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Financial Innovations Lab Report

*Financial Innovations for
Freshwater Revitalization:
Transboundary Project Finance in Israel,
Jordan, and the Palestinian Authority*

FINANCIAL INNOVATIONS LAB REPORT



MILKEN INSTITUTE

Financial Innovations Labs bring together researchers, policy makers, and business, financial, and professional practitioners for a series of meetings to create market-based solutions to business and public policy challenges. Using real and simulated case studies, Lab participants consider and design alternative capital structures and then apply appropriate financial technologies to them.

This Financial Innovations Lab Report was prepared by Caitlin MacLean and Glenn Yago.

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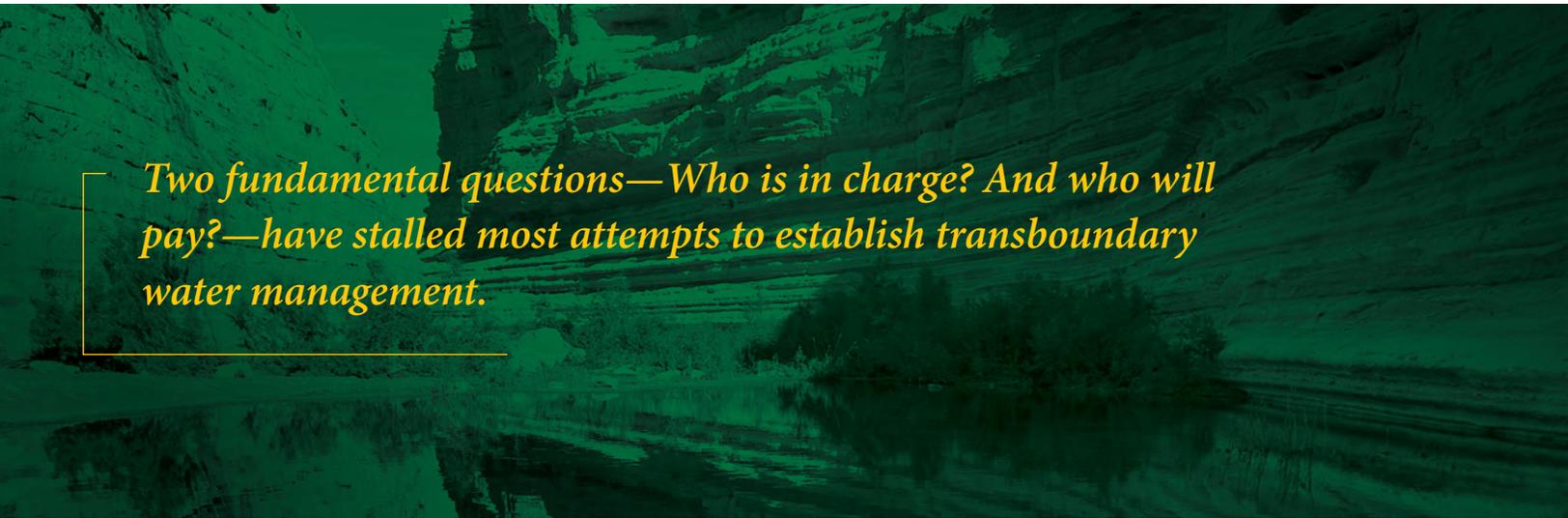
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Two fundamental questions—Who is in charge? And who will pay?—have stalled most attempts to establish transboundary water management.

INTRODUCTION

In much of Israel, Jordan, and areas under Palestinian Authority control, water is noticed largely for its absence.¹ In many West Bank towns, the only water accessible to Palestinians may be in the buckets they fill from tanker trucks owned by Israel's national water company. A Jordanian farmer on the outskirts of Amman faces the lingering effects of drought and another potential crop failure. Israeli fishermen wade through garbage, marine debris, and industrial and residential pollutants up and down the Mediterranean coast. Riverbeds are dry. Over-consumption, desertification, and inadequate infrastructure planning and management plague the region. Across all borders, one thing is clear: everyone is running out of water.

The issue of water management is rife with political consequences, and not just for the Middle East, but for an alarming number of regions. Two-thirds of the world's population will face water scarcity by 2025, and this will emerge as one of the most volatile political issues in the decades to come.² Worldwide, authorities count 261 international river basins, or waterways that pass through two or more political boundaries.³ These rivers and their tributaries contain approximately 60 percent of the world's water resources.⁴ It is crucial, therefore, to improve transboundary water management that can bypass rivalries and hostilities, and become a basis for regional cooperation.

Israel, the Palestinian Authority, and Jordan share water resources—among them the Jordan River and other historically significant surface waterways—that have become overexploited or poisoned by sewage and industrial pollutants at a shocking rate. Despite attempts at collaboration, political tensions and bureaucratic barriers have impeded the development of sustainable cross-border water management. On the larger stage, international diplomacy has largely neglected the important—and very political—issue of water management, concentrating almost exclusively on “final status” negotiations related to the Israel–Palestinian conflict. Meanwhile, competing allocation plans have diverted the flow of the Jordan River to such an extent that it has dropped from more than 1.3 billion cubic meters a year to less than 100 million cubic meters. Aquifers in the West Bank fill with black wastewater that permeates from the ground above.⁵ The Kidron, flowing from East Jerusalem, runs with more sewage than water, a major source of peril for the Dead Sea.

Researchers and environmentalists worldwide have called for a comprehensive transboundary solution to restore the region's rivers and streams. That solution involves stakeholders in a variety of spheres, from finance and technology to government at all levels. The vision is complex, yet cross-border mechanisms are succeeding elsewhere around the world. This is the hope for a place where political tension is often palpable, and where cultures frequently clash.

Two fundamental questions—Who is in charge? And who will pay?—have stalled past attempts by local authorities, NGOs, and international development agencies that were unable to align transboundary interests because of ambiguous or undefined governance. Few direct multilateral approaches have been attempted because of the generally understandable reluctance to relinquish sovereignty over natural resources. Nonetheless, a number of short-term solutions (notably in the sometimes criticized Israeli–Palestinian Joint Water Committee) have been achieved on a “special purpose,” sub-sovereign basis.

As for the first question, cases do exist of thriving transboundary water management between and among nations. Examples include a four-nation transborder restoration plan for the Mekong River, and more than 160 conservation, restoration, and wastewater management facilities along the U.S.–Mexico border under the Border Environment Cooperation Commission. And with respect to the second question—Who will pay?—the United States has demonstrated the success of a financing model, reproduced in other countries, in which a state obtains funding from a larger entity (the federal government) and allocates the funds for various water treatment and reclamation projects. Created by Congress in 1987, the State Revolving Fund (SRF)⁶ allows states to leverage matching grants from the federal government with funding from philanthropic and private investment. The SRF has evolved into a sustainable model for financing river projects and facilitating the joint roles of national and local governments in water revitalization projects.

