

water

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the red line

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**COVER PHOTO Women from Aqabat Jabr refugee
camp collecting water from local spring UNRWA**

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acronyms

ADS	Arab Development Society
ANERA	American Near East Refugee Aid
ARIJ	Applied Research Institute of Jerusalem
GNP	Gross National Product
JD	Jordanian Dinars
JNF	Jewish National Fund
MCM	Million cubic metres
MM	Milimetres
NGO	Non-governmental organisation
NIS	New Israeli Shekels
PARC	Palestinian Agricultural Relief Committees
PHG	Palestinian Hydrology Group
PLO	Palestine Liberation Organisation
PPM	Parts per million
WHO	World Health Organisation
UN	United Nations
UNDP	United Nations Development Programme
UNRWA	United Nations Relief & Works Agency

CONVERSION

ppm	= 1mg/litre
US\$	= NIS3
dunam	= 1,000sq metres

foreword

The water issue is one of the most critical issues in the Middle East, particularly in the Arab-Israeli conflict. Indeed, it is one of the causes of this conflict. Israeli plans in 1966, to divert the course of the Jordan River into Israel, constituted a major source of tension which culminated in the 1967 war. This war led to Israel's occupation of the rest of Palestine, the Egyptian Sinai Peninsula and the Syrian Golan Heights. In fact one of the first attacks by the national forces against Israeli targets was on the Eilaboun tunnel which Israel had constructed to divert the Jordan River.

During the years of Israel's occupation of the West Bank and Gaza Strip, Israel has pursued a policy of taking control of Palestinian water resources for use inside its own territory. Palestinian agriculture, the mainstay of the local economy in the Occupied Territories, has been severely hit as a result. Israel's continuing denial of the Palestinian peoples' rights over their water resources, in contravention of international law, will imperil any efforts at resolving the Israeli-Palestinian conflict. A just solution to the water problem will be one based on cooperation rather than on Israeli control. And resolving the water crisis is one of the primary cornerstones in any attempts to reach a regional solution for sustainable use of the Middle East's scarce water resources.

In preparing this study, the JMCC has attempted to cover most of the issues and arguments in a comprehensive manner. After more than fifteen months of research it is our hope that this report will shed light on one of the most complex issues in the Middle East.

Ghassan al-Khatib
JMCC Director, April 1994

introduction

... Israel's water policy in the Occupied Territories is a natural sequel to its broader designs of colonising and ultimately annexing these territories. Water in the Occupied Territories, however limited, is largely the only natural resource Palestinians have. Any tampering with that wealth would necessarily frustrate their objective of establishing their own State and would render their claim to self-determination meaningless.

United Nations, 1992¹

If the shortage of water becomes worse and worse and we can't solve it by peaceful means, then it will have to be solved by war.

What other choice is there?

Zvi Ortenberg, chair of [Israeli] Lake Kinneret Authority, 1991²

The two sides agree to ... cooperation in the field of water, including a Water Development Program prepared by experts from both sides, which will 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 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.

Annex III, Protocol on Israeli-Palestinian Cooperation in Economic and Development Programs, Declaration of Principles on Interim Self-Government Arrangements, Washington DC, September 1993.

The conflict and problems over water in the occupied Palestinian territories, and in the Middle East as a whole, stem from three crucial factors: Israel's continuing occupation of Palestinian land and territorial expansion; the consequent political uncertainty in the wider Middle East which prevents joint management and accountability of largely shared water resources; and limited water resources themselves which, in this semi-arid region, are vital for development and impinge on wider security issues for all countries in the region.

Israel's military occupation of the Palestinian West Bank (including East Jerusalem) and Gaza Strip in 1967, enabled it to control access to water resources and use water as a political weapon to realise wider political and economic objectives. Since 1948, the consumption of water in Israel has increased ten-fold.³ According to Palestinian economist Adel Samara, Israel's exploitation of renewable water resources is one of the most intense in the world, running at between 95-98 percent.⁴ Israel currently uses seven to ten times more water per capita than Palestinians living in the Occupied Territories, and five times more per capita than its Lebanese, Syrian and Jordanian neighbours.⁵ Israel's military conquests are integral to its control over the area's natural resources. Israel's occupation of the Syrian Golan Heights gave it control of the tributaries flowing into the Jordan River, and its occupation of the West Bank gave it control of the Jordan Valley and the two major shared aquifers supplying water to the West Bank and Israel.

What has to evolve is 'a better understanding of the shared but scarce water resources in the Middle East [as] fundamental to the resolution of the Arab-Israeli conflict'.⁶ There has, for example, never been a bilateral or multilateral water management agreement between the countries of the Middle East who are, to a large extent, dependent on each other for sustainable water resources. Although almost all major water resources in the region are shared by two or more states, cooperation has been negligible or nonexistent. Nor has a joint commission ever been authorised to deal with allocation of, and disputes arising from, shared water supplies and their distribution; 'In other words, Jordan, Israel, [the occupied Palestinian territories], Syria and Lebanon have yet to regulate the amount of water that each riparian state is entitled to'.⁷ The Jordan River basin, for example, connects three countries - Jordan, Israel and Syria - as well as the occupied West Bank. They are to varying degrees dependent on water from the Jordan River, although Jordan, Syria and Israel have never formally agreed on each other's use of the river. According to water experts, by 1995, Israel and Jordan will have fully exploited their renewable water resources and will reach the stage of exploiting non-renewable water resources unless measures are taken quickly.⁸ And current rivalries may increase. If Syria, for example, continues its development schemes on the upper

Yarmuk River to construct a series of medium and small dams, eventually diverting up to 40 percent of the Yarmuk's waters,⁹ Jordan's access to the river, which it relies on to irrigate its side of the Jordan Valley as well as to supply water to upland urban centres including Irbid and Amman, will be reduced. Downstream resources currently utilised by Israel would also be affected.

Future cooperation and management of the region's water resources is contingent upon a halt to Israel's expansionist policies. According to a recent United Nations (UN) report, 67 percent of the water used by Israel comes from outside its 1948 borders (the 'Green Line'), including 35 percent from the West Bank and tributaries of the Jordan River, and 22 percent from the Golan Heights.¹⁰

Water could provide a basis for cooperation and joint management, laying a foundation for a lasting political settlement. According to Aric Issar, Professor of Water Resources at Jacob Blaustein Institute for Desert Research, although 'the agricultural people believe that we can't let the Arabs have control of our [sic] water', the future of water use in the region lies in cooperation between Arabs and Israelis rather than conflict. Issar believes that resources 'such as the Jordan [river], as well as underground water resources, have to be shared'.¹¹ At a hearing of the US Congress House of Representatives' Subcommittee on Europe and the Middle East in June 1990, Professor Thomas Naff of the University of Pennsylvania warned that, 'Israel, for some years, has been preventing Jordan from cleaning the intake to the East Gorem Main Canal, the national water carrier in Jordan. When the Jordanians have gone out to clear out the rocks and silt, the Israelis have brought up troops and there have been exchanges of gunfire over the issue.'¹² Israel has conducted similar activities in southern Lebanon: according to an article in *Middle East International* in 1990, 'geological and topographical studies [of south Lebanon] were begun in 1983 and 1985. Israel began constructing ducts aimed at diverting the waters of the Wazzani, one of the Litani's tributaries near the town of Marjayoun in southern Lebanon. There is increasing concern that Israel is merely waiting for the right political circumstances to implement these projects.'¹³ According to Thomas Naff and John Kolars, Israel is already diverting water from the Litani River, as well as the Hasbani River, which also rises in Lebanon.¹⁴ And, even before its occupation of the Palestinian territories in 1967, Israel obtained some 37 percent of its water supplies from the upper Jordan River, its tributaries and Lake Tiberias (which is supplied with water from the Jordan River).

Fundamental to access and use of all water resources is an awareness that the Occupied Territories and Israel are in a semi-arid region. Water resources are limited and becoming scarce. As these resources are exploited at increasingly unsustainable levels, the quality of remaining water resources

worsens, reaching what is called the 'red line'. Israeli hydrologist Schwarz warned in 1982 that the groundwater level in Israel and the Occupied Territories was just above the 'red line'.¹⁵ Over a decade later no serious action has been taken. In terms of domestic supplies, water affects the quality of life. While Israeli settlers living on confiscated land in the Occupied Territories have abundant supplies of water for swimming pools and flower gardens, Palestinians in the Gaza Strip face chronic water shortages, highly saline supplies and poor health as a result. Daily life involves collecting saline water some distance from people's homes which are surrounded by open drains. Sewage flows freely onto the streets where children play. The economic consequences have been severe. Whereas Israel has made 'the desert bloom', this has been at the expense of Palestinians who, denied access to their own and shared water resources, have been prevented from developing their land and economy.

Future policies will have to take into account the true costs of water. Agriculture currently constitutes only 10 percent of Israel's total GNP, employs 6 percent of the labour force but absorbs 75 percent of Israel's total water consumption. The real cost of this water, however, has not figured in Israeli policies. Israeli farmers have been charged approximately one-third of the real costs of the water they use and are thus quite happy to grow water-intensive crops, ill-suited to semi-arid conditions. As a *Jerusalem Post* editorial complained, 'the result is that the Israeli taxpayer subsidises to the tune of US\$200 million per year the European consumer's purchase of Israeli produce'.¹⁶ Time will dictate the real economic cost of water: 'It is cheaper to import bananas to Israel than to grow them. Oranges and grapefruits which are grown in Israel and are sold abroad, are essentially exported water. Israel can import oranges from Europe for less money than it costs to grow them here (if the farmers had to pay the real price of water)'.¹⁷ The true costs of irrigation-quality water throughout the Middle East are hidden as water is subsidised in most countries 'and especially so in Israel'.

This report focuses on Israel's policies and practices affecting the Palestinian population living under military occupation in the West Bank (including East Jerusalem) and Gaza Strip (ie. the Occupied Territories). It does not include original research but brings together information from a wide variety of sources and presents different opinions and options for the future, reflecting contemporary debate on water in the current conflict. As with most research carried out in the Occupied Territories, we were often faced with widely conflicting, and at times inaccurate, data and information. However, we hope that the information included is of sufficient detail and accuracy to provide a useful overview of the water issue.

Chapter 1 outlines the distribution of resources in the Occupied Territories and Israel, and has a short note on the situation in neighbouring Jordan, southern Lebanon and Syria. Having outlined the interdependence on not only surface supplies, but especially groundwater supplies, Chapter 2 examines various international laws related both specifically and generally to water resources in the Occupied Territories and Israel.

Chapter 3 provides an historical overview of the current conflict and examines various agreements and attempted agreements which provide the background to today's discussions on water in the peace negotiations. Finally, Chapter 4 gives an outline of Israeli policies and practices affecting Palestinians in the Occupied Territories. It compares the consequences of severely discriminatory policies which control and affect Palestinian access to, and use of, water resources, to the situation for Israeli settlers.

Within the context of the recent peace agreement, the conclusion presents a summary of various proposals, both immediate and longer-term, which are being suggested from a range of sources.

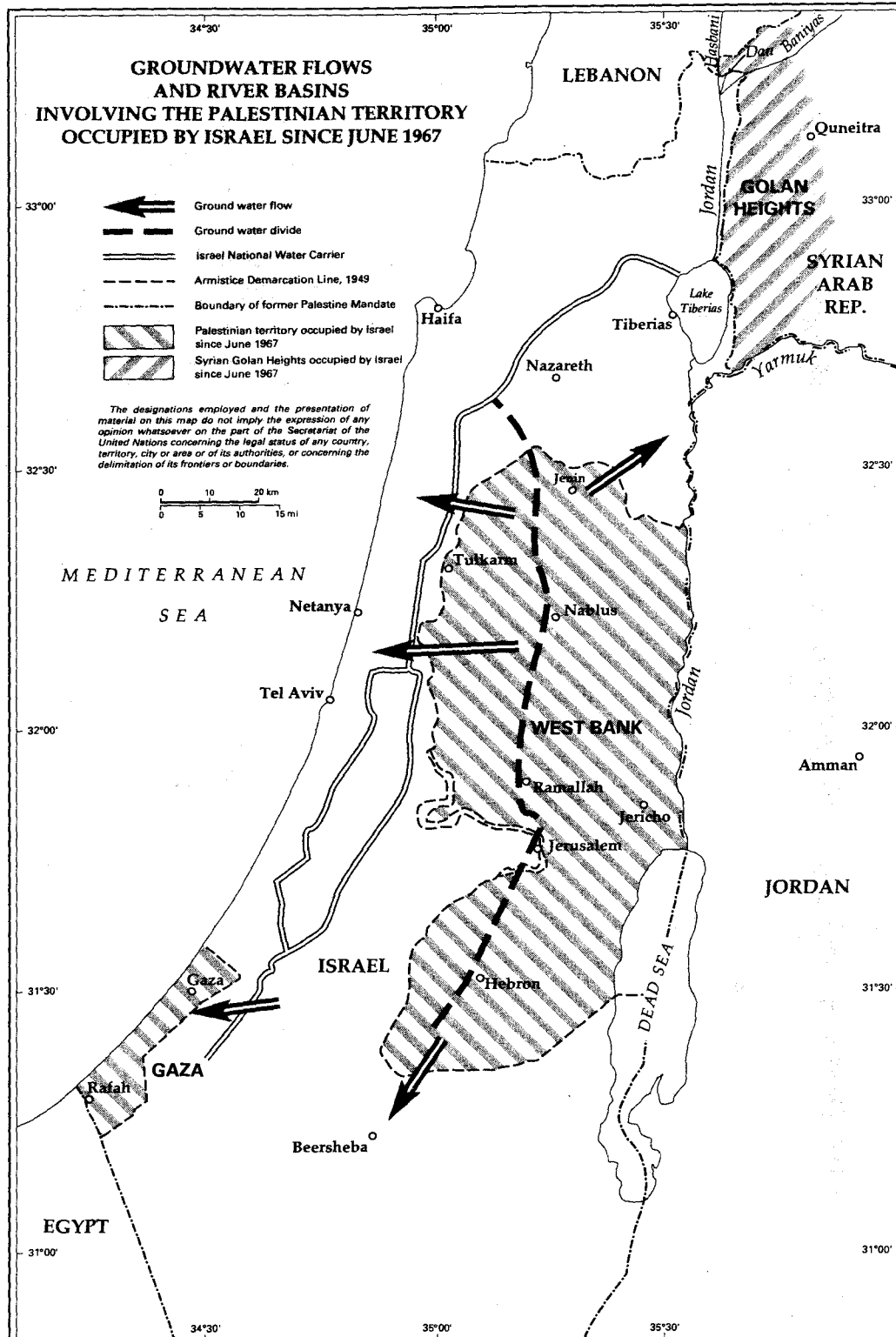
Discussion of the water issue has come none too soon. While the human cost has been all but ignored, the political cost of past water policies will have to be acknowledged and dealt with. The Israeli water company Mekorot recently drilled wells in settlements near Deir el-Balah where some of the best remaining good quality water in the Gaza Strip is located. This water is pumped in Mekorot pipes. None of it is sold to the local Palestinian population through whose midst the pipes pass.¹⁸

Despite a multitude of international resolutions and declarations recognising Palestinian sovereignty and rights over their water resources, Israel's refusal to recognise these rights has had severe consequences for Palestinian access to, and development of, water resources. The human, social and economic costs of this discrimination must be clearly acknowledged and rapidly acted upon.

Indeed, the water issue in the Middle East as a whole is critical and increasingly a source of tension and conflict, and may cause an escalation in the conflict unless regional agreement on shared water resources is reached.

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water resources

1

Water resources are an important material aspect of the question of Palestine and relevant to any lasting peaceful solution to the Arab-Israeli conflict.
United Nations, 1992¹

The Occupied Territories and Israel are dependent on the same water resources, and current use and control of this water is based on Israel's territorial control and political objectives. This chapter gives a survey of these water resources, and briefly looks at the regional nature of shared water resources.

Renewable water sources in the Occupied Territories and Israel are all rain fed and comprise groundwater and surface water. The groundwater sources consist of underground aquifers and sub-aquifers which are recharged by rain water and underground flows between the basins. The surface water sources consist of perennial and seasonal rivers and lakes; the Jordan River and its tributaries, and Lake Tiberias (Sea of Galilee) being the major ones.

OCCUPIED TERRITORIES

The West Bank and Gaza Strip constitute two quite different areas in

terms of topography, geology and rainfall patterns. This is reflected in their different water resources.

West Bank

In the hilly West Bank the annual rainfall varies between 500-700mm on the western slopes, and 100-500mm on the eastern slopes. Falling mainly during the short rainy season (November to May), rainfall is the West Bank's main water source. Sixty-eight percent evaporates and the rest percolates down to replenish the aquifers which the springs tap. A small amount drains off as surface run off.² The only perennial surface source is the River Jordan, which runs along the West Bank's eastern border (and its tributaries in Jordan). Groundwater (i.e. the aquifers) constitutes the major source of water.

