

**Hydropolitics In West Asia :
Water As A Factor In Israeli-Palestinian
Peace Process**

*Dissertation submitted to Jawaharlal Nehru University
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CERTIFICATE

This is to certify that the dissertation entitled "**Hydropolitics in West Asia : Water as a factor in Israeli-Palestinian Peace Process.**" submitted by **Mr. Sanjeev Kumar Gupta** in partial fulfilment of the requirements for the Degree of **Master of Philosophy (M. Phil.)** of the University, is an original work and has not been submitted for the award of any other degree of this University or any other University to the best of my knowledge.

We recommend that this dissertation be placed before the examiner for evaluations.


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(Chairperson)


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(Supervisor)

to

nuclear free world

and

preservation of *Homo sapiens*

with

the pray to Almighty

for

their well-being

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PREFACE

In the West Asia region, water is going to become more important than oil, as later's availability, is sustainable for coming hundred years, but former's insufficient presence throughout the regions, might aggravate the consumptive competition for the water, among water deficient countries, in this arid region. Although the fresh water is vital for human survival but struggle for access to, and control over, water supplies has consistently provoked tensions and conflict between tribes and countries.

The waters of the Jordan River basin and the groundwater of the West Bank have long been issues of crucial importance for Israel, Jordan and Palestine. Peace talks conducted during 1993-94 between Jordan and Israel culminated in October 1994, with an agreement on watersharing. The agreement was less favourable than Jordan had hoped but was acceptable in the context of a complex accord which established peace and also addressed territorial issues.

During the preliminary stages of the negotiations between the Israel and Palestine, which subsequently became to known as the Oslo (1993) and Oslo II (1995) Accords, five crucial issues were identified : territory, Jerusalem, settlements, refugees and water.

Although water remains both a symbol of Palestinians national interest and an important current and future national resource, it is likely to be a fundamental element in the cooperative relations between Israel and Palestine during and beyond the 'final status' negotiations.

The dynamics of hydropolitics in the Jordan River basin has been dealt in comprehensive manner, chronologically, and various conflicting factors and proposed solutions by concerning parties in different periods of time have also been discussed. The whole dissertation is divided into five chapters, with necessary data, figures, maps, documents etc. clubbed into appendices behind the chapters.

The **first chapter** is introductory, which explains the geographical significance of water resources and hydrostrategic positions of the Jordan riparian states and their conflicting claims on water uses, right from the distintegration of the Ottomon Empire, in early twentieth century.

The **second chapter** deals with the history of water conflict between the riparian countries. It shows how water was crucial issue in the demarcation of boundaries of various emerging riparian states in the region. The coming of Johston Plan in 1953 and subsequently series of wars on water issue in 1964, 1967 etc. are highlighted in the chapter.

The ***third chapter*** is very significant from the point of political dynamics of water. It begins from the Madrid Conference in 1991 to Wye River Accord II in 1999. It discuss about various conferences, peace initiatives, picnic table talks etc. to find out the solutions for West Aria Peace Process. The role of various outside external actors are also emphasized and shows that how these countries manoeuvred the conflicting parties to come on the table for peace talks.

The ***fourth chapter*** deals with the water laws, technical and policy options which are important for any cooperative and amicable relationships between the states. The chapter discuss various alternatives on water-sharing policies and technology to reduce the water stress.

And, finally, the ***fifth chapter*** recapitulate the summary of water politics, and concluded the dissertation with prospects for peace in West Asia region in general, and Israel and Palestine in particular.

CHAPTER I

INTRODUCTION : HYDROSTRATEGIC POSITION OF THE JORDAN RIPARIANS AND THEIR CONFLICTING CLAIMS

Hydropolitics refers to a particular political process whereby solutions to social and economic problems related with water are solved and different aspirations are met by the process of discussion and compromise rather than by the application of decree or force.

Before the emergence of the nation state, arbitrary political division of a unitary river-basin — the area of land drained by a river and its tributaries led to problems regarding the interests of the states and/or communities located within the basin and the manner in which conflicting interests should be resolved.

The perception of conflict over water resources is linked to two factors - (1) the states relative power resources, and (2) its need for unimpeded access to the water supply in question. If the security of a state could be threatened by denial of access to a particular body of water, the latter would be considered a potential source of conflict. In contrast, when the security of a state cannot be threatened, either because the water resources are not vital and indispensable, or else, the state is hegemonic in the basin insofar as power and capabilities

are concerned, the very same body of water will not be considered a potential source of conflict¹.

While the ties of geography prescribe the unitary development of the river basin, the contingent ties of history may stymie the process. Only reluctantly will states relinquish control over land or resources that lie, even partially, within their borders. Furthermore, the concern to maximise individual benefits provides a powerful incentives to exploit resources unilaterally. States are constrained in their behaviour by structural factors as well. For one, and as political realists argue, power and capabilities define relations in the international system. However, systems of government, ideologies and emotions, and historical experience - in other words, the unique character of states - also influence the conduct of international affairs and the character of conflicts, wars and cooperation. Yielding sovereignty, is always a dubious proposition. Even under favourable circumstances, states may shy away from cooperating, when they can afford to. Hence the challenge in international river basins remains the achievement of cooperative solutions to the provision of a common property resource and avoidance of the tragedy of commons².

¹ Mirriam, Lowi R., *Water and Power : The Politics of a Scarce Resource in the Jordan River Basin* (Cambridge : Cambridge University Press, 1993), P. 170.
² *Ibid.*, p.1.

Politics and water are closely interrelated. Invariably the final decision to develop water resource schemes is very much of a domestic political process³. There are other political dimensions of water management. In federal countries where there are state or provincial governments, chances exist for conflict between the two levels of government⁴. The situation is much more difficult regarding international river basin disputes. Institutional arrangements and precedents to solve intra-country conflicts exist, but these are virtually lacking for international problems. Beyond the disapproval of the international community, there are few third party sanctions to apply against those countries that disregards internationally accepted rules of behaviour and principles of sharing.⁵

Freshwater is vital for human survival, yet its availability is uneven and substitutes do not exist. The struggle for access to, and control over, water supplies has consistently provoked tensions and conflict between communities and nations.

Geography suggests that, by virtue of its physical unity, a river basin should be developed as a single, indivisible whole, irrespective of political divisions. This is because water binds land areas together as

³ . Yahia Bakour and John Kolars, "The Arab Mashrek : Hydrologic History, Problems and Perspectives," In Peter Rogers and Peter Lyden (eds.), *Water in the Arab World : Perspective and Prognoses* (Massachusetts : Harvard University Press, 1994),p. 135.

⁴ *Ibid.*

⁵ *Ibid.*

it flows toward an outlet, and interference with the water and its movement at any point has repercussions elsewhere in the basin. The water in question is a shared resource, and it can be considered a common-property resource within the river basin. Like a public good, common-property resource is supplied jointly and no party can be excluded from access to it. But unlike a public good, the use of the common-property resource by one party does detract from the benefits enjoyed by all others.⁶

In the case of the Indus River, a basin-wide agreement was reached in 1960 between India and Pakistan, and a supranational authority, the Permanent Indus Commission, was established. This was possible, however, only after an imaginative hydro-engineering feat had been accomplished. The river system was physically partitioned between the two states, so that there would be no interdependence and no interaction between the adversaries.

In studying conflicts in international river basin, it is important to remember that a number of hydro-strategic facts govern the basin and affects politics within it. First, not only does water flow, but it does not respect political boundaries. Moreover, upstream states, by exploiting within the territory, the waters of a river that traverses international boundaries, can diminish the quantity and quality of water available to

⁶ Mirriam, Lowi, R., "Rivers of Conflict, Rivers of Peace," *Journal of International Affairs*, Vol. 49, # 1, 1995, pp. 125-126.

downstream states. Upstream states can starve out downstream states by cutting off their water supply, or they can pollute the waters downstream by dumping toxic waste into the river. In the absence of a basin-wide agreement, these states can alter river flow in their territory and the downstream states must suffer the consequences.⁷

The West Asia is the most water poor region of the globe, within the world's lowest per capita consumption of water.⁸ The problem attendant to water scarcity is particularly acute in the West Asia, as the region has one of the fastest growing populations.⁹ Water may be more important than either oil or politics, where as proven oil reserves in the area are estimated to last atleast 100 years, water supplies are already insufficient throughout the region, and competition for them is inevitably going to increase in the years ahead. In addition, there are a number of rivers in this region that traverse international boundaries established during the twentieth century, and that have become a focus of interstate tensions.¹⁰ Already there have been a number of clashes between countries over water, and several political leaders have suggested that future conflicts may well center on access to water, both surface and sub-surface. Water is, after all, the most basic

⁷ *Ibid.*, p. 127.

⁸ See Tables, *Appendix I*.

⁹ Mirriam, Lowi R., 1995, *op.cit.*, p.124.

¹⁰ *Ibid.*

resources, critical to sustainable development in the West Asia and to the well-being of the area's populations.¹¹

The two transboundary river basins in the West Asia are – the Jordan River basin, which includes Israel, Jordan, Lebanon, Syria and the West Bank; and the Euphrates River basin, which includes Iraq, Syria and Turkey. In these basins, no binding arrangements for sharing the waters exist, yet some form of cooperation is imperative in order to meet the immediate and long term needs of the states and peoples in question.

The issue of water has been addressed in both bilateral and multilateral sets of negotiations, generally referred to as 'ongoing peace process'. It was agreed that multilateral negotiation would also be undertaken on five regional subjects, including water.¹²

The Euphrates Basin

Iraq, Syria and Turkey cover the Euphrates-Tigris basin. The Euphrates River rises in the mountains of south-eastern Turkey and flows through the territories of Turkey, Syria and Iraq before emptying into the Shatt-al-Arab water way. Twenty-eight percent of the basin lies in Turkey which is the uppermost riparian, seventeen percent lies

¹¹ Bakour and Kolars, 1994, *op.cit.*, pp.138-139.

¹² The four other issues were arms control, economic development, environment refugees.

in Syria (the middle riparian) and forty percent lies in Iraq (the downstream riparian). Turkey invokes the notion of sovereignty to exploit water in its territory often at the cost of other states.

Considerable friction among the states started due to unilateral exploitation of river water by states. Absence of any tripartite agreement to share water worsened the situation. Iraq accuses of Syria of being responsible for it getting less than its allotted share because of construction of the Assad Reservoir and the Taqba Dam in the 1970's.¹³ The construction of the South-Eastern Anatolia Project by Turkey begun in 1980s, which comprises harnessing the waters of the Euphrates and the Tigris River to irrigate 1.7 million hectares of land. Ataturk Dam is at the core of conflict. It costs \$.2.3 bn and is the world's ninth largest dam and is expected, after completion, to control the flow of the Euphrates into and through Syria.

Turkey is insisting that these two river basins – the Euphrates and the Tigris, should be treated as one single basin and the projects to be evaluated in the light of their economic merit. Syria has raised objections to the project from the start, as it views the Turkish project for exploiting the Euphrates at Syria's disadvantages. Syria complains that Turkey's implementation of the project in the Euphrates had been done without consulting the other two countries. Further this was

¹³ Gischler, Christian E., *Water Resources in the Arab Middle East and North Africa* (Cambridge : Cambridge University Press, 1979),p. 52.

contrary to international law and added that Turkey's release of large amounts of polluted water across the border with Syria was endangering the environment and the lives and health of people and animals.

Syria emphasized that sharing the Euphrates waters is only solution to all problems and differences with Turkey; and it also stressed that its earlier calls for a trilateral meeting between the Foreign Ministers of Syria, Iraq and Turkey — the three riparians that share the river waters is still valid, in order to discuss problems over the distribution of the Euphrates waters. Syria also stressed that political decision at the highest level is must for solving the problems; Iraq supports Syria in its stand against Turkey's domination to build a dam across the Euphrates. Iraq rejected the Turkish proposal that three states should treat the Euphrates and the Tigris basins as a single entity as this was not possible from the point of view of either topography, geography or water. The Euphrates basin is different from the Tigris and they should be treated as two separate issues. Iraq is demanding a flow of 700 cubic metre per second instead of the 500 cubic metre per second that the Turks are currently releasing at the Syrian-Turkish border in accordance with the terms of the interim agreements. Iraq has been

holding talks with Turkey since 1960 but no agreement has been reached in sharing the Tigris waters.¹⁴

Hydrography

Natural system : Surface Water

The Jordan River watershed drains an area of 18,300 km², in five political entities – Lebanon, Syria, Israel, Jordan, and the West Bank.¹⁵

Three springs make up the northern headwaters of the Jordan : the Hasbani, rising in Lebanon with an average annual flow across the border of 125 MCM/Yr (million cubic metres/year), the Banias in the Golan Heights, averaging 50 MCM/yr, and the Dan, the largest spring at 250 MCM/yr, originating in Israel. The streams from these springs converge 6 km into Israel and flow south to the sea of Galilee at 210 metres below sea level.¹⁶

The Yarmouk river has sources both in Syria and Jordan and forms the border between these countries before it adds about 400 MCM/yr to the Jordan, 10 km south of the sea of Galilee. Beyond this

¹⁴ John, Waterbury, "Transboundary Water and the Challenge of International Cooperation in the Middle East," In P. Rogers and P. Lyden (eds.), 1994, *op.cit.*, pp.54-55.

¹⁵ See Maps in *Appendix II*.
Naff and Matson (eds.), *Water in the Middle East : Conflict or Cooperation?*, (Boulder : West view Press, 1984), p.21.

¹⁶ Moshe Iarbar and Maos Jacob, "Water Resource Planning and Development in the Northern Jordan Valley," *Water International*, vol. 9, 1984, pp. 18-19.

confluence, the Jordan picks up volume from springs and intermittent tributaries along its 320 km meander southward along the valley floor of the Syrio–African Rift. At its terminus, at the Dead Sea, 400 m below sea level, the Jordan River has a natural flow of 1470 MCM/Yr.

The salinity of the water rises greatly even as its flow increases, because much of the Jordan's flow is below sea level and the small springs that contribute to its flow pass first through the salty remains of ancient seas. Though the headwaters at the Hasbani, Baniyas, and Dan have a salinity of 15-20 ppm (parts per million), levels at the southend of the sea of Galilee are 340 ppm. This is diluted to some extent by the Yarmouk, which has salinity of 100 ppm, but increases significantly downstream, reaching several thousand ppm by the Allenby Bridge near Jericho. The dead sea, a terminal lake, has a salinity of 250,000 ppm, seven times that of the ocean.¹⁷

The river flows through the transition zone from the mediterranean subtropical climate of Lebanon and the Galilee region in the north to the arid conditions of the Negev Desert and the Rift Valley to the south. Similarly rainfall patterns vary spatially, with decreasing rainfall generally from north to south and from west to east.¹⁸

¹⁷ Naff and Matson, 1984, *op.cit.*, p.21.

¹⁸ Aaron T.Wolf, *Hydropolitics along the Jordan River : Scarce Water and its Impact on the Arab-Israeli Conflict* (New York : United Nations University Press, 1995),p. 9.

Natural System : Groudwater

The hills along both banks of the Jordan serve as recharge areas for extensive aquifer system in the West Bank, Israel, and Jordan. Rain that falls on these mountain ridges and does not evaporate or run off as surface water, percolates down to the water-table and then flows laterally, *albeit* extremely slowly, through the pores, and cracks of the underlying rock layers. One measure of an aquifer's utility is its 'safe yield' or the amount of water that can be pumped without adverse effects to the water left in storage. This is usually considered to be equal to the annual recharge rate.¹⁹

There are three principal aquifers system west of the Jordan.²⁰ The aquifers have the following safe yields : the north east basin which recharges in the northern West Bank and discharges in the Israel's Bet She'an and Jezreel valleys, has a safe yield of 140 MCM/yr; the western or Yarkon – Tannimim basin, which also recharges in the hills of the West Bank but discharges westwards toward the Mediterranean coast in Israel, has a safe yield of 320 MCM/yr; The eastern basin, which is made up of five separate catchment areas in the West Bank, all of which flow east toward the Jordan Valley, has a combined safe yield of 125 MCM/yr.

¹⁹

Ibid.

²⁰

See Maps in *Appendix II*.

The coastal aquifer, another major groundwater source in Israel but without hydrologic connection to those listed above, provides, a safe yield of about 280 MCM/Yr. The Gaza aquifer, with connection to the coastal aquifers, provides an additional yield of 60 MCM/Yr.

Groundwater replenishment within Jordan totals about 270 MCM/Yr in 12 different aquifers, mostly in Zarqua, Yarmouk and Jordan catchments.²¹

Current Water Uses²²

Israel has a renewable annual water supply of approximately 1,600 MCM/Yr. Of this 60 percent is ground water and 40 percent is surface water, almost entirely from the Jordan River system. Its water budget is augmented by about 200MCM/Yr from waste-water reclamation and non-renewable groundwater. The 1800 MCM/yr total is allocated to agriculture (73%), personal consumption (22%), and industrial use (5%). Israel irrigates 66% of its cropland, and has population of 4.2 million and annual population growth rate of 1.6% (excluding immigration).²³

The 8,00,000 Palestinians on the West Bank consume about 115 MCM/Yr, 90 percent of which is groundwater. Of this total, about 90 MCM (78%) is for irrigation and rest is for personal use. The 70,000

²¹ See details in Andra G., and Salameh, E. (eds.), *Jordan's Water Resources and their Future Potential* (Amman : Siftung, 1992).

²² See Tables in *Appendix I*.

²³ Sandra, Postel, "Trouble on Tap," *Worldwatch*, 1989a, p.14.

Israeli settlers use an additional 35 MCM/Yr 95% of which is for agriculture.²⁴ The residents of the West Bank, Arab & Jewish, irrigate 6% of the cultivatable land and have a population growth rate of approximately 3%.²⁵

Gaza, with a population of about 600000 growing at 3.4% annually, is probably in the most desperate situation hydrographically. Although the people of Gaza are completely dependent on the 60 MCM/yr of annual groundwater recharge, they currently use approximately 95 MCM/yr. The difference between annual supply and use is made up by overpumping in the shallow coastal aquifer, resulting in dangerous salt water intrusion of existing wells and ever decreasing per capita water availability.

Jordan has a total renewable annual water supply of 700 MCM of which 50% is surface water (mostly from the Yarmouk river). These sources above are augmented by about 170 MCM non-renewable groundwater per year. Of the total water budget of 870 MCM/yr, 85% is allocated for agriculture, 10% for personal consumption, and 5% for industrial use. Jordan irrigates 10% of its cropland and has a population of 3.3 million, which is growing at a rate of 3.5% per year.²⁶

²⁴ Aaron, T. Way, 1995, *op.cit.*, p.11.

²⁵ Sandra, Postel, 1989a *op.cit.*, p.14.

²⁶ *Ibid.*

Lebanon and Syria are relatively, minor consumers of water from the Jordan River, with the former using about 35 MCM/yr from the Hasbani and the latter about 250 MCM/yr from the Yarmouk, each for local irrigation projects near the respective headwaters. Their major sources are the Litani and Euphrates rivers, respectively. The Litani, with an average flow of 700 MCM/yr lies wholly within Lebanon, but because it flows to within 7 km of the Hasbani, it has been included in several planned diversion schemes in conjunction with the Jordan system. Lebanon irrigates 29% of its cropland, and has a population 2.6 million, and an annual rate population growth of 2.1%. Syria irrigates 11% of its cropland, and has a population of 10 million, which is growing at a rate of 3.8% per year.²⁷

Droughts are common and a natural part of the climate. Yet the prolonged recent droughts suggest that even the natural aridity of the area may have been exacerbated by such human actions as the increase in greenhouse gases from burning more fossil fuels. Even without human intervention, rainfall is seasonal. The water resource problem thus concerns not only the total volume of water available but also its seasonality—the shortage of water in the dry, hot summers. In addition, most of the West Asia rainfall is very irregular, localized, and unpredictable. Furthermore, the region suffers from high evapo-

²⁷ *Ibid.*, p.15.

transpiration rates, a factor that diminishes the value of the water that is available.²⁸

Claims, Counter Claims, Fears and Concerns

The water conflict became more serious just after the significant change of the hydrostrategic position of the riparian states of the Jordan River basin following the Arab-Israeli war of 1967. Both Israel and the Arab countries have tried to divert water : Israel through its National Water Carrier to expand agriculture in the Negev and the Arabs through their attempts to divert water from the Jordan basin to Lebanon, Syria and Jordan. Disagreement over water was a major contributing cause of the 1967 Arab – Israeli war. Through its victory, Israel enhanced its water resources by capturing the Golan Heights and the West Bank aquifers. These captured sources supply as much as 25% of Israel's total water needs,²⁹ but have led to charges that Israel is stealing Arab water. On the West Bank, Israeli authorities have prevented the Palestinians from digging new wells or even finding alternative sources of water to compensate for water lost as a result of withdrawals by Jewish settlements. The disparity between the water allocations to Jewish and Arab settlements on the West Bank is enormous : The average aggregate per capita consumption for the Jewish settlements ranges between 90 and 120 cubic metres, where as

²⁸ Christine, Drake, "Water Resources Conflict in the Middle East," *Journal of Geography*, Vol. 96, #1, 1997, pp 4-5.

²⁹ John, Waterbury in P.Rogers and P.Lyden (eds.),1994, *op.cit.*, pp.58-59.

for Arab settlements the consumption is only 25-35 cubic meters per capita.³⁰

In order to better understand the nature of the conflict and its intensity, it is essential to spell out, in some detail the claims and counter claims as well as the real and perceived fears and concerns of the sides of the dispute over the water resources.

Palestinian Claims and Concerns :

- that the flow of the mountain aquifer that is derived from rainfall over the West Bank, 80-90% of which is currently extracted from deep wells mainly within Israel should be allocated for their use, and that Israel's much criticized, long term, over pumping of the aquifer is a serious threat to the Palestinians' future essential water reserves.
- that Israel, due to development requirements resulting from the mass immigration of Jews from Russia and other countries will use more and more of the water. Some Arab leaders have requested that the authorities in those countries should stop the emigration of Jews to Israel, which they view as a threat.
- that the Israel Civil Administration has effectively frozen Palestinian utilization of water sources in the Occupied

³⁰ Christine, Drake, 1997, *op.cit.*, p.9.

Territories and has allocated insufficient amounts for urban and industrial use instead have allocated significant amounts of water for agricultural and urban use of new Jewish settlement in the areas.³¹ The Palestinians claim that by doing this Israel has violated the Geneva Convention and misused its authority as the "belligerent occupier."³²

- that in the process of drilling new Israeli deep wells within the Occupied Territories there have been cases of lowering the aquifer, and drying out wells and springs. It has also caused salinisation of Gaza wells due to over pumping.
- that even if a peace settlement is achieved with an appropriate Palestinian entity being established, the agreed upon division of the very limited shared water resources will leave them with insufficient amount of water to allow for normal population growth and resettlement.
- that had the water diversions included in the Johnston negotiation been developed, water from two sources would have been delivered to the West Bank. The West Ghor Canal would have brought 70-150 MCM / Yr to a narrow agricultural strip

³¹ United Nations, *Permanent Sovereignty over Natural Resources in the Occupied Territories*. Report of the Secretary-General, General Assembly-Economic and Social Council, A/38/282-E/1983/84, 3 June 83.

