

IGCC Policy Brief

Resolving Israeli-Palestinian Water Issues

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To resolve Palestinian-Israeli conflicts over water resources, water should be treated as an economic commodity with resulting revenue divided according to a mutually agreed formula.

Full Recommendations, p. 8

Summary: Throughout history, water has been at the center of conflict in the Middle East. The perception that water is a key source of current disputes has been articulated by UN Secretary General Boutros Boutros-Ghali, who cautioned that the next war in the Middle East would likely be over water.

Although the current dilemma is identified as a crisis of water scarcity, in reality, the critical issue is to find a way to efficiently manage available water resources. The purpose of this policy brief is to develop a broad framework for a potential agreement that would establish efficient management of water resources in the region. With such an agreement in place, water would be transformed into an economic commodity that could be produced, transported, bought and sold, and thereby, utilized to its highest valued use.

This proposed framework entails two distinct components; the first would involve the design of a joint management plan to maximize overall net revenues. Such a management plan would address issues of water supply, water quality, conveyance,

reuse, public health, ecosystem protection, and agricultural production. The second would involve negotiating an Israeli-Palestinian agreement for allocating shares of net revenue from the sales of available water.

The key elements of the framework are technically feasible and economically viable. Some have been previously proposed. More importantly, most have recently been implemented in some, albeit, less than optimal fashion. The impetus for these changes stems from the increasing urbanization of both the Israeli and Palestinian populations. The absence of an agreement between the Israelis and the Palestinians on water issues can be seen as a major additional impediment to solving the internal conflicts that typically occur within a country experiencing substantial changes in its pattern of water use.

Palestinian-Israeli cooperation on water could lead to mutual collaboration on other issues of contention in the region and can be resolved independently of any land settlements.

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Background

Since biblical times, water has been the source of conflict in the Middle East and has long played a prominent role in the demarcation of political boundaries in the region. Not unexpectedly, the Oslo Accord that initiated the peace process between Israel and the Palestinian National Authority failed to provide a blueprint for resolving most of the water allocation issues. This issue was left to be resolved in conjunction with an agreement on land allocation at a future date, thus further solidifying the perceived links between water and land arrangements. The Oslo process established multilateral talks on water and the environment to design methods to increase water supply and develop ecosystem linkages, as well as bilateral talks to discuss allocation and access to water. With the exception of the Israeli-Jordanian agreement on water allocation, there have been no major breakthroughs during these contentious debates.

The failure to resolve the allocation of water from the three major underground aquifers in the region and the Jordan River has proved to be a major obstacle in the path of the Israeli-Palestinian peace process. Both the Israeli Government and the Palestinian National Authority publicly stated that a reason for the stalemate during the most recent round of land transfer discussions was the absence of a water allocation agreement.

A plethora of academic commentary exists on the role of water over time as a source of conflict in the Middle East.¹ Academicians are increasingly supporting the employment of economic mechanisms

¹ See for instance, "Water, War, and Peace in the Middle East," by Peter Gleick in *Environment* (1993, vol. 39, no. 3, 6-42) or *Hydro Politics Along the Jordan River. The Impact of Scarce Water Resources on the Arab-Israeli Conflict* by Aaron Wolf (Tokyo: United Nations University Press, 1995).

and incentives as an approach to solving Middle East water conflicts.²

In formulating the framework for an Israeli-Palestinian water agreement presented in this paper, we draw heavily from this academic literature, as well as a number of working group reports and conferences that have brought together scholars, government officials, and NGO representatives over the past several years. During these conferences, participants discussed key water issues in a collegial atmosphere, seeking solutions to overcome roadblocks to agreement. The Institute on Global Conflict and Cooperation sponsored the most recent conference comprised of academicians from Egypt, Jordan, Israel and the Palestinian National Authority and was hosted by the foreign minister of Cyprus in Nicosia.

A Water Shortage Crisis or A Water Management Crisis?