This report will explain how appropriate and fair contributions to a similar fund from the three different governments can leverage donor aid and other revenues under the management and oversight of an independent authority created by these same governments. The result would be a transparent, accountable, and risk-averse financial vehicle that develops sustainable transboundary water projects

for the environmental and public health, and economic benefit, of their citizens.

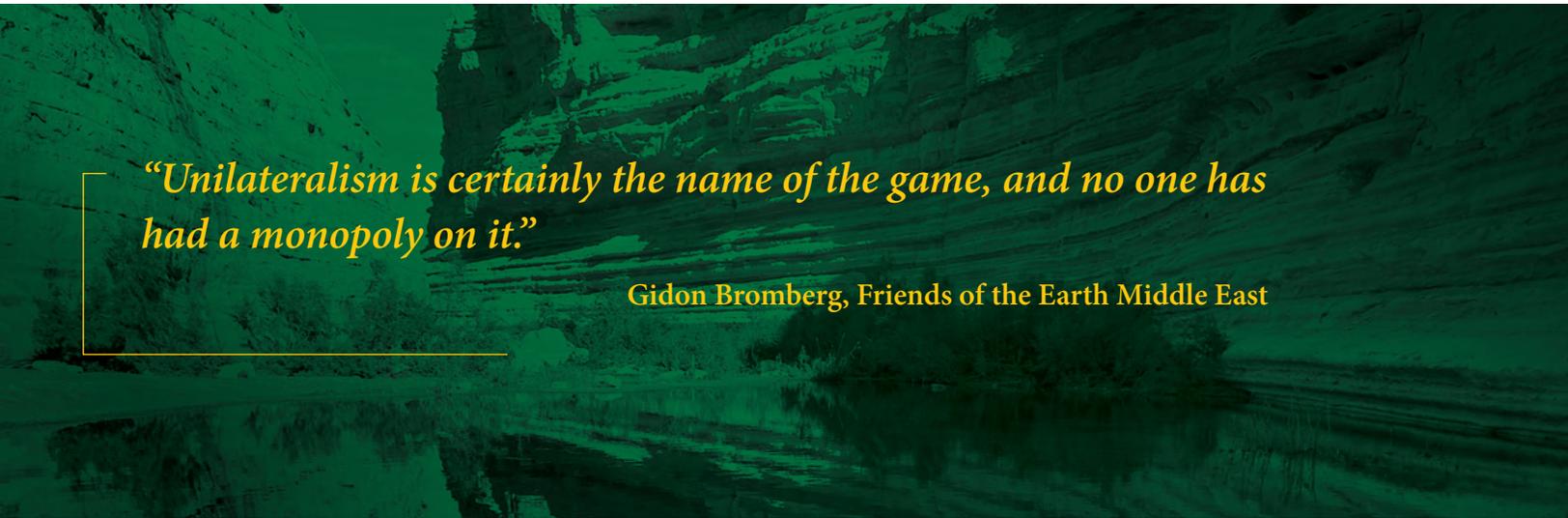
To examine the SRF model and its potential applications in the Middle East, the Milken Institute held a Financial Innovations Lab in November 2008 in Jerusalem. More than forty industry professionals, scientists, ministry officials, capital market investors, water engineers, and environmental experts attended from Israel, the Palestinian Authority, Jordan, and the United States. The session examined possible incentives and regulatory mechanisms that could offset the longstanding problems of refuse, sewage, and environmental neglect affecting the region’s transboundary river basins. Among the U.S. delegation



Members of the Palestinian Wastewater Engineers Group, in coordination with USAID, install local wastewater treatment cisterns in the West Bank.

Photo: courtesy of Monther Hind, Palestinian Wastewater Engineers Group.

were experts responsible for the creation of numerous SRFs in their home states, who explained the infrastructure and financing integral to the success of their programs. Participants also discussed regulatory, technological, and financial models that could generate water revitalization and economic growth in local economies.



“Unilateralism is certainly the name of the game, and no one has had a monopoly on it.”

Gidon Bromberg, Friends of the Earth Middle East

ISSUES & PERSPECTIVE

The Middle East is one of the world's most water-deprived regions, and not just in the Fertile Crescent. Throughout the Arabian Peninsula and North Africa, water shortages generate major problems. The scarcity of surface water in the region has resulted in the over-extraction of water from underground aquifers at a faster rate than the aquifers can refill. And due to the cross-border meanderings of the Middle East's few major waterways—the Jordan, the Tigris–Euphrates, the Nile, for example—it is inevitable that conflicts emerge over upstream and downstream demands, over dam building and irrigation requirements, and allegations of pollution.⁷