Gaza Strip

In the Gaza Strip, groundwater is the only significant source of water. This is replenished directly by rain water infiltration and by underground flows from the Naqab (Negev) in the east (inside the 'Green Line'). At present, groundwater sources are replenished by rainfall, irrigation run off and cesspool sources resulting in severe contamination of the groundwater reserves. In addition, Israel's overpumping inside the 'Green Line' is preventing replenishment by freshwater of the Gaza Strip aquifer.³

Situated along the south-west coastal plain of historic Palestine, and bordering the Mediterranean Sea, the Gaza Strip has an arid climate. There are no permanent surface water sources (perennial rivers). Although in some years there is a little temporary surface run off (for example in early 1992, as a result of the heavy winter rainfall), almost none of this water is collected. Annual rainfall is far lower than in the West Bank (falling from 350mm in the north to 150mm in the south) and rates of evaporation are extremely high.⁴

groundwater resources

Two ground aquifers straddle the border between the West Bank and Israel: the Turonian-Cenomanian (or Yarkon-Tanninim) aquifer of the Ajlun series (Israeli name - Judea Group), the so-called mountain aquifer; and the Eocene aquifer of the Jenin subseries of the Belqa series (Israeli name - Avdat subgroup of the Mt Scopus Group) (see map).

Extending along the western drainage basin of the West Bank, the Turonian-Cenomanian aquifer has the largest outcrop area and the largest annual replenishment of all aquifers in the West Bank, accounting for 335mcm, or 57 percent of total average replenishment.⁵ As a result of a severe drop in the water table over the last few years, however, water now has to be pumped out of the aquifer. The Eocene aquifer, extending across the Jenin and Nablus

areas in the northern West Bank, accounts for 140mcm, or 24 percent of total aquifer replenishment in the West Bank.⁶

Together, these two aquifers account for 82 percent of all average annual replenishment in the West Bank. The remaining 18 percent comes from aquifers within the Jordan Valley drainage basin.⁷

Surface supplies flowing into the West Bank from the Jordan River basin have been reduced to a trickle of polluted water due to Israel's increased use. Surface run off into the Gaza Strip from the Naqab has decreased as a result of Israeli dams which tap water that would otherwise flow into the Gaza Strip.

The Gaza Strip's groundwater sources consist of a number of sub-aquifers whose salinity is so high, and water level so low, that they are dangerous and inadequate for domestic usage, as well as for agricultural purposes. The situation has reached a critical point: 'high salinity is a direct effect of over-pumping of the aquifer,'⁸ whose water table level has, in some areas (Beit Lahiya and west of Deir al-Balah), now reached sea level (a similar process has been happening in Israel, also as a result of over-exploitation of groundwater resources). As Israeli hydrologist Schwarz concludes, 'these generally low water table levels will inevitably result in seawater intrusion into the aquifers up to a distance of 1.5km or more from the coast',⁹ a condition the Israeli State Comptroller has described as 'critical'.¹⁰ The increased salinity in the Gaza Strip has been caused by:

- inflow of groundwater entering from the east, having a chloride content of some 600-2000mg/litre;
- seawater intrusion from the west [reported in 1989 to be 1.51 metres in the freshwater aquifer];
- and upconing [the upward movement] of deeper, more saline groundwater.¹¹

Prospects for the future are not good. Schwarz believes there will be a water deficit of between 200-400mcm per year in the Gaza Strip by the end of this century.¹²

wells and springs

Most of the water consumed in Palestinian towns and villages for domestic use and irrigation comes from wells which tap the aquifers. Although figures for the number of wells vary, Palestinian economist Hisham Awartani notes that approximately 750 wells existed at the beginning of the Israeli occupation in 1967, of which only 413 were in operation.¹³ By 1990, approximately 364 Palestinian-owned wells were functioning in the West Bank, in addition to 32 wells drilled by the Israeli water company Mekorot for Israeli settlers in the West Bank.

An additional source of water, natural springs, exists in the Occupied Territories, according to PHG director, Palestinian engineer Abdel Rahman Tamimi.¹⁴ Numbering around 527 in the West Bank, their water potential is approximately 50mcm per year. They are one of the main sources of water for drinking and irrigation and provide a cheap and guaranteed source of water for many villages in the West Bank if the aquifer is not overpumped by Israel.

Figures for the number of wells in the Gaza Strip, for both domestic and irrigation purposes, vary significantly. Between 1,700-2,072 wells are currently in operation, of which between 28-40 are for the exclusive use of Israeli settlers.¹⁵ Most of these wells were drilled before 1967, except those supplying water to Israeli settlements which have been drilled more recently.

Of the total number estimated to be used by Palestinians, around 50 are for domestic purposes and approximately 1,700 for irrigation.¹⁶ In 1985, a total of 21-25mcm of water was pumped from wells for drinking supplies and 51-66mcm for agricultural use, approximately 30mcm more than the 90mcm estimated renewable reserves from the Gaza Strip's groundwater resources.¹⁷

Israeli settlements

Although the Israeli Ministry of Foreign Affairs claimed that 'Jewish communities in the Gaza district [sic] derive their water from sophisticated drilling operations that collect water that would otherwise flow into the sea',¹⁸ this is not correct. Not only has Mekorot drilled 31 wells in the southern Gaza Strip for the settlements' domestic and agricultural use, but there have been reports of water being transferred from the Gaza Strip for use inside Israel.¹⁹ It is quite clear that drilling for the exclusive use of settlers has, in some instances, caused neighbouring Palestinian wells to go dry (see Chapter 4).

ISRAEL

A 1990 report by the Bank of Israel indicates the source of Israel's water supplies:

- 37 percent from the Jordan River and Lake Tiberias;
- 38 percent from the two transboundary aquifers located under the West Bank;
- 25 percent from other small aquifers situated under the West Bank and Israel.²⁰

groundwater sources

Israel's groundwater sources are the two main aquifers: the Turonian-Cenomanian and Eocene under the West Bank, in addition to the coastal

aquifers extending into the Gaza Strip, and a number of small sub-aquifers in the Jordan Valley. According to water analyst Karen Assaf, in the coastal plain aquifer and the foothill aquifers of the Turonian-Cenomanian group, 'underground water storage has become an integral part of Israel's water supply system', and Israel artificially recharges water in the ground to supplement existing groundwater. Most of this recharge utilises flood water or waste water reclamation²¹ which is then used to replenish over-exploited aquifers (thereby preventing sea water intrusion). It is also used to supply the Israeli National Water Carrier, and to provide a storage of surplus water for future use. Underground water storage is particularly suitable given the climatic and geographic conditions in the area.

REGIONAL WATER

A summary on Jordan, southern Lebanon and Syria is given below to illustrate the regional nature and interdependency of the area's water sources, and the similarity between Israeli activities in southern Lebanon, the Syrian Golan Heights, and the occupied Palestinian territories.

Southern Lebanon

Israel is able to freely divert water from the two major rivers in southern Lebanon, the Litani and the Hasbani, because of its occupation of this area since the 1982 Israeli invasion of Lebanon. Israel's self-styled 'security zone' conveniently includes the Litani, its tributary the Wazzani, and the Hasbani. Although Israel denies diverting water from the Litani,²² Professor Thomas Naff of the University of Pennsylvania and others have established that Israel is, in fact, doing just this. According to *Le Monde*, Israel is currently 'stealing' 320mcm of water by tapping the Hisbani and its tributaries and other groundwater resources in the 'security zone' where the Lebanese themselves are no longer allowed to sink wells.²³

Jordan

Israeli and Syrian upstream exploitation of water from the Jordan River means that Jordan receives only 30 percent of the total water supplies from the river.²⁴ Jordan is thus forced to over-exploit its non-renewable resources at a rate of approximately 15 percent each year.²⁵ Remaining water resources are becoming increasingly saline. Despite current shortages, Professor Thomas Naff estimates that 1985 figures of total consumption - 870mcm - could reach 1,000mcm by the year 2000, a deficit of 170-200mcm per year.²⁶ Jordan's current water deficit of some 40 percent is expected to rise to 65 percent by the year 2005, by which time the population of 3.4 million will have increased by some 70

percent.²⁷ According to Joyce Starr of the Washington-based Center for Strategic and International Studies, in order to meet future requirements Jordan will have to rechannel increasing amounts of water from the Jordan Valley to urban areas in the upland plateau, and will have to rely more heavily on recycled water.

Syria

Israel has access to the Yarmuk River, a tributary of the Jordan River flowing along the Syrian-Jordanian border, because of its continuing occupation of the Syrian Golan Heights. The Yarmuk currently provides 3 percent of Israel's total water supply,²⁸ and Israel claims it has rights to between 25-40 mcm of its waters.²⁹

Although accurate figures concerning water resources in Syria are unavailable, water experts believe that by the year 2000, Syria could face a deficit of approximately 1 billion cubic metres. Parts of Syria already face water shortages; with a reduced flow from the Euphrates River and contamination of resources by pesticides and fertilisers, major Syrian cities already experience water shortages and electricity shortages generated from hydroelectric sources. The Syrian government is already taking action to try to alleviate current and future shortages; with only 10 percent of the investment budget in the past being spent on water and hydroelectric projects, this percentage was set to increase to 43.5 percent in 1988.³⁰

Syria relies on the Euphrates for 90 percent of its surface water supply. A disaster will occur if, for example, a proposed Turkish dam is built on the upper reaches of the river, since it would deprive Syria of two-thirds of the Euphrates's water flow. As the Syrian director of the A-Thawra dam explained, there would no longer be a river; 'the Euphrates [will be] dead. The Turks are telling people who live along this river to emigrate or die'.³¹

CONCLUSION

So entrenched is Israel's dependence on water resources from the Occupied Territories that an Israeli Ministry of Agriculture's advertisement in the *Jerusalem Post* in 1990 claimed, 'it is difficult to conceive of any political solution consistent with Israel's survival that does not involve complete, continued Israeli control of the [West Bank's] water and sewage systems, and of the associated infrastructure, including the power supply and road network, essential to their operation, maintenance and accessibility'.³²

A similar point was made by Ben Meir in an article written in 1979, during previous negotiations for Palestinian self-rule: 'While the West Bank is under military rule, Israel could easily control its water resources. Self-rule

would prohibit Israel from exploiting these resources. The Palestinians are expected to irrigate another million dunams in the following 20 years. The only chance for the West Bank to satisfy this need is either the East Bank [Jordan] or the western slopes of the West Bank itself. The second alternative would be to the cost of Israel - from the West Bank's own resources - Israel must stop that. But it is impossible to stop the satisfaction of this Arab need without the continuing of the occupation.³³

Although they recognise that limited water resources are, and will be, an increasing problem in the Occupied Territories and Israel, the Palestinian plaintiffs to the Second International Water Tribunal believe that, 'rather than there being a problem of natural water shortages and water needs outstripping water supplies, the problem is foremost a problem of water allocation - inequitable allocation between the Palestinian population and the Israeli settler population ... these grossly inequitable distortions are ingeniously concealed beneath an argument which asserts that peace and cooperation are dependent on the import of water'.³⁴

The rapidly diminishing water resources in the Gaza Strip is a warning bell, and indicates what lies ahead for the rest of the Occupied Territories and Israel: 'over-exploitation [of water] is causing permanent damage to the existing fresh groundwater reserves and should be phased out in the near future'.³⁵ Unless immediate action is taken, by the year 2000, Palestinians will not be able to find a single drop of drinking water in the whole of the Gaza Strip. And as the Dutch Ministry of Foreign Affairs report warns, 'data on water availability and water demands are not always uniform but are, in the opinion of the consultants, generally too optimistic. The water scarcity in Gaza is more serious than reported'.³⁶ According to Israel's Water Commissioner, Tsamech Yishai, 'the situation [in Gaza] is a catastrophe'.³⁷

The use of the region's water resources is at present highly dependent on territorial control and the political objectives of the states involved. Israel has subordinated the needs and interests of both the surrounding Arab states and the Occupied Territories to its own political ambitions in the area and has thus created a water crisis which is fuelling the continuing political instability in the region.

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international law

2

The clear legal status of the West Bank and Gaza Strip as territory occupied by a belligerent occupier has been established by numerous international laws, regulations and conventions. That Israel has refused to accept the applicability of international law to its occupation of the Palestinian West Bank (including East Jerusalem) and Gaza Strip, together with the ambiguity of international law concerning shared water resources, has led to considerable confusion, misrepresentation, misinformation and abuse in this area.

Although international laws covering water resources, including those that are shared, are ambiguous and unclear, they nevertheless provide clear guidelines to ensure the protection, distribution and allocation of resources in occupied territory, and to a population under occupation. The onus to ensure these guidelines are adhered to lies with the international community and the various organisations which implement international law and practice.

The general principles relevant to water resources in occupied territory are provided by the two pillars of international law relating to occupation - the Fourth Geneva Convention and the Hague Regulations. These are outlined in this chapter, together with

the various UN Security Council and UN General Assembly resolutions specifically relating to Palestinian water resources. In addition, a number of other international agreements relating to shared water resources are examined. A review of the role of international third parties illustrates the selective application of these regulations, and the consequences for Palestinians in the Occupied Territories.

International regulations determine exactly what an occupying power can and cannot do in occupied territory. In summary:

- an occupying state does not acquire the right of sovereignty over the territory it occupies [or the territory's natural resources]; it merely exercises *de facto* authority;
- occupation is by definition a provisional situation; the rights of the occupant over the territory are merely transitory;
- in exercising its powers, the occupant must comply with two basic requirements: fulfilment of its military needs, and respect for the interests of the inhabitants;
- the occupying power must not exercise its authority in order to further its own interests, or to meet the needs of its own population.¹

These principles are derived from, among others, two international conventions relating to belligerent occupation: the Hague Regulations of 18 October 1907, and the Fourth Geneva Convention Relative to the Protection of Civilians in Time of War of 1949. The purpose of international law relating to belligerent occupation is to provide guidelines within which an occupation must be administered. Aside from the human and social harm caused by prolonged Israeli occupation, the economic costs have been formidable, as a 1992 American Academy of Arts and Sciences study group reports:

If the Fourth Geneva Convention were applied to the Occupied Territories, a wide range of measures that harm economic life would cease, notably land confiscation [and other natural resources, including water resources], the establishment of settlements, the imposition of punitive taxes, and collective punishments such as curfews, restrictions on travel and commerce, and the closure of universities. Those changes would introduce an element of security and predictability into economic life in the Occupied Territories.²

**International
regulations and
conventions relevant
to protection,
management and use
of water resources in
occupied territory**

The Hague Regulations (1907)
The Fourth Geneva Convention (1949)
United Nations Security Council Resolutions
(UNSCR 465, 466)
United Nations General Assembly
Resolutions
Helsinki Rules (1966)
Salzburg Resolutions (1961)
Stockholm Declaration (1972)
World Commission on Environment and
Development (1987)

HAGUE REGULATIONS OF 1907

The Hague Regulations are widely believed to constitute one of the main components of customary international law and are thus, according to one legal expert, 'binding on all nations'.³ Although Israel has not signed the regulations, the Israeli High Court has twice accepted that the Hague Regulations are binding in relation to its occupation of the West Bank and Gaza Strip.⁴ The humanitarian nature of these regulations is meant to ensure and uphold an occupying state's various responsibilities towards the local population, as well as various rights relating to state and privately-owned property.

During the Jordanian administration of the West Bank (1948-1967), groundwater was considered state property, and water resources located on privately-owned property (including wells and springs) were considered privately owned. However, at the onset of the Israeli occupation, Israel ruled that *all* water was state property, including private wells and springs (Military Proclamation 2, 1967).