The core issue that must be resolved first is whether the current shortage of water is attributed to an actual scarcity or to mismanagement. The skeptical economist's first reaction will be to assert that a shortage simply signifies that the price of the commodity has not been allowed to rise enough to reduce existing demand and to increase existing supply.

The natural first question to ask then is whether sectors of the Israeli and/or Palestinian economies exist that substantially reduce water usage concurrent with significant price increases. The answer, of course, is yes. Some farmers, particularly field crop growers, dramatically cut back on water usage in the face of extensive water price hikes. Globally, the paradigm follows that farmers, industry, and households reduce water consumption as prices increase. Further, as the use of water-saving

² See for instance, the 1994 special issue of the journal *Resource and Energy Economics* edited by Mordeci Shechter on *Sharing Water Resources in the Middle-East—Economic Perspectives*.

equipment increases, water use concurrently declines. Indeed, Israel has been a major developer and exporter of water-saving technologies, which accounts for reductions in water use as installation in homes becomes widespread.

The second question to ask is whether there exists the possibility of producing additional water. The answer is yes and there are several ways this can be done. The first is to stop using some of the water. This occurs, for instance, when a farmer replaces a low-value field crop with a higher-valued vegetable crop with the unused water sent to a thirsty city. Implicit in this transfer is the second way to obtain additional water; import water-intensive commodities, such as wheat, from abroad.

Conservation is another way to effectively obtain more water. This can be done in both the agricultural and urban sectors. Conservation can be induced via higher water prices, and encouraged with the provision of information and better technology. The Israelis and Palestinians already have a number of projects underway that represent the state-of-the-art with respect to efficiently using water. However, these efforts need to be greatly expanded.

Water can be directly imported. Numerous schemes have been proposed, ranging from the fanciful, such as towing icebergs, to ideas that are feasible in the relatively short-run, such as obtaining water from the Litani River in Lebanon. Other strategies are potentially feasible, but involve extensive infrastructure investments and changes in the current political climate. One frequently discussed proposal involves running a pipeline from the Euphrates in Turkey to Saudi Arabia, with intermediate stops through several countries of the Middle East.

Probably more important is desalination. It is feasible now and has already been implemented on a large scale in cities along the Persian Gulf. However, its high cost and the current access to cheaper sources of water discourage a trend toward expanding desalination in

the short-term. At present, desalination serves the useful role of delineating a ceiling on the cost of current water supply. Desalination costs have fallen greatly over the last decade. They will continue to drop and will eventually play a major role in the region's water supply. One tangible outcome of the multilateral water talks has been the establishment of a desalination research center in Muscat, Oman.

Finally, water can be acquired through reuse. In the long run, the agricultural sector will obtain most of its water from reused municipal and industrial water. This will be a more cost-effective alternative than desalination over the next decade. Water reuse will continue to be a major option for the foreseeable future due to conveyance considerations. Again there are already many examples of projects in the region that can serve as models.

In sum, the perception of a water shortage crisis should give way to the reality that it is actually a crisis of water management. Water consumption is sensitive to price. Higher prices will induce a shift away from low-value to high-value agricultural crops. In addition, water can be produced in a number of different ways. The *effective* water supply can be increased by more efficient use of water in all sectors, by shifting water from agriculture to urban areas, replacing low-value with high-value crops in the agricultural sector, and importing water-intensive commodities. Reused water will become one of the major sources for agricultural production. While desalination is a feasible alternative, it is unlikely to be implemented on a wide-scale basis at present in light of cheaper alternatives. However, the cost of completely replacing the current supply of fresh water in Israel via desalination (*i.e.*, in the hundreds of millions of dollars) is dwarfed by Israel's GNP, which is equivalent to US\$100 billion.

Efficient Management of the Region's Water Resources

Efficient management of a region's water resources requires the ability to deliver all the water that is demanded in a reliable way. Ignoring for the moment the issue of water pricing, the most serious short- to medium-term management issues involve deficiencies in the infrastructure required for transporting water to where it is most needed. Poor water quality is also becoming an increasingly critical issue.