³² El-Hindi, Jamal L., "Note, The West Bank Aquifers and Conventions Regarding Laws of Belligerent Occupations," *Michigan Journal of International Law*, Vol.11, #1, 1990, pp. 1411-12.

parallel to the Jordan River, in addition to upto 300 MCM/yr designated for the Jordan Valley from the Yarmouk and the Jordan River.³³

In general, the Palestinian claims their historic rights to exercise complete and total control of "Palestinian" water (the mountain aquifer), and suggest that complicated and expansive schemes to import water from other nations or desalinated sea water be allocated to Israel which in return should forgo claims to the local, easily available, "Arab" water sources.

Jordan's Claims & Concerns :

The Jordanians might put much of their emphasis on the allocations achieved during the Johnston negotiations. Although they would probably allow for some revisions in Israel's favour, they point out that they are currently being deprived of Yarmouk (currently about 90 MCM/yr, versus 25 MCM/yr originally allocated). Meanwhile, Syria has launched a drive to impound yarmouk headwaters upstream to Jordan, partly with the presumed justification of depriving Israel of this water. Currently 250 MCM/yr is impounded by Syria, with plans for an additional 50 MCM/yr. Jordan hopes that by reaching agreement with Israel, similar accord will follow with Syria, clearing the way both for

³³ Aaron, T.Wolf, 1995, *op.cit.*, p.141.

allocations closer to those of the Johnston negotiations, and for building a long planned storage facility at Maqarin.³⁴

Israeli's Claims & Concerns :

- that it has legitimate historical riparian rights to the mountain aquifer, based on the principle of prior use, major portions of which flow naturally into its territory and which has been developed at great expense and fully utilized over a period of time going back some 60 years.³⁵
- that if the Palestinian achieve autonomy or independence, they will, once gaining physical control of the territory, insist on making their claim that all the water of the shared Yarkon-Tannimim aquifer that is derived from rainfall within the West Bank be allocated exclusively for their own use. This fear of Israel is compounded by the *diaspora* retreat.
- that if there is major unregulated increase of pumping from the aquifer in the West Bank area, it might reduce the current source of drinking water by some 300 MCM/yr.
- that if an equitable agreement is achieved on the division of the waters of the mountain aquifers between Israel and any future

³⁴ *Ibid.*, p.140.

³⁵ Hillel, Shuval, "Approaches to Resolving the Water Conflicts Between Israel and Her Neighbours – A Regional Water-for-Peace Plan", *Water International*, vol.17, #3, 1992, p.224-25.

Palestinian entity, there is serious concern about the possible degradation of the quality of the water as a result of inadequate monitoring and control of urban pollution, wastewater and toxic agricultural and industrial wastes in the West Bank that could cause serious pollution in the highly susceptible karstic limestone aquifer in the downstream areas of Israel, making the water unfit for human consumption.

- that unregulated overpumping of the aquifer in the West Bank areas could lead to a serious lowering of the water-table with the resulting danger of sea-water intrusion. Palestinian calls for the ending of immigration to Israel from Russia and other countries are seen as an unacceptable interference in Israel's internal affairs. Israel views unrestricted immigration to Jewish refugees as the foundation stone and *raison d'être* of the state and any demand to restrict immigration is seen as inadmissible.
- that the Palestinians have not been deprived of the use of needed water. They cite the construction of hundreds of new village piped water supplies, introduced by Israel since the end of Jordanian rule in 1967, the granting of permits to the Palestinians to drill some 40 new deep wells, and the importation of water from the Israel National Water Carrier to increase the water supplies to Palestinian cities and villages in

the Occupied Territories. According to Israeli claims, the total water supplies and per capita use in the Occupied Territories has increased significantly during the period of Israeli administration. Israeli hydrologists say there is limited connection between the groundwater in Gaza and Israel and the salinisation of wells in Gaza is solely the result of years of overpumping by the Palestinians mainly before 1967. Israeli also points out that many of the claims of drying up of Palestinian wells and springs coincided with the 1988-91 drought period and may have nothing to do with the Israel Water Development Projects.³⁶



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CHAPTER II

HISTORICAL OVERVIEW OF CONFLICTS IN THE WEST ASIA

From the origins of civilizations in the West Asia, the limits and fluctuations of water resources have played a role in shaping political forces and national boundaries. Water availability helped to determine both where and how people lived, and influenced the way in which they related to each other.

Issues of water conflict and cooperation have become especially intense with the growth of nationalist feelings and populations in the twentieth century.¹ These issues are also relevant to current conflict – particularly between Israel, Jordan, and the Palestinians on the West Bank and Gaza – but they may offer new opportunities for dialogue as well.

The roots of conflict over the waters of the Jordan River lie in the convergence of two phenomena, one material, the other historical and ideological. First, and as noted above, scarcity characterizes the natural resource endowment of Palestine. However, a viable economy is dependent upon a maximum degree of land and food security, and the development of sources of energy.

¹ Aaron, T.Wolf, 1995, *Op.cit.*, p.12

Second, the Zionist movement sought to establish a Jewish national home in Palestine. Not only is land the basic requirements of settlements, but also the actual land of Israel (Biblical Zion) – the need to ‘return’ to it, to work and ‘redeem it – was an essential ingredient of Zionist thought in the early part of the twentieth century.²

The Zionist movement was dominated by socialist trends from its inception, where water and agriculture predominated the thought and ideology of Zionist leadership. Encouraging agricultural activities in Palestine was central to the achievement of their goals. The use of water resources to bolster political claims has not been restricted to questioning Israel’s motives towards its neighbours. Nationalists within Israel have also claimed water as an overriding incentive for their political ends.³

Water, because it is an essential ingredient of agriculture, was and continues to be considered important by Zionists and the state of Israel. Moreover, it has always been linked in some fashion to their ideological, economic, political and security related concerns. Water would help to make possible the absorption of increasing numbers of immigrants in *Eretz Yisrael*. It would also make possible for Jews to till

² In Zionist ideology, ‘Zion’ is an abstract and metaphysical concept : there are no precise definitions of its borders. It did, however, function as the central mobilising symbol of the Zionist movement.
For ‘return to the land’ see in details Fraser TG., ‘The Arab – Israeli’ Conflict.’ (London : Mcmillan Press Ltd. 1995)

³ Aaron, W.Wolf, 1995, *op.cit.*, p.78

the land. In turn, the ploughing of land will allow for : - firstly, the economic development of Jewish state; secondly, progress toward economic self-sufficiency; progress toward economic self-sufficiency; thirdly, the development of 'ties to the land', and lastly, the occupation of land and keeping others out. In addition, with water Israel could implement more fruitfully its policy of population dispersal, spreading Jewish settlement throughout the country, and after 1967 war, the Occupied Territories as well. Prior to 1948, the Arab population of Palestine constituted a largely agricultural society that worked and lived off the land. Traditionally, agriculture was the principal economic activity, water, whether in the form of rainfall or surface flow, was vital to the livelihood of the Palestinian peasants. She was both tied to the land and dependent on water. Water was perceived as an extension of the land.⁴

Hence, the combination, in an arid climate, of the following three factors – acute population presence, the demands of economic developments and the focus on the Jordan Valley for the settlement of refugees and the agricultural development of the country – has caused the East Bank Arabs to view access to water resources as essential to their continued survival.

The Zionist movement started to study Israel's needs for water at the beginning of the present century, when it came to the conclusion that

⁴ Mirriam, Lowi R., 1993, *op. cit.*, p. 784

“Greater Israel” must be established in and around Palestine. When representatives of France and Great Britain met at Versailles to divide the spoils of World War I, Zionists, among others were lobbying intensively for the share of the defeated Ottoman Empire. Zionist pressures induced Great Britain to claim jurisdiction in Palestine all the way to the Litani River, as well as all Transjordan and the headwaters of the Jordan River. French demands, backed by the Sykes- Picot Agreement, partly prevailed however, and ensured that whole of the Litani basin as well as Mt. Hermon were included in the French Mandates of Lebanon and Syria. From this time onward, Zionist efforts have been directed towards gaining control of as many as possible of those land and water resources not granted to the British Mandate Authority at the Paris Peace Conference.⁵

The Zionists observed that the main water resources in the region capable of meeting the agricultural and industrial needs of projected Israel were the Jordan and Litani Rivers for the their plans in Palestine proper, and the Euphrates and the Nile for land outside Palestine, if the Zionists were to succeed in their expansionists schemes.⁶

⁵ Leslie Schmida, “Israeli Water Projects and their Repercussions on the Arab – Israeli Conflict” in Majid, Farid A. and H. Sirriyeh (eds.), *Israel and Arab Water* (London : Ithaka Press, 1985), p. 25.

⁶ Mahmond Riyadh, “Israel and the Arab water in Historical Perspective”, in Majid, Farid, A. and H. Sirriyeh (eds.), 1985 *op.cit.*, p.10.

As the Ottoman Empire crumbled, the location of water resources, particularly the headwaters of the Jordan River, helped to influence the boundaries of the French and British Mandates, later the border between Israel, Lebanon Syria and Jordan.⁷ Preliminary studies showed that the water inside Palestine was not sufficient to meet the needs of the new Jewish immigrants as envisaged by Israeli plans. The Zionist tried to modify the frontier lines agreed upon by France and Britain before the end of the first World War in their plans to partition the Arab East. The Sykes – Picot Agreement designated the Baniyas River and the Eastern shore of Lake Tiberias (the sea of Galilee) as being Syrian territory; while Hasbani and Litani Rivers would be entirely within Lebanon.⁸

After the end of the First World War, the Zionist submitted to the Paris Peace Conference (1919), their demands concerning Palestinian borders and suggested these borders start from a point on the Mediterranean, north of the mouth of the Litani, extending eastward to include all the sources feeding the Jordan River : the Hasbani in Lebanon, Baniyas in Syria, the eastern shores of Lake Tiberias in Jordan. Weizman, the Zionist leader, also thought that merely drawing the Litani and Yarmouk waters into Palestinian territory would not be adequate; it was necessary also to annex the land in which they

⁷ Aaron, T. Wolf, 1995, *op.cit.*, p.81.

⁸ Mahmoud, Riyadh, 1985, *op.cit.*, p.10.

flowed, that is, Jordanian and Lebanese lands. The peace conference rejected the Zionist demand on the insistence of France who at time had both Syria and Lebanon under its occupation.

As the population and economies grew against the hydrologic limits, so, too, grew the dangers of conflict over water. In the 1930s and 1940s water was a focus of several reports⁹ that tried to determine the 'economic absorptive capacity' of land. These reports influenced British, Arab and Jewish attitudes and policies towards immigration and land settlements.¹⁰ The dramatic findings of Peel Commission by British in 1936, resolved the conflicting issues by dividing Palestine into two self-governing communities Jewish and Arab. Perhaps neither side were fully satisfied as both wanted freedom and security apart from territorial advantage.

After the Peel Commission Report, the Arab revolt, begun in 1936, resisted the site location of Jewish settlement in the Northern Galilee which were to include Jordan headwaters.

In response to Arab resistance, a report on partition, the Woodhead Report of 1938, suggested modifications to the borders to the two projected states. It also included a section on limitations that scarce water resources placed on the possibilities of population resettlement –

⁹ Reports *viz.* Passfield White Paper (1930), Peel Commission Report (1936), Woodhead Report (1938) etc.

¹⁰ Aaron, T.Wolf, 1995, *op.cit.*,p.173.

the first British Policy Paper especially naming water as a factor, limiting policy objectives in Palestine.¹¹ A blow to Zionist plans came later in May 1939, in the form of the Mac Donald's White Paper. This Report, a total reversal of British Policy called for a single state in Palestine, west of Jordan River, governed by Arabs and Jews to their proportions (but specifying that Jews should not exceed one-third of the population).

Palestine Jews reacted with shocks and anger, particularly in light of exacerbating conditions for European Jewry. Arab also rejected the paper, said Palestine will be independent within the Arab Union and will remain forever.¹²

The partition of Palestine was decided on 2nd February 1947 into two states, but included a vehicle for joint economic development, especially in respect of irrigation, land reclamation and soil conservation.¹³ Though the Jewish Agency reluctantly accepted partition, the Arab states rejected outright and, when the British pulled out of the Palestine in May 1948, Egypt, Jordan, Iraq, Syria, Lebanon and Saudi Arabia went to war against the new state of Israel. After war, every countries started developing their own water resources unilaterally, A result of the war in 1948, were immediate demographic

¹¹ *Ibid.*, p.39.

¹² ESCO Foundation, *Palestine : A study of Jewish Arab and British Policies* (New Haven : Yale University Press, 1947), pp.908-9.

¹³ Aaron, T.Wolf, 1995, *op.cit.*, p.42.

consequences and dramatic shifts of population throughout the regions. The concept of 'economic absorptive capacity' applied in the early stage of the partition plans for Palestine, disappeared quietly as Israel and Jordan had to host hundreds of thousands of refugees and immigrants.¹⁴

In an effort to mitigate the acute tensions in the region, the US government began to promote a basin wide project – the Unified Development of Water Resources of the Jordan Valley Region – that included the four riparian states. Not only was this considered optimal in terms of economic efficiency and human welfare, but the Eisenhower Administration also thought that if the enemy states could cooperate in sharing and managing such a vital resource, this technical collaboration could eventually inspire a political settlement. This position echoed that of political functionalists who argued that peace could be achieved by fostering interdependence between adversaries in technical matters.¹⁵ Mutual dependence and continuous interaction in this domain would eventually cause states to realize that harmonious political relations were not simply the next logical step, but could also be mutually advantageous.¹⁶ Several technical conferences were held, one of the most significant of which

¹⁴ Hoffmann, Berthold, "Hydroparanoi and its Myths : The issue of Water in Middle East," *Orient*, vol. 39, # 2, 1998, p.257.

¹⁵ See Details, David, Mitraney, *The Functional Theory of Politics* (New York : St. Martins Press, 1975).

¹⁶ Mirriam, Lowi R., 1995, *op.cit.*, p.130.

was the conference held in Jerusalem in 1953 to study the future water needs of Israel and how to utilize everydrop of water in her possession for agriculture and industry.¹⁷

Gordon Clapp, the chairman of the Tennessee Valley Authority (TVA) in the USA, had in the same year (1953), at the request of the US government, drawn up a plan for the exploitation of the Jordan River waters. This plan was carried to the Arab states and Israel by Eric Johnston, the special envoy of President Esienhower. Clapps plan met with objections from delegations of Arab League council. It was decided to set up a committee of Arab experts to give their opinions and to submit to the Arab League Council an Arab Plan for the exploitation of the Jordan River waters, taking into considerations the interests of the Palestinian people and the riparian Arab states. Every Arab states around Israel set up its own technical committee on the condition that these committee meet and draw up a unified plan at a later date.¹⁸

Eric Johnston, worked for two years to hammer out a water sharing agreement between the riparians of the Jordan River. Although unratified for political reasons, the allocations agreed to by Arab and Israeli technical committees have generally held recognized modifications. Moreover, both Israel and Jordan agreed to send

¹⁷ Mahmoud, Riyadh, 1985, *op.cit.*, p.11.

¹⁸ *Ibid.*, p.11.

technical representatives to regular 'Picnic Table Talks' to determine day-to-day hydrologic operations.

Throughout the negotiating process, however, there were serious disagreements over water allocations and their destinations, as well as conflicting views of rights, needs and international legal precedents. In essence, Arab states were concerned about becoming dependent on Israel and having to rely on its goodwill to gain access to water. Israel was chiefly concerned about international supervision of the water distribution and management scheme and the resultant constraints on her national sovereignty.

Eventually, many of the contentious issues were resolved and both parties – Israel on the one hand, and Egypt, Jordan, Lebanon and Syria on the other – agreed, that as a hydro-engineering study, the basin – wide project was acceptable. However, only the Arab League, the regional organization representing the Arab states, had the authority to make the final decision. After lengthy deliberations, the League decided that within the prevailing political context, the project could not be approved.¹⁹

The Arab states were not interested to enter into acceptable agreements with a state that they didn't recognize. They argued for political settlement of the Arab-Israeli conflicts before they come on

¹⁹ Mirriam, Lowi R., 1995, *op.cit.*, p.130-131.

the technical collaboration on the sharing and managing water resources. Thus, Unified Development Plan come to halt. Although, part of the relative success of the plan has been described to the technical nature of the deliberations, which were conducted away from the glare and distraction of publicity, and to obvious potential advantages for all the parties involved. Yet not formally binding, both sides have generally adhered to the technical details and allocations of the Johnston Plan even while proceeding with unilateral development.

In the absence of basin-wide agreement on Unified Plan, there arose interstate tensions, which gradually mounted after Israel decided to build National Water Carriers, a system of pipelines from the northern tip of Lake Tiberias to the southern reaches of the country, that is Negev desert. In reaction to Israeli diversions from the Jordan River, the Arabs proposed a Headwater Diversion Plan, which to a conceivable degree prevented the Jordan headwaters from reaching Israel.

When the Arab Summit Conference met in Cairo in 1964, the heads of the Arab states discussed Israel's project to divert the waters of the Jordan River to the Negev desert and considered this action to be a new aggression against the Arabs. They decided to implement the former recommendations of the Arab League to exploit fully the Hasbani, Banias and Yarmouk waters in the Arab lands. It was also

decided that Arab states contribute to the expenses of exploitation of Jordan River tributaries and the establishment of a corporation to supervise the execution of this project. Technically difficult, with water to be pumped as high as 350 metres, and economically inefficient, giving Arab states less water than they could have hoped for under the Johnston Plan, it has been estimated that the scheme would divert up to 35% of the installed Israeli carrier and increase the salinity of the lake Kinneret.²⁰ Israel declared the impending diversion as an “infringement of its sovereign rights”. Thus, the “Water-wars” begun with the tank and air-strikes by Israel to halt the construction of the diversion during 1964-67, which was the period of direct – water related conflict. These attacks initiated a prolonged chain of border violence that linked directly to the events that led to the June 1967 or Six Day war.

When Israel started the 1967 wars, the Arab Plans for the utilization of the Jordan River waters were permanently suspended. Israel completed the projects which she had made public since 1953 and was thereby able to use all the water resources of Jordan and prevent Syria and Lebanon from utilizing the Hasbani and Baniyas waters in irrigating their land.

The Palestinian people were deprived twice of their right to the water; first, when they were expelled from their villages and agricultural

²⁰ Naff and Matson, 1984, *op.cit.*, p.433

lands, thus losing their means of livelihood and becoming refugees; and secondly, when Israel seized the Jordan River waters and banned the irrigation of new lands in the West Bank.

Israel didn't stop here. She was always in need of water resources in order to meet the ever increasing demand for water caused by the constant influx of immigrants and establishment of new settlements. Every new acquisition of water has been made at the expense of the Arabs and particularly the Palestinians, which has led to further escalation of tension in the region.

After taking over river waters, and exhausting all the surface water resources, Israel turned to exploiting the subterranean waters in the West Bank and has forbidden the Arabs to increase the utilization of these waters, claiming that she has rights to these waters. She needs to use the greatest possible amount of water in the West Bank in order to meet the needs of the settlements established there like – Jenin, Nabulus, Jericho, Poria, Hebron, Beisan, Ramallah, Yitav, Tirzah etc. where as Almogor, G'dot, Kafr Harib, Ein Gev, Ha'on etc. are in Golan Heights. It needs to be clarified here that the successive Israeli governments consciously set up these settlements along basin so as to hinder the peace process in the region.

Even as the tensions were leading to the following week's outbreak of Six Day war, the US Department of Interior and State convened an

“International Conference on Water for Peace,” in Washington D.C., which attracted 6400 participants from 94 countries, including Israel, Egypt, Jordan, Yemen and Saudi Arabia.²¹

After the war, Israel had also greatly improved its hydrostrategic position, especially due to the occupation of the Golan Heights. It now held all headwaters of the Jordan with the exception of a section of the Hasbani, which made the Headwater Diversion impossible.²²

Due to geopolitical outcome of 1967 war, the concerns of the riparian states have changed considerably. Israel is no longer interested in a basin-wide accord, largely because such an agreement would impinge upon the advantages it reaps as a result of its superior riparian position on the main trunk of the Jordan River, its sovereignty over lake Tiberias– the only natural reservoir within the river system – and its control over the West Bank groundwater reserves. However, Israel has continued to insist that it be recognised as a party to all the main tributaries of the basin. Thus, any scheme to develop the Yarmouk River waters or the Lower Jordan must also engage Israel. In late 60’s, Jordan began to construct East Ghor Canal to transport Yarmouk River water to the Jordan Valley, and beyond. After measuring the Jordan’s River base in April 1969, Israelis became suspicious, that Jordan was overriding the Yarmouk. This laid to Israeli raids in July

²¹ Aaron, T.Wolf, 1995, *op.cit.*, p.51.

²² Hoffmann, Berthold, 1998, *op.cit.*, p.258.

and August 1969 to destroy one of the most vulnerable targets in Jordan – The East Ghor Canal²³. Secret negotiations from 1969-70 between Israel and Jordan mediated by the US., led to an agreement²⁴ Israel was persuaded that the drop in Jordan baseflow was natural and Jordan would be allowed to repair the canal. In the 70's Jordan hoped for improvement of its Jordan Valley Development Plan and it succeeded in increasing irrigation capacity by 130%.

In the late 1970's and early 1980's, efforts were made, once again, to reach a cooperative solution for developing water resources in the regions. This time, damming of Yarmouk River was objective. The Maquarin Dam Project was planned as a Jordanian-Syrian irrigation and hydro-electric scheme based on joint exploration of Yarmouk waters for the benefit of both sides of the common border. The US government under the Carter Administration, immediately took an interest in the Maquarin Dam Project. The US made condition to help Jordan with financial assistance for Dam, if Jordan gets approval of the Syria and Israel. Israel negotiated for larger allocation of Yarmouk water than what Jordan was prepared to offer. But Syria was not agreed on trilateral water - sharing plan with Israel. Thus, regional

²³ The East Ghor Canal diverts water from the Yarmouk River and conveys it along the eastern edge of the lower Jordan Valley for irrigation. According to Dodge and Tell, it is most important development project ever undertaken in the Jordan. See *Peace and Politics of Water in Jordan* (Allan and Court, p. 178).

²⁴ In exchange Jordan decided to eliminate PLO (Palestine Liberation Organisation) and agree on Johnston Plan.

conflict hindered in resolving the international river – basin disputes and so the Jordan basin. The projects was temporarily revived in 1987 in the form of considerably smaller dam at a different site on the river. Jordan and Syria signed a treaty to build the Unity Dam, and Jordan petitioned the World Bank to finance the project. Once again assistance was conditional upon reaching basin wide agreement.²⁵

The Israeli Authorities have control and management over West Bank after the 1967 war, and since then, about forty percent of the country's sustainable annual supply of groundwater and twenty five percent of its total renewable fresh water originate in the West Bank. The Water Commission Administration of Israel frame the policy for Arabs and Jews. Because of Israel's West Bank water policies, the consumption of water by the territory's Arab population in the 1980s was not allowed to exceed 18 percent of total availability. Today, Arab consumption is approximately 15 percent of total availability.²⁶ Hence the remaining 82-85 percent, less what is lost to evaporation or surface run-off represents the amount that can be exploited by the Jewish settler population and beyond the West Bank.

The policy set forth by Israel's Water Commission Administration allows Arabs in the West Bank a total consumption of 125-130 MCM

²⁵ Mirriam, Lowi R., 1995, *op.cit.*, pp.131-132.