The Hague Regulations distinguish between 'moveable' and 'immoveable' property; a vital distinction given the provisions for exploitation and use of one and not the other by a belligerent occupier. The Regulations accept that the occupying state exercises *de facto* authority over moveable property, but not immoveable property. And, although groundwater is not mentioned as immoveable, the definition given in *Article 53* of moveable property does not apply to water; '... generally moveable property belonging to the State which may be used for military operations', includes '... depots of arms, means of transport [and] stores and supplies'. In their petition to the International Water Tribunal, the Palestinian Hydrology Group (PHG) shows that although *Article 53* of the Hague Regulations does not mention groundwater as immoveable, the West Bank's water resources do fall within the category of immoveable property.⁵ They explain:

Neither international law, nor hydrology make a distinction between water *per se* and the geologic formations in which water is located. International law thus works with a *territorial* [emphasis added] concept of water with which land and water are integrally related and thus immoveable.⁶

Article 55 of the Hague Regulations gives the occupying state the right of guardianship, exploitation and use of natural and other resources, but not the right of ownership, disposal or transfer to its own state:

The occupying State shall be regarded as an administrator and usufructuary of public buildings, real estate, forests and agricultural estates belonging to the hostile State, and situated in the occupied country. It must safeguard the capital of these properties, and administer them in accordance with the rules of usufruct.⁷

In addition, *Article 52* of the Hague Regulations limits the rate of exploitation by the occupier to previous exploitation rates; one exception is when resources are required by the occupying army to fulfil military needs, and even then safeguards are built in for the civilian population under occupation. In summary, '... the occupying authority cannot increase exploitation of the resource, other than for strictly military purposes [again within the safeguards provided by the Hague Regulations]. The only means left for the occupying authority to increase the rate of exploitation would be to increase the level of service provision for the civilian population, according to *normal use*.'⁸ And as to Israel's argument that the prolonged nature of its occupation of the West Bank and Gaza Strip allows it to do otherwise, El-Hindi explains:

To hold that an occupying power can unilaterally redefine normal use patterns, would negate any meaning that the doctrine would have regarding proper limits to an occupying power's actions.⁹

In two similar cases concerning natural resources in occupied territory, exploitation of the resource by the occupier was said to violate *Article 55* of the Hague Regulations and was thus illegal under international law. First, during its occupation of the Sinai peninsula in the 1970s, Israel was involved in a dispute with the US over previously unexploited oil fields in the Gulf of Suez. The US government insisted that the oil resources were immoveable and that exploitation of previously unexploited immoveable property was precisely what *Article 55* was intended to prohibit.¹⁰ A second example involved Japanese exploitation of oil deposits in the occupied Dutch East Indies during

the Second World War. The Singapore Court ruled that the oil deposits were immovable and thus exploitation was prohibited under Article 55.¹¹

Article 43 of the Hague Regulations states that an occupying power shall '... take all the measures in [its] power to restore and ensure, as far as possible, public order and safety, while respecting, unless absolutely prevented, the laws in force in the country'. Israel has altered and changed the previously existing laws in both the West Bank and Gaza Strip to such an extent as to render them almost unrecognisable (see Chapter 4). More importantly, the Israeli authorities declared *all water* to be state property; *Article 46* of the Hague Regulations is intended to ensure that 'private property ... must be respected ... [and] cannot be confiscated'. As one legal expert concludes, 'any unauthorised interference with such property amounts to illegal confiscation'.¹²

There are three exceptions to this provision: where use is limited to the occupying army, in relation to the resources of the country; if expropriation of private property is in accordance with pre-occupation laws, or if all expropriated resources are paid for by the occupying army. Israel has not complied with any of these exceptions with regard to its requisition of private property. Water resources from the Occupied Territories supply the Israel National Water Carrier and Israeli settlements.

The system of military orders instituted by Israel has dramatically altered pre-existing statutory and customary law, and far from being compensated for the water Israel takes from the Occupied Territories, Palestinians are denied adequate access to their own water resources.

All extraction and use of water by Palestinians in their own land requires permission, which is usually denied, from the military's Civil Administration. Having declared the water resources state property, a legal web was created to deny Palestinians use of their own water resources for all but the bare minimum required for domestic purposes.

The internationally accepted definitions and distinctions of water - whether moveable, immovable, state-owned, or privately-owned - are fundamental given the significant transfer of Palestinian water resources from the Occupied Territories to the Israeli network for use inside Israel as well as for Israeli settlers. As a 1992 UN report on water resources in the Occupied Territories explains:

Since the water resource management practices of Israel ignore administrative, political and hydrological boundaries, the Israeli authorities are in a position to transfer water from one basin or aquifer to another, both within the West Bank and from the West Bank to other areas. Water of the Jordan basin is diverted into the Israel National Water Carrier and distributed to other Israeli basins. Water abstracted from the groundwater

aquifer of the West Bank is likewise conveyed into the same National Water Carrier. These waters are sometimes transferred from the National Water Carrier back to Israeli settlements ... in the Golan Heights and the West Bank. This method of 'water-sharing', permitted under Israeli legislation, suspends the basin-of-origin protection clauses found in the legislation in force in the West Bank prior to occupation.¹³

Although official Israeli communiques to the UN insisted that no water is transferred from the Occupied Territories into its own territory, and that no wells exist which abstract water from the West Bank to the Israel National Water Carrier, nor to other users outside the West Bank,¹⁴ an earlier official Israeli statement to the UN did admit to the pumping of water from the West Bank to Israel.¹⁵ Other official and non-official sources similarly admit to the transfer of Palestinian water resources to Israel. A paper from the Israeli Ministry of Foreign Affairs notes that, 'before 1967, much of Israel's water sources were dominated by hostile forces in the Golan Heights and Judea/Samaria [West Bank] ... [since] before and after 1967, all the residents of these areas have used the water resources jointly. Man-made boundaries are meaningless when dealing with the common use of limited resources.'¹⁶

Israel's effective control of internationally determined shared water resources, coupled with the lack of any rights given to Palestinians over these shared resources, has enabled it to unilaterally extract large amounts of water from what should be shared resources. Israeli analyst Benvenisti believes that the ratio of current extraction from the transboundary reserves (the aquifers) is 95.5 percent to Israel, and 4.5 percent to Palestinians in the West Bank.¹⁷ This can hardly be described as shared output of a shared resource. An Israeli Ministry of Agriculture advertisement in the *Jerusalem Post* in 1990 acknowledged that a significant amount of Israel's natural water supply comes from the Yarkon-Tanninim aquifer in the West Bank.¹⁸

FOURTH GENEVA CONVENTION (1949)

Although Israel is a signatory to this Convention, it refuses to accept the Convention's *de jure* applicability to its occupation of the Occupied Territories. The UN Security Council and UN General Assembly, and the rest of the international community, unanimously accept its applicability to the Palestinian West Bank, Gaza Strip and East Jerusalem. As the 1990 US Government Country Report explains:

The United States considers Israel's occupation to be governed by the Hague Regulations of 1907 and the 1949 Fourth Geneva Convention

Relative to the Protection of Civilians in Time of War. Israel does not consider the Convention applicable but states that it observes its humanitarian provisions.¹⁹

The Convention requires that an occupying power take full responsibility for meeting the needs of the civilian population under occupation. The Fourth Geneva Convention was specifically formulated to be humanitarian in character and to reinforce the Hague Regulations and other international conventions and regulations. Contrary to its word, however, Israel has violated the humanitarian aspects of the Convention to which, it claims, it adheres.²⁰ According to *Article 47* of the Convention:

Protected persons who are in occupied territory shall not be deprived, in any case or in any manner whatsoever, of the benefits of the present Convention by any change introduced, as the result of the occupation of a territory, into the institutions or government of the said territory ... nor by any annexation by the latter of the whole or part of the occupied territory.

The Commentary to the Convention explains that this is meant to prohibit 'unilateral action on the part of the victor to dispose of territory he [sic] had occupied'; in other words, 'anticipated annexation' of water resources is forbidden. Israel's actions are clear violations of this provision; as the Israeli Ministry of Agriculture's advertisement in the *Jerusalem Post* (1990) explained:

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 sewage systems, and of the associated infrastructure, including the power supply and road network, essential to their operation, maintenance and accessibility.²¹

This principle prohibiting 'anticipated annexation' has been upheld by Israel's Supreme Court:

Long-term fundamental investments in an occupied area bringing about permanent changes that may last beyond the period of the military administration are permitted if required for the benefit of the local population - provided there is nothing in these investments that might introduce an essential modification in the basic institutions of the area.²²

Israel has violated this principle on a number of counts. Firstly, significant

changes to water investments have been introduced and undertaken, and many are irreversible. Secondly, according to the Convention, those water investments are only to be used for the local population or for the occupying forces and their administration. However, those civilians who have been transferred from Israel to the Occupied Territories, Israeli settlers (prohibited by *Article 45* of the Convention), use significant amounts of water; they are doing so illegally and in clear breach of the Convention. And as a recent UN report commented, 'Israeli settlements are often found on the most suitable sites in terms of abundance of groundwater and soil quality'.²³ In the Gaza Strip, for example, the majority of Israeli settlements are found in the southern part of the Strip where water resources are less contaminated. The Washington-based Foundation for Middle East Peace cited that by 1991, approximately 220,000 Israeli settlers were living in the Occupied Territories; 120,000 in East Jerusalem and 100,000 in the West Bank and Gaza Strip.²⁴ Even the pro-government *Jerusalem Post* explained that,

Under the circumstances, there was little justification for putting Jewish settlers in the territory or allowing them generous water supplies ... The gain to the Jewish settlements was certainly a loss to the local community.²⁵

Article 53 prohibits any destruction by the occupying authorities of property. According to an expert at the Gulf Centre for Strategic Studies in London, water levels are currently at dangerously low levels. Water quality has deteriorated, rendering much of it useless even for irrigating crops, let alone fit for domestic use by the local population. Increasing numbers of Palestinian wells are drying up as their water sources are depleted by neighbouring Israeli settlements and considerable amounts of water continue to be transferred from the supposedly shared aquifers under the West Bank to supply Israel's National Water Carrier. As legal expert, Dillman, explains: 'While it is true that water is not actually "destroyed", it is rendered unusable for the local population'.²⁶

Israel's management of Palestinian water resources has not only largely destroyed these water resources, but now threatens the condition of Israel's own water resources. According to Dillman, 'Israeli practices resulting in the increased and possible permanent salination of underground aquifers is clearly a destruction of property within the meaning of *Article 53*'.²⁷

Article 147 of the 'Commentary to the Convention' describes 'extensive appropriation of property, not justified by military necessity' as a grave breach of the Convention. This covers 'the case of requisitioning on an extensive scale', regardless of the distinction between private and public property.²⁸

In addition, *Article 55* states that an occupying power can only requisition 'foodstuffs, articles or medical supplies' (what the official

Commentary describes as 'any article necessary to support life')²⁹ if they are to be used by the occupying forces or administrative personnel, and even then only if the needs of the local population have been taken into account. In addition, '... subject to the provisions of other international conventions', the occupying power must ensure that fair value is paid for any requisitioned goods or resources. This is reinforced by *Article 54 of Protocol I* which confirms that requisitioning constitutes a form of removal.³⁰ And, the Commentary to the Convention further reinforces *Article 55*: the occupying power 'may not requisition supplies for use by its own population'. *Article 56* obliges the occupying state to ensure and maintain public health and maintain medical services, which, as Chapter 4 illustrates, is not upheld by the occupying Israeli authorities.

Although Israel is party to this Convention, it has officially annexed East Jerusalem and has dramatically changed pre-occupation (Jordanian and Egyptian) laws that conflict with this provision, including rights and access to water supplies and Palestinian-managed institutions. As a 1980 UN Security Council report concluded, Israel's policies concerning the West Bank's water resources amounts to nothing less than a 'clear and gross violation of the Fourth Geneva Convention'.³¹

UN SECURITY COUNCIL RESOLUTIONS

As with the above conventions and regulations, the UN Security Council has been clear in its condemnation of Israeli practices and abuses of Palestinian water resources. In 1979, based on various UN General Assembly resolutions, the UN Security Council, under *Resolution 446*, established a commission:

To investigate the reported serious depletion of natural resources, particularly water resources [in the Occupied Territories], with a view to ensuring the protection of the territories under occupation.

The recommendations from this commission were approved by the UN Security Council under *Resolution 465* in 1980. They concluded that 'the changes of a geographical and demographic nature in the Occupied Territories, including Jerusalem, brought about by Israel, constitute a violation of the Fourth Geneva Convention and of the relevant decisions adopted by the Security Council in the matter'.³² The report noted, for example, that in the early days of the occupation, the Israeli authorities blew up 140 water pumps in the West Bank and Palestinian farmers were subsequently prevented from pumping water from the River Jordan as a substitute for irrigation. The report concluded that the Israel Water Commission 'has taken direct control of the

water in the occupied Palestinian territory', and that 'the economic activity of a number of Palestinian inhabitants had already been reduced to subsistence level, as the water originally available to them has been turned to the benefit of the Israeli settlers'.³³

The Commission's recommendations included the 'need to consider measures for the impartial protection of private and public land and property, and water resources', 'to continue to examine the situation relating to settlements in the Arab territories occupied since 1967, including Jerusalem, and to investigate the reported serious depletion of natural resources, particularly the water resources, with a view to ensuring the protection of those important natural resources of the territories under occupation'.³⁴ As the PHG notes, 'so far such measures have not been enacted'.³⁵

The Commission's findings were adopted by the UN Security Council (*Resolution 465*, 1 March 1980). Twelve years later in 1992, a UN report on Palestinian water resources concluded that, '... the Council has yet to address the Commission's report and the protective measures in need of consideration'.³⁶

UN GENERAL ASSEMBLY RESOLUTIONS

Countless resolutions have been adopted by the UN General Assembly in relation to permanent sovereignty over natural resources, both generally and specifically, relating to Palestinian natural resources. Those general resolutions which have been adopted to protect the sovereign rights of peoples and states over their natural resources include *Resolution 1803 (XVII)* of 14 December 1962 (signed by both Israel and the US) which states,

Violation of the rights of peoples and nations to sovereignty over their natural wealth and resources is contrary to the spirit and principles of the Charter of the United Nations and hinders the development of international cooperation and the maintenance of peace.

Although the Occupied Territories do not, as yet, constitute a state, the above declaration recognises the full applicability of international law to peoples as well as territory defined as occupied.³⁷

Moreover, *Resolution 3171 (XXVIII)*,

... supports resolutely the efforts of the developing countries and the peoples of the territories under colonial and racial domination and foreign occupation in their struggle to regain effective control over their natural resources.

And, *Resolution 3101 (XXVIII)* supports the right of

... states, territories and peoples under foreign occupation, alien and colonial domination or apartheid to restitution and full compensation for the exploitation and depletion of, and damages to, the natural resources and all other resources of these States, territories and peoples.

And, still further, *Resolution 3281 (XXIX)* declares that:

No State has the right to promote or encourage investments that may constitute an obstacle to the liberation of a territory occupied by force.

Concerning permanent sovereignty over natural resources in the occupied Palestinian and other Arab territories, the General Assembly has time and time again reaffirmed its support for permanent sovereignty for the Palestinians over their natural resources. 'Throughout the 1980s ... the General Assembly has "strongly condemned the illegal exploitation of the natural wealth and resources" of the Occupied Territories and called upon Israel to desist immediately from such activities'.³⁸ Relevant resolutions include: 37/135; 36/173; 35/110; 34/136; 38/144 and *Resolution 32/161*, which calls on Israel to stop its exploitation of the human and natural resources in the Occupied Territories and reaffirms that these resources belong to 'the Arab states and peoples whose territories are under Israeli occupation'.

Resolution 2995 (XXVII) 'emphasises that, in the exploration, exploitation and development of their natural resources, States must not cause significant harmful effects in zones situated outside their national jurisdiction'. *Resolution 3336 (XXIX)* acknowledges Palestinian sovereignty over the Occupied Territories and its natural resources; *Resolution 3005 (XXVII)* affirms 'the principle of the sovereignty of the population of the occupied territories over their national wealth and resources'. All these resolutions called on Israel to halt its illegal policies and measures regarding its use of natural resources in the Occupied Territories and reaffirm the right of Palestinians '... to full and effective permanent sovereignty and control over their natural and other resources, wealth and economic activities'.³⁹

The *International Covenant on Economic, Social and Cultural Rights*, adopted by the UN General Assembly in 1966, and ratified by Israel, states that:

- 1 All peoples have the right of self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development.

- 2 All peoples may, for their own ends, freely dispose of their natural wealth and resources ... In no case may a people be deprived of its means of subsistence.
- 3 The States party to the present Covenant, including those having responsibility for the administration of Non-Self-Governing and Trust Territories, shall promote the realisation of self-determination, and shall respect that right, in conformity with the provisions of the Charter of the United Nations.

Similarly, other international legal conventions and resolutions are applicable to peoples, territory and resources defined as occupied under the laws of belligerent occupation. Regardless of the fact that the West Bank and Gaza Strip do not currently constitute a state, these laws are applicable to the Palestinians living under occupation. As the Palestinian plaintiffs note in their petition to the Second International Water Tribunal: 'whatever the status of the West Bank, whether under occupation, or as a sovereign territory, Israel has obligations concerning shared water reserves and has to ensure that water policies undertaken within the State of Israel are not prejudicial to rights of water entitlement by West Bank [and Gazan] Palestinians'.⁴⁰

HELSINKI RULES OF 1966

The Helsinki Rules on the *Uses of Waters of International Rivers of 1966* provide a comprehensive codification of international water law. Adopted by the International Law Association, to which Israel is a signatory, in 1966. *Article IV* states that:

Each basin state is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

And *Articles VII* and *VIII*, which refer to 'reasonable use', state that:

A basin state may not be denied the present reasonable use of the waters of an international drainage basin to reserve for a co-basin State a future use of such water.