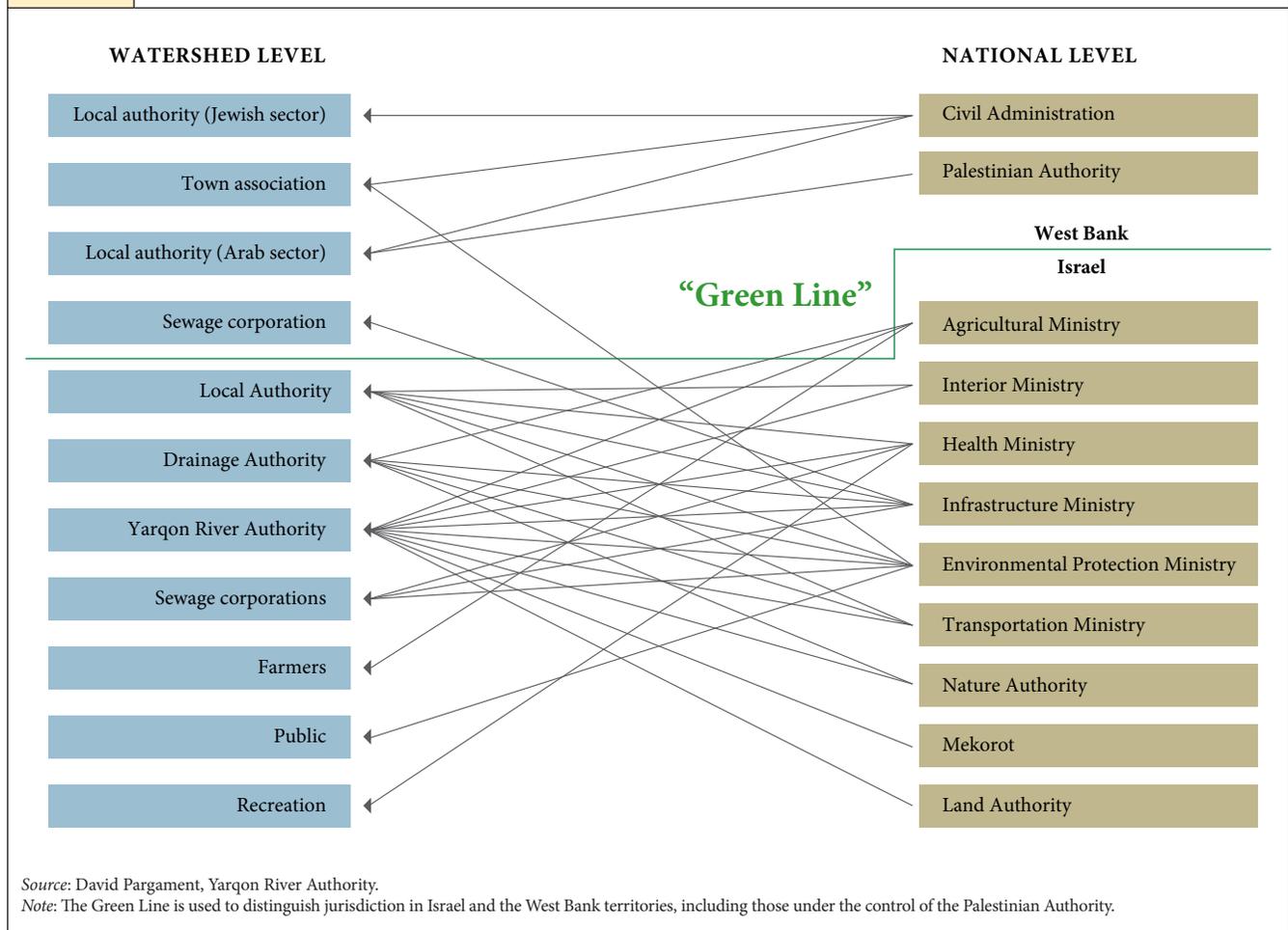
Israel, Jordan, and the Palestinian Authority all face unique internal challenges. Each has made efforts through the years to bring a semblance of collaboration to water restoration. Oslo II, signed by the Israelis and Palestinians in 1995, designated water allocation amounts, as well as the creation of a Joint Water Committee, which has had arguable results in the decade since its inception. And following the 1994 Israel–Jordan Peace Treaty, each state has had at least minimal control over its own resources. In the years since, however, cooperation has stalled, and each party faces significant threats to the shared water supply. Each has adopted a unilateral environmental policy that siphons off precious water resources for its own use. The lower Jordan River, for example, has been drained of more than 90 percent of its water, redirected for domestic and agricultural use.⁸ It has dropped to historically low levels, threatening the ecosystem dependent on its existence. On its way from Syria to the Dead Sea, the river feeds many of the region's lakes and streams, including the Sea of Galilee. Restoration of the Jordan is widely seen to be a project of the utmost importance.

Similarly, the Mountain Aquifer area of the West Bank—shared, albeit unequally, between Israel and the Palestinians—has suffered ecological destruction attributable to the untreated sewage of at least 2 million inhabitants.⁹ Because the eastern part of the aquifer feeds the lower Jordan River on its way to the Dead Sea, and the western part feeds important coastal streams, over-extraction affects the watershed of the entire region.¹⁰

Each government, as well as the ministries and agencies within that government, has its own regulations and regulatory processes in place, some more complex than others and serving competing interests. David Pargament, director of the Yarqon River Authority—one of the few agencies working specifically on transborder river watershed management—explained how tangled the governance web can be (see figure 1).

FIGURE
1

Governance surrounding the Yarqon River: The bureaucracy of river management



WATER MANAGEMENT BY COUNTRY

To begin to tackle the region's water crisis, it is necessary to understand the complexities of each area's water management. The following sections provide an overview.

Israel

Most of Israel's major rivers and streams, including its transboundary waterways, are dying. From the Kishon in the north to the Besor basin in the south, years of industrial and residential pollution and over-extraction have left a legacy of destruction. Increases in population and economic output have affected subterranean water sources, including the low-lying Mountain Aquifer. Necessity, at least, has served invention: Israel now leads the world in wastewater treatment, with 65 percent of its recycled water used for agricultural purposes.¹¹

In 1988, the government established the Ministry of Environmental Protection. However, it is just one of twenty-two ministries that handle legislation involving the environment.¹² In addition, thirty-five public authorities oversee local projects.¹³ More than sixty entities on the Israeli side alone have oversight of the Kidron, a stream that runs past Jerusalem and the West Bank.¹⁴ "All of these people may not be able to move a project forward, but most of them can stop it," said Lab participant Richard Laster, an environmental law expert from Hebrew University. Due to the sheer volume of bureaucratic red tape, funding requests and allocations for river restoration have been fraught with delays.

Jordan

Jordan's water scarcity ranks among the highest in the world, according to the United Nations, which has calculated the amount of water an individual needs per year for basic health and sanitation needs. Below 1,700 cubic meters, and an individual is living in "water stress"; below 1,000 cubic meters, in "water poverty." That doesn't bode well for Jordan, where the annual per capita allocation is only 145

cubic meters.¹⁵ The country's crisis begins with a scarce water supply but worsens due to an aging distribution network. A significant portion of Amman's water supply is lost to leakage and seepage on its way to local villages.¹⁶ When it does not disappear, it is ineffectively used. Agriculture, for example, contributes only about 1 percent of Jordan's annual GDP yet receives two-thirds of the nation's water supply.¹⁷

Jordan's Water Authority and the Ministry of Water and Irrigation determine the nation's water policies. In 2008 they introduced a campaign to increase the country's water supply to fill the projected 300 million cubic meter gap between supply and demand by 2022.¹⁸ The ministry has begun to expand wastewater treatment plans,

Only 31 percent of West Bank housing is connected to a sewage network.



View of Jordan River from Adam-Damya Bridge, a border crossing between Israel (the West Bank) and Jordan.

Photo: courtesy of Friends of the Earth Middle East.

and to use desalinated brackish water to alleviate some of the pressure from the agricultural industry. Because Jordan enjoys a relatively stable political position in the region, it has started collaborating with Israel and the Palestinian Authority on Jordan River issues. More needs to be done to restore the Yarmouk, a northern tributary of the Jordan, and to develop other solutions, such as the controversial link between the Dead and Red seas, and tapping the Disi aquifer in the south, to augment dwindling water resources.¹⁹

The Palestinian Authority

As its nascent government struggles with political uncertainty and corruption, the Palestinian Authority faces significant challenges just to provide potable water to residents and to deliver adequate water for agricultural use. Delays in well construction and wastewater recycling projects worsen the crisis, and primitive infrastructure for water delivery is another reason for significant water loss.²⁰ Per capita annual water availability is 75 cubic meters in the West Bank, approximately half the allocation for Jordanians.²¹ For many Palestinians, the only option is to purchase water from Mekorot, Israel's national water company, and to create their own methods of waste disposal. Only 31 percent of West Bank housing is connected to a sewage network,²² and unregulated disposal of solid waste and sewage has contributed to the destruction of local rivers and streams.²³

The Palestinian Water Authority was established in 1995. However, the Israeli Civil Authority, along with the Joint Israel–Palestinian Water Committee, oversees much of the zoned West Bank's hydrological operations. But a politically charged review process has proved ineffective, according to a recent U.N. report.²⁴ Since the Second *Intifada* in 2000, movement across the border has been severely restricted or blocked altogether, slowing construction and limiting water access, while dampening the likelihood for projects that could increase supply.

Threats of conflict, bureaucratic delays, governance issues, poor infrastructure, and a fledgling but crippled economy continually undermine Palestinian independence and contribute to dependence on Israel and international donor aid. Many donor projects remain unbuilt. Meanwhile, population growth is high “and there are real needs,” said engineer Monther Hind, general director of the Palestinian Wastewater Engineers Group.

Across all borders, ineffectual governmental policies and ineffective water aid have contributed to the ongoing water crisis. Lab participants acknowledged that governments are unlikely to relinquish sovereign rights over their water resources even as they begin to work together to reverse the destruction of the past. On a more positive note, they added, sub-sovereign entities do not compromise nationally established governance or inherent rights.

ACCOMMODATING SOVEREIGN STATE RIGHTS THROUGH SUB-SOVEREIGN SPECIAL PURPOSE ENTITIES

During the late nineteenth and early twentieth centuries, New York and New Jersey waged an intense political battle over control of the lower Hudson River, which empties into several large bays before reaching the Atlantic. The Treaty of 1834 apportioned the border between the two states. However, disagreement over control of the area continued because shipments arriving by boat into the New York harbor eventually had to reach the rail lines situated in New Jersey. In 1921, the two states established a governing body that would control the region's shipping operations without compromising the sovereign rights each state had to its land.

The new entity, the Port of New York Authority (later renamed the Port Authority of New York and New Jersey, or PANYNJ), permitted bi-state jurisdiction over 1,500 square miles centered on the Statue of Liberty.²⁵ PANYNJ oversees the largest port on the Eastern Seaboard, and the third-largest tonnage of shipped goods nationally. It is jointly headed by the governors of New York and New Jersey, who appoint six members to a board of commissioners. The Port Authority does not have the authority to tax citizens but maintains a cash flow based on the rents, tolls, and fees for services. It monitors the area's bridges, tunnels, and airports, and supports its own police force.

PANYNJ is an excellent example of a state's ability to relinquish control, while not giving up sovereign rights to its natural resources.

THE FUNDING CHALLENGE

Ineffective, self-interested governance is not the only barrier to transboundary water management. Finance is another. The Israeli, Jordanian, and Palestinian governments have limited budgets to restore the water resources within their own boundaries, let alone across multiple borders. Compounding the problem, these limited budgets are rarely leveraged with private capital.

Israel's Ministry of Environmental Protection has an annual budget of around \$50 million.²⁶ In fact, that total amounts to only one-tenth of Israel's annual expenditure on all environmental projects, but some Lab participants noted that Israel must spend \$6 billion to restore its rivers and streams.²⁷ Similarly, last year Jordan's Ministry of Irrigation and Water released a report predicting it will cost \$8 billion to meet basic water needs over the next twenty years.²⁸

The Palestinian Authority derives most of its funding from external aid. With few opportunities to generate local economic growth, the Authority's budget, including that of its Water Authority, is drastically underfunded. Most philanthropic donations come in as emergency relief and do little to promote long-term infrastructure development. Over the past two years, more than \$10 billion has been pledged to fill the Authority's gaping deficit.²⁹ However, there is little coordination between donors, leading to unstable aid flows; and mismanagement on the part of the Palestinian Authority worsens the situation. The mix of political strife and bureaucracy slows construction and frustrates the donor

community, said Lab participant David Katz of Hebrew University and Zalul. As a result, foundations and agencies are less likely to donate to long-term projects that will almost assuredly be postponed, sometimes indefinitely.

All three governments have ignored possibilities to leverage capital with private investment or philanthropic aid and have thus limited the scale and type of their projects. Money is available, but because of the complexities of watershed management and the legislative processes that transboundary water projects require, inefficiencies prevail. Overcoming these financial and operational gaps will require the collaboration of public and private capital through partnerships and joint ventures.

THE FINANCIAL INNOVATIONS LAB

Participants discussed transboundary management models in other countries, including U.S. State Revolving Funds. They also examined legislative cooperation between the United States and Mexico. Finally, they discussed the creation of a “finance facility” to develop, fund, build, and operate transboundary infrastructure projects. The facility would function solely to appropriate funding for river restoration in coordination with a sub-sovereign governing body.

Miriam Haran, head of the environmental management program at Ono Academic College in Kiryat Ono, Israel, and former head of the Ministry of Environmental Protection, moderated the first panel and provided an overview of the problem. Gidon Bromberg of Friends of the Earth Middle East set out the current issues in transboundary water management. Participants reviewed specific river and watershed case studies, putting each into a cross-border perspective. Presentations on the Kidron, Jordan, and Yarqon rivers generated discussion of integrated management possibilities.

The second session, moderated by Booky Oren of the Arison Water Initiative and former head of Mekorot, focused on watershed governance and technological solutions. Monther Hind, general director of the Palestinian Wastewater Engineers Group described village models that connect citizens to sewage networks and potable water. Sa'ad Abu Hammour, an engineer at the Jordan Water Company–Miyahuna, described legislative initiatives addressing the search for additional water resources. Participants discussed how to best incorporate new technologies into a sub-sovereign governing body.

The third panel focused on successful U.S. financing models. Peter Taylor, formerly of Barclay's Capital, Steve Townley of the Missouri Environmental Improvement and Energy Resources Authority, and Susan Weil of Lamont Financial Services Corporation explained how to structure a finance facility to leverage governmental grants with private and philanthropic investment. Participants discussed how revenue could be incorporated into this model and how local communities could benefit from a facility.

The Lab examined the following steps to create a transboundary, sub-sovereign finance facility:

Establishment of the finance facility governance. Self-interested, unilateral management has defined Middle East water governance. However, Lab participants agreed on the urgent need to structure operational and financial oversight that works across political and geographical boundaries. The governance of the finance facility must be viable for all parties if implementation is to occur.

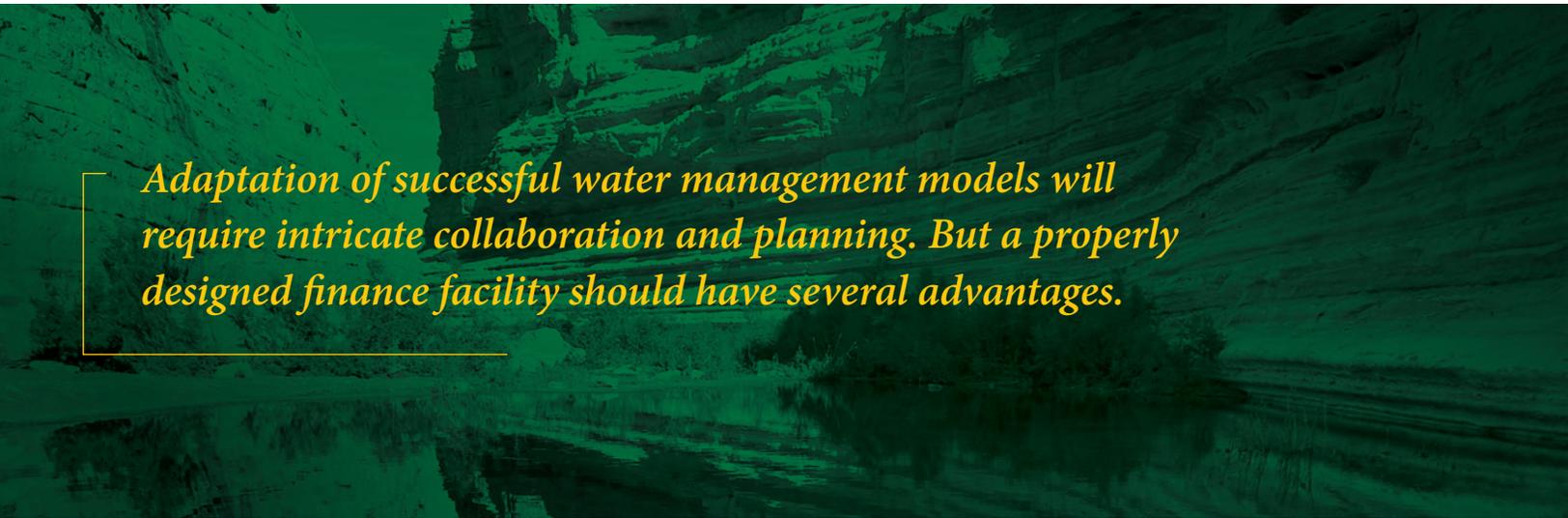
“The challenge of supplying fresh water is constantly increasing and the aging infrastructure cannot cope with the growing quantity and quality needs. It’s a real market opportunity.”

*Booky Oren
Arison Water Initiative*

Development of the financing structure. The finance facility would pool funding from the governments benefiting from the revitalization project, based on the U.S. revolving fund model. Philanthropic and country-specific aid is sizable but sporadic, and often ineffectively delivered. Consequently, the facility would also need to leverage any government funds with donations. Pooled fees, taxes, and levies could help ensure a steady cash flow for specific projects funded by the facility. And the rivers themselves have potential to add capital, from increased tourism and real estate taxes to wastewater treatment fees.

Mapping of project revenue. In order to alleviate political fear or skepticism, Lab participants agreed it will be critical to prove the program's viability. Preparation of case studies for projects under consideration could satisfy this requirement. The projects would need to be mapped, with revenue sources established.

Finally, Lab members recommended that these case studies be evaluated by a working team in the creation of a financial facility.



Adaptation of successful water management models will require intricate collaboration and planning. But a properly designed finance facility should have several advantages.

FINANCIAL INNOVATIONS FOR FRESHWATER REVITALIZATION: TRANSBOUNDARY PROJECT FINANCE

This section details the steps necessary for implementing a transboundary, sub-sovereign finance facility. Each step is accompanied by recommended action items that would represent development benchmarks.

1

STEP

Establishing Financing Facility Governance

Models for creating the finance facility to perform activities for multiple-government bodies are well established in the United States, Europe, and elsewhere. These entities take a number of forms and perform a variety of functions in sovereign territories, as well as cities, townships, provinces, and states with cross-border needs. They are used to isolate risk and provide access to lower-cost capital.

A financing facility is typically created to perform specific functions within the scope of its charter (in the way that an airline might create a corporation, or financing facility, whose sole function is to purchase new fleets of planes). Likewise, a financing facility can also be used in management of natural resources. The United States and Mexico have a long history in the management of their shared water resources. From 1887, when they created the International Boundary and Water Commission, to 1993, when they established the Border Environment Cooperation Commission (BECC), the two nations have worked to preserve the Colorado River and Rio Grande watersheds. And while political tensions are significantly more muted than in the Middle East, the Mexico–U.S. model of the finance facility, both for governance and for funding, could provide a foundation for similar structures there. Moreover, the application of these models has seen positive results in Slovenia and other areas of Eastern Europe, and in Latin America.

Model: Border Environment Cooperation Commission

The mission of the BECC is to preserve the ecological balance of watersheds in the U.S.–Mexico border region through the development and certification of infrastructure projects that incorporate innovative sustainability and public participation.³⁰ Projects that focus on water pollution, wastewater treatment, and municipal solid waste management are researched and selected, and are then eligible for funding from the North American Development Bank (NADB). NADB was established to leverage funding from both governments for the issuance of further funding to border communities for relevant water projects.

The commission is governed by a ten-member board, equally represented by delegates from each country, from the national to the local level. Daily operations are reviewed by general managers, two for each country, with additional supporting staff. The model has seen significant success. In 2007 alone, twenty new environmental infrastructure projects were selected by BECC to benefit nearly 1.4 million residents on both sides of the border. Of these projects, representing an estimated infrastructure investment of more than \$187 million, half are under construction. Since 1993, eighty-three projects in Mexico, and seventy-seven in the United States have been certified.³¹

Model: The Mekong Program

Aaron Wolf of Oregon State University presented an example of integrated watershed management for the Mekong River, which originates in Tibet and flows through China, Myanmar, Cambodia, Laos, Thailand, and Vietnam before emptying into the South China Sea. It is the tenth-longest river in the world and the lifeblood of the 60 million people living in the lower Mekong basin. Eighty-five percent of the population depends on the river for agriculture. The world's largest freshwater fishery, the river also provides the main source of protein for people in the region.

Flooding and pollution serve as constant reminders of the importance of a thriving watershed. To restore the river's health, Cambodia, Laos, Thailand, and Vietnam came together in 1995 to create the Mekong River Commission and its River Programme, which promote regional cooperation for sustainable development of the entire river basin. From flood forecasting to new irrigation practices, the program focuses on water utilization and resource restoration.³²

The River Commission is made up of a council that has one ministry-level representative per country to oversee policy decisions; a joint committee with members at the department level who implement the projects; and a secretariat for day-to-day operations. Funding for the commission comes from governmental budgets, as well as significant philanthropic aid. The program has succeeded in building integrated watershed management across borders, undertaking river restoration, and improving the lives of the people who live in the basin.

Of course, adaptation of successful models in the Israel/Palestinian Authority/Jordan region will require intricate collaboration and planning. But a properly designed finance facility should have several advantages, including:

- professional, politically neutral management of river revitalization and integrated watershed management
- adequate input and involvement of the parties to ensure compliance with delegated powers
- improved political stability through guaranteed continuity of operation
- enhanced financing capacity through the use of public-private partnerships and market finance models, such as a revolving fund
- increased financial and legislative transparency and accountability.

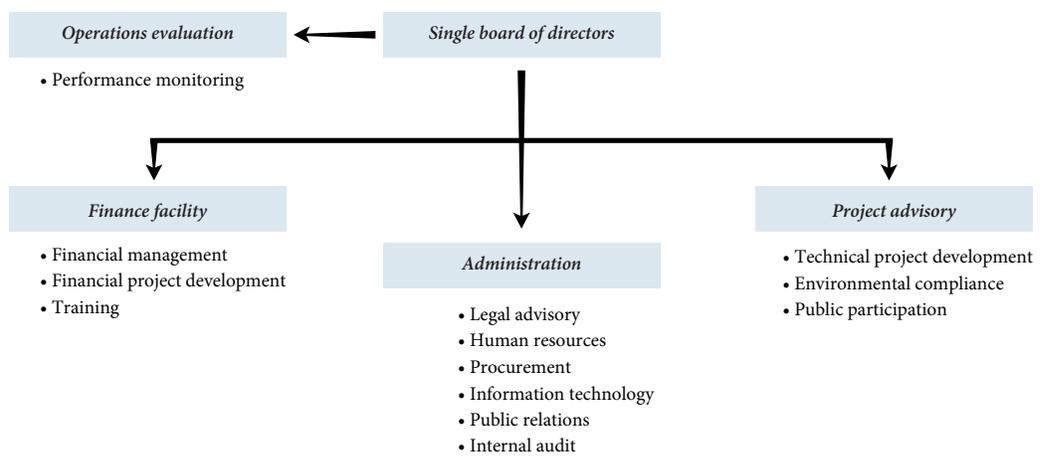
Design the Structure

The finance facility, which would employ the financial structure of a transboundary model, must work within the confines of established national governance. It must also act independently. It would not have sovereign power but would execute its scope of activities from the decisions and delegations of the countries that form it. Each government could designate five members to the board to represent its legislative, technological, and financial needs. Legal counsel, both local and external, would help ensure compliance with national and international laws. A strong legal foundation is important to foster good faith between the parties, noted Samer Talozzi of the Jordan University of Science and Technology. "We have to look for ways to build trust," he said.

To ensure objectivity, an outside committee, comprising delegates from donor nations, could advise the management team. These experts could serve as neutral parties to instruct board members on international best practices. Lab participants agreed that a review board could also evaluate performance and monitor project progress in coordination with board members to improve financial transparency and accountability.

FIGURE 2

Sub-sovereign facility structure



Source: North American Development Bank/Border Environment Cooperation Commission Business Process Review.

Establish a Charter

The finance facility, after finding the appropriate structure, would focus on a charter mapping the scope of its governance and activities. The charter must outline strategic plans for achieving short- and long-term goals, with an emphasis on guidelines to quantify success. This will also serve to better assign the duties of the board and promote accountability.

Lab participants agreed that an integrated watershed management method would take into consideration all aspects of river revitalization, not simply how best to treat wastewater or divert sewage. The charter must encompass the restoration of an entire watershed, including the ecological habitat, the community at large, and economic benefits.

Determine Eligible Projects

The charter would also outline activities to be funded. The facility would support a variety of projects in order to ensure appropriate restoration and to diversify its portfolio, mitigating potential risks. Projects may be country-specific; the facility could fund wastewater treatment in the Palestinian Authority while investing in nonpoint-source, or runoff, management in Israel, and pay for research in Jordan on crops

that are less water-dependent (see figure 2 on page 19). Given the amount of venture capital invested in clean technology and other areas of environmental innovation, the financing facility should work in coordination with the financial markets to develop the best technologies to improve water quality.

ACTION ITEMS:

- Establish a feasibility study to map international best practices, and determine optimal structure and operational management for the sub-sovereign financing facility.

TABLE 1	<i>Activities of the facility</i>
	Construction of publicly owned wastewater treatment works
	Nonpoint-source pollution control management
	Development of an estuary conservation plan
	Outreach and education
	Including a variety of projects promotes an integrated approach and ensures that potential revenue streams are separate enough to absorb potential risk.

Developing the Financing Structure

2
STEP

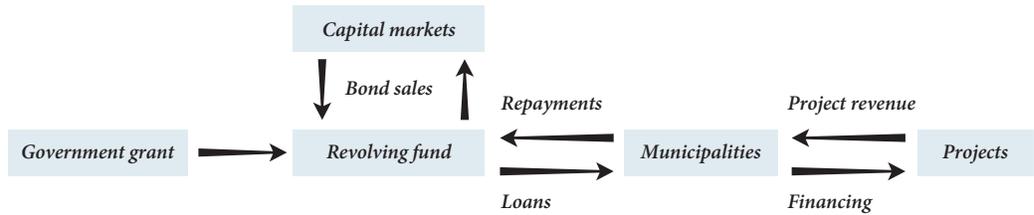
The major barrier to financing river revitalization is the risk of project unsustainability attributable to conflict, corruption, and cumbersome legislative processes. But Lab members maintained that finance models could work within the current governmental structures. Until 1987, environmental funding in the United States consisted of one-time-only grants. This limited the number and size of projects capable of accepting the funding. As states’ needs expanded, the federal government began to combine public aid with private-sector investment to create funding for water restoration projects. This is the State Revolving Fund model, which starts with a capitalization grant from the federal government and is matched at 20 percent by the state government. The state can then leverage this money with private and philanthropic investment to issue loans to local communities, which in turn generate sustainable project revenues that repay the original investment and recapitalize the fund. Those revenues could also provide subsidies for projects that cannot repay the fund, and thus protect against potential defaults.

“A capital markets approach to financing infrastructure develops a certain amount of imposed discipline on projects themselves.”

*Peter Taylor
The Regents of the
University of California*

FIGURE 3

Revolving fund model



Source: Milken Institute.

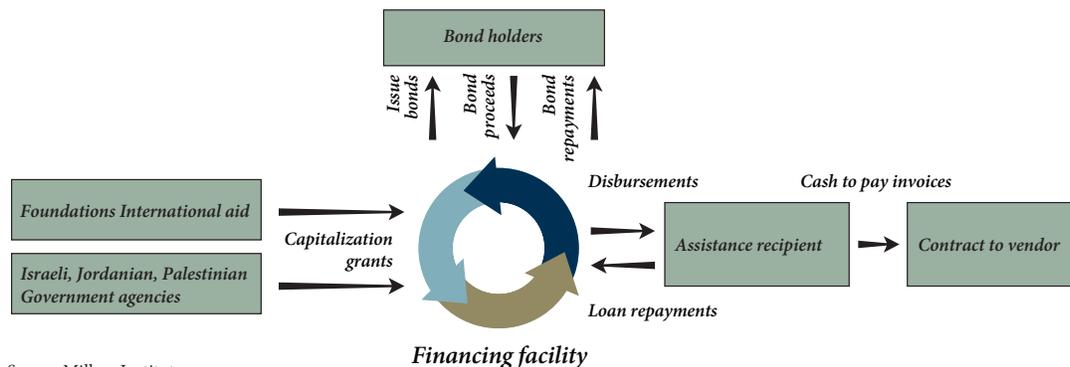
Structure

The U.S. revolving fund model highlights how moneys from different government sectors—or in a transboundary model, moneys from different countries—can be pooled to ensure the fund’s sustainability. The amount of capital flowing into, and grants coming out of, the facility must be established on a country-specific basis to promote fairness and equality. Because the SRF model covers all areas of water management, requiring representation both financially and administratively from a variety of institutions and authorities, it could be transferred into a model for a regional corporation or public-private partnership. However, fund governance must be clearly defined and monitored to increase transparency for all funded projects.

When approaching the financial structure of the facility, Lab participants discussed the disproportionate ability of some governments to contribute.³³ It is imperative to create guidelines for national capitalization based on agreed-upon factors. Similarly, each government would have to agree to allow overseas and philanthropic aid that would normally go directly to the government to go instead into the facility. This would offset any inability of a government to contribute monetarily.

FIGURE 4

The finance facility



Source: Milken Institute.

Within the revolving fund model, states could leverage the grants from their central governments by selling bonds to private investors in the international financial markets. The bonds could also be sold locally, with the revenue pooled to recapitalize the facility.

This model of financing could close the gap between the barriers that currently plague river revitalization in Israel, the Palestinian Authority, and Jordan. It could also increase transparency, promote accurate reporting, and provide incentives to see a project through to completion.

ACTION ITEMS:

- Develop financial guidelines for national contributions.
- Research regulations within the international bond market.
- Explore financing mechanisms for the facility, including bond structure and the creation of a reserve fund.

Mapping of Project Revenue

3
STEP

The pool of financed projects would play a substantial role in the success of the fund itself. Diversification is imperative in order to mitigate risk. The planned expenditure, possible outcome, and cash flow for each project would have to be analyzed, both pre- and post-revitalization.

Participants discussed current revenue-producing options, as well as those that could be generated. Special fees could be enacted, and revenues could come from the projects themselves. Potential charges for treating wastewater in Jordan, for example, were discussed in terms of employing water-use fees from the agricultural sector.

Taxes could also offset costs. In the United States, SRFs are often repaid through the use of municipal taxes; and according to Richard Laster of Hebrew University, in the Palestinian Authority now, a form of community taxation is in place: residents of the community of Beit Jala are paying an incremental increase in taxes to pay for the Nahal Sorek wastewater treatment plant. Some projects might generate their own revenue in the form of park fees and other public-use fees, real estate, or venues for special events.

TABLE 2		<i>Special fees and surcharges</i>	
Drainage	⋮	Taxes	
Storm water	⋮	Special purpose taxes	
Flushing fees	⋮	Tax increments (through the use of local levies)	
Sewage	⋮	Dedicated allotment of local or state taxes	
Drinking water	⋮	Project revenues	
Wastewater	⋮	Events	
Recreational fees (fishing licenses, entrance fees)	⋮	Donations from nonprofits, NGOs	
Real estate development	⋮		

In examining potential revenue sources, it is important to understand that each watershed has different potential. To this end, Lab participants presented potential case studies to demonstrate the viability of a financing facility.

Kidron

Passing through Israeli and Palestinian villages, the Kidron River flows past some of the most historically and religiously significant sites in the world. Unfortunately, on its trip from Jerusalem to the Dead Sea, it becomes a dumping ground for pollution and sewage. Neglect from governments on both sides of the border has left this contested area ecologically devastated.

Richard Laster has created a proposal for the development of a master plan that would encompass transboundary integrated water resource management. A joint steering committee has been established, with representatives from Israel and the Palestinian Authority, as well as the Milken Institute, but the cost of completing the master plan alone is expected to total \$187,500. More research needs to be done to determine the potential revenue that can be generated from the river itself.³⁴

Potential revenue could come from archaeological parks created around the river. The Kidron Valley is rich in ancient sites; all three major monotheistic religions claim historic links to the area. There is already hope, expressed in the proposal for the Kidron Valley master plan, that the valley may receive designation as a UNESCO World Heritage Site. Entrance and tour fees, as well as special permits, could contribute to a finance facility that would restore the area. With additional wastewater treatment facilities in East Jerusalem and West Bank villages, special taxes or surcharges could bring additional revenue.

Jordan River

The Jordan has been brought to the brink of extinction from water partitioning by Israel, Syria, the Palestinian Authority, and Jordan. Some 90 percent of its freshwater has been diverted, and significant sewage pollutes the waterway.³⁵ But the work of Lab participants from Friends of the Earth Middle East has begun to take root. With a peace park planned where the Jordan and Yarmouk rivers meet, and a larger rehabilitation project in place for the lower river region, experts hope to reverse decades of damage. An integral part of this project is the mapping of potential revenue sources to offset the significant cost to the overall revitalization.

Since the Lab, there has been discussion about the creation of tourism districts to collect additional taxes to repay any loans from the facility. For example, businesses within a certain distance from the Jordan River would be charged an additional increment on their property tax. This could work in conjunction with the fees and surcharges already collected from tourists and visitors to the area.

