



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

## **Environmental Degradation and the Israeli - Palestinian Conflict**

Prepared by: Jad Isaac and Mohammad Ghanyem

### **Introduction:**

Palestine's proud history as the cradle of civilization and a focal point of the world's three monotheistic religions has long given it a global influence belying its size. It is a tiny piece of land whose compactly coexisting religious, ethnic and political diversity is echoed in the remarkable range of ecological variation found within its close borders. Admittedly, world attention in recent years focused on the political conflict between Israelis and Palestinians while less attention was given to the environment of the area. Environmental problems do not recognize political, racial or religious boundaries. Although small in size, its unique location at the crossroads of three continents has made Palestine an environmental melting pot for the flora and fauna of Africa, Asia, and Europe. This natural diversity has become an innocent bystander to the destructive practices of occupation.

Unfortunately, it is difficult now to recognize the Land which was described by early visitors as a land "flowing with milk and honey". Barren hills have taken the place of what was once rolling woodland covered with thickets and forests. Deserts have replaced grassland. A fetid trickle of sewage now runs where once was the Jordan River. And the Dead Sea has sunk so low that it is now two separate seas and still dropping. As it stands now, the land is degraded, suffering from years of environmental mismanagement and neglect that has only worsened in the past 34 years of Israeli occupation. Palestine is a classic example of the organic relationship that exists between environmental degradation and political conflicts. This paper will try to address the environmental problems in Palestine defined here as the West Bank and Gaza, including East Jerusalem, out of a conviction that sustainable peace is only possible through just and equitable utilization and management of natural resources between Israelis and Palestinians.

### **The Geopolitical Background :**

The total area of historical Palestine is estimated at 26,320 km<sup>2</sup> of land in addition to 704 km<sup>2</sup> of an inland water (Anglo-American Committee of Inquiry, 1946). Palestine, as it stands today, consists of two physically separated land masses: the West Bank and the Gaza Strip ([Figure 1](#)). Its total area including the area of the Dead Sea reaches approximately 6,210 km<sup>2</sup> (ARIJ GIS, 1998). The Gaza Strip, the smaller of the two covering an area of 365 km<sup>2</sup>, is a Coastal Zone at the eastern extreme of the Mediterranean and on the edge of the Sinai Desert. The West Bank, covering an area of 5,845 km<sup>2</sup>, is surrounded by Israel from the West, South and North, and the Jordan River from the East. The West Bank can be divided into four topographic regions: the Jordan Valley, the Eastern Slopes, the Central Highlands, and the Semi-Coastal Zone. The Jordan Valley encompasses the eastern part of the West Bank lying to the west of the Jordan River. The Eastern Slopes consist of the hills extending from the Jordan Valley westward towards the Central Highlands, with an altitude ranging between 200 m below sea level and 800 m above sea level. This has traditionally been the principle location for pastoral grazing.



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889





**Applied Research Institute – Jerusalem (ARIJ)**  
 P.O.Box 860, Caritas St.  
 Bethlehem, Palestine  
 Tel: +972-(02)-277-0535  
 Tel: +972-(02)-274-1889

The bulk of the West Bank is made up of the terraced hills of the Central Highlands. This area reaches up to 1,100 m above sea level. The cooler average temperatures that result from the higher elevations make this home to the majority of the human population in the region. Finally, the Semi-Coastal Zone makes up the extreme northwest section of the West Bank. Its elevation ranges between 100-300 m above sea level (ARIJ GIS, 1998).

Although the peace process has provided increased opportunities for Palestinian self-determination, the fact also remains that Palestine is not only underdeveloped but also still occupied. All land outside towns and villages, about 60 percent of the total land area in the West Bank, remains under Israeli control and more than 30 percent of the land in the Gaza Strip continues to be held by Israel. The "Oslo II" agreement, signed in Washington D.C. in September of 1995, sets out the interim stage for Palestinian Autonomy in the West Bank and Gaza, pending "final status negotiations" which were scheduled to begin in May 1996 and finish by May 1999.

The Declaration of Principles (DOP), which was signed in 1993, called for an Interim period of 5 years during which the representatives of the Palestinian people and the Israeli government will initiate negotiations over the final status, which include Jerusalem, refugees, colonies, borders and water. It was also agreed upon that neither party should initiate any action during the interim period that might jeopardize the outcome of final status negotiations. According to the Oslo Interim Agreements, Palestinians gained control over 70 % of the Gaza strip and 3 % of the West Bank as area A and 24% as area B (see below for definitions). In January 1997, The Hebron protocol was signed in which 85 % of the city came under the Palestine National Authority (PNA) control (H1). 15 % of the city area was designated as area H2 and remained under Israeli control. H2 includes around 20,000 Palestinians and 400 Jewish colonists.