²⁶ Lonergan, C.S. and Brooks, D.B., *Watershed : The Role of Freshwater in the Israeli-Palestinian Conflict* (Ottawa : Canada International Development Research Centre, 1994), p.42.

per annum (out of about 650 MCM), plus modest increases for population growth. To ensure that this policy is respected, the Israeli government has adopted stringent measures to closely monitor and control the Arab population in this regard. For example, no Arab individual or village has received permission to drill a new well for agricultural purposes since July 1967, not to repair one that is in close proximity to an Israeli well. Water allocations to Arab agriculture have remained at their 1968 level of about 100 MCM, with only a slight margin of growth. Moreover, strict limits have been placed on the amount of water that can be pumped annually from each well, while meters fixed to each well monitor the amounts extracted.²⁷

When comparing Arab and Israeli usage of West Bank water, the effects of these policies are glaring. For example, in 1989, the cultivated area of Jewish settlement represented less than five percent of the total cultivated area of the West Bank. However, as much as ninety percent of the Jewish cultivated area is irrigated as opposed to only 2.5 percent of the Arab cultivated area. The most striking differential water use can be found in the Jordan Valley. There, Jewish settlers who plough one-quarter of the cultivated area use 45 percent of the water in the valley consumed by agriculture. In contrast, Arab farmers, with three times as much cultivated land, are able to

²⁷ Mirriam, Lowi R., 1995, *op.cit.*, p.133-134.

consume four times more water (55 percent). Furthermore, Jewish settlers consume four times more water per capita than do West Bank Arabs : about 368 liters per capita per day, as opposed to roughly 88 liters in the West Bank.²⁸

Israel has exhausted all the water resources she had previously acquired. These resources now fall short of satisfying the requirements of the current Israeli plans to receive new immigrants, start new farms in the Negev, establish settlements in the West Bank and Gaza and set up new industries. Israeli researchers reveal that Israel badly needs about four hundred million cubic metres of water before the end of 1985, which is equal to what she can obtain from the Litani.²⁹ Thus, the Israeli aggressive invasion of Lebanon in 1982 was enshrined with twin objectives, firstly to destroy the military-political base of PLO guerillas; which were frequently responsible for cross-border terrorism on the northern frontier of Israel and secondly, but significantly was to secure the control over the headwaters of Litani Rivers.

This attack had an observable hydraulic component. During the years of Israeli occupation from 1982 to 1985, several analyst developed and elaborated on a 'hydrologic imperative theory' which described water

²⁸ *Ibid.*, p. 135.

²⁹ Mahmoud Riyadh, 1985, *op.cit.*, pp.14-15.

as the impetus for Israeli conquests, both in Lebanon and earlier in the West Bank and the Golan Heights.³⁰

³⁰ Naff & Matson, 1984, *op.cit.*, p. 75-80 (discussing political and technical weaknesses of the theory). David Wishart : "An Economic Approach to Understanding Jordan Valley Water Dispute.", in *Middle East Review*, 21(4), 1989, p 45-53. Although the imperative has been fairly discredited Naff & Matson note.... that although water may not have been the prime impetus behind the Israeli acquisition of territory, as the hydraulic imperative alleges, it seems to be perhaps the main factor determining its retention of that territory".

CHAPTER III
DYNAMICS OF PEACE PROCESS
SINCE MADRID CONFERENCE

Just as the conflict over water in the Jordan River basin changed significantly after the 1967 war, so did the interest of the parties when considering cooperation. As earlier, Israel is no longer interested in basin-wide accord, largely because such an agreement would impinge upon advantages it reaps as a result of its superior riparian position on the main trunk of the Jordan River, its sovereignty over Lake Tiberias-the natural reservoir within the river system and its control over the West Bank groundwater reserves.¹ However, Israel has continued to insist that it be recognised as a party to all the main tributaries of the basin.

Various scholars also view Israel's involvement in Lebanon for Israeli access to water. Following the war with Lebanon in 1978, Israel established the security zone in southern Lebanon and expanded it after the 1982 war, which includes the Litani River as well as the Hasbani and Wazzani Rivers. With the expansion of the security zone, Israel established control over the lower parts of the Litani. In 1984, the Lebanese government protested to the UN regarding Israeli water

¹ Mirriam, Lowi R., 1995, *op.cit.*, pp. 134-135.

exploitation and accused of carrying out excavations between the Litani and the Israeli border to divert water from it.

In early December 1987, following an incident in Gaza, the Palestinians of the West Bank and Gaza rose up against the Israeli occupation in spontaneous protest. The Palestinians continued their *intifada* (uprising) in the following years, focusing unprecedented international attention on their national aspirations and on their unequivocal opposition to the occupation.

Conditions in the Palestinian territory during more than 20 years of military occupation, including land confiscation, settlement by Israeli settlers and restrictions of civil liberties, contributed to the eruption of the *intifada*. Palestinians from all walks of life – youth, merchants, labourers, women and children – have since been involved in massive demonstrations, economic boycotts, strikes, tax resistance and stone – wielding protests.

The occupation authorities used live ammunition against demonstrators and punitive beatings, maltreatment, torture, lethal use of teargas, etc., where thousands of Palestinians were detained and many deported from the occupied Palestinian territory. The occupation authorities had also increasingly resorted to various forms of collective reprisal, such as demolition of houses, imposition of prolonged curfews and restrictive economic measures.

The Palestinians in the Occupied Territories protested against the deliberate and forcible acquisition of farm lands and exploitation of waters of Palestinian inhabitants, who had farmed this lands for generations.² The uprising was brutally suppressed by Israeli forces, which came under international criticism, over the high number of casualties. This uprising was followed by the declaration of Palestine independence in 1988, and thereafter, recognition of PLO by USA. Again in 1989, the Prime Minister of Israel visited Washington for peace initiative talks.

Jordan in 1989 approached the US department of state for help in resolving the dispute. Ambassador Richard Armitage was dispatched to the region in September 1989 to resume secret indirect mediation between Jordan and Israel where Phillip Habib had left off a decade earlier. By fall of 1990, agreement seemed to be taking shape, by which Israel agreed to the concept of the Unity Dam, and discussions on a formal document and winter flow allocations could continue during construction.³

The *Intifada* was followed by the next series of events, which were geopolitical in nature. In the wake of the Gulf War 1991, which witnessed bonds of friendship between USA and the majority of Arab

² Frazer, T.G., *The Arab-Israeli Conflict* (Malaysia : Macmillan Press Ltd. 1995), p.137.

³ Aaron, T. Wolf, 1995, *op.cit.*, p.66.

states against Iraq, it appeared that US may be able to work out a comprehensive settlement with regard to Palestine. Infact, during the Gulf War President Bush and President Gorbachev announced in Moscow on 31st July 1991, their intention to throw their combined weight behind a comprehensive settlement of the Arab - Israeli conflict. Ultimately on 18 October, 1991, the two leaders decided to convene a conference at Madrid (Spain) to launch a West Asia Peace Initiative and issued invitations to the concerned parties.

While the region was still in the throes of drought, water was mentioned as a motivating factor for the talks. Jordan, as has been mentioned, is squeezed hydrologically between two neighbours attempting to reinterpret prior agreements, but otherwise has no major territorial disputes with Israel. Mohammed Beni Hani, the head of Jordan Water Authority, is one of the Jordan's twelve delegates to the peace talks. At the opening ceremonies in Madrid, Dr. Haider Abdel Shafi, the head of the Palestinian delegation, included in his opening remarks a call for "the return of Palestinian land and its life giving waters".⁴

During the bilateral negotiations between Israel and each of its neighbours, it was agreed that a second track be established for multi lateral negotiations on five subjects deemed "regional". These subjects

⁴ *Ibid.*, p.67.

included ecology, energy, economic cooperation, arms reduction and water resources.

Earlier in August 1990, the Israeli Ministry of Agriculture, headed by Rafael Eitan of the right wing Tzomet Party, took out full page advertisements in the international press, subheaded, "The Question of Water – Some Dry Facts." The advertisement described the hydrologic relationship between Israel and the West Bank and emphasized the danger to both water quantity and quality of territorial compromise. The advertisement concluded that Israeli control over the entire West Bank was necessary to protect water sources⁵ :

"It is important to realize that the claim of Israeli control over Judea and Samaria is not based on extremist fanaticism or religious mysticism but on a rational, healthy and reasonable survival instinct."

The Madrid talks held towards the end of October 1991 failed because Israel refused to budge from its stand. Israel not only refused to vacate the seized territory but also refused to enter into negotiations with the PLO leader Yasser Arafat. Despite this, the talks were of great significance because for the first time in the history of 43 years old Arab – Israeli conflict, Israel and Syria sat face-to-face. They were also significant because for the first time peace talks were held without a mediator.

⁵ See Appendix III.

The official Israel – Palestinian talks in Washington, which commenced in December 1991 in the wake of the Madrid Conference, proceeded through ten rounds without arriving at an agreement. As a mediating power, the US failed to use its considerable influence to bring the two sides together.⁶

With the opening of peace talks, the emphasis in international arenas quickly went from the potential for conflict over water to its potential as a vehicle for cooperation. Seminars and conferences were held throughout the early 1990's in the US, Canada, Europe and West Asia, on the possibilities of cooperation of water resources. The world Bank also held seminar on similar topic⁷. The Israel-Palestinian center for Research and Information (IPCRI) co-sponsored 'First Israeli/Palestinian International Conference on Water' in October 1992, another earlier in December 1990.

In Israel, at the sametime, the Jaffee Center for Strategic Studies undertook a study of the regional hydrostrategic situation and the potential for regional cooperation. It studied comprehensive regional water development including the evaluations of hydrologic, political, legal and ideological constraints.⁸ Some of the policies contradicted

⁶ Sanders, Jacinta, "Honest Brokers? American and Norwegian Facilitation of Israeli-Palestinian Negotiations (1991-93)," *Arab Studies Quarterly*, vol.21, # 2, 1999, p. 47.

⁷ Aaron, T.Wolf, 1995, *op.cit.*, p.68.

⁸ Document was "Water in the Middle East : Solutions to Water Problems in the Contexts of Arrangements Between the Israel & Arab (Schwartz & Zohar 1991).

government policies in the study. In the sections on possible contradicted. In the sections on possible arrangements between Israel and the Palestine, and between Israel and Syria, maps of the West Bank and Golan Heights included lines to which Israel might relinquish control of the water resources in each area, without overlying endanger its own water supply. In January 1992, the Israeli military censor backed the position of the Minister of Agriculture and, citing sensitivity of the reports findings, censored the report in its entirety.

On a large scale, the first round of multilateral negotiations on water were held in Vienna in May 1992. At that meeting, each party agreed to compile a programme for regional development which would then be examined in the United States for any commonalities that could be exploited to induce cooperation. This same approach is being taken by the World Bank, which commissioned similar studies from the states in the region. In conjunction with the peace talks, less-public and less-official dialogues, called the "Track 2 talks" have been held between Israelis and Palestinian in the United States.⁹

The West Asia Peace talks suffered a setback in December, 1992 when Israel deported more than four hundred Palestinians on the ground of inciting muslim fundamentalists violence in Israeli occupied lands.

⁹ Aaron, T. Wolf, 1995, *op.cit.*, p.69.

Ultimately on 2nd February 1993, bowing to the international pressure, Israel agreed to tuck back home some hundred expelled Palestinians and reduced the period of banishment for others. However owing to US pressure on Israel, negotiations were stepped up and on 13th September 1993, the Foreign Minister of Israel and PLO Executive Committee member signed a peace agreement in the presence of US President.

The secret negotiations in late January 1993, were sustained by delegations in direct contact with the then Yitzak Rabin and Shimon Peres in the Jerusalem and with Yasser Arafat in Tunis. Norway hosted the parties during the secret negotiations. The Norwegian head of government and Foreign Minister both played an effective and reconciliatory role in the secret talks.¹⁰

Twenty-two months of negotiations following the Madrid Conference were unquestionably historical since it gave the Palestinians a chance to be directly involved with their own issues. That was the first time the Palestinians had put together documents, doctrines and tactics associated with their interests through legal terms, but the negotiations came to no solution to the question.

¹⁰ Aras, Bulent, "Palestinian-Israeli Peace Process since Oslo : Reality or Dream?," *Strategic Analysis* , vol. 19, # 8, 1996, p.1158.

The Declaration of Principles (DoP) signed between Israel and the Palestinians on September 13, 1993, followed by the Cairo Accord on May 4, 1994, was expected by many to be the first steps towards the establishment of a Palestinian state in the Gaza strip and the West Bank. The accords which were the result of secret negotiations between Israeli and Palestinians leaders in Oslo had envisioned the process to be divided into phases : phase one which dealt with the withdrawal of Israeli troops and introduction of self-rule in the Gaza strip and the West Bank town of Jericho soon after signing of the DoP; phase two, which was to bring self rule to the rest of the West Bank after a period of nine months; and phase three, when final status talks for the establishment of a permanent self-rule Palestinian entity was to begin.¹¹

Among other issues, the Declaration of Principles called for the creation of a Palestinian Water Administration Authority. Moreover, the first item in Annex III, on cooperation in economic and development programmes, included a focus on

“.....cooperation in the field of water, including a Water Development Programme prepared by experts from both sides, which will also specify the mode of cooperation in the management of water resources in the West Bank and Gaza strip, and will include proposals for studies and

¹¹ Shebonti Ray Dadwal, “Oslo II : Self - Rule Comes to the West Bank,” *Strategic Analysis*, vol. 18, 1995, p.1123.

plans on water rights of each party, as well as on the equitable utilization of joint water resources for implementation in and beyond the interim period”.

Although the declaration was generally seen as a positive development by most parties, some minor consternation was expressed by the Jordanians about the Israeli – Palestinian agreement to investigate a possible Med-Dead Canal.¹²

Nevertheless, a bilateral agreement, the Declaration of Principles helped streamline a logistically awkward aspect of the ongoing multilateral negotiations, as the PLO became openly responsible for representing the Palestinians – previously the Palestinian delegations – had been affiliated with the Jordanian delegations. By the fifth round of water talks in Beijing in October 1993, somewhat of a routine seemed to be setting in at the multilateral negotiations, whereby reports were presented on each of the four topics agreed at to a second meeting in Vienna – enhancement of data availability, enhancing water supply, water management and conservation, and concepts of regional cooperation and management.¹³ The sixth and most recent round of

¹² The Med-Dead Canal Project was proposed to be built between the Mediterranean Sea and Dead Sea. The desalination project was to be set up along this Canal for production of desalinated water for domestic and agricultural uses and production of hydro-power, for the supply in Gaza, West Bank and Jordan.

¹³ See in details, Aaron, T.Wolf, “International Water Dispute Resolution : The Middle East Multilateral Working Group on Water Resources,” *Water International*, vol. 20, 1995.

talks was held in Muscat, Oman, in April 1994, the first of the water talks to be held in Arab country and the first of any working group to be held in the Gulf. Tensions mounted immediately before the talks as it became clear that the Palestinians would use the occasion as a platform to announce the appointment of a Palestinian National Water Authority. While such an authority was called on for in the Declaration of Principles, possible responses to both the unilateral nature and to the appropriateness of the working group as the paper vehicle for the announcement were unclear. Only a flurry of activity prior to the talks guaranteed that the announcement would be welcomed by all parties. This agreement set the stage for a particularly productive meeting.

Recent progress made in bilateral negotiations between Jordan and Israel has outpaced the multilateral negotiations. On June 7, 1994, the two states announced that they had reached an agreement on a sub-agenda for cooperation, building on an agenda for peace talks that had been agreed to 14 September, 1993 which would lead eventually to peace treaty. The sub-agenda included several water related items, notably in the first heading listed (in advance of security issues, and border and territorial matters), Group A – Water, Energy and the Environment.

I. Surface Water Basins.

- A. Negotiation of mutual recognition of the rightly water allocations of the two sides in Jordan River and Yarmonk River waters with mutually accepted quality.
 - B. Restoration of water quality in the Jordan River below Lake Tiberias to reasonably usable standards.
 - C. Protection of water quality.
- II. Shared Groundwater Aquifers.
- A. Renewable freshwater aquifers – southern area between the Dead Sea and the Red Sea.
 - B. Fossil acquifers – area between the Dead Sea and the Red sea.
 - C. Protection of the Water quality of both.
- III. Alleviation of Water Shortage.
- A. Development of water resources.
 - B. Municipal water shortages
 - C. Irrigation water shortages
- IV Potentials of future bilateral cooperation, within a regional context where it is appropriate.

[Includes Red Sea – Dead Sea Canal; management of water basins; and interdisciplinary activities in water, environment and energy].

On 26 October 1994, Israel and Jordan formalized a peace treaty after resolving the last and most contentious issue – shared water resources.

According to Accord –

Israel will yield 40 MCM / yr from the Yarmouk, plus 10 MCM/yr desalinated brackish spring water :

- An additional 50 MCM/yr will be developed through joint projects, to be determined by a joint water committee.
- Jordan will store 20 MCM/yr of winter flood water in the sea of Galilee, to be returned during summer months – flood water in addition to current uses will be split between the two countries.
- Two dams will be constructed – one each on the Yarmouk and the Jordan.

When negotiations started in 1995 and the Palestinians began insisting on their rights to water, on reallocation of supplies and on joint management, the Israeli government didn't want any modification in the distribution of water resources. They accepted that the Palestinians had to have a little more water, but with a condition to retain control over the management of water resources. The deal

signed in September 1995 was a compromise, leaving longer term solution to be tackled when “permanent status” talks begin in May 1996. However, the interim agreement established for the first time the vital principle that Palestinians have right to West Bank Ground Water. The agreement also set up Joint Israeli – Palestinian Committee to manage water affairs in the West Bank and allocated more water to Palestinians, mainly from the eastern aquifers plus small amount from shared resources, it also allows Gaza a little more Israeli water. The then Foreign Minister Shimon Peres insisted, however, that any new arrangement on water would not come at the expense of Israel. “There will be no division of what already exists, but rather we are talking about an effort to create new water sources” he said.¹⁴

The importance of the water issues in the region led the Working Group on Water Resources to accept in April 1994 a joint United States / European Union proposals for a Regional Training Program in the water sector. The program consisted of 14 courses, although some were offered twice so 20 sessions were presented. The topics covered included water related aspects of planning, management, administration, technical, legal, financial and institutional subject. A total of 275 people participated in the program, including : Palestinians (91), Jordanians (70), Egyptians (47), Israelis (38) Omanis

¹⁴ *The Jerusalem Post*, Jerusalem, July 20, 1995.

(14), Yemenis (8), Tunisians (4), Moroccans (2), and Saudi Arabians (1). Participants ranged from scientists, planners, and managers, to policy level decision makers.

The issue of water remains one of the key controversial topics in the final status negotiations, a dispute that some allege can be major roadblock on the path to peace. Israeli, who currently use most of the water, fear giving up control of water resources in the West Bank, and the Palestinians, who already suffers from severe shortages, fear a dry future unless they get an increased share. The chairman of Palestinian Water Authority, Nabil Sharif, says –

‘The Palestinian Authority is looking to the final – status negotiations to redress an imbalance under which scarce water is used overwhelmingly by Israel. We are claiming that there should be equality between Palestinians and Israelis in per capita use. Israeli should consider that they are over using the sources and that the Palestinians are hardly using any thing.’¹⁵

The mountain aquifer, which supplies about one quarter of Israel’s and one half of Palestinians’ fresh water supply lies mostly under the West Bank. Yet the outlets of that aquifer are mostly on the western slopes of mountain ridge, within Israel. So even though the aquifer is

¹⁵ Though Water is one issue among five to be discussed, but it wasn’t discussed in Wye River Agreement (USA) in 1998 and also in Wye River II Agreement at Sharm-el-Sheikh in 1999 in USA.

actually like a huge underground bath tub, the situation is similar to a river on which the Palestinians are the 'Upstream' party and Israel is 'downstream'. Though some water resources, such as the mountain aquifer may seem to be an Israeli-Palestinian issue, it makes no sense to treat the overall water problem bilaterally, the West Asia Peace process should eventually produce water agreements between the peoples of the Jordan River basin : Syria, Lebanon, Israel, Jordan and the Palestine.

The fundamentals principles of international water law of equitable sharing' applies no less to Syria and Lebanon than it does to the others three riparians. Though international legal instruments are not fully developed in the area of water, their spirit is clear – both upstream and downstream parties have rights which must be reconciled.

This means that Israel has rights though its historic usage and development of the mountain aquifer, while the Palestinians have rights relating to their possible eventual control of the land that is the water's source.

No comprehensive agreements have been reached over an equitable allocation of the Jordan – Yarmouk waters, although water was vital and sometimes overriding factors in the peace process of the early 1990's. On October 26, 1994, Jordan signed a peace treaty with Israel,

an important part of which was Annex II on the subject of water. The Annex is ambiguous and currently is the subject of negotiations. Jordan's viewpoint is that it should be the recipient of an additional 225 MCM per year as a 'peace dividend'. However it is now receiving only 50 MCM per year. The remainder is subject of negotiation with Israel and Syria.¹⁶ The October 1994 peace treaty between Israel and Jordan, which was only formalised after the last and most contentious issue – shared water resources was agreed to, included an agreement for a Joint Water Committee to develop additional water resources, including two new dams, one each on Yarmonk and the Jordan. Also the creation of a "Palestine Water Authority" was an important aspect of the 1993 Declarations of Principles. But given the inherent hostility in the region, it is likely that water will remain a major source of conflict and instability for the foreseeable future.

¹⁶ Borthwick, Bruce, "Jordan Confronts its Water Crisis," *Orient*, vol. 40, # 3, 1999, p. 4.

CHAPTER IV

LAW, TECHNOLOGY & POLICY OPTION FOR MUTUAL GAINS

Gideon Fishelson¹ of the Armand Hammer Fund for economic co-operation in the West Asia has stated :

“The danger of war over water hangs over the heads of the Middle-East countries, yet there is also the possibility of co-operation and harnessing new technologies and capital that would prevent such wars. Solving the water issue is one of the essential prerequisites to achieving a meaningful and lasting peace in the Middle-East.”

Solutions other than conflict clearly exists. Some of the measures that can help to mitigate the problems and relieve tension over scarce water resources will be discussed below.

The variety of proposals for the management of scarce water resources indicates once again the growing importance of the work due by the “epistemic communities” such as green movements, the economists and physical scientists.” Even if the influence of these communities is on the rise, the question remains, how on an interstate level co-operation can be promoted.²

¹ Gideon, Fishelson, (ed.), *Economic Cooperation in the Middle East* (Boulder : Westview Press, 1989), p. 180.

² Hoffmann, Berthold, 1998, *op.cit.*, p.262.

Not only efficient but also equitable water sharing agreements stand as a pre-requisite to hydropolitical stability. International law, seems to be the place to look as a mediator in cases of conflict over sharing water. However, it has proven to be difficult to determine criteria for “equity” where international water law is both ambiguous and at the sometime contradictory³ measures that have historically been used to promote water sharing equity include rights-based measures-often favoured by the international legal community, -needs based measures particularly using population, arable land, or historic use parameters and measures based on economic definitions of efficiency. Besides these different approaches toward water rights, one can clearly observe a growing consensus towards co-operation as the underlying principle for conflict resolution in international water law.

Law, Water & Conflict : Basic Laws

The cornerstone of international fresh water law is the assumption that the allocation of scarce resources requires legal means, rather than coercive force, if sharing is to be equitable and conflict is to be avoided.

