

The Management of Water in the Jordan Basin in 2010

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Abstract This paper is intended to contribute to the thinking of those involved in the management of the water in the Jordan Basin. It describes the situation as it was in 2010 with regard to water management and raises the question, "What changes may be needed if the problems posed by increase in temperature and decrease in precipitation are to be dealt with effectively?" The paper is based in part upon interviews with prominent experts from Israel, Jordan and Palestine. It presents the water management of the three national entities describing the relevant legal and administrative frameworks under which water is managed and comments on the situation with regard to day-to-day management. At the time of the underlying research all three national entities were in the process of reviewing the legal and administrative frameworks under which water is managed in the Jordan Basin. However there is little evidence that, in any of the thinking of the respective parties, attention is being given to the Basin as a whole or how to improve the existing structures for regional cooperation.

Keywords Jordan River, Israel, Jordan, Palestinian Authority, water management, cooperation, stakeholders.

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1 Introduction

It is generally agreed by climatologists that the Middle East is likely to be adversely affected by global warming. The Jordan Basin is no exception. Work already carried out by research teams working with the GLOWA Jordan River project (a major German research initiative involving teams from Israel, Jordan, Palestine and Germany) and by individual researchers, has lead to the conclusion that a rise in temperature and decline in precipitation would appear to be inevitable over the next three decades, even if steps are taken to reduce emissions of "greenhouse" gases as a result of international agreements.

Given that precipitation is likely to fall dramatically over the next decade. This paper is intended to contribute to the thinking of those involved in the management of the water in the Basin. It describes the present situation with regard to water management and raises the question, "What changes may be needed if the problems posed by increase in temperature and decrease in precipitation are to be dealt with effectively?"

The paper is based in part upon interviews held in 2010 with 16 prominent experts from Israel, Jordan and Palestine (see Annex), and in part on written sources (Are there any

References?). It consists of three sections, one on water management in Israel, one on water management in Jordan and one on water management in the Palestinian Areas. All three sections list the relevant legal and administrative frameworks under which water is managed in the respective countries and comment on the current situation with regard to day-to-day management in the Jordan Basin. Of necessity, the paper takes into account not only how water is managed in the Basin, but also wider national structures which impinge on the situation in the Basin. The final section makes some tentative suggestions as to possible alternative ways of managing the reduced resources that are likely to be available.

At the moment, Israel, Jordan and the Palestinian Authority are all in the process of reviewing the legal and administrative frameworks under which water is managed in the Jordan Basin. However, while all three countries are in the process of drawing up new plans, adjusting their administrative structures and generally trying to improve their management of water, they are doing so in isolation. There is little evidence that, in any of the thinking of the respective parties, attention is being given to the Basin as a whole or how to improve the existing structures for regional cooperation.

It is likely that this lack of a regional approach to water management will be a serious source of weakness when the long term problems related to climate change, population increase and the demands of development projects, have to be faced.

2 Water Management in Israel in 2010

2.1 Key Points

- Responsibilities for water management in Israel are divided between different institutions which are involved in water supply, agriculture and environment.
- The Israel Water Authority is the policy making body. The actual work of the supply and the distribution of water is carried out by Mekorot and the Drainage and River Authorities.
- The Water Authority does not have an operative arm for the enforcement of its policies.
- Long term planning is the responsibility of the Planning Department of the Water Authority.
- Short term planning of water flows is the responsibility of the Operations Committee, which is advised by the Operations Department of the Water Authority. As part of short term planning, the current meteorological and hydrological situation is considered but the long term Master Plan is not always fully taken into account.
- Even though there is elaborate legislation for the Israeli water sector, legislation is not always followed closely when it comes to day-to-day administration. This is because the law requires time consuming and complicated processes, which need the participation of many different stakeholders.
- The River Rehabilitation Authority has, together with the Jewish National Fund and the Drainage Board, drawn up rehabilitation Master Plans for all rivers in Israel. For the Jordan River, the Master Plans are divided up into geographical sections and no single plan includes the whole length of the river with Israel.
- It appears that the general view within Israeli water administration is that there is no need for the expansion of cooperation with the Palestinian Authority or Jordan and that the present arrangements are sufficient.

2.2 Relevant Legislation

- Water Law, 1959 (IWL); Water Decree (Establishment of Courts for Water Issues), 1959
- Lake Kinneret Order, 1947; Drainage and Protection from Floods Law, 1957; Drainage and Protection from Floods Decree (Establishment of Courts for Water Issues), 1958; Drainage and Protection from Floods (drainage areas) Declaration 1996; Drainage and protection from floods Regulations (setting protection zone for paths in the area of Yarkon drainage authority), 2003
- Streams and Springs Authorities Law, 1965; Streams and Springs Authorities Order (Yarkon River Authority), 1988; Streams and Springs Authorities Order (Kishon River Authority), 1994; Streams and Springs Authorities Decree, 2003; Bathing Areas Arrangements Law, 1964
- Public Health Rules (Sewage Purification for Irrigation), 1981; Public Health Regulations (Setting Standards for Wastewater), 1992; Public Health Rules (Treatment of Wastewater Intended for Irrigation), 1981
- Environmental Law (Ways of Punishment), 1997; Abatement of Environmental Nuisances (Civil Actions) Law, 1992; Administrative offences Regulations (Administrative Penalty-Water Law Offences), 2002
- Water Regulations: Regulation of the Level of the Sea of Galilee, 1967; Setting new insertion targets, 1968; Improving the Water Usage in Groves, 1971; Prevention of Water Pollution in Lake Kinneret

2.3 Stakeholders

Ministry of National Infrastructure; Water Authority; Mekorot; Ministry of Agriculture; Drainage Boards (in the Jordan Valley two Drainage Boards exist – the Kinneret Authority and the Southern Jordan Authority); Ministry of the Environment; National Parks Authority; Society for the Protection of Nature; Keren Kayemet LeIsrael.

2.4 A Review of the Present Situation

For many years, the Israeli water administration has been under sustained criticism. In 2002 the criticisms made the establishment of a Parliamentary Committee of Inquiry on the Israeli Water Sector inevitable. Mistakes needed to be admitted, failures needed to be addressed, constructive suggestions made. The Committee came to the conclusion that the Israeli water sector had been in crisis ever since the 70s and that there was an overexploitation of the national water budget of about 2000 million m³ (mcm)¹. Ever since then, the Israeli water sector has been subject to reform but there are still substantial complaints.

Water management in Israel has to satisfy four different agendas: domestic water supply and sewage treatment, agriculture, industry and environment. Even though these fields are interconnected, there are different sets of institutions responsible for the decision-making with regards to water .

The institution responsible for the water supply and waste water is the Governmental Authority of Water and Sewage (Israel Water Authority), which is part of the Ministry for National Infrastructures (1). The institutions responsible for managing the river in relation to agriculture are the Ministry of Agriculture and the eleven regional Drainage Authorities that are focused around the catchment areas of Israel's rivers. Their priorities are irrigation and

¹ David Magen, "Report of the Parliamentary Committee of Inquiry on the Israeli Water Sector", Juni 2002.

flood prevention and the protection of the respective geology and fauna, in part to counteract erosion (2). Thirdly, the Ministry of the Environment has general responsibility for water and the environment. Environmental work in the field is executed by the Drainage and River Authorities as well as by other bodies dealing with landscape and nature development, such as the National Parks Authority and the Jewish National Fund. The aim of the two latter organisations is to keep water for nature so as to protect Israel's ecosystems and maintain the natural water cycle. Water for leisure is also an important concern of theirs (3).

2.5 Legislation and Implementation

The actions of the different institutions are regulated by an agglomeration of statutes which are listed above.

The most important legislation for water management is the Israeli Water Law (*IWL*). The *IWL* establishes the framework for the control and protection of Israel's water resources. It stipulates that all water sources are public property and every person is entitled to use water, as long as that use does not cause salination or depletion of the water resource, (*Chapter One IWL*). To further define this general principle the *IWL* contains provisions to limit the right of public usage (*Water Usage Arrangements, Chapter Two, IWL*), especially by regulating the prevention of water pollution and norms and rules of water usage (quantity, quality, price, conditions of supply, terms of utilization). Additionally the *IWL* contains provisions on water production and supply, quotas and artificial water recharge, as well as on water works (including the administrative setup of the water management, procedures and the delegation of authority to regional water authorities, (*Chapter Three, IWL*) and on the procedure of defining and collecting water charges.

2.6 The Israel Water Authority

The 2006 law amending the *IWL* created the Israeli Water Authority as the main body responsible for the management of water in Israel as of 1st of January, 2007. It is responsible for supply and demand management in the water sector and reports to the Minister of National Infrastructures and to the Knesset. Before the amendment, the respective body was the Water Commission which was less independent than the Water Authority. The Water Commission was part of the Ministry of Agriculture .

The Water Authority is overseen by an inter-agency body (Council), headed by the Director of the Authority, and composed of senior representatives of the Ministries whose spheres of responsibility are affected by issues of water management. These are the Ministries of Finance, National Infrastructures, Environmental Protection and Interior. The Director of the Authority (formerly the "Water Commissioner") is a civil servant appointed by the Cabinet for a period of five years.

The Water Authority executes the *IWL* (though the law sometimes allows for delegation). More specifically, it is responsible for planning, operations and tariffs as well as for quality and quantity of the water supply². In fact, planning and operations are partially outsourced, e.g. to Tahal or Mekorot, but also to the 180 municipalities that are mainly responsible for the treatment of sewage. Unfortunately, since cost efficiency is a big factor for the municipalities, treatment of waste water is not uniform .

The Water Authority acts as an executive agency with regards to the quantity of water supplied. It also regulates the operational aspect of supplying water, which is carried out by local water suppliers. However, the Water Authority does not have an operational arm to ensure that local suppliers adhere to its policies. Ownership of purified waste water thus

² Water Law, Chapter 3, Section 48.

moves from the ownership of the state to the ownership of the municipality running the treatment installation, and therefore the state loses power over the distribution of treated water .

The Ministry of National Infrastructures is mainly responsible for legislative control, but it does not currently have much influence over the Water Authority. The Minister of National Infrastructures, Uzi Landau, has voiced doubts about the Authority's independent status.

Within the Water Authority, two different departments share responsibility for the determination of the water flows within Israeli rivers and within the National Water Carrier. The Planning Department, which was established in 1993 when the former planning authority, Tahal, was privatized, takes care of the long-term planning of water demand and supply. The time scale of the plans is usually twenty years although some plans are made thirty years ahead. The Planning Department initiates Master Plans, Regional Plans etc. and writes the terms of reference for the planning contractors. The actual work of planning is outsourced, but the contractors' work is monitored, evaluated and approved by a committee within the Water Authority which meets every two weeks to evaluate small-scale projects. Once a plan is approved by the Committee it is submitted to the Director General for approval and then to the Development Department for implementation. The Development Department deals with the selection of contractors etc. Most of the work is carried out by Mekorot. The Planning Department developed a limited Master Plan in 2002, primarily to stabilise the drought situation at that time. The most prominent new element in the 2002 Master Plan was the introduction of seawater desalination to Israeli water management planning.

Short-term decisions are taken by the Operations Committee which meets every few months and lays down the exact quantities for water flows in the National Water Carrier. Meetings are prepared by the Operations Department, which considers the meteorological and hydrological situation, before informing the Committee about the current data situation. The long-term planning as laid down in the Master Plan appears to have limited influence on the decisions of the Operations Committee.

