

בְּצֵלֶם

B'tselem – The Israeli Information Center for Human Rights in the Occupied Territories

Thirsty for a Solution

*The Water Crisis in the Occupied Territories
and its Resolution in the Final-Status Agreement*

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Executive Summary

Introduction

Since the beginning of the occupation, in 1967, the demand for water by Palestinians has increased significantly. However, Israel's strict control of the water sector in the Occupied Territories has prevented development of this sector to meet the increasing demand for water, causing a water shortage and crisis.

Underlying Israel's water policy in the Occupied Territories was the desire to preserve the quantity of water that Israel uses. Israel did this in two ways. First, by continuing the unequal division of the shared ground water that was created prior to the occupation. Second, by exploitation of new water sources, to which Israel did not have access prior to 1967, such as the Eastern Aquifer in the West Bank and the Gaza Aquifer, primarily to benefit Israeli settlements established in those areas.

A conspicuous feature of Israeli policy has been the substantial neglect of water infrastructure, primarily in two key areas: construction of infrastructure to connect the rural population to a running-water network, and proper maintenance (to prevent loss of water) of existing networks .

Water Sources

A significant part of the water sources that Israel uses to meet its needs are, according to international law, international water resources shared by Israelis and Palestinians. Despite this, the right of Palestinians to share these resources was not recognized in practice, and the division gradually became discriminatory and unfair. Israelis benefit from advanced and reliable infrastructure for the supply of water for domestic use, enabling them unlimited water consumption for all domestic and urban uses. Even though a high degree of water pollution is occasionally found at certain extraction sites, the water that ultimately reaches Israeli consumers is of reasonable quality. By contrast, Palestinians in the Occupied Territories suffer from an underdeveloped and unreliable water-supply system for domestic use.

Israel and the Palestinian Authority fully share two water systems: the Mountain Aquifer and the Jordan Basin. Israel receives 79 percent of the Mountain Aquifer water and the Palestinians 21 percent. Palestinians have no access to the Jordan Basin: Israel utilizes 100% of its water.

The Gap in Water Consumption

The discrimination in utilization of the resources shared by Israel and the Palestinian Authority is clearly seen in the figures on water consumption by the two populations: per capita water consumption in the West Bank for domestic, urban, and industrial use is only approximately 26 cubic meters a year, which is approximately 70 liters a day.

There is a huge gap between Israeli and Palestinian consumption. The average Israeli consumes for domestic and urban use approximately 103 cubic meters a year, or 282

liters a day. In other words, per capita use in Israel is four times higher than in the Occupied Territories. To make a more precise comparison by also taking into account industrial water consumption in Israel, per capita use per year reaches 128 cubic meters - 350 liters per person a day - or five times Palestinian per capita consumption.

Urban water consumption of Israeli settlers in the Gaza Strip is 584 liters per person a day, almost seven times greater than domestic water consumption among Palestinians in the Gaza Strip.

The World Health Organization and the United States Agency for International Development recommend 100 liters of water per person per day as the minimum quantity for basic consumption. This amount includes, in addition to domestic use, consumption in hospitals, schools, businesses, and other public institutions.

Three Features of the Water Crisis in the Occupied Territories

Lack of a Water Network

Among those particularly suffering from the water shortage are residents of villages and refugee camps in the Occupied Territories not connected to a running-water network. In the West Bank alone, as of June 2000, the number of such residents amounted to at least 215,000 persons living in more than 150 villages. The principal water source for these people is rainfall, which is collected on rooftops and stored in cisterns near each house. This source meets their water-consumption needs for only a few months, generally from November to May. In the summer, these residents must collect water from nearby springs (if such exist) in plastic bottles and jerricans, and purchase water from private dealers at high prices.

Discriminatory and Insufficient Supply of Water

Several municipalities in the West Bank are compelled to implement rotation plans, particularly during the summer, to distribute the little water available. Under these plans, residents in a particular sector of the city receive water for a few hours. The flow is then shut off, and water is supplied to other areas until the sector's turn comes again. Hebron, Bethlehem, and Jenin implement such plans.

This system is made necessary due to the increased demand for water during the hot season. However, while there is increased demand both among Palestinians and among Israeli settlers, Mekorot [Israel's water company] discriminates and increases the amount of water supplied to the settlers, at the expense of supply to Palestinian towns. Reduction at times when water consumption increases is accomplished by closing the valve of the main water pipelines through which water flows to Palestinian towns.

Poor Water Quality

Unlike the West Bank, the worst problem in the Gaza Strip's water sector is not the shortage or irregular supply during the summer, but the poor quality of water flowing through the pipes. The poor condition of the water seriously affects the quality of life of the local residents and exposes them to severe health risks. The sole local water

source is the Gaza Aquifer, which provides 96 percent of overall water consumption in the Gaza Strip. Since the 1950s, this aquifer has become polluted and salinated, a process that has worsened with the increased consumption and extraction of water. The main reasons for the pollution and salinization of the aquifer are "over-extraction," penetration of untreated sewage, and penetration of pesticides and fertilizers.

The Interim Arrangement

Although Israeli officials relate to the interim agreement signed by Israel and the Palestinian Authority in 1995 (Oslo 2) as a turning point, in which responsibility for the water sector was handed over to the Palestinian Authority, in practice, the scope of Israeli control of this sector did not significantly change. Israel's control is evident in its power to veto any new water project, both through the Joint Water Committee and through the Civil Administration.

The starting point of the agreement as it regards division of water from the shared sources is that the amount of water for Israeli consumption, both within the Green Line (pre-1967 border) and in the settlements, is not reduced. According to this principle, any additional water that the Palestinians utilize comes from unutilized sources, and not from a re-division of existing sources. From the perspective of Palestinian water needs, the sole actual "achievement" in this agreement is the Israeli-Palestinian understanding to increase water supply to the Occupied Territories by some 30 percent during the interim period, i.e., from September 1995 to May 1999. As of June 2000, more than a year after the interim period ended according to the agreement, only half of the promised additional quantity was produced and supplied to the Palestinians.

Division of Shared Water Resources in the Final-Status Agreement

The main principle for division of water between countries, according to international law, is that of equitable and reasonable use. The key that B'Tselem proposes in order to implement this principle in dividing the water between Israelis and Palestinians is satisfaction of every individual's basic water needs. The assumption is that, in principle, Israelis and Palestinians have similar current and potential water needs, and that the quantity allocated to each side for basic needs should be based on the size of the population. This key meets the requirements of international law.

Arrangements regarding management and control of the shared water sources that will be adopted in negotiations over the final-status agreement directly affect the human rights of Israelis and Palestinians. The failure to maintain close cooperation in preserving the shared water resources will lessen the ability of the two sides to cope with dangers such as pollution, salinization, and a lower water table, and will limit the ability of Israelis and Palestinians to exercise their rights to water and to benefit from their natural resources. In addition, implementation of the principle of equitable and reasonable use calls for an arrangement that will provide the tools for close and continuous cooperation and mechanisms for resolving disputes between the sides.

The general principle that B'Tselem proposes on the question of control and management of the shared water resources is joint management, to be effected by an Israeli-Palestinian institution having the expertise and ability to enforce its policy.

Remedy for Human Rights Violations

Israel's control of the water sector in the Occupied Territories during the occupation entailed violation of human rights and international law. Therefore, the final-status agreement must include provisions for remedy and compensation by Israel for these violations. The main violations that require remedy and compensation are: violation of the right to adequate subsistence and housing; violation of the right to health, resulting from the negative public health effect of the water shortage and consumption of poor-quality water; illegal utilization of water resources of the Occupied Territories to benefit the settlements; and implementation of a policy of discrimination between Palestinians and settlers in the supply of water.

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Introduction

Water is a necessity of life. In the twentieth century, domestic water supply - together with transportation, electricity, and communications - became, in the West primarily, a fundamental infrastructure service. Domestic water use fills a number of basic functions: drinking, cooking, maintaining personal hygiene, sanitation, housecleaning, laundering, dishwashing, operating heating and air-conditioning systems, and more. The quality of the system is perceived as a clear indication of the quality of life. A domestic water-supply system must meet a few essential requirements to be considered high quality.¹ It must supply water free of bacteria, high salinity, and other polluting material; the quantity must be sufficient to meet domestic needs; the water pressure must enable the water to reach high-altitude areas and the upper stories of buildings; the supply must be reliable and continuous, i.e., water must also be available at peak consumption times, and the like.

In addition to domestic consumption, water is vital for a variety of major communal and economic activities, such as sanitation, agriculture, industry, urban development, and tourism. In agriculture, for example, 1,500 liters of water is required to produce one kilogram of flour, 4,000 liters is needed to produce one kilogram of rice, and 10,000 liters of water to produce one kilogram of cotton. Water is also necessary for industry. Production of a ton of steel requires 200,000 liters of water, a ton of paper requires from 50,000 to 300,000 liters, and 30,000 liters is needed to produce one automobile.² It is difficult to envision a successful tourism industry without plentiful amounts of water in hotel rooms and swimming pools, or a developed town without green areas, which require constant watering.

A substantial portion of the water that Israel uses to meet its needs is, according to international law, international water resources shared by the Israelis and the Palestinians. Despite this, Palestinians have not realized their rights to their portion of the shared resources, and division of those resources has gradually become discriminatory and unfair. This inequitable division, dating back to the 1950s, worsened as a result of the acts and omissions of Israel since the occupation began in 1967. Discrimination in the utilization of water resources created an enormous gap in the ability of the two populations to properly meet their water needs, primarily their domestic and urban needs.

Israelis benefit from advanced and reliable infrastructure for supplying water for domestic use, enabling them unlimited water consumption for all domestic and urban uses.³ Though highly polluted water is occasionally found at some extraction sites, the water that ultimately reaches the consumers' homes is of reasonable quality. Unlike Israelis, Palestinians in the Occupied Territories suffer from a backwards and unreliable water-supply system for domestic use: tens of thousands of families, primarily located throughout the West Bank, are not connected to a water network and

¹ Kally, 1997, pp. 14-15.

² UN, 1998, pars. 9-10.

³ The exception is the water supplied to most of the unrecognized Arab villages, particularly Bedouin villages in the Negev. For updated information on this subject, see *Ha'aretz*, "A Narrow Pipe for 3,000 Residents," 30 May 2000.

are compelled to obtain water in other ways; in a large percentage of the towns and villages, water supply during the summer is reduced, and residents suffer from prolonged periods in which the water flow stops; low water pressure does not enable continuous water supply to especially high places; in the Gaza Strip, most of the water consumed is foul, brackish, and polluted to levels much higher than those recommended by the World Health Organization.

Water has been on the peace process agenda since the Madrid Conference, in 1991. Subsequent agreements between Israel and the Palestinian Liberation Organization (later the Palestinian Authority)⁴ established a number of temporary arrangements regarding supply of water to the Occupied Territories. However, discussion of the water rights of Palestinians and control of the shared sources was postponed, together with four other issues, to negotiations on the final-status arrangements.⁵

The present document has a dual objective. The first is to present the scope and characteristics of the water shortage suffered by Palestinian residents of the Occupied Territories.⁶ In this regard, this document is a follow-up and augmentation of B'Tselem's report of September 1998 and an issue of B'Tselem's Quarterly, published in June 1999, that was dedicated to the subject of water.⁷ The second objective is to recommend possible solutions for the final-status arrangement on water-related issues, so that the agreement that the parties reach complies with fundamental human rights norms.

The position paper has three parts. Part 1 includes two chapters that provide background to the substantive discussion in the following two parts. The first chapter deals with the right to water as a human right, and with a number of related rights, under international law. The second chapter describes the principal features of the water sectors of Israel and the Palestinian Authority. The discussion focuses on the water resources shared by Israel and the Palestinians, their natural characteristics, and how they are utilized.

Part 2 deals with the various aspects of the water shortage suffered by Palestinians in the Occupied Territories. Chapter 3 deals with the patterns of control of the water sources and supply in two periods. The first period runs from the beginning of the occupation, in 1967, to the Interim Agreement, in 1995. The discussion focuses on the limitations that Israel placed on development of the water sector in the Occupied Territories and the motives underlying that policy. The second part of this chapter discusses the period from the signing of the Interim Agreement to the present, and focuses arrangements set forth in the agreement and the degree to which they were implemented. Chapter 4 discusses various aspects of Palestinian water consumption: a description of the principal water suppliers to the urban sector; an estimate of the various components of per capita water consumption in the Occupied Territories; an estimate and analysis of the gap between Palestinian water consumption and water

⁴ These agreements are the Declaration of Principles (1993), the Cairo Agreement (Oslo 1, 1994), and the Interim Agreement (Oslo 2, 1998).

⁵ The other four issues are the borders of the Palestinian entity, the status of the Israeli settlements, the status of Jerusalem, and the Palestinian refugees.

⁶ This includes all of the West Bank and Gaza Strip, including those areas under the control of the Palestinian Authority.

⁷ B'Tselem, 1998; B'Tselem, 1999.

consumption in Israel; and the place held by agriculture in the water sectors of Israel and of the Occupied Territories. Chapter 5 points out three focal points of the water crisis and the nature of the crisis in each: the villages that are not connected to a running-water network; towns that are compelled to employ water-rationing programs during the summer; and the problem of poor quality water flowing through conduits in the Gaza Strip.

Part 3 deals with recommendations for the final-status arrangement on water. Chapter 6 deals with the core of the dispute between the parties, i.e., arrangements for division of the shared water. The solution proposed is based on equal allocation of water for basic needs, and relies on international water law, which is presented in brief at the beginning of the chapter. Chapter 7 relates to an aspect of the water issue that is second in importance - arrangements for control and management of the shared water sources - and examines the various alternatives. The arrangement proposed is adoption of one form or another of joint Israeli-Palestinian management. Chapter 8 deals with the duty of Israel to compensate the Palestinians for having violated their human rights as a result of maintaining exclusive control of the water sources and water-supply system during the occupation.

Part 1

Legal and Hydrologic Background

Chapter 1

The Right to Water as a Human Right

It seems obvious that enjoyment of sufficient water of suitable quality should be classified as a human right, given the clear connection between such enjoyment and an individual's welfare and dignity. However, human rights documents do not expressly relate to such a right. Therefore, the question arises whether a right to water in adequate quantity and quality exists, thus imposing a legal duty on states to guaranty exercise of the right. As we shall see below, such a right does exist, and this fact affects the negotiations on the final-status arrangement relating to water. Classifying the right to water as a human right is significant primarily because the legitimacy of the document that the parties will sign depends, from an international law perspective, on the respect that it shows for this right.

A. The Universal Right to Water

The two principal international instruments dealing with human rights, the International Covenant on Civil and Political Rights and the International Covenant on Economic, Social, and Cultural Rights,⁸ do not explicitly relate to the right to water. However, this right may be derived from other rights appearing in these instruments and from the accepted interpretation of those rights.

In the Covenant on Civil and Political Rights, the right to water is derived, first and foremost, from the inherent right of every human being to life (article 6). No one can survive for more than a few days without access to a certain quantity of water of a certain minimal quality.

The Covenant on Economic, Social and Cultural Rights enumerates the various elements of the right to an adequate standard of living (article 11), which is also mentioned in the Universal Declaration on Human Rights (article 25). One of the major elements of the right to an adequate standard of living is the right to housing. The UN committee charged with interpreting the Covenant and monitoring its implementation expressly held that:

An adequate house must contain certain facilities essential for health, security, comfort and nutrition, all beneficiaries of the right to adequate housing should have sustainable access to natural and common resources, *safe drinking water*...⁹ [our emphasis]

Also, given the clear causal relationship between insufficient water consumption or consumption of polluted water and certain diseases and bodily disorders, the right to water can also be derived from article 12 of that covenant, which provides:

⁸ The covenants were adopted by the United Nations in 1966. Israel ratified them in 1991. For the complete names of the conventions, documents, and other international instruments appearing throughout this document, see the bibliography.

⁹ General Comment 4 (1991), par. 8(b).

1. The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.
2. The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for:
 -
 - (c) The prevention, treatment and control of epidemic, endemic, occupational and other diseases;
 -

Furthermore, the two Covenants provide that states must implement all of the Covenants' provisions without discrimination. According to article 2 of the Covenant on Economic, Social and Cultural Rights:

2. The States Parties to the present Covenant undertake to guarantee that the rights enunciated in the present Covenant will be exercised without discrimination of any kind as to race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.¹⁰

The Convention on the Rights of the Child, which the UN adopted in 1989, explicitly establishes the state's duty to provide access to clean water.¹¹ Article 24 of the Convention, which incorporates the duty of states to ensure to every child the highest attainable standard of health, provides that:

2. States Parties shall pursue full implementation of this right and, in particular, shall take appropriate measures:
 -
 - (c) To combat disease and malnutrition, including within the framework of primary health care, through, inter alia, the application of readily available technology and through the provision of adequate nutritious foods and *clean drinking -water...* [our emphasis]
 -

The UN Convention on the Law of the Non-Navigational Uses of International Watercourses, which the UN adopted in 1997, which shall be discussed at length in part 3 below, also relates to the right to water.¹² Article 10 of the Convention states that, in the event of a conflict between uses of an international watercourse (for example, production of electricity from a hydroelectric plant compared to basic needs), special regard should be given to "vital human needs."

Various resolutions of the UN General Assembly over the past three decades, although not binding under international law, bolstered the status of the right to water

¹⁰ A similar clause is found in article (1) of the International Covenant on Civil and Political Rights.

¹¹ Israel ratified this convention in 1991.

¹² Israel has not yet signed this convention. However, most of its provisions are considered customary law. See the discussion in chapter 6(A) below.

as a human right.¹³ One of the salient resolutions was the proclamation of the period from 1981 to 1990 as the "International Drinking Water Supply and Sanitation Decade," in which states assumed a commitment to bring about a substantial improvement in the standards and levels of services in drinking water and sanitation by the year 1990.¹⁴

Israel's statutes do not expressly relate to the right to water, but its Supreme Court heard the issue and ruled that, "The right to water is a substantive right... [It] does not have to be created by statute necessarily, but can be grounded on other foundations, such as agreement, custom, or any other manner."¹⁵

B. The Right to Natural Resources

So far the discussion has focused on the right to water and related rights only as rights of the individual. However, international human rights law also contains another right, the right of self-determination, which grants all peoples the right to benefit from their natural resources. The first article of both the Covenant on Civil and Political Rights and the Covenant on Economic, Social and Cultural Rights 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* without prejudice to any obligations arising out of international economic cooperation, based upon the principle of mutual benefit, and international law. In no case may a people be deprived of its own means of subsistence. [our emphasis]

Because water sources are an integral part of the natural resources of every people, a collective right to water is derived from the right of self-determination. This collective right is granted in addition to the individual's right to water. The UN Human Rights Committee, charged with interpreting the Covenant on Civil and Political Rights and monitoring its implementation, held that,

The right of self-determination is of particular importance because its realization is an essential condition for the effective guarantee and observance of individual human rights and for the promotion and strengthening of those rights.¹⁶

C. Water in International Humanitarian Law

International humanitarian law establishes several basic norms relating to water sources and water-supply systems for civilian populations in times of war and

¹³ For a discussion on the principal relevant resolutions, see UN, 1998.

¹⁴ General Assembly Resolution 35/18, 10 November 1980. This resolution implemented the decision of the first international conference on water, which the UN held in Mar del Plata (Argentina) in March 1977.

¹⁵ Civ. App. 535/89, *Water Commissioner v. Perlmutter et al.*, *Piskei Din* 56(5) 695-696.