Historically, international riparian law has been underdeveloped, eluding the efforts of jurists to sort out its complexities and persuaded

³ Peter Gleick, “Water, War & Peace in the Middle East” *Environment*, vol. 36, 1994, p.39.

nations to subject their competing claims to a standardised code of legal principles. Those complexities have sometimes made the process appear muddled. Although in the era of the United Nations some headway has been made, progress has been so slow and achievement so meagre that some observers have concluded that no universal code of international riverine law is possible.⁴

Law : Equitable and no Appreciable Harm

In customary international law, every state is under an obligation not to cause harm to another, not only by direct action, but by allowing the use of its territory in ways that result in harm to the rights of other countries. No appreciable harm provides that while a state is entitled to use the waters of a river that traverses its territory, it may not do so in such a way as to cause appreciable harm to the rivers other riparians. This proposition does not explicitly proscribe any harm whatsoever, and though "appreciable harm" has proven impossible to define precisely, it clearly means more than merely "perceptible" but not necessarily "substantial". That is, it must be harm of a certain gravity or significance beyond simple inconvenience. Equitable utilisation states that riparians of an international water way are obliged to use, develop and protect the water course in an equitable and reasonable manner and are duty bound to do so co-operatively.

⁴ Dante, Caponera A., *Principles of Water Law and Administration, National and International* (Rotterdam : A.A. Balkami, 1992), p.212-213.

Rather, equitability implies the idea of proportionality, a share and usage proportional to a riparian's population and its social and economic needs, consistent with the rights of its co-riparians.⁵

Law : Empowerment and Constraints

This same institutional requirement applies in the international sphere as well, in the form of international courts and organisations that are supranational and are empowered to enforce judgements by recognised international legal means. In the international spheres, treaties are the key legal instruments, but to enable the judicial process to function effectively, treaties must include arrangements for settling conflicts by rules of law through appropriate legal institution. These goals have been difficult to achieve in international law particularly as regards to transboundary and international rivers. Thus, riparians and other conflicts continue for the most part to be dealt with by specific treaty agreements or by power relationships or, sometimes by mediations in combination with the other two choices, but without necessary reference to or application of law. "In absence of a neutral enforcement mechanism, international law has nothing better to offer for sanctioning violations than the law of the vendetta." In some highly local instances, cultural factors and customary practices are successfully employed to settle riparian disputes, but it

⁵ Thomas Naff in P.Rogers and P.Lydon (eds.), 1994, *op.cit.*, pp.263-64.

is difficult to generalise such cases because they are so culturally and locally specific.⁶

The Helsinki Rules

The Helsinki Rules are essentially a compendium of useful guidelines, drawn up by the International Law Association (ILA) for the application of law instead of coercion in the settlement of riparian disputes. The rules deal with the four prevailing principles and their offshoots, but in the end they come down in favour of equitable and beneficial utilisation. As stipulated in key articles (III & V), each basin actor is entitled within its territory to a “reasonable” and “equitable” share in the beneficial uses of the waters in an international drainage basin as long as it does not cause substantial injury to another basin state. But, unlike the UN’s International Law Commission (ILC) in its efforts to fashion a set of generally acceptable principles for the application of international riparian law, the International Law Association (ILA) did not attempt to provide an objective or operational definition of such pivotal concepts as “equitable” and “reasonable”. It is not only the complexity of the issues being defined that accounts for the generality or even vagueness that often characterises these legal usages but also

⁶ *Ibid.*, pp. 265-66.

the recognised need for built-in-pragmatic flexibility where international or transboundary water questions are concerned.⁷

Because the International Law Association is a private professional association without official status, the Helsinki Rules have no official standing. The Rules represent little more than the collective opinion of a group of experts in the relevant fields of international law. Such opinion carries only the weight of a secondary source of international law insofar as they provide evidence of customary international law. However, the essence of Helsinki Rules has been encapsulated in the draft proposals of the International Law Commission (ILC), which is an officially constituted international body of legal experts, an official organ created by the United Nations. Although at this time, its work is also merely secondary evidence of customary international law, the ILC's position is expected to become the basis of a multilateral treaty on the peaceful non-navigational uses of fresh water. Should it be ratified by the members of the UN, the treaty will then become a direct primary source of international law.⁸

One overriding principle of international water law that is almost universally recognised is that, regardless of all other factors, a nation on a shared water basin has the right to expect that the minimal water

⁷ *Ibid.*, p.266.

⁸ See in details, Mc Cafferey, "Water, Politics and International Law," in Peter Gleick (ed.), *Water in Crisis*, (New York : Oxford University Press, 1993.)

needs of domestic uses required for its survival are met. This concept is specifically mentioned in the Israel-Jordan Peace Agreement and has been accepted in principle by Israel. The problem with international law is that, in the absence of overarching authority, it is not really enforceable. However, there is a moral weight, that tends to influence outcomes. The international community for instance, expects that Israel and Palestinians negotiate a settlement based on the assumption that they share common water resources and that an accommodation should be reached in the spirit of the principles of international law.⁹

The Water Resources Working Group¹⁰

The Working Group on Water Resources (WGWR), for which the United States serves as Gavelholder and Japan and the European Union serve as co-organizers, established the following four broad agenda items to address some of the critical water issues.

- A. Enhancement of water data availability
- B. Water management practices, including conservation.
- C. Enhancement of water supply.
- D. Concepts of regional water management and cooperation.

⁹ Hoffmann, Berthold, 1998, *op.cit.*, p. 262-63.

¹⁰ From *Internet*.

Taking into consideration that the water resources of the region are already fully exploited and demand for water is rising rapidly, the issue of water has become one of the most urgent. Given its important to sustaining the quality of life and future economic development, emphasis is being placed on enhancing existing resources and developing new, additional resources, including desalination and sewage treatment.

Since its inception, the WGWR has been implementing a variety of projects under its four agenda items. Each project enjoys the support, both technical and financial, or one or more of the WGWR's extra-regional donor delegations. The multilateral framework has been a successful mechanism for addressing regional problems. The WGWR in particular has been successful in developing a cadre of high-level water decision makers that now can effectively work together on regional water issues.

Following are several projects carried out to date :

The *Regional Water Data Bank Project* is organized to improve the availability and applicability of water data information. The project goal is to enable the exchange of consistent, compatible and reliable water data and information to support decision making at both local and regional scales. As a result of continuous collaborative work since January 1995, the Regional Water Data Banks Project has achieved

some remarkable successes. Water data collection, storage and retrieval capabilities have been established within the Palestinian Water Authority and those of the Israeli Hydrological Service and the Jordanian Ministry of Water and Irrigation were improved and enhanced. Among the donor countries taking part in the initiative are Canada, France, the Netherlands, and Australia.

The *Middle East Desalination Research Centre* (MEDRC) – The Centre was established in Oman in December 1996 and coordinates and sponsors basic and applied research in the area of desalination. The U.S., Israel, Japan, Oman, the E.U. and Korea are the founding members of this first regional center, and comprise its board of directors. A number of training courses have been held for regional participants.

The objectives of MEDRC are :

- Discovering, developing, and improving methods of desalination through basic and applied research.
- Initiating training programs in the field of desalination to develop expertise as well as technical and scientific skills.
- Promoting electronic networking communications to improve the dissemination of technical information on desalination.

- Establishing regional cooperation and work to foster progress in the development, improvement and use of water desalination and related technical areas.
- The *Public Awareness and Water Conservation Project*, established in 1996, is managed by the United States. The first activity completed by the regional participants was the design and preparation of a video aimed at youth that highlights the importance of water issues from a regional perspective. The second major activity underway, WaterCare, is the preparation of a Student Resource Book, Teacher's Guide, and complimentary Web Page focused on regional water conservation issues that are regional. The materials are being prepared jointly by educational writers from each of the regional participants and are being written for students between 12 and 15 years old. The major topics addressed by the materials include water resources, water use, water pollution and life/health, water management for conservation, and water care for the future, all from a regional perspective. The materials are scheduled for implementation in schools throughout the region in January 2001.

The *Middle East Regional Study On Water Supply and Demand Development* – The German Government undertook a study of the long-term strategic development of water resources in the region.

The objectives of the study were to elaborate specific proposals for the provision of additional water resources on the basis of a comprehensive demand forecast, and develop a concept for coordinated future management of all regional water resources. The study was completed in 1998.

The data show a significant gap between water supply and demand throughout the region, even when using conservative estimates of future population growth and water use. In addition, deteriorating water quality already is a serious issue in some parts of the region, and increasing pollution and salinization threaten to make more and more regional water resources non-utilizable in the future. The five activities considered to be the highest priority are :

- Joint development of prototype desalination plant (s) at the Mediterranean and/or the Red Sea.
- Prefeasibility study of large-scale coastal desalination plants.
- Comparative study of intersea schemes (Med-Dead : Red-Dead).
- Prefeasibility study of intraregional conveyance systems.
- Study on regional institutional setups.

Comparative Survey of regulatory and legal framework of water laws, pricing and management – A comparative study outlining these issues has been conducted by the Norwegian government through CESAR. In

June 1996, the Israeli, Jordanian and Palestinian (Core Party) participants adopted a *Declaration of Principles for Cooperation on Water – Related Matters and New and Additional Water Resources* identifying principles for regional cooperation.

The first project to result from this was the establishment of the *Waternet Project*, designed to develop a computerized information system for water related issues to serve as a tool for researchers in the region and to enhance regional cooperation. The project has three main parts : Waternet-Local assists the Core Parties to develop a computerized water information system to display relevant local water information. Waternet-Regional assists the participating parties to link local nodes to form a share regional computer information network. The third part is establishment of a Regional Waternet and Research Centre in Amman, Jordan, to begin operation in 2000.

Optimization of Intensive Agriculture under Varying Water Quality Conditions – This project, established in 1996, is managed by the Government of Luxembourg. The primary focus of the project is to demonstrate how brackish and saline water can be used to support sustainable farming. A demonstration farm, established in Gaza at Beit – Hanoun, is used to support technology transfer in the field of water use. Project implementation is led by Al-Azhar University of Gaza.

Existing Technological Options

Desalination

The Middle-East has already spent more on desalinating plants than any other part of the world. The region has 35% of the world's plants with 65% of the total desalinating capacity, mostly along the Arabian peninsula.¹¹

It is the problem of cost that makes desalinated water impractical for most applications. Although drinking water is a completely inelastic good-that is, people will pay almost any price for it- water for agriculture, by far the largest use in the West Asia, has to be cost effective enough of the agricultural end-product to remain competitive in the market place. The present costs of about US\$ 0.50-\$1.50/m³ to desalt sea water and about US \$ 0.30 /m³ for brackish water¹² do not make this technology an economic water source for most uses. Efforts are on ahead to lower these costs through multiple use plants, increased energy efficiency in plant design, and by augmenting conventional plant power with solar or other energy sources.

Waste Water Reclamation

Israel has completed most of the efforts at establishing and adopting water demand management for its existing industries, while new

¹¹ Aaron T.Wolf, 1995, *op.cit.*, p.91.

¹² See details in Starr and Stoll (eds.), *The Politics of Scarcity : Water in the Middle East* (Boulder : Westview Press, 1988),p.15.

industries are currently installing cooling systems and pre-designed “cascading” facilities. The price mechanism as well as effluent charges are gradually being enforced and are contributing their share to industrial water management. Many of the industries are located in the urban sector and are subject to the additional utility prices.

The average cost of water saved was in the \$0.15-0.25 per c.m. range. The fresh water allocation for the Israeli industry is approximately 7-8 per cent of the total use and therefore the additional potential savings is relatively small. However, the environmental impact of industrial wastes could by itself justify higher levels of investment in treatment facilities, as in-house treatment and re-use reduces potential pollution of streams and water resources.

Israel will probably demand that the Palestinian Authority assures adequate effluent treatment and disposal policies in order to ensure the safety of the sensitive mountain aquifer underlying the West Bank. As relatively high levels of treatment will have to be adopted, it is reasonable to assume that local reuse for irrigation purpose will be the most cost-effective solution, mainly in areas where aquifer pollution is not expected. Drip irrigation of horticulture tree crops is preferred in these conditions when the fields surround most, if not all, the towns and cities. It is essential that the design and

implementation of adequate sewerage systems are given top priority when the external funding instruments become available.

Effluent re-use is a valuable method of decreasing demand for water and, therefore, it is used in conjunction with water conservation. The legislative/financial/economic arrangements for conservation and reuse should be closely linked.

Urban water re-use : the economics of this strategy is strongly linked to whether the effective and efficient use of effluents irrigation is a viable option. Treatment and transfer costs could determine whether a river or a marine outfall is the most economical option and under what conditions farmers would be ready to trade fresh water for treated effluent (that is, at what price and ratio of exchange, under what investment-sharing plan between the city and farmers, and whether "bridging" funds are provided by the authorities). So there is a clear connection between urban demand management activities (not the reduction of unaccounted-for water, which is a separate issue) and effluent quality, effluent re-use and trade-off policy and legislation. Salinization of the effluents could make them inadequate for irrigation so that city has a direct interest to avoid "contaminating" the waste flows. Israel plans and intends to re-use most of its treated wastewater subject to economic feasibility. A major obstacle to the completion of the National Re-use Master Plan is the controversial

issue of the environmental impacts of discharges of highly treated effluents into the Mediterranean Sea.

This technology is used to increase the supply by cleaning and reusing water. Israel currently reclaim 200 MCM/yr of waste water, meant for irrigation for 15000 hectares of cotton crops. This type of project can be developed throughout the region, and even World Bank aid is given for such project's viability.

Possible Solution

Agriculture Water Conservation

This endeavour includes efforts (technological as well as economic measures, credits and incentives) for further reducing water use in the urban centres and industry as well as to further improve the efficiency of water use in agriculture. Incremental costs of water saved in Israel range from \$0.05-\$0.04 per c.m.

The levels of direct and indirect water production through savings and improved efficiency of water use are very important as they represent permanent reduction of demand. Israel has gone a long way in its efforts while the West Bank and Gaza, Jordan, Syria and Lebanon could still benefit significantly developing new and expensive sources. The term "efforts" is much more complicated than it sounds. It means

large-scale application of adequate technology (drip, sprinkler, automation) changes of industrial water use and water processes, (like “cascading” changes and cooling methods) and the wide scale application of demand-management policies and technologies in the cities. Training, public education and effective extension system, must accompany the promotion and implementation instruments. These measures are over stressed as the “trickle down” system and will not work by themselves. Finally, the efficiency of pricing mechanisms and the application of a market system can play a dominant role in the whole operation. A comparison of prevailing prices for irrigation water between Jordan and Israel illustrates and partially explains the gap in the two countries’ agricultural yield/c.m., and the potential for decreasing agricultural water demand.

Israel could play an important role in the application of demand-management policies throughout the Middle East and thus help delay the need for expensive future projects in the area. Water conservation should be the first priority short-term strategy within proposed plans for regional co-operation. However, if only the partner invests and applies rigid demand-management policies the impact will be limited. Overall demand for water will rise beyond the supply capacity and over pumping way lead to regional conflicts.

Urban Water Conservation

Unaccounted-for water (UFW) causes significant water and financial losses to urban utilities and municipalities. Unaccounted-for water has been substantially decreased in Israel, but remains a serious problem in Jordan, the West Bank, Gaza and other Middle Eastern countries. In Jordan, for example, UFW rates in some cities are above 50 per cent and represent critical water and financial losses. Leakage is estimated to account for almost 50 per cent of the total UFW (could reach 30 m.c.p.c. a year) which means that 3 million c.m. per annum could be recovered per 100,000 urban users. If multiplied by 50 cents per c.m. (the minimum marginal costs of future water supply), the utility's financial annual losses equal approximately, \$15 million per one million urban residents. There is no doubt, given experiences in Israel and many other countries, that losses can be reduced to more reasonable levels. Large sums of money can be saved and reinvested in further conservation and maintenance efforts.

However, it must be stressed that if the sewage effluent is totally and efficiently, reused, the end result of demand management is mainly accounted for in economic terms as incremental operation and maintenance savings associated with the water wastage (water supply and waste treatment). In addition to dogmatic and commercial use,

city and residential parks and household gardens should be re-fitted with drip irrigation and/or small automated irrigation systems.

The excess uses of water can be checked by reducing waste in agriculture, industries, municipal uses and transport etc. This can be encouraged by education, media campaigns and water pricing.

Each country in region should evolve a mechanism for the pricing of water. The tariff imposition could inevitably will check the redundant uses of water. It could be more democratic, if the community based ownership is tendered to the local community by the state agency. The moral responsibility will generate while paying tariffs, within the community.

Developing private sector institution :

The private sector should be allowed to participate in co-operation with public sector. This will enhance efficiency, flexibility and duty-responsive towards the water users, by proper water planning, management and control.

Physical sciences & technology:

The technical implementers of water policy are the physical scientists, i.e. hydrologists, hydrogeologists, engineers and chemists manage the supply, delivery, storage and quality of water to the users. Low water

use technology are being used and researched in farm practices, green house technology, biotechnology etc. This section contributes in mitigating the alleviation of water disputes in the West Asia by offering various alternatives to increase supply and reduce demand of water in the region.

Increase Supply

No 'new' rivers will be discovered, but winter flow, if can be checked and stored in the Maquarin Dam, efficiently, then this will increase Israel's water budget by 330 MCM/yr, alone. More water is saved in underground through artificial groundwater recharge, amounts to 200 MCM /yr for Israel, alone. Groundwater can be tapped efficiently by systematic and periodic evaluation, like the discovery of Nubian sandstone's filled with huge fossil water in the Sinai and Negev deserts. The extra water can be fetched by towing icebergs and cloudseedings. Though, the former is cost-expensive but latter is often tapped in the northern Galilee catchment.

The three most promising technologies to increase water supplies are desalination, waste water reclamation and water imports. The obvious and traditional response to water shortages has been to construct dams in order to retain runoff from floods, to store water and for use throughout years, and even to replenish shallow aquifers. But all dams have an impact on development in downstream.

Inter Basin Water Transfers :

Inter-basin water transfers are another technological solution, such as Turkey's proposed two " Middle East Peace Pipelines" designed to carry surplus Anatolian water from the Seyhan and Ceyhan rivers to Syria, Jordan and Israel, and on through Iraq to Saudi Arabia and the Gulf States. These countries, however, are more reluctant to be dependent on others for their most basic need—water, which could be interrupted for political reasons. In addition, the costs for all these projects would be enormous, probably higher than by obtaining water through desalination.¹³

Better Management

More water-efficient methods and technologies can be adopted. For example, in agriculture, it is essential to move away from inundation (flood) techniques, which currently account for about 95 percent of irrigation practices, to sprinkler techniques, trickle irrigation techniques (which take water directly to the plant roots from perforated plastic pipes), or subsurface irrigation techniques (which control the height of the water-table and irrigates plants through capillary action, thus minimising evaporation). Other management techniques includes hydroponics (planting of seeds in pipelines, where

¹³ Christine, Drake, 1996, *op.cit.*, p. 10

water is filled with salts and minerals as present in soils), lining canal to prevent seepage losses, covering them to minimise evaporation, repairing pipes to reduce leakage, improving drainage to reduce soil salinization, minimising evaporation by better field preparation and water application, and irrigating at night and early in the morning when evaporation rates are lower.¹⁴

Demographic Checks :

Finally, but perhaps most significantly, it is crucial that all states in the region drastically reduce their population growth rates, for in a context of rapidly increasing population, all other efforts to ensure water availability over the long term may well be futile. Certainly population stability is a long term strategy, but it may well be the most critical strategy of all.

In addition to above possible solution to water crisis, study is also being done how to make water as a basis for mutual cooperation between the states of region. In the regard *Gershon Baskin*¹⁵ opines that—Water equals money. There are many ways of translating the value of water into money. Some of them are very complex and require projects costing millions of dollars. Other ways are quite simple and logical and- at least to begin with- require only common sense and the

¹⁴ *Ibid.*, p. 10

¹⁵ Gershon, Baskin, *A Solution for Water*, (Jerusalem : The Jerusalem Post, Nov. 1999)

ability to see beyond the individual wells to the overall well-being of both the Israeli and Palestinian peoples.

The solution below will not provide answers for a period beyond 10-15 years, when there will be no fresh water available in Israel or Palestine for purposes other than domestic use. The premise of this proposal is, that if Israel is generous to the Palestinians with water, it will translate into profits for Israel and for the Palestinians, as well.

Agriculture accounts for the highest single use of water in both in Israel and in Palestine. More than two-thirds of the available fresh water is used in agriculture. In Israel, less than 3% of the labour force is engaged in farming, while in Palestine it account for about 25% of the work force.

The rising costs of land and labor is making labor-intensive agriculture less and less economical in Israel. It is likely that Israeli agricultural imports will increase over the next decade, particularly of labor-intensive field crops.

Israel today already purchases the entire Palestinian agricultural surplus, which fills 1/12 of Israel's fresh fruit and vegetable needs. For the next 10-15 years Israel could continue to purchase the entire Palestinian fresh fruit and vegetable surplus; but if Israel made more water available, the Palestinians could produce an even larger share of Israel's fresh food needs.

Increasing the Palestinians' water supply has payoffs for both sides.

For Palestine, these include :

- ◆ A steady increase in agricultural jobs at a time of high unemployment ;
- ◆ A guaranteed market for what the Palestinians produce (resolving the first major problem faced by the producer of anything, anywhere in the world);
- ◆ The ability to irrigate and cultivate more land, preparing new areas for increased Palestinian settlement and development.

For Israel, this arrangement assures :

- ◆ A guaranteed source of fresh, high-quality and cheap fresh food;
- ◆ Increased Palestinian purchases of Israeli agricultural inputs such as seeds (high profit), fertilisers and pesticides, as well as Israeli irrigation technologies;
- ◆ That shekels remain in the economy where much of them will be re-spent by Palestinians in Israel; there will be no need to use foreign currency to import food;
- ◆ Israeli "generosity" in water transfers could be presented to the international community as a significant concession that would be "rewarded" by the international community through the

establishment of an international fund for research and development that would focus on desalination.

The fund could be used to create hi-tech jobs and scientific co-operation, between Israeli, Palestinian, Jordanian, Egyptian and other international water scientists. The developments and patents produced through the R & D fund could be used to sustain ongoing co-operative research projects.

CHAPTER V

CONCLUSION

The West Asia is the most water poor region in the world, with the lowest per capita consumption of water. The scarcity of water in the region is aggravated due to the rapid growing population, —highest population growth rates in the world. In addition, there are number of rivers in this region that traverse international boundaries, established during the twentieth century and that have become a focus of inter-state tensions. Among them, Jordan River basin is most inflammable basin that has been cause for several water conflicts till date.

After the fall of Ottoman Empire, the borders between Israel, Lebanon Syria and Jordan, were influenced by headwaters of Jordan Rivers. During 1953-55, Eric Johnston, a special envoy of US president worked for two years to hammer out a water-sharing agreement between the riparians of the Jordan River, based on the basin-wide agreements.

Water-Wars (1964-67) begin with the Arabs decisions to build an All-Arab Diversion of the Jordan headwaters to preclude the Israeli National Water Carrier, and was stopped three years later when Israeli tank and air-strikes halted the construction of the diversion; this was a period of the most direct water-related conflict. This tension was

culminated into the Six-Day war, where hydrostrategical as well as geopolitical configuration was changed in the favour of Israel.

Israel gains were also impressive as water resources were concerned. By occupying the Syrian Golan Heights, it controlled the headwaters of the Baniyas tributary. And since the 1982 invasion of Lebanon, Israeli forces controlled Hasbani tributary as well Israel also achieved substantial gains on the West Bank. The rich groundwater resources of that territory also fell within her jurisdiction.

The problem posed by the emergence of independent Palestine state is not of security, in terms of threat to existence, of the state of Israel, as often portrayed, but rather the problem lie in the barrier that an independent state would pose for expansion and access to natural resources, particularly water.