After a one and half year freeze, the Israeli-Palestinian negotiations were restarted and the Wye memorandum was signed in 1998, which included a detailed plan for implementation. Israel implemented the first phase and then new elections took place in Israel. At Sharm el Sheikh, a new memorandum was signed. Table 1 outlines the stages of the interim agreements.

Table 1: The Redeployment percentages according to the agreements.

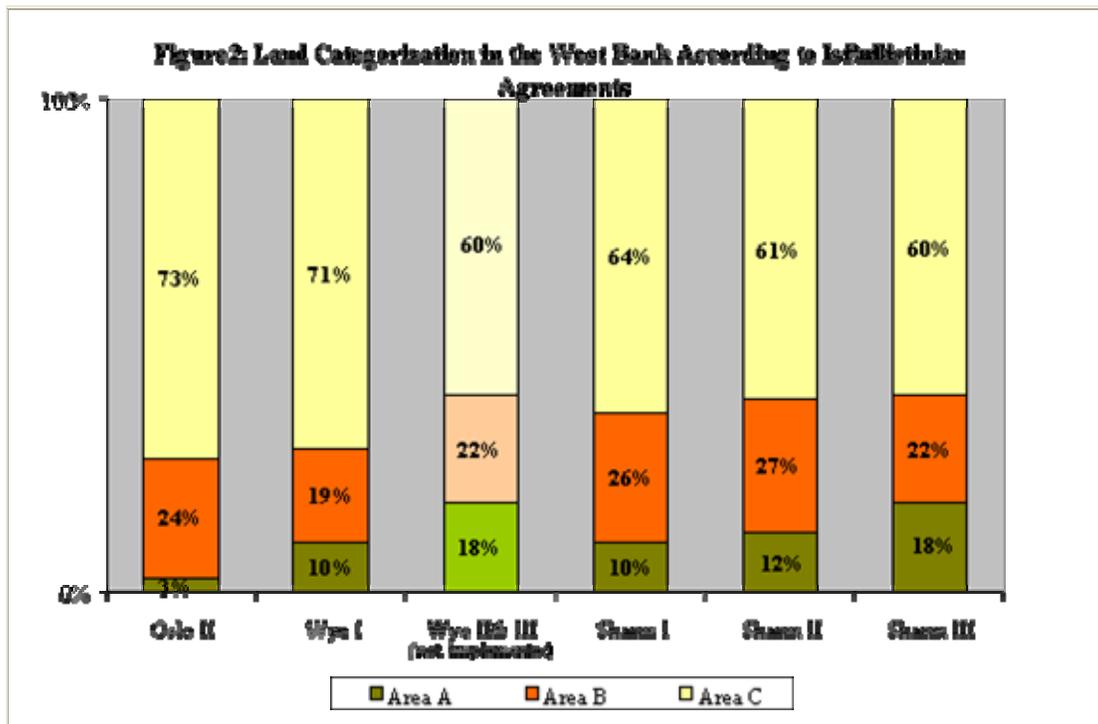
<b>Area</b>	<b>Oslo II May 1994</b>	<b>Wye I October 1998</b>	<b>Wye II &amp; III (not implemented)</b>	<b>Sharm I September 1999</b>	<b>Sharm II (Implemented in delay) January 2000</b>	<b>Sharm III (implemented in delay) March 2000</b>
A	3%	10.1%	18.2%	10.1%	12.1%	18.2%
B	24%	18.9%	21.8%	25.9%	26.9%	21.8%
C	73%	71.0%	60.0%	64.0%	61.0%	60.0%

The Interim agreement divided the lands of Palestine into three classifications: areas A, B, and C. The Israeli military withdrew from lands classified as area A, and complete control was assumed by the Palestinian National Authority. This marked the first time that a Palestinian government retained sovereignty over any of their land. At present (March 2001), area A comprises now 1004 sq. km of the



West Bank and 254.2 sq. km of the Gaza Strip. In area B, the Palestinians have full control over civil society except that Israel continues to have overriding responsibility for security. These areas constitute now 1204 sq. km of the West Bank. In area C, Israel retains full control over land, security, people and natural resources. This situation has remained static since the Sharm El Sheikh phase III redeployment in March 2000 ([Figure 2](#)).

**The status of Palestinian built-up areas lying in Area C after the March 2000 withdrawal is as follows:**



The jagged distribution of yellow and blue areas in the Gaza strip and areas A, B, C, H1 and H2 has partitioned the West Bank and Gaza into isolated cantons, which are physically separated from each other. ([Figure 3](#)) shows the map of the current distribution of areas A, B and C and Map two for the current status of the Gaza Strip.

**According to Oslo II:**

- The Israelis should have withdrawn from all of the West Bank and Gaza excluding the issues of the permