

Chapter 11

The Public's Role as a Stakeholder in the Yarqon River Authority, Israel

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Introduction

Institutional design principles for water management have evolved from abstract concepts to application and acceptance. These principles are an integral part of major legislative initiatives, including the European Union Water Framework Directive. They include governance along hydrological boundaries (river basin or catchment basin), integrated water resources management (IWRM), stakeholder participation on all levels, transparency and accountability. No principle, however, can encapsulate the convoluted nature of an ongoing governing body, even one working within accepted boundaries and under clear policies and guidelines. The art of management requires that every institution understand its limitations, its strengths and weaknesses. All institutions are fluid; no government body works in a vacuum and they are all limited in time, personnel, resources and political support. For this reason, theorists, such as Kai Lee, who recognize the dynamic nature of institutions for the protection of natural resources, propagated adaptive management theory:

Adaptive management is an approach to natural resource policy that embodies a simple imperative: policies are experiments; learn from them. ...we do not understand nature well enough to know how to live harmoniously within environmental limits. Adaptive management takes that uncertainty seriously, treating human interventions in natural systems as experimental probes" (Lee, 1993, p9)

The Yarqon River Authority (YRA) was Israel's first attempt at governance of a river basin. When it was created in 1988 there were examples of river authorities operating in other parts of the world, but none in the region. There was also abundant literature about institutional structure and governance of natural resources both within and without Israel. Early literature from the 1970's steered policy makers toward several principles. One, suggested by Bruce Ackerman and James Sawyer (1972), predicts failure if there is separation of thinkers from doers. A single institution must develop a master plan for the basin and implement its provisions. A second, also suggested by Ackerman and Sawyer, is that decisions by a basin agency are political and 'decisions generated by the political process are generally accorded legitimacy in the contemporary polity' (1972, p423). Therefore a basin authority should be representative of those living in the basin. A second author of wide practical experience, Ian Sinclair (1985) (1994), refined these general principles into a guide for effective governance of a river authority. Sinclair posited that a basin agency, to be effective, must have knowledge of the basin, be open and transparent and have the power to determine the quality of the water resources in the basin. Building on these guidelines, Elinor Ostrom (1990) actually proposed design principles for common property resource management, that is, clearly defined boundaries, decision-making in public with those using the resource involved in the decision making process and nesting of local institutions with other levels of decision-making.

These forerunners of the YRA inspired the management institution that has operated in the Yarqon Basin since 1988. The YRA actually adopted these principles and promoted the idea that the YRA be open to public debate. Nothing was held sacred that was not submitted to open debate, either within the managing directorate of the YRA, which itself is composed of representatives of the public or with the general public at large. Issues that affected certain

segments of the public were first presented to that segment for discussion prior to continuing with the program. Examples of these will be brought forth in this chapter. It is clear, however, that the guiding principle behind the operation of the YRA was that openness, transparency and accountability are the basic principles of management that go hand-in-hand with the theoretical design of integrated water resource management. One cannot function without the other.

The public holds important information that can be useful and even critical to managing a river. And if the silent public, the trees, birds and other animals could talk, they would also add their voices to the vocal public. Yet due to their failure to make sounds that *homo sapiens* can understand, the YRA stays attuned to ecosystems via research prepared by academic institutions familiar with ecosystem management. All major projects are first tested in an academic setting and knowledge soundboards before continuing, in order to get ecosystem feedback before embarking on a project.

In its early years, decision-making in the YRA did not involve local interest groups. Both because few actually existed and it was not considered important. The interests of the public were thought to be sufficiently represented by the local government authorities and the other representatives sitting on the YRA governing bodies. Social participation in the YRA, initiated by the YRA, began as a way of getting feedback from the public about its decisions. In 1994 the YRA turned to one of the river's major polluters, the farmers who tilled the soil near the river's banks, and asked to hold a series of meetings to reduce non point pollution of the stream. In addition, meetings were initiated with the residents of urban neighborhoods in Tel Aviv riparian to the stream. As stream quality improved in the directions which served the local population, participation spread further. This in turn put pressure on the YRA as well as on local authorities and the national government to further fund river rehabilitation and increase amenity

uses. The symbiotic three-way relationship between the YRA, government authorities and the public has created an upward spiral in the Yarqon River's environmental and social quality.

Today participation in the YRA is comprised of an ongoing dialogue with several local interest groups and the scientific community, an open door policy, a multi-faceted information dissemination system, involvement of the general public in developing a Yarqon Master Plan, and a governance structure that includes representatives from government, NGO's and the general public. Implementation of these methods of participation requires constant learning and revision on the part of the YRA.