These two issues are closely linked. The decline in water quality results from improper sewage disposal, poorly managed agricultural runoff, an increasing rate of seawater intrusion, and urban encroachment along rivers, streams, and lakes. The problems of water quality and high water loss rates in distribution systems of drinking water plants, particularly in Palestinian areas, need to be rectified. Protecting the quality of key water resources could be accomplished by providing buffer zones and green spaces.

The proximity of Israeli and Palestinian populations in particular areas renders separate water services economically impractical. In these areas, water services could be provided by an independent utility that would be responsible for operating and maintaining water systems. The net revenues from the operation of such facilities would be shared between Israel and the Palestinian Authority proportionate to the water services delivered respectively and could be based on the population served or quantity of water delivered. Mandating international firms to operate water services would nullify any land conflicts over ownership and access to municipal water supplies.

Any water agreement must address the issue of managing the major aquifers in the region, as unrestricted pumping by either the Israelis or the Palestinians will soon lead to disaster. Several plausible strategies exist for the management of shared aquifers. One approach is for each political entity to manage a specified quantity of water independently, while

jointly coordinating maintenance, *e.g.*, water quality in the aquifer. Alternatively, a joint management agency could administrate the management and coordination directly. Such an agency could be a private company operating as a regulated utility. In this case, each of the political entities would own shares in the company according to their adjudicated water rights. Allocation rules and allotments (or shares) could be evaluated and modified over time in response to changing conditions.

Water Quality

Ensuring adequate water quality is likely to be a more difficult management problem than simply supplying enough water. The water quality problem has several dimensions. First, Open sewage in Gaza is only the most visible of current problems. Second, there is a severe problem of seawater intrusion into aquifers from over pumping and contamination from various sources. Thirdly, agricultural and urban runoff already impact rivers and other water bodies. Fourth, deep percolation of salts and other soluble chemicals lead to ground water contamination. Controlling the salinity problems associated with irrigated agriculture will require strong management actions. Incentives, direct control, and education should be used to control the salinity problem.

Food Security and Agricultural Production

While food security is often advanced as a goal, it is neither feasible nor desirable for the populations of Israel and the Palestinian National Authority to locally produce all needed grains with available water resources. Instead, water resources should be used to generate the income required to import foodstuffs from surplus-producing nations. Income could be generated from the production and sale of high-value crops (including fruits, vegetables, and flowers), as well as through industrial activities. Rain fed agriculture should be encouraged to

provide grains, fruits, and range products that complement the intensive irrigation production systems in the region. Areas that were mined or otherwise degraded through past military actions should be restored and developed for agriculture and environmental purposes.

In the long-term, fresh water should be allocated primarily for human consumption and treated water reserved for agricultural purposes. Research to facilitate improved utilization of treated water must be accelerated and infrastructure to convey it must be built. Agricultural production, itself, is responsible for much of the water quality problems in the region. In particular, there is growing reliance throughout the region on chemical pesticides. Reduction of pesticide use, appropriate fertilizer use, and further adoption of integrated pest management are important priorities. Furthermore, production of pesticide-free and organic food may provide new economic opportunities for farmers and should be encouraged.

There is great potential for regional cooperation in the production and marketing of food. Agriculture is dynamic and growing, and should utilize biotechnology, computers, and information technologies. Together, Israel and the Palestinian National Authority can become leading exporters of high-value food and agricultural products to Europe and elsewhere in the Middle East.

Information and Technical Expertise

Effective management of a large water system requires reliable information. When multiple parties share responsibility for operating a system, information needs to be freely and openly accessible. This includes information on water use patterns, water availability in aquifers, and water quality, costs and transfers. This information will allow all interested parties to monitor key aspects of the system. When net revenues are being allocated between two or more parties, it is crucial that all aspects of the system including allowable costs are readily verifiable by all parties to the agreement.