2.7 Drainage Authorities

The Drainage Authorities and River Authorities manage the rivers. They are independent of the Water Authority even after the 2006 amendment of the IWL and are not regulated by the Water Authority, but they do receive parts of their budget from it. It is easier for the Drainage Authorities to reach practical solutions concerning the rivers than it is for policy-making bodies. In many cases, such solutions are reached without following legal procedures. This may seem unsatisfactory on one hand, but on the other, all of the interviewees in Israel pointed out that the provisions as laid down in the legislation are too complicated and time-consuming to be practical. Time efficiency is also important due to the heavy workload and the large number of projects that employees in the water sector are expected to carry out. It is a common, and also widely recognized, practice to take measures without following the official path, save in the case of major projects.

The catchment area of the Jordan River is handled by two Drainage Authorities. The Kinneret Drainage Authority is responsible for the whole catchment area north of the Kinneret and south of it until Naharayim (there is also a body called the Kinneret Authority which is responsible for the water quality of the Kinneret, though this body is not independent, but merely a division of the Kinneret Drainage Authority). And the Southern Jordan Drainage Authority is responsible for the catchment area south of Naharayim until the "green line" (the former border with Jordan).

Initially, the Drainage Authorities were only responsible for the river in its drainage function, that is, in its role in transporting water. Since the enactment of the Streams and Springs

Authorities Decree in 2003, the Drainage Authorities also act as River Authorities and have thus also become environmental authorities. The empowerment as River Authorities has led to the allocation of funds for the restoration of rivers by the Ministry of the Environment, and has thus promoted the ecosystem-approach within the Drainage Authorities. This has played a major role in changing the former view of the river as solely a means to move water discharge. As a result, the Drainage Authorities nowadays see themselves fulfilling both an environmental as well as an agricultural function.

Since the Drainage Authorities play a double role within water administration, they have to follow different administrative procedures, depending on the law upon which the respective action is based. Actions according to the Drainage Law are much easier to implement because most decisions are taken by the Agricultural Committee within the Ministry of Agriculture. The Drainage Authorities then merely execute the decisions. In contrast, measures under the Streams and Springs Authorities Law, as amended in 2003, have to be taken by a joint committee (the Stream Authority) of which the Drainage Authority is only a part. If no consensus is reached within the Stream Authority, no action will be taken.

Because of the division of powers in Israeli water management, the Drainage Authorities have no say about the quantities of water that flow in the river beds, which is the responsibility of the Water Authority. The Drainage Authority takes part in the planning process of water plans within its geographical area. Recently, a Water Plan has been released for the Herod River, north of Beit Shean, which states that for the months of August and September, the river will pour fresh water amounting to 60 cm/hour (13 mcm/year if it flows steadily) water into the Jordan River.

2.8 The Ministry of the Environment

The Ministry of the Environment, which is responsible for preventing pollution of the country's water sources, has placed river restoration high on its list of priorities. It has taken various steps towards securing the state of the environment in and around the rivers. In 1993, it created – together with the Jewish National Fund – a special River Rehabilitation Authority, an umbrella authority of over fifteen governmental, non-profit and research bodies concerned with river health. The Rehabilitation Authority coordinates responsibilities, financial resources, and professional knowledge in cooperation with the Water Authority, Ministry of the Interior (Planning Administration), Ministry of Tourism (Israel Government Tourist Corporation), Ministry of Agriculture (Soil Conservation and Drainage Division), Nature and National Parks Protection Authority, and local authorities adjacent to the rivers. The Department for the Development and Reconstruction of Rivers in Israel at the Ministry of the Environment contributes by establishing quality standards for river water and for effluents discharged to rivers, monitoring water quality in rivers and effluents discharged to them, stopping pollution of the rivers, planning rehabilitation activities along with local river authorities, determining the quantity and quality of water needed for rehabilitation, and documenting progress as part of an overall education and information effort³. To structure the actions of the Rehabilitation Authority, the Ministry of the Environment and the Jewish National Fund commissioned a multi-annual working plan for river rehabilitation which sets out priorities for planning along with necessary budgetary allocations⁴.

³ "Towards River Restoration", Ministry of the Environment, http://www.sviva.gov.il/Environment/Static/Binaries/Articals/toward_restoration_2.doc. Accessed in 2010.

⁴ Information about the programmes can be found here: http://www.environment.gov.il/bin/en.jsp?enPage=BlankPage&enDisplay=view&enDispWhat=Zone&enDispWho=hanehalim_shikum&enZone=hanehalim_shikum (in Hebrew). Accessed in 2010.

2.9 Need for an integrated approach

Since the rehabilitation program has to take into account the whole catchment area of the river, rehabilitation is carried out in close cooperation with the Drainage Authorities. Those are the only institutions responsible for the administration of the whole catchment area. Currently, a Master Plan is being prepared for the Jordan River section between Naharayim and the former green line border with Israel. This master plan will be the next in a line of about thirty master plans that outline the reconstruction of Israel's rivers. A plan that includes the Jordan River section south of the green line is not envisaged. Since this area is a closed military zone, there is little environmental concern about the ecosystem in the lower Jordan River from the side of the Ministry of the Environment: "The ecosystem stays untouched in spite of the fact that the little water remaining is heavily polluted".

Even though it seems there is a lack of an integrated approach between the Water Authority and the Ministry of the Environment, the two institutions commissioned a common study on the economic value of water allocations (freshwater and recovered) for river rehabilitation, using the Soreq River as a model. The model serves as a basis for decision making on water allocations by the Water Authority. Guidelines on water allocations for the rehabilitation of eight coastal rivers were prepared thereafter. It was determined that the water necessary to rehabilitate these rivers totals 51 mcm⁵.

Unfortunately, the aims that the different decision-makers are pursuing are not well integrated. At times, there is a conflict of aims and consideration of other points of views is not always complete. Suggestions have been made that there should be new legislation, taking into account the existing Water Law, Flood-Prevention Law and the Rivers and Springs Law, in order to create a single body responsible for all different matters of river management in a basin-wide approach .