Setting the scene – the Yarqon River

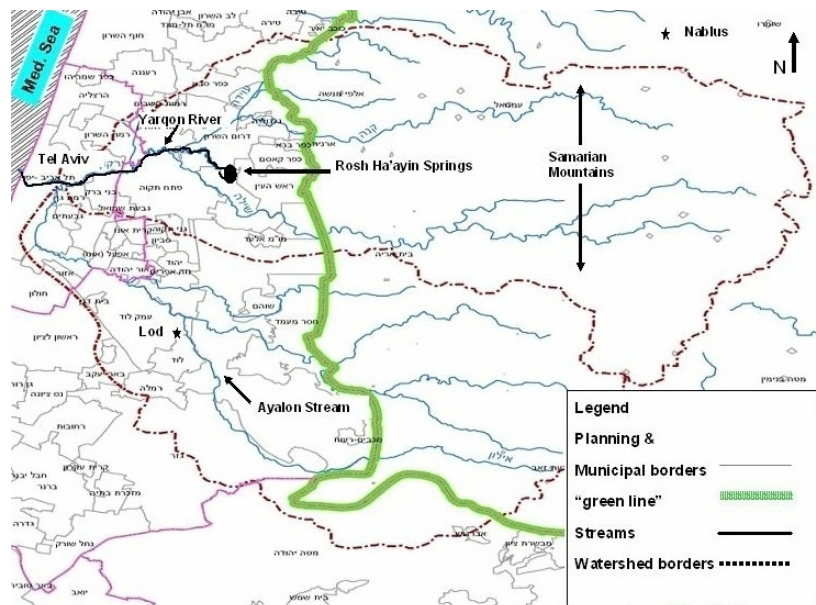
The vision of Israel, viewed from outside, is one of a semi-arid state located in the arid Middle East. This view misrepresents Israel as a desert state. Israel has a wet north and a dry south.

Rainfall in parts of the north reaches eight hundred millimeters a year (as much as London), but in the southern port of Eilat only twenty millimeters annually. Yet unlike precipitation in Europe, rain comes only during the winter, and avoids the region during the summer months. This has led to a dependence on ground water, including the sources that feed the Yarqon, as the major source of drinking water, so that the few rivers and streams that flow year-round are not used for potable water as they are in Europe and North America.

The Yarqon River was often mentioned in historical literature as one of the major routes for transportation as well as one of the most difficult barriers for merchants and armies coming from south to north through the Via Maris, the ancient caravan route between Egypt and Mesopotamia (Syria). This was especially true during the winter when the river often flooded. The base flow of seven m³/sec created a unique ecology and served as a source of energy for

powering flour mills, adding to its importance as a source of water. This has all changed; the Yarqon headwaters have been captured and its flow has been reduced to a trickle; the underground water table has been lowered and the two thousand hectares of swampland in the Yarqon basin that existed a century ago are gone.

The Yarqon River is geographically situated in the center of Israel and flows through the country's most densely populated area. The river is the main channel of a watershed approximately 1800km² in size that begins at the Samarian Mountains and ends in the Mediterranean Sea. The River rises in springs within Israel near the town of Rosh Ha'Ayin (in Hebrew, the headwaters), and flows westward for about seventeen miles (twenty eight km) to the Mediterranean Sea where it exits in Tel Aviv–Yafo. About two-thirds of the watershed lies east of the green line, the pre-1967 border, within the Palestinian Authority. This physical connection, seen mainly in runoff and sewage pollution, is not reflected in any official political cooperation between the YRA and the Palestinian Authority. The name Yarqon comes from the Hebrew word *yaraq* (green) because of its flora and fauna. Its Arabic name is Nahr el-'Auja (The Tortuous River) because of its winding nature; it curves around itself in several places.



Beginning 50 years ago, the headwaters of the Yarqon, at Rosh Ha'Ayin, were captured to supply water to the homes, factories and farmers of Israel for industrial, agricultural and domestic use. What was once a flowing stream containing over 220 million cubic meters of spring flow annually now contains less than four million cubic meters. On the other hand, the increase in population and the growing amount of raw sewage and low quality effluent discharged into the river, resulted in destruction of habitats, disappearance of many plant and animal species and turned the river into a general nuisance associated with mosquitoes and bad odors. This, augmented with the need to control mosquitoes by spraying, destroyed riparian vegetation and contributed to the poor state of the river and the negative feelings of the public towards the Yarqon. This known and expected vicious cycle was even more frustrating because there was no end in sight. Not only did the public not have the means to address complaints, the municipalities did not have one either. The ongoing state of pollution and deterioration of the river, as the springs were pumped at increasing rates, influenced urban planning processes in the surrounding cities to the extent that inferior land uses, such as industrial areas and major transportation infrastructure, were placed between the population and the river.

In order to stop the vicious cycle, the national government drafted a bill to protect the Yarqon. The Rivers and Streams Authorities Law was passed in 1965, and the Yarqon River Authority, Israel's first river authority, was created twenty-three years later.

The legal framework for the protection of surface water in Israel

Israeli law was fortunate to have inherited Ottoman law for the protection of water sources. Ottoman law, which was in force in Palestine from 1516 until World War I, treated water resources as common property, not capable of private ownership. States under Ottoman rule

never adopted a riparian rights doctrine or a prior appropriation doctrine found in the laws of most countries in the world. According to the *Majelle*, the Ottoman legal code, all major rivers and streams were considered free property which belonged to the entire community, and even ground water was considered a community resource when it was needed for domestic use.³

The subsequent British Mandate over Palestine declared that all existing Ottoman legislation remain valid, unless amended or replaced by new legislation.⁴ When the State of Israel was founded in 1948 there was little need to take water rights away from existing users, since due to the previous legal regimes for water, little of these existed. Rather, there was a need to regulate and prioritize water usage and to prevent flooding. This was done in a series of water laws from 1955 to 1959. The Water Metering Law of 1955 required that all uses of water were to be metered. The Water Drilling Law of 1955 required that drilling for water or using a well required government approval. The Drainage Law of 1957 set up drainage authorities throughout the State to protect persons and property from runoff and storm water. The drainage authorities were independent bodies created to protect persons and agricultural interests from surface water, but not to protect surface water from persons and pollution.