Within a large regional water system, decisions are made both locally and system-wide. Adequate technical expertise must be available to make these decisions. Further, all parties to the agreement must have competent technical experts whom they trust who can assess policy choices.

Within the region, it is important to reduce hardship and obstacles to the movement and cooperation of scientists and other technical experts. It is also important that the technical experts assisting the various parties have a working relationship with each other. This can be accomplished by establishing collaborative networks and common forums for dissemination of technical evaluation and policy analysis.

Such efforts have been sponsored and supported by foundations, international agencies and foreign governments. Support for such interactions should be intensified and interaction should be institutionalized in the region. Funding is needed to support the logistics and cost of joint research efforts on managing natural resources, agriculture, and the economies. Establishment of one or more outlets for publications and communication of results to policymakers and the public would be valuable. Wider collaborative efforts and sharing of knowledge would be beneficial, as many of the water issues in the region bear a great deal of similarity to problems in other parts of the world.

Water Allocation or Water Revenues?

In a world of perfect markets, there would be no difference between Israel and the Palestinian National Authority; each would have rights to an allotment of a specified amount of water from specific sources and rights to a certain percentage of the net revenues from the sale of water. Most markets, however, are not perfect, and water markets represent some of the most imperfect markets on a global scale. The reason for this is straightforward; rights to water have traditionally been determined either by location or historical

use. The ability to buy and sell water is often restricted by law and limited by institutional structure. Further, unlike electricity, water conveyance systems have not historically been designed to easily transfer water to sectors or areas not originally designated. Throughout the world, water has proven to be an ideal vehicle for governments to provide hidden subsidies to particular interest groups, such as farmers.

The divergence between water prices for different sectors and areas in the region is prima facie evidence that water is not allocated efficiently. Efficient allocation occurs when all users face the same price after taking into account different quality needs (e.g., drinking water versus irrigation water) and conveyance costs.

Water should be allocated according to activities that generate the most economic value from its use. This generally requires the implementation of mechanisms that encourage effective buying and selling of water between regions and sectors and investing in the infrastructure at a reasonable cost.

The predominant objection to trading water at its economic value is based on human health requirements. Other objections follow from the concept that providing “cheap” water serves a multitude of government objectives. It is crucial to recognize that someone is implicitly paying the full economic value of water. When government policy mandates that water be delivered to one party at a lower cost (often below the cost of production) than another party is willing to pay, an economic transfer between the two parties occurs.

The benefit of sharing net revenues from the sale of water, rather than allocating the water directly, is that it negates conflict over water rights, an issue that has thus far obstructed a comprehensive water agreement between Israel and the Palestinian National Authority. A more equitable outcome can be negotiated when bargaining focuses on how to divide net revenues from water sales rather than who possesses rights to

water. In particular, the rationale for dividing net revenues can be independent of past conflicts and current land claims. Further, once both Israel and the Palestinian National Authority no longer engage in the use of hidden subsidies, both sides will have an interest in increasing the overall net revenues from the sale of water. This is best achieved through the efficient management of the region’s water resources.

An arrangement to share net revenues would not prevent either Israel or the Palestinian National Authority from subsidizing water for a particular sector or group. The difference is that the subsidy would be explicit, and any subsidies granted by the Israelis or Palestinians would not adversely affect each other financially. Indeed, overall net revenues from the sale of water would rise as a result of the increased demand that follows from a subsidy grant.

There are two distinct approaches to allocating net revenues from water sales between Israel and the Palestinian National Authority. The first is to continue along the current path and allocate net revenues in a manner proportionately similar to either land allocation and/or prior use. The second is to allocate water on the basis of current or projected population growth (for the year 2025, for example).

The second method is interesting in that if some minimum quantity of water per person is assumed necessary for health and sanitation purposes (e.g., a per capita yearly water allotment between 100 -150 cubic meters), then for all practical purposes, all fresh water resources are effectively allocated, if one uses 2025 population estimates. The principle of allocating water first for direct human needs appears to have been accepted by all sides to the dispute. The Israeli Water Commissioner, Meir Ben-Meir, recently stated that “any agreement must be based upon the principle of equality for human needs.” Palestinian officials have made similar statements.

What has not been generally recognized is that acceptance of this

principle effectively changes the issue from a long-term problem to a short-term one. Acceptance of this principle shifts the focus of negotiations to which future population levels should be used as the basis for allocating net water revenue. This may, moreover, turn out to be a less divisive basis on which to negotiate than agreeing on how to apportion each of the currently available fresh water resources.

Over the next 20-25 years, the key problems involve transitioning both the Israeli and Palestinian economies toward the eventual allocation of water. The guiding principle to adopt is that any fresh water not used directly for human purposes should be allocated to its highest valued use. Any "net revenues" related to this "surplus" water should be split between Israel and the Palestinian National Authority proportionate to the agreed upon long-term allocation of water.

Acceptance of this principle will gradually shift both the Israeli and Palestinian agricultural sectors toward the reuse of domestic urban water supplies and toward the elimination of water pipeline leaks and implementation of a variety of conservation measures in urban areas. It also necessitates the construction of appropriate facilities for the efficient transport of water to different areas and sectors. Both the Israeli government and the Palestinian National Authority should be free to "subsidize" the use of water for any purpose they desire, as long as they are willing to effectively "pay higher than the going price" for the use of that water. In the short-run, such subsidies may be necessary to insure that all households have acceptable access to potable water. Water prices, at the wholesale level, should be set so as to ensure supply and demand are balanced.

Cooperation In The Larger Region

There are many reasons to consider expansion of cooperation on water resources beyond the Israelis and Palestinians. Jordan, in particular, shares

one of the major water resources in the region, the Jordan River. Egypt, Lebanon, and Syria share common borders and have substantive issues to resolve in regard to water resources. More importantly, they also bring additional water resources that can be shared, pooled, or swapped.

Within the region, establishing networks that provide continuous, timely information on the weather and agro climatic conditions could result in significant benefits. Some environmental problems, such as pests, do not recognize international borders; therefore, mutual collaboration in eradicating common pest problems would be valuable on both sides of the border. Exportation of high quality agricultural products will be facilitated via a common quality assurance program and marketing effort involving a larger set of countries from the region.

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Observations and Recommendations

- Although water availability has long helped shape the political landscape in the Middle East, **water should not currently be seen as an insoluble barrier to peace in the Middle East.**
- Water issues in the region are potentially strictly economic**, rather than strategic.
- Large-scale water desalination represents a ceiling on potential costs. These **costs are quite small relative to regional GDP** and much less expensive solutions are available through cooperation.
- The issue of **how to optimally manage the water resources** of the region from both a conceptual and practical standpoint **can be seen as independent of how to allocate net revenues** from those resources.
- Net revenues should be allocated on an equitable basis** between the Israelis and Palestinians.
- Water trading can help to appropriately price water** and enhance efficiency and flexibility.
- In the long-run, water quality, not quantity, will likely be the major regional water issue.**
- Agricultural production** which currently uses most fresh water **will continue to shift toward higher valued crops and urban water re-use.**
- Provision of adequate quality **water for human consumption should be given a very high priority.** It is urgent that a minimum standard of water quality be met, especially in Gaza.
- In many areas, **it makes economic sense to have local water facilities that serve both Israelis and Palestinians.** Such facilities could be put up for international tender and net revenues shared.
- Access to information and developing regional technical expertise is a critical** element in the implementation and continued acceptance of any regional water agreement.
- Most regional water conflicts have been resolved peacefully**, with only a few leading to even minor skirmishes. In part, this is due to the technical complexities involved in managing major water systems.