2.10 Enforcement

Enforcement of existing legislation, collection of fees, and other related administrative actions generally take place without difficulty in Israel.

2.11 Cooperation with Palestine and Jordan

Official cooperation with the Palestinians and Jordanians takes place in the respective Joint Water Committees. The Israeli/Palestinian Joint Water Committee was established under the framework of the Oslo Accords and has functioned without interruption since 1994. All major developments in the supply and management of water in the West Bank and (until 2007) in Gaza have to have the approval of the Joint Water Committee on which sit senior officials from the Water Authorities of both sides and technical staff. The workings of the Committee have been subject to criticism by Palestinians who assert that there have been long delays in the consideration of specific projects and that not all the projects which have been approved have been possible to implement because of interference from the Israeli security forces. These criticisms are not accepted by the Israelis who feel that poor administration and executive delays on the Palestinian side have been the cause of delay. Never-the-less the Committee has been working consistently over fifteen years and great efforts have been made in the last two years to improve its efficiency.

Cooperation with Jordan has been effective. Meetings of senior officials take place regularly and there are no reports of severe confrontation.

While there is cooperation over major issues at the higher level, the same is not true at the

⁵ "Towards River Restoration", Ministry of the Environment, http://www.sviva.gov.il/Environment/Static/Binaries/Articals/toward_restoration_2.doc, S. 5. Accessed in 2010.

lower level. It appears that the majority of those who are engaged in the management of water on a day-to-day basis in Israel, Palestine and Jordan, where water management should ideally be trans-boundary, do not cooperate on a regular basis. Cooperation is dealt with at higher levels in the governmental structure and does not affect the decision-making process on the ground. The day-to-day concerns of the neighbouring reparians are thus not always dealt with effectively.

Most interviewees in Israel do not see the need to improve cooperation with their neighbours. They see it sufficient to act as a supplier of water to Jordanians and Palestinians, but find it unnecessary to apply a common management system. A solitary comment to the contrary was made by a staff member of the Southern Jordan River Drainage Authority, who stated that the need for effective cooperation at an operational level with the Jordanians became obvious after the 2004 flood that affected large areas south of Naharayim.

3 Water Management in Jordan in 2010

3.1 Key Points

- The key stakeholders for water management in the Jordan Valley are the Ministry of Water and Irrigation, the Jordan Valley Authority and the Jordanian Water Authority.
- The two Authorities will ultimately be replaced by bulk supply agencies for surface water in the Jordan valley and ground water in the highlands.
- Jordan is planning to privatise supply, operation and maintenance of water.
- At present, the Jordanian system of water management suffers from miscommunication between various authorities. There are problems about the monitoring of river run-off and water quality observation.
- Enforcement is the weakest point in the Jordanian system and is not always achieved as laid down by law due to tribal based social structures.
- Cooperation with Israel and the Palestinian Authority is recognised as desirable but not given much emphasis.

3.2 Legislation

- Water Authority Law 18 of 1988 (WAL);
- Jordan Valley Development Law 30 of 2001 (JVDL);
- Administrative Organization of the Ministry of Water & Irrigation 54 of 1992 (MWI By-Law);
- Public Health Law 54 of 2002;
- Underground Water By Law 85 of 2002;
- Environmental protection law 52 of 2006
- Environmental Health Legislation, Law 12 of 1995.

3.3 Stakeholders

Ministry of Water and Irrigation; Ministry of Agriculture; Ministry of Environment; Ministry of Industry; Ministry of Tourism; Water Authority of Jordan: Jordan Valley Authority; Northern Governorate Water Administration (NGWA); Miahuna (Amman); Aqaba Water Company (AWC); Northern Water Company; Royal Water Committee (headed by Prince Faisal).

Jordan is undergoing major legal changes in the water sector.

3.4 The Present Situation

Following the new National Water Strategy, from 2008 to 2022, the Jordanian Ministry of Water and Irrigation together with the German aid agency, GTZ, is working on a new Water Sector Law that will change the water administration in the Jordan Valley, and move the national water management towards privatisation. Approval and implementation of the law will take some years. At present the old legislation is still relevant.

Jordan's priorities on water supply, as set out in the water strategy, are as follows:

- water for drinking,
- water for tourism and industry and
- water for irrigation.

3.5 Legislation and Implementation

The administration of the Jordan River is mainly subject to the three laws that created the Ministry of Water and Irrigation (*MWI By-Law*), the Water Authority (*WA Law*) and the Jordan Valley Authority (*JVA Law*) and that regulate the work of these institutions.

According to Article 3 of the *MWI By-Law*, all three authorities are attached to the Ministry thus, by law, there is a strong interconnection between them. Interactions should also be facilitated by the fact that all three authorities are located in the same building in Amman. In reality, the communication among the three entities is limited partly because information exchange is not well organized⁶.

3.6 Ministry of Water and Irrigation.

The Ministry of Water and Irrigation is the policymaking body. It has full responsibility for water and public sewage in the Kingdom as well as projects relating to it. The Ministry is responsible for the economic and social development of the Jordan Valley as well as for all the work necessary for the realisation of this development (*Article 4, MWI By-Law*). The Ministry is advised by a Consultative Body, which works under the chairmanship of the Minister, and consists of the Secretary General of the Ministry, the Secretary General of the Water Authority, the Secretary General of the Jordan Valley Authority and four qualified and experienced members to be appointed by the Council of Ministers for a two year term. The Council can request the advice of national and international experts (*Article 17, MWI By-Law*). It is also responsible for setting the water abstraction rates (*Article 18, MWI By-Law*). The aim of water allocations is to keep all fresh water for domestic use and to make agriculture dependent on treated effluent. The Ministry realises its policies through National Water Strategies.

