

[13] "Tropical Medicine & International Health" Mosleh et al,2008.

[14] Al-Kharabsheh. "Influence of Urbanization on water quality at Wadi Kufranja basin." Journal of Arid Environments Vol 43, no. 1 (1999) pp. 78-89.

[15] Jordan Valley Authority. Jordan Valley Authority Law No. 19. 1988 last amended in 2001.

Figure 3: A neighborhood in Al Masharaa, August 2012, Photo: FoEME

Municipalities

The municipalities are very limited in their authority over major projects in their areas. With no real decision making power, municipal councils submit requests for projects to ministries, in this case, the Ministry of Water and Irrigation. If approved by the MWI, municipalities are responsible for monitoring and oversight of the execution of projects contracted by WAJ.

Furthermore, municipalities are in charge of enforcing health regulations in their areas which includes monitoring cesspit violations. These regulations are poorly enforced and violations are rarely reported due to low fines and a familial culture that values loyalty within small communities.

Overlap in Jurisdiction and Need for a Strategic Approach

Because of overlap in jurisdiction of relevant government agencies, it is unclear who from the JVA, WAJ, or MWI is primarily responsible for the development of a wastewater treatment network. The 2009 Water Strategy for Jordan sets forth a more reformist scheme for a procedural reshaping of the water and wastewater sectors. The Strategy criticizes the detached nature of performance and cooperation between the MWI, WAJ, and JVA. It is the MWI that is in charge of initiating the development of a wastewater master plan for the Jordan Valley. However, the Secretary General of MWI informed FoEME that no master plan has been studied for sanitation issues in the Valley since a 1995 World Bank Study[16]. A study conducted by Metcalf and Eddy in collaboration with Consolidated Consultants in the 1990s concluded that connecting houses in the Jordan Valley through a wastewater network was not feasible. The first justification for this determination was the existence of a low population density scattered on a wide area of land. However, the 1994 population of 200,000 residents in the Jordan Valley has since grown to 660,000 residents in 2011. The study also identified the intersections of pipes with the King Abdullah Canal as a major barrier; this problem can now be solved with new trenchless technologies. It is obvious that a new feasibility study is urgently needed.

Project Characteristics:

All eight Jordan Valley communities are in need of a healthy, sustainable method of dealing with wastewater. A wastewater collection network is the most desirable and efficient solution. However, several options exist for treatment, including greywater systems, constructed wetlands, and septic tanks with leech fields. Variations in population density, soil type, and elevation indicate that a single solution may not be ideal for all eight communities. Therefore, a feasibility study is needed to assess the conditions in each community or cluster of communities and to determine what treatment method would be best. This feasibility study needs to be carried out in cooperation with local municipalities, the Water Authority of Jordan and the Jordan Valley Authority. Ideally, the study would empower local municipalities and improve their management capacity.

Wastewater Networks and Treatment Plants

Piped networks connected to a wastewater treatment plant are the most common system of wastewater disposal in towns and cities in Jordan. A piped wastewater collecting system conveys wastewater produced from households through a network to a treatment plant. In 2008, 62% of Jordanian residents were served by a wastewater network. The Water Authority of Jordan expects this figure to rise to 70% by 2012. There are no plans however to extend wastewater networks to Jordan Valley communities.

In the Jordan Valley, the first and only operational treatment plant in use since November 2004 is in Tel Al Mantah, with a capacity to treat 400m3/day. While the Water Authority of Jordan (WAJ) is responsible for the treatment plant itself, the Jordan Valley Authority (JVA) manages the water reuse activities. The North Shouneh treatment plant, primarily funded by USAID, is now under construction. Once operational, the plant is designed to treat up to 1200m3/day, drawing wastewater from municipalities in northern Jordan. Not all surrounding communities will be served immediately by the plant however. North Shouneh is not expected to serve

[16] Majed Joudeh, Water Authority of Jordan. Interviewed by authors. Amman: 7/8/2012.

Figure 4: An open space where wastewater is being disposed of in Ghor Safi, 2012, Photo: FoEME

the municipality of Muath Bin Jabal, for example, until 20 years after opening. In the short and medium term, around 33 small communities (many with a population of less than 2000) in the region can be served. The treatment plant will consist of several lagoons, sand filters, reed beds, and drying beds. It is a low-cost, low-tech solution for treating wastewater delivered by tankers. The effluent will be used mainly for agricultural purposes. Until the plant in North Shouneh is functional, wastewater tankers in Muaz ben Jabal Municipality continue to dispose of the wastewater in a nearby wadi.

In South Ghors (Ghor Safi & Ghor Fifa) Municipality, a small treatment plant was funded by the European Union but never operated. An article from Al-Ghad newspaper suggests that the treatment plant failed because it did not meet the required specifications of South Ghor Municipality and WAJ[17]. With no nearby treatment plant or designated dumping site, randomly selected open spaces are used to dispose of wastewater as the picture below shows.

Al Akaider is a wastewater treatment plant that serves the northern cities of Jerash, Irbid, North Shouneh, and Ramtha. The treatment plant was designed with a capacity of 4000 m3/day; it receives now an average of 3232 m3/day. The average amount of treated wastewater produced from Al Akaider is 2790 m3/day and is totally used for irrigation[18].