The disparity between the water allocations to Jewish and Arab settlements on the West Bank is enormous. The average aggregate per capita consumption for the Jewish settlements ranges between 90-120 cubic metres, where as for Arab settlements the consumption is only 25-35 cubic metres. The frequent attempt by Israeli forces to deprive Palestinians to procure groundwater from West Bank and making attempt to enpoison the water resource, has become bone of contention between them which can thwart the West Asia Peace Process in coming future.

No comprehensive agreement have been reached over an equitable allocation of the Jordan-Yarmouk waters, although water was vital and sometimes overriding factor in the peace process of the early 1990's particularly in the Declaration of Principles, of the Oslo Agreements of 1993. The October 1994, peace treaty between Israel and Jordan, which was only formalised after the last and most contentions issue-shared water-resources was agreed to, included an agreement for a Joint Water Committee to develop water resources, including two new dams—one each on the Yarmouk and the Jordan. Also, the creation of a Palestine Water Authority was an important aspect of the 1993 Declaration of Principles. But given the inherent hostility in the region, it is likely that water will remain a major source of conflict and instability for the foreseeable future.

If at some point in future, the "Greenline" becomes the border between Israel and a Palestinian state, two of the three groundwater basins in the West Bank would likely be considered international basins, as defined by international groundwater law, given that their water flows naturally across the border. This would obligate Israel and Palestine to negotiate a division of the subterranean sources based on the principle of equitable and reasonable use. Surely, individuals with technical expertise in West Asia and elsewhere will continue to offer an array of creative solutions for sharing the waters of the West Bank, as well as of the Jordan River basin. Needless to say, the implementation of

solutions will have to be preceded either by a final settlement on the question of Palestinian statehood, or by considerable progress in that direction. There seems little reason to believe that water issues could be resolved- although different scenarios certainly could be debated in the absence of atleast credible and tangible guarantees for the Palestinian people.

In the opinion of Aaron T. Wolf, the hydro politics of Jordan River basin is shifting from the conflict towards co-operation. The Big Powers including USA, UK and others, and as well as the various International bodies like UN, European Union etc. are keen to sort out the conflict on mutual agreements by compromised sharing of waters, which could be the minimum, requirements for the basic domestic consumptions and rational utilisation in the agricultural and industrial developments.

The advancement of science and various methods of conservation of water are under experiment in this region. The desalination project, inter-basin transfers, recycling of waste water, lining of canals, sprinkler and drip irrigations, hydroponics etc. are the measures and alternatives being adopted by the water deficient countries of the region. Nevertheless, the conjunctive methods and policies with appropriate technology has increased water supply, but still there is lag between demand and meagre supply. Even it has been assumed

that cost of cooperation between the riparian states will be very-very less than the cost of conflicts.

The issue of water has been always a factor in all the bilateral or multilateral negotiations in ongoing peace processes. Since, water was the motivating factors in peace-talk, initiative, so Multilateral Working Group on water has been set up to discuss relatively 'free dialogues' over water issues. The Declaration of Principles, between Israelis and Palestinians and the Treaty of Peace between Israel and Jordan in 1994 are two comprehensive agreements on water has been documented in written irrespective of its effective implementation.

The signing of the treaties, however, is far from the solution to the problems of water scarcity, water allocation and water management. The hydrostrategic position of Israel is, no doubt, very much strong after the geopolitical changes in 1960's. Hence, Israel has been more reluctant to come on the negotiating table for peace, and dispute settlements, deliberately, nor she will like to relinquish the control of Occupied Territories which possesses huge water resources. Though, Israeli-Jordan Peace Treaty obligates Israel to increase and regulate the water share of Jordan and West Bank, but she is in tough position against its compliance because of the fierce opposition from the domestic quarters. It is also cleared from the words of the Israeli Prime

Minister Mr. Benjamin Netanyahu in 1997, that "Israel can't relinquish territories of water resources".¹

Regarding, interim agreement between Israelis and Palestinians, in which a Joint Israeli-Palestinians Committee was set up to manage and regulate water affairs in the West Bank; both sides' hydrologists often meet regularly, formally and informally, progressing and leading to the first agreements. Presently, the West Bank and Gaza are served by Israel's water carrier, and more important, the groundwater, in the region's aquifers are tapped by wells. Although, some sort of autonomy is given to the Palestinians, but regulation of digging new wells and repairing old wells lies wholly at the descretion of the Israeli authorities. The dwellers of West Bank and Gaza are left at the mercy of Israelis with quarter share of water for domestic consumption. Thus, the strained water and huge population matrix is likely to be the destabilising factor in the peace process.

It has been repeatedly expressed by the experts that there is likelihood for future conflict over water. Few argue that couple of factors, viz.- growing water scarcity, increasing populations, rising standards of living, and higher consumption level, are stimulating the reason for water conflict. Many of the rivers and aquifers in the regions are shared and the lack of adequate treaties and international laws, added

¹. "Netanyahu on Golan Heights, Jerusalem", *World Focus*, p.23, 1997.

to the absence of adequate enforcement mechanisms, increases the likelihood of confrontation.

Other school argues for the co-operation rather than conflict over water sharing : for one thing, co-operation is cheaper than conflict. As Aaron Wolf (1995), put forward, “why go to war over water, when for the price of one week’s fighting you could build five desalination plants?” One can now, easily assess the cost effectiveness of peace process which is being rounded to US\$100 billions till date, and no solution or a ray of hope is seen in the region for peace.

There are a number of geopolitical forces and supranational agencies exerting pressures for peaceful co-operation on water allocation issues. The progressive peace between Israel and neighbours, and Turkey’s entrance into the European Union in post-cold war era, are instances of geopolitical manipulations. Throughout the years of hostilities in the West Asia, water issues has always been the subject of secret talks between the states of the region. This talks which may lead into peaceful negotiations may also be supplemented by the pragmatic co-operation over regional water planning and use of technology, a prelude to the political settlement.

"Precisely because it is essential to life and so highly charged, water can perhaps even tends to produce co-operation even in the absence of trust between concerned actors".²

With all its integrating potential, however, water cannot be considered as a separate and most significant issue. Israelis settlements on the West Bank and its occupation of the Golan Heights, radical groups within not only the Palestinian population and Israel, but also among the Kurds and other disadvantaged groups, economic pressures—these and many other pressures could produce bitter conflict that uses water either as a weapon or as an excuse for hostility. The current deadlock of the peace process in the wake of construction of Har Homa settlements in the east Jerusalem by the Israel, and the Palestinian suicide attack in Tel Aviv, came as surprise, in which water was the confrontational factor rather than co-operative and integrative one.

The crux of the matter is that, for the moment, Israel's hope for security and the Palestinian hope for autonomy appears to be incompatible. Much depends on the ability and capability of the regional leaders, who can control radical and conservative elements that want to exploit water issues.

². Frey Fredrick and Thomas Naff, "Water : An Emerging Issue in the Middle East?", *Annals of the American Association of Political Science*, vol. 431, 1985, p. 67.

It also include ability to obtain capital for the water resource development and management on peaceful co-existence basis, the ability to obtain food security, the ability to campaign and educate citizens on rational uses of water, develop an ethos of conservation and fix water tariffs on communitarian principle within democratic set-up, and lastly, the ability to promote co-operation and encourage the sharing of technology, data and research. One has to hope and ensure that the advantage of co-operation in the development of river basin and the rule of law will be seen to outweigh the costs of conflict.

Appendix – I

Table 1. Water balance of the Jordan River system

	Estimated flow (MCM/yr) ^a		Natural
	Observed		
North Jordan System			
Hasbani River (Lebanon)	125		125
Dan Spring (Israel)	250		250
Banias River (Golan Heights)	125		125
Local run-off (Upper Valley)	140		140
Irrigation-return flow (Huleh Valley)	-100		
<i>Subtotal to Lake Tiberius</i>	540		640
Lake Tiberius			
Spring flow (salty)	65		65
Precipitation	65		65
Local run-off	70		70
From Yarmuk	100		—
<i>Subtotal</i>	+840		840
Evaporation	-270		-270
To National Water Carrier	-500		
<i>Subtotal to Lower Stem of Jordan River (N. Jordan)</i>	+70		570
The Yarmuk River	(Al-Fataftah)	(Beaumont)	
	(Salameh)	(Gruen)	
Flow from Syria	+400 ^b	495 ^b	400
Syrian irrigation	-90	-250 ^c	
Syrian return flow	+20	+50(est.)	
To East Ghor Canal	-158 ^b	-150 ^b	
To Israel (via Tiberius)	-100 ^b	-80 ^b	
<i>Subtotal to Lower Stem of the Jordan River (Yarmuk)</i>	+72	+65	970
Lower stem of Jordan River			
Lower Jordan spring flow	+185		185
Zarqa River and Wadis	+322	+539	322
East Ghor return flow	+32		
Total	+611^d	+604^d	1,477

Source: Kolars (1992).

a. Million cubic metres in an average year; climatic variations can change the values by $\pm 30\%$.

b. Conflicting sources of data account for these variations.

c. Smaller values from the Johnston Plan; 1991 evidence indicates as many as 20 small diversionary dams have been built on the headwaters of the Yarmuk in Syria. Larger withdrawal values reflect such possible diversions.

d. Once in the main stream, this water is unusable owing to high salt concentrations.

TABLE 2 .
Per Capita Surface Water Availability in
the Jordan and Euphrates Basins, 1990³

	Total Water/year (bcm)	Population (millions)	Per Capita Water (cubic meters)
Iraq	91.20	17.0	5364
Israel	1.95	4.6	424
Jordan	0.77	3.3	233
Lebanon	4.80	2.7	1600
Syria	23.00	13.0	1769
Turkey	100.00	55.0	1818
West Bank/ Gaza	0.20	1.8	111

SOURCE : LOWI, M.R (1995)

Table 3. Population projections for countries around the Jordan River watershed: Populations and growth rates (without immigration)^a

Entity	1991 Population	Annual growth rate (%)	Extrapolated 2020 population
Israel	4,800,000	1.6	8,850,000
Jordan	3,600,000	3.5	9,760,000
West Bank	900,000	3.4	2,370,000
Gaza	600,000	3.4	1,580,000

Sources: World Resources Institute (1991); Bank of Israel (1991) (Soviet immigrants); Heller (1983) (West Bank Immigrants).

a. Immigration: Israel anticipates 1 million additional Soviet Jews over the next 10 years; Jordan is absorbing 300,000 refugees from the Gulf War; the West Bank might absorb 600,000 Palestinian refugees in the context of "right of return."

Table 4. Current water use and availability

	Water budget/Natural potential (MCM/yr)	Percentage to Agr/Dom/Ind ^a
Israel ^b	1800/1600	73/22/5
Jordan ^c	870/870	85/10/5
West Bank	115/115	78/22/-
Gaza ^d	95/60	85/15/-

Sources: World Resources Institute (1991); Israel: Naff and Matson (1984), State of Israel (1988); Jordan: Garber and Salameh (1992); West Bank and Gaza: Kahan (1987).

a. Water in the region is allocated between agriculture (Agr), domestic use (Dom), and industry (Ind), with by far the largest share going to the former.

b. Israeli natural potential of about 1600 MCM/yr is augmented through waste-water reuse, some desalination, and, until 1991, a 200 MCM annual groundwater overdraft.

c. Jordan's budget includes 170 MCM/yr of planned use of fossil (non-renewable) aquifers.

d. Gaza budget includes approximately 35 MCM/yr aquifer overdraft which is leading to serious problems of salt-water intrusion.

Table 5. Johnston negotiations, 1953–1955: water allocations to riparians of Jordan River system

Plan/Source ^a	Allocation (MCM/yr)				
	Lebanon	Syria	Jordan	Israel	Total
Main Plan	nil	45	774	394	1213
Arab Plan	35	132	698	182	1047
Cotton Plan	450.7	30	575	1290	2345.7
Unified (Johnston) Plan					
Hasbani	35				35
Banias		20			20
Jordan (main stream)		22	100	375 ^b	497 ^b
Yarmuk		90	377	25	492
Side wadis			243		243
Total Unified Plan	35	132	720	400^b	1287^b

Source: Naff and Matson (1984).

- a.* The Cotton Plan included the Litani as part of the Jordan River system. Different plans allocated different amounts in accordance with differing estimates of the resources of the system. One major variable in the reporting of the planned allocations is the amount of groundwater included in the estimates.
- b.* According to the compromise "Gardiner Formula," the share to Israel from the main stream of the Jordan was defined as the "residue" after the other co-riparians had received their shares. This would vary from year to year, but was expected to average 375 MCM.

Table 6. Recorded immigration and emigration, Palestine, 1930-1939

Year or period	Immigration			Emigration			Net immigration		
	Jews	Non-Jews	Total	Jews	Non-Jews	Total	Jews	Non-Jews	Total
1930	4,944	1,489	6,433	1,679	1,324	3,003	3,265	165	3,430
1931	4,075	1,458	5,533	666	680	1,346	3,409	778	4,187
1932	9,553	1,736	11,289	x ^a	x	x	9,553	1,736	11,289
1933	30,327	1,650	31,977	x	x	x	30,327	1,650	31,977
1934	42,359	1,784	44,143	x	x	x	42,359	1,784	44,143
1935	61,854	2,293	64,147	396	387	783	61,458	1,906	63,364
1936	29,727	1,944	31,671	773	405	1,178	28,954	1,539	30,493
1937	10,536	1,939	12,475	889	639	1,528	9,647	1,300	10,947
1938	12,868	2,395	15,263	1,095	716	1,811	11,773	1,679	13,452
1939	16,405	2,028	18,433	1,019	977	1,996	15,386	1,051	16,437
Total	222,648	18,716	241,364	6,517	5,128	11,645	216,131	13,588	229,719

Source: Esco Foundation (1947).

a. "x" indicates that emigration was not reported.

Table 7. Population of Palestine, 1922-1942^{a,b}

Year	Total	Moslems		Jews		Christians		Others	
		(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
1922 Census	752,048	589,177	78.34	83,790	11.14	71,464	9.50	7,617	1.01
1931 Census	1,033,314	759,700	73.52	174,606	16.90	88,907	8.60	10,101	0.98
1931 ^c	1,036,339	761,922	73.52	175,138	16.90	89,134	8.60	10,145	0.98
1932	1,073,827	778,803	72.52	192,137	17.90	92,520	8.61	10,367	0.97
1933	1,140,941	798,506	69.99	234,967	20.59	96,791	8.48	10,677	0.94
1934	1,210,554	814,379	67.27	282,975	23.38	102,407	8.46	10,793	0.89
1935	1,308,112	836,688	63.96	355,157	27.15	105,236	8.04	11,031	0.85
1936	1,366,692	862,730	63.13	384,078	28.10	108,506	7.94	11,378	0.83
1937	1,401,794	883,446	63.02	395,836	28.24	110,869	7.91	11,643	0.83
1938	1,435,285	900,250	62.72	411,222	28.65	111,974	7.80	11,839	0.83
1939	1,501,698	927,133	61.74	445,457	29.66	116,958	7.79	12,150	0.81
1940	1,544,530	947,846	61.37	463,535	30.01	120,587	7.81	12,562	0.81
1941	1,585,500	973,104	61.38	474,102	29.90	125,413	7.91	12,881	0.81
1942	1,620,005	995,292	61.44	484,408	29.90	127,184	7.85	13,121	0.81

Source: Esco Foundation (1947).

a. Exclusive of members of His Majesty's Forces (Great Britain).

b. Adapted from table, "Estimated Population of Palestine," *Statistical Abstract of Palestine 1943*, p. 2.

c. The figures for 1931 and following years are as of 31 December of each year.

Table 8. *Immigration of Jews into Israel, 1948-86 (in thousands)*

Year	Immigrants	Total population	Total Jewish population
1948	101.8	914.7	758.7
1949	239.4	1,173.9	1,013.9
1950	169.7	1,370.1	1,203.0
1951	174.0	1,577.8	1,404.4
1952	23.4	1,629.5	1,450.2
1953	10.4	1,669.4	1,483.6
1954	17.5	1,717.8	1,526.0
1955	36.3	1,789.1	1,590.5
1956	55.0	1,872.4	1,667.5
1957	71.1	1,976.0	1,762.7
1958	26.1	2,031.7	1,810.1
1959	23.0	2,088.7	1,858.8
1960	23.6	2,150.4	1,911.2
1961	46.7	2,233.6	1,985.5
1962	59.6	2,331.8	2,068.9
1963	62.2	2,430.1	2,155.5
1964	52.5	2,525.6	2,239.2
1965	28.8	2,598.4	2,299.1
1966	13.6	2,657.4	2,344.9
1967 ^a	12.3	2,776.3	2,383.6
1968 ^b	20.5	2,841.1	2,434.8
1969	37.8	2,922.0	2,500.0
1970	36.7	3,022.1	2,582.0
1973	54.8	3,338.2	2,845.0
1974	31.9	3,421.6	2,906.9
1975	20.0	3,493.2	2,959.4
1978	26.4	3,737.6	3,141.2
1979	37.2	3,836.2	3,218.4
1980	20.4	3,921.7	3,282.7
1981	12.6	3,977.9	3,320.3
1984	19.9	4,199.7	3,471.7
1985	10.6	4,266.2	3,517.2
1986	9.5	4,331.3	3,561.4

^a Following 1967 only those years in which there was a considerable increase or decrease in immigration appear in the table.

^b All years from 1968 onwards include the population of East Jerusalem.

Source: Blake, "Israel," p. 185; Orni and Efrat, *Geography of Israel*, p. 260; State of Israel, *Statistical Abstract*, 1987.

Table 9. Projected population and water demand, for different immigration scenarios, of entities dependent on the Jordan River watershed

Entity	Scenario ^a	Year	Population (millions)	Water needs (MCM/yr) ^b		Low/high water deficit (MCM/yr) ^c
				Low demand	High demand	
<i>Israel</i>	1 million immigrants	1991	4.80	1,800	1,800	200/200
		2000	6.44	2,000	2,000	400/400
		2020	8.85	2,200	2,200	600/600
	2 million immigrants	1991	4.80	1,800	1,800	200/200
		2000	7.46	2,100	2,100	500/500
		2020	10.01	2,400	2,400	800/800
<i>Jordan</i>	300,000 refugees	1991	3.60	870	980	0/110
		2000	4.91	960	1,100	90/230
		2020	9.76	1,300	1,600	430/730
<i>West Bank</i>	No immigration	1991	0.90	115	180	0/65
		2000	1.21	120	210	5/95
		2020	2.37	140	330	25/215
	600,000 immigrants	1991	0.90	115	180	0/65
		2000	1.61	125	250	10/135
		2020	3.67	170	460	55/345
<i>Gaza</i>		1991	0.60	95	140	35/80
		2000	0.81	100	160	40/100
		2020	1.58	120	240	60/180

a. Assumes 1 million immigrants to Israel by 1993 (as in fact, was the case), 2 million by 2000; Palestinian immigration is assumed to be between 1995 and 2005, all to the West Bank.

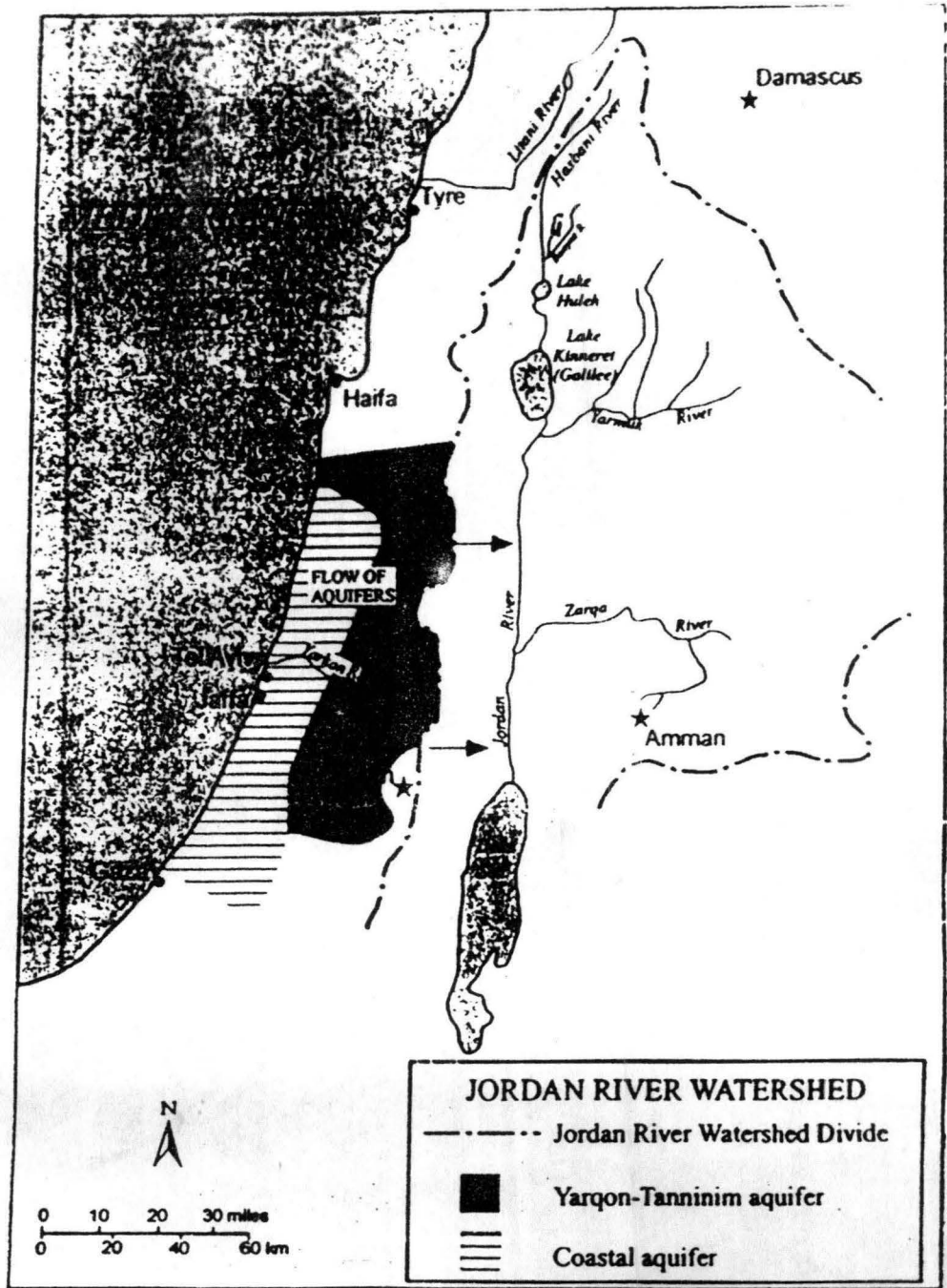
b. Projections assume constant demand for agriculture, growth to come through technology; low demand assumes urban use grows at current per capita usage; high demand allows 100 m³ per capita for urban use.

c. Projected deficit equals current annual natural potential minus projected demand.