In 1959 the Knesset passed one the world's most significant water laws, the Water Law of 1959, which, in its preamble, creates the following conditions. First of all, the water resources of the state of Israel belong to the people to be managed by the government. Everyone has the right to the use of water but no one has the right to a water source, even those working or living on the banks of that source. No one may degrade a water resource nor overdraw its source, and all water uses are connected to a permitted use, such as domestic, agricultural, industrial and public.

The Water Law created a Water Commissioner (today called the Director of the National Water Authority) with wide statutory powers to protect, enhance and manage the water resources

of the State.³ Using the powers invested in him, the Water Commissioner designed, built, and supervised Israel's national water supply system. First a national water company was created, and then the Water Commissioner issued licenses to regional and local supply companies. Israel has a well-managed supply system for water use regulated by a central authority. This, however, came at the expense of the surface and ground water sources because the supply system developed without thought for sustainable development. The Water Law contemplated that the Water Commissioner would protect surface and ground water as supply systems were developed; all the power was available by law, but the tools given the Water Commissioner, immense in scope, rusted in his hands. Due to this failure of governance, the rivers and streams became polluted and the aquifers suffered from over pumping. The Water Commissioner's reluctance to prevent water pollution or even resist over-pumping of groundwater led to reduction of stream flows and an increase of pollution loads.

All of the 31 major streams and rivers in Israel deteriorated with little objection raised, but the Yarqon struck a special note with members of the Knesset, Israel's parliament. Beginning in 1964, the Knesset began debate on a law to protect the Yarqon River specifically, but the proposed law evolved into something wider- the Rivers and Streams Authorities Law of 1965. The law delineates a framework as to how a river authority should be set up and run. The Knesset gave the Ministers of Agriculture and Interior the power to implement the law. The two Ministers could decide which rivers or streams should have a river authority and what their powers should be. But by placing the law under the jurisdiction of two ministers, the national government delayed its implementation for twenty-three years. The Minister of Agriculture was in no hurry to grant power to a fledgling river authority that might interfere with higher policy set by the Water Commissioner. The Minister of Interior was in no hurry to take powers away

from local authorities and grant them to a river authority. The creation of the Ministry of Environment in 1988 broke the deadlock. The Ministers of Agriculture and Interior finally agreed to create the Yarqon River Authority, and turned supervision of the law over to the Minister of Environment. Since then, only one other river authority has been created- the Kishon River Authority in 1992.

The law's stated purpose was to rehabilitate the Yarqon River and turn it into a source of recreational use rather than a conduit of sewage and solid waste. The law enabled the creation of a public body whose major stakeholders are representatives of the local authorities. The new law did not, however, change the contours of Israel's legislation for protection of water resources. This meant that the new authority would have to find its way through a bureaucratic maze if it intended to rehabilitate the river.

During the twenty-three year lapse between adopting the law and actual implementation, too much water had been pumped out of the headwaters of the Yarqon and too much pollution discharged into the river for it ever to reclaim its former glory. This, however, did not daunt the original members of the YRA who met in 1989 to begin reclaiming the Yarqon and its banks for public use.

The Yarqon River Authority: the legal background

As Ostrom writes in her design of institutions managing a natural resource, one major criterion is to nest the governing body with other levels of governance (Ostrom, 1990). The YRA is not the only government body concerned with the Yarqon River; it is, however, the focal point for all stakeholders concerned. This is achieved by statutory fiat; that is, the law creating the YRA established the pecking order for stakeholder involvement. Since water in Israel is under the

auspices of five national government ministries, the order creating the YRA gives representation to all five government ministries on its executive council. All the cities riparian to the Yarqon are also represented, as are landholders and representatives of the Nature Reserves and National Parks Authority (NRA). A 2002 amendment to the Rivers and Streams Authorities Law added a requirement that river authority membership must also include three representatives of the general public, at least one of whom represents an environmental organization.

The YRA budget covers all routine activities including the creation of the Master Plan and many components of its implementation. The budget is funded by the eighteen members of the YRA – seven municipalities, four government ministries and seven additional stakeholders that are members.

In order for the Authority to work efficiently, the YRA has both a council and a directorate. On the council sit representatives of stakeholders from the national, local and regional government, plus NGO representatives, some eighteen in all. It meets twice a year to set policy and budget allocations, debate proposed regulations and approve all major decisions of the directorate. On the directorate sit nine members, four representatives of local government, two representatives of the national government, and one each from the Yarqon Drainage Authority, the NRA and the Organization of Towns for Sewage and Environmental Quality. The directorate meets often, as much as once a month and more if needed. The public is represented in both the council and the directorate through representatives of the local authorities riparian to the Yarqon, who are the major stakeholders in both organs. Local environmental interests are served via representatives of the Nature Reserves Authority and environmental NGOs, but other local interests (e.g boaters, cyclists, fishermen and residents) have no direct representation other than their local government representative or through direct contact with the YRA.

The day-to-day running of the YRA is handled by a four person staff that includes a general director, biologist, inspector and secretary. Other specialists such as engineers, ecologists, hydrologists, urban planners, project managers and lawyers are outsourced.

The order creating the YRA requires it to operate under a master plan approved by the Council. In other words, the YRA must first create a master plan in order to conduct all of its activities, with the master plan to be approved by the full council. The creation of the master plan involved numerous representatives of the public and took one year to develop, as described in Case Study 1. The master plan mandated an action plan for implementation that is still underway. The two-phased action plan dictated a long, public, open process for protection of the Yarqon for future generations. Both the statutory plan process and its action plan for implementation require networking with statutory bodies, NGOs and the general public, as explained below.

The concept of social participation in the YRA

As specified, the Yarqon River Authority (YRA) is required by law to operate within the framework of a master plan. In hindsight, the process that was initiated to create the master plan in 1995 became one of the most important assets for the future operation of the YRA, in addition to the plan itself. The process and plan, together with the publicly open and proactive mode of operation that the YRA adopted, serve as a basis for its activities. Within the framework of public participation, as perceived by the YRA, there are two pathways that the public can utilize for involvement in decision-making processes. The first is the statutory pathway and the second through an informal open door policy.

The statutory pathway does not just mean abiding by legal dictates. It includes the degree

of openness by which the decisions are made by the statutory bodies for decision-making. In other words, are the statutory stakeholders of the authority a rubber stamp or is there a real process that results in decisions that have a wide base of support? In Israel, the technical part of the planning process that takes place in the regional planning boards includes representatives from the Society for the Protection of Nature (SPNI). SPNI is the largest independent membership organization in Israel, aimed at protecting Israel's environmental assets and the SPNI's representative is always very active. In effect, this means that even before the part of the planning process that is fully open to the public, public representatives participate in planning and decision-making processes.

Many government entities, national and local, have statutory power over the Yarqon watershed, and without the YRA would intervene and manipulate the watershed, each for its own interest. This is the natural state of governance, where government governs along political borders and nature operates along geophysical lines. Therefore, watershed management to be effective must include within the basin authority all the government authorities who have statutory powers affecting the watershed. The members of the YRA represent sections of public organizations from local and national government, including elected officials. At first glance this may appear to be only a governance structure, but it can serve as a benchmark for examining public participation (Ackerman and Sawyer, 1972). In YRA meetings, each representative must act according to needs and policies having to do with the river and not according to interests of the organization that he/she represents. In rare instances, government representatives acted in the interest of their proctors, but, overall, the YRA directorate looks beyond local interests to serve the basin as a whole. This proves the general conclusion that the actual success of public participation in general and local stakeholders in particular in watershed management issues

requires the ongoing commitment of local organizations and representatives from the central government for the benefit of the basin and its constituency. Funding, confidence building, and an atmosphere of flexibility and openness facilitate collaboration (Leach, et al 2002; Ferreyra and Beard, 2007). In addition the central government aids basin management through funding, courses, workshops, technical aid and information transfers.

The effectiveness of collaboration efforts depends on the need and the willingness of the stakeholders to participate and on the ability of the watershed manager to prepare and lead the process in a way that will generate effective collaboration to navigate between the parties and the issues (Smutko et al, 2002). Conflicts among local representatives are to be expected as well as conflicts and power struggles due to the basic inequality and lack of a common basis other than the watershed and the myriad issues associated with it. This will complicate the interaction between local stakeholders even with the best intentions (Ferreyra and Beard, 2007).

In addition to national and local government representatives, the YRA council includes two representatives from the public, nominated by the Minister for Environmental Protection as well as the SPNI representative. The YRA's adoption of this mode of operation coincides with its structure, which sets the agenda in a way that makes it clear that the authority represents the river's needs in the overall aspects as opposed to the needs of any particular municipality along the river or central government authority. One way to test the success of this method is to see if the statutory decision-making process does not meet with the contemporary polity, in the words of Ackerman and Sawyer (1972). How many decisions were appealed to a court of law? How many overturned by the legislature? How many approved by the national government? The answer is that there has been only one court case against the YRA in its history instituted by an environmental NGO and this case ended in support for the master plan and its implementation. In

a country as litigious as Israel, the lack of appeal to a court serves as an indication of public support.

Due to the recognition of the scientific community's importance to the work of the YRA and the health of the river, the YRA made a principle decision to tie itself with the academic community. The YRA works with scientists on several levels. First, it aids researchers, scientists and students doing studies on natural resources. Second, the YRA hires scientists as part of collaboration with the Ministry of Environmental Protection. The YRA initiated a call for papers, funded by the Ministry of Environmental Protection, for research that would increase scientific understanding related to decision-making necessary for achieving the goals of stream rehabilitation. This ties into the fact that scientists, especially in the field of ecology, have a high environmental awareness and in many cases are involved in public environmental struggles.

The second component of participation needs elaboration. When the YRA first began operation, participation focused on statutory stakeholders: national and local government authority representatives and institutions like manufacturers and farmers associations, but not the general public. There were two reasons for this. First, the poor water quality and resulting condition of the river over so many years caused people to give up and accept the Yarqon as a place to avoid rather than visit. Second, there was no precedent of social participation in Israeli water management institutions and very few public interest groups existed beyond a couple of nature protection organizations.

Integrated watershed planning and management traditionally relate to the technical issues and aspects of drainage, flood mitigation and ecology. But the real force that drives governmental organizations to implement watershed management planning processes is the protection of the different human uses. As human's footprint encroaches into the river basin, the

need to protect these new uses arises. In addition, as the environmental quality of urban rivers like the Yarqon improves, the amount and variety of uses increases. Seen together, this increased complexity requires the involvement of local stakeholders in decision-making processes in order to achieve proficient and integrated management. Participation in the YRA began as a sounding board in order to test the quality of its decisions. This was particularly apparent in the development of the master plan for the river, as illustrated in Case Study 1. Subsequently, as the quality of the river and its environs improved, amenity usage by the public grew. This in turn spurred the development of interest groups who demanded further improvements from the YRA and the relevant local and national government authorities. This symbiotic three-way relationship between the YRA, government authorities, and the public has resulted in a steady improvement to the Yarqon River's environmental quality and social value .

Since the purpose of public participation in the YRA is to create consensus or maximize support for particular actions through collaboration and consideration of different views, the YRA adopted several principles, as illustrated in the case studies described below. First, decisions are made in informal consultation with a maximum number of stakeholders. This is relatively easy with existing organizations such as rowing clubs, bicycle clubs, individuals and any organization that plans activities in the river's corridor. In addition, representatives from the YRA meet with representatives from environmental organizations several times a year, in addition to their presence at YRA council meetings. To date, all of the initiatives concerning public participation have been the result of a specific request either from a particular organization or the initiative made by the YRA. In addition, the YRA has either initiated meetings or responded to requests to debate planned actions such as flood mitigation and the management of riparian vegetation.

An example is the issue of large eucalyptus trees that grow on the banks of the River. Many of the majestic trees are between fifty to one hundred years old and are identified by the public as part of the natural Yarqon scenery. Unfortunately the trees are the cause of several problems. Besides not being indigenous, they interfere with proper development of indigenous species because of allelopathy. They contain compounds that inhibit bacterial activity, thus interfering with the food chain. Furthermore, eucalyptus trees shed large branches without warning, endangering people using the river corridor for recreation. Even general maintenance of the trees, for instance trimming overhanging branches, can be problematic. Therefore YRA general policy targets the removal of eucalyptus trees from the immediate river banks. On the other hand, for many people cutting the trees down, even for ecological reasons or as part of flood mitigation actions, is unacceptable.

In order to address these objections and create a consensus, the YRA initiated meetings and field trips with representatives from the two prominent nature societies for the purpose of explaining the need for the removal of the trees and replacement with indigenous species. This YRA policy is not carried out at one time, but rather in small steps. The law requires a permit from the Inspector of Forests to cut down each eucalyptus tree. A permit is issued only after the Inspector weighs both scientific and professional aspects together with any public objections. Due to the general and justified sensitivity of cutting down trees, discussions between the YRA and NGOs and even private citizens are held in order to reach a consensus, sometimes even concerning a single tree.

Second, information is constantly available to the public through the YRA website, the press, verbal or written communication with local residents and signs explaining specific projects that are in progress. Educational projects involving local schools develop awareness of the

Yarqon and its environment. Students conduct study assignments in different areas of the river in the fields of ecology, flood mitigation, urban planning and architecture and participate in projects such as tree planting, archeological excavations and clean-up campaigns.

Third, specific inquiries by the public are promptly answered by mail, e-mail or telephone. Each year there are close to a hundred requests for information on various issues concerning the river, at least as perceived by the public. Inquiries come from concerned citizens, students at all levels, professionals and laypeople with suggestions for improvements, as well as NGO's and other groups. Some of the queries relate to river issues such as vegetation rehabilitation, maintaining habitats for song birds and kingfishers and the issue of eucalyptus trees. Most of the queries concern non-river specific issues such as the bicycle paths, pedestrian bridges and requests for specific information.

In recent years river quality has substantially improved, as have the services provided. The YRA put special emphasis on improving habitat conditions and increasing recreational activities. These changes include rehabilitation of trees and vegetation along the river corridor, improved water quality, increased water quantity and developing an ongoing maintenance routine for trash collection, pathway upkeep and river cleanup and dredging. The opportunity for making improvements increases if the achievements and advantages of integrative management, including collaboration with stakeholders, are identified, measured and expressed in terms of gains to the public. These gains include increases in public assets such as parks and recreational areas, as well as the expected increase in property values adjacent to rivers (Imperial and Hennessey, 2000). When the results of the work done in the Yarqon actually improved the conditions in and around the river in a manner visible to the public, negative pressures from the public dropped significantly, while positive pressures increased. Many of these public concerns

focus on issues not exclusively within the authority of the YRA, chiefly the use and expansion of open spaces along the river corridor. This has extended the focus of public participation in the Yarqon River to the local municipalities, the National Park Service and other governmental authorities.

The following case studies demonstrate the public's role in the decision-making process and the extent of its influence on the improvements mentioned. Case Studies 1 and 2 analyze public participation in the YRA planning process. Case Studies 3 and 4 illustrate YRA interaction with boaters and farmers, two important stakeholder groups.

Case study 1: creation of the master plan

The Master Plan process was designed so that all of the members of the YRA and local stakeholders participate in the process. In the initial stage, the YRA's Board of Directors formulated the terms of reference (TOR) for preparing the master plan, thus creating a wide base of agreement among the members. The subsequent preparation of the plan itself required putting together a team that would study the river in depth in order to create a holistic overview of the river system and to understand how to integrate the factors so that the rehabilitation would answer the needs of both the ecosystem and the people. As planning progressed, consultations with local stakeholders provided feedback and direction for the planners.

The TOR was explicit in defining the relationship between the planning team and the steering committee. The planning team was instructed to consult with the members of the Board of Directors, who were part of the steering committee, at specific stages during the planning process. This arrangement served to familiarize the Board of Directors with the structural properties of the river and its environment, with the river's hydrological and ecological needs

and to maximize their involvement in the planning process.

The goals that were set in the master plan reflect the tasks designated for the YRA mainly to rehabilitate the river and make it suitable for recreational activity (Rahamimoff, 1996):

** To create and secure a green lung for the most populated region in Israel, providing a green oasis in the midst of Israel's largest urban area, as well as naturally cleaning the air of dust and toxins.

** To change the current public attitude toward the Yarqon from a backwater to an urban showcase.

** To rehabilitate the river's ecosystem and improve the water quality by solving the problems created by the discharge of sewerage and low quality effluent.

** To provide appropriate solutions for river regulation and flood hazard reduction.

** To suggest economic initiatives for river use compatible with principles of sustainable development.

** To improve the environmental and aesthetic values of the river and its adjacent corridor.

In effect, the intensive process, concluded in one year, became one of the most important interactions between the planning discipline, represented by city planners and decision-makers on all levels and between hydrologists and ecologists on the other end of the spectrum. This is true for all of the stakeholders at the level of the authority, the watershed and on the national level. The process of preparing the plan served as a workshop for educating decision makers and all those involved including mayors, city engineers, and other local and government officials, about the river's structure and needs. The regional planners, who operate according to the planning and building law and who are key position holders in all planning processes, also adopted the principles described in the master plan and started to act according to them despite

the fact that it is only a precursor to outline plans that are the statutory basis for detailed plans. This enabled the YRA to proceed with decision-making regarding the actions needed to initiate the river's rehabilitation.

After the YRA Board of Directors and Council approved the Master Plan, it was submitted to and approved by the Ministerial Committee for the Environment. This approval received the status of a Government Cabinet Directive in April 1996 and since then the Master Plan has served as a guideline document for the YRA's activities, which are presently focused on its implementation.

It is difficult to assess the direct contribution of non-YRA member stakeholders in developing the Master Plan because initially there were no meetings that were designed to elicit remarks. As this is the first Master Plan created for a river in Israel, when work began there were very few organized stakeholder groups that could be identified save for the farmers who irrigate with water pumped out from the Yarqon and the SPNI. Today it is possible to identify several groups of stakeholders as will be shown in the subsequent case studies and their participation is closer to the classical interpretation of public participation.

One particular early example of interaction with stakeholders was the YRA's work with cyclists. The master plan for the Yarqon created "fingers", access routes from built-up areas to the open spaces and parks along the river, in order to encourage recreation and commuting by bicycle. Prior to the approval of the plan, the YRA produced a map of the available mountain bike paths around the Yarqon and distributed them, free of charge. The influx of large numbers of cyclists created a major stakeholder group promoting protection of the Yarqon and its environs, thus increasing public pressure on policy makers to rehabilitate the river.

Case study 2: creation of a comprehensive strategic plan for tourism

Preparing the river and its corridor for recreation is central to the YRA's activities and is an integral part of the Master Plan. However, it would seem that at this stage of the development of watershed management in the Yarqon, tourism is a necessary by-product but not a direct component of watershed management. In this context, the creation of a tourism plan may be ahead of its time but it is important to set such processes into motion, parallel to other processes.

The geographical position of the Yarqon, flowing through the most heavily populated area in Israel, serves as an incentive to provide quality open spaces and a substantial boost in the quality of life for over two million people who live within a half an hour radius of the river. The YRA initiated the creation of a tourism plan in collaboration with the local communities with the aim of developing small businesses and jobs that relate to the activities along the river. Recently there has been a rapid increase in local eco-tourism, particularly in the rural areas of Israel. The idea is to transfer this idea to the urban setting. In order to do this, the YRA hired a specialist in eco-tourism and chose one particular regional council in order to develop a suitable model with the local residents. The head of the regional council supported the entire project that began with a series of workshops and lectures about the Yarqon River and the plans for its rehabilitation and development. These subjects were introduced on the local scale as well as on the watershed scale. Participants were asked to fill out questionnaires and to submit suggestions regarding the suitable concept for local economic endeavors as well as for possible recreational activities. The results were analyzed and incorporated into the strategic plan that was the end product of this stage. Experts on starting small businesses were invited to talk to the attendants in the workshop and field trips were taken to areas in Israel where there are similar projects. The implementation of this has been slow mainly due to difficulties arising from the convoluted relationships between

local authorities, who would like to see implementation proceed at a fast pace, as opposed to some national government agencies and NGOs who are slow to make decisions and wary of development even when considering eco-tourism projects. These conflicting approaches dampened the participants' initial enthusiasm, and after the development stage ended, the rate of the public's activity declined. Still, three years after the project ended, some of the initiatives are in the process of implementation.

Case study 3: interaction with farmers

The farmers who grow crops and orchards along the river and especially those who extract water from the river for irrigation are the stakeholders with the longest history of continuous use along the river. Even during periods of severe drought, the farmers' pressure forced the Water Commissioner to discharge spring water into the river for the farmers' benefit, thus preventing the river from becoming a dry riverbed. The YRA recognized that these stakeholders had power, influence, and a historical connection to the river. It was imperative to clarify to these stakeholders that the YRA considers agriculture an important factor in preserving the heritage of the area and creating the desired atmosphere of open spaces within the urban setting, on the condition that it not harm the river. Meetings with the farmers were held at the local branch of the Ministry of Agriculture and the Water Commissioner and his staff were involved.

Representatives from the YRA explained the Master Plan to the farmers and responded to the issues raised. Since these initial meetings with the farmers in 1995, there has been a generally positive relationship between the farmers and the YRA, with the following results:

** Changes were made to the weir system that enabled water diversion by building permanent weirs that serve both the farmers and the river. The new weirs were planned to perform

ecological functions such as water aeration and habitat enhancement as well as provide the necessary head for pumping. In addition, the weirs serve as passages from one side of the river to the other. This is important since there are not enough bridges that can serve recreational uses.

** In response to the YRA's request to minimize pollution from diesel fuel, pesticides and empty pesticide containers, farmers installed pollution prevention structures and cooperated with monitoring the use of pesticides, whether by air or land application. This has resulted in reduced pesticide residues reaching the river.

** After winter floods, the YRA removes debris from the river. At the request of the farmers, the YRA also removes sediment from the farmer's pumping stations so that they can begin irrigation when needed.

** The YRA provides water quality data to the farmers, a requirement for obtaining permits from the Ministry of Health to irrigate crops with river water.

It should be noted that not all farmers responded immediately to the requests made by the YRA. Some maintained an atmosphere of suspicion and in one instance, one of the weirs was purposely damaged in order to enable increased pumping. Even though this was one isolated incident, it was an important lesson to the YRA, who realized that their priorities are not always in sync with the farmers.

In another instance a conflict arose between the YRA and one particular farmer who for years had been issued an abstraction permit from the Water Authority at a point in the upper reaches of the Yarqon. The Water Commissioner decided to replace irrigation water pumped directly from the upper section of the river with water from the national water supply network. This decision resulted in a lawsuit brought by the farmer against the Water Commissioner. The YRA voluntarily joined the case as an additional defendant in order to work towards ending all

pumping from the upper reaches. With the intervention of the YRA, the farmer dropped his demand for pumping from the river. It should be noted that the Yarqon River rehabilitation scheme calls for ending all pumping from the river in the future and replacing it with water from other sources. It is expected that this will create additional conflict, but the water situation in Israel cannot compare to the days when irrigation from the river was permitted. Under the final master plan concept, water flowing in the Yarqon will be pumped out for agricultural use only at the point where the river enters the Mediterranean. This will enable a double use of the river, once for amenity uses and second for irrigation, but irrigation will not be permitted directly from the river.

Partnerships between local stakeholders and government basin authorities need to be based on a win-win situation or at least win-no lose. This does not mean that the partners, stakeholders and the organization managing the watershed agree on all subjects, nor that there is total agreement on projects central to watershed management (Imperial and Hennessey, 2000). But the start of discussions requires a uniform definition of the issues before the organizations and a division of authority and their degree of responsibility.

Case study 4: interaction with boaters

There has always been boating on the Yarqon River, but activity increased in correlation with improved water quality. Measurements have shown fecal coliform bacterial counts dropped from 10^5 and 10^6 a decade ago to 10^2 and 10^3 today. The improvement brings bacterial counts to a range that is acceptable for rowing activities. The daily number of rowers has increased to hundreds and the number of active rowing clubs has grown from three to five. This led the Ministry of Health to demand that a bacterial quality standard be set for the river to protect the

boating public. By law, however, river quality is the province of the Ministry of Environmental Protection and boating on the Yarqon, the province of the YRA. In addition, the Ministry of Transportation holds responsibility for transportation on watercourses. The YRA decided that due to the rising demand for rowing it would have to take the lead in drafting an ordinance to regulate the activity. Due to the number of stakeholders involved, however, drafting a simple ordinance became a major effort. The Ministry of Health has no responsibility for boating but it does set limits for public exposure to health hazards. The Ministry of Environmental Protection is responsible for setting water quality in rivers, and the Ministry of Transportation sets standards for boating. The rowing public, however, has been rowing in the Yarqon for over fifty years without a sign of sickness incurred as a result of rowing; their pressure to allow rowing year round forced the regulators to work together to solve this convoluted issue.

The process that took place to resolve the issue began with a lobbying effort that was initiated by a rowing center that, in coordination with the YRA, brought the issue to the Israeli Parliament's Environmental Committee. Members of the rowing clubs were invited to the deliberation in the parliament and they were allowed to state their case. Subsequently a committee was formed to set water quality criteria, balancing health considerations with boaters' demands.

At that point, the YRA began the process of drafting an ordinance. As the statutory process proceeded apace, the YRA recognized that it must in parallel, encourage public debate. As mentioned previously, the management of the YRA recognized that adaptive management requires continual learning. This means that stakeholders with experience in boating must be heavily involved in the policy decision for rowing on the Yarqon River. In essence two types of stakeholders were engaged: representatives of the Ministry of Transportation skilled in boating

regulation and the rowers themselves, including the commercial concessions that rent small boats.