¹⁶ General Comment 12 (1984), par. 1.

occupation. The Hague Regulations Respecting the Laws and Customs of War on Land, of 1907, which are customary law and therefore apply to every state,¹⁷ provide, in article 23(A), that it is forbidden to employ poison or poisoned weapons. This provision primarily relates to poisoning of wells serving the enemy.¹⁸ Article 54(2) of the First Protocol of the Geneva Conventions, of 1977, prohibits attacking or destroying objects that are indispensable to the survival of the civilian population, and expressly prohibits attacking drinking water installations and irrigation works.¹⁹ Also, international practice indicates that water sources and installations are generally immune from attacks during war.²⁰

The Hague Regulations impose certain limitations on the occupying state's use of requisitioned property, including limitations on the use of natural resources of the occupied area. The scope of the limitation depends on whether the requisitioned property is private or public and on whether it is movable or immovable. It is not clear that water, particularly groundwater, belongs in one of the four existing categories,²¹ but the general opinion is that it should be considered immovable public property.²² Regarding immovable public property, Article 55 of the Hague Regulations states:

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

Thus, in no case does the occupying state become the owner of immovable public property.²³ Use of requisitioned property in occupied territory is allowed if limited to military needs. However, in that instance, too, it is forbidden to make greater use of that property than had been made prior to occupation.²⁴

Furthermore, as a rule, the occupying state must respect all areas of the law existing in the occupied territory prior to occupation. Article 43 of the Hague Regulations provides:

The authority of the legitimate power having in fact passed into the hands of the occupant, the latter shall take all the measures in his power to restore, and ensure, as far as possible, public order and safety, while

¹⁷ Beginning in 1978 with the Beit El case in the High Court of Justice, Israel's Supreme Court has also considered the Hague Regulations to be part of international customary law. H CJ 606,610/78, *Suleiman Tawfiq Ayyub et al. v. Minister of Defense et al.*, *Piskei Din* 33(2) 113, 120-122.

¹⁸ Dinstein, 1983, p. 128.

¹⁹ Israel has not yet signed this protocol.

²⁰ Dellapena, 1995, pp. 57-58.

²¹ One of the main reasons for this difficulty results from the disparity between the categories for defining property rights to water in Ottoman law, which the Jordanian and Egyptian governments relied on in the West Bank and the Gaza Strip, and the categories in Roman law, on which the Hague Regulations are based (Abouali, 1998, p. 85).

²² In many aspects, groundwater may be considered similar to oil, which is defined as immovable public property (Dinstein, 1983, p. 230). For specific reference to the present case, see El-Hindi, 1990. For another opinion, which views the groundwater that Israel seized as private immovable property, see Abouali, 1998, pp. 84-90.

²³ Dinstein, *ibid.*

²⁴ Von Glahn, 1957, p. 177.

respecting, unless absolutely prevented, *the laws in force in the country*.
[our emphasis]

Lastly, the Fourth Geneva Convention of 1949, which deals with the protection of the civilian population in occupied territory, obligates the occupying state to implement the principle of equality in the occupied territory.²⁵ The prohibition on discrimination in supplying water may be derived from the provisions of article 27:

... all protected persons shall be treated with the same consideration by the Party to the conflict in whose power they are, without any adverse distinction based, in particular, on race, religion or political opinion.

D. Quantification of the Right to Water

The human rights instruments do not set the quantity of water that constitutes exercise of the right to water. There is no sure answer; rather, the quantity depends on evaluation of the relevant population's basic needs. These needs themselves are subject to several variables, such as climate, income, cultural attitudes, and the like. Although it is impossible to set a standard and accepted quantity of water necessary to meet basic needs, a few principal criteria exist.

A person requires from three to five liters of water a day to exist in the narrow meaning of the term "human subsistence." In other words, this amount is sufficient to prevent death from dehydration. However, most deaths worldwide related to water shortage result from pollution and disease and not from dehydration itself. If the term "human subsistence" is expanded to also include prevention of death from these causes, the minimal amount of water necessary is substantially higher. According to accepted estimates, a person needs approximately fifty liters of water a day: five for drinking, twenty for sanitation, fifteen for personal hygiene, and ten for preparation of food.²⁶ It should be noted that this quantity relates only to the most limited domestic needs, and does not include water for economic and communal needs.

The World Health Organization and the United States Agency for International Development recommend one hundred liters of water per person as the minimal quantity to meet basic urban needs, which include, in addition to domestic supply, water for hospitals, schools, businesses, and other public institutions.²⁷ Obviously, the water supplied must meet minimal quality standards for the particular use, with drinking water having extremely stringent standards.²⁸

In evaluating exercise of the right to water, we shall use as a point of reference a quantity of one hundred liters of water a day per person as the amount necessary to exercise the right to water. This amount is much less than the desired minimum necessary for a modern city to function, which, according to water experts, is one hundred cubic meters/person/year, which is the equivalent of 274 liters/person/day.²⁹

²⁵ Israel ratified the convention in 1951.

²⁶ Glieck, 1996, p. 49. For lower estimates, see Roberts, 1998.

²⁷ USAID, 1999.

²⁸ The WHO published a guidebook detailing the requirements regarding the quality of drinking water (WHO, 1998).

²⁹ Assaf *et al.*, 1993; Shuval, 1992; Ben-Meir, 1997 (one cubic meter of water = 1,000 liters).

Setting the quantity for exercise of the collective right to water is even more difficult, because it depends on the quality and quantity of the water sources found in the relevant territory. However, it is clear that the right to benefit from one's natural resources is not limited to the entitlement of every person to meet his or her minimal water needs, but is defined according to the features and supply capabilities of the relevant water sources.

Chapter 2

The Water Sectors of Israel and the Palestinian Authority

This chapter describes the natural-water sources³⁰ in Israel and the Occupied Territories and their division between Israel and the Palestinian Authority.³¹ The chapter focuses on sources that, under international law, are international water resources shared by the two sides.³² The discussion deals with two principal subjects: the natural characteristics of the water resources (geographic and hydrologic data), and the contribution of the specific source to each side's water sector.

Natural water sources are normally divided into two kinds, groundwater and surface water. Groundwater includes water that seeps into the ground and is collected in an underground aquifer, and water from springs, which flow above ground. Surface water flows or is collected above ground, such as in rivers, streams, and lakes. For the sake of our discussion, we shall adopt this division although, from a hydrologic perspective, the two sources are interdependent, and should not be considered independent sources.³³ As we shall see below, this interdependence is reflected in the interpretation that international law gives to the term international watercourse, and is thus relevant in determining the legal status of water sources over which Israel and the Palestinian Authority are negotiating.³⁴

Israel and the Palestinians definitively share two water systems, one groundwater and the other surface water. The groundwater system - called the Mountain Aquifer - traverses the border between the West Bank and Israel. The shared surface-water system is the Jordan Basin, which is also shared by Jordan, Syria, and Lebanon. The Coastal Aquifer, which traverses the border between Israel and the Gaza Strip, is another groundwater system. Because the hydrologic connection between its two parts (Israeli and Gazan) is minimal, its legal status is in dispute.

As will be explained in Part 2, the water shared by Israel and the Palestinians is divided unfairly, with a strong bias against the Palestinians. This discrimination is a major reason for the water shortage suffered by the Palestinian population.

The annual quantity of water that Israel produces from all the sources (shared and unshared) amounts to 2,070 million cubic meters (hereafter: mcm). Of this, 1,810 mcm are natural water (a minority of which is brackish water that was desalinated), and 260 mcm are recycled (treated sewage). In comparison, the Palestinians, through various

³⁰ Natural water sources include fresh water, which is suitable for drinking, and brackish water. Although they differ significantly, this chapter will discuss them together because they are found in the same basins and because brackish water can be used for all purposes following desalinization at relatively inexpensive cost.

³¹ "Palestinian Authority" for our purposes refers to all the Palestinian bodies dealing with water production and supply, even if they are not an organic part of the Palestinian Authority or do not act in areas currently under its complete control.

³² An international watercourse is "a watercourse, parts of which are situated in different States." UN Convention on the Law of the Non-Navigational Uses of International Watercourses, article 2.

³³ CSWS, 1999, pp. 34-42.

³⁴ Article 2 of the UN Convention on the Law of the Non-Navigational Uses of International Watercourses defines watercourse as "a system of surface waters and ground waters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus."

bodies, produce 270 mcm a year. The natural water does not exceed 200 mcm, and the remaining 70 mcm is "over-extracted" water in the Gaza Strip (see the explanation below). It should be noted that these figures do not relate to consumption, but only to water production. The quantity of water that ultimately reaches Israeli and Palestinian consumers differs slightly because of loss of water (largely on the Palestinian side) and because Mekorot, the Israeli water company, sells water to Palestinians. In 1999, Mekorot sold the Palestinian Authority 21 mcm, approximately one percent of Israel's water inventory.

A. The Mountain Aquifer

The Mountain Aquifer extends over 130 km, from Mount Carmel in the north to the northwest tip of the Negev in the south. The aquifer is 35 km wide, from the Jordan Valley in the east to Israel's coastal strip in the west (see map). Israel extracts from this source slightly more than one-fourth of all the water it produces, while the Palestinians extract from it almost all the water produced in the West Bank. Most of the water extracted by Israel from the Mountain Aquifer lies within the Green Line (Israel's pre-1967 border), and only a small portion from the West Bank (primarily the Jordan Valley). Of the water that Israel extracts from the Mountain Aquifer (from Israel and the West Bank), three percent is sold to Palestinian bodies.

The Mountain Aquifer is divided into three sub-aquifers, according to the direction of the water flow and the storage basin: the Western Aquifer, the Northeast Aquifer (hereafter: the Northern Aquifer), and the Eastern Aquifer. Each of them contains a recharge area, in which the earth is porous and rainfall seeps through into the aquifer, and a storage area, which is circumscribed by a "floor" and "ceiling" made of impenetrable rock. The water flows from the recharge area and is collected in the storage area. For the sake of the discussion in later chapters, it is important to note that extracting water by wells in the storage area is cheaper and more constant than in the recharge area.³⁵

The Western Aquifer of the Mountain Aquifer system is referred to in Israel as the Yarkon-Taninim Aquifer. It flows from the western slopes of the West Bank mountain range. In the past, its waters drained into the Rosh Ha'Ayin and Taninim springs, but that changed when intensive extraction from wells began. The Western Aquifer is the largest of the three sub-aquifers. Most of its recharge area (almost 80 percent) lies in the West Bank mountain range, and almost its entire storage area lies in Israeli territory. In addition to the quantity of water it contains, the Western Aquifer is important because its water is relatively high quality. The natural recharge of this basin amounts to 360 mcm a year.³⁶ This entire amount was already being extracted in the early 1950s, and the division has remained the same since then: 95 percent by Israel, mostly for urban consumption in the greater Tel-Aviv area, Jerusalem, and Israeli settlements near the Green Line, and five percent by the Palestinians, used mostly for irrigation, in the area of Tulkarem and Qalqilya, where the water is extracted from wells, and the Nablus area, where it is extracted from springs.

³⁵ Unless otherwise stated, the data on the Mountain Aquifer are taken from Gvirtzman, 1994.

³⁶ The term "natural recharge" refers to the amount of rain that recharges the aquifer each year. However, the quantity of water stored in the aquifer is greater than this natural recharge, so "over-extraction" is possible. For more on this phenomenon, see the discussion on the Gaza Aquifer below.

The Northern Aquifer is known in Israel as the Nablus-Gilboa Aquifer. It flows northeast from the northern slopes of the Samarian mountains and, until water began to be extracted from wells, drained into the Harod and Beit Shean springs. Ninety-three percent of the water in both the recharge area and the storage area is located within the West Bank and seven percent in Israeli territory. The natural recharge of this aquifer by rainfall is 145 mcm a year, of which Israel extracts 70 percent from its territory, most for irrigation in the Jezreel Valley and Beit Shean Valley, and a small percentage for settlements in the Jordan Valley. The remaining 30 percent is extracted by Palestinians from wells and springs, and are used for urban consumption (primarily in Nablus and Jenin) and irrigation.³⁷

The Eastern Aquifer flows from the eastern slopes of the West Bank mountain range towards the Jordan River and the Dead Sea, and is composed of several separate sub-basins. Other than a small segment in the area of Jerusalem and land to its west (less than two percent of the aquifer's area), all recharge and storage areas of the aquifer lie within the West Bank. This geographical fact led Palestinian researchers to argue that this basin is not an international watercourse, but an exclusively Palestinian resource.³⁸ This argument is faulty for two reasons: first, the natural drainage area of this basin is the Jordan River, so the international status of the Jordan Basin also applies to this portion of the aquifer;³⁹ second, the water that Israel "contributes" to the basin in the Jerusalem area is not only from rainfall, but also a substantial quantity that leaks from the city's water system and seeps into the aquifer.⁴⁰

Another dispute involves the natural recharge capacity of the Eastern Aquifer. The Interim Agreement estimated it to be 172 mcm a year, from which the Palestinians were "granted" the right to develop an additional 70 mcm that had not been utilized.⁴¹ In contrast, Israeli researchers have indicated that the potential recharge capacity of this basin is only 100 mcm a year.⁴² Of the water currently being utilized, 37 percent is consumed by Israelis (most in settlements in the Jordan Valley) and 63 percent by Palestinians in numerous areas of the West Bank, which they extract from wells and springs. The unutilized water from this basin is mostly brackish water not suitable for drinking without undergoing desalinization.⁴³

³⁷ The Interim Agreement, 1995, Annex 3, article 40, Schedule 10.

³⁸ Elmusa, 1997, p. 38; Abouali, 1998, p. 66.

³⁹ Soffer, 1998, pp. 45-46.

⁴⁰ Gvirtzman estimates the overall "contribution" of Israel from the Jerusalem area, both from rainfall and leakage, at 10 percent of the aquifer's natural recharge. (Gvirtzman, pp. 211-212)..

⁴¹ Interim Agreement, 1995, Annex 3, articles 40(5) and 40(6).

⁴² Ben-Gurion University and Tahal, 1994, sec. 2(5)(4); Gvirtzman and Benvenisti, 1993, p. 35.

⁴³ Hydrology Service, 1999, p. 193.

Division of Water from the Mountain Aquifer System

Division/ Aquifer	Israel*		Palestinian Authority**	
	mcm	Percentage	mcm	Percentage
West	350***	94	22	6
North	105	70	45	30
East	40	37	67	63
Total	495	79	134	21

Source: Interim Agreement, 1995, Annex 3, Schedule 10; Hydrology Service; West Bank Water Department.

* Includes all the water pumped by Israeli bodies, including water intended for Israeli settlements and water sold to Palestinian towns and villages in the West Bank (approximately three percent).

** Includes all the water extracted by Palestinian bodies in the West Bank.

*** In addition to this amount, Israel utilizes the aquifer for brackish water from springs (in 1998, 50 mcm) whose source is not recharge from rainfall, so it is not included in this table (Hydrology Service, 1999, p. V)

B. The Jordan Basin System

The drainage basin of the Jordan River stretches over 330 kilometers from the Upper Galilee in the north to the Dead Sea in the south and has an average width of 30 meters.⁴⁴ The system can be divided into four primary parts: the upper Jordan River, the Sea of Galilee, the Yarmuh, and the lower Jordan River. The principal sources of the basin are the Dan River, which is located entirely within Israel, the Hermon River (Banyas), located in the Golan Heights, and the Snir River (Hatzbani), located mostly in Lebanese territory. These three rivers join the upper Jordan River, which feeds 850 mcm of water a year into the Sea of Galilee.⁴⁵ The upper Jordan River and the Sea of Galilee have relatively good quality water, enabling use for both irrigation and domestic needs.

The Yarmuh is the single most significant source of water for the lower Jordan River after the latter exits from the Sea of Galilee. However, most of its water is utilized in Syria and Jordan before it reaches the lower Jordan River. Israel extracts 70 mcm a year from the Yarmuh, which represents 15 percent of its natural flow, and three percent of its overall water output.⁴⁶ As a result of increased utilization of water from the Sea of Galilee by Israel and from the Yarmuh by Syria, Jordan, and Israel, the amount of water currently flowing in the lower Jordan River into the Dead Sea is insignificant. Furthermore, the lower Jordan River water is extremely poor quality (highly brackish and polluted) and unsuitable for any use if not desalinated. The main reason for the extreme brackishness of this section of the Jordan Basin is the system that Israel built to divert brackish springs (which formerly flowed into the Sea of

⁴⁴ Bar, 1998, p. 209.

⁴⁵ Kally, 1997, p. 57.

⁴⁶ Hof, 1998, p. 82.

Galilee) to the lower Jordan River, bypassing the Sea of Galilee, to preserve the lake's water quality.⁴⁷

According to international law, the Palestinians are entitled to benefit from the Jordan River's drainage basin because the West Bank is situated on the bank of the lower Jordan River. Palestinian rights to the aquifer's waters will not be affected if the final-status agreement makes Israel the sovereign of the strip along the Jordan River. The reason is that the Northern Aquifer and the Eastern Aquifer of the West Bank are hydrologically linked to the Jordan River's drainage basin.⁴⁸

The Palestinians do not currently have access to the basin's waters.⁴⁹ By contrast, since its founding Israel has intensively used the Jordan Basin's water. Its territorial expansion resulting from the 1967 war and its control of most of the basin's water sources led to an increase in utilization of the basin's waters. Israel utilizes 630 mcm a year from the Jordan Basin, constituting 31 percent of all the water produced by Israel. Israel extracts for its various uses 530 mcm/year from the Sea of Galilee and the Yarmuh, 450 mcm of which is to supply the National Water Carrier and the remainder for towns and villages surrounding the Sea of Galilee.⁵⁰ Israel extracts another 100 mcm/year from the upper Jordan River and its sources for use in the Hula Valley and Golan Heights.⁵¹ Five mcm a year, or 0.8 percent of the quantity that Israel extracts from the Jordan Basin, is currently being supplied to the Gaza Strip, amounting to four percent of total Palestinian consumption there.⁵²

C. The Coastal Aquifer

The Coastal Aquifer is a system of groundwater that stretches along the Mediterranean Sea's coastal strip in Israel and the Gaza Strip, from the foothills of Mt. Carmel in the north to Rafah in the south. The Coastal Aquifer differs fundamentally from the Mountain Aquifer in that its recharge areas also comprise its storage and extraction areas. The aquifer recharges from rainfall along the coastal plain that seeps into the aquifer, and the extraction wells are located in this same area.⁵³ Although there is no physical separation between the Coastal Aquifer in the Gaza Strip (hereafter: the Gaza Aquifer) and the Coastal Aquifer in Israel, they can be treated as two separate systems. The reason for this is that the water flow of the Coastal Aquifer is primarily east to west, and there is no flow from north to south or south to north.⁵⁴

In addition to rainfall, the aquifer is also fed by "return flows," i.e. water that had previously been utilized for irrigation, or domestic use that and turned into sewage before seeping into the aquifer. On the Israeli side, this sewage was treated and then

⁴⁷ Kally, 1997, p. 76.

⁴⁸ Soffer, 1998, pp. 45-46.

⁴⁹ When Jordan controlled the West Bank, it planned to divert water from the Yarmuh to the West Bank by a canal. The water was to be used for irrigation. The 1967 war and the resultant Israeli occupation stopped the plan. The canal that was planned is known as the Ghor Canal. In the 1960s, Jordan built the eastern Ghor Canal, which still operates and carries water for irrigation in the West Bank and for domestic use in Amman. (Bar, 1998, chap. 6).

⁵⁰ Hydrology Service, 1999; Blank, 2000, p. 13.

⁵¹ Kally, 1997, p. 57.

⁵² Abu Mayla *et al.*, 1998.

⁵³ Gvirtzman and Benvenisti, 1993, p. 38.

⁵⁴ *Ibid.*

artificially inserted for storage and reuse.⁵⁵ The Gaza Aquifer is also fed by sewage, but it is untreated and seeps in unintentionally, both as a result of the lack of sewage infrastructure in many places and because of leaks in the sewage networks where they exist.⁵⁶

The Israeli part of the aquifer is not considered an international water resource, because the Gaza Strip does not "contribute" water to it and the Palestinians do not have access to it. In contrast, experts disagree over whether the Gaza Aquifer is an international water resource.

According to one view, the eastern boundary of the Gaza Aquifer almost totally follows the Green Line and the aquifer is, therefore, a "closed and independent system."⁵⁷ Another view holds that the eastern boundary of the Gaza Aquifer lies east of the Green Line, so that Israeli acts from within Israel affect somewhat the quantity of water available within the Gaza Strip. In this view, a well drilled in Israel near the northeast tip of the Gaza Strip (the Nir Am well) extracts water that would otherwise naturally flow into the Gaza Strip.⁵⁸ However, water experts reported that the water extracted from this well is very brackish and, if not extracted at this point, would increase the brackishness of the Gaza Aquifer.⁵⁹ Supporters of the second view also claim that there is a hydrologic connection between the surface water flowing in the Bsr River (Wadi Gaza) and the Gaza Aquifer's groundwater. This river, which recharges only a few days a year, flows east to west - from Israel via Gaza towards the Mediterranean Sea - and some of it seeps into the aquifer.⁶⁰ Israel established on its territory a plant to store water from the river (up to nine mcm a year) for irrigation, thus preventing some of the water from reaching the Gaza Strip.⁶¹

Despite the lack of clarity of the legal status of the Gaza Aquifer, it should be noted that, unlike the conflict over the other two water systems, the quantity of water in dispute regarding the Gaza Aquifer is relatively small. The dispute centers on three issues:

1. Israel's extraction of water within the Gaza Strip for Israeli settlements (see below).
2. Israel's extraction of water within its territory near the Gaza Strip's northeast border.
3. The manner of utilization of the water from the Bsr river, regardless of whether it is part of the Gaza Aquifer or is an independent surface-water source.

It should be noted that, issues B and C are the kind of disputes that international law dictates should be decided in negotiations between the parties. In contrast, the legal

⁵⁵ Kally, 1997, p. 65.

⁵⁶ MOPIC, 1996, pp. 11-18. For a discussion on the quality of water in Gaza, see chapter 5(C).

⁵⁷ Gvirtzman and Benvenisti, 1993, p. 38.

⁵⁸ Roy, 1995, p. 165; Elmusa, 1997, p. 46.

⁵⁹ Bruins and Tuinhof, 1991, pp. 9-10.

⁶⁰ Gross and Soffer, 1996, pp. 56-57.

⁶¹ Blank, 2000, p. 14.

aspect of issue A is clear, because extraction of water from occupied territory to benefit the settlements is illegal.⁶²

Israel extracts an average of 290 mcm of water a year from that part of the Coastal Aquifer located within its territory. This quantity is replenished each year by rainfall and returned flows from water that had been used for irrigation.⁶³ In addition to this amount, Israel extracts from the Gaza Aquifer six mcm for Israeli settlements there.⁶⁴ The total quantity of water that Israel produces from the Coastal Aquifer (including the Gaza Aquifer) make up 14 percent of its overall production.

The most glaring feature of utilization of the aquifer in the Gaza Strip is "over-extraction," i.e., extracting water in quantities greater than are naturally replenished. The primary consequences of over-extraction are continuous lowering of the water level and increasing salinity of the water.⁶⁵ The Palestinians annually extract 135 mcm of water a year from the Gaza Aquifer.⁶⁶ This amount supplies 96 percent of the total water supply of the Gaza Strip. Only one third is replenished by rainfall, and the remainder comes primarily from returned flows (from irrigation and urban sewage) and from seepage of seawater.⁶⁷

D. Other Sources

In addition to the three natural water sources described above, Israel utilizes a few water sources to which the Palestinians have no rights. Northern Israel contains two relatively small aquifers: the Western Galilee Aquifer and the Carmel Aquifer. The two are situated entirely within Israel. Together, they supply 175 mcm a year, constituting eight percent of Israel's water production.⁶⁸ Southern Israel contains the Negev-Arava Aquifer, an international water source shared by Israel and Jordan. Israel extracts ninety mcm/year from this aquifer, representing four percent of its overall output.⁶⁹ Another sixty-five mcm/year, constituting three percent of water output, is produced in Israel at floodwater storage plants.⁷⁰ Two hundred and sixty mcm of water a year, representing 13 percent of Israel's water production, are produced from treated sewage and used for irrigation.⁷¹

On the Palestinian side, in addition to the shared resources described above, there are only two additional sources of supply. The first is rainfall collected individually by

⁶² For an extended discussion on this issue, see chapter 8(B).

⁶³ This amount does not include the treated sewage (125 mcm/year) artificially collected in the Coastal Aquifer. It also does not include the water collected from the Bsor River (Hydrology Service, 1999, p. V).

⁶⁴ Abu Mayla *et al.*, 1998, p. 11.

⁶⁵ For a more detailed discussion of the process of increasing salinity of the Gaza Aquifer and its health consequences, see chapter 5(C).

⁶⁶ Abu Mayla *et al.*, 1998, p.11.

⁶⁷ MOPIC, 1996, p. 25. For a slightly different breakdown of the water of the Gaza Aquifer, see Ben-Gurion University and Tahal, 1994, sec. 2(5)(6).

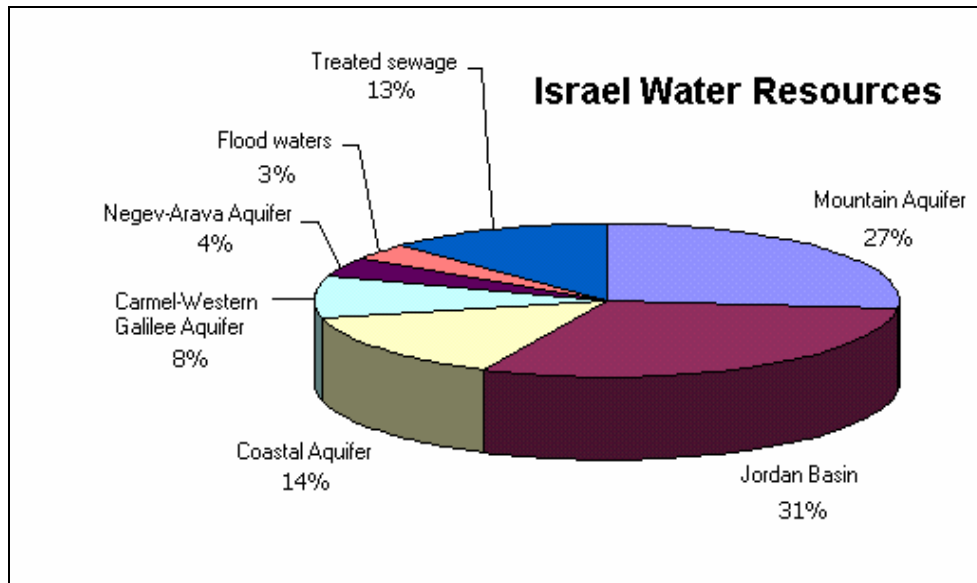
⁶⁸ Hydrology Service, 1999, p. V.

⁶⁹ Most of the water from this aquifer is brackish and is desalinated prior to use. Also, most of the water is used only once because of the very limited rainfall and recharge. The water is used for irrigation in the Arava and consumption in Eilat (Ben-Meir, 1997, p. 10)

⁷⁰ Blank, 2000, p. 14. This quantity significantly changes in strength from year to year.

⁷¹ This figure is for 1997, the last year for which verified figures are available (ICBS, 1999, Table 15.6).

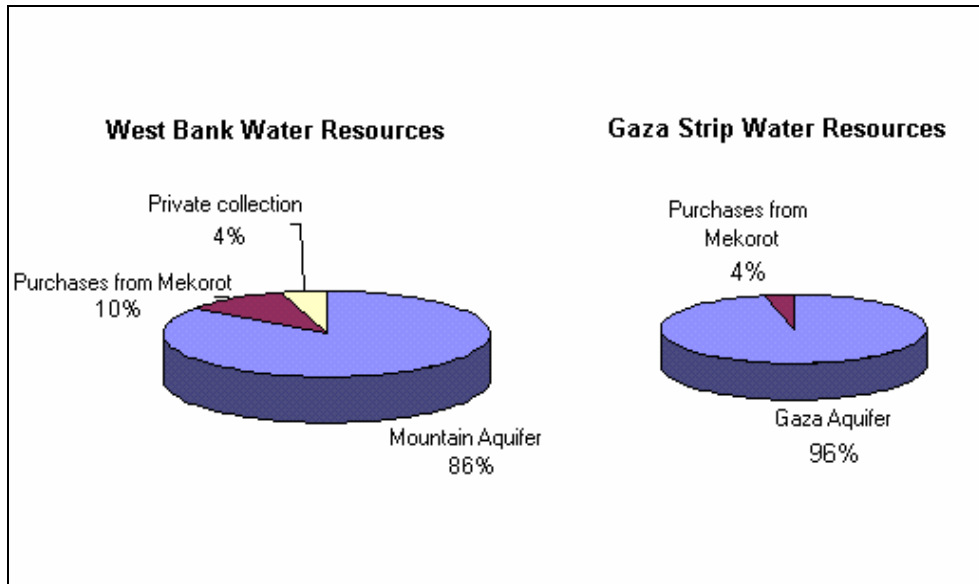
families on roofs of their houses. Water from this source amounts to seven mcm a year in the West Bank.⁷² Comparable figures are not available for the Gaza Strip. The second source is water purchased from Mekorot. Mekorot sells 10 percent of the total quantity of water supplied in the West Bank (a third of the domestic and urban supply) and four percent of total supply in the Gaza Strip (10 percent of domestic and urban use).⁷³



The above chart covers all uses, including industrial and agricultural. Approximately one percent of the total inventory is sold to the Palestinian Authority.

⁷² MOPIC, 1998, p. 19.

⁷³ For a discussion on sources of water supply in the Occupied Territories, see chapter 4(A).



The above chart covers all uses, including industrial and agricultural. The water sectors of the West Bank and the Gaza Strip are presented separately because water is not transferred from one to the other.

Part 2

The Water Crisis in the Occupied Territories

Chapter 3

Control of the Water Sector

A. The Water Sector from the Beginning of the Occupation to the Interim Agreement (1967-1995)

Demand for water by Palestinians in the West Bank and the Gaza Strip has been increasing since the 1920s. The main reason for the increase is, in addition to natural population growth, the increased number of homes connected to a central water network. Construction of the infrastructure and connection of the residents began during the British Mandate and continued under Jordanian and Egyptian control and later under Israeli control.⁷⁴ In addition, the demand for water in the Occupied Territories increased at a greater rate since the beginning of the Israeli occupation, in 1967, because of the relative increase in the Palestinian standard of living following integration of the economies of the Occupied Territories and Israel.⁷⁵

However, Israel's tight control of the water sector in the Occupied Territories prevented development that would enable the water sector there to meet the increasing demand for water. Israel instituted restrictions and prohibitions that had not existed under Jordanian and Egyptian control. These restrictions and prohibitions are a principal reason for the water shortage and resultant distress, which will be discussed below.

Israel's water policy in the Occupied Territories benefited Israel in two primary ways:

1. Preservation of the unequal division of the shared groundwater in the West Bank's Western Aquifer and Northern Aquifer. This division was created prior to the occupation, a result of the gap between Israel's economic and technological development and that in the West Bank. However, the gap would have likely have diminished had Israel not prevented it.
2. Utilization of new water sources, to which Israel had no access prior to 1967, such as the Eastern Aquifer (in the West Bank) and the Gaza Aquifer, primarily to benefit Israeli settlements established in those areas.

To promote this policy, Israel drastically changed the legal and institutional system of the water sector in the Occupied Territories that was in effect prior to the occupation. This change was made in two main stages. In the first stage, which began just after the 1967 war ended, all powers relating to water, which had been under Jordanian and Egyptian authority, were transferred to the occupation authorities. Military legislation significantly augmented these powers.⁷⁶ In the second stage, which began in 1982, a

⁷⁴ Elmusa, 1997, pp. 108-109.

⁷⁵ *Ibid.*, pp. 136-144.

⁷⁶ Military Order 92 (Order Regarding Powers in Water-Law Matters) and Military Order 158 (Order Amending the Supervision Over Water Law No. 31, of 1952), which were issued in the West Bank in

substantial portion of the powers held by the occupation authorities, among them supply of most of the water to the urban centers, were transferred to Mekorot, which operated under the supervision of Israel's Water Commissioner and Ministry of Agriculture.⁷⁷ The result of these changes was the integration of the water resources of the West Bank and the Gaza Strip with those of Israel and their operation by the Israeli bureaucracy as a single, centralized system.

For residents of the Occupied Territories, the primary result of the change in the law and transfer of powers over the water sector to Israeli bodies was the drastic restriction on drilling new wells to meet their water needs. Under the military legislation, drilling a well required a permit, which entailed a lengthy and complicated bureaucratic process to obtain. The vast majority of applications submitted during the occupation were denied. The few that were granted were solely for domestic use, and were less than the number of wells that, after 1967, had ceased to be used due to improper maintenance or because they had dried up.⁷⁸ Also, in 1975, Israel set quotas for extracting water from wells and installed meters to enforce them. The quotas were woefully inadequate to meet the population's needs.⁷⁹

It should be emphasized that the legal and institutional changes that Israel instituted in the water sector in the Occupied Territories are not intrinsically unacceptable. They conformed to the approach taken in Israel's water sector and could, in principle, have led to a more efficient supply of water to the Palestinians. However, Israel utilized these changes to promote only Israeli interests, almost completely ignoring the needs of the Palestinian population, which was left to face a growing water shortage.

Other Israeli restrictions, not directly related to its water policy and stemming from other factors (such as security or ecology), reduced Palestinian access to water. For example, a strip of land along the lower Jordan River was declared a closed military area, and Palestinian farmers in the West Bank were unable to utilize it for irrigation, as they had done prior to the occupation.⁸⁰ Another example is classification of areas with fresh water springs as nature reserves, where access is limited or entails payment.⁸¹

The water shortage in the Occupied Territories resulted not only from the restrictions Israel placed on Palestinian residents, but also from Israel's relatively minimal investment in water infrastructure. The neglect in infrastructure was conspicuous in

August 1967, transferred all powers that had been in effect under Jordanian legislation to the appointee of the Commander of IDF forces in the region and revoked all the rights that the Jordanian legislation had granted to the population, unless the said officer extended them. In contrast to the Jordanian legislation, decisions of the commander could not be appealed to any other level of authority or court. Military Order 498, of 1974, created a similar situation in the Gaza Strip. In 1981, the powers over water matters were transferred to the Interior Department of the Civil Administration.

⁷⁷ The Water Commissioner's Office was part of the Ministry of Agriculture until 1996, when the office was transferred to the Ministry of National Infrastructure.

⁷⁸ According to the head of the Palestinian Water Authority, Nabil al-Sharif, from 1967 to 1996, Israel only approved thirteen wells to be drilled for domestic use (letter from al-Sharif to B'Tselem, 18 June 2000).

⁷⁹ For a discussion on the wells in the Occupied Territories and Israel's restrictions, see Elmusa, 1997, pp. 84-88; Zarour and Isaac, 1994; Matar, 1992.

⁸⁰ Haddad, 1998, p. 180.

⁸¹ The principal springs that were classified as nature reserves are al-'Ouja, al-Badi, 'Ein-Fasha, al-Qelt, and al-Turba.

two areas: in construction of infrastructure to connect village residents to a running-water network, and in maintenance (to prevent loss of water) of the existing networks. When the Interim Agreement was signed, 20 percent of Palestinians in the West Bank were not connected to a running-water network.⁸² The water-pipe leaks resulting from improper maintenance led in some instances to a loss of 60 percent of the quantity of water supplied. This was true, for example, in Jenin⁸³ and Gaza.⁸⁴

Despite the lack of figures on the scope of Israeli investment in the water sector in the Occupied Territories, it is reasonable to assume that it was comparable to the general pattern of Israel's economic policy in the Occupied Territories. Several economic research projects found that the amount of public expenditure in the Occupied Territories (in all fields) was less than the revenues from taxes that Israel collected from the population. The surplus of revenues minus expenditures flowed regularly into the state's treasury.⁸⁵

Establishment of the settlements in the Occupied Territories also affected the Palestinian water shortage. Unlike in the West Bank, in the Gaza Strip Israel was not significantly interested in the aquifer's water. Over-extraction from this aquifer began before the occupation, and limitation on extraction was necessary to preserve the aquifer. However, the new wells that Israel drilled to supply water for the Israeli settlements that were established in the Gaza Strip led to further ecological damage to the aquifer. This damage resulted from the extraction of water that otherwise would have served the Palestinian population and thus slightly reduce over-extraction.⁸⁶ Other than drillings for the settlements, Israel's responsibility for the destruction of the Gaza Aquifer stems from omission rather than commission. Until the early 1990s, Israel failed to supply water to the Gaza Strip from its own sources or from West Bank sources. Even in the 1990s, the small quantities of water supplied could not abate the damage to the aquifer.

There is a factual dispute as to whether the drilling of new wells for Israeli settlements in the Jordan Valley damaged water sources that served Palestinian towns and villages in the area.⁸⁷ According to Palestinian researchers, extractions from those wells led in several cases to reduction and even complete desiccation of nearby springs that had served the local population, primarily for irrigation.⁸⁸ In contrast, Israeli researchers argue that these claims are unfounded, because the drillings for the settlements extracted water from the deep layer of the aquifer, which, from a hydrologic perspective, is detached from the upper layer from which Palestinian wells and springs in the Jordan valley are fed.⁸⁹ The only case on which there is agreement occurred in the mid-1970s when Israel drilled two wells to serve the Mehola

⁸² Nassereddin, 1997, p. 122.

⁸³ Ja'as, 1999.

⁸⁴ MOPIC, 1996, p. 12.

⁸⁵ Arnon *et al.*, 1997, pp. 30-34; World Bank, 1993, p. 33.

⁸⁶ For an extended discussion on this phenomenon, see chapter 5(C).

⁸⁷ The Interim Agreement of 1995 (Annex 3, article 40, Schedule 10) notes that Israel extracts forty mcm/year from the Jordan Valley.

⁸⁸ Matar, 1992; Elmusa, 1997, p. 257.

⁸⁹ For a summary of the arguments of those researchers, see Sherman, 1999, pp. 63-66.

settlement (at the northern edge of the Jordan Valley), leading to desiccation of the springs in the Palestinian villages Bardaleh and 'Ein Al-Beyda.⁹⁰

B. Preserving Patterns of Control after the Interim Agreement (1995-2000)

The interim agreement that Israel and the Palestinian Authority signed in September 1995 (Oslo 2) includes the most updated understanding on water that has been reached in the peace process framework. It is also more detailed than previous documents. The subject appears in article 40 of the Protocol on Civil Affairs (Annex 3). Israeli officials relate to it as a turning point at which responsibility for the water sector is transferred to the Palestinian Authority.⁹¹ However, as we shall see below, this agreement did not significantly change the scope of Israeli control.

The point of departure of the understanding on division of water from the shared sources is that the quantity of water that Israel consumes, both within the Green Line and in the settlements, will not be reduced.⁹² According to this principle, any additional water for the Palestinians would be produced from previously unutilized sources, and not by re-distribution of existing sources. This means that almost every addition of water to the Palestinians under this agreement should come from the Eastern Aquifer of the West Bank, which, according to the agreement itself, is the only source that had not been fully utilized prior to signing of the agreement.⁹³

From the perspective of the water needs of the Palestinians, the sole actual "achievement" of this agreement is the joint understanding to increase the supply of water to the Occupied Territories by 28.6 mcm/year. This addition currently constitutes 10 percent of the overall water supply of the Occupied Territories, and 30 percent of domestic and urban use. This quantity is classified as intended for "immediate needs... during the interim period," i.e., from September 1995 to May 1999. As of June 2000, more than a year after expiration of the interim period, only 16 mcm of the addition were actually produced and transferred provided to the Palestinian population.

Article 40 divides responsibility for development of the additional water between Israel and the Palestinian Authority. Israel is responsible for developing 9.5 mcm/year, of which 4.5 is intended for the West Bank and five for the Gaza Strip.⁹⁴ The quantity for the West Bank is presently supplied in full, but the Gaza Strip has not received any additional water, because the Palestinian Authority did not meet its undertaking to construct the pipeline from the National Water Carrier to the Gaza Strip.⁹⁵ Responsibility for producing the remaining 19.1 mcm/year, all intended for

⁹⁰ This case was covered by the international media. After great pressure was placed on Israel, Mekorot agreed to compensate the residents for their farming loss. The compensation was in the form of allocating water from these two wells to farmers in the two Palestinian villages (Matar, 1992; Sherman, *Ibid.*)

⁹¹ The Foreign Ministry made this claim during the severe water shortage, following a drought, in the Occupied Territories in the summer of 1999. The document was placed on the ministry's Web site: <http://www.israel-mfa.gov.il/mfa/home.asp>

⁹² Interim Agreement, 1995, Annex 3, article 40(3)(a).

⁹³ For details on the shared water sources and their utilization, see the discussion in chapter 2.

⁹⁴ Interim Agreement, 1995, Annex 3, article 40(7)(a).

⁹⁵ Interim Agreement, 1995, Annex 3, article 40(7)(b)(3). According to the head of the Palestinian Water Authority, Nabil al-Sharif, Israel conditioned performance of the undertaking on the water being

the West Bank, was the responsibility of the Palestinian Authority. Of this amount, it currently only produces 11-12 mcm/year.⁹⁶ Israel and the Palestinian Authority dispute the reasons for the delay by the Palestinian Authority in meeting its commitment. The reasons will be discussed later in this chapter.

The agreement also provides that the Palestinians are allowed to develop an additional 41-51 mcm, which presently represents an addition of 17-20 percent of their overall supply, and 40-50 percent of their domestic and urban use. These quantities are intended to meet "future needs." The agreement does not set a time schedule for producing this water. The water is supposed to be extracted from the Eastern Aquifer of the West Bank and "other agreed sources in the West Bank."⁹⁷ However, as noted in chapter 2, water experts dispute the recharge potential of the Eastern Aquifer, and, in any event, most of the unutilized water there is brackish and requires desalinization to make it usable. As for the "other agreed sources," the agreement does not mention them and it is unclear what the drafters were referring to given that all water sources are already fully utilized.

While the quantity of water promised to the Palestinians for the interim period, like the responsibility to implement those additions, is clearly defined in the agreement, the supply of water to the West Bank prior to the agreement is not clearly stated. Therefore, the quantity on which the addition is based is not readily apparent.⁹⁸ Thus, the water that Mekorot sells to the Palestinians, which amounts to one-third of the urban water supply in the West Bank,⁹⁹ is not incorporated in the Interim Agreement. The agreement provides that the Joint Water Committee "develop a Protocol relating to all aspects of the supply of water from one side to the other."¹⁰⁰ B'Tselem requested Israel's Water Commissioner's Office and the Palestinian Water Authority to provide a copy of the protocol. Although both agreed to do so, B'Tselem has yet to receive a copy.¹⁰¹

Israel recognized that the Gaza Strip and the West Bank comprise one territorial unit.¹⁰² However, the Interim Agreement stipulates that, regarding water resources, the Gaza Strip will be a separate water sector and, other than the small quantity that

moved to the Strip via one point only, which required the Palestinian Authority to build a new network capable of transporting the additional quantity of water. According to al-Sharif, the delay resulted from the lack of money to cover the high construction costs of the network (letter to B'Tselem, 18 June 2000).

⁹⁶ Letter from al-Sharif, *Ibid*.

⁹⁷ Interim Agreement, 1995, Annex 3, article 40(7)(b)(6).

⁹⁸ The only relevant information appears in Schedule 10 to article 40, under the heading "Data Concerning Aquifers." This schedule sets the amounts extracted from every aquifer in the West Bank, and indicates the recipient of each amount (Palestinians or Israelis). It is apparent from sub-article 40(18) that the amounts appearing in this schedule only relate to extractions by each side, the water that Mekorot sells to the Palestinians being included in the Israeli quota.

⁹⁹ For an extensive discussion on this matter, see chapter 4(A).

¹⁰⁰ Interim Agreement, Annex 3, article 40(19).

¹⁰¹ The request to the Palestinians was made to the deputy head of the Palestinian Water Authority, Fadel Qawash, on 17 April 2000. A week later, he stated (through a senior assistant) in a telephone conversation with B'Tselem that he does not have a copy of the protocol. Regarding the Israeli side, the request was sent to the Israeli representative on the JWC, Shmuel Cantor, on 18 April 2000, in the context of a request to meet with him. The meeting was never held and the document was not provided (see footnote 111).

¹⁰² Declaration of Principles, 1993, article 4 (in the bibliography, see Israel-PLO Declaration of Principles).

Israel undertook to sell,¹⁰³ residents of the Gaza Strip will have to meet their needs solely from resources located within its borders, i.e., they are not allowed to obtain water from the West Bank. The failure of the Interim Agreement to re-distribute the water resources shared by the West Bank and Israel prevented any "surplus" of water in the West Bank that could increase the supply of water to the Gaza Strip. As a result, the severance of the Gaza Strip and the West Bank continued, further damaging the Gaza Aquifer because of the necessity to continue the over-extraction.

Pursuant to the Interim Agreement, the parties established the Joint Water Committee (JWC), the body charged with approving every new water and sewage project in the West Bank. The JWC is comprised of an equal number of representatives of Israel and the Palestinian Authority. All its decisions are made by consensus, and no mechanism is established to settle disputes where a consensus cannot be attained.¹⁰⁴ This method of decision-making means that Israel is able to veto any request by the Palestinian representatives to drill a new well to obtain the additions stipulated in the agreement. Since its establishment, the JWC has approved the drilling of seventeen new extraction wells. Six Palestinian requests for drilling new wells were rejected by the Israeli representatives, and fifty-six requests are at one stage or another of review.¹⁰⁵

Israel's control of extraction of water from the shared aquifers is not limited to its veto power in the JWC over new drillings. If the well approved by the JWC is situated in Area C, which is under Israel's complete control, the High Planning Committee of the Civil Administration must approve the drilling.¹⁰⁶ The Civil Administration must also approve every other water-related project that involves Area C. Because of the geographic reality created by the Oslo Accords, whereby most of the West Bank remained under complete Israeli control, almost every project that calls for water to flow from one place to another entails movement through Area C, necessitating Civil Administration approval.

Obtaining approval of the Civil Administration entails a lengthy and protracted bureaucratic process, and many Palestinian applications are rejected.¹⁰⁷ For example, since the beginning of 2000, the Civil Administration has rejected three requests for new water-related projects: construction of a reservoir at Ras Jabareh (Tulkarem District), laying a main line at 'Izbat Tabib (Qalqilya District), and construction of a reservoir at Bet Duqo (Ramallah District).¹⁰⁸ Every project that is executed without the appropriate approvals is likely to be demolished by the Civil Administration. In

¹⁰³ Five mcm/year that are currently being supplied via the National Water Carrier (see chapter 2(B) and an addition of five mcm/year that will be supplied in the future.

¹⁰⁴ Interim Agreement, 1995, Annex 3, article 40(14).

¹⁰⁵ The information was provided to B'Tselem by the head of the Palestinian Water Authority, Nabil al-Sharif, in a letter of 18 June 2000.

¹⁰⁶ The Civil Administration has rejected three requests for wells that passed all the JWC's approval stages. The Civil Administration claimed that the proposed site of the well was in a nature reserve, near a settlement, or in a closed military area.

¹⁰⁷ Letter of 18 June 2000 from al-Sharif to B'Tselem.

¹⁰⁸ The information was provided to B'Tselem by engineer Muhammad Ja'as, of the West Bank Water Department (for information on this department, see chapter 4(A) below).

May 1999, for example, the Civil Administration demolished five reservoirs that were built without approval.¹⁰⁹

According to the Palestinian Water Authority,¹¹⁰ the lengthy time required for new-project approval and the many rejections of proposed projects, both by the Israeli side of the JWC and by the Civil Administration, are the primary reasons for delay in providing the additional quantity of water to the West Bank that the Palestinians had undertaken to supply during the interim period.¹¹¹

Senior officials of Israel's Water Commissioner's Office and the Civil Administration deny these contentions.¹¹² They contend that the Palestinian Authority did not meet its commitments in the agreement because of inefficiency and political considerations. For example, the Palestinian Authority postponed for a protracted period the start of extractions from the new well in Jenin because it insisted that the water be extracted by an independent generator that it did not have, so that it would not have to hook-up to Israel's Electric Company. In another case, according to the same officials, duplicate requests for drilling wells were submitted to the Civil Administration - once by the Palestinian Authority itself and once by the American company that was going to do the work - calling for different proposed sites.

The Interim Agreement also stipulates the establishment of at least five Joint Supervision and Enforcement Teams (JSETs).¹¹³ The JSETs are given several tasks, primarily supervision of extractions from each well in accordance with the quotas set by the JWC. In this area also, the balance between the sides is not equal. The JSETs' jurisdiction is limited to the West Bank, and they are not allowed to check or supervise the vast majority of the water that Israel extracts from the shared aquifers, because that water is extracted inside the Green Line.

The only powers transferred to the Palestinian Authority pursuant to the Interim Agreement are operation of several wells that only serve the Palestinian population and were previously in the hands of Mekorot, and collection of water bills issued to Palestinian consumers.¹¹⁴ In contrast, in matters related to drilling new wells, execution of water-related projects, and setting of extraction quotas, i.e., everything related to division of water between Israel and the Palestinians, Israel's control was not reduced one iota.

¹⁰⁹ These reservoirs were demolished on 19 May 1999. On 1 June 1999, B'Tselem's researcher, Najib Abu-Rokaya, was given the testimony of Qa'id Fadel Naji Jabber (unpublished), who owned two of the five reservoirs. For a report on the incident, see *Ha'aretz*, 20 May 1999.

¹¹⁰ This contention was made by Fadel Qawash, deputy head of the Palestinian Water Authority, in an interview with B'Tselem, 17 April 2000.

¹¹¹ B'Tselem contacted the senior representative of Israel on the JWC, Shmuel Cantor, to set up a meeting to discuss this issue. Although Cantor agreed in principle, repeated requests by B'Tselem to fix a time for the meeting remained unanswered. B'Tselem also contacted the Civil Administration to obtain its response to this contention. The spokesperson, Captain Peter Lerner, informed B'Tselem that he was unable to respond because the Civil Administration personnel who handle the relevant issues were on strike.

¹¹² For a discussion of these contentions, see Amira Hass, "Drink Too Much," *Ha'aretz*, 12 July 1999.

¹¹³ Interim Agreement, 1995, Annex 3, Schedule 9).

¹¹⁴ Interim Agreement, Annex 3, article 40(4).

Chapter 4

Palestinian Water Consumption

A. Water Suppliers

Almost all the running water used by Palestinians in the Occupied Territories that comes through a pipeline, for all uses other than irrigation (hereafter: urban use), is groundwater extracted from wells. A small portion is from springs. Ownership of the wells and responsibility for their operation and maintenance is scattered among several institutions and entities.

The principal entity is Israel's Mekorot Water Company, which sells water to Palestinian towns and public bodies. In the West Bank, Mekorot supplies water from wells located in Israel and in the settlements. It currently sells to Palestinians a third of the water used for Palestinian urban consumption in the West Bank.¹¹⁵

The second entity is the West Bank Water Department, which serves towns and villages throughout the West Bank by means of thirteen wells that it operates. The status of this body is not clear. It is a department of the Palestinian Water Authority, which is subject to the Palestinian Authority and represents the PA on the JWC. However, all the wells that it operates are controlled by the Civil Administration and Mekorot, which are solely responsible for setting the quantities and division of the water extracted. The West Bank Water Department is also responsible for collecting, on behalf of Mekorot, the water bills issued to municipalities and other Palestinian bodies. The Department presently supplies one-quarter of the water used by West Bank Palestinians for urban consumption.¹¹⁶

Therefore, over half (56 percent) of the water for urban use in the West Bank is supplied by Israeli bodies or entities subject to Israeli control. This means that, as will be shown in the next chapter, the Palestinians remain directly dependent on Israel even after the signing of the Interim Agreement and the "transfer" of authority for management of the water sector to the Palestinian Authority. This dependence is significantly smaller in the Gaza Strip.

The rest of the water for urban needs is supplied by three actors. The first is composed of the water departments of municipalities and of a small percentage of village councils. The second are independent public bodies serving large areas in the West Bank. The most important are the Jerusalem Water Undertaking,¹¹⁷ which serves almost the entire Ramallah District and part of the Jerusalem District, and the Bethlehem Water and Sewage Authority, which serves almost the entire Bethlehem

¹¹⁵ The data on the water-supply system in the West Bank are based, unless noted otherwise, on the report of the West Bank Water Department, which was prepared by engineer Muhammad Ja'as (Ja'as, 1999). Because the data in the report relate to 1998, Ja'as updated them in his interview with B'Tselem on 7 May 2000 at the offices of the West Bank Water Department in Ramallah's suburbs.

¹¹⁶ The information on the status of this body was provided by the director general, Taher Nassaradin, in an interview with B'Tselem on 24 March 1999.

¹¹⁷ For details on this institution, see its Web site: <http://www.jwu.org>.

District. The water supplied by these two entities comes in part from its own wells and in part from purchases from Mekorot and the West Bank Water Department.

The third actor involved in supplying water in the West Bank is the Palestinian Water Authority, which was established in 1995. It is a statutory body under the authority of the president of the Palestinian Authority, and its function is to plan, regulate, and manage the water sector in the Occupied Territories.¹¹⁸ In practice, it coordinates the Palestinian bodies supplying water in the Occupied Territories, and represents the Palestinian Authority in contacts with the donor nations on water-related matters. The Palestinian Water Authority also owns some of the new wells that were drilled pursuant to the Interim Agreement.

In the Gaza Strip, Mekorot supplies 10 percent of the water for Palestinian urban needs. This water comes from the Sea of Galilee and is transported via the National Water Carrier. In addition to this limited quantity, responsibility for extraction primarily lies with the municipalities and village councils. UNWRA, the UN's refugee agency, owns five wells that supply water to the Jabalya, Khan Yunis, and Rafah refugee camps.¹¹⁹

It should be explained that the water-supply system described above does not relate to the agricultural sector in the West Bank and the Gaza Strip. The wells used for irrigation are almost exclusively privately owned by the farmers, who are individually responsible for obtaining water for their crops. However, every irrigation well has a meter and extraction from the well is supervised by the JWC, which sets the quotas. Water consumption in the agricultural sector will be discussed in section D of this chapter.

B. Palestinian Water Consumption for Domestic, Urban, and Industrial Use

The discriminatory division of water resources shared by Israel and the Palestinian Authority, discussed in previous chapters of this document, is clearly reflected in figures on water consumption by Palestinians in the Occupied Territories.

The annual quantity of water supplied to Palestinians in the West Bank for urban needs amounts to fifty mcm.¹²⁰ Thus, Palestinian per capita water consumption is twenty-nine cubic meters/year, or eighty liters a day.¹²¹ However, since a significant percentage of the water supplied is lost in the municipalities' water networks, actual use is much lower. The West Bank Water Department estimates that at least 25

¹¹⁸ The Water Authority was established pursuant to Presidential Order No. 90, of April 1995, and its powers were later incorporated in Law No. 2, of February 1996. The same law established the National Water Council, which is responsible for setting water policy and whose members include representatives of government ministries and the public (Haddad, 1998, pp. 181-182).

¹¹⁹ This information was provided to B'Tselem by the head of the UNRWA office in Gaza, Lionel Brisson, in a letter of 20 June 2000.

¹²⁰ For the source of the figures on water supply in the West Bank, see footnote 115.

¹²¹ In 1999, the West Bank had a population of 1.73 million people (PCBS, 2000). This figure does not include Palestinian neighborhoods and villages in East Jerusalem that were annexed into Israel and whose water is supplied by the Jerusalem Municipality.

percent of the water supplied in the West Bank is lost before it reaches the consumer.¹²²

As a result, per capita annual water consumption in the West Bank is only 22 cubic meters/year, or sixty liters a day. Consumption varies from region to region. In villages that are not connected to a running-water network, consumption is significantly less (see the discussion in chapter 5(A)). Consumption also varies between the towns and villages that are connected to a running-water network. In Ramallah District, for example, per capita consumption is seventy-five liters, while in Jenin District the figure is only forty-five liters.¹²³ It should be noted that the figures only relate to consumption of water running through the pipeline, and does not include the rainfall and spring water that Palestinians collect privately or the water extracted from agricultural wells, which serves, in addition to irrigation purposes, limited domestic use.¹²⁴

The quantity (but not the quality) of water consumed in the Gaza Strip is higher than in the West Bank. The quantity of water supplied to Palestinians in the Gaza Strip for urban consumption is estimated at 55 mcm/year.¹²⁵ Therefore, before taking water loss into account, per capita consumption is 50 cubic meters/year (137 liters a day). In contrast, actual per capita consumption is 88 liters a day, i.e., 36 percent of the water supplied is lost before it reaches the consumer.¹²⁶ Water consumption is higher than average in Gaza City and significantly lower than average in the refugee camps (60-70 liters a day per person), in which close to one-half of the Gazan population lives.¹²⁷

The weighted average of urban consumption of running water from pipelines to the West Bank and the Gaza Strip together amounts, therefore, to 70 liters a day per person, or 26 cubic meters/year/person.

¹²² The water loss is the difference between the quantity of water supplied by each municipality or village council and the quantity for which consumers in the relevant area were charged. That is, this category includes not only water lost by leaks in the network, but also water that was stolen. A separate figure for leakage loss could not be obtained (see footnote 115 above).

¹²³ A district includes dozens of towns and villages, including the major town of the district, after whom the district is named.

¹²⁴ Per capita consumption includes the water purchased from private dealers, who obtain the water from public wells, but does not include the water that comes from private agricultural wells.

¹²⁵ The information was provided by the head of the Palestinian Water Authority, Nabil al-Sharif, in a letter of 18 June 2000 to B'Tselem.

¹²⁶ Letter from al-Sharif, *ibid.* The calculation of per capita consumption is based on a population of 1.1 million (PCBS, 2000).

¹²⁷ Letter from the head of the UNRWA office in Gaza, Lionel Brisson, of 20 June 2000.

**Water Consumption in the Occupied Territories,
For Non-agricultural Use (1999)**

	Population (in millions)	Total Urban Supply (mcm)	Pre-Loss Consumption		Actual Consumption	
			cubic meters/ year/ person	liters/ day/ person	cubic meters/ year/ person	liters/ day/ person
West Bank	1.73	50	29	80	22	60
Gaza Strip	1.1	55	50	137	32	88
Total	2.83	155	37	102	26	70

C. Gaps in Consumption

The gap between Palestinian water consumption and Israeli water consumption is enormous. Per capita Israeli consumption for domestic and urban use alone is 103 cubic meters/year, equivalent to 282 liters/day.¹²⁸ In other words, per capita consumption in Israel is four times higher than in the Occupied Territories. If Israel's industrial sector is also taken into account, annual per capita consumption reaches 128 cubic meters (350 liters/day), or five times Palestinian consumption for the comparable sectors.¹²⁹

Like the situation in the Occupied Territories, domestic and urban consumption in Israel is divided unequally from place to place: in Jerusalem, per capita daily consumption is 192 liters, while in the Israeli Arab city of Umm-al-Fahem it is only 110. In contrast, the figure is 685 liters a day in Eilat and 904 in Savyon, a wealthy suburb of Tel-Aviv.¹³⁰

**Israeli Consumption (including Settlements) for Domestic, Urban,
and Industrial Use, and the Gap between Israeli Consumption and Palestinian
Consumption in these Sectors (by percentage)**

Israel		Gap in comparison to the West Bank	Gap in comparison to the Gaza Strip	Gap in comparison to total Palestinian consumption
cubic meters/ year/ person	liters/ day/ person			
128	350	483	298	400

¹²⁸ The figures on water consumption in Israel relate to 1998 and are taken from the Hydrology Service, 1999, p. VI. Calculation of per capita consumption is based on a population of six million people (ICBS, 1999, Table 2.1).

¹²⁹ In examining this comparison, it is necessary to take into account the great gap, for reasons unrelated to the water shortage, in the industrial sectors of the two economies. The reason that the comparison is made here is the lack of figures dealing only with water consumption in the industrial sector in the Occupied Territories. Industrial water consumption is included in the figures on domestic and urban water consumption.

¹³⁰ Kally, 1997, p. 16.

Per capita consumption in Israel also includes water consumption in the settlements in the Occupied Territories. Because the Israeli Central Bureau of Statistics does not publish the breakdown of consumption according to regions, it is not possible to determine the precise gap between water consumption in the settlements and in Palestinian towns and villages.

Israel's previous Water Commissioner, Meir Ben-Meir, estimated domestic, urban, and industrial consumption in the settlements in the West Bank (for 1998) at 16.7 mcm/year, a per capita daily consumption of 274 liters.¹³¹ This figure is four times higher than the comparable figure in Palestinian towns and villages in the West Bank. Estimates published by independent researchers are substantially higher than those of Ben-Meir.¹³²

There is less disagreement over the amount of urban water consumption of Israeli settlements in the Gaza Strip. For 1998, that figure was estimated at 1.3 mcm/year.¹³³ Since the number of persons living in those settlements is very small, the water supplied for urban use amounts to 584 liters a day per person, which is almost seven times higher than urban consumption in Palestinian towns and villages in the Gaza Strip.¹³⁴

It should be explained that the discriminatory division of the shared resources and the limitations imposed by Israel during the occupation are not the only reasons for the gap in water consumption. Water-sector researchers maintain that there is a certain relationship between the level of household income and water consumption.¹³⁵ That is, a certain percentage of the gap in water consumption between Israelis and Palestinians stems from the gap in demand for water by each of the two populations. This demand is affected, in part, by the difference in their standards of living.

However, the research proves that Palestinian demand for water exceeds the quantity supplied.¹³⁶ This conclusion is also clearly apparent from comparison of per capita water consumption in the Occupied Territories to consumption for comparable uses in other countries having a standard of living (based on per capita GDP) that is similar, or lower, to that found in the Occupied Territories. It is clear, therefore, that if Israel did not dictate the existing unfair division of water, the gap in consumption between the two populations would be significantly smaller.

¹³¹ Letter reply of 2 January 2000 from Ben-Meir to B'Tselem. The calculation is based on a population of 166,000 people (ICBS, 1999, Table 2.7).

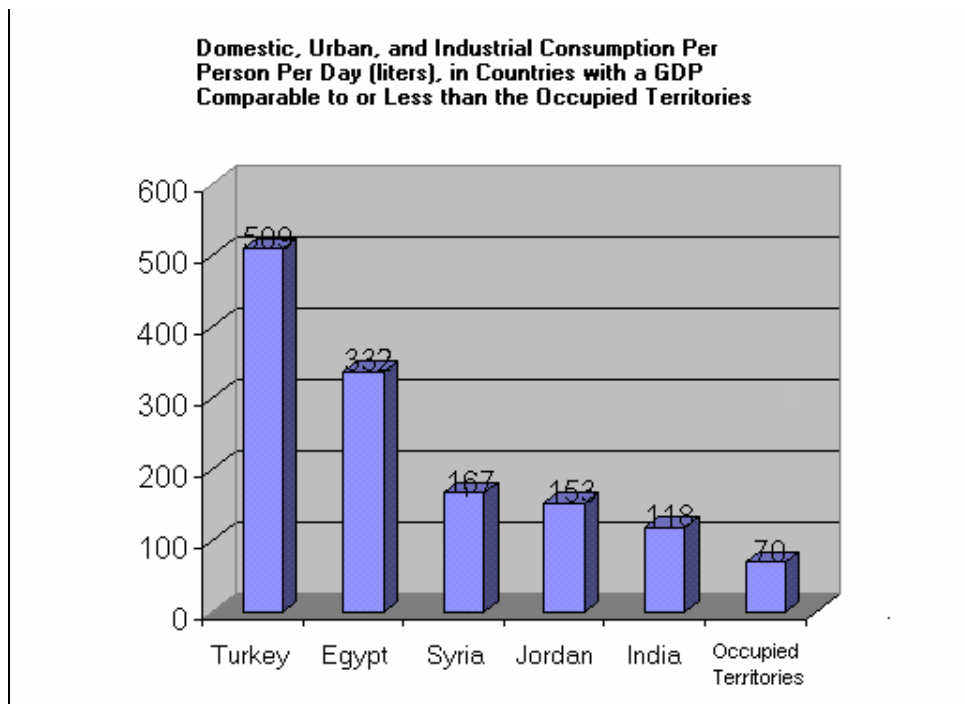
¹³² For a summary of these estimates, see B'Tselem, 1998, p. 13.

¹³³ Letter of 2 January 2000 from Ben-Meir to B'Tselem.

¹³⁴ The calculation is based on a population of 6,000 people (ICBS, 1999, Table 2.7).

¹³⁵ CSWS, 1999, p. 61.

¹³⁶ Elmusa, 1997, pp. 136-149; Roy, 1996, pp. 162-175.



Source: Sherman, 1999; CSWS, 1999; Elmusa, 1997.

* The figures for Turkey, Egypt, and India relate to 1992; those for Jordan to 1994, and for Syria to 1990.

D. Water Consumption by the Agricultural Sector in the Occupied Territories and in Israel

The agricultural sector is the largest water consumer in the Occupied Territories, consuming 170 mcm/ year (90 mcm in the West Bank and 80 mcm in the Gaza Strip). This amount comprises 62 percent of all Palestinian water consumption. Agriculture is a relatively important component of the Palestinian economy, constituting seven percent of GDP of the Occupied Territories and employing 14 percent of the work force.¹³⁷

Sixty percent of the water used for irrigation in the West Bank is extracted from springs and 40 percent from wells.¹³⁸ In the Gaza Strip, water for irrigation is extracted only from wells.¹³⁹ Unlike wells that supply water for domestic and urban use, the vast majority of agricultural wells are privately owned by the owner of the

¹³⁷ The GDP figures relate to 1997 and the work force figures to 1999 (PCBS, 2000).

¹³⁸ There are more than 300 wells in the West Bank that are used for irrigation. The output of each is much lower than the municipal wells, and the water is extracted only from the upper layers of the aquifer (ARIJ, 1998).

¹³⁹ The number of agricultural wells in the Gaza Strip is unknown. The reason is that, since the transfer of the Strip to the Palestinian Authority, hundreds of wells were drilled without approval. In all, there are more than 2,000 agricultural wells in the Gaza Strip (MOPIC, 1996, chap. 4).

land being irrigated. Another significant difference is that the percentage of lost water in the agricultural sector is lower, because, unlike supply for domestic purposes, it is generally unnecessary to transport the water by long pipelines from the extraction site to the field being irrigated.

In Israel, too, the agricultural sector is the largest water consumer. In 1998, it consumed 1,339 mcm, which comprised 64 percent of the water consumed in Israel that year. The price of water for agricultural use rose slightly in the 1980s, but it continues to be subsidized, and is less than the cost to produce it. The centrality of agriculture in the Israeli economy has gradually declined since the 1970s. In 1998 it comprised 2.5 percent of GDP and three percent of exports, and employed two percent of the labor force.¹⁴⁰

The water allocation policy for the agricultural sector in Israel has undergone several reversals since the founding of the state. Until the mid-1960s, water allocations rose steadily, reflecting the policy that viewed agriculture as a means to settle the state's frontier areas. Allocations then remained more or less stable until the end of the 1980s, when the water quotas for agriculture began to fall for political and economic reasons.¹⁴¹ This trend quickly reversed itself, and, in 1992, the water quotas for agriculture gradually increased until 1998. Consumption in the agricultural sector rose from 955 mcm in 1992 to 1,339 mcm in 1998, a 40 percent increase.¹⁴² This addition equals the entire water supply for domestic and urban use in the West Bank and the Gaza Strip together for four years.¹⁴³ As a result of the little rainfall during the winter of 1998-1999, in April 1999, the Israeli government decided to temporarily reduce the quotas for agricultural use by 40 percent.¹⁴⁴ Figures on water consumption for 1999 have not yet been published, so the extent to which the decision was implemented is unclear. According to an Israeli water expert, agricultural water consumption in 1999 was only three percent less than in 1998.¹⁴⁵

¹⁴⁰ ICBS, 1999, Tables 6.7, 8.7, and 12.9

¹⁴¹ Feitelson, 1998.

¹⁴² Hydrology Service, 1999, p. VI.

¹⁴³ According to one of the conjectures, the event that caused this significant increase in the water allocation for agriculture was the beginning of the peace process - the Madrid Conference, in 1991 - which led Israel to increase its water consumption to "create facts on the ground" and demand in future negotiations, based on its "past use," larger rights in the shared water resources (Allan, 1999).

¹⁴⁴ *Ha'aretz*, 12 April 2000.

¹⁴⁵ Gvirtzman, "Extract Water Painfully," *Ha'aretz*, 30 June 2000.

Chapter 5

Core of the Water Crisis

The figures on per capita consumption presented in the previous chapter are general and abstract. They indicate the existence of a problem and the low water consumption in the Occupied Territories, but say nothing about the nature of the crisis in specific locations. This chapter will focus on three features of water supply in the Occupied Territories that create the crisis: the lack of a running-water network, discriminatory and insufficient supply of water, and poor-quality water.

A. Lack of a Water Network

Residents of villages and refugee camps in the Occupied Territories that are not connected to a running-water system particularly suffer from the water shortage. As of June 2000, in the West Bank alone this includes at least 215,000 Palestinians living in more than 150 villages, constituting 12 percent of the West Bank's population.¹⁴⁶ Most of these villages are concentrated in the north of the West Bank, in the districts of Jenin, Nablus, Tubas, Qalqilya, and Salfit.¹⁴⁷ In the Gaza Strip, the problem is less severe, affecting about 20,000 persons living in refugee camps.¹⁴⁸ The main reason for the lack of basic water infrastructure is, as mentioned in chapter 3, Israel's policy, maintained throughout the occupation, not to invest in public infrastructure in the Occupied Territories.

The principal water source for this population is rainfall, which is collected on roofs and stored in cisterns near each home. This source only supplies water several months a year, in most cases from November to May. In the summer, the residents must collect water from nearby springs (where available) in plastic bottles and jerricans and purchase water from private dealers.

The main problem with these two sources is the lack of supervision of water quality, which may result in the residents drinking polluted water. The spring water flows along the ground and is exposed to contact with the sewage from nearby towns and villages. Water dealers sell water collected both from municipal wells and from agricultural wells.¹⁴⁹ The latter are more exposed than municipal wells to pollution from pesticides and fertilizers.¹⁵⁰ Although it is generally difficult to establish a causal relationship between water quality and the incidence of a particular disease, prolonged consumption of highly polluted water is known to cause, or contribute to, the

¹⁴⁶ See footnote 115. Regarding the size of the population, the estimate is low because it does not include residents who live in towns or villages with a running-water network but are not connected to it. Regarding the number of villages, the definition of what constitutes a village is in dispute, so there is research that states a much higher number of unconnected villages. For example, according to MOPIC, 1998, there are 282 unconnected villages.

¹⁴⁷ Nassereddin, 1997, p. 124.

¹⁴⁸ This figure is based on an estimate for 1998 (PCBS, 2000).

¹⁴⁹ Reported to B'Tselem on 4 April 2000 by a tanker driver and confirmed by the deputy head of the Palestinian Water Authority, Fadel Qawash (interview with B'Tselem on 17 April 2000).

¹⁵⁰ For further details regarding the problems inherent in the use of pesticides and fertilizers by farmers in the West Bank, see ARIJ, 1998, chap. 8.

incidence of several infectious (viral and bacterial) diseases, as well as to kidney and stomach disorders.¹⁵¹

Furthermore, the Palestinian Authority does not currently supervise the prices charged by the dealers, which vary depending on supply and demand. The prices generally fluctuate from NIS 15-40 per cubic meter, which is five to thirteen times the price paid for water obtained from the running-water network. The large amount of money expended on water places a heavy burden on the families, and in poor families comes at the expense of purchasing other basic goods.¹⁵²

Although precise figures do not exist on per capita water consumption in villages that are not hooked up to a running-water network, per capita consumption is clearly much less than seventy liters a day, which is the per capita figure for the Occupied Territories. As mentioned in chapter 1, the recommended minimum for domestic and urban consumption is 100 liters a day per person. The extremely low consumption in the unconnected villages, especially in the arid climate of the West Bank, causes the recurrence of health disorders generally accompanying the lack of sufficient water in the body: dehydration, fatigue, various neurological symptoms, kidney malfunction, and others. Children, the elderly, and the ill are especially vulnerable during a water shortage. Also, a chronic water shortage creates poor hygiene and cleaning habits, increasing the frequency of skin infections and fungal disorders.¹⁵³

B. Discriminatory and Insufficient Water Supply

Several cities in the West Bank are compelled to implement rotation plans, particularly during the summer, to distribute the little water available. Under these plans, residents in a particular area of the city receive water for a number of hours. The flow to their homes is then shut off, and water is supplied to other areas until their turn comes again. Among the cities in which these plans are implemented in the summer are Hebron, Bethlehem, and Jenin, with a combined population of over 300,000 people.¹⁵⁴ Water in these cities is generally supplied continuously during the rest of the year, except for high-altitude neighborhoods, where supply is not continuous because of insufficient water pressure to enable the water to reach the homes.

The rotation plans are necessary because of the increase in demand for water during the hot season. However, while demand increases both among Palestinians and Israeli settlers, Mekorot's response is discriminatory. It increases supply to the settlers, but does not increase, or even decreases, the quantity of water supplied to these Palestinian cities. Reduction of supply when consumption increases is accomplished by turning off the valves at the junctions of the main pipelines that bring water to the Palestinian cities. Furthermore, to reduce regular water supply to Palestinian towns

¹⁵¹ Bellisari, 1994, pp. 59-61.

¹⁵² For testimonies of residents that illustrate the financial burden, see B'Tselem, 1998 and 1999.

¹⁵³ Bellisari, 1994.

¹⁵⁴ In these cities, B'Tselem conducted a separate examination, which was based on information it had collected in previous years. The information showed that the water shortage in these cities is greater than in other West Bank towns and cities.

and villages from lines that also supply the settlers, Mekorot installed devices that decrease (within the pipes) the diameter of the pipes, thus regulating the flow.¹⁵⁵

A senior official who worked in the Water Commissioner's Office until a few years ago and requested anonymity confirmed to B'Tselem that this policy exists. He also explained that,

Mekorot does not have a policy to desiccate the Palestinian population. However, Mekorot's obligation is, first of all, to the Jewish settlement and Israeli citizens. The water shortage among Palestinians led [Yitzhak] Rabin at the time to direct us to separate the water-supply network of the settlements from those of the Palestinians. Unfortunately, it was hardly done.¹⁵⁶

The low and irregular supply of water, particularly during the summer, exposes the population to many health problems, as described above. The irregular supply also affects the functioning of hospitals, where proper hygiene is particularly vital because of the many germs present. The water shortage severely disrupts the cleaning routine and occasionally the number of treatments and operations performed. Improper sanitary conditions not only endanger patients, but their relatives and other visitors as well.¹⁵⁷

For two days in August 1999, a strike by Mekorot employees enabled Israelis to experience, in extremely limited form, what is routine for most residents of West Bank. An editorial in *Ha'aretz* stated:

Mekorot employees realized their threats and cut off the water supply to many towns and villages. It is unnecessary to expand on the suffering caused to residents of the towns and villages who were harmed by the employees' actions, but it should be mentioned that prolonged damage and not only immediate suffering is involved. According to experts, the interruption of water supply to the large cities, particularly the decrease in pressure, is liable to enable penetration of pollutants into the pipes.¹⁵⁸

1. Hebron Municipality

The Hebron Municipality supplies water to the city, six nearby villages, and two refugee camps, a total of close to 190,000 people.¹⁵⁹ Today, the Municipality's primary water source is a new well in the Herodion area, which was drilled to supply part of the additional water quantities promised in the Interim Agreement,¹⁶⁰ and

¹⁵⁵ Interview with engineer Muhammad Ja'as (see footnote 115). The name of the device is "unitrol."

¹⁵⁶ The comments were made to B'Tselem in a telephone conversation on 25 May 2000.

¹⁵⁷ B'Tselem, 1998, pp. 16-19. The directors of al-Ahli Hospital, in Hebron, reported to B'Tselem that, as of May 2000, the hospital has to buy water from dealers to meet minimal needs, which cannot be met by the running-water network alone.

¹⁵⁸ *Ha'aretz*, 5 August 1999.

¹⁵⁹ The nearby villages are Dura, Dir Razah, Rabud, Abu al-Asjeh, Tarameh, and Qurzeh. The refugee camps are al-Fawar and al-'Arub. The information on the water situation in Hebron was provided to B'Tselem by the town's water engineer, 'Amad 'Abd al-Khalim a-Zir, on 4 April 2000.

¹⁶⁰ Since the Interim agreement, six new extraction wells have been drilled in the Herodion area. Interim Agreement, 1995, Annex 3, article 40(7)(b)(1).

which began operation in the summer of 1999. This well supplies the Hebron Municipality with 7,000 cubic meters of water a day. The Municipality also owns two wells, which together produce an average of 1,000 cubic meters/day and primarily serve the two refugee camps.

The Municipality also receives water from five wells operated by Mekorot and the West Bank Water Department, which also supply water to several settlements in the southern part of the West Bank. These wells supply 5,000 cubic meters/day most of the year. This amount, together with the sources mentioned above, enable continuous water flow to most parts of the city. However, in June, July, and August, the quantity is cut in half, to only 2,500 cubic meters a day. Because Hebron is the final destination, and is the highest-altitude site along the pipelines transporting water from these wells, the increased consumption by the settlements connected to those pipelines results in less water for Hebron.

Under last summer's rotation plan, every home received water for twenty-four hours a week. This was an improvement over the summer of 1998, when residents received water one day every two weeks. The improvement resulted from operation of the new well mentioned above. Another well in the Herodion area, also drilled in conjunction with the Interim Agreement, is almost completed and is supposed to supply water to Hebron during the summer of 2000. When this occurs, the summer water shortage in Hebron will decrease, but will still not enable continuous water supply throughout the week.

According to Israel's previous Water Commissioner, Meir Ben-Meir, the principal problem in supplying water to Hebron is theft by local Palestinian residents from the main pipeline bringing water into the city.¹⁶¹ The Municipality's water engineer confirmed that theft is a problem. He stated that the Municipality, together with the Palestinian Authority, is acting to reduce it. However, he thinks that the thefts do not significantly affect the city's water shortage during the summer months.

2. Bethlehem Water Authority

The Bethlehem Water and Sewage Authority is an independent public body that supplies water to the city of Bethlehem, seven adjacent villages, and three refugee camps,¹⁶² a total of 75,000 persons.¹⁶³ Until recently, all the water supplied by the authority to its consumers was purchased from Mekorot, which supplies the water from three wells and from one connection to the Jerusalem Municipality network. At the end of 1999, a new well began to operate in the Herodion area. This well belongs to the Palestinian Water Authority, which drilled it as part of its commitments in the Interim Agreement, and supplies Bethlehem with 6,000 cubic meters of water a day.¹⁶⁴

¹⁶¹ Response by letter to B'Tslem's report (B'Tselem, 1998, p. 29).

¹⁶² The villages are Bet Jala, Bet Sahur, al-Khader, Batir, Husan, Wadi Fuqin, and Za'atreh. The refugee camps are 'Aida, al-'Az'azeh, and Deheisheh.

¹⁶³ The information on Bethlehem District was provided to B'Tselem by the director general of the Water and Sewage Authority, engineer Musa Shaher, on 3 May 2000.

¹⁶⁴ See footnote 160.

Throughout most of the year, Mekorot supplies the Bethlehem Water and Sewage Authority with 10,000 cubic meters/day.¹⁶⁵ Like the situation in Hebron, the supply declines in the summer, to 6,000 cubic meters/day. The reduction is made only at two of the four connections to the Mekorot network, which also supplies water to the nearby settlements.¹⁶⁶ During the summer of 1999, a rotation plan was implemented in the Bethlehem region. Consumers received water for three days and then the supply was stopped for approximately two weeks. In high elevations, primarily the town of Bet Jala, the situation was more severe, with intermittent water supply year-round. As in Hebron, the situation this summer (2000) is likely to improve following the operation of an additional well in the Herodion area, which is supposed to supply 5,000 cubic meters/day. Even if this addition is made in the summer of 2000, it will not enable continuous supply of water throughout the week.

3. Jenin Municipality

The Jenin Municipality is only responsible for supplying water to the 41,000 residents of the city.¹⁶⁷ It owns one well, which extracts water from the upper layer of the aquifer. For reasons outside the scope of this discussion, its output is not stable year round (fluctuating between 400 to 1,800 cubic meters/day). The second source is from a connection to Mekorot's network and the West Bank Water Department. Supply from this latter source also fluctuates. It supplies an average of 600 cubic meters/day during the summer. Unlike the situation in Hebron and Bethlehem, the fluctuation in supply from this connection does not result from increased demand in the settlements. However, as in the other cases, Mekorot does not increase the supply of water to Jenin when demand rises.

At the end of 1998, as part of Israel's commitments under the Interim Agreement, a new well (Jenin 2) was operated. This well produces 4,000 cubic meters/day.¹⁶⁸ Of that amount, 3,000 cubic meters were piped to the Jenin Municipality, and the remaining 1,000 cubic meters were transported by tankers to eleven neighboring villages west of Jenin that are not connected to a water network.¹⁶⁹ Connection of these villages to a new water network, connected to the Jenin 2 well, is to be completed in the next few months. Upon completion, it will supply 2,000 cubic meters/day, i.e., it will reduce the supply to Jenin by 1,000 cubic meters/day.

When Jenin 2 began to operate, the water situation in the city improved and enabled continuous supply throughout the summer of 1999, except for a number of days of especially high demand, and except for supply to a few houses at high-altitude areas. Operation of the new network for the eleven villages this coming summer will require a permanent return to the rotation plan and, according to the Municipality's water

¹⁶⁵ The Bethlehem Water and Sewage Authority owns one well, but, pursuant to an agreement it has with the West Bank Water Department, the well only supplies water to settlements in the area (5,000 cubic meters/day), in consideration for which Mekorot supplies the aforementioned quantities.

¹⁶⁶ The Bethlehem Water and Sewage Authority provided B'Tselem with water bills from Mekorot (through the West Bank Water Department) for various times of the year. The bills clearly show the reduction in supply during the summer.

¹⁶⁷ The information on the water situation in Jenin was provided to B'Tselem by the Municipality's water engineer, Mazen 'Ali Faras Shawahneh, on 5 April 2000.

¹⁶⁸ Interim Agreement, 1995, annex 3, article 40(7)(a)(5).

¹⁶⁹ The villages are Z'buba, Rumaneh, a-Tybeh, 'Arbuneh, a-Silat al- Khartiyeh, 'A'anin, al-Yamun, Kfar Dan, al-Khashmiyeh, al-'Ar'leh, and Kfar Qud.

engineer, will require every home to be shut off from the water network for about two days a week.

C. Poor Water Quality

Unlike the situation in the West Bank, the problem in the Gaza Strip is not a water shortage or irregular supply during the summer, but the poor quality of the water flowing through the pipes.¹⁷⁰ The poor quality severely affects the standard of living of the residents and exposes them to serious health hazards. The only local source of water is the Gaza Aquifer, which provides 96 percent of the water consumed by Palestinians in the Gaza Strip. This aquifer has become more saline and polluted since the 1950s, a process aggravated by increased consumption and extractions.

The primary reason for the salinization is "over-extraction," i.e. extraction of water in quantities greater than the rainfall recharging the aquifer. As mentioned in chapter 1, the accepted estimate is that annual rainfall equals approximately one-third of the water extracted. When the aquifer level falls, two phenomena occur: seepage of saltwater from the Mediterranean Sea into the aquifer¹⁷¹ and increase of brackish water from the deeper layers of the aquifer.

In addition to salinization, two principal sources of pollution exist. The first source is pesticides and fertilizers, which farmers use extensively without proper supervision and monitoring by the Palestinian Authority. A significant portion of these poisonous materials mixes with irrigation water and seeps into the aquifer. The second source is the raw urban sewage that seeps into the aquifer. Only 45 percent of Gaza Strip residents are connected to a sewage system.¹⁷² Furthermore, a significant portion of sewage flowing into the systems leak into the aquifer or is spilled into the sea or onto sand dunes without being treated.

The accepted measure of the level of brackishness is the quantity of chlorides per liter. The level recommended by the WHO is up to 250 milligrams per liter.¹⁷³ A level of 250 to 600 mg/liter primarily affects the taste of the water. A higher level is a health hazard, primarily (but not only) for persons with kidney or heart problems.¹⁷⁴ The chloride level in 90 percent of the wells in the Gaza Strip fluctuates between 400 to 1,200 mg/liter. The water authorities in the Gaza Strip generally stop extractions only when the chloride level reaches 1,000 to 1,200 mg/liter. The situation is particularly grave in wells in Gaza City, in wells in the center of the Strip (the Nuseirat refugee camp and Dir al-Balah), and in towns in the extreme southeast (Bani Sohila, 'Absan, and Khirbet Akhza'aweh).

The second parameter, which generally indicates organic sources of pollutants, is the level of nitrates. The WHO recommends a level not exceeding 50 mg/liter. A higher

¹⁷⁰ The information on water consumption in the Gaza Strip and the condition of the aquifer is based, unless noted otherwise, on MOPIC, 1996.

¹⁷¹ The seepage occurs at those points where the hydrostatic pressure in the aquifer falls, following a fall in the water level, to less than the sea's hydrostatic pressure.

¹⁷² The information was provided by the head of the Palestinian Water Authority, Nabil al-Sharif, in a letter of 18 June 2000 to B'Tselem.

¹⁷³ WHO, 1998.

¹⁷⁴ Conway, 1998.

level is extremely hazardous to infants and pregnant women. In exceptional cases, nitrates can significantly harm the level of oxygen in the blood and cause death from suffocation.¹⁷⁵ The nitrate level in most wells in the Gaza Strip is from 100-200 mg/liter. In the Jabalya and Khan Yunis refugee camps, the level ranges from 300 to 600 mg/liter, i.e., twelve times higher than the recommended standard. Despite the severity of the situation, no empirical research has been conducted to examine the health effects on local residents.

A comprehensive examination of the quality of the water used for domestic purposes that was conducted in 1995 and combined the chloride and nitrates levels showed that, of all the water extracted from the aquifer, only seven percent met the WHO's recommended standard. Thirty-eight percent of the water was of medium quality (250-500 mg of chloride and 50-150 mg of nitrates/liter), while 55 percent was of extremely poor quality (more than 500 mg of chloride and more than 150 mg of nitrates/liter).

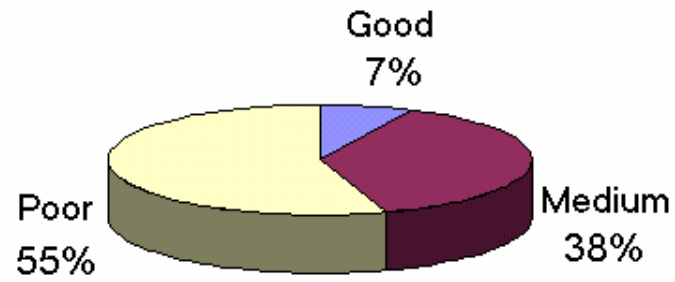
Although numerous other chemicals and organic materials - in addition to chloride and nitrates - can harm water quality and safety, there is insufficient documentation of their existence in the domestic water-supply system in the Gaza Strip. An exception is fluoride, which is known to be found in amounts four times higher than that recommended by the WHO.¹⁷⁶ Although the correct dose of fluoride prevents tooth decay, a large dose is toxic and can lead to various kinds of infections and ulcers, kidney disorders, and dental and bone diseases.¹⁷⁷

¹⁷⁵ This phenomenon is known as the "blue baby syndrome." *Ibid.*, p. 743.

¹⁷⁶ Bellisari, 1994, p. 56.

¹⁷⁷ Bellisari, *Ibid.*; Conway, 1998, p. 744.

Quality of Water for Domestic Use in the Gaza Strip



Source: MOPIC, 1996, p. 18

Part 3

The Final-Status Agreement on Water

Introduction

Israel and the Palestinians have discussed the water issue since 1991, in the context of the peace process, along two parallel tracks, one multilateral and the other bilateral. The Multilateral Working Group on Water was established at the Madrid Conference (1991). Its members, in addition to Israel and the Palestinians, include thirteen Arab states, the United States, Russia, and other countries.¹⁷⁸ This forum, which first met in 1992 in Moscow, has refrained from discussing water rights and division arrangements in the Middle East and in the Palestinian-Israeli context, in particular. In the Israeli-Palestinian context, the discussion focussed on a number of water-related projects throughout the Occupied Territories.¹⁷⁹

The Israeli-Palestinian bilateral track resulted in three signed agreements that related, *inter alia*, to water: the Declaration of Principles, of September 1993; the Cairo Agreement, of May 1994 (Oslo 1); and the Interim Agreement, of September 1995 (Oslo 2). As early as the Declaration of Principles, the parties established two principal issues that lie at the center of the agenda of future negotiations between Israel and the Palestinians: an arrangement for an equitable division of the shared sources and an arrangement for cooperation in management of those sources.¹⁸⁰ The unique contribution of the Interim Agreement in its provisions regarding water is that "Israel recognizes the Palestinian water rights in the West Bank."¹⁸¹

The proposals that will be raised and discussed in this part of the position paper will focus, therefore, on what the two parties defined as the two principal problems, i.e., arrangements for allocating the shared water sources and arrangements for controlling them. In the context of the discussion on the final-status arrangement, we shall also discuss a third issue, which does not appear in the agreements signed by the parties, and it is unclear if it will arise during the negotiations. This is the issue of remedy and compensation for water-related human rights violations.

The next three chapters include recommendations directed to Palestinian and Israeli decision-makers on possible ways to reach a permanent agreement on water, while respecting the right to water and the right of all peoples to benefit from their natural resources, discussed in chapter 1. The recommendations proposed here are intended to point out guiding principles and directions for action, rather than to propose a solution that must be accepted in full. As we shall detail below, even if the decision-makers on both sides adopt these recommendations in their entirety, many aspects of the agreement will still have to be decided within the context of the peace process. This part of the position paper does not profess, therefore, to replace negotiations taking place between the parties, but to recommend a solution to the water problem from the human rights perspective.

¹⁷⁸ For a complete list of the countries, see the Web site of Israel's Foreign Ministry: <http://www.israel-mfa.gov.il>.

¹⁷⁹ For a discussion on various aspects of the multilateral track, see Libiszewski, 1995, pp. 82-85.

¹⁸⁰ Declaration of Principles, 1993, Annex 3, article 1.

¹⁸¹ Interim Agreement, 1995, Annex 3, article 40(1). It should be emphasized that, from a legal perspective - as distinguished from the political aspect - this recognition is meaningless, because the source of the rights lies in international law and not in an Israeli "gesture."

Chapter 6

Division of Water from the Shared Sources

A. International Water Law

In 1996, the International Law Association (ILA) approved the Helsinki Rules, considered one of the most authoritative statements on customary water law.¹⁸² These rules were the first draft of accepted legal norms for the use of shared water resources.¹⁸³ In 1986, the ILA expanded the part of the Helsinki Rules dealing with the use of international groundwater. This document is known as the Seoul Rules.

The second statement on international water law was drafted by the UN International Law Commission (ILC). In 1971, the ILC began to discuss a preliminary draft for an international convention. In 1994, after twenty-three years of work, the ILC presented a final draft for discussion by the sixth committee of the UN General Assembly. In May 1997, the UN approved, by majority vote, the Convention on the Law of the Non-Navigational Uses of International Watercourses (hereafter: the UN Convention).

Because the required number of states have not yet ratified it, the UN Convention is not in effect. Israel abstained in the General Assembly vote on the Convention and has not signed it.¹⁸⁴ Despite this, Israel is obligated to act in accordance with its provisions because of the widely-held understanding that its major principles constitute international customary law.¹⁸⁵ These principles reflect the customary practice in states worldwide, expressed in almost 300 international agreements signed since 1914.¹⁸⁶ As such, the principles of the UN Convention apply to all states, regardless of whether they formally ratified the Convention. The status of the convention as customary law was strengthened by judges of the provisional International Court of Justice, in The Hague, which based its decision in the dispute between Hungary and Slovakia over waters from the Danube River, *inter alia*, on the UN Convention's provisions.¹⁸⁷

Another source of water-law norms, the Johnston Plan, is specifically related to Israeli-Palestinian negotiations. This plan was a multilateral agreement that Eric Johnston, an emissary of the president of the United States, formulated in 1953-1955.

¹⁸² Caponera, 1994.

¹⁸³ The backdrop for ILA activities were disputes that arose in the 1950s regarding a number of rivers, among them the Indus River (dispute between India and Pakistan), the Nile (between Egypt and Sudan), and the Jordan (between Israel and its neighbors). These disputes clearly showed the need to clarify water law and settle conflicting doctrines. The world's leading jurists, including Israelis, participated in the drafting committee's work (Bar, 1998, p. 124).

¹⁸⁴ In light of the situation described in Part I of the position paper, it is interesting to note that one of the reasons for abstaining was that, in Israel's opinion, "the adequate supply of drinking water should be of greater primacy [in the Convention]" UN General Assembly, Press Release, GA/9248.

¹⁸⁵ Lien, 1998; Dellapena, 1995; Caponera, 1994; Barberis, 1991; Lazerwitz, 1993.

¹⁸⁶ Wolf, 1997, p. 29.

¹⁸⁷ International Court of Justice, 1997, pars. 85, 147. The decision may be found on the Internet: http://www.icj-cij.org/icjwww/idocket/ihs/ihsjudgement/ihs_ijudgement_970925_frame.htm and

The parties to the agreement were Israel, Jordan, Syria, and Lebanon, and the agreement concerned division and development of the Jordan River on a regional basis.¹⁸⁸ The plan recognized the water rights of the Palestinians in the West Bank and included them in the allocation for Jordan, which controlled that territory at the time. Primarily because of the refusal of Arab political leaders to recognize Israel, the plan did not become a binding international agreement. However, the technical teams of all the countries accepted it, and it has served as a basis for determining the division of the Jordan River waters, primarily between Israel and Jordan.¹⁸⁹

B. Principle of Equitable and Reasonable Use

Under international law, the main principle for division of shared water between states is the doctrine of equitable and reasonable use.¹⁹⁰ This principle is based on the limited-sovereignty doctrine, which provides that, because all parts of the drainage basins of watercourses are hydrologically interdependent, countries are not allowed to utilize water located in their territory as they wish, but must take into account the other states that share the resource.¹⁹¹

This principle does not state a precise formula quantifying the rights of each state sharing an international watercourse. Rather, it lists the factors to be considered in negotiations between the states to determine the division. Article 6 of the UN Convention enumerates seven of these factors:

1. The natural features of the shared watercourse (geographic, climatic, hydrologic, and the like);
2. The social and economic needs of the watercourse states;
3. The population dependent on the watercourse in each watercourse state;
4. The effects of the use of the watercourses in one watercourse state on other watercourse states;
5. Existing and potential uses of the watercourse;
6. Conservation, protection, and development of the water resources of the watercourse and the costs of measures taken to that effect;
7. The availability of alternatives to a particular planned or existing use.

¹⁸⁸ For a comprehensive discussion of all aspects of the process leading up to formulations of the plan, see Bar, 1998, pp. 230-269.

¹⁸⁹ Although it is not expressly mentioned, the plan formed a basis for the 1994 Jordanian-Israeli water agreement in the context of the peace agreement between the two countries. Bar, 1998, p. 259; Hof, 1998, p. 85.

¹⁹⁰ This principle appears in similar language in the Helsinki Rules and the UN Convention. For discussion purposes in this position paper, the wording of the UN Convention will be used. Although it is more recent than the Helsinki Rules, it has been formally approved by the UN General Assembly, and, as such, is more suitable for use as a source when drafting agreements between countries.

¹⁹¹ The limited-sovereignty doctrine is a compromise between two polar doctrines that many states raised over the years, depending on their individual interests, but did not receive international recognition: the absolute territorial sovereignty doctrine, at one extreme, and the absolute territorial integrity doctrine, at the other extreme. According to the first, which generally benefits upstream states, every state has an absolute right to resources located in its territory and is entitled to unlimited utilization of them. According to the second, generally benefiting downstream states, it is totally forbidden to take any action regarding a shared watercourse without the consent of the states sharing the source that is affected by the action (Lazerwitz, 1993).

In the context of the Israeli-Palestinian dispute over water rights, both at the official and academic levels, each side emphasizes one of the aforementioned factors such that it becomes the exclusive determinant of equitable and reasonable use. The emphasized factor generally varies depending on the identity of the party and leads to the conclusion that the relevant party holds maximum rights over the shared watercourse under international law.

For example, Israel traditionally argues that any division of the Mountain Aquifer must be based on past uses.¹⁹² According to this argument, additional quantities to the Palestinians may not be provided from the water currently being utilized in Israel, which constitutes the vast majority of the shared water. It should be noted that the past uses factor appeared as a separate factor in the Helsinki Rules, but is not mentioned as a separate factor in the UN Convention. Rather, it may be derived from factor 5 in determining the principle of equitable and reasonable use in the UN Convention, mentioned above, which grants equal weight to existing (which includes past) and potential use.¹⁹³

The prevalent Palestinian argument is that "the water contribution of each state," i.e., the quantity of water that enters the aquifer from each of the states, is decisive in determining water rights.¹⁹⁴ According to this argument, the great majority (some 90 percent) of the Mountain Aquifer system belongs to the Palestinians because most of its recharge areas are situated in the West Bank.¹⁹⁵ "Each state's contribution," like "past use," is listed as a separate factor in the Helsinki Rules but not in the UN Convention. It may be argued that factor 1 of those listed in the UN Convention, which requires taking into account natural features of the watercourse, also relates to the contribution of each state.