3.7 Water Authority

The Water Authority is an autonomous corporate body with financial and administrative independence (*Article 3, WAL*) within the over-all framework provided by the Ministry of Finance. Its responsibilities include the survey and conservation of water resources as well as their exploitation except for the use for irrigation. It acts as the implementing agency for the Ministry's policies. The Water Authority also builds water installations and can issue permits for such installations to engineers and licensed professionals (*Article 6, WAL*).

⁶ National Water Strategy, Chapter 4, "Institutional Reform", 4-1.

3.8 Jordan Valley Authority

The Jordan Valley Authority was created in 1977 to put into effect the reconstruction and integrated development of the war-stricken and partially deserted Jordan Valley. The valley had been abandoned by most of its inhabitants during the 1967 war when it became the frontline between Israel and Jordan. In 1977, there were only 30,000 people left living in the valley. The climatic, geological and hydrological conditions of the valley meant it was of major importance for the food-security of the Kingdom. Due to its climate, the Jordan Valley acts as a natural green-house. Additionally, water is directly available from the Yarmuk and Jordan River via the King Abdullah Channel. To take advantage of these favourable conditions, there was an urgent need to resettle farmers on the East Bank of the Jordan. The redevelopment included the implementation of all infrastructure projects needed (streets, electricity, schools, hospitals etc.), the administration of the water and waste water system as well as the management of surface water used for irrigation. The initiative has led to an overwhelming success: Today's population amounts to about 450,000.

The Jordan Valley Authority was created along the lines of the Tennessee Valley Authority. Its main responsibility is the social and economical development of the Jordan Valley (*Article 3, JVDL*). To achieve this goal, the JVA received the power to develop the whole infrastructure of the Valley. As a first step, the JVA expropriated the remaining farmers from their land in the Jordan Valley and immediately requisitioned the land and the water shares necessary for the implementation of infrastructure projects (*Article 21, JVDL*). In a second step, which has not been fully completed, the land will be divided up into farm units and redistributed to the farmers with a deduction of up to 15 % of the original area for development services (*Article 22, JVDL*). The re-allotment will only be completed once all of the development work is finished.

Today, limited water resources increase the pressure on JVA to limit the extension of agricultural land and to develop alternative water resources, such as desalinated brackish water or high quality effluent. The emphasis of the work of the Authority has shifted from integrated development to the development of water resources, agriculture and tourism infrastructure and environmental protection.

In addition to the development function, it should be noted that the JVA is responsible for supplying 100 mcm to the treatment plant at Miyahuna. This represents 70% of Amman's water supply (about 113 mcm a year). Surface water supply amounts to 37% of Jordan's total water supply, most of which is taken from the Jordan River System. Water in the Jordan Valley is not allocated by means of a Master Plan. There is a simulation model that calculates water needs based on farm size and agree cropping pattern. A formula exists for changing amounts allocated in accordance with water availability. Regular meetings are held with local farmers to make sure that they are informed about the water situation. On the basis of these meetings, the Jordan Valley Authority creates a yearly water budget for demand and supply quantities. In 2008, farmers received only 40% of their water demand. In 2009, supply equaled 55% of demand.

The Minister of Water and Irrigation heads the Board of Directors of the Jordan Valley Authority. However, a wide decision-making power is left to the Secretary General of the Jordan Valley Authority. This has in the past led to friction with the governmental system. Nevertheless, the people in the Jordan Valley appear to approve of the work of the Authority.

3.9 Need for Integration

The clashes of competences in the past between the different authorities and occasional failures to effectively collect and share data were the main reasons for the decision to reform the water sector. It appears that the Water Authority and the Jordan Valley Authority have in general terms executed the policy of the Ministry but the Ministry has not had formal means at its disposal to enforce compliance on a day-to-day basis. According to the new legislation, supply, operation and maintenance will be privatised. The Water Authority and Jordan Valley Authority will lose their independence and will become agencies within the Ministry. The Water Authority will become a department for the analysis of water, for consultation and for regulation of utilities. The Jordan Valley Authority will become a department for irrigation, water and land supply in the Jordan Valley. The privatisation of supply, operation and maintenance will give the Ministry the possibility of effectively enforcing its policies towards the private stakeholders and, hopefully, securing a more efficient system. As for the Jordan Valley Authority, most infrastructural projects in the Jordan Valley have been finished and there is no longer a need for an independent body with its own administration.

3.10 Enforcement

Interviewees were in general not wholly satisfied with the enforcement of water legislation. Due to the social tribe system which prevails, especially in the highlands, it is hard to enforce the law effectively. Attempts at enforcement in Jordan have led, and may lead, to acts of violence against the enforcer. Therefore the authorities are slow to act and prefer to make use of slower but more diplomatic and effective ways of trying to maintain the law. For example, a violation may be published in a newspaper with a description of the infringement and also an explanation of the legal situation as it should be to give the violator the possibility to legalise his actions. There is also the possibility of "buying out" farmers which as many as 30 % would probably accept. However, the problem is a difficult one which will take time to deal with

At the same time, illegal water abstraction from the King Abdullah Channel has been reduced by almost 90% in the last three years though this was only achieved by major application of manpower. In 2008, the Jordan Valley Authority launched a campaign against illegal installations aided by 200 soldiers and 100 policemen. In southern Jordan there are many problems with illegal connections. Collection rates for water services are low in Jordan. Non-collection of revenues is a serious problem. It can be as high as up to 50% in some parts of the country⁷, though the average is around 20%. Traditionally, Jordanians are reluctant to pay for governmental water services. Private companies have a somewhat higher revenue and also offer better service to users. Aqaba is particularly noteworthy – the city has a modern metering and billing system and supply for a full 24 hours. After the sector reform, with total privatisation of water supplies, it is hoped that services will be better and revenues sustainable.

However, there is substantial criticism of privatisation: "Privatisation is useful in big states with a strong private sector, but we do not have a strong private sector that could take the responsibility, said one interviewee.