In 2007 the YRA initiated contacts with the clubs and the commercial concessions in order to explain the process and to hear their reactions. The process began with a meeting held at the main boating club on the river. Present were representatives of clubs, commercial interests and individual boaters. A lively debate developed, in the spirit of adaptive management called bounded conflict, where conflict is welcome but confined to limited objectives. The wealth of knowledge in the room combined with the spirit of the rowers imbued the management of the YRA with the drive to pursue criteria advantageous to continued rowing. Knowledge gained from other rivers together with the active cooperation of the Yarqon rowing clubs led the management team to adopt a flexible rowing program. No one would be forbidden from rowing, instead flags would be raised when water quality would be below a certain bacterial level and rowers could row at their own risk. When the ordinance takes effect it will be studied, water quality will be monitored and studies will look at health effects among the rowers. Over time, quality levels and flag flying will be adapted according to study results.

Conclusions

Although social participation in the YRA seems quite tame when seen from afar, in many ways it is leading the way for participation in Israeli water management institutions. In its early years, the YRA used participation as a sounding board in order to test the soundness of its decisions in developing the Yarqon River master plan. The main focus for participation was through representatives in the YRA's council and directorate.

As the first river authority in Israel, the YRA had no choice but to develop its own

constituency. For some, this would mean working strictly within the statutory framework. Yet for the YRA, this would not include the silent public, those that benefit directly from the Yarqon and its environs, but do not get involved in public debate. These stakeholders had to be found and actually congealed into a constituency, for example, boaters clubs and the farmers. There was no group of farmers created to deal with problems along the Yarqon until the YRA asked to meet with such a group, nor with the boaters and the bikers. In short, the YRA created participation forums to contribute to the goals of adaptive management of continuing to learn and adapt changing streams to changing streams of thought.

As these groups congealed and grew, they began putting pressure on the YRA and the local and national authorities to further improve the river and its amenity uses. Today the YRA has an informal open-door policy that encourages the public to voice their opinions, and a management policy that is constantly changing in response to new information and ideas. While in many cases the classic mode of social participation is at most a technical issue or part of a check list, in-depth and ongoing participation has become a deciding factor in the success of implementing policies in the YRA. What can be learned from the Yarqon experience is that principles of basin management are sound. Implementation of the principles, however, requires trial and error, with a learning curve built in. 'Adaptive management is field science; its laboratory is not a controlled setting, but a noisy, changing world of human actions and natural fluctuations' (Lee, 1993, p69). No better sounding board for success exists than the public and, therefore, encouraging participation in the management process ensures that mistakes will be discovered; the response of management to those mistakes ensures improvement and further participation.

Channeling public debate from turmoil to effective management requires first and

foremost an understanding of democratic institutions. It further requires a humility not often found in political institutions. More important there must be an understanding that no single organization, even a basin authority, can control the basin or manage a river and its environs. All rivers in Israel flow through local government entities. This means that getting the public involved must begin with the mayors of local and regional councils, who must recognize this fact and act accordingly. They must initiate processes by which the river will turn into an asset for public amenities and not public blight. Without a proper framework for operation, understanding adaptive management practices and public participation would not have occurred.

The involvement of so many interests in the welfare of the river has provided the YRA with the power to demand improved water quality and quantity from the Director of the National Water Authority and the relevant government ministries. The main result has been a change from a downward spiral of increasing pollution and neglect to ever-increasing improvements in river quality and public usage. For example, the National Water Authority is now allowing 3.6 million cubic meters a year of freshwater to flow down the river from the Rosh Ha'ayin springs. The Yarqon River and its environs is now one of the most beautiful recreation sites in Israel, visited annually by millions of local residents and tourists. It was transformed from an embarrassment to a showcase for recreational use of rivers and streams in Israel within less than ten years of operation. The experience in managing the Yarqon River shows that integrated water resource management in a watershed, coupled with adaptive management practices and strong social participation at crucial stages, speeds the process of stream rehabilitation.

Notes

¹ The Magelle, §§ 1235, 1237, 1238. ‘Water flowing in the bowels of the earth are not the property of any man.’ *Id.* § 1235. ‘Oceans and large lakes are ownerless.’ *Id.* § 1237. ‘The many rivers that are no man's property and are not separated into rivulets, i.e. they don't enter into channels that are the property of a recognized group of people, are ownerless....’ *Id.* § 1238

² Article 46 of the 1922 King's Order in Council proclaimed that ‘The jurisdiction of the Civil Courts shall be exercised in accordance with the Ottoman Laws in force in Palestine on 1st November 1914, and such Ottoman Laws as have been or may be declared in force by Public Notice, and such Orders in Council, Ordinances and Regulations as are in force in Palestine at the date of the commencement of this Order, or may hereafter be applied or enacted.’ These laws were subject to the enactments of the new legislator, the British High Commissioner, to the Orders-in-Council issuing from the King of Great Britain and to Acts of the British Parliament.

³ Water Law, Article 124s. As of 2006, the Water Commissioner is now called the Director of the Government Authority for Water and Sewage, (Director of the Water Authority).

⁴ As has happened to the environmental impact assessment process.

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