Even if each of the two factors relied on by the sides is legitimate, the only way to implement the principle of equitable and equitable use in accordance with the UN Convention is by taking into account "all relevant factors,"¹⁹⁶ i.e., consider all elements of the principle as one indivisible package.¹⁹⁷

¹⁹² This position was clearly expressed in the arrangement over water set forth in the Interim Agreement, which states that the existing quantities utilized by Israelis (including settlers) shall be maintained. For a statement of this position, see Gvirtzman and Benvenisti, 1993.

¹⁹³ In opposition to the Israeli claim of past use, Palestinian researchers argue that those uses are not legitimate, because they were made by force during the occupation and not by natural, gradual development. Palestinians also argue that, if past use is to be taken into account, past Palestinian use during other periods must also be considered. These periods include, for example, pre-1948 utilization of the Coastal Aquifer by Palestinians (Elmusa, 1997, pp. 309-312).

¹⁹⁴ This position is based on the territorial absolute-sovereignty doctrine, which has never been adopted in international water law. This position was officially adopted by the PLO in 1992 (Elmusa, 1997, p. 312), and is often raised by Palestinian researchers (see, for example, Zarour and Isaac, 1994).

¹⁹⁵ For details on the structure of the Mountain Aquifer system, see chapter 2(A). Israeli hydrologists dispute this interpretation of the "contribution" factor, arguing that, where groundwater is involved, the storage areas (most of which are located in Israel) and not recharge areas have greater relevance in determining a state's contribution (Gvirtzman, 1994, p. 213).

¹⁹⁶ UN Convention, article 6(1).

¹⁹⁷ Caponera, 1994, p. 176.

C. Per Capita Quantity of Water Necessary to Meet Basic Needs

The key that B'Tselem proposes in implementing the principle of equitable and reasonable utilization (hereafter: the Principle) is division of the water sources shared by Israel and the Palestinians so that it satisfies the basic water needs of every individual. The assumption is that, in principle, Israelis and Palestinians have similar existing and potential water needs, and that the quantity allocated to each side for basic needs should be based solely on the size of the population.

The idea of basing division of water sources shared by Israel and the Palestinians on per capita basic needs was raised as long ago as 1992 by the Israeli water expert Professor Hillel Shuval.¹⁹⁸ Similar proposals were raised during the 1990s by other experts who researched the problem of the Palestinian-Israeli shared water sources.¹⁹⁹ In addition, a comprehensive review of all water agreements signed in the twentieth century found that agreements dealing with division of shared watercourses were based on various formulations for calculating the states' needs, and not on other criteria, such as sovereignty or historic rights.²⁰⁰ The Johnston Plan, for example, was based on a calculation of irrigation needs of each state, at a time that agriculture was considered vital to a state's existence.

Division based on needs calls for defining the basic needs on which the division will be made. The definition should include not only domestic use necessary for survival, but also the minimal needs to enable living in dignity and to provide employment in the context of a modern city. Therefore, it is also necessary to take into account supply of water to schools, hospitals, public parks, businesses, tourism, and industry. This broad definition conforms with factor 2 of the principle, which requires that social and economic, and not only subsistence needs, be considered.

The negotiators can determine, for example, that 130 cubic meters/person/year are necessary to meet these needs.²⁰¹ This quantity is the current Israeli per capita use for these needs²⁰² and is the quantity that Palestinians are expected to consume in the future as a result of improvement in water supply, industrial development, and increase in the standard of living.²⁰³ This quantity is compatible with factor 5 of the Principle - existing and potential uses. Alternatively, the negotiators may conclude that, taking into account the limited resources available to the two sides, natural water resources should not be allocated for industry. In that event, industrial needs would

¹⁹⁸ Shuval, 1992. A year later, it was adopted by an independent team of Israeli and Palestinian experts as a key for dividing the shared water sources. Assaf *et al.*, 1993.

¹⁹⁹ Wolf, 1997; Benvenisti, 1997; Haddad *et al.*, 1999.

²⁰⁰ This research is based on a computerized database that includes data on some 300 water agreements signed in the twentieth century. It found that forty-nine of them dealt with division of water, every one of which contained a transition from an initial approach emphasizing rights to one emphasizing needs. Wolf, 1997.

²⁰¹ According to Prof. Shuval's proposal, the recommended allocation for these needs is 125 cubic meters/person/year. Shuval, 1992.

²⁰² This calculation is based on the estimate of the Water Commissioner's Office regarding overall urban consumption in 1998, divided by the country's population that year. The precise figure is 127.7 cubic meters/person. For discussion purposes, and based on an upward trend in consumption that characterized previous years, we assume per capita use for 2000 at close to 130 cubic meters/person.

²⁰³ The conjecture that Israelis and Palestinians will have identical basic water needs at some undetermined future time is held by water experts on both sides, including the recent Israeli Water Commissioner (Wolf, 1997; Haddad *et al.*, 1999; Ben-Meir, 1997, p. 7).

not be included within the basic needs, and the quantity allocated to each side would be 105 cubic meters/person/year, which is Israel's current use for domestic and urban purposes.

In determining the degree to which each side exercises its entitlement to water for basic needs, the total quantity of water available to each side, including water from unshared sources, would be taken into account. However, Israel would not be required to forego water from the unshared sources, such as the Coastal Aquifer or the Carmel Aquifer. Rather, it would be obligated to allow the Palestinian Authority to utilize a larger portion of the Mountain Aquifer and the Jordan Basin to enable it to obtain a sufficient quantity to meet its population's basic needs. Because of Israel's superior starting point, it would continue to enjoy a significant "surplus" over basic needs for many years.

For example, if the agreement sets 130 cubic meters/person/year as the quantity that meets basic needs, in the current situation, in which Palestinians use 70 cubic meters/person/year for all their needs (including irrigation),²⁰⁴ they suffer a "deficit" of 60 cubic meters/person/year. In contrast, use for the same purposes in Israel is 310 cubic meters/person/year (not including treated sewage), so Israel has a "surplus" of 180 cubic meters/person/year. In this situation, Israel would be required to cover the deficit on the Palestinian side by transferring 168 mcm.²⁰⁵

Basic needs, as proposed above, do not include supply of natural water for agriculture, which, as stated, is currently the largest consumer of water in both Israel and the Occupied Territories. Preference for domestic and urban use over agricultural use is based, in part, on article 10(2) of the UN Convention, which states that, in the event of conflict between uses of an international watercourse, special regard should be given to the "requirements of vital human needs." In addition, most water experts on both sides, regardless of their position on the final division arrangement, agree that, in an arid area with limited water resources and a high birth rate, like in Israel and the Occupied Territories, allocation of water from natural resources for irrigation should be ceased in the near future.²⁰⁶

This determination does not mean the elimination of agriculture in our region. Agriculture can continue, though in smaller dimensions, by using treated sewage. In principle, for every cubic meter of water consumed in urban areas, it is possible to produce 0.6 cubic meters of recycled water, which is suitable for almost all crops.²⁰⁷ For Israel, the process is not a possible eventuality, but one that has been taking place for several years. The Sewage Treatment Plant for the Dan Region, around Tel Aviv treats about one-quarter of Israel's sewage and produces water of extremely high quality, which is used to irrigate the Negev.²⁰⁸ Israel currently treats 65 to 70 percent

²⁰⁴ This figure is based on 134 mcm for the West Bank and 67 mcm for the Gaza Strip, i.e., the Palestinian quantity does not include the over-extraction of the Gaza Aquifer.

²⁰⁵ The calculation is obtained by multiplying the 60 cubic meters/person by the current total Palestinian population, which numbers 2.8 million persons.

²⁰⁶ Feitelson, 1997; Soffer, 1998; Haddad *et al.*, 1999; Kally, 1997, p. 116.

²⁰⁷ Ben-Meir, 1997, p. 8.

²⁰⁸ There are also a number of other treatment plants that recycle to a lower quality water than that treated by the Dan Region plant. The water they produce is suitable for irrigating crops not intended for eating. The primary factor affecting the choice of level of treatment is cost. (Kally, 1997, pp. 85-86)

of sewage, to various levels of purification, and this percentage is steadily rising.²⁰⁹ In contrast, a tiny amount of sewage in the Occupied Territories is treated, and the recycled water is not yet reused.²¹⁰

Because the present standard of living in the Occupied Territories is much lower than that in Israel, Palestinian consumption (for all non-agricultural uses) will not immediately be as high as Israeli consumption.²¹¹ It will approach that level as income rises and the industrial sector develops, together with improvement in the water system. Therefore, even after increase in the quantities of water allocated to the Palestinians for basic needs, in the initial years of the arrangement they will not have to forego water that they currently use for irrigation. Meeting the basic needs of Palestinians will be accomplished, in the first stage, from natural water resources that are currently being used for Israeli agriculture. Only in the second stage will basic needs be met by drawing from the natural water resources used for Palestinian agriculture.

The advantage given to the Palestinian side is intended to protect an important source of income in the Occupied Territories, where agriculture employs 14 percent of the labor force, and the rate of unemployment is 24 percent.²¹² In contrast, agriculture constitutes only 2.5 percent of Israeli GDP, and employs two percent of the work force. Thus, the gradual reduction in the water quotas for Israeli agriculture that would be set forth in the arrangement would cause extremely negligible damage to the Israeli economy.²¹³

This aspect of the proposed arrangement is incorporated in factor 4 of the Principle, which requires that the effects of use in one watercourse state on the other watercourse state be taken into account. It is also consistent with another central principle of international water law, stated in article 7 of the UN Convention, which states the duty to "take all appropriate measures to prevent the causing of significant harm to other watercourse states." Undoubtedly, any arrangement that requires the Palestinians to forego agriculture in coming years to meet their basic needs, or, alternatively, an arrangement that does not harm agriculture, but is insufficient to meet basic needs, would result in very significant harm. Furthermore, it would be difficult to argue that gradual reduction of Israeli agriculture would cause such harm to Israel.

According to a proposal raised by an Israeli water expert, Israeli farmers could be compensated for their loss of water. The compensation would be in the form of an undertaking by the Palestinian side to return part of the water it receives to meet basic needs, after the water is treated to an agreed-upon level.²¹⁴ Implementation of this

²⁰⁹ Blank, 2000, p. 19.

²¹⁰ B'Tselem interview with the deputy head of the Palestinian Water Authority, Fadel Qawash, on 17 April 2000.

²¹¹ For a discussion on the relationship between income and water consumption, see chapter 4(C) above.

²¹² The unemployment rate includes those who have ceased looking for work but are in practice part of the labor force (UNSCO, 1999).

²¹³ Although the economic damage is negligible at the macro level, the process is liable to severely affect the income of certain farmers. Therefore, a consequence of the proposed arrangement, which is not part of the present discussion, is Israel's duty to compensate the persons harmed.

²¹⁴ Feitelson, 1997.

proposal would not only reduce the harm to Israeli agriculture, which would obtain an addition of recycled water, it would reduce the current pollution of the aquifers from the sewage that Palestinian municipalities discharge into the streams.

Unlike other proposals for the final-status arrangement on water, which provide for a one-time division of the shared sources based on some key, the proposal described here is dynamic. Following an initial re-division of the water resources, the division would be set annually in accordance with the change in the population dependent on the shared sources (factor 3 of the Principle). Also, the two sides would be allowed to raise, at various stages of the division procedure, proposals to change the quantitative guidelines for determining basic needs. Changes are expected for various reasons, such as alterations in the natural characteristics of the shared sources (factor 1 of the Principle), significant changes in the size of the two populations, and technological developments that will significantly reduce water consumption.

D. Alternative Water Sources

The proposed solution, in which Israel foregoes in favor of the Palestinians part of the water it uses for agricultural, meets factor 7 of the principle of equitable and reasonable use. This factor relates to the availability to each side of alternative water sources. In this regard, Israel is far more capable than the Palestinians.

The professional and political debate on this matter generally mentions three alternatives to the natural water sources: recycled water, desalination of brackish water and seawater, and water imports from countries rich in water resources.

The likelihood of implementing the first alternative, i.e., recycling water, differs greatly on each side. Production and use of recycled water in significant quantities in the future Palestinian entity entails a project that, even if ultimately realized because of need or pursuant to agreements with Israel, will not be accomplished soon. It would require that several pre-conditions be met: connection of most of the population to a central sewage network, establishment of recycling facilities, construction of a system to transport the recycled water to its use site, and construction of reservoirs for storage following treatment and prior to use. It will be a long time before the Palestinians meet these conditions and raise the vast amount of money required to execute the project.²¹⁵ This alternative already is well developed in Israel, and relatively modest sums of money would be sufficient to expand it.

Regarding the second alternative - desalination of brackish water and seawater - Israel's capability is vastly superior to that of the Palestinian entity. It should be noted that various desalination technologies have existed for a number of years, and the major application problems are access to water sources and cost of desalination (including the cost of erecting the facilities). Since the 1960s, Israel has established several desalination facilities for brackish water, primarily for the Arava Aquifer, but they are not considered an "alternative" source because this quantity is already included within current consumption. In addition, the Negev contains an aquifer with tens of thousands of mcm of brackish water that are not being utilized because the waters are not renewable due to the lack of rainfall; therefore, these waters are for

²¹⁵ For a report on the condition of the sewage network in the West Bank and the obstacles to improvement, see Amira Hass, "A River of Sewage Separates Them," *Ha'aretz*, 18 July 1999.

one-time use only.²¹⁶ In the future, this source can serve as an optional source of supply after desalinization if Israel so decides. The Palestinians' only significant source of brackish water is the Eastern Aquifer, in the West Bank, which, according to the Interim Agreement, is to supply them with 41 to 51 mcm of water a year.²¹⁷

Regarding desalinization of seawater, Israel has a long border with the Mediterranean Sea, stretching for hundreds of kilometers, and a small outlet to the Red Sea. Israel currently operates one seawater desalinization plant, which supplies Eilat with 3.6 mcm/year. There are plans to desalinate large quantities of water from the Mediterranean Sea in the coming decade.²¹⁸ The Palestinians' situation is not as good. The West Bank has no egress to the sea; the Gaza Strip has a short coastline and many competing uses for the water (ports, tourism, fishing, and the like), so that it can sustain, according to Palestinian experts, no more than one desalinization facility.²¹⁹ Another factor limiting establishment of desalinization facilities in the Gaza Strip is the extensive areas held by the Israeli settlements.

Cost is decisive in determining whether the sides implement the desalinization option. The cost of desalinating seawater is approximately one dollar per cubic meter, in contrast to 32 cents to produce a cubic meter of natural water. The cost of desalinating brackish water fluctuates from fifty cents to a dollar per cubic meter, depending on the degree of brackishness.²²⁰ It should be noted that these are the costs of production and not the price paid by consumers, which would be higher because of transportation and municipal-supply costs. Also, these prices do not include the initial cost of erecting the desalinization facility. Since Israel's economy is substantially larger than the Palestinian economy, Israel is in a better position to finance a desalinization project.²²¹

As for the third alternative - water imports - the only option given consideration has been importation of water from Turkey. The water can be transported by sea and theoretically also by land. By sea, the water would be transported in special sacks ("baggage") or by cargo ships. Land transport depends on attaining a peace agreement between Israel and Syria because land transport requires canals and pipelines that would cross Syrian territory.²²² The Palestinians can also import water from Turkey. However, like the other alternatives, Israel is better able to implement this alternative than the Palestinians. A group of Palestinian and Israeli researchers raised another idea that, assuming peace in the region, would enable the Palestinians to "import" water from Turkey without having to pay significant transport costs.²²³

²¹⁶ This aquifer contains fossil water that seeped into it in prehistoric times (Issar, 1979).

²¹⁷ Interim Agreement, 1995, Annex 3, article 40(7)(b)(6).

²¹⁸ In April 2000, the Knesset's Economy Committee approved erection of a seawater desalinization plant near the Ashkelon shoreline that will desalinate from 50-100 mcm/year starting as soon as 2002. *Ha'aretz*, 18 April 2000. There are also plans to desalinate much larger quantities of water over the course of the coming decade (Blank, 2000, p. 24).

²¹⁹ Elmusa, 1997, p. 320.

²²⁰ CSWS, 1999, p. 149.

²²¹ To illustrate the gap, Israel has a per capita GDP of \$ 17,000, while per capita GDP in the Palestinian Authority is \$ 1,700 (PCBS, 2000; ICBS, 1999).

²²² Kally, 1997, pp. 125-126.

²²³ According to this idea, Turkey would release water from the Euphrates River for Syria, in consideration for which Syria would release water it presently uses from the Yarmuh River for the Palestinians, which would be transported to the West Bank by canal (Assaf *et al.*, 1993, p. 58).

Summary

As mentioned in the introduction to this part of the position paper, our proposal incorporates principles and approaches that comply with international water law, with the objective that the parties reach an agreement that respects the human rights of Palestinians and Israelis. Even if these principles are adopted, numerous aspects of their implementation will remain to be resolved by negotiations. In addition to determining the quantity of water necessary to meet basic needs, the parties will have to select the sources that will supply the water needs of each side, set water-quality standards for each use and for the water transferred from one side to the other, consider seasonal needs and seasonal and yearly changes in hydrology, and more.

Chapter 7

Control and Management Arrangements

Management and control arrangements over the shared water sources constitute a human rights issue for two primary reasons. First, because of the hydrologic interdependence of all parts of the shared resources, the nature of the prospective arrangements will decisively affect realization of the right to water and the right to benefit from natural resources. Second, the nature of the arrangements for management and control of the shared resources will greatly affect the parties' ability to implement the division arrangement proposed in the previous chapter.

A. Principle of Joint Management

Regarding the issue of control and management of the shared water sources, B'Tselem proposes that the parties adopt the principle of joint management. As mentioned in the beginning of the previous chapter, a major tenet of the limited sovereignty doctrine is that every international drainage basin and all its constituent parts comprise a single unit. As a result, the states sharing the basin must coordinate their actions relating to the basin. This view is also found in the UN Convention, which provides, in articles 8 and 9, that the watercourse states "shall cooperate" in managing the shared water sources. There are hundreds of examples of cooperation and coordination between states in preserving and developing shared water sources. However, international experience in building joint institutions having authority and enforcement capability, as proposed here, is limited.²²⁴

From the perspective of the human rights of Israelis and Palestinians, joint management contains several striking advantages:

1. Palestinian, Israeli, and international water experts agree that the hydrologic interdependence among all parts of the shared resources, particularly the Mountain Aquifer, is extremely high.²²⁵ The absence of close cooperation in preserving the shared water resources will lead to a reduction in each side's ability to cope with hazards such as pollution, salinization, and a falling water level, and will also limit the ability of Israelis and Palestinians to exercise their right to water and to benefit from their natural resources.
2. Joint management incorporates within it the concept of intergenerational equity, because future generations would suffer the severe harm to the shared sources if joint management is not instituted.²²⁶
3. The proposal regarding division requires a very high degree of interaction over many years because the quantity each side needs is determined on a yearly basis. If the agreement is based on joint management,

²²⁴ Dellapena, 1995, p. 83.

²²⁵ CSWS, 1999; Ben-Gurion University and Tahal, 1994; Haddad *et al.*, 1999.

²²⁶ For a discussion on intergenerational equity regarding conservation of water sources in this region, see CSWS, 1999, pp. 17-19.

but does not establish the joint-management institutions and mechanisms to solve disputes between the parties, it will quickly become a dead letter with no chance of execution. Successful implementation of the principle of equitable and reasonable use requires the establishment, at least at a minimal level, of a joint management institution.