There are two vital components concerning transboundary water resources: firstly, 'prior apportionment', whereby all users must be in agreement and be satisfied before new claims can be honoured; and secondly, 'equitable

apportionment' where each user is entitled to, and allocated, an equal portion of the shared resource. In its petition to the Second International Water Tribunal, the PHG explains that 'if Israel could prove that its current use of shared West Bank groundwater was "reasonable", it would still be obliged to change its current groundwater use patterns if other competing reasonable uses had not been fully considered. If shared water resources are developed in such a way as not to allow for the modification or termination of an existing use, this would run contrary to the practice of international water law. Therefore Israel would have no privileged right to water, either by "prior apportionment" or by historical circumstance. It would always be required to renegotiate its reasonable use in order to accommodate other competing uses. Similarly so would other riparians.'⁴¹

In statements to the UN, Israel has stated that it accepts the principle of equitable distribution among riparians as a 'well-established right'. And in response to a UN report, Israel also indicated that it accepts the principle that interference by one country in the surface or groundwater flow has repercussions on the activities of other countries sharing the same basin, and that the effects of any activities in connection with water resources are particularly felt in downstream territories which depend on upstream water supplies.⁴²

SALZBURG RESOLUTIONS OF 1961

These resolutions - 'The Utilisation of Non-Maritime International Waters' - were adopted by the *Institute of International Law* in Salzburg in 1961. They provide the basic framework when examining issues concerning international water resources. *Articles 3 and 4* detail the responsibilities and obligations for co-riparian states. According to *Article 3*:

If the States are in disagreement over the scope of their rights of utilisation, settlements will take place on the basis of equity, taking particular account of their respective needs, as well as other pertinent circumstances.

And with regards to equitable apportionment, *Article 4* reads:

No state can undertake works of utilisation of the waters of a watercourse or hydrographic basin which seriously affect the possibility of the utilisation of the same waters by other states except on condition of assuring them the enjoyment of the advantages to which they are entitled under *Article 3*, as well as adequate compensation.

STOCKHOLM DECLARATION OF 1972

Principle 21 of the Stockholm Declaration affirms that, '... in accordance with the Charter of the United Nations and the principles of international law, [a state has] the sovereign right to exploit their own resources pursuant to their environmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction'.⁴³

WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT OF 1987

Article 13 of the Commission's report reiterates the principle that 'states shall apply as a minimum at least the same standards for environmental conduct and impacts regarding transboundary natural resources and environmental interferences as are applied domestically (i.e. do not do to others what you would not do to your own citizens)'.⁴⁴

ROLE AND RESPONSIBILITY OF INTERNATIONAL THIRD PARTIES

These international regulations and conventions set a clear framework within which the international community and international third parties should stop, or at least limit, violations by an occupying power in occupied territory. Although Israel has adopted a policy that is unilateral, exclusive and clearly discriminatory in character with regards to its occupation of the Occupied Territories, neither the 'legal' status of its policies, nor the status of Palestinian water resources, nor the effects of these policies on the Palestinian population have been challenged by international third parties. As the PHG concludes in its petition to the Second International Water Tribunal:

No rulings have been made on the laws of international water as they pertain to belligerent occupation. The plaintiffs attribute this to the failure of the High Contracting Parties to enforce laws of belligerent occupation. Only international enforcement will lead to the fuller integration and interpretation of international conventions, international custom, general principles of law, judicial decisions and academic opinion regarding water.⁴⁵

This neglect was described in a recent UN report:

Despite available legal protection and growing expressions of concern,

the international community has not so far found appropriate measures for the protection of the Palestinian water resources.⁴⁶

CONCLUSION

From the general principles of the Fourth Geneva Convention and the Hague Regulations, to specific UN Security Council resolutions on the question of Palestinian water resources, a framework for use and allocation of water resources in the Occupied Territories does exist. In practice, however, Palestinians have received no protection from the international community for access to, and distribution of, their water resources. This failure to act accepts, by default, Israel's claim that it has *de facto* sovereignty over Palestinian water resources. And despite the safeguards provided under international law, Israel has been able, largely unhindered, to proceed with its effective annexation and exploitation of Palestinian water resources. In their petition to the Second International Water Tribunal, the Palestinian plaintiffs warn that:

Israel's denial of recourse to international law and the assumption that international law has nothing to say about present modes of exploitation of West Bank groundwater may have much to do with the lack of third party concern for the issue ... It is also evident that the character of the type of control being exerted by Israel is more closely associated with the needs of the occupying state than with the population under occupation. As yet these developments have not been governed by any recognised legal regime.⁴⁷

The international community, including those institutions that coordinate international law and practice on a global level, has failed, over 27 years of Israeli occupation, to protect Palestinian water rights. It remains to be seen what the recent peace agreement between the PLO and Israel will resolve for the area's dwindling water supplies. Palestinians believe their right to sovereignty over their water resources must be recognised, as must their right to decide how to use those water resources. They believe it is their right to participate, on an equal basis, in any jointly-managed committee or agreement on the issue of water resources, including those that are shared. While international law has failed them in the past, many Palestinians believe that within a negotiated peace agreement, international legislation should be used to ensure that their rights and needs are recognised.

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Israeli soldier in the occupied Golan Heights surveys Jordan from above the
Yarmuk River
A BRUTMANN

historical background

3

We are in a water war with the Arabs. The fate of the Jewish state depends on the result of this battle. If we do not gain this battle, we will achieve nothing.

David Ben Gurion, 1956¹

Israel's desire to control the region's water resources has played a crucial role in political, economic and military developments since 1948. Indeed, even before the establishment of the Israeli state, water played a key role in the Zionist colonisation of Palestine.

As early as 1919, Chaim Weizmann, campaigning for the 'minimum requirements essential to the realisation of the Jewish National Home' in Palestine, wrote to the then British Prime Minister Lloyd George:

The boundaries [of the Jewish Home] cannot be drawn exclusively on historic [biblical] lines ... [o]ur claims to the north are imperatively demanded by the requirements of modern economic life ... The whole economic future of Palestine is dependent on its water supply for irrigation and for electric power, and the water supply must mainly be derived from the slopes of Mount Hermon, from the headwaters of

the Jordan and from the Litany River [in Lebanon] ... [W]e consider it essential that the National Frontier of Palestine should include the Valley of the Litany, for a distance of about 25 miles above the bend, and the Western and Southern slopes of Mount Hermon.²

As international legal expert Dillman explains, the borders Weizmann was proposing 'covered not only all of present-day Israel and the occupied territories of the Gaza Strip, the West Bank, and the Golan Heights, but also significant portions of Lebanon, Syria and Jordan'.³

Having outlined major treaties and agreements, both those adopted and those that failed, this chapter illustrates that the political content and bias of water policies of successive Israeli governments is bound up with the belief that control of all the region's water resources is vital to Israel's very existence and livelihood. Palestinians assert that this belief is more political than factual. If a negotiated water agreement is effected between the PLO and Israel, many Palestinians believe that the historical injustices can be rectified, and that the rights and needs of each population can be addressed and catered for in a sustainable and equitable manner.

PAST TREATIES AND AGREEMENTS

Since the early years of Zionist colonisation, several attempts were made to draw-up treaties aimed at resolving the dispute over Palestine's water resources. It was clear that whoever controlled the water sources also controlled the economy. Most early treaties considered more favourably the requirements and expectations of the Jewish settler population at the expense of the indigenous Palestinian population.

Lowdermilk Plan (1944)

The Lowdermilk Plan was clearly aimed at supplying the anticipated Jewish state with as much water as it desired, regardless of natural constraints and without consideration for Palestine's indigenous population. Lowdermilk proposed a massive water development project, the 'Jordan River Valley Authority', modelled on the Tennessee Valley Authority in the US. This would allow the development of '... farms, industry and [the provision of] security for at least four million Jewish refugees from Europe, in addition to the 1,800,000 Arabs and Jews already in Palestine and Transjordan'.⁴ Lowdermilk envisaged the irrigation of the Jordan Valley, water diverted from the Jordan and Yarmuk rivers to supply hydroelectric power plants, the diversion of water from the north of Palestine to the Naqab desert in the south and use of the Litani River in southern Lebanon.

Hayes Plan (1948)

The Lowdermilk Plan laid the foundation for the Hayes Plan, which was commissioned by the World Zionist Organisation. Hayes, an American engineer, had helped develop the Tennessee Valley Authority, and he was asked to elaborate on the Lowdermilk Plan. He recommended that half of the Yarmuk River's water supply be diverted to Lake Tiberias to replace water lost by the diversion of the upper Jordan River as outlined in the Lowdermilk Plan. This was recommended despite the fact that the Yarmuk River forms the border between Jordan and Syria and only ran along the border of the anticipated Jewish state for a very short distance. Hayes recommended that the other half of the Yarmuk be allocated to Transjordan, however '[this allocation] must await the completion of the previous irrigation works and diversions for the River, which will enable a more accurate determination of what is left in the Jordan'.⁵ The expectations and requirements for the new Jewish state were paramount.

United Nations Partition Plan for Palestine (1947)

The partition of Palestine into two states, one Palestinian Arab and the other Jewish, was adopted by the UN in 1947. At the time, Palestinians comprised 70 percent of the population and owned 45 percent of the land; the Jewish community comprised 30 percent of the population and owned only 7 percent of the land; the rest of the land was state-owned and administered by the British Mandate Authorities.⁶ Under the Partition Plan, the Jewish community was allocated 55 percent of the land, and the Palestinians only 45 percent of their original homeland. In addition to granting the Jewish population a larger proportion of land, the UN Partition Plan allocated the new Jewish state a significant amount of historic Palestine's water resources. As Hayes explained:

The Jewish state was awarded an area embracing the upper reaches of the Jordan in the north ... thereby the opportunity was given for carrying out the basic conception of the Lowdermilk-Hayes project.⁷

The president of the Zionist Organisation of America, Dr Emmanuel Neuman, confirmed this:

Fortunately, those who had been responsible for working out the details of the United Nations partition plan, were familiar with the basic aspects of the Lowdermilk-Hayes project and took it largely into account in drawing the boundaries of the new states ... Thereby the opportunity was given for carrying out the basic conception of the Lowdermilk-Hayes project: To carry the waters of the north ... to the fertile plains and to the

parched but potentially rich lands in the southern part of the country ... The Jewish State was thus provided with far-reaching possibilities for utilising the most vital natural resource of the country for large-scale irrigation, agricultural colonisation and hydroelectric development.⁸

According to recent studies by Israeli historians, Zionist acceptance of the UN Partition Plan was merely a tactical decision, aimed at preventing the establishment of a Palestinian state, leaving open the possibility of further Zionist expansion onto land designated by the UN for the new Palestinian state. Thus, when the much expanded State of Israel was declared in 1948, following the 1947-48 war, no reference was made to the UN Partition Plan or to any internationally recognised borders.⁹ As David Ben-Gurion explained: 'I do not see partition as the final solution of the Palestine question ... after the formation of a large army in the wake of the establishment of the state, we will abolish the partition and expand to the whole of Palestine'.¹⁰

The new Israeli state immediately began work on its water projects. In 1953, construction of the National Water Carrier began, according to the basic outline developed under the Lowdermilk-Hayes project.¹¹ This involved significant diversion of the Jordan River, which Syria protested against to the UN since it violated the ceasefire agreement.¹² The US considered Israel's moves to be provocative and threatened to cut off aid to Israel, which then stood at \$50 million annually.¹³ Israel backed down and instead the Israeli National Water Carrier was supplied with water from Lake Tiberias.

Johnston Plan

As conflict over water resources in the remainder of historic Palestine, Syria, Jordan and the newly-declared Israeli state intensified, especially in the Jordan Valley, US President Eisenhower sent a special envoy, Eric Johnston, to mediate in the conflict. The Johnston Plan, as it has come to be known, was in fact prepared by Charles Main. One significant drawback to the plan was that it dealt only with surface water and not with underground sources, the aquifers, which comprise the major source of historic Palestine's water resources. In addition, it did not take into account the needs of the Palestinians as a people with sovereign rights over their water. Both the Arab states and Israel objected to the plan and both prepared their own counter plans; the Arab Technical Committee Plan and the Cotton Plan respectively. A comparison of the different water allocations (in million cubic metres) for each country in the three plans is detailed below:

water allocations

country	Johnston Plan	Cotton Plan	Arab Technical Committee Plan
Israel	394mcm	1,290mcm	200mcm
Jordan	774mcm	575mcm	861mcm
Syria	45mcm	30mcm	132mcm
Lebanon	-	450.7mcm	35mcm

The Cotton Plan included the Litani River in its distribution of the region's water sources; 400mcm of its waters were allocated to Israel and 300mcm to Lebanon.

Johnston updated his plan, incorporating some aspects of the separate Arab and Israeli plans. Although this was the first attempt to create a development plan for the whole of the Jordan River basin, each update increasingly favoured Israel. Israel's share rose from 394mcm in the original plan, to 565mcm in Johnston's final plan of October 1955; Jordan's share dropped from 774mcm to 720mcm.¹⁴ Although the Arab Technical Committee was prepared to accept the modified version of the Johnston Plan, it was rejected by the Arab League on political grounds. Whether or not Israel was prepared to accept the new Johnston Plan is not clear; contradictory evidence suggests that both sides were prepared to both accept and reject the plan.¹⁵

While both Syria and Jordan argued that quotas should be distributed according to sovereign states' requirements, Israel later argued that its rights had increased because, by 1967, it controlled the Golan Heights, the West Bank and the Gaza Strip. As one analyst explained: 'Israel pursued claims on water quotas, using rights on the basis of a military occupation which [was] rejected by the international community ... on the basis of the Jewish settlements in the West Bank and the Golan Heights - settlements which are considered unlawful by the international community'.¹⁶

Despite the absence of a formal acceptance of the Johnston Plan, both the Arab states and Israel have based subsequent water development plans on its main principles. However, without formal acceptance, the Arab countries and Israel were free to continue work on their own independent water plans.

Israel's work on the first stage of its National Water Carrier project prompted the neighbouring Arab states to threaten to decrease the flow of water to Israel. The Huleh swamps, for example, situated in the demilitarised zone in the north between Israel and Syria, were reclaimed by Israel in 1951, and linked to the

Israeli National Water Carrier. Although Israel was bound by the ceasefire agreement not to make any changes in the area, Israel kept insisting on its right to cultivate all of the Huleh Valley, and had, even by 1950, established agricultural settlements in the demilitarised zone. When, in 1953, Israel began implementing its plan to divert water from the Jordan River to Lake Tiberias in the demilitarised zone along the Syrian border, 'Israel [was] placing herself in a situation in which hostility from Jordan and Syria was aggravated'.¹⁷

The Arab states' decision to increase their use of their water resources was to be partially accomplished through the construction of two storage dams on the Yarmuk River, the main tributary of the Jordan River, and by diverting water from the Baniyas River in the Golan Heights to Syria and Jordan. At an Arab states' summit meeting in 1964, a proposal was discussed to divert the headwaters of the Jordan River and work on various projects begun in 1965.¹⁸ Conflict soon erupted; Israel accused the Arab states of aggressive actions and proceeded to attack Syrian projects on the Baniyas in 1965, and again in 1966.¹⁹

These confrontations ended when, in 1967, Israel attacked and occupied the West Bank and Gaza Strip and the Syrian Golan Heights. All Syrian projects came under Israeli control and all their equipment was captured.²⁰ If not the main issue, conflict over water resources was certainly one of the major factors which led to the 1967 war; as Israeli journalist Yehuda Litani wrote in *Ha'aretz* in 1978, 'it is possible that this is the true reason, so far unknown, for the eruption of the Six Day War'.²¹

And, since 1967, conflict over these shared resources has not subsided. To help counter its chronic water shortage, Jordan began work on the Maqarein Dam Project on the Yarmuk in 1974-75, to provide water for irrigation in the Jordan Valley. However, because the project would reduce Israel's access to water from the Yarmuk, Jordan was asked by the funders of the project (the major funder was USAID) to come to an agreement with Israel before construction could begin.²² Part of the dam was to be built on Syrian territory, so Syria also had to be consulted. Since no agreement could be reached between Jordan, Syria and Israel, the project was shelved in the late 1980s.²³ And more recently, Jordan's application to the World Bank for funding for the US\$350 million Wahda dam, the so-called Unity dam on the upper Yarmuk, has similarly been postponed because of the World Bank's insistence that all riparians to the water project (Jordan, Israel and Syria) must first give their approval.²⁴ Although Syria agreed to the project, Israel refused to give assurances that it would not attack the dam because of its fears that its own water supplies would be affected.²⁵ With a capacity of 220mcm per year, the dam, it was hoped, would provide water for irrigating several thousand hectares of land in the Jordan Valley, as well as provide an extra 50mcm of water for the cities of Amman and Zarga. In addition, the dam was to provide

electricity, and three-quarters of the output was to have supplied Syria.²⁶ According to Professor Soffer of Haifa University, and a water consultant for Israel's Foreign Ministry, Israel had no need to veto the Unity dam nor to extract water from the Yarmuk.²⁷ Jordan is now forced to spend large amounts of money on deeper drilling for groundwater resources, a cost far in excess of what Jordan can afford.²⁸

ISRAELI OCCUPATION

Israel's occupation of the West Bank, Gaza Strip, and the Golan Heights in 1967, and of southern Lebanon in 1982, changed the nature of the conflict over the region's scarce water resources. Israel, the dominant power, was now in control of all water resources in historic Palestine (the aquifers under the West Bank, surface water in the West Bank and the coastal aquifer bordering the Gaza Strip), Syrian water resources originating in the Golan Heights, the water sources in southern Lebanon, and its occupation of the Golan Heights gave it complete control over Lake Tiberias.²⁹ As an article in the Israeli daily, *Davar*, in 1978 noted:

The state of Israel has ... managed in its short life to engage in confrontations with two of its neighbours, Syria and Jordan, and even mobilize aircraft and raiding forces against them on the question of the exploitation of water of the Jordan and the Yarmuk Rivers.³⁰

The Israeli 'legal system' imposed on the Occupied Territories, embodied in the military orders, and the ensuing political and economic repression and exploitation has enabled the occupying authorities to pursue their political and economic policies and goals unchecked. The repression of all aspects of Palestinian life - economic, legal, social, political and developmental - coupled with Israel's use of military force, has given Israel a virtual free-hand in shaping its policies for using and abusing Palestinian water resources over the past 27 years. A legal net has been created which prohibits Palestinians from using their own water resources as they wish except for the bare minimum of domestic requirements.