SOURCES : LOWI, M.R. (1993)

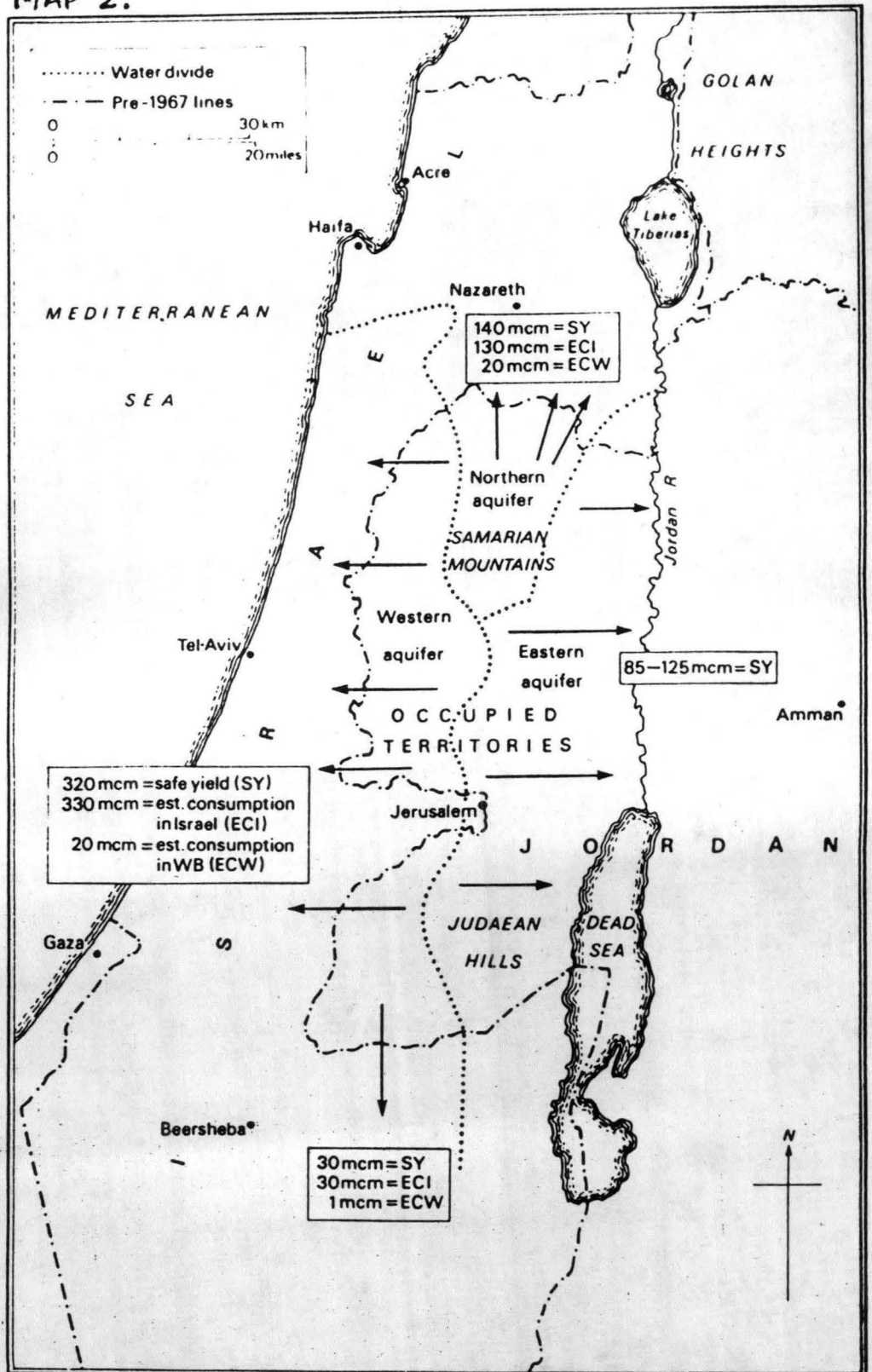
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Appendix – II



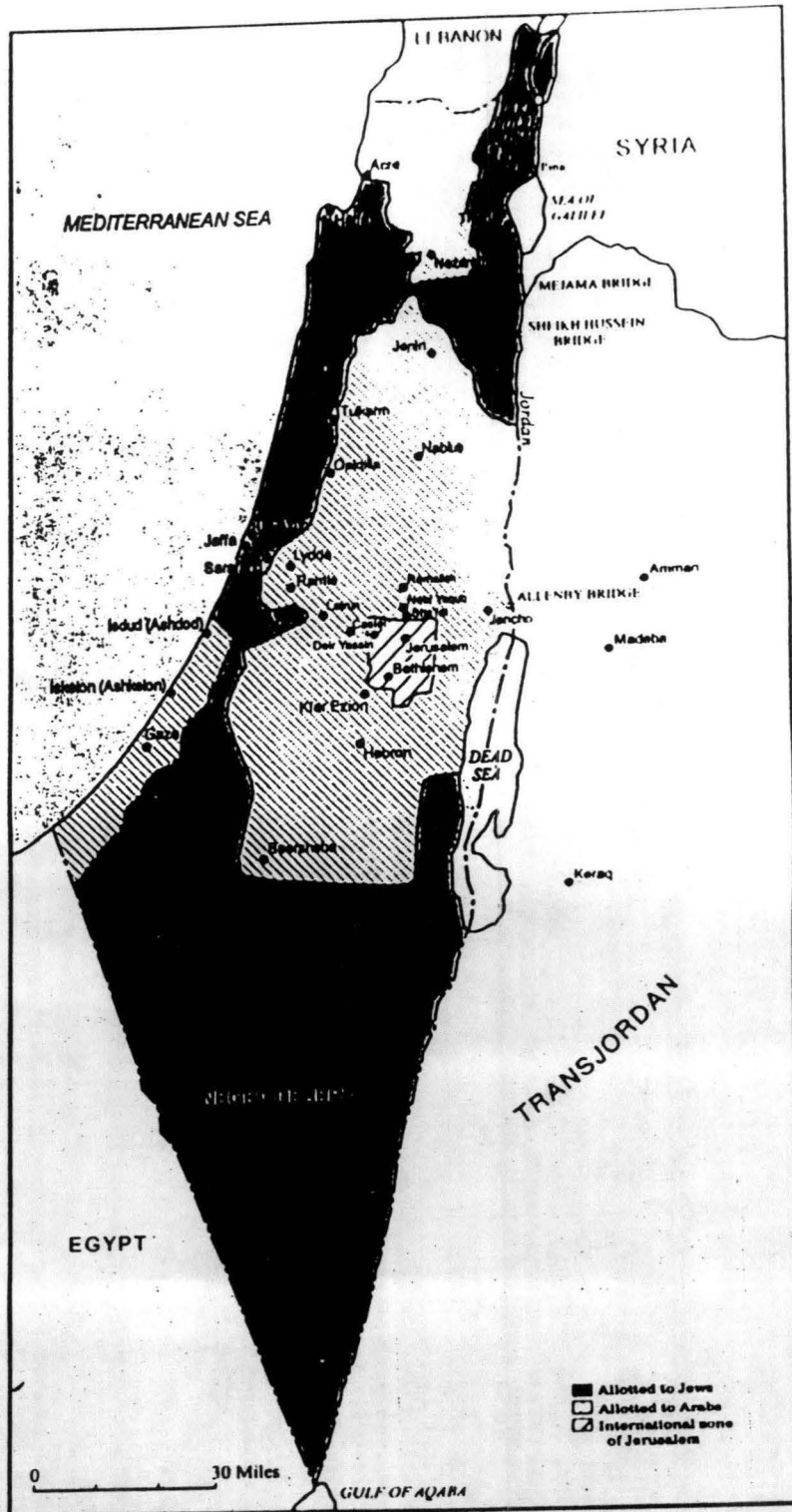
Map 1 Jordan River watershed
 SOURCE: WOLF A.T. (1995)

MAP 2.

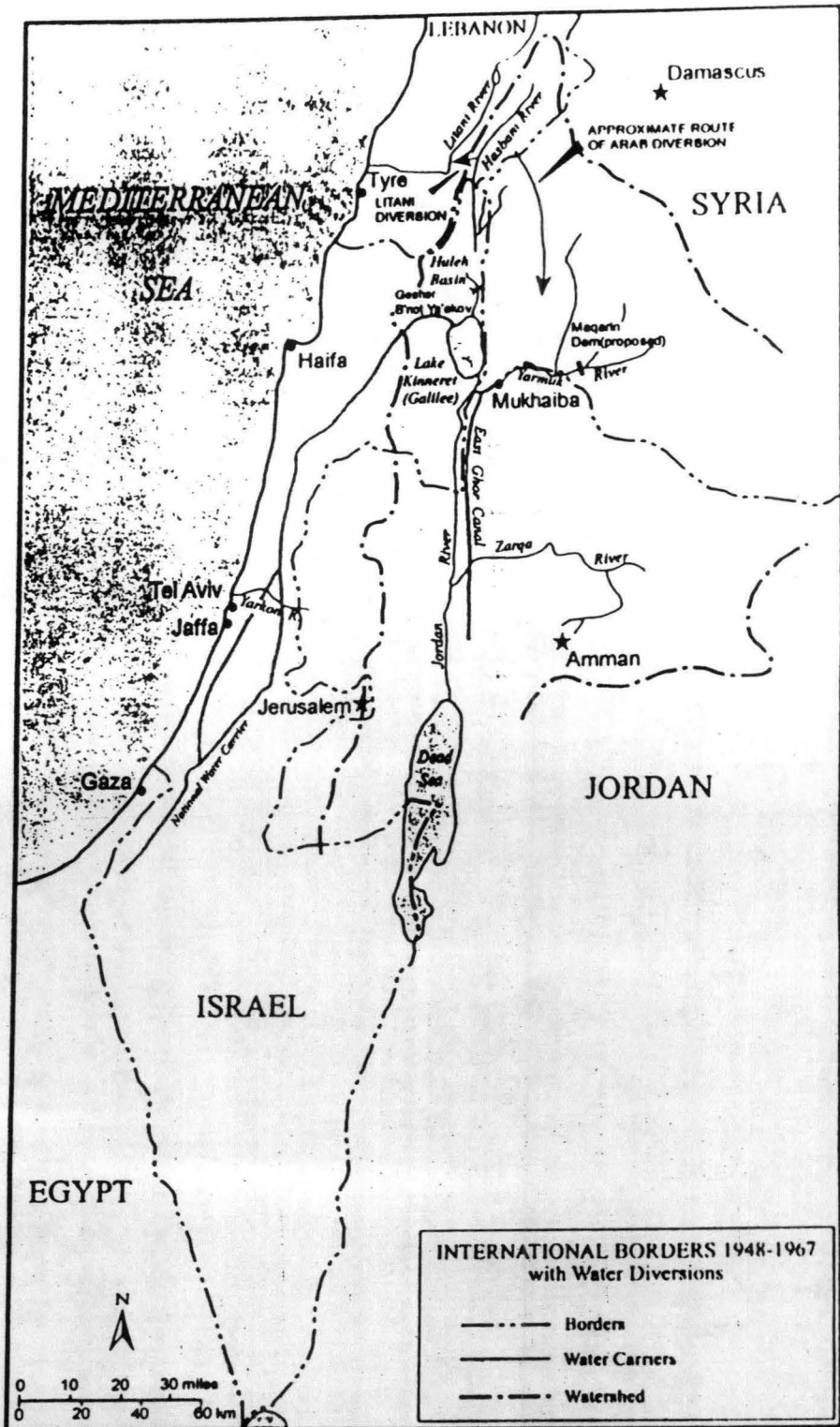


West Bank groundwater: quantities and direction of flow, 1984

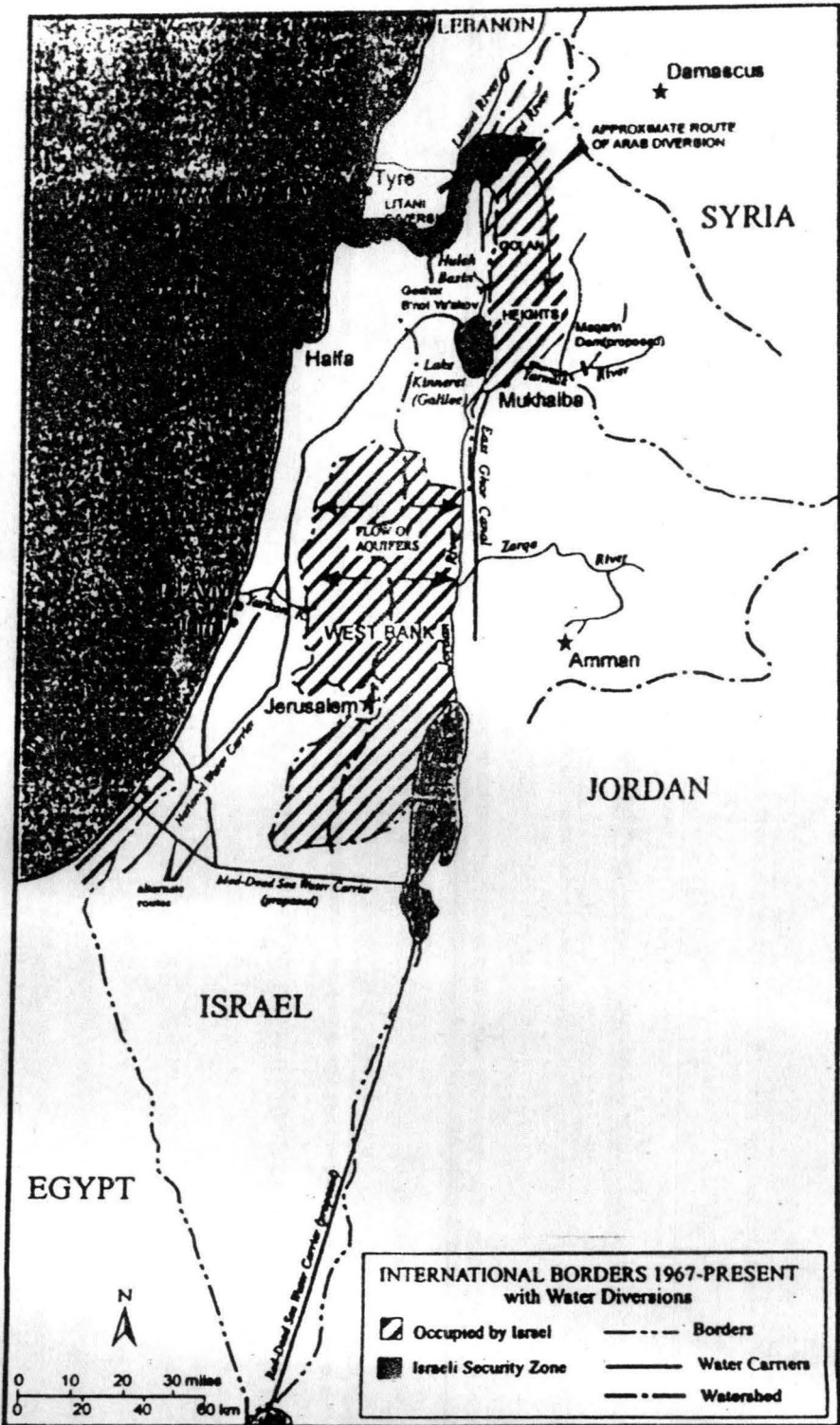
SOURCE: LOWI M.R. (1993)



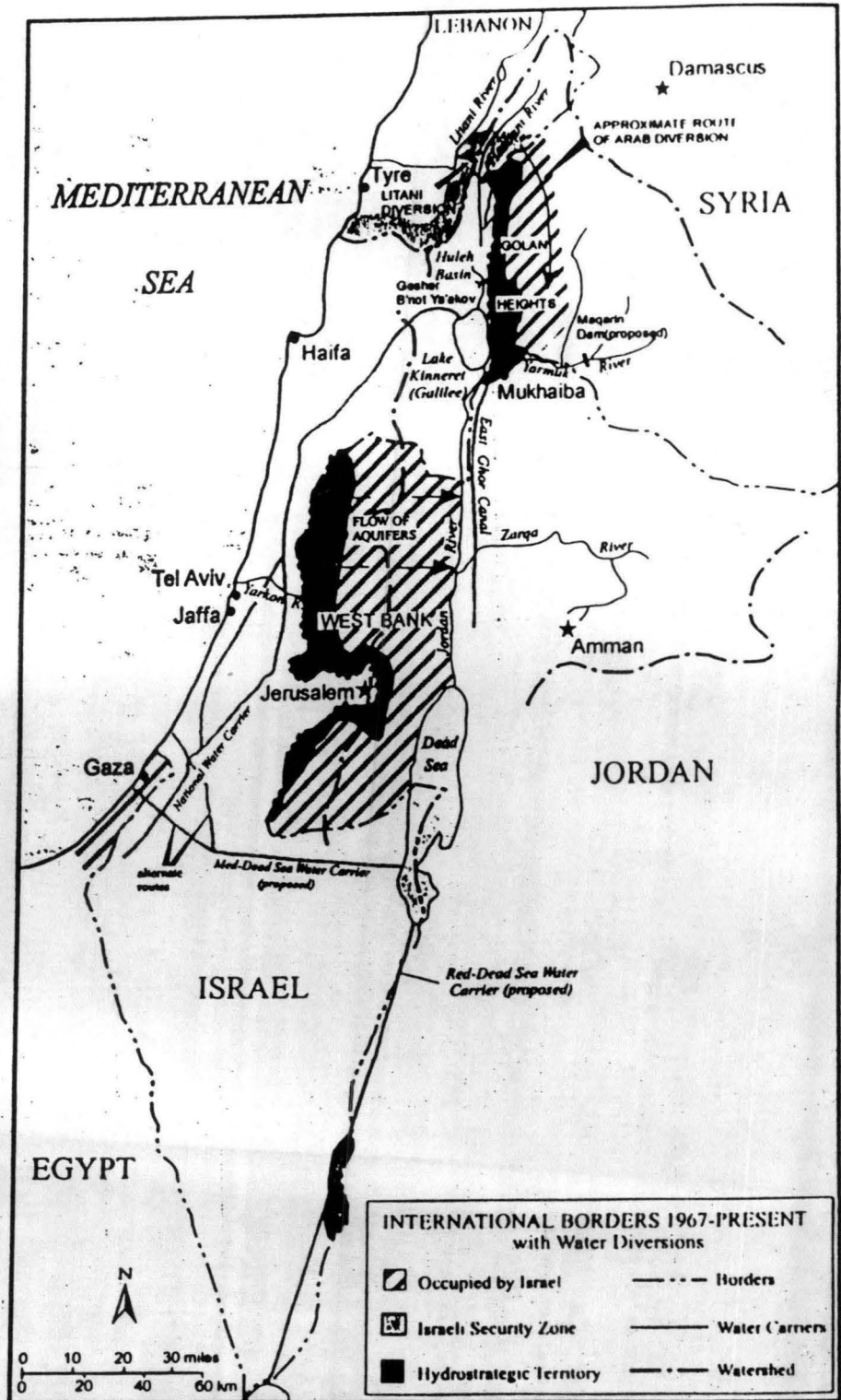
Map 3. United Nations plan for partition of Palestine, November 1947. Source: Sa-
 char (1979)



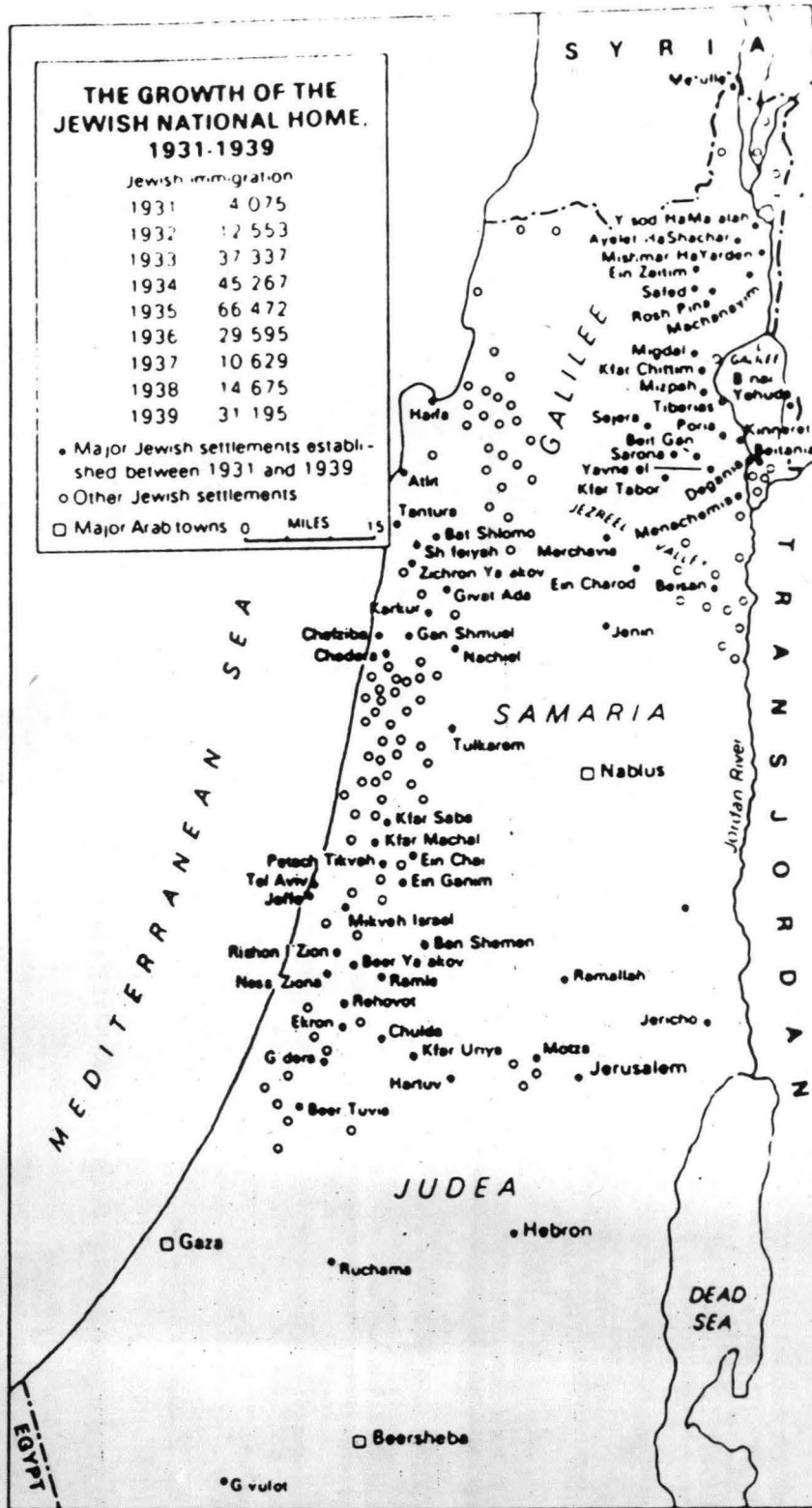
Map 4. International borders, 1948-1967, with water diversions
 SOURCE: WOLF (1995)