3.11 Cooperation with Israel and Palestine

Israel supplies Jordan with a yearly amount of 55 mcm of Jordan River water. The Joint Israeli/Jordanian committee meets to determine water quantity issues, and drought and flood

⁷ National Water Strategy, Chapter 4, "Institutional Reform", 4-1.

problems. It does not deal with water quality.

Cooperation with the Palestinians is limited by the fact that the Palestinian Authority has little or no say in what goes on in the areas adjacent to the Jordan River .

It should be noted here that between Israel, Jordan and Palestine, there is cooperation taking place under the umbrella of multilateral research projects financed by the international community - EXACT (a regional database relating to water established in 1994), GLOWA and SMART (German government financed projects involving scientific teams from Israel, Jordan, Palestine and Germany). Within the framework of EXACT, there is a common training program involving Israelis and Palestinians .

NGO-driven projects such as "Friends of the Earth Middle East's" Jordan River Rehabilitation Project have been perceived differently by various stakeholders. By some it has been described as working well due to its non-governmental structure whereas others were more reserved on the issue, essentially suspicious of a cross-border initiative for political reasons.

Generally, cooperation with Israelis and Palestinians over water issues is regarded as satisfactory. But cooperation is seen of more value with Israel as the Israelis have the higher level of expertise. While some individuals claim that Jordan has "especially good cooperation with the Israelis," others are more guarded: "We have no problem in dealing with them, but the agreement is more favourable to Israel than to us . . ."

It should be noted that the Jordanian population consists of almost forty per cent Palestinians who are in a strong position to put the Jordanian government under pressure. Therefore peace between Israel and Palestine is regarded as elementary for good governance of the joint water resources between Jordan and Israel. "Without peace, nothing will be permanent ".

4 Water management in the Palestinian Authority in 2010

4.1 Key Points

- Palestinian Water Law is undergoing major changes. It is intended that the new law will be issued and implemented over a three year period.
- General water sector policies are made by the Palestinian cabinet of ministries and the National Water Council. The Palestinian Water Authority (PWA) acts solely as a regulatory authority.
- PWA prefers joint management of the Jordan basin and feels unable to draw up a unilateral Master Plan for its part of the basin, until its relations with the Israeli Authorities have been clarified.
- PWA has started to take action to effectively enforce water legislation in the West Bank.

4.2 Legislation

Palestinian Legislation:

- Presidential Decree No.5/1995 (decree establishing the Palestinian Water Authority)
- Law No.2/1996 (law establishing the Palestinian Water Authority and defining its objectives, functions and responsibilities)
- Presidential Decree No.66/1997 (decree establishing the internal regulations of the Palestinian Water Authority and the rules of procedures)
- Palestine Water Law No.3/2002 of July 2002 (includes within its articles the institutional framework of each level in the water sector, the roles of each level, and

some water regulations, with the primary aim to develop and manage water resources efficiently in order to meet present and future needs in an environmentally sustainable way).

Israeli Legislation applicable in the Palestinian Territories:

- Military Order on Powers Concerning Water Laws No.92/1967 (Stipulates that all powers concerning water which were previously held by the Government of the Hashemite Kingdom of Jordan will be held henceforth by a person to be appointed by the Military Commander.)
- Military Order Amending Law No.31/1953 on Water Control No.158/1968 (Put all water production installations that were not addressed by the previous MO under the control of the Israeli authorities. The Order provides that the erection, possession and operation of any water production installation requires a license.)
- Military Order on Land and Water Settlement No.291/1969 (Stipulates that any water and land settlement which has not yet been completed in accordance with the Jordanian Law is put in abeyance and may not prevent real estate transactions.)
- Military Order Amending the Law on the Regulation of the Natural Resources No.457/1972 (Provides that the assessment of the value of land and water quotas for the purpose of compensation is to be made by an official body appointed by the Military Commander).

Jordanian Legislation applicable in the Palestinian Territories (if not contravening any more recent legislation):

- Land and Water Settlement Law No.40/1952 (procedures of the registration process);
- Water Control Law No.31/1953 (construction of irrigation structures in Irrigation Areas, Water Allocations);
- Municipalities Law No.29/1955 (powers of the municipalities to provide water to the residents, and to determine the means of provision and the organization of water allocations, determination of tariffs and fees, and the prevention of pollution of springs, canals, pools, and cisterns);
- Law on the Organization of Matters of Drinking Water in the Jerusalem District No.9/1966 (creating the Jerusalem Water Undertaking).

British Mandatory Ordinances applicable in the Palestinian Territories:

- Municipal Corporations (sewerage, drainage, and water) Ordinance No.6/1936; Safeguarding of Public Water Supplies Ordinance No.20/1938; Water Survey Ordinance No.2/1938

Ottoman Legislation applicable in the Palestinian Territories:

- The 1858 Ottoman Law on Land and the 1870 Ottoman Civil Code (the “Mejelle”)

4.3 Stakeholders

Palestinian Water Authority, Ministry of Agriculture, Ministry of the Local Governorates, Environmental Quality Authority, Ministry of National Economy, Palestinian Energy Authority

4.4 The Present Situation

For Palestinians, the management of the Jordan River basin has a low priority because they do not have access to the river's water. The Jordan River within the Palestinian Authority Areas is a Israeli closed military zone. Therefore, the right to exploit the springs along its shorelines only exists on paper and a share in the management of the river itself is purely theoretical. The view of the Palestinian Water Authority is that the management of the Jordan River is subject to international law, to the Johnston Plan and to the Oslo Accords but not, as yet, to Palestinian national law. Therefore they attribute responsibility for management of the Jordan River and its basin to the Joint Water Committee and the Israeli Defence Forces' Civil Administration.