Jordan's population is projected to increase significantly over the coming years because of the country's high fertility rate at 3.8 births per woman and because of huge influxes of refugees from neighboring countries as a result of unstable political conditions[19]. This increases the strain on the country's water supply. Scarcity of water is Jordan's severest challenge. Water shortage and the high demographic growth during the second half of the 20th century listed Jordan as the fourth poorest country in the world in terms of water resources. With limited water resources, protection of ground and surface

Figure 5: North Shouneh treatment plant, 2012, Photo: FoEME

Figure 6: North Shouneh treatment plant, 2012, Photo: FoEME

[17] Mohammad Eshaibat "South Ghor: the dream of advancement of the less fortunate areas turning the province into failure development projects" Al Ghad newspaper, June 2012.

[18] Water Authority of Jordan, August 2012.

[19] The World Factbook 2009. Washington, DC: Central Intelligence Agency, 2009.

water from all types of pollutants should be a top national priority. The LJR, Yarmouk River and Zarqa River are the major sources for surface water in Jordan. However, the Jordan and Zarqa rivers are severely polluted. This problem is compounded by extensive pollution from cesspits.

Proper wastewater management in the Jordan Valley will reduce current risks to public health, provide reused water for irrigation of agricultural produce, and reduce strain on limited groundwater resources in addition to reducing pollution of the LJR.

With European Union financial support, FoEME is currently undertaking a regional integrated NGO Master Plan for the Jordan Valley. A Jordan NGO Master Plan will be developed as part of this effort that will propose sanitation solutions in the Valley. Extensive public consultation in the Jordan Valley is scheduled to begin in 2013.

FoEME will seek Jordanian Government and donor support to implement recommendations for the wastewater solutions proposed in the Jordanian GWN communities.

Cross-Border Impact:

Without an integrated approach to sanitation solutions along the full length of the Jordan Valley, FoEME's Lower Jordan River rehabilitation water quality targets will not be met. Without removal of sewage from or seeping into the river from all sides, water authorities at the regional level will be reluctant to release fresh water back to the river system.

Figure 15: Tanker dumping wastewater in Wadi Al Arab, July 2012.

Bibliography

1. Afaneh, Baha and Tatyana Gorskaya Afaneh. Lower Jordan River Rehabilitation Project: Transboundary Diagnostic Analysis, Jordan. Amman:EcoPeace/Friends of the Earth Middle East, 2010.

2. Al-Kharabsheh. "Influence of Urbanization on water quality at Wadi Kufranja basin." Journal of Arid Environments Vol 43, no. 1 (1999) pp. 78-89.

3. Bromberg et al. Good Water Neighbors: Identifying Common Environmental Problems and Shared Solutions. Amman, Bethlehem, Tel Aviv: EcoPeace/Friends of the Earth Middle East, 2007.

4. Department of Statistics, Survey of Family Expenditure and Income, 2010.

5. Directorate for Social Development. Study for South Ghor. South Ghor: 2007. pp 2.

6. Dombrowsky, Ines, Waltina Scheumann, Nele Lienhoop, Tamer Al Assad, Sawsan Zaater, and Ra'ed Daoud. The Role of the Institutional Setting for Decentralized Wastewater Treatment and Reuse: A Case Study of Jordan. Karlsruhe, Germany: University of Karlsruhe, 2010. http://www.iwrm-smart.org

7. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1014&context=agronomyfacpub; http://www.sciencedirect.com/science/article/pii/S0167880997001291. Last accessed 12 August 2012.

8. Jordan Valley Authority. Jordan Valley Authority Law No. 19. 1988 last amended in 2001.

9. Ministry of Planning and International Cooperation. "Poverty Pocket Study."Al-Balqa: January 2005. P 03.

10. Ministry of Water and Irrigation. Water for Life: Jordan's Water Strategy 2008-2022. Amman: Ministry of Water and Irrigation, 2009.

11. S.Stamatiadis et al, "Field and laboratory evaluation of soil quality changes resulting from injection of liquid sewage sludge" University of Nebraska – Lincoln, 1999.

12. Mohammad Eshaibat "South Ghor: the dream of advancement of the less fortunate areas turning the province into unsuccessful development projects" Al Ghad newspaper, June 2012.

13. "The Historical Evolution of the Water Resources Development in the Jordan River Basin in Jordan". Rebhieh Suleiman.

14. The World Factbook 2009. Washington, DC: Central Intelligence Agency, 2009.

15. "Tropical Medicine & International Health" Mosleh et al,2008.

16. Water Authority of Jordan. "Water Authority of Jordan". Accessed July 26, 2012. http://www.waj.gov.jo/sites/ar-jo/SitePages

17. Wolf, Leif, and Hotzl, eds. SMART - IWRM : Integrated Water Resources Management in the Lower Jordan Rift Valley; Project Report Phase I. KIT Scientific Publishing, 2011.

www.foeme.org

Amman Office
PO Box 840252 - Amman, Jordan, 11181
Tel: +962 6 5866602/3
Fax: +962 6 5866604
Email: info@foeme.org

Bethlehem Office
PO Box 421 – Bethlehem, Palestine
Tel: +972 2 2747948
Fax: +972 2 2745968
Email: info@foeme.org

Tel Aviv Office
90 Begin Road – Tel Aviv, 67183 Israel
Tel: +972 3 5605383
Fax: +972 3 5604693
Email: info@foeme.org