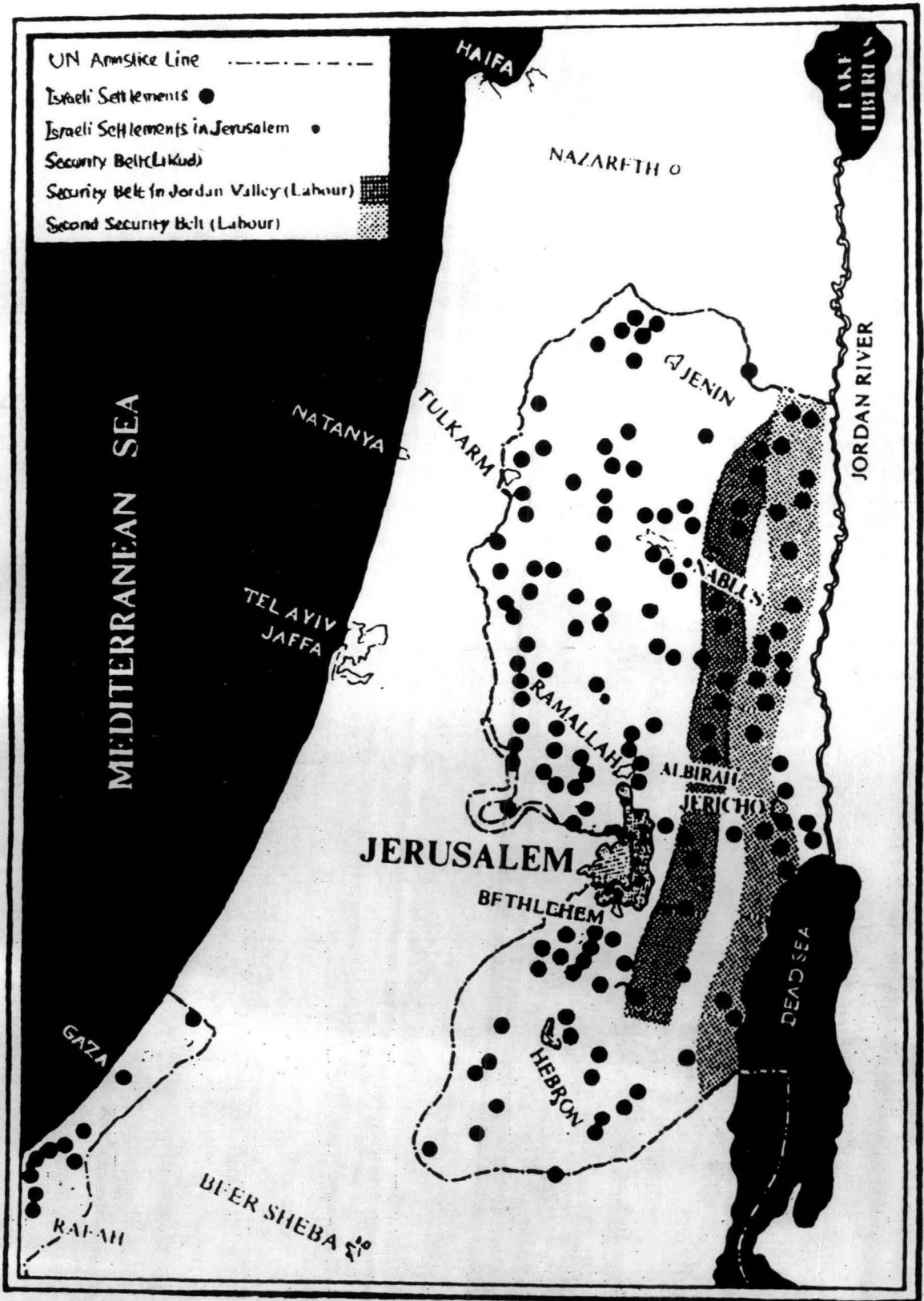
Map 5. International borders, 1967–Present, with water diversions
 SOURCE: WOLF (1995)



Map 6. Hydrostrategic territory
SOURCE: WOLF (1995)



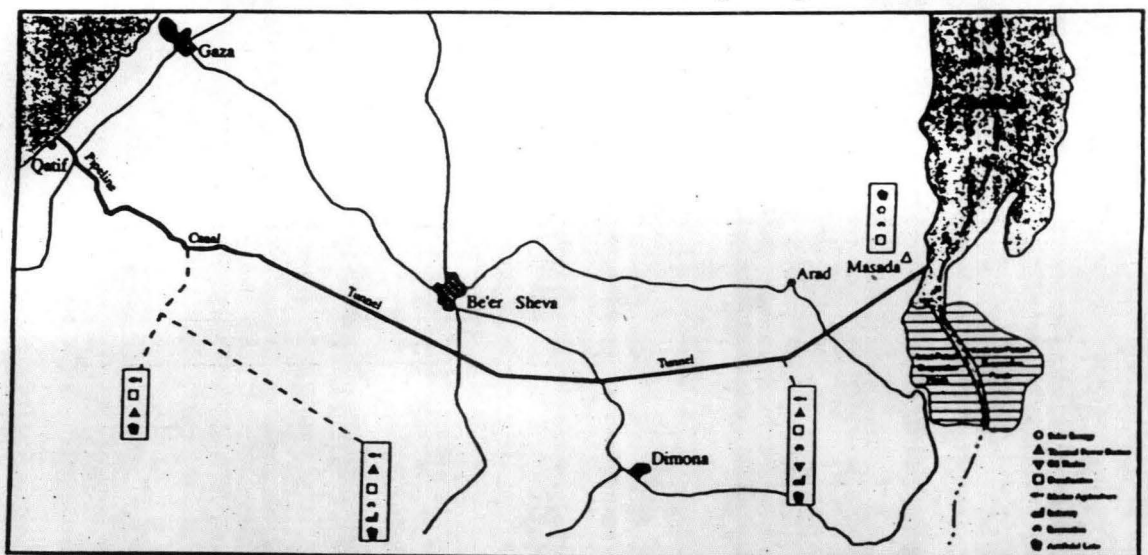
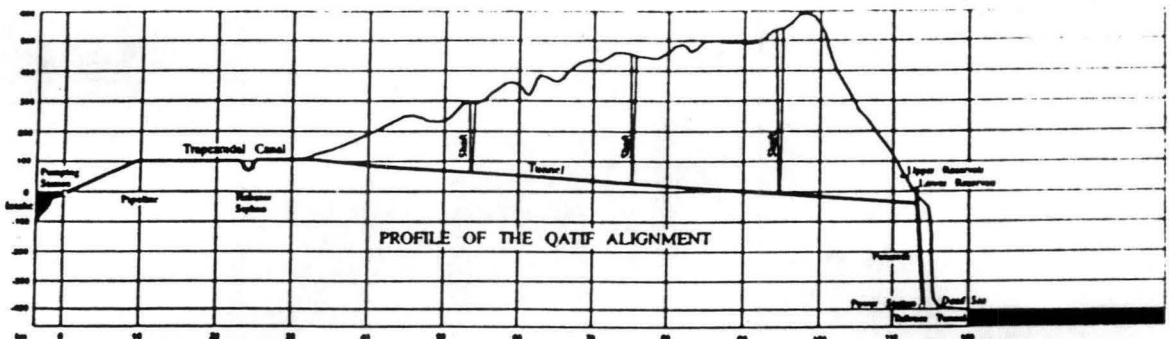
Map 7 Growth of the Jewish national home, 1931-1939. Jewish immigration: 1931, 4,075; 1932, 12,533; 1933, 37,337; 1934, 45,267; 1935, 66,472; 1936, 29,595; 1937, 10,629; 1938, 14,675; 1939, 31,195. Source: Sachar (1979)



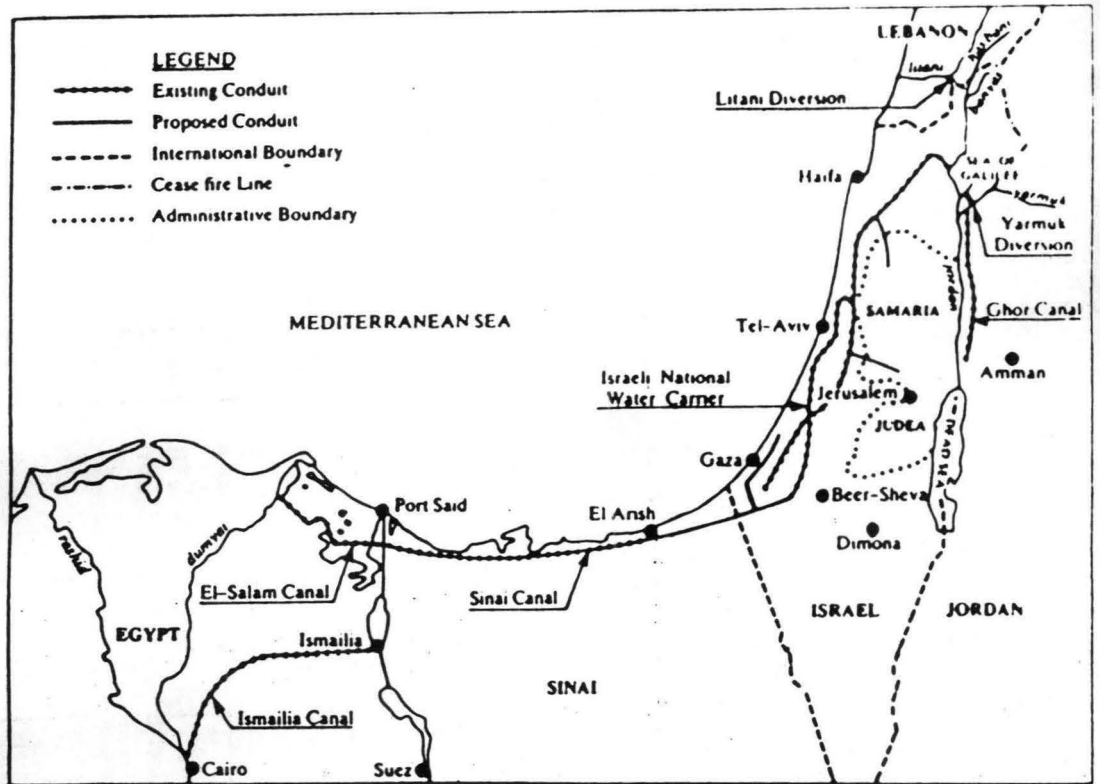
MAP 8.

ISRAELI SETTLEMENTS & SECURITY BELT
IN THE WEST BANK & GAZA STRIP

SOURCE : KHALID (1998)



Map 9. Med-Dead Canal. Source: Mediterranean-Dead Sea Co. (1983)



Appendix – III

THE ISRAEL MINISTRY OF AGRICULTURE

Presents:

ISRAEL-THE LAND AND ITS SIGNIFICANCE

THE QUESTION OF WATER-SOME DRY FACTS

Water is an extremely scarce resource in Israel. In fact, it is in many ways the limiting factor on the country's future development.

At present all the known sources of supply are being almost fully exploited and in some cases even dangerously overexploited.

The country's natural water supply originates from three major sources:

- The Jordan River catchment area
- Two major underground water-bearing geological structures called aquifers.

- The Mountain (or Yarkon-Taninim) Aquifer
- The Coastal Aquifer

The latter two sources constitute subterranean reservoirs, containing approximately 60 per cent of Israel's water supply. The waters they store are affected, directly and indirectly, by civilian and ecological activity in Judea and Samaria - as to both the quantity and the quality of the water.

The Physical Implications

- Excessive pumping or uncontrolled sewage and waste disposal in Judea and Samaria are liable to cause serious depletion, salinization and pollution of the aquifers. Relinquishing the western slopes of the Judean and Samaritan hills will create a situation in which the fate of the national water supply could be determined by the actions of whatever Arab authority controlled the evacuated areas after withdrawal.

- Any exploitation or pollution of the aquifers (particularly the Mountain Aquifer) by the Palestinian authorities would, by the principle of connecting vessels, have an immediate and significantly detrimental effect on the Israeli water supply. Given the present critical scarcity of water in Israel, even with all the

available sources of supply at her disposal, withdrawal and the relinquishing of control of a substantial portion of these sources could leave the country in a potentially desperate plight.

- It is important to note that the mortal dangers implicit in such a situation could arise, even without there being any malicious intent on the part of the Arabs. They could result with equal severity from simple municipal mismanagement, poor planning, lack of knowledge or plain neglect. However, whatever the reasons may be, Israel may easily find herself facing irreparable damage to the supply of one of her most vital strategic sources - a situation which would, in a most tangible way, endanger her continued existence.

The Political Implications

- ★ The crucial issue to be considered in any political solution regarding the future of Judea and Samaria is the question of who will have final authority in resolving issues in dispute. This is especially acute in the case of water resources, as any proposed Palestinian political entity, whether sovereign or autonomous, would have no water resources at all, other than those upon which Israel is so critically dependent for her day-to-day survival.
- ★ This intense interdependence and the scarcity of water supplies accentuate even more the severity of the problem of authority. For under such conditions, even if some sincere and trustworthy Palestinian party could be found with whom an agreement could be made, the problems of allocating such a vital and scarce shared resource would make disputes almost inevitable.
- ★ Who would have the final say as to where drilling sites were to be located? How much water is to be pumped from them without irreparably damaging the aquifers? Where potentially polluting industries should or should not be established within the evacuated areas? In cases of disagreement, whose will is to be imposed on whom? How could Israel secure its vital interests without imposing impossible restrictions on the Palestinians' freedom to resolve their own domestic issues? Conversely, how could the Palestinians be given freedom to safeguard their legitimate domestic issues, without gravely endangering Israel's vital interests?
- ★ Moreover, even if all disputes were resolved, however unlikely such a possibility may be, and some fragile compromise were to be

reached, Israel's future would be completely dependent upon the honoring of that compromise agreement not only by the Palestinian party who signed it, but also by any successor who may come to power in the future. Clearly, the many extreme and militant elements, who undoubtedly oppose any agreement with Israel, together with the enormous socio-economic difficulties that any Palestinian administration would face, make very likely the overthrow of the original Palestinian regime and its replacement by some other regime, far more hostile to Israel. Such a successor regime would, of course, be highly unlikely to honor the compromise so vital to Israel's continued existence, especially as it would constitute the very justification for the overthrow of its predecessor!!!

- ★ Finally, relinquishing control over Judea and Samaria will leave Israel without any legal, moral or practical means to prevent the repatriation of almost a million Palestinians resident in refugee camps in surrounding Arab countries, whether by their own free will or by forcible "transfer" by their reluctant Arab "hosts." Such a wave of poverty-stricken humanity would generate an impossible strain on the already over-extended water supply and inadequate sewerage system, endangering even further Israel's vulnerable and fragile source of life.
- ★ It is difficult to conceive of any political solution consistent with Israel's survival that does not involve complete, continued Israeli control of the water and sewerage systems, and of the associated infrastructure, including the power supply and road network, essential to their operation, maintenance and accessibility.

This is an important point to ponder for those advocates of Israeli concessions who believe the Jews should have a viable independent state in their ancient homeland. It is important to realize that the claim to continued Israeli control over Judea and Samaria is not based on extremist fanaticism or religious mysticism but on a rational, healthy and reasonable survival instinct.



לשכת שר החקלאות

The criticism levelled at the publication of the advertisement dealing with the country's water problem focuses on two major allegations:

1. The subject matter was not within the scope of the Ministry's activities
2. The advertisement constituted party-biased election propaganda

Both allegations are totally groundless.

1. The Nature of the Subject Matter

- a) The national water system in its entirety (including Tahal - National Water Planning, Mekorot - National Water Supplier, and the Water Commissioner) are all subordinated to the Ministry of Agriculture. Therefore the Ministry has a duty to warn the public of imminent dangers to the national water system whether the origin of these dangers be ecological processes or possible policy decisions.
- b) This duty continues to exist even if in the past the Minister's own party happened to point to these dangers whilst it was in opposition. Moreover it continues to exist even if it is difficult to reconcile the hydrological facts with ideological opinions of parties holding views opposed to those of the Minister's party.
- c) The allegation that the question of authority and control over the water sources in Judea and Samaria is of no concern to the Ministry of Agriculture is totally without foundation. For example the former (Labour Party) Minister of Agriculture Katz-Oz related to precisely this issue in the very same spirit as expressed in the advertisement.

In a letter dated 14/5/89/ to Premier Shamir titled "The Security of the State of Israel's Water Today and in the Future" Katz-Oz proposed that the government "prepare a legal and political basis to insure continued Israeli control and administration of the water sources in Judea and Samaria, whatever the political situation in the future."

- d) Just how vital the issue of control of the water sources in Judea and Samaria is for the activities of the Ministry of Agriculture is reflected in the following excerpt from the Water Commissioners report to the Israeli Government. The report entitled "Political Arrangements in Judea, Samaria and Gaza, and their Influence on the Security of the Water of the State of Israel" (May 89) states:

The water sources of Judea and Samaria are intimately interconnected with the principal water sources of Israel ... the quantities reaching Israel are exploited entirely as high quality groundwater, and constitute approximately half of the country's supply of drinking water.... It is physically possible to increase the rate of pumping in



לשכת שר החקלאות

service but a moral responsibility. The concealment or playing down of these facts (quite probably for political reasons) constitutes a grave dereliction of duty by those formerly charged with the fate of nation's water system.

Clearly one cannot negate the right of a Minister to make public the covert policy of his predecessor simply because this policy is in line with the Minister's publicly stated views on the subject prior to his taking office.

2. The advertisement constituted party-biased election propaganda

This allegation is extremely difficult to comprehend since:

- a) There is no reference at all, neither explicit nor implicit, to any political party whatsoever, much less any call to solicit votes for any specific party.
- b) There are several parties, both in the coalition and the opposition, which could enlist the contents of the advertisement to support their political views.
- c) The contents of the advertisement deal overtly with policy issues previously handled covertly by a Minister of Agriculture from the Labour party, whose declared political platform is very different from that of the present Minister's party.
- d) It would be absurd to prevent a ministry from elaborating aspects of its policy, and its rationale, on the grounds that incumbent minister had, prior to taking office, voiced his opinion on matters for which the ministry has responsibility.
- e) The sensitivity of the national water system to whatever happens to the water sources in Judea and Samaria is an indisputable (and undisputed) hydrological fact. Therefore, the importance of control of the water sources in these areas is an inevitable corollary of this sensitivity. Illumination and articulation of these facts, and their implications, can in no way be considered political propaganda.

If there is any political aspect to the advertisement, it is in no way related to party partisan vote soliciting, but rather to the creation of public understanding concerning future initiatives of the Ministry in an area of its responsibility, initiatives which it considers essential in preventing the water issue in Israel from being transformed from an extremely grave problem into an insoluble one.

Consequently the Ministry of Agriculture is of the opinion the matter of the control and administration of the water sources in Judea and Samaria as one of vital importance to the existence of the State of Israel in general.



לשכת שר החקלאות

Judea and Samaria in the North and West regions to such a degree so as to cause the halt of pumping operations inside Israel... An additional danger to the groundwater in Judea and Samaria arises from sewerage and other sources of pollution which will contaminate the water in the western regions..."ppi-2.

e) These facts have immediate impact on agricultural policy and its planning. In a publication: "A Proposed Rehabilitation and Development Program for Agriculture" by the Ministry's Council for Planning and Development of Agriculture and Rural Settlements, and the Jewish Agency, it is stated, under the heading "The Water System - Aims and Development Program" as follow :

The principles formulated for the water system are:

1. Preservation of the various water sources, both as regards quality and quantity, and the prevention of over-exploitation.
2. Ensuring the supply of drinking water to the population in the quantity and quality required.

f) Clearly, from the report of the Water Commissioner (d) above) it is impossible to preserve, ensure water supplies or prevent over-exploitation of the system, if one does not have complete control over the water sources in Judea and Samaria (because of the principle of connecting vessels - see (i) below).

(g) The former Minister of Agriculture was aware of this fact and suggested together with his aforementioned proposal to ensure continued Israeli control over the water sources in Judea and Samaria (c) above) that Israel "prevent any increase of the pumping operation in Judea, Samaria and Gaza.

h) How serious an influence the loss of control of the water sources would be, has been stressed by members of the academic community. In a memorandum to the Minister of Agriculture titled "The Water System - Its Condition and Cure" Prof. Szlavski of the Faculty of Agricultural Engineering of the Haifa Technion writes:

"The mountain water sources are controlled mainly by Arab settlements, a significant portion of which are over the Green Line. The past wars over water are liable to be a pale shadow of future wars over water..."

In the Globes daily (22.8.) the professor asserts:

"There is no doubt that the two populations, that inhabiting the mountains ridges (of Judea and Samaria) and that inhabiting the coast are supplied from the same water source. Those charged with the



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responsibility for the water system and its planning must take account of this fact... The concern is not only about unrestrained exploitation by those inhabiting the mountains. There is also a problem of the pollution of the water. The population of Judea and Samaria have no central sewerage system or sewerage treatment. There is no doubt that this sewerage contaminates the source of water used by us.

- (i) Support for this position is voiced by Matti Hagai of Tel Aviv University in this thesis: "Water Management in Israel: Views on National Planning". He writes:

Anyone who controls the water sources of Judea and Samaria can dry out, if he so wishes, wells in the coastal plain, Harod Valley and Bet She'an valley, by the principle of connecting vessels

- (j) In somewhat more severe tones the (left-wing) Ha'aretz newspaper warns:

Anyone who controls the water source of the West Bank can, quite simply dry out the coastal plain in Israel. Control of the two major aquifers, drilling of deep bore-holes and subsequent intensive pumping in Western Samaria and in the Jenin and Tubas area are liable to leave the Jewish farmers of the Sharon without irrigation water, and the fields of the Jezre'el Valley devastated.

from "Water - The Bone of Contention" Reuven Pedazur 25.4.89.

Clearly the prospect of Jewish farmers in the Sharon being left without irrigation water and devastated fields in the Jezre'el Valley are matters of very real and legitimate concern to the Ministry of Agriculture and one which it should address openly. When the Minister charged with the responsibility for both the national water system and the nation's agriculture sees potential dangers arising from possible future policy decisions, who if not that Minister should alert the public?

- k) It is true that the advertisement analyzes implications and dangers involved in future political arrangements, but only in so far as they impinge on the question of water. However this is no more than an elaboration and explanation justifying former Minister Katz-Oz's claim to "prepare a legal and political basis to insure continued Israeli control and administration of the water source in Judea and Samaria whatever the political situation in the future."

From the above it is quite clear that the subject matter of the advertisement - i.e. the control of the water sources in Judea and Samaria - was, and still is, one of the vital issues in the Ministry's field of activity. Bringing vitally important but little known facts, and their implications to the knowledge of the public is not only a real public



לשכת סדר החקלאות

and its agriculture in particular.

Exposing these facts and their implication to the public even by unconventional means is both a public service and a public duty.

BIBLIOGRAPHY

PRIMARY SOURCES

Government Documents

Arab League of States, Report (Cairo : Arab League of States, 1993).

State of Israel, *Hydrological Year- Book of Israel : 1986- 1988*,
(Jerusalem : State of Israel, Ministry of Agriculture, 1990)

Israel State Archives, *Documents on the Foreign Policy of Israel*
(Jerusalem : State of Israel, 1981)

United Nations Documents and Publications :

FAO Legislative Study, *Preparing National Regulation for Water Resources Management : Principles and Practice* (Rome, 1994)

Global Environment Facility, *GEF Operational Strategy* (Washington, D.C., 1996a)

General Assembly Sixth Committee, *Working Group of the Whole for the Elaboration of a Convention on the Law of the Non-Navigational Uses of International Water Courses Report of the Drafting Committee*, A/C.6./51/NUW / WG / L.1 / Add. 1, 1996 c. (New York : United Nations, 1996).

General Assembly Records, *Report of the International Law Commission in the Work of its forty-sixth Session*, A / 49 / 10, 1994 (New York : United Nations, 1994).

UN Department of Technical Co-operation for Development, *Treaties Concerning the Utilization of International Water Courses for other Purposes than Navigation, Natural Resources / Water Series*, No. 13, (New York : United Nations, 1984).