Following the Camp David agreement with Egypt in 1977, the then Israeli Prime Minister, Menachem Begin, appointed a committee to formulate Israel's policies concerning continued control of *all* Palestinian water resources. In its discussions with the various water institutions in Israel, the committee heard from the Israeli Water Commission that Israel's water needs and the establishment of new settlements in the occupied Palestinian territories depended on Israel's continued control over all the water resources in any

'autonomy' arrangement for the Palestinians. In 1990, more than ten years later, the Israeli Minister of Agriculture at the time, Rafael Eitan, was reported to have argued in a cabinet meeting that '... giving up control of the State of Israel's main water sources in Judea and Samaria [sic] is absolutely out of the question'.³¹ According to Eitan, Israel's continued control over the West Bank's water resources '... is necessitated by reality' and the Israeli government would be well advised 'to hammer this principle into public consciousness'.³² Recent statements from the Israeli Ministry of Foreign Affairs seem to do just this: 'water, Israel's lifeblood, was manipulated by the Arabs for political reasons. Israel's presence today in Judea/Samaria [sic] and the Golan Heights has prevented this from re-occurring'.³³

By 1992, in the aftermath of the Madrid peace negotiations, statements made by the Israeli delegation, and by Israeli Prime Ministers Yitzhak Shamir, and later Yitzhak Rabin, including position papers, illustrate how little things have changed. Although the present Rabin government has hinted at its readiness to discuss land and water issues with the Palestinians, 'this readiness is based on Palestinian agreement to concede continuing Israeli control over key resources'.³⁴ And with the signing of the Declaration of Principles between the PLO and Israel in Washington DC in September 1993, it remains to be seen whether Israel will cede control over key resources, or whether, in fact, Israeli understanding of 'Palestinian autonomy' is only autonomy for the people and not their land and its resources. A detailed document presented to the Palestinian peace delegation during the seventh round of negotiations at the end of 1992 in Washington DC, explained Israeli journalist, Yoel Marcus, in *Ha'aretz* in September 1991,

... fails to refer to a single issue of any substance for the negotiations. Yet the failure to resolve such issues precludes any kind of progress. The document says nothing about the source of authority nor about anything related to water and land ... the impression is created that in fact there is no real difference in the positions of this and the previous government.³⁵

Rabin explained: 'Our aim is to reach interim agreements of which [the settlements question] will not be a part ... there is no territorial dimension to the interim period ['territorial' includes water and security issues]. Once you start to deal with the territorial dimension, you are tackling the problem of a permanent solution'.³⁶

With events still unfolding regarding the final status of the Occupied Territories, it remains to be seen whether the issue of water, or land, will be discussed during the final stages of the current peace agreement and whether Israel will agree to arrangements for sharing the scarce water resources.

CONCLUSION

When the Centre for Strategic Studies at Tel Aviv University finished a major research project on the implications for Israel of a complete withdrawal from the Occupied Territories in early 1992, publication of the report was censored by the director of the Israeli Water Authority and the then-Minister of Agriculture, Rafael Eitan. Eitan reportedly said that it was not the business of an academic study to define a territorial settlement in the region.³⁷ According to *Ha'aretz*, the study demonstrates that even with complete withdrawal from the Occupied Territories, Israel would still be able to prosper with adequate water supplies. The former director of the Israeli Water Authority, Kentor Cohen, believed it 'strange' that the military censors would have a problem with the report: 'All the details on water in Israel and the Arab states are published by the United Nations and the World Bank ... there are no secrets in this field ... Professionals submit their studies to the decision-makers in the government. Government officials are obliged to consider the facts in these studies, and they decide whether to agree or not ... but they cannot ignore them ... People who say that Israel cannot return the [occupied] territories because of water are politicians - not experts in water issues ... The experts don't say that.'³⁸

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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, salination and pollution* of the aquifers. Relinquishing the western slopes of the Judean and Samarian 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 might 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 problem 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.



Collecting water from spring in Artas village near Bethlehem, June 1992
A BRUTMANN

Israeli policies

4

***E**very dunam cultivated or irrigated by Arabs will lead to the thirst of a dunam in Israel.*
Menahem Cantour, director general of Tahal Water Company, 1979¹

Both before and after 1967, all the residents of these areas have used the water sources jointly ... [and] Israel has not altered the relative balance between the amount of water used by both parties before 1967 ... Over the years, many accusations have been made regarding Israel's use of the water resources in the territories - accusations that are often anchored in misunderstandings or political exploitation and disinformation ... Israel has not reduced the quantity of the aquifer water (as it is often falsely claimed), nor has it affected or damaged its quality.

Israeli Ministry of Foreign Affairs, 1991²

Since the onset of their military occupation, the Israeli authorities were able to gain near absolute control over all water resources in the Occupied Territories. Controlled management of the area's water resources is necessary

given the limited resources available. However, absolute Israeli management and control provides the basis for discriminatory policies and practices in favour of Israelis (including the settlers living in the Occupied Territories) at the expense of Palestinians. The Palestinian Hydrology Group (PHG) believes that 'the type of control ... exerted by Israel is more closely associated with the needs of the occupying state than with the population under occupation'.³ In addition to discrimination in access to water supplies for domestic and other purposes, Israel's control has resulted in a deterioration of the remaining water supplies, especially those in the Gaza Strip. A recent UN report explains: 'Under conditions of Israeli military occupation, water resources of the occupied Palestinian territory are being diverted and used at an alarming rate by Israel, the occupying Power, at the expense of the Palestinian people'.

As a consequence [of Israel's policies], a "man-made" water crisis has been brought about which undermines the living conditions and endangers the health situation of the Palestinian people.⁴

Israel's control was facilitated by a consolidation of the legal structure governing ownership, use and access to water resources. During the first few days of its military occupation in 1967, the Israeli authorities declared all water 'state' property and all previous agreements concerning water null and void. This change has allowed selective access to water; 'state' property in Israel is used for the exclusive benefit of Jewish Israelis, and not all Israeli citizens or those living under Israeli occupation. Stringent controls suppress Palestinian investment and development of water resources and installations, while allowing for the expansion and development of those resources supplying Israeli settlements in the Occupied Territories.

In the stifled and underdeveloped Palestinian agricultural sector limited access to water hinders an already tightly-controlled sector of the local economy. Figures for access to water for irrigation illustrate discrimination between the two populations. In the Gaza Strip, the amount of land under irrigation for Israeli settlers, whose livelihood is agriculture, was seven times higher (per capita) than for Palestinians; in the West Bank the figure is even higher; 13 times more land (per capita) is under irrigation for Israeli settlers than for Palestinians.⁵

This chapter examines the effects of Israeli policies and practices on the agricultural sector, health and sanitary conditions for Palestinians. These are illustrated with some case studies from the West Bank and Gaza Strip. Concerning the Palestinian industrial sector, we found it very difficult to collect accurate information and analyses on the effects of limited access to water. We were therefore unable to include this sector.

ISRAELI MILITARY ORDERS

Israeli policies in the Occupied Territories are enforced by approximately two thousand military orders (up to the end of 1993) issued for the West Bank and a similar, but separate set, for the Gaza Strip. These military orders amend existing Jordanian law in the West Bank, Egyptian law in the Gaza Strip and British Mandate and Ottoman laws. The main military orders (and proclamations) issued for the West Bank concerning water resources are:

Military Proclamation 2 (7 June 1967) All water resources in the newly-occupied territories are to be state-owned and controlled.

Military Order 92 (15 August 1967) Full authority is granted over all matters concerning water to an Israeli officer who is appointed by the Area Military Commander. This officer assumes full control over all water resources, with the power to control all permits for existing and new water installations, permits and licences for new and existing water authorities, and the methods of operation and appointment of directors for all water authorities.

Military Order 158 (19 November 1967) This 'Order Concerning Amendment to Supervision over Water Law' prohibits the construction of any new water installation without a permit. It grants the official the power to refuse a permit, revoke or amend a licence without justification. According to Gwyn Rowley, 'in essence, despite shortages and the depletion of their existing water sources, the Arab population is prevented by the military order from responding positively to that deficit situation through developing other sources'.⁶ When Palestinians try to increase and develop their water supply, they are invariably prohibited from doing so, or wait years for a response from the Israeli authorities. When farmers from A-Fara' village in the West Bank, for example, applied for a licence for an irrigation project in 1978, they waited 8 years until they were finally granted the licence in 1986.⁷

Military Order 291 (19 December 1968) All water resources are declared state property, bringing the West Bank and Gaza Strip's water resources in line with the Israeli Water Law of 1959. *All previous and existing settlements of disputes concerning water were now declared invalid.* This change, argues legal expert Dillman, '... is not consistent with the rights of an occupying power under international law'.⁸ According to the Report of the UN Secretary-General, it resulted in the '... appreciable change in the legal character and economic and social value of land ownership [in the Occupied Territories]'.⁹ This order also considerably increased the jurisdiction of the appointed official under *Military Order 92*.

Military Order 1376 (24 July 1992) Gives detailed specifications regarding the jurisdiction, responsibilities, structure, budget and accounts, property and employment policies for the Bethlehem, Beit Jala and Beit Sahour water and sewage authority; this order cancels *Military Order 484* (15 September 1972) which previously established these water authorities. Wider jurisdiction and control over the authority is given to an Israeli official whose signature is required for almost all the authority's projects and functions.¹⁰

In the Gaza Strip there was no government or administrative body responsible for water supplies and for allocating permits prior to the Israeli occupation. Water use was based on traditional (customary) law; landowners and others were allowed access to water resources for domestic purposes and irrigation. The Israeli authorities permitted access to water supplies on this basis until the 1970s, when restrictions were imposed to control utilisation of the deteriorating and declining resources, and to allow for selective quotas in favour of the expanding Israeli settlements in the Gaza Strip.

Military Order 498 (Gaza Strip) (November 1974) Covers water conservation procedures, supervision of water quality, licensing of distribution and supply and setting prices and fines. The Regional Military Commander appoints an agricultural staff officer as the authorised supervisor of operations.

The fragile water supply in the Gaza Strip dictates that control is necessary. However, the question is, have Israel's actions and policies been introduced in the interests of Palestinians, or have they facilitated Israeli settlements being allocated as much water as possible at the expense of Palestinians' minimum domestic requirements. The facts on the ground suggest the latter is the case. Note, for example, that the issue of water supplies to the refugee camps in the Gaza Strip is not even considered by the Israeli authorities, despite the fact that 80 percent of Gaza's population are registered refugees. Similarly, in terms of investment for the future, the amount of monies and attention allocated to water supplies for Israeli settlements far exceeds that allocated to Palestinians.

INFRASTRUCTURE

Water supply and management in the Occupied Territories is mainly controlled by the Israeli military's Civil Administration. There are a few local Palestinian water suppliers - the Bethlehem, Beit Jala and Beit Sahour Water and Sewage Authority, Nablus Municipality, and the Jerusalem Water Undertaking (based

in Ramallah) which covers the Ramallah/Al-Bireh district and parts of East Jerusalem. However, they all need permission from the Civil Administration to drill new, or renovate existing, wells.

In the West Bank, the Civil Administration's water unit is headed by a staff officer and has four departments: a planning department which supervises and executes all projects; a technical department which monitors and maintains the water systems, as well as providing advice and assistance to municipal and rural councils; a hydrology department responsible for monitoring water resources, including salinity and watertable levels, and an administrative department responsible for employment, finance, as well as requests for new projects.¹¹ According to Palestinian engineer Tamimi, the Israeli water company, Mekorot, is playing a 'dangerous' role. As well as holding technical authority with regard to wells and springs in the Occupied Territories, it has significant authority over the Civil Administration's water officer, and *carte blanche* authority over all technical and administrative activities of the municipalities and village councils in the Occupied Territories.¹²

In the Gaza Strip, a similar unit, headed by a water officer, operates as part of the agricultural staff officer's unit. Domestic water supplies are controlled by the military's Civil Administration. Mekorot supplies some domestic water, distributed through the municipalities and village councils, and controls water sold privately by well owners.

integration into the Israeli national water system

With all water resources in the occupied Palestinian territories declared 'state property', Israel was able to incorporate these resources into its national supply and distribution network. Water could now be freely transferred from one area to another, one basin to another, regardless of whether the basin or aquifer was situated in, or under, the Occupied Territories. Internationally-accepted legal restrictions on the transfer and use of shared water resources were ignored. Not surprisingly, the only instance in which Israeli occupation law is more lenient than Jordanian statutory and customary law (in force in the West Bank prior to 1967), concerns the transfer of water from one drainage basin to another (or within basins) or from one aquifer to another.¹³

According to a number of reports, water has been transferred from the Gaza Strip to supply the Naqab inside Israel.¹⁴ As an extension of its control over the Gaza Strip, the Israeli authorities undertook the integration of Gaza's water network into the Israeli national network, described in the 1986 Israeli State Comptroller's report:

In 1982, the government of Israel decided to connect the water system of southern Gaza to the water system of the State of Israel. Jewish settlements

would be supplied by water from the Israeli water system; the existing water sources would be reserved [!] for Arab settlements, including the wells that formerly supplied the Jewish settlements.¹⁵

In 1982, under the auspices of the then Israeli Minister of Defence, Ariel Sharon, control of all the water resources at Israel's disposal was given to Mekorot. The process of connecting all Palestinian towns and villages to Israeli national water networks was initiated - effective annexation¹⁶ - a policy no different to others designed to integrate the Occupied Territories into the 'Israeli system'. As the 1986 Israeli State Comptrollers Report explained, 'the civil administration ... transferred seven water works, including equipment, to Mekorot, according to prior agreement. The Water Staff Officer estimated the worth of these assets at 5 million dollars. The transfer of assets was not recorded in the property ledgers of the region; nor were any permits for receipt of the equipment found in the unit's files.'¹⁷

Structural integration intensified and increasing numbers of Palestinian towns and villages were integrated into Israel's national water network. Whereas in 1967, only 50 villages in the West Bank were connected to water supply systems,¹⁸ between 1967 and 1984, 150 Palestinian villages and 10 towns were connected to the main water systems of the Civil Administration or municipal councils, and plans were underway to connect a further 50 villages with water. In some instances this control was direct. In the case of Ariel settlement near Nablus, a central pumping station was built in the settlement to give the settlers complete control over supply and distribution of water for the neighbouring Palestinian villages.¹⁹

JERUSALEM

*Water supply in Jerusalem has always been like a noose around the city's neck. Michael Dumper, 1993.*²⁰

In June 1980, the Israeli Knesset (parliament) passed the Jerusalem Basic Law which 'officially' (and illegally) annexed Palestinian East Jerusalem. East Jerusalem's water system had, however, already been connected to the Israeli supply system; as Michael Dumper notes, 'within days of the occupation of East Jerusalem [in 1967] ... the Water Department of the Israeli Municipality of Jerusalem connected pipes between the two systems ... this was part of the "integration of services" to which Israel was prepared to admit, rather than to accept the term annexation'.²¹ This 'integration' of Palestinian towns and villages to the Israeli national water network has been resisted by Palestinians 'as affronts to their sovereignty over their own natural resources'.²² In 1990,

the *Jerusalem Post* reported that the Jerusalem Municipality had substantially reduced the water supply to 'Azzaria village, on the outskirts of East Jerusalem, because of the village's refusal to pay the high water bills the municipality said it owed.²³ This was the second time that year that the Municipality cut off approximately 75 percent of the water supply to a Palestinian area; previously the supply to Shufat Refugee Camp was cut as a result of a dispute between the military's Civil Administration and the Jerusalem Municipality over who was responsible for the total cost of supplying water to the camp.²⁴

Current Israeli policies concerning water resources in Jerusalem indicate two things. First, as Michael Dumper notes above, the supply of water to East Jerusalem and surrounding towns and villages has been used by Israel in its creeping *de facto* annexation policy; 'Municipality pipes have been extended ... this extension of the Municipality's services is consistent with its attempts to be the sole supplier of water in Jerusalem and with the government's attempt to secure physical control over Jerusalem'.²⁵ Secondly, Israel's control over land and resources, in what it claims as 'Greater Jerusalem', enables it to exploit at will the water resources. At least five wells, for example, have recently been drilled by Mekorot in the Bethlehem area to satisfy the needs of the mainly Israeli residents of West Jerusalem.²⁶

MEKOROT & TAHAL

Mekorot and Tahal are the two Israeli water companies which plan, design and construct water projects in Israel, and since 1967 in the Occupied Territories. They are responsible for the supply and management of water resources as well as for the drilling of all new and existing wells and the construction of irrigation and water supply projects.