According to the interviewees, several things can be done to mitigate the water shortage without further cooperation

- 1 share data,
- 2 exchange information,
- 3 trigger public awareness campaigns,
- 4 reduce leakage in the pipe system,
- 5 drill new wells in the eastern basin,

Ultimately, Palestinians are relying on the international community and on Israel's goodwill. According to members of the PWA, there is no risk that Israel will stop cooperation in the water sector. "If Israel does not help the Palestinians to develop their own water resources, they will eventually be responsible for supplying the Palestinians with fresh water". Never-the-less many Palestinians working in the water sector feel that the role of the Israelis in water management has had a negative effect on their ability to manage their water resources effectively and that these resources are insufficient in part because Israel is taking a larger allocation of water from the mountain aquifer than is justified.

4.5 Legislative Framework

Throughout history, Palestine has been under the jurisdiction of many different rulers. Nevertheless, the change of the ruler did not automatically lead to the change of previous jurisdictions. Each ruler kept existing legislation and changed it only if deemed necessary. The result is a mixture of legislation from different time periods and different cultures that regulate life in Palestine. Relevant legislation with regard to the current situation include the Sharia, Ottoman legislation, British Mandatory Law, Jordanian Legislation as well as Israeli Military Orders. Legislation originating in Palestine in the field of water only exists following the establishment of the PWA in 1995 in the aftermath of the Oslo Accords.

At the time that the PWA was established, the roles and responsibilities in the Palestinian water sector were scattered, fragmented and unclear. Clashes between authorities had led to inefficient management and uncoordinated investment. There was an urgent need for restructuring the water sector in order to regulate, monitor and control the management at the national, regional and local level. The Palestinian water sector was somewhat chaotic due to a plethora of water service providers and utilities at many levels none of which was fully effective⁸. However, the Palestinian attitude towards implementing a more sustainable and efficient approach towards regulation as well as policies is that this can only happen once the issue of water rights has been settled with Israel. For example, it is widely recognised within the PWA, that desalination is an important factor for a long term approach to water security,

⁸ Amnesty International, "Troubled Waters – Palestinians Denied Fair Access to Water – Water is a Human Right", 2009.

but for the moment Palestinians are reluctant to discuss it. Even though it is one of the most feasible options for providing long term water security they charge Israel with using the possibility of desalination to “run away from the fresh water issues.” According to members of the PWA, fresh water rights are the Palestinians' major concern now, though they are anxious to see desalination plants make their contribution, particularly in the Gaza Strip.

4.6 The Palestinian Water Authority

The PWA started drafting the necessary laws and regulations immediately after its establishment in order to guarantee the sustainable development and optimal utilization of water resources. The Palestinian Water Law was enacted in 2002. It lays down the institutional framework of the water sector and regulates the water use. The Water Law is complemented by five related regulations, for tariffs, pollution, service providers, licensing and water users. Since its enactment in 2002, the law has revealed disadvantages and limitations and is therefore currently being amended to meet the needs of Integrated Water Resource Management. The amendments will also provide for the creation of a national bulk utility and four sub-provider utilities on a regional level. All reforms for the water sector will be passed then implemented step by step according to a three-year plan which is financed by different donors.

The institutional framework referred to above gave the PWA a mandate to manage water resources, execute the water policy, establish, supervise and monitor water projects as well as to initiate coordination and cooperation between the stakeholders in the water sector. However, the PWA is not the policy-making body for water within the Palestinian Authority. Politics, plans and programmes are ratified by the National Water Council (NWC), whose chairman is the chairman of the Palestinian Authority, and whose secretariat is the PWA⁹. The members also include the main Palestinian ministries and other relevant stakeholders. Unfortunately, the National Water Council is not meeting on a regular basis.

4.7 The Present role of Mekorot to be taken by a National Water Utility

Water related operations are currently carried out by Mekorot, the Jerusalem Water Undertaking and the Water Supply and Sewage Authority (the latter two in urban areas) as bulk suppliers, and the municipalities as local suppliers. According to the Water Law, operations are supposed to be in the hands of a National Water utility, which has not yet been established. Discussions about its structure are in process. One of the major problems in creating this utility is the lack of clarity as to the role of the private sector in the Palestinian water supply system. This is not only attributable to different points of view as to the utility's role within the Palestinian water administration but also to structural legal problems. Because of the public nature of water resources in Palestine, Palestinian constitutional law does not allow any private participation in the water supply sector. It is yet unclear, how this legal problem is going to be tackled.

The proposed National Water utility will be a public, decentralized body that will implement the Palestinian National Water Strategy. In general, it is intended as a bulk utility on a national level with an adjoined set of regional Water utilities for North, Center, South of the West Bank and Gaza (which is actually the only one that is already functional as Coastal Management Water Utility). The subdivisions are going to be financially independent, though supervised by the PWA. Supervision is to be executed by auditing the utility's investment plan, which will need approval as part of the PWA's Strategy Plan.

The Water Law enables PWA to create a Water Master Plan for the Palestinian Territories.

⁹ Chapter three, Palestinian Water Law.

Such Master Plan was developed in 1998, but it has never been implemented. This is due to the fact that PWA deems it difficult to develop a National Water Master Plan for statehood issues while relations with Israel remain unclear. Also relevant is the lack of integration with the planning of the neighbouring riparians. The PWA would prefer the development of a common Master Plan for the whole region (including the Jordan basin) to a unilateral approach. Also, as already stated, Palestinians are reluctant to implement a sustainable and efficient strategy before water right issues with the Israelis have been settled.

According to members of the PWA, the “National Committee for the Development of the Jordan Valley” is working on a new Master Plan, which will be based on a Strategy Plan of the Ministry of Planning. Members of the committee are the PWA, the Ministry of Agriculture, the Ministry of Local Government, the Environmental Quality Authority, the Ministry of National Economy and the Palestinian Energy Authority. The efficiency of this body has been doubted. A new committee headed by the mayor of Jericho has started to work on the Jordan River at a municipal level.