Besor Basin and Tributaries

Running from the Be'er Sheva Valley through the Gaza strip on its way to the Mediterranean, the Besor River basin is the largest in the region. Pollution is a significant problem; communities from Dimona to Hebron dispose of sewage directly into the river, affecting many tributaries along its seventy-mile trip to the sea. Based on its rich archaeological history, from the prehistoric period to the Ottoman Empire, UNESCO designated the area at Tel Be'er Sheva a World Heritage Site in 2005.³⁶ The nearby city of



Garbage dumps, such as this one near the Kidron Valley's Mountain Aquifer, allow chemicals and other pollutants to seep into the groundwater.

Photo: courtesy of Friends of the Earth Middle East.

Be'er Sheva has worked to restore its namesake stream, a tributary of the Besor, and to capitalize on the restoration work by developing plans for a five-mile river park, replete with promenades, gardens, a manmade lake, amphitheater, sports center, and playgrounds. Modeled after River Walk in San Antonio, Texas, the Be'er Sheva river park will generate revenue to aid ongoing restoration.

Mountain Aquifer

Perhaps the most important resource for drinking water for Palestinians and Israelis, the Mountain Aquifer in the Kidron Valley is continually

polluted by untreated sewage. It is the source of many rivers, including the Yarqon and Hadera, as well as the springs that provide water for the Palestinian cities of Tul Karem and Qalqiliya. Regional NGOs like Friends of the Earth Middle East, local mayors, and the international donor community, including the United States and Germany, have developed guidelines to prevent further pollution, and have mapped steps to clean the current mess.³⁷ More research is necessary, said Gidon Bromberg of Friends of the Earth Middle East, on potential projects and revenue sources. Incentives could promote sustainable allocation practices to prevent a deficit in supply.

ACTION ITEMS:

- Map potential case study projects as part of the feasibility study.
- Engage all relevant players in integrated watershed management for a working team.
- Design a budget to determine financial feasibility.

RECOMMENDATION

Establish a working team to research and evaluate a strategic plan to implement case study trials.

Lab participants agreed that all the projects show substantial promise, but that case studies are necessary to better understand how to structure and implement the different financing facilities, and to develop the most effective models. A business plan is essential not only to map the guidelines for the facility, but also for the projects it will fund. Participants discussed the possibility of convening a working team of integrated river management experts to evaluate the best practices, from technology and financing to governance.

The Milken Institute expects to play an integral role in reaching out to industry experts to continue the forward momentum on the creation of a sub-sovereign financing facility. The working team will reconvene at a future Financial Innovations Lab to finalize details for implementation.

CONCLUSION

There is more that unites us than divides us. Nowhere is this more apparent than in the vital need for water. As the land becomes drier and the thirst of the expanding population grows, the time is now for change: change in the political atmosphere. Change in the management of the region's rivers and streams. Change in public responsibility for pollution and ecological destruction. Change in the slow and unreliable financing of revitalization projects. And most of all, a change in the appreciation of the world's most precious resource.

Financing and governance models can facilitate this change without compromising national sovereignty. From the economic success of the U.S. Revolving Fund to the administrative success of the Border Environment Cooperation Commission and other international experiences, transboundary management of water resources has proved to be not only possible, but effective. Integrating all aspects of the problem and including all major players, these models can and should be utilized in the Middle East. They will promote low-visibility projects with high social value, such as sewage treatment, land conservation, and watershed management. They will create greater transparency for international aid and leverage public monies and donor funds with new sources of investment to improve the region's environment.

Contested political borders may constrain communities, but they cannot confine nature's greatest resources. Peaceful coexistence requires the urgent and immediate restoration of freshwater resources, the financing and construction of alternative water recycling, and conservation of shared land to promote long-term social and economic environmental prosperity for all.

APPENDIX

Financial Innovations Lab Participants

Sa'ad Abu Hammour

*Deputy CEO
Miyahuna*

Ram Almog

*Coordinator for the Kidron Master Plan
The Dead Sea Drainage Authority*

Nissim Almon

*Manager
Sharon Drainage Authority*

Hashem Alnaser

Jordan Ministry of Water and Irrigation

Shai Arnon

*Researcher
Ben-Gurion University*

Itzik Bechar

*Project Manager
The Portland Trust*

Nir Becker

*Head, Department of Economics
Tel-Hai Academic College*

Shmuel Brenner

*Faculty
Arava Institute for Environmental Studies*

Gidon Bromberg

*Israeli Director
Friends of Earth Middle East*

Yosef Dreizin

*Strategic Consultant
Israel Water Authority*

Tamir Eitan

*Project Manager Department of Infrastructure
Israeli Local Government Authority*

Itay Fischhendler

*Researcher
Hebrew University*

Alma Gadot-Perez

*Project Manager, Israel Center
Milken Institute*

Miriam Haran

*Head of Environmental Studies
Ono Academic College*

Monther Hind

*General Director
Palestinian Wastewater Engineers Group*

Daniel Katz

*Consultant
Dead Sea Drainage Authority*

David Katz

*Environmental Economist
Zalul and Tel Aviv University*

Richard Laster

*Professor of Environmental Law and Attorney
Hebrew University and Laster & Gouldman
Law Offices*

Eytan Levy

*Founder and CEO
Emefcy Ltd.*

Clive Lipchin

*Director of Research
Arava Institute for Environmental Studies*

Dan Livney

*Attorney
Laster & Gouldman Law Offices*

Caitlin MacLean

*Coordinator of Financial Innovations Labs
Milken Institute*

Booky Oren

*President and CEO
Arison Water Initiative*

David Pargament

*Administrator
Yarqon River Authority*

Alfred Abed Rabbo

*Professor
Bethlehem University*

Gil Reichmann

*Director of Municipal Environmental
Protection Department
Jerusalem Municipality*

Paul Rohrlich

*Environment and Science Officer
Embassy of the United States*

Omar Salah

*Chairman
Century Investment Group*

Ron Schwartz

*General Manager
Dead Sea Drainage Authority*

Aviva Shemesh

*Project Manager
Friends of the Earth Middle East*

Avraham Snapiri

*Manager
Idea*

Roberto Spindel

*Director
Spin Marketing and Investments Ltd.*

Samer Talози

*Water Resources and Irrigation Engineer
Jordan University for Science and Technology*

Peter Taylor

*CFO
The Regents of the University of California*

Steve Townley

*Finance Officer
Missouri Environmental Improvement
and Energy Resources Authority*

Aaron Wolf

*Professor
Oregon State University*

Susan Weil

*Financial Advisor
Lamont Financial Services Corporation*

Glenn Yago

*Director, Capital Studies
Milken Institute*

Ami Yessodi

*Commercial Managing Director
GE Water*

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1250 Fourth Street
Santa Monica, California 90401
Phone: (310) 570-4600 Fax: (310) 570-4601
E-mail: info@milkeninstitute.org
www.milkeninstitute.org



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