These companies are part-owned by different Zionist and Israeli organisations whose role is to further exclusive Jewish Israeli interests. Mekorot was established by the Jewish Agency, the Histadrut and the Jewish National Fund (JNF) in 1937. Tahal was established in 1952 by the Israeli government, which holds 52 percent of the shares; the remainder are held by the Jewish Agency and JNF. Tahal is responsible for overall planning and design of Israeli water development projects.

Although Israeli water law treats water as '... state property ... subject to the control of the state and ... destined for the needs of its inhabitants and the development of the country',²⁷ the crucial and central role played by Mekorot and Tahal in Israel's water policies and planning in the Occupied Territories violates this declaration. This process has been explained by Uri Davis and Walter Lehn:

Through deliberate and conscious legal formulations predicated on the manipulation of the meaning of terms such as person, nation, etc., the State of Israel has succeeded in presenting to Western intellectual and public opinion its far-reaching apartheid legislation as progressive social democracy. This manipulation is predicated on the rather different meanings ascribed to the terms in Zionist usage, where 'person' is read as 'Jewish person', 'public' as 'Jewish public', 'the people' as 'the Jewish people', 'nation' as 'Jewish nation', and 'Israel' as 'the people of Israel' (i.e. the community of adherents to Judaism to be distinguished from the citizens of the State of Israel, and even from the Jewish citizens of the state).²⁸

Discrimination is evident in development plans for water supplies. Between 1974 and 1983, the JNF invested nearly \$16 million in West Bank projects; and, in 1983, the Israeli government spent \$5.5 million on water development projects in the West Bank! 'Nearly all of these projects benefited Jewish Israeli settlers exclusively'.²⁹

FOREIGN AID

While negligible amounts of money from official Israeli sources are spent on development and planning of water resources for Palestinians, foreign aid is also restricted. The Israeli authorities have a history of selective approval for projects aimed at helping and encouraging Palestinians to help themselves. Permission for a project in Jiflik in the Jordan Valley, for example, which would have reduced water evaporation by replacing open irrigation ditches with pipes, was rejected by the Israeli authorities. The project was to have been sponsored by an American volunteer organisation.³⁰

Most foreign development and aid organisations are forced to submit project applications for Israeli military approval; the military can refuse or delay any application on 'security grounds'. As Sara Roy notes, those projects which are approved are very rarely development or productive projects, but usually those of a consumptive nature, which '... tie indigenous communities to the Israeli infrastructure such as ... state-controlled water and electricity ... These ties also enable the authorities to withhold services to a given community as a form of collective punishment'.³¹ In addition, until 1992, all money coming into the Occupied Territories had to be declared along with its source. Development of water facilities, both sanitary, domestic and especially agricultural, has suffered severely.

Of projects actually implemented in the Occupied Territories, Israeli analyst Benvenisti notes that approval was granted for consumption-related

projects at a rate of 44 percent, whereas the approval rate for development projects, including water facilities and resources, was 33 percent.³² (For more information on the restrictions and problems facing foreign donors, see the JMCC's report on *Israeli Obstacles to Economic Development in the Occupied Palestinian Territories*.³³)

WELLS AND SPRINGS

Given the apparent Israeli objective of preventing increases in the use of water in the West Bank in order to protect the flow of water from the West Bank to the Israeli aquifers, and given the Israeli policy to support fully the water needs of the settlements, it is difficult to see how the water management system that has been established can operate without discrimination.

United Nations, June 1984³⁴

Israel operates discriminatory policies in relation to wells and springs. As Palestinian economist Hisham Awartani explains, 'the basic underlying objective of all Israeli policies in this connection is trying to restrict pumping from Arab wells to the bare minimum so that the largest volume of usable groundwater is preserved for Israeli use'.³⁵ While Palestinians are denied permission to dig new wells and deepen existing ones, wells serving the Israeli settler population are drilled in close proximity to existing Palestinian wells and are often sunk to greater depths. An ex-water commissioner, Ze'ev Golani, said in an interview that since 1978, Palestinians applying for permission to drill wells into the deep mountain aquifer (the Turonian-Cenomanian aquifer) were refused because the aquifer was already being fully-utilised, especially by Israeli settlements.³⁶

Given that approximately half of the groundwater used in the West Bank, and over half of that used in the Gaza Strip, is supplied by wells, the effects of these policies are significant. While few permits are given to Palestinians, Mekorot has received permission to sink approximately 30 deep-bore wells with an average yield of 1,640mcm to serve Israeli settlements.³⁷ And whereas permits for wells serving Israeli settlements are granted for depths up to 500m, the few permits given for Palestinian wells restrict the depths.³⁸ Palestinians are prevented from drilling below 60-150 metres in the West Bank and 15-80 metres in the Gaza Strip.³⁹ Awartani reports that only 23 new permits for Palestinian wells have been issued for the West Bank since 1967; 21 for public institutions, three for irrigation wells, and the rest for domestic use. In the Gaza Strip, between 1967 and 1990, 630 wells were

constructed by Palestinians, including some which are no longer in use.⁴⁰

Because of restrictions on maintenance and redevelopment, the condition of Palestinian wells is poor. Many well beds have accumulated large amounts of silt; the pipes and well structures are worn-out and in need of repair or replacement - leakage of up to 20 percent is the result of a 30-year-old antiquated pipe distribution system. The pumping engines are old and of low horsepower, and have low fuel efficiency. And, despite the appalling condition of wells, any repairs require permission from the Israeli water authorities.

According to Palestinian engineer Mohammed Subeih, about 80 percent of well failure is the result of encrustation from dirt or other deposits.⁴¹ Encrustation is one of a number of problems which, with constant monitoring, can be prevented. And, Subeih notes, this is something that can be done even within current restrictions imposed by the Israeli military authorities. What is needed is a comprehensive management project which can offer advice and expertise to individual well owners.⁴² If such action is taken, Subeih believes that the discharge from half of the existing wells could be doubled. While permission is sometimes given for repairs and replacing engines, permits are rarely given for the deepening of existing wells. Even for repairs or replacement of equipment, farmers have to cover the total cost of the repairs as, according to Awartani, there are no international or other funding organisations which currently fund such development.⁴³

The most severe constraint facing Palestinian well-owners is the restriction on construction of distribution reservoirs. Such reservoirs cut fuel costs, regulate water distribution and facilitate modern irrigation techniques. According to Awartani, by 1992 there were 188 reservoirs in the West Bank, 177 of which were located in the Jordan Valley. The majority were built in the early years of the Israeli military occupation.⁴⁴

In the Qalqilia and Tulkarem areas in the northern West Bank, Israeli wells pump a total of 320mcm per year, while Palestinian wells pump only 20mcm per year - a situation Awartani described as a 'lion and bear partnership'.⁴⁵ More serious is the condition of the Palestinian wells: '... out of 70 small wells, at least 60 are in a desperate state [because] permission for repair work has been refused'.⁴⁶ At a workshop organised by PHG in Jerusalem, Awartani challenged Palestinians to confront Israeli policies restricting well construction and improvement at the UN: '... new wells must be dug. We have been convinced for the past twenty-four years that Israel does not allow for the issuance of licenses for wells, why can't we Palestinians for once try to drag Israel to the United Nations on the issue of one well? [especially since] the possibility of digging wells exists.'⁴⁷

Unable to expand to deeper depths, increasing numbers of Palestinian wells go dry or supply increasingly saline water. A UN Security Council report

in 1980 gave numerous examples of Palestinian population centres, including al-Ouja, Ramallah, al-Bireh, Bardala, Tel el-Beids and Kardala, whose water supply was drastically cut as a result of new wells being drilled for nearby Israeli settlements.⁴⁸ And in Jericho, the increasingly saline water pumped from local wells has been attributed to two wells sunk by the Israeli government which serve Israeli agricultural settlements in the Jordan Valley.⁴⁹

In *Foreign Policy*, Cooley notes that many wells in the Gaza Strip have been blocked and sealed by the Israeli authorities, in some instances to prevent them from draining nearby wells supplying Israeli settlements.⁵⁰ And in the *Journal of Palestinian Affairs*, Harmlani cites the Israeli closure of 25 artesian wells outside Zawaydeh, and 42 wells in the Rafah area in the Gaza Strip.⁵¹ According to Sara Roy, the Gaza Strip's main water reservoir, located in the north, is not accessible to Palestinians, but reserved for the exclusive use of Israeli settlements.⁵² The situation in the West Bank is similar. Hydrology expert Gwyn Rowley explains that,

On the West Bank the deep-bore wells with powerful pumps, referred to locally as 'Jewish wells', have been developed down to some 300-600m below the surface, and even lower in certain localities ... where a number of these deep pumped wells are working, their intersecting cones of depression produce a general lowering of the water table and the traditional wells are left literally high and dry. As a result, pastures may dry out ... Not only is the quantity of water severely depleted in the traditional wells, but the quality and salinity of the water may change quite dramatically.⁵³

Israeli overpumping has had a major impact on the level of the water table and the quality of the remaining water resources. The water table of the two aquifers in the West Bank has fallen significantly as a direct result of Israeli policies and practices. The water table in the Jordan Valley fell by 16 metres between 1969 and 1991, and 26 wells dried up completely. In the Jenin district it fell by 10 metres.⁵⁴

In terms of groundwater quality, the concentration of salts and chlorides in the vast majority of the West Bank and Gaza Strip's water resources has increased markedly since the onset of the Israeli occupation. In the Jordan Valley as a whole, for example, the total salt concentration rose 130 percent between 1982 and 1991, and by approximately 200 percent in the Jericho area. Similarly, the chloride concentration rose during the same period by some 50 percent in this area.⁵⁵

the Mawassi al-Bahar wells

In 1988, the Israeli authorities demanded that all small wells used for irrigation in the Gaza Strip be registered. This restriction was introduced despite the fact that other major supplies were no longer accessible to Palestinians and existing supplies had been contaminated by pesticide infiltration and over-exploitation by neighbouring Israeli settlements. Approximately 31 wells had been drilled to serve Israeli settlements situated between Khan Younis and Rafah. Palestinian sources believe this change was introduced to raise taxes from well owners and to attempt to limit the amount of water used by Palestinians. When Palestinian well owners refused to register their wells the Israeli authorities declared them illegal. A military order was issued rendering all wells located within a 500 metre band from the seashore, which had been previously exempt, illegal. According to a local farmer, settlers began to destroy Palestinian wells and land under cover of darkness.

Israeli wells

The situation regarding Israeli-administered wells is completely different. Using considerably more advanced technology they operate at depths of between 400-600 metres with powerful pumps driven by electricity. As one would expect they are far more efficient than Palestinian wells.⁵⁶ In addition to their performance, the allocation of water far exceeds that of Palestinian wells.

WATER ALLOCATION

The amount of water permitted to be pumped from wells in the Occupied Territories is determined by quotas set by the military's Civil Administration and the Israeli water authorities, Mekorot and Tahal. Quotas set in 1976 were reduced by 10 percent in 1986. Although both Palestinians and Israelis exceed quotas on occasion, it is not clear whether Palestinians are more heavily penalised than Israeli settlements. In some instances well owners have been dealt severe fines, or had other sanctions imposed on them.

Awartani notes that 38 percent of wells sampled in the West Bank are in fact using 90 percent or less of their allocated quota. He attributes this to a decline in the profitability of irrigated agriculture and recent improvements in the efficiency of irrigation practices.

The amount of water pumped by Israeli-administered wells in the Occupied Territories has increased in line with the continuing settlement policies of successive Israeli governments. From 1977, 1984 and 1990, the total annual amount rose from 13.8mcm to 43.1mcm to 52mcm respectively. This means that 32 Israeli wells account for 47 percent of the total quantity of water discharged from wells in the West Bank, with 364 Palestinian wells

accounting for the remaining 53 percent.⁵⁷ In the Gaza Strip, Israeli-administered wells discharged a total of 4.5mcm in 1990, 2.5mcm of which was used by Israeli settlers in the Gaza Strip, with the remainder sold to local Palestinian authorities. On a per capita basis this amounted to 758 cubic metres used by each settler and 137 cubic metres for each Palestinian.⁵⁸

water prices

Water prices in Israel are set by the Ministry of Agriculture, while consumer prices in the Occupied Territories are set according to recommendations of an advisory council appointed by the head of the military's Civil Administration. Whilst Palestinians are charged the full costs of the water they use, for domestic, agricultural and industrial purposes, Israeli settlers have the costs of their water supplies subsidised by the World Zionist Organisation (WZO).⁵⁹ According to a 1992 report by the Israeli Peace Now movement, in 1987 Israeli settlers paid NIS 0.15 per cubic metre for water for agricultural use and NIS 0.23 for domestic use. In contrast, in the same year, Palestinians were charged NIS 0.70 per cubic metre for water from Mekorot, regardless of whether the water was for domestic or agricultural purposes.

Costs of water in Jerusalem are slightly different: NIS 0.64-0.75 for the first 15-20 cubic metres, and NIS 1.6-1.8 for additional water used. And according to Peace Now, 'the extent of current subsidisation [for settlers] of water consumption [in Jerusalem] is not clear'.⁶⁰

The Israeli authorities have long used restrictions on water resources as a means of collective punishment. When the water supply to Hebron in the West Bank was cut off in August 1984, Palestinians were forced to buy water from settlers in the nearby Kiryat Arba settlement at a cost of JD 25 per tank (NIS 90).⁶¹ And in February 1993, residents from Beit Reema, Deir Ghassaneh, Kufar 'Aeen and Qarawat Bani Zeid villages had their water supply cut off for four days with no reason given, despite having paid all their bills.⁶²

AGRICULTURE

Our good luck is that the agriculture in the West Bank is not developed.

Israeli journalist **Amon Magen**, *Davar*, 26 November 1978

Although there has been a decline in the number of Palestinians working in agriculture, agricultural production is still the backbone of the Palestinian economy. Israeli discriminatory policies and restrictions on this sector have been devastating; land is continuously being confiscated using a variety of methods (currently some 60 percent of the West Bank and 50 percent of the

Gaza Strip's land is under direct Israeli control). The host of permits and licenses required at each step of the agricultural production process strangles almost all development and initiative, as do quotas imposed (by military order) on the cultivation of certain crops. Severe water restrictions exacerbate these problems. The livelihood of a substantial section of the population is affected.

One-quarter of Palestinians employed in the West Bank work in agriculture (approximately 16 percent of the total population, or some 160,000 people). In the Gaza Strip, of the 60 percent of families who make their living locally within the Gaza Strip, ⁶³20 percent do so from agriculture - approximately 85,000 people. The proportion of Israeli settlers who live off agriculture in the Occupied Territories is 6 percent of the total settler population, approximately 6,000 people predominantly living in settlements in the Jericho, Gaza, Hebron and Bethlehem areas. ⁶⁴

Direct action is taken to force Palestinian farmers to comply with military orders restricting water extraction from Palestinian wells while Israeli agricultural settlements in the West Bank and Gaza Strip face no restrictions in drilling water for irrigation purposes. ⁶⁵ In February 1991, for example, ten wells were destroyed by Israeli bulldozers in the village of Beit Ula in the Hebron district; water pumps were confiscated and citrus trees destroyed. ⁶⁶ The Israeli Democratic Front for Peace and Equality petitioned the government for an explanation for this destruction, and for compensation to the villagers, estimated at US\$ 500,000.

Shortages of water, together with land confiscation and the declining profitability of agriculture, have led to a fall in total Palestinian agricultural production, from 32.5 percent of the GNP in 1970, to 24.9 percent in 1986. And partly as a consequence, the agricultural labour force fell from an estimated 79,000 workers in 1970, to 41,600 workers in 1986. ⁶⁷

al-Qa'rara village⁶⁸

Situated in the southern part of the Gaza Strip, and covering an area of some 15,000 dunams, Al-Qa'rara village is home to approximately 8,000 people, most of whom earn their living from agriculture. Six thousand dunams of village land are planted with fruit trees, including olives and date palm; 4,000 dunams are planted with vegetables; there are approximately 100 plastic greenhouses, and the remaining 5,000 dunams lie uncultivated because of the water shortage and the increasingly difficult economic climate for marketing agricultural produce.

A local farmer reported that the salt water content of the village's water supplies has increased dramatically. Of the 33 underground wells in the village, more than half are now unsuitable for agriculture and for livestock. Of these, ten wells east of the village were sealed by the Israeli authorities in 1991, who

also prevented a further ten wells from being used. Of the remaining wells which the villagers consider to contain relatively sweet water, the percentage of chlorides in the water is more than 800 parts per million (the recommended WHO level is 250mg/litre). The farmers in the village say that water from the main well in the village, 'Bir Al-Kurd', which supplies most of the drinking water, tastes exactly the same as sea water.

In an interview with *Al-Maraya*, the newsletter of the Palestinian Agricultural Relief Committees (PARC), a group of farmers from Al-Qa'rara explained the difficulties they encounter as a result of the high price of water; the price of pumping water for one hour is between NIS 30-50, a sizeable amount given that the daily wage in the Gaza Strip is approximately \$10 (NIS 29). The farmers mentioned Israel's tough restrictions on the amount of water permitted to be pumped by the village, an amount which, they said, was being reduced each year. The result has been a fall in agricultural production by approximately 40 percent, and a shift in the types of crops planted from citrus and vegetables to almonds which require less water.

There are two schools in Al-Qa'rara which are supplied with water only one day a week, and according to one student, even this water is very salty. School children were interviewed on their way to school carrying their water bottles, which they take with them to school so that they can fill them up from what is considered to be the best well in the village; a well with a chloride content of 800 parts per million.

decline of cultivated and irrigated land

Although improvements in irrigation and farming techniques have resulted in a drop in the amount of water used in agriculture, by the late 1980s, 32 percent of the irrigated land still used traditional irrigation methods.⁶⁹ Overall there has been a significant fall in the area of irrigated land cultivated by Palestinians: from 322,000 dunams in 1970, to 101,300 dunams in 1984. According to a recent Peace Now report, from a total of 115mcm of water received by Palestinians in the West Bank, 100mcm was used for irrigation. And in the Jordan Valley, out of a total of 40-50mcm in 1990, 30mcm was used for agricultural purposes.⁷⁰ By 1991, of the total amount of land confiscated by Israel since 1967, 200,000 dunams was under cultivation, and according to Peace Now, approximately 50,000 dunams of this was irrigated (65 percent of the total). And whereas 4 percent of the total area cultivated by Palestinians is irrigated, the area under irrigation in Israeli settlements accounts for some 20 percent of the total area of irrigated land in the Occupied Territories. The severe reduction in the amount of Palestinian land under irrigation in the West Bank illustrates the effect of Israeli policies; from 27 percent in 1967, the area has fallen to 3.7 percent in 1992.⁷¹

A recent Israeli Civil Administration report explains, 'amounts of water drawn in Judea and Samaria [sic] have remained fairly constant over the past twenty years'. The report admits that the lack of water has been one of the limiting factors affecting the expansion of Palestinian agriculture; '[the] ability to continue with the intensification is severely limited, on the one hand by the lack of water (water quotas have not increased since 1969) and on the other hand by the rockiness of the rest of the land, which does not allow for expansion of cultivation'.⁷² This rockiness, however, does not seem to have deterred increased cultivation by Israeli settlers. Similarly, in the Gaza Strip, the area of land under citrus cultivation, the largest crop in the Gaza Strip, fell from 80,000 dunams in 1967 to 63,000 dunams in 1989, and citrus production fell from 237,100 tons in 1975/76, to 174,300 tons in 1989/90.⁷³

The ratio of irrigated land to the total amount of land under cultivation in the West Bank is only 4 percent, compared to 12 percent in Jordan, 11 percent in Syria, 20 percent in Lebanon, and 49 percent in Israel.⁷⁴

cultivation and irrigation inside Israel

Figures for the area of land in Israel under irrigation show an overall increase, although this has now started to fall. From 300,000 dunams in 1949, the total area of land under irrigation increased to 1,616 million dunams in 1968, and to 2,153 million dunams in 1987. For the same time period, the area of land inside Israel under cultivation rose from 1,650 million dunams to 4,136 million dunams in 1968, and to 4,384 million dunams in 1987. Since 1987, however, amounts of water used in agriculture have been declining.

Israel's agricultural sector is still extremely water intensive and requires extensive irrigation. And within Israel, the kibbutzim (collective agricultural settlements) are the single largest users of water. In 1985-86, over 50 percent of the cultivated land in Israel was irrigated, most of which was in the kibbutzim. Many kibbutzim changed to single-crop production during the economic crisis in the 1980s, and one of the main crops adopted was cotton, a water-intensive crop which has the potential to create a highly unsustainable agricultural sector. More recently, as cuts in water supplies have been introduced (according to the *Jerusalem Post International*, water consumption in the farming sector was reduced by 40 percent in 1990/91),⁷⁵ calls have been made from Israel's Water Commissioner, Zemach Yishai, and the Israeli Finance Ministry,⁷⁶ for an end to the production of water-intensive crops such as cotton.⁷⁷

migration from Al-Ouja village

The Israeli authorities constructed four wells in the Al-Ouja area north of Jericho to tap the main aquifer in Al-Ouja to supply water to the Israeli

settlements in the Jordan Valley. The Al-Ouja well, located in the Jordan valley, is 70 metres deep with a normal discharge of approximately 90 cubic metres per hour. During the winter months it has a much higher flow rate as spring water from the rain recharges the well.

The construction of the new, and deeper, Israeli wells led to local Palestinian wells and springs drying up; 1,300 dunams of bananas were laid waste. An additional 150 dunams of citrus were also destroyed; and Palestinian land under vegetable cultivation fell to approximately 2,000 dunams in the whole of the Jordan Valley.⁷⁸ Palestinian farmers are now forced to buy water from Mekorot.

Ten farming families were forced to leave the village and move to Jericho. However, because of the heavy winter rains in 1991 and 1992, some farmers were able to begin cultivating their land again using the rain water they had collected. In the long run, though, they cannot rely on this source of water because it depends on the unpredictable rainfall during the winter season.

irrigation in Jericho: the Arab Development Society⁷⁹

The Arab Development Society (ADS) was established in 1948 to reclaim exhausted land, and to provide employment for orphans from the Jericho region. The land owned by the Association covers an area of 8,000 dunams, of which 2,000 dunams were confiscated by the Israeli authorities. By 1993, 2,000 dunams were used for agricultural production, and 4,000 dunams were left fallow because of lack of water.

Although there are 14 wells situated on the land, only five are currently in use because of Israeli restrictions preventing refurbishment of the ones in poor condition. According to an engineer working with ADS, the Israeli authorities have granted licenses for wells up to depths of 150 metres, but for deeper wells the application has to go through the Israeli courts. In order to reach water suitable for agriculture, wells need to be drilled up to a depth of 300 metres and permission is not usually given to Palestinians, while the wells in the Israeli settlements in the Jordan Valley drill to depths of 450 metres or more. The depth of drilling determines the chloride content of the water; water from Palestinian wells contains up to 1,800 parts per million, whereas water from Israeli wells does not exceed 600 parts per million.

While Israeli wells extract between 350-450 cubic metres per hour due to their greater depth, Palestinian wells, restricted to a depth of 150 metres, produce only 50-60 cubic metres per hour. And while Palestinian farmers have to bear the full brunt of the costs of pumping water, water prices for Israeli settlers are subsidised by various Zionist organisations. As a result of the high salinity of the water, ADS has found it impossible to grow certain crops, including potatoes, grapes and citrus fruit. Fodder, which used to be grown in

large amounts to the east of Jericho, can no longer be grown because of the increased salinity of the water. Palestinians in the Jericho region are forced to buy fodder from neighbouring Israeli settlements.

greenhouse project in Khan Younis

A greenhouse project, 5 kilometres south-east of Khan Younis, covers an area of 2,000 square metres, and receives water from a local well and from rainwater run-off collected from its roof (an almost salt-free source of water). The rainwater is collected and stored in a closed cistern built underground, even though the average annual rainfall is low at only 250mm. The stored water is pumped into a water tank where it is mixed with local groundwater. By mixing equal quantities, the water has only 400 parts per million chlorides. It is then pumped into the greenhouse and applied using a drip irrigation system. Such projects are very successful because of their ability to combine four improvements: a reduction in evaporation, collection and reuse of rain water, use of brackish groundwater, and effective and economical use of water using drip irrigation techniques.

HEALTH

The water supply and sewage system in all Palestinian towns, villages and refugee camps is grossly inadequate. Many villages, and most refugee camps, have very limited water supplies and no sewage disposal system. According to the *Christian Science Monitor*, this is a deliberate policy; 'for Palestinians living under Israeli military occupation, water shortages are not so much a function of nature as of politics'.⁸⁰ According to the 1986 Israeli State Comptrollers report, 'in most cities of Judea, Samaria [sic] and Gaza, untreated sewage is allowed to run freely into the wadis so that the contamination of groundwater becomes a distinct possibility'.⁸¹ Untreated sewage runs freely onto the streets, and, as is the case in the Gaza Strip, directly into the sea.

Sewage from Israeli settlements is often allowed to run freely onto neighbouring Palestinian-owned land, destroying not only the land and crops, but also contaminating the water supply for the surrounding area (see below).

Israeli analysts Schiff and Ya'ari warned that, 'the worst problem [in Gaza] threatens to be the availability of water - and not just for agricultural purposes, for it is the consumption of drinking water that stands to rise appreciably with the growth of the population. The greater the demand on local wells, the more sea water will penetrate the water table, making its yield ever saltier until it is no longer potable'.⁸² With a current population of around 750,000, Gaza's population is expected to rise to over 1 million by the turn of the century.

The supply of domestic water in the Gaza Strip is entirely from shallow groundwater sources. Whereas most Palestinian towns are now connected to a piped water supply network, small villages and outlying communities obtain their supplies from local wells. According to Israeli analyst Kahan, 90 percent of the population in cities and towns in the Gaza Strip have piped water, and 60 percent of residents in small towns and villages.⁸³ This may mean, however, piped water for as little as 20 minutes each day and not a 24 hour supply. In the West Bank, estimates indicate that approximately 51 percent of Palestinian villages are not connected to a water network, and rely mainly on springs and rainwater.⁸⁴ And in the refugee camps throughout the Occupied Territories, the piped water distribution system is limited, with most households dependent on alternative supplies from natural springs, wells and rainwater collection tanks.

Khan Younis Refugee Camp⁸⁵

According to residents of Khan Younis Refugee Camp, the piped water supply to their homes, with a high salt content, is only turned on for 20 minutes each day by the local municipality. The Khan Younis Municipality provides water for 85 percent of the refugee camp's residents, while the remaining 15 percent is supplied by UNRWA.⁸⁶ Camp residents have to collect water from a standpipe situated half a kilometre from the camp near the hospital. Nasser Hospital was supplied with piped water by the Israeli Civil Administration in 1984 when the hospital opened its kidney department.

According to one of the doctors from the camp's UNRWA clinic, the number of diseases that can be traced to the bad quality of the camp's water supplies is very high. He explained that between 5-8 percent of the camp's residents are suffering from giardia, which, he said, was not surprising given that up to 50 percent of the camp's water supplies were found to contain the bacteria. In addition, he noted that the incidence of people with kidney stones had increased significantly, and other diseases, including typhoid and dysentery, were also prevalent in the camp. Although there are private wells in the camp, they are in need of repair and improvements. These are prohibited by the Israeli authorities without prior permission. UNRWA does not administer any new wells in Khan Younis Refugee Camp and the UNRWA office itself has only one well whose water cannot be used for drinking because of the high chloride content. Some residents in the camp were given permission to dig new wells in 1991. However, they have been unable to start construction because of a lack of funding.

contamination of Gaza's water supplies

There is no one institution responsible for sewage and sanitation in the Gaza Strip. All projects have to fit into the master plan prepared by the Israeli Civil

Administration, which does not cover the refugee camps (and consequently a large percentage of the population) for political reasons.⁸⁷

Lack of coordination or rational planning has led to the rapid contamination of the water resources from pesticide and fertilizers and as a result of the completely ineffective management system for waste water. Because of the lack of a piped sewage system, raw sewage is often collected in pits and consequently seeps into the underground water supplies. A recent Israeli State Comptroller report warned that 'if a solution is not expedited ... the problem will cause greater damage, and the financial investment required will be much greater than it would be today'.⁸⁸ A new sewage system for the Gaza Strip will cost \$16 million (at 1987 prices), but, as Joyce Starr of the Washington-based Centre for Strategic and International Studies notes, 'Israel has refrained from making significant investments in West Bank and Gaza Strip water and waste water services ... [other donors and NGO's] have attempted to address this need, but only in a piecemeal fashion'.⁸⁹

Sources in the Gaza Strip, including Dr Akram Matter of the Gaza Environmental Programme, say that there is a high incidence of kidney disease in Gaza due to the high salinity of water, caused in part by the high chloride content. Palestinian and overseas medical workers at Al-Ahli Arab Hospital in Gaza have also expressed concern at the increased incidence of kidney disease and other medical conditions related to highly saline and contaminated water supplies.⁹⁰ Excessive amounts of nitrates caused by contamination from sewage, widespread throughout the Strip, also has detrimental effects.

West Bank rural surveys

The Palestinian Health Development Information Project has, over the past few years, carried out field research on primary health care in Palestinian communities throughout the West Bank. Below is a summary of their findings concerning water supplies in different areas of the West Bank:

Interim Report 1: Jenin area (1990). Of the 70 communities surveyed, only 24 communities were supplied with piped water by Mekorot - 88,906 people, or 45 percent of the total population included in the survey. Remaining communities collected rainwater or water from natural springs. Of the 70 communities, only one, Jenin Refugee Camp, reported being partially-served by a piped sewage system for 25 percent of the camp.⁹¹

Interim Report 2: Tulkarem area (1991). From a total of 90 communities in the survey, 32 (36 percent) had piped water networks, serving 58 percent of the population. Mekorot served 14 of these networks; 13 were fed from local spring water, and the remaining five were controlled by the Tulkarem and

'Azzun municipal councils. Of the remaining communities, 42 (47 percent) obtained their domestic water supplies solely from rain-fed cisterns, although none had access to water quality checks of any kind.⁹² One community had no water supply and was forced to use draft animals to carry water from nearby communities.⁹³

Interim Report 3: Ramallah area (1991). Of a total of 92 communities surveyed, 77 communities, covering 85 percent of the rural population, had piped water supplies. Forty-seven of these were supplied by the Jerusalem Water Undertaking and the others were supplied by Mekorot.⁹⁴

Interim Report 4: Nablus area and the Jordan Valley (1992). Of a total of 53 communities surveyed, 25 rural communities, comprising some 56 percent of the rural population, had access to piped water supplies; six communities were supplied by local springs, and the rest by Mekorot or the Nablus Water Authority. Of those communities with no access to piped water supplies, 13 obtained their water from rain-fed cisterns only, and 15 from rain-fed cisterns and natural springs.⁹⁵

sanitation and sewage

Sanitary conditions in many villages, and especially in the refugee camps, are appalling. So-called 'black water', direct from toilets, often seeps directly into the ground, contaminating the shallow groundwater supplies and percolating to the deep groundwater supplies. This is one of the main causes of high nitrate levels in groundwater sources, especially in land under the refugee camps. So-called 'grey water', waste water from other domestic activities, is usually collected in open drains and ditches, or runs freely on the streets.

With one of the highest population densities in the world (1,857 people per square kilometre), and poor water supplies, one quarter of the Palestinian population in the Gaza Strip has no running water in their homes.⁹⁶ In Shati Refugee Camp (Beach Camp) in the Gaza Strip, the sanitary conditions are particularly abominable. The sewage system consists of open ditches running alongside houses and draining directly into the sea. During the fishing season, the sewage openings to the sea are sealed causing the ditches to overflow and spill over onto the streets and often into houses.

The Israeli authorities have failed to take seriously the sewage and sanitation problems in the Gaza Strip. This is not because they are unaware of the critical situation. The 1986 Israeli State Comptrollers Report explained that, 'most of the sewage water is not purified, and contaminates the water table'.⁹⁷ Even their sewage 'master plan' in the early 1980s did not take into consideration the refugee camps, home to nearly half of the Gaza Strip's

population. And attempts by UNRWA and the United Nations Development Programme (UNDP) to connect the camps to existing or planned municipal facilities have proved extremely problematic.⁹⁸

According to the 1986 Israeli State Comptrollers Report, sewage is allowed to run freely out of many Israeli settlements. In 1983, the settlers' Samaria Regional Council, for example, began improvements on settlements' sewage facilities; '[their] solutions were not always successful and health hazards resulted'.⁹⁹ And, according to a review of waste disposal in Palestinian towns and cities by the Israeli Health Commission in 1986, critical sewage disposal problems were found in all the main Palestinian towns including Nablus, Ramallah, El-Bireh, Jericho, Bethlehem, Beit Jala, Beit Sahour and Hebron, as well as in all the refugee camps. The Commission noted that investment in sewage systems for these towns and cities would require tens of millions of dollars.¹⁰⁰

EFFECTS OF ISRAELI SETTLEMENT

Throughout the Occupied Territories, Israeli settlers, with official Israeli government approval, deprive neighbouring Palestinian towns, villages and refugee camps of water supplies. In 1986, the Israeli authorities drilled a well to serve settlers in the Herodian area near Bethlehem. This was in addition to four wells already serving the same settlements. According to a statement released by the Bethlehem Water Authority on 29 June 1986, the well was intended to pump 8,000 cubic metres per hour to serve both surrounding settlements and Israel via the National Water Carrier. According to the Water Authority, five Palestinian wells in the Bethlehem and Hebron areas were expected to dry up as a result of construction of the new wells.¹⁰¹ Israel claims ownership of 80 percent of the water reserves in the Bethlehem area. In another instance, villagers from Bardala and 'Ain al-Baida, both situated on some of the most fertile land in the Jordan Valley, found their land virtually worthless when their wells dried up as a result of deep well drilling by neighbouring settlements.¹⁰²

Ain Yabroud and Ofra settlement¹⁰³

For the past 13 years, sewage and waste water from Ofra settlement has been flooding agricultural land in the Hamdoun Valley, causing severe economic and health problems for the people from 'Ain Yabroud village near Ramallah. Most of the crops have been damaged and the land rendered near useless.