4. An arrangement based on joint management is likely to more faithfully express factor 1 of the principle of equitable and reasonable use, according to which division of the shared watercourse takes into account the natural features of the water source. As mentioned in chapter 1 regarding the Mountain Aquifer, extracting water from above the storage areas is much more logical than extracting water from the recharge areas. Joint management of the aquifer will enable the two sides to select the extraction points that are optimal vis-a-vis the natural features of each water source, while reducing the importance of political borders.
5. As regards conformity with factor 6 of the principle of equitable and reasonable use - the need to conserve the shared source - joint management has an especially striking advantage, which will be explained below.

B. Opponents of Joint Management

Despite the many advantages of joint management, the two sides, and primarily Israel, do not assume that it will be adopted. For example, Israel's previous Water Commissioner, Meir Ben-Meir, believes that allocation of water between Israel and the Palestinians "must be made on the basis of complete humanitarian equality, but without giving them [the Palestinians] access to the reservoir."²²⁷ According to Dr. Haim Gvirtzman, a senior Israeli hydrologist, in the final-status negotiations,

The rights of Palestinians will only be reflected in agreed-upon drilling areas in the eastern basin [of the Mountain Aquifer]. The extraction areas from the Western Aquifer must be classified as Israeli security zones, and Palestinians should be prevented from having any access to groundwater in these areas.²²⁸

In November 1999, the National Security Council submitted to Prime Minister Barak a report in preparation for the final-status negotiations on water. In the report, the Council recommends that any joint management arrangement be rejected "for a lengthy interim period."²²⁹

Suggestions like these would continue exclusive Israeli control over the water sources. Comparable proposals have proven a poor way to meet the minimal needs of Palestinians, as was explained at length in part 2 of this position paper. These suggestions also violate the rights of the Palestinian people to benefit from their natural resources.

²²⁷ He is apparently referring to access to the western basin of the Mountain Aquifer. See Ben-Meir, 1997, p. 13.

²²⁸ Gvirtzman, 1996, p. 13.

²²⁹ *Ha'aretz*, 7 November 1999.

The argument commonly made in Israel that only a military presence enabling complete control of all the water sources will ensure the future of the water sector contravenes international water law and is inconsistent with state practice.²³⁰ If such an argument were legitimate, Syria and Iraq would be justified in occupying a substantial part of Turkey to ensure proper flow of the Tigris and the Euphrates. Similarly, Egypt would be justified in occupying broad expanses of the Sudan and Ethiopia to ensure its ability to extract water from the Nile. Such is not the case.

A contrasting approach calls for physical separation between Israel and the Palestinians.²³¹ Supporters of this view call for severance of the Occupied Territories from Israel in all areas, including shared physical infrastructure, reducing Palestinian dependence on Israel as much as possible. However, most water experts consider total separation of control over the water resources an unreasonable option because of the high level of interdependence among the various parts of the resources.²³² For example, the source of water from which Israel extracts water from the Mountain Aquifer lies in the West Bank. No fence or wall along the border can prevent a source of pollution in the West Bank from polluting the waters extracted in Israel. Adopting an arrangement based on separation is liable to rapidly lead to grave ecological damage, some of it irreversible.

The deputy head of the Palestinian Water Authority, Fadel Qawash, objected to joint management, arguing that it would prejudice the sovereignty of the coming Palestinian state. The Palestinians' main concern is that joint management would in practice camouflage continued Israeli occupation, which was indeed what happened in the arrangement adopted in the Interim Agreement.²³³ However, a joint management agreement that respects mutuality can alleviate some of these concerns. For example, if the arrangement stipulates that joint teams supervise the quantities extracted from each well, each team would be given free access to every extraction site, both in Israel and in the Palestinian entity. This was not the case in the Interim Agreement's arrangement.

A Palestinian researcher related to the gap in economic development between the two sides to justify his objection to joint management.²³⁴ The concern results from the cost inherent in a joint framework with Israel, which would require the Palestinians to adopt tighter environmental protection standards and limit industrial activity and would entail substantial costs in various areas (sewage treatment, for example). The vastly greater economic strength of Israel and its relevant effects surely create problems. However, the solution is not to reject the principle, but to face the problems individually as they arise in the course of implementing joint management.

²³⁰ For an argument on the right to annex territory for hydrologic reasons, see Sherman, 1999.

²³¹ The demand for physical separation is made by a wide constellation of groups, from the right and left of the Israeli political spectrum. For a complete and systematic statement of this demand, see Schueftan, 1999.

²³² CSWS, 1999; Haddad *et al.*, 1999; Shuval, 1992.

²³³ Qawash raised these concerns in an interview with B'Tselem on 17 April 2000.

²³⁴ Elmusa, 1997, p. 343.

C. Application of the Principle of Joint Management

Joint management arrangements are appropriate, in principle, both for the surface water and the groundwater. However, management of the shared aquifers differs from management of the Jordan Basin. The principal reason for the difference is that five states share the Jordan Basin watercourse. Therefore, its joint management as one entity requires that a multilateral agreement be attained. This is possible only if Israel is at peace with Syria and Lebanon. The second reason is that the conservation and development problems of a shared surface water source are less complicated and require less coordination than in the case of aquifers.²³⁵

In 1994, Israel and Jordan signed a peace agreement that contains a framework for cooperation in managing the Yarmuk and Jordan rivers. In essence, the sides undertake not to discharge untreated urban and industrial sewage into the two rivers, and to cooperate in desalinating and utilizing the brackish springs flowing into the Sea of Galilee, which Israel diverted to the lower Jordan River.²³⁶ In addition, to develop a database on water quantities and quality, the two states agreed to establish joint monitoring stations operating under the authority of the Joint Water Committee.²³⁷ Until a multilateral agreement is reached that includes joint management of the Jordan Basin, a similar framework would serve as a useful example for an Israeli-Palestinian or Israeli-Palestinian-Jordanian agreement on that water source.

There are several options for joint management of the groundwater. The team of Israeli and Palestinian experts, headed by Dr. Eran Feitelson, of the Hebrew University, and Prof. Marwan Haddad, of a-Najah University, discussed this idea.²³⁸ A few of the team's conclusions are presented below to illustrate the principle of joint management and explain its significance.²³⁹

Management of the groundwater reserves entails numerous tasks: monitoring the quantity and quality of the water in each basin; researching, regulating, and monitoring activity above the recharge areas; setting extraction limitations to prevent salinization; setting and enforcing a policy covering periods of drought; establishing and enforcing a pollution-prevention policy; coordinating establishment of sites for extraction and artificial recharge of water; setting standards for treatment of urban and industrial sewage; instituting market mechanisms, where needed, to increase efficient use; privatizing certain functions or granting concessions to private entities, where beneficial; establishing mechanisms for financing the previously mentioned activities, and more.

Efficient execution of these tasks while respecting the rights of the two sides requires a joint institution having sufficient expertise and powers, including agreed-upon mechanisms for resolving disputes resulting from implementation of the arrangement on division and joint management.

²³⁵ Haddad *et al.* 1999.

²³⁶ Israel-Jordan Peace Agreement, 1994, Annex 2, articles 3(3)(3) and 3(3)(5).

²³⁷ *Ibid.*, article 3(2).

²³⁸ The team's work and proposals are documented in a series of six books edited by these two experts, under the title "Joint Management of Shared Aquifers."

²³⁹ The conclusions presented here are primarily based on Haddad *et al.*, 1999.

The previously mentioned team of experts recommended alternative approaches that the joint institution could adopt, each approach focussing on a set of functions and tasks related to management of the shared aquifers. The team proposed that the Palestinian and Israeli negotiators select, based on their perception and understanding, the alternative that best meets the interests of each side and has the greatest chance of success. None of the proposed alternatives requires dissolution of bodies currently managing the water sectors on the two sides. These bodies would continue to operate, but in certain areas determined by the sides (in accordance with the alternative selected) would be subordinate to the joint management institution. It is possible that some of the tasks within the joint responsibility framework would be executed by currently existing bodies, while other tasks would be assigned to the staff of the joint institution.

Summary

The two primary joint management alternatives raised by the two sides are the separation of responsibility and powers, on the one hand, and unilateral Israeli control, on the other hand. In the opinion of many water experts, the first option is unreasonable and would lead to severe harm to the shared water sources. The second option contravenes international water law, violates the right of the Palestinian people to self-determination, and is inconsistent with state practice.

The kind of arrangement that will be established to control and manage the shared water sources will have numerous implications. It is clear that selection of an arrangement that does not provide the tools for close cooperation will diminish the ability of the two peoples to realize their right to water of proper quantity and quality and to benefit from their natural resource. The manner of implementing the principle of joint management, if agreed upon by the two sides, would be determined by negotiation.

Chapter 8

Remedy of the Human Rights Violations

A. Duty of Remedy in International Law

Remedy of human rights violations is a primary legal principle. This concept is reflected in several international instruments dealing with human rights and international humanitarian law, in inter-state relations, and in decisions of international tribunals.

International human rights instruments stipulate the right of every person to an "effective remedy" for violation of his or her rights. This right appears, *inter alia*, in article 8 of the Universal Declaration of Human Rights and in article 2(3) of the International Covenant on Civil and Political Rights.²⁴⁰ The right to a remedy also appears in international humanitarian law. Article 3 of the 1907 Hague Convention Respecting the Laws and Customs of War on Land provides that a state that violates the provisions of the regulations shall be liable to pay compensation.²⁴¹ Articles 147 and 148 of the Fourth Geneva Convention list the human rights violations from which "No High Contracting Party shall be allowed to absolve itself or any other High Contracting Party" of liability, and is, therefore, required to remedy them.

The duty to remedy injustice is also derived from the international responsibility of states, a responsibility based on UN resolutions and the International Court of Justice.²⁴² A precedent-setting decision of this court given in 1928 states that:

The fundamental principle, which is included in the notion of an illegal act, is that remedy of the aberration must, as much as possible, erase all the results of the illegal act, and restore the previous situation, which would likely have existed if the act had not been executed.²⁴³

Violations of international law can be remedied in three ways: restoration of the situation to its prior condition, monetary compensation, and satisfaction.²⁴⁴ Regarding the first, it should be noted that there are instances in which the nature of the violation does not enable turning back the clock. Monetary compensation can provide an alternative to restoring the prior situation when the latter is impossible and can also serve as an independent element of compensation for the harm caused by the violation. Satisfaction is a remedy that has no economic significance and can be made in addition to restoration of the prior situation and payment of compensation, or in their

²⁴⁰ Article 9(5) of the Covenant explicitly relates to the right to compensation. The right to remedy and compensation also appears in article 6 of the International Convention on the Elimination of All Forms of Racial Discrimination.

²⁴¹ Similarly, article 41 of the Hague Regulations provides that a state must pay compensation upon violation of the terms of armistice.

²⁴² For a comprehensive discussion on the principle of the international responsibility of states, see Van Boven, 1993, chap. 4.

²⁴³ *Factory of Chorzow (Germany v. Poland)* (indemnity), 1928, PCIJ (Series A) No. 17.

²⁴⁴ Dinstein, 1977, chap. 37.

stead by apology, a ceremonial act, punishment of persons responsible, providing guarantees regarding future violations, and the like.

Determining the amount of compensation and the manner of payment, whether by making a one-time payment or by establishing a tribunal to hear claims, are subjects that do not lie within the scope of this document and will not, therefore, be discussed in this chapter.²⁴⁵

2nd. Israeli Violations of International Water Law

Israel's responsibility for the water resources of the Occupied Territories and for supplying water to Palestinians and Jews living there is subject to two legal systems. The first is international humanitarian law and international human rights law, which establish the norms binding a state in territories under its control. The second system is international water law, discussed in chapter 6(A), which establishes the proper norms for dividing international water sources regardless of occupation or war. The discussion that follows will only focus on Israel's responsibility for violation of the norms established in the first legal system. The reason for restricting the discussion is that, although Israel discriminatorily divided the water it shares with the Palestinians and thereby breached norms of international water law, it is difficult to substantively determine at what precise stage the division became unfair and when international water law became legally binding on Israel.

Because the principal norms related to water sources and supply of water were discussed in chapter 1 of this position paper, and Israel's violations of these norms were discussed in part 2 above, this chapter will only briefly mention the issues that should be discussed during the negotiations.

1. Violation of the Prohibition on Changing Legislation

Article 43 of the 1907 Hague Regulations prohibits the occupying state from changing the legislation in effect prior to occupation. The military orders that Israel issued regarding the water resources and the supply of water in the Occupied Territories, described in chapter 3, significantly changed the legal and institutional structure of the water sector. The water resources in the Occupied Territories were integrated into the legal and bureaucratic system of Israel, severely limiting the ability of Palestinians to develop those resources.

Under article 43, the occupying state is allowed to change local legislation only for vital military necessity or for the benefit of the population in the occupied territory.²⁴⁶ Although there is dispute over which acts are included in these categories, supplying water to the Jewish settlements and maintaining an unfair division of the shared resources do not come within either of the two allowable situations.

2. Illegal Utilization of the Water Resources

Article 55 of the Hague Regulations limits the right of occupying states to utilize the water sources of occupied territory. The use is limited to military needs and may not

²⁴⁵ For a discussion on this subject, see *Ibid.*, p. 136; Benvenisti and Zamir, 1998, pp. 70-78.

²⁴⁶ Dinstein, 1983, p. 216.

exceed past use. Use of groundwater of the Occupied Territories in the settlements does not meet these criteria and therefore breaches article 55.

3. Discrimination between Palestinians and Israeli Settlers

Article 27 of the Fourth Geneva Convention of 1949 prohibits the occupying state from discriminating between residents of the occupied territory.²⁴⁷ As described in chapter 4(B), the quantity of water supplied to the settlements is vastly larger than is supplied to the Palestinians. Similarly, the regularity of supply is much greater in the settlements. This discrimination is especially blatant during the summer, when the supply to Palestinians in some areas of the West Bank is reduced to meet the increased demand for water in the settlements receiving water from the same pipelines.

4. Violation of the Right to an Adequate Standard of Living and Housing

Access to water in sufficient quantity and quality is a necessary condition for exercising the right to an adequate standard of living, and to adequate housing in particular, which are set forth in article 11 of the International Covenant on Economic, Social and Cultural Rights. Unlike the Hague Regulations, the Covenant is not part of customary law, and therefore only applies to signatory parties. Because Israel ratified the Covenant in 1991, it is only legally responsible for implementing it (in contrast to bearing public or moral responsibility) from that time.

A grave consequence of Israel's policy on investment in the Occupied Territories is the lack of water infrastructure in hundreds of villages throughout the Occupied Territories. According to one estimate, in 1995, when authority over the local water networks was transferred to the Palestinian Authority, 20 percent of the population in the West Bank lived in villages that were not connected to a running-water network. Supply of water to locations that were connected to a water network was and continues to be, as explained in chapters 4 and 5, low and irregular. Per capita consumption of seventy liters/day, and even less, cannot be considered exercise of the right to an adequate standard of living and to adequate housing.

5. Violation of the Right to Health

Exercise of the right to health, stated in article 12 of the International Covenant on Economic, Social and Cultural Rights depends on access to water of adequate quantity and quality. Israel's legal responsibility to implement this provision applies, as in the case of adequate standard of living and housing, only since 1991.

The vast majority of water supplied for domestic use in the Gaza Strip is of much lower quality than the standards set by the World Health Organization. As described in chapter 5(C), this situation severely endangers the population's health. Israel's responsibility results from three primary failures: first, the lack of investment in sewage infrastructure to prevent non-treated sewage from entering the aquifer; second, Israel's responsibility for increased salinization of the Gaza Aquifer resulting

²⁴⁷ Despite the broad consensus that the Convention applies in the Occupied Territories, Israel's official representatives deny its application on grounds that it is not legally occupied territory. For a discussion on this point, see B'Tselem, 1997.

from extraction of water for the settlements; and third, the failure to supply appropriate quantities of water from resources within Israel. In the West Bank, the violation of the right to health results from the health hazards inherent in reducing the access of a large percentage of the population to water, primarily during the summer.

Determination of the kind of remedy for violating the right to health depends on a more precise examination of the extent of the effects of the water shortage and of the consumption of poor -quality water on public health in the Occupied Territories. This examination is not currently possible due to the lack of a firm research base.

Summary

The remedy of violations of international law is not currently on the agenda of negotiations towards the final-status arrangement on water as set by the Oslo Accords. Despite this, a just solution of the Israeli-Palestinian dispute over water is impossible without attention to this issue.

This chapter presented a number of Israeli violations of international law regarding the use of water resources in the Occupied Territories. Because most of the violations result, directly or indirectly, from establishment of the settlements, the kind of remedy adopted will depend, in part, on the results of negotiations regarding the settlements. Therefore, the form of the specific remedy or mechanism for determining the amount of compensation and its payment is not within the scope of this position paper, but remains to be decided by the Israeli and Palestinian decision-makers.

Conclusion

Israel and the Palestinian Authority face critical decisions. The nature of the agreement that will be reached following Israeli-Palestinian negotiations over the final-status arrangement will significantly affect future relations between the two peoples. Arranging division and control of the shared water sources is among the issues to be decided in the negotiations. This position paper points out the human rights aspects and problems inherent in resolving this issue.

The position paper described the features and dimensions of the water shortage suffered by Palestinians in the West Bank and the Gaza Strip. It discussed the roots of the water shortage and the arrangements that have been instituted since the beginning of the peace process. The principal features of this shortage are:

1. Israel controls and utilizes for its benefit the vast majority of the water resources it shares with the Palestinians (the Mountain Aquifer and the Jordan Basin). This division violates the principles of equitable and reasonable utilization set forth in international water law.
2. During the occupation, Israel froze development of the water sector in the Occupied Territories. Its objective has been to maintain an inequitable division of the shared water and to promote the interests of Jewish settlement in the Occupied Territories. The freeze applied to drilling of new wells and development of running-water infrastructure, primarily in West Bank villages.
3. The Mekorot water company continues to conduct a policy of discrimination. Mostly during summer months, Mekorot does not increase, and even decreases, the quantity of water supplied to Palestinian towns and villages so that it can meet the increased demand in settlements that receive water from the same pipelines.
4. Despite the transfer of certain powers to the Palestinian Authority, the Oslo agreements did not significantly change Israeli control over the water sector in the Occupied Territories. Responsibility over the water sector in the Gaza Strip was in fact transferred to the Palestinian Authority, but it was defined as an independent unit, thus leading to continuous destruction of the local aquifer.
5. These factors created a severe water shortage among Palestinians. This shortage is reflected, *inter alia*, in the extremely low per capita consumption, prolonged lack of supply at times of increased demand, and the poor quality of the water. These phenomena violate the right of every person to water of adequate quantity and quality.

In describing the current situation, B'Tselem seeks to send a dual message. First, that, unrelated to the negotiations, immediate assistance must be provided to areas where the water shortage is particularly grave. The second is that the final-status arrangements must include a just solution to the water shortage created by Israel.

This position paper proposes three principles, incorporated in international water law, on which to base the final-status arrangement on water so that it complies with fundamental human rights norms:

1. Division of water between Israel and the Palestinian Authority in a manner that meets the basic needs of every individual. The presumption is that individuals have comparable needs, thus the quantity allocated to each side for basic needs must be based solely on population size.
2. Arrangements for control of the shared water sources based on joint management, the goal being to start with a minimal level of cooperation and advance to comprehensive management of the sources by a joint institution. This kind of solution is necessary because of the high degree of hydrologic interdependence of all parts of the shared water resources. Separation of control of these sources would decrease the capability of coping with severe ecological dangers.
3. Remedy of Israeli violations. The final-status agreement must include Israel's obligation to provide remedy and compensation for violations of international human rights law resulting from its control of the water sector in the Occupied Territories during the occupation.

The principle underlying this part of the position paper is that Israel and the Palestinian Authority are not free to formulate a final-status arrangement according to their whims. If the final-status agreement does not take into account the human rights of Palestinians and Israelis in accordance with international law, the moral and legal validity of the agreement will be questionable.

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