4.8 Implementation

Interviewees in Palestine agreed that in the last three years at least, within the PWA, the administrative procedures were followed closely and that there is no granting of favour (wafta) within the Authority.

4.9 Enforcement

The most difficult part of any regulation process is enforcement. Depending on the constitutional system, it may be relatively easy to reach political consent for the enactment of regulatory legislation whereas it is in general very difficult to reach compliance of the law by the citizens. This is especially true for societies whose values are formed by a family-based and local loyalties, as is the case in much of Palestine.

During recent years, the Palestinian water sector had, and still has, to struggle with lack of adherence to the water laws. Common problems in Palestine are the refusal to pay water fees, the installation of illegal connections (water stealing and water piracy), and the drilling of illegal wells. Many trespassers are not even aware that they are acting *contra legem* because they feel it right to claim the water on their land. Such behaviour is often neither reported nor stopped by the respective municipalities therefore unaccounted for water averages 34% and collection rates average 50% in Palestine¹⁰. To tackle this problem the PWA has started cooperating with the police as of March 2009 to stop illegal drilling and connections. To support PWA’s operation, the Prime Minister announced in July 2009 that every municipality which does not comply with the water law will be dismantled. However, the fact is that in “Area C” (under direct Israeli control), it is hard for the various Palestinian bodies to assert their will (as already stated by the Palestinian Authority).

4.10 Cooperation with Israel and Jordan

According to PWA, the Jordan River as a joint resource cannot be managed unilaterally. The most important criteria for a multilateral approach are the principles of “equitable and reasonable usage” and the “no harm principle.”

PWA would therefore welcome a multilateral approach, but at the same time will not take part in any long term arrangement before Palestinian water rights have been agreed upon with Israel. Also, the Palestinians doubt if Israel can see them as a partner in resource management

¹⁰ World Bank, “Assessment of Restrictions on Palestinian Water Sector Development,” 2009, S.42.

rather than as a consumer of water.

Cooperation takes place mainly through the Joint Water Committee (see above). It is seen as a major achievement that Palestine has been recognised as a riparian in the Terms of Reference for the proposed Red Dead Conduit. This is, Palestinians believe, a very important precedent for further cooperation in the river.

Outside official channels, cooperation on water issues is happening through research projects such as SMART and GLOWA. But these have not been perceived of by Palestinians as being sufficient to ensure genuine cooperation. "Everybody just states their sovereign visions without taking into account the other side. The Israelis use these projects to represent their view of things. Israel looks at us not as a stakeholder but as a factor. Projects like SMART and GLOWA are seen as important to the extent that they enhance cooperation but not very significant in shaping policy."

5. Conclusion – Approaches to Regional Management

In light of the situation apparent from the accounts given above of the current management of water in the region, it is proposed that attention should be given by all stakeholders to thinking about appropriate management structures for water in the Jordan Basin. These will, of course, vary in accordance with the political, economic and social variables and developments in the region.

It is evident that the water management structures of Israel, Jordan and Palestine are inter-connected and in the long run this must be recognized in the government of water in the region. At present, as is clear from the descriptions given above, there is little coherence within the legal and management structures of each of the three countries themselves, let alone in regional management. While evidently there will always be differences due to the different social and political structures of the three countries, in the way water is managed, more coherence between the management structures used in the region would do much to make more effective the fight against water shortage, desertification and climate change. How water is used in agriculture, how to make the best use of treated waste water, how to avoid over-pumping, how to minimize health risks, these are the type of issues which should be faced and resolved regionally.

Among alternatives which might be considered is the creation of a Water Board for the Jordan Basin along the lines of the basin-wide Boards established under the European Union Water Directive. This will, of course, only be possible under optimum political and economic circumstances.

Other alternative possibilities are canvassed in a recently published article by David Brooks and Julie Trottier in the "Journal of Hydrology" (volume 282 March 2010)¹¹. They include provision for a "Bilateral Water Commission" for Israel and Palestine" and for a "Water Mediation Board". Though the authors refer specifically to Israel and Palestine there seems no reason why Jordan should not be included in such arrangements.

There is a need to take stock of existing management structures and of regional cooperation in the water sector generally and put forward ideas as to how they can be improved.

Improvement in management practice and structures in the region and, more difficult to achieve but essential, changes in attitudes among the stakeholders involved are essential. If they take place, climate change and other hazards can be overcome, if they fail, this will endanger the future of the people of the region.

¹¹ David Brooks & Julie Trottier (2010) Confronting water in an Israeli–Palestinian peace agreement. *Journal of Hydrology* 382, 103-114, <http://dx.doi.org/10.1016/j.jhydrol.2009.12.021>.

Annex: List of interviews cited

Interviewee Name	Background (Nationality, Position)
Arlozoroff, Shaul	Israeli, former Director of the Board of Mekorot and Chairman of the Finance Committee
Assaf, Karen	U.S.-American, Consultant to PWA
Avraham, Inbal	Israeli, Engineer for the “Southern Jordan Valley Drainage Authority”
Aways, Youssef	Palestinian, PWA, Head of the International Coordination Department
Hadaddin, Munther	Jordanian, former Minister for Water and Irrigation
Jamaani, Mussah	Jordanian, Head of the “Jordan Valley Authority”
Jarrar, Aiman	Palestinian, Head of Water Control Department at PWA
Laster, Richard	Israeli, attorney and professor for environmental law at the Hebrew University, Jerusalem, legal advisor of the Yarkon River Authority
Molchoi, Ron	Israeli, Engineer for the "Kinneret Drainage Authority”
Provisor, Mo	Israeli, Head of Planning Department, Israel Water Authority
Subah, Ali	Jordanian, Head of the Department for the Creation of a National Water Masterplan
Yaffee, Eyal	Israeli, Head of the Department for Development and Restauration of Rivers in the Israeli Ministry of the Environment