One farmer, Wajeeh, owns 52 dunams of agricultural land in the valley. In the summer months he used to plant his land with chick peas, and in the winter months with wheat. In 1982, waste water and sewage began to flow

onto his land from Ofra settlement. Approximately five dunams were affected, and the land, because it kept absorbing the sewage through a break in the ground, became unusable. In 1983, the settlement constructed an uncovered cess pool, 60 metres long, 35 metres wide and 3 metres deep, and surrounded it by a 3 metre high fence. A pipe connected to the pool was periodically opened and waste water and sewage was allowed to flow freely onto Wajeeh's land.

In 1984, Wajeeh took the settlers to court for stealing a large amount of soil from his land - approximately 5,500 cubic metres - which was placed around the pool, and with destroying much of his land. The court decided in his favour, and the settlement was ordered to pay NIS 20,000 for the soil and as compensation for destroying his land. A campaign of harassment by the settlers forced Wajeeh to resettle the matter out of court with the person responsible in the settlement. He never received the NIS 20,000 in compensation, and was instead given back the stolen soil!

Wajeeh dug a channel to divert the continuing flow of settlement waste water to stop any further damage to his land. The flow continued, and at the end of November 1991, the waste water began to flow onto land belonging to two other farmers located 1,500 metres from the cess pool. Once the level of waste water reaches a certain level in the cess pool, the settlers reportedly open the pipe to allow the water out. The surrounding land, covering an area of 30 square metres and to a depth of between one to 10 metres is affected. On one particular occasion, water flooded a fig grove before passing into the channel constructed by Wajeeh, and then flooded additional fields planted with crops and an area of some 247 dunams, including 70 dunams planted with olive trees. In total, the amount of land damaged by this waste water was 38.5 percent of the total land in the valley, owned by 16 people; 3.2 percent was planted with crops, and 96.8 percent with olive trees.

CONCLUSION

According to PHG, Israel's 'water policy ... has been unilateral and exclusive in character'.¹⁰⁴ Various official Israeli statements, however, have attempted to gloss over the effects of Israeli policies on Palestinians living under occupation: an Israeli Foreign Ministry background paper asserts that, 'since 1967, the previous Jordanian Civil Law has been maintained in Judea and Samaria [sic] ... requests for the drilling of new wells for household uses have been granted as a matter of course ... [and] the Civil Administration has granted permits to drill wells for agricultural purposes when the criterion [sic] of the law are fulfilled'.¹⁰⁵ And in justification of Israel's settlement of the Jordan Valley and its subsequent extraction of significant amounts of water, the background paper asserts that the 'Jordan Valley ... is hydrologically and demographically

isolated and separated from the Arab population centres'.¹⁰⁶

The reality is different: '[the] lack of water resource development, together with the confiscation of wells on "absentee property",¹⁰⁷ means that today there are fewer wells in the Jordan Valley providing less water for Palestinian agriculture than were available on the eve of the 1967 war'.¹⁰⁸

More worrying, however, is that development and investment plans for the future completely ignore Palestinian interests and instead allow for development and expansion of water supplies to Israeli settlements. According to the 1986 Israeli State Comptrollers Report, the budget allocations approved by the military's Civil Administration for development of water projects in the West Bank for 1984 and 1985 were only partially used. The report further notes that although 'the condition of the water systems [in the West Bank was] grave' and that city councils were encouraged to improve, renovate and replace water systems as part of their future development plans, an investigation by the Israeli Water Commissioner concluded that this had not been carried out 'due to lack of funds'.¹⁰⁹ This is merely an excuse given the fact that Israel deducts large amounts of money in taxes from the wages of Palestinians working inside Israel and from Palestinian businesses. Israeli analyst Benvenisti estimated that during the first 19 years of Israel's occupation, approximately \$700 million - an 'occupation tax' - was deducted from the wages of West Bank Palestinians alone. This was two and a half times the total Israeli government expenditure during the same period. A significant amount of this money makes its way directly to the Israeli treasury; in 1987 alone, Benvenisti estimated that at least \$80 million collected from Palestinians in the Occupied Territories was devoted to Israeli public expenditure inside Israel.¹¹⁰

While Israel talks about 'peace' and joint and equitable management of the region's shared water resources, it continues to implement policies which amount to *de facto* annexation of the Occupied Territories and their natural resources. The deep drilling at Herodian near Bethlehem in 1987 worried many Palestinians, who saw that excessive drilling of one of the few remaining water sources would rapidly deplete the area's water reserves. For many Palestinians, this policy of expropriating the water reserves was part of a wider policy of effectively forcing Palestinians off their land. As Israeli analysts Schiff and Ya'ari explain:

To [the Palestinians] the project was sheer theft, a scheme to wrest control of one of their natural resources (perhaps the sole reserve of water left in the West Bank) as part of a broader plan to reduce the Palestinians to a state of national indigence and to drive them out'.¹¹¹

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You have a full glass
and mine is empty ... let's share



Israel and
Arab water
An-Nahar
25 April 1994

conclusion

5

The cheapest solution which is not impossible, though very difficult, is for peace to abide in the area.

Issam Shawwa, director of ANERA in Gaza¹

If the crisis is not eased, it will result in a significant rise in the probability of an outbreak of warfare ... It is water, in the final analysis, that will determine the future of the Occupied Territories and by extension, the issue of conflict or peace.

Professor Thomas Naff in a speech to the US Congress in 1990²

A solution to the water crisis will depend on the extent to which the peace agreement between the PLO and Israel succeeds. Then the task begins of finding and implementing solutions to the many problems created by 27 years of Israeli military occupation and the consequent under-development of the Occupied Territories. If the Israeli occupation continues, it is likely that the already critical water situation will worsen significantly. Although advanced water technologies can reduce the strain on existing water supplies, the only genuine and lasting solution to the region's water problems is a comprehensive

peace settlement. And, like other issues in the Israeli-Palestinian conflict, that of water rests on the issue of sovereignty, on the right of Palestinians to self-determination, and their right to develop their land and its resources as they wish.

Palestinians have not refused regional cooperation as a solution to the water problem, but rather have specified conditions which have to be met prior to cooperation. As Tamimi warns, joint water projects cannot be implemented until a comprehensive solution is agreed between Israel and the Palestinians: 'Joint projects require peaceful and just conditions and mutual confidence'.³

While all countries in the region suffer from a shortage of water, the Occupied Territories and Jordan are especially severely hit. And although Israel is currently dependent on water resources originating in the occupied West Bank, this dependence need not prevent a mutually acceptable solution from being found. Future planning and development must be based on an equitable and just allocation of the area's scarce water resources.

Various policy options and plans are now being presented. With the creation of a new Water Development Programme, within the terms of the *Declaration of Principles* (see appendix), it is anticipated that experts from both the Palestinian and Israeli sides will 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 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'.⁴ However, critical to this will be Palestinian access to information on all aspects of water, which up until now Israel has withheld from them.

Developing work on the water issue need not wait for a final political settlement. One of the most cost-efficient and least problematic proposals involves the encouragement of more efficient water management and conservation strategies, and a public education campaign will serve to emphasise the importance of water conservation. Current contamination, especially by sewage, should be monitored and efforts made to limit it further, and pollution control and water treatment processes can be improved.

Present Palestinian NGOs working on water, such as PHG, the Land and Water Establishment and the Applied Research Institute of Jerusalem (ARIJ), would be able to provide valuable human and physical resources as well as technical and development policy advice. For example, PHG conducted a two year study to identify the location, condition and estimated potential output of natural springs, many of which are in a neglected state and are losing

water as a result. They have classified springs into those requiring technical assistance, those needing maintenance and those requiring significant reconstruction for domestic or irrigation projects.

Work is being carried out by PHG to establish a Palestinian monitoring system to provide information and data on water quality, water quantity and climatic observations. Accurate information is needed on the exact condition of water reserves in the Occupied Territories to provide the basis for future policy and development. Comprehensive long-term monitoring could include information on:

- aquifer characteristics*
- run off data*
- nature of existing and operating wells*
- hydro-geological data*
- meteorological data*
- demographic data*
- supply, consumption and demand figures*

Where possible, appropriate agricultural and other technologies (eg. sprinkler and drip irrigation to reduce evaporation, plant-breeding and high-value crops) should be encouraged. According to Palestinian engineer Mohammed Rimmawi, current water losses as a result of inefficient and old technologies are very high, reaching 70 percent in some areas.⁵

Rainwater collection has a long tradition in Palestinian villages, and more recently has been the focus of major PHG projects in the Occupied Territories. PHG has installed 600 collection systems in the West Bank, and constructed pools for collecting rainwater in the central Gaza Strip. In areas of the Naqab in Israel, rainwater run off is used for both drinking water supplies and agricultural production. In the Golan Heights, Syrian farmers are successfully collecting rainwater in tanks for the irrigation of their apple orchards. In order to help solve the critical water situation in Gaza, it has been suggested that superficial lakes could be constructed, big enough to contain 400,000 cubic metres of water, as well as sand tanks on low lying areas of the Strip to collect rainwater in the winter months. Both these would help reduce wastage.⁶

Water and sewerage projects, especially in the refugee camps, are now being targeted. UNRWA, for example, is building a water distribution system, including a water tank and filter system, at Aqabat Jabr in Jericho, and will be undertaking a feasibility study for future sewerage and drainage improvements in the Jericho refugee camps. Other UNRWA projects already underway include the construction of sewerage systems in Shati (Beach), Rafah and the middle refugee camps in the Gaza Strip.⁷ Based on ten years experience in this

field, Save the Children Fund have found that the health benefits from the introduction of a new water supply project can be cancelled out by the effects of improperly-disposed waste water.⁸ A sewage disposal project should, according to their experience, always accompany a water supply project, or vice versa.⁹

Although there is no experience in the Gaza Strip of reusing waste water for irrigation purposes, the process has been successfully applied in both Egypt and Israel. Gaza produces 35mcm a year of sewage water which is currently not utilised,¹⁰ and waste water treatment projects in both Jabalia and Gaza City, it is anticipated, will distribute the effluent for irrigation purposes. The estimated amount of reusable domestic waste water is approximately 30mcm per year; it is expected to reach 60mcm by the year 2000, and 130mcm by the year 2010, representing a significant resource of potential water supplies for agricultural purposes.

Palestinian water experts have highlighted the fact that, given current discrimination and inequalities, these activities must be the beginning of a continuous process. And local manpower development, the training and upgrading of staff in all related fields, is needed in order to implement new projects.¹¹

According to Jad Ishaq, head of the new Palestinian Environmental Protection Authority, whereas Palestinians are allocated 115mcm of water per year in the West Bank, Israel uses some 450mcm per year. In addition, while Palestinians can only irrigate 6 percent of their total agricultural land because of water shortages, Israel irrigates 50 percent of the cultivated land inside Israel. Israeli settlers in the Occupied Territories irrigate 70 percent of the agricultural land under the control of Israeli settlements. The overall picture illustrates these excesses; Israel is the only country in the world which has 750mcm of water per year, yet manages to use (from other sources) a total of 2 billion cubic metres.¹²

Israeli policies and practices which hinder and prevent Palestinian development projects and practices aimed at improving water efficiency and preventing further contamination of supplies should immediately cease and the military orders cancelled. Military orders, for example, make construction of plastic greenhouses conditional on a building permit, involving an application process which can take many years and is often unsuccessful. Building without a permit can, and often does, lead to the demolition of the greenhouse. There are military orders which prevent the renovation and construction of Palestinian wells, and water supplies have become contaminated as a result.

Aside from policies which can, and should be, implemented now, long-term options are being considered. One option that has received particular attention is the desalination of brackish water or sea water. This is a very costly

process in terms of installation and operational costs and is only cost-effective if undertaken on a large-scale with sufficient sources of power available. Although the cost may be prohibitive, if combined with advanced agricultural practices, desalination could prove vital in forestalling or alleviating water shortages on a large-scale. Because a large percentage of the cost of desalination is associated with the price of energy, solar energy could provide a cheap energy source to fuel the process. According to the Dutch Foreign Ministry team who visited Gaza in 1991, the cheapest option is desalination of brackish groundwater; desalination of seawater is the most expensive option.

However, according to Riad Al-Khudari, desalination as a solution to the water problem in the Occupied Territories and Israel should not be considered until all other options have been exhausted. With regards to the Gaza Strip, for example, Al-Khudari has suggested that Israel stop pumping water inside the Green Line and damming surface water that would otherwise flow into the Gaza Strip.¹³

Many believe that the area's water resources are simply insufficient for future demand, and that the import of large amounts of water will be necessary. According to the Dutch Foreign Ministry's report, the 'long-term and permanent solution to Gaza's water problem can only be achieved through import of large quantities of water and/or desalination of brackish groundwater and seawater'.¹⁴ Because of the regional nature of importing water, it is unlikely that this could be implemented prior to a comprehensive peace settlement. Many believe that the necessity of such large-scale operations is debatable. Dr Shkeir from Bethlehem University warns, '[Palestinians should] not get involved in the complications of bringing in water from other countries because that would have political connotations ... to pursue it won't get us anywhere as long as we don't have authority'.¹⁵

Crucial to the success of any future action will be the formation of a joint management body composed of representatives from all the countries in the immediate area - Israel, Jordan, Lebanon and Syria - including from an independent Palestinian state. Such a regional coordinating body could examine various issues of water resource management and development and investigate different possibilities for improvements and solutions to the region's water deficits. Attention will have to be given to long-range research and planning which, under past Israeli policies, was directed for the exclusive benefit of Jewish Israelis living in Israel and the Occupied Territories at the expense of Palestinians and neighbouring Arab countries.

The interdependence of Palestinian and Israeli water resources can no longer be ignored. Professor Naff's predictions for the Gaza Strip should be taken as a warning: 'the Gaza Strip aquifer is rapidly deteriorating. There is already water encroachment from the Mediterranean, and if that aquifer goes,

that will have a very serious impact not only on the Gaza Strip, but it could have an impact on the coastal plain aquifer within Israel itself because there is a strong probability that there is an interchange between the two. There is serious deterioration in the aquifer and it is reaching what is known as the red line.'¹⁶

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appendix

Excerpts from the

**DECLARATION OF
PRINCIPLES ON INTERIM
SELF-GOVERNMENT
ARRANGEMENTS**

13 September 1993
Washington DC
*signed by the PLO and the
Government of Israel*

**ARTICLE VII
INTERIM AGREEMENT**

... 4. In order to enable the Council [the 'Palestinian Interim Self-Government Authority, the elected Council'] to promote economic growth, upon its inauguration, the Council will establish, among other things, a Palestinian Electricity Authority, a Gaza Sea Port Authority, a Palestinian Development Bank, a Palestinian Export Promotion Board, a Palestinian Environmental Authority, a Palestinian Land Authority and a *Palestinian Water Administration Authority* [emphasis added], and any other Authorities agreed upon, in accordance with the Interim Agreement that will specify their powers and responsibilities.

5. After the inauguration of the Council, the Civil Administration will be dissolved, and the Israeli military government will be withdrawn.

ANNEX III
PROTOCOL ON ISRAELI-PALESTINIAN COOPERATION IN
ECONOMIC AND DEVELOPMENT PROGRAMS

The two sides agree to establish an Israeli-Palestinian Continuing Committee for Economic Cooperation, focusing, among other things, on the following:

1. Cooperation in the field of water, including a Water Development Program 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 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.

ANNEX IV
PROTOCOL ON ISRAELI-PALESTINIAN COOPERATION
CONCERNING REGIONAL DEVELOPMENT PROGRAMS

1. The two sides will cooperate in the context of the multilateral peace efforts in promoting a Development Program for the region, including the West Bank and the Gaza Strip, to be initiated by the G-7 ...

2. The Development Program will consist of two elements:

- a) an Economic Development Program for the West Bank and the Gaza Strip.
- b) a Regional Economic Development Program.

A. The Economic Development Program for the West Bank and the Gaza Strip will consist of the following elements ...

(3) An Infrastructure Development Program (water, electricity, transportation and communications, etc.) ...

B. The Regional Economic Development Program may consist of the following elements ...

(2) The development of a joint Israeli-Palestinian-Jordanian Plan for coordinated exploitation of the Dead Sea area.

(3) The Mediterranean Sea (Gaza) - Dead Sea Canal.

(4) Regional Desalinization and other water development projects.

(5) A regional plan for agricultural development, including a coordinated regional effort for the prevention of desertification.

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