Israel's Policy on the West Bank Water Resources, prepared for the Committee on the Exercise of the Inalienable Rights of the Palestinian People. (New York : United Nations, 1980).

The United Nations and the Question of Palestine (New York : United Nations Department of Public Information, 1994).

World Bank Documents

Jordan Water Resource Sector Study (Washington, D.C. : The World Bank, 1988).

World Development Report, 1992 : Development and the Environment, (New York : Oxford University Report, 1992)

Water Resources Management : A Policy Paper (Washington, D.C. : The World Bank, 1993).

SECONDARY SOURCES

Books

Abate, Z., "The Integrated Development of Nile Basin Waters", in P.P. Howell and J. A. Allan (Eds.), *The Nile : Sharing a Scarce Resource* (Cambridge : Cambridge University Press, 1994).

Allan, J. A. and Appelgren, B., *A Management Approach to National Water Scarcity : Water Policy* (Cranfield : Cranfield University Press, 1991).

Allan, J. A., "Striving the Right Price for Water?", in J. A. Allan and C. Mallet (Eds.), *Water in the Middle East : Legal, Political and Commercial Implications* (London : Tauris Academic Studies, 1995).

Allan, J. A., *Water, Peace and the Middle East : Negotiating Resources in the Jordan Basin* (London : Tauris Academic Studies, 1996).

Allan, J. A., *Priorities for Water Resources Allocation and Management* (London : Office of Development Assistance, 1993).

Arian, Asher, *Politics in Israel : The Second Generation* (New Jersey : Chatham House Publishers Inc., 1985).

Aron, Raymond, trans. Richard Howard and Anette Baker Fox, *Peace and War : A Theory of International Relations* (New York : Double Day & Co., 1966).

- Axelrod, Rober, *The Evolution of Co-operation* (New York : Basic Books, 1984).
- Bakour, Yahia, "Planning and Management of Water Resources in Syria", in Le Moigne, G.S. Bergouti, G. Feder, L. Garbus and M. Xie, (Eds.), *Country Experiences with water Resources Management : Economic, Technical and Environmental Issues*. World Bank Technical Paper No. 175, (Washington, D.C., The World Bank, 1992).
- Bakour, Yahia, *Planning and Management of Water Resources in Syria* (Damascus : The League of Arab States, AOAD, 1991).
- Beaumont, P., Gerald, H. B., and J. Malcolm Wagstaff, *The Middle East-A Geographical Study* (New York : Halsted Press, 1988).
- Berber, F. J., *Rivers in International Law* (London : Stevens Press, 1959).
- Beschorner, Natasha, *Water and Instability in the Middle East*, ADELPHI Paper No. 273 (London : Brassey's 1992).
- Bingham, G. Wolf and Wohlegenat T., *Resolving Water Disputes : Conflict and Co-operation in the United States, the Near East and Asia* (Washington, D.C., US Agency for International Development, 1994).
- Biswas, Asit (Ed.), *International Waters of the Middle East from Euphrates- Tigris to Nile* (Bombay : India Oxford University Press, 1994)
- Blake, G. H., "Israel : Immigration and Dispersal of Population" in J. I. Clarke and W. B. Fisher (Eds.), *Populations of the Middle East and North Africa : A Geographical Approach* (London : University of London Press, 1972).
- Bos, E., My T. Vu, A. Levin, and R. A. Bulatao, *World Population Projections 1992-93 Edition*, A World Bank Publication, (Baltimore : The John Hopkins University Press, 1992).
- Brawer, Moshe, "The Geographical Background of the Jordan Water Dispute" in Charles A. Fisher (Ed.), *Essays in Political Geography* (London : Methuen & Co. Ltd., 1968).

- Cole, John, *Geography of the World's Major Regions* (London : Routledge, 1996).
- Cooley, John, *Green March, Black September : The Story of the Palestinian Arabs*, (London : Frank Cass, 1973).
- Duna, Cem, "Turkey's Peace Pipeline" in Joyce Starr and Daniel Stoll (Eds.), *The Politics of Scarcity : Water in the Middle East* (Boulder : Westview Press, 1988).
- Esco Foundation, *Palestine : A Study of Jewish, Arab, and British Policies*, (New Haven : Yale University Press, 1947).
- Farid, M. A. and Sirriyeh, H. (Eds.), *Israel & Arab Water* (London : The Arab Research Centre, 1985).
- Fisher, F., *An Economic Framework for Water Negotiation and Management* (Cambridge : Institute for Social and Economic Policy in Middle East, Harvard University, 1994).
- Fisher, W. B., *The Middle East : A Physical, Social, and Regional Geography* (London : Methuen & Co., 1978).
- Fraser, T. G., *The Arab-Israeli Conflict* (London : Macmillan Press Ltd., 1995).
- Frederiksen, H., *et. al.*, *Water Resources Management in Asia* (Washington, D.C. : World Bank, 1993).
- Galnoor, Itzhak, "Water Planning : Who Gets the Last Drop?", in Raphaella Bilski, Itzak Galnoor, Dan Inbar, Yohanan Manor, and Gabriel Sheffer (Eds.), *Can Planning Replace Politics : The Israeli Experience* (The Hague : Martinus Nijhoff Publishers, 1980).
- Gischler, Christian, E., *Water Resources in the Arab Middle East and North Africa* (Cambridge : Middle Eastern and North African Studies Press Ltd., 1979).
- Glassner, Martin, (Ed.), *Global Resources : Challenges of Interdependence* (New York : Praeger, 1983).
- Gleick, P. H. (Ed.), *Water in Crisis* (New York : Oxford University Press, 1993).

- Goleman, D., *Vital Lies, Simple Truths* (London : Bloomsbury, 1997).
- Heller, Mark, *A Palestine State : The Implications for Israel* (Cambridge : Harvard University Press, 1983).
- Hillel, Daniel, *Rivers of Eden : The Struggle for Water and the Quest for Peace in the Middle East* (New York : Oxford University Press, 1994).
- Hillel, Daniel, *The Negev : Land Water and Life in a Desert Environment* (London : Praeger, 1982).
- Hof, Frederic, *Galilee Divided : The Israel-Lebanon Frontier, 1916-1984* (Boulder : Westview Press, 1985).
- Howe, C., and K. Easter, *Interbasin Transfers of Water : Economic Issues and Impact* (Baltimore : John Hopkins University Press, 1971).
- Human Development Report, Published for the UNDP (London : Oxford University Press, 1992).
- Kahan, David, *Agriculture and Water in the West Bank and Gaza* (Jerusalem : The West Bank Data Base Project, 1983)
- Kalley, Elisha and Abraham Tal, "A Middle East Water Plan Under Peace", In Meir Mehav (Ed.), *Economic Co-operation and Middle East Peace* (London : Weidenfield and Nicolson, 1989).
- Kerr, Malcolm, *The Arab Cold War (1957-1967)* (New York : Oxford University Press, 1967).
- Kliot, Nurit, *Water Resources and Conflict in the Middle East* (London : Routledge, 1994).
- Lemarquand, D., *International Rivers and the Politics of Co-operation* (Vancouver : Westwater Research Centre, University of Columbia, 1977).
- Lonergan, S. C. and Brooks. D. B., *Watershed : The Role of Freshwater in Israeli-Palestinian Conflict* (Ottawa : International Development Research Centre, 1994).
- Lowi, M. and Rothman, J., "Arabs and Israelis : The Jordan River" in Guy Olivier Faure and Jafferey Z. Rubin (Eds.), *Culture and*

- Negotiation : The Resolution of Water Disputes* (California : Sage Publications, 1993).
- Lowi, M., "Conflict and Co-operation in Resource Development", in Elise Boulding (Ed.), *Building Peace in the Middel East : Challenges for States and for Civil Society* (Boulder : Lynne Rienner Publishers, 1994).
- Lowi, M., *The Politics of Water : The Jordan River and the Riparian States* (Montreal : McGill Studies in International Development, 1985).
- Lowi, M., *Water and Power : The Politics of a Scarce Resource in the Jordan River Basin* (Cambridge : Cambridge University Press, 1993)
- Mazur, Michael, P., "Economic Development of Jordan" in Charles A. Cooper and Sidney S. Alexander (Eds.), *Economic Development and Population Growth in the Middle East* (New York : American Elsevier Publishing Co. Inc., 1972)
- Mc Caffrey, S., "The 1997 UN Convention of the Non-Navigational uses of International Water Courses", at the *Second International Conference on Water : Legal and Regulatory Issues* (Dundee : CEPMLP, Dundee University, 1997).
- Mc Carthy, Justin, *The Population of Palestine* (New York : Columbia University Press, 1990).
- Mitraney, David, *The Functional Theory of Politics* (New York : St. Martin's Press, 1975).
- Murakami, Masahiro, *Managing Water for Peace in the Middle East : Alternative Strategies* (Tokyo : United Nations University Press, 1995).
- Naff, Thomas and Matson (Eds.), *Water in the Middle East : Conflict or Co-operation* (Boulder : Westview Press, 1984).
- Orni, Efraim and Efrat, Elisha, *Geography of Israel* (Jerusalem : Israel University Press, 1971).

- Postel, S., *Dividing the Waters : Food Security, Ecosystem, Health and the new Politics of Scarcity* (Washington, D.C. : Worldwatch Institute, 1996).
- Postel, S., *The Last Oasis : Facing Water Scarcity* (New York : Norton, 1992).
- Richardson, John, *The West Bank : A Portrait* (Washington : The Middle East Institute, 1984).
- Rogers, Peter and Lydon, Peter (Eds.), *Water in the Arab World : Perspectives and Prognoses* (Cambridge, Mass. : Harvard University Press, 1994).
- Rothman, Jay and Lowi, M., "Culture, Conflict and Co-operation : The Jordan River Basin", in Gershon Baskin (Ed.), *Water : Conflict or Co-operation* (Jerusalem : Israel / Palestine Centre for Research and Information, 1992).
- Schmida, Leslie, *Keys to Control : Israel's Pursuit of Arab Water Resources* (American Educational Trust, 1983).
- Sehachter, D., *Sharing the World's Resources* (New York : Columbia University Press, 1977).
- Shapland, Greg, *Policy Options for Downstream States* (London : School of Oriental and African Studies, 1992).
- Shiklamanov, I. A., "Large-scale Water Transfer", in Rodda, J. (Ed.), *Facets of Hydrology* (London : Johnwiley, 1985).
- Shuval, Hillel (Ed.), *Water Quality Management Under Conditions of Scarcity* (New York : Academic Press, 1980).
- Starr, J. and Daniel, S. (Eds.), *The Politics of Scarcity : Water in the Middle East* (Boulder : Westview Press, 1988)
- Teclaff, Ludwik, A., *The River Basin in History and Law* (The Hague : Martinus Nijhoff, 1967).
- Tujil, W. V., *Improving Water Use in Agriculture : Experiences in the Middle East and North Africa* (Washington, D.C. : The World Bank, 1993).

Utton, Albert, E. and Ludwik, T. (Eds.), *Transboundary Resource Law* (Boulder : Westview Press, 1987).

Vatikiotis, P. J., *Politics and the Military in Jordan* (London : Frank Cass & Co. Ltd., 1967).

Watubury, John, *Hydropolitics of the Nile Valley* (New York : Syracuse University Press, 1979).

Wolf, Aaron, T., *Hydropolitics Along the Jordan River : Scarce Water and its impact on the Arab-Israeli Conflict* (New York : United Nations University Press, 1995).

Zahlan, A. B. and Qasem, Subhi (Eds.), *The Agricultural Sector of Jordan* (London : Ithaca Press, 1985).

Articles

Allan, J. A., "Natural Resources as National Fantasies", *Geoforum*, 1983, pp. 243-247.

Al-Weshah, R., "Jordan Water Resources : Technical Perspective", *Water International*, vol. 17, 1992, pp. 124-132.

Appelgren, B. and Klohn, W., "Management of Transboundary Water Resources for Water Security : Principles, Approaches and State Practice", *Natural Resources Forum*, vol. 21, #2, 1997, pp.91-100.

Arad, Arnon, and Uri, Kafri, "Hydrogeological Inter-Relationship Between the Judea Group and the Nubian Sandstone Aquifers in Sinai and the Negev", *Israel Journal of Earth Sciences*, vol. 29, 1980, pp. 67-72.

Aras, Bulent, "Palestinian-Israeli Peace Process Since Oslo : Reality or Dream?" *Strategic Analysis*, vol. 19, #8, 1996, pp. 1155-1177.

Arcari, Maurizio, "The draft articles on the Law of International Water Courses adopted by International Law Commission : An Overview and Some Remarks on Selected Issues", *Natural Resources Forum* vol. 21, #3, 1997, pp. 169-177.

Aruri, Nasser, H., "US Role in the Peace Process : From Madrid to Hebron", *Middle East Journal*, vol. 545, 1997, pp. 16-18.

- Azar, Edward, Jureidini, Paul and Mclaurin, R., "Protracted Social Conflict : Theory and Practice in Middle East", *Journal of Palestine Studies*, vol. 8, #1, 1978, pp. 41-60.
- Bar, Joseph U., "Israel's Noethern Eyes and Shield : The Strategic Value of Golan Heights, *Journal of Strategic Studies*, vol. 21, #3, 1998, pp. 46-66.
- Ben-Moshe, E., "Jordan's Yarmuk Plan," *New Outlook*, vol. 5, #2, 1962, pp. 22-24.
- Biswas, Asit K., "Indus Water Treaty : The Negotiating Process", *Water International*, vol.17, 1992, pp. 21-38.
- Borthwick, Bruce, "Jordan Confronts its Water Crisis", *Orient*, vol. 40, #3, 1999.
- Bourne, C. B., "The Development of International Water Resouces : The Drainage Basin Approach", *The Canadian Bar Review*, vol. 47, #1, 1969, pp. 62-82.
- Cano, Guillermo, "The Development of the Law in the International Water Resources and the Work of the International Law commission", *Water International*, vol. 14, 1989, pp. 167-171.
- Caponerna, Dante, "Patterns of Co-operation in International Water Law : Principles and Institutions", *Natural Resources Journal* vol. 25, #3, 1985, pp. 563-588.
- Colley John, "The War Over Water", *Foreign Policy*, #54, 1984.
- Colley, John, "Jordan and Politics of Water", *Middle East International*, 30 January, 1981.
- Cowell, Alan, "Next Flashpoint in the Middle East : Water", *New York Times*, 16 April, 1989.
- Dadwal, Shebonti Ray, " Oslo II : Self Rule Comes to the West Bank, *Strategic Analysis*, vol. 18, Nov. 1995, pp. 1123-1140.
- Dadwal, Shebonti Ray, "Politics of Water in West Asia", *Strategic Analysis*, vol. 19, #3, 1996, pp. 467-482.

- Davis, Uri, Antonia, Maks, and John R., "Israel's Water Policies", *Journal of Palestine Studies*, vol. 9, #2-34, pp. 3-32.
- Dees, Joseph L., "Jordan's East Ghor Canal Project", *Middle East Journal*, vol. 13, #4, 1959, pp. 357-81.
- Dillman, Jeffrey, "Water Rights in the Occupied Territories *Journal of Palestine Studies*, vol. 19, #1-73, pp. 46-71.
- Drake, Christine, "Water Resources Conflict in the Middle East", *Journal of Geography*, vol. 96, #1, 1996, pp. 4-12.
- Duda, A. M., "Achieving Pollution Prevention Goals for Transboundary Water Through International Joint Commission Process" *Water Science And Technology*, vol. 30, #5, 1994, pp. 223-231.
- Dufournaud, C., "On the Mutually Beneficial Co-operative Scheme : Dynamic Change in the Payoff Matrix of International River Basin Scheme", *Water Resources Research*, vol. 18, #4, 1982, pp. 764-772.
- Fareley, Jonathan, "Middle East Peace Process : The Prospects for Progress after Wye?" *Round Table* vol. 350, 1999, pp. 313-20.
- Fishelson, Gideon, "Water and the Middle East", *Israel Scene*, vol. 4, #5, 1990.
- Fisher, M. Frankline, "Removing Water as a Source of Conflict", *Middle East International*, 6 Jan. 1995, pp. 20-21.
- Fisher, M. Frankline, "Water and Peace in the Middle East, *Middle East International*, 17 Nov. 1995, pp. 17-18.
- Fox, I. K. and D. G. Le Marquand, "International River Basin Co-operation-The Lessons from Experience", *Water Supply and Management*, vol. 2, #5, 1978.
- Frey, Frederick and Thomas, Naff, "Water : An Emerging Issue in the Middle East?" *Annals of the American Associations of Political Science*, vol. 431, Special Issue, 1985.
- Frey, Frederick, "The Political Context of Conflict and Co-operation over International River Basin", *Water International*, vol. 18, #1, 1993.

- Galnoor, Itzak, "Water Policy Making in Israel", *Policy Analysis*, vol. 4, 1978, pp. 339-367.
- Garbel, Maurice A., "The Jordan Valley Plan", *Scientific American*, vol. 212, #3, 1965, pp. 23-31.
- Gleick, Peter H., "Water and Conflict : Fresh Water Resources and International Security", *International Security*, vol. 18, #1, 1993, pp. 79-112.
- Gleick. P.H., "Water, War and Peace in the Middle East, *Environment*, vol. 37, 1994, pp. 7-42.
- Gurr, Ted R., "On the Political Consequence of Scarcity and Economic Decline, "International Studies Quarterly, vol. 29, #1, 1985, pp. 51-75.
- Hayton, Robert and Utton, Albert E., "Transboundary Groundwaters : The Bellagio Draft Treaty", *Natural Resouces Journal*, vol. 29, 1989, pp. 663-722.
- Hayton, Robert, "International Aquifers and International Law", *Water International*, vol. 6, 1981.
- Hoffmann, Berthold, "Hydro Paranoia and its Myths : The issue of Water in the Middle East", *Orient*, vol. 39, #2, 1998, pp. 251-269.
- Inbar, Moshe and Maos, J.O., "Water Resource Planning and Development in the Northern Jordan Valley", *Water International*, vol. 9, #1, 1984, pp. 18-25.
- International Water Resources Association, "Special Issue on Water, Peace and Conflict", *Water International*, vol. 15, #4, 1990.
- Issar, Arye, "Fossil Water Under the Sinai -Nagev Peninsula", *Scientific American*, vol. 253, #1, 1985, pp. 104-111.
- Kemp, Geoffrey, "Scarcity and Strategy," *Foreign Affairs*, vol. 56, #2, 1978.
- Kolars, John, "The Course of Water in The Arab Middle East", *American-Arab Affairs*, #33, 1990.

- Kolars, John, "Water Resources of the Middle East", *Canadian Journal of Development Studies*, Special Issue, 1992.
- Lepawsky, Albert, "International Development of River Resources", *International Affairs*, vol. 39, 1963, pp. 333-50.
- Lowi, Mirriam R., "Bridging the Divide : Tranboundary Resources Disputes and the Case of West Bank Water", *International Security*, vol. 18, #1, 1993.
- Lowi, R. Mirriam, "Rivers of Conflict, Rivers of Peace", *Journal of International Affairs*, vol. 49, #1, 1995, pp. 123-144.
- Lustick, J., "Zionism and the State of Israel : Regime Objectives and the Arab Minority in the First Years of Statehood", *Middle Eastern Studies*, vol. 14, #1, 1981, pp. 127-146.
- Mac Donnel, Lawrence J., "Natural Resources Dispute Resolution : An Overview", *Natural Resources Journal*, vol. 28, #1, 1998, pp. 5-20.
- Majeed, Yahia Abdel, "Environmentally Sound Management of Water Resources", *Water Resources Development*, vol. 10, #2, 1993.
- Matar, Ibrahim, "Israeli Settlements in the West Bank and Gaza Strip", *Journal of Palestine Studies*, vol. 11, #1, 1981.
- MEED : Water Special Report, 26 February, 1999.
- MEED : Water Special Report, 26 January 1996.
- Michael, M. "The allocation of Waters of International Rivers", *Natural Resources Lawyer*, vol. 8, #1, pp. 45-66.
- Middle East Peace Process : Hopeful Signs, *World Focus*, #205, January 1997.
- Palestinian Self-Rule : Uneasy Road Ahead, *World Focus*, #174, June 1994.
- Pearce, Fred, "Wells of Conflict on the West Bank", *New Scientist*, #1, 1991.

- Platter, Adele, and Thomas M., "A Unified Analysis of International Conflict and Co-operation", *Journal of Peace Research*, vol. 26, #4, 1989, pp. 367-383.
- Postel, Sandra, "Trouble on Tap", *Worldwatch*, September, 1989, pp. 12-20.
- Quiring, Paul, "Israeli Settlements and Palestinian Rights, Part 2", *Middle East International*, October, 1978.
- Rogers, P., R. Burden and C. Lott, "System Analysis and Modelling Techniques Applied to Water Management", *Natural Resources Forum*, #2, 1978, pp. 349-358.
- Rogers, Peter P., "The Value of Co-operation in Resolving International River Basin Disputes", *Natural Resources Forum*, May 1993, pp. 25-27.
- Salameh, Elias, "Jordan's Water Resources : Development and Future Prospects", *American-Arab Affairs*, #33, 1990.
- Shahin, M., "Review and Assessment of Water Resources in the Arab Region", *Water International*, vol. 14, 1989.
- Shuval, Hillel, "Approaches to Resolving the Water Conflicts Between Israel and Her Neighbours—A Regional Water-for-Peace Plan", *Water International*, vol. 17, #3, 1992.
- Starr, Joyce, R., "Water Wars", *Foreign policy*, #82, 1991, pp. 17-36.
- Stauffer, Thomas, "The Price of Peace : The Spoils of War", *American-Arab Affairs*, #1, Summer 1982.
- Stern, Eliahu and Yehuda, G., "The Med-Dead Sea Project : A Vision or Reality", *Geoforum*, vol. 12, #3, 1981.
- Trolldalen, J. M., "Troubled Waters in Middle East : The Process Towards The First Regional Water Declaration Between Jordan, Palestinian Authority and Israel", *Natural Resources Forum*, vol. 21, #2, 1997, pp. 101-108.
- Turan. J., "Turkey and the Middle East : Problems and Solutions", *Water International*, vol. 18, #1, 1993.

- Tvedt, Terje, "The Struggle for Water in the Middle East", *Canadian Journal of Development Studies*, Special Issue, 1992.
- Utton, Albert, "The Development of International Groundwater Law", *Natural Resources Journal*, vol. 22, #1, 1982.
- Vesilind, P. J., "Water, the Middle East's Critical Resources", *National Geographic*, vol., 183, 1993, pp. 38-71.
- Wilkinson, J.C., "Muslim Land and Water Law", *Journal of Islamic Studies*, vol. 1, 1990.
- Wishart, David, "An Economic Approach to Understanding Jordan Valley Water Disputes", *Middle East Review*, vol. 21, #4, 1989, pp. 45-53.
- Wishart, David, "The Breakdown of the Johaston Negotiations Over the Jordan Water", *Middle Eastern Studies*, vol. 26, #4, 1990.

References

The Middle East & North Africa (London : Europa Publication, 2000).

Water Food and Trade in Middle East, (London : Arab Research Centre, 1995).

Newspapers and Magazines

The Hindustan Times, New Delhi.

The Hindu, New Delhi.

The Jerusalem Post, Jerusalem.

The Khaleez Times, Abu Dhabi.

The New York Times, New York.

The Times of India, New Delhi.

The Economist, Singapore.

The Frontline, Chennai.

The US News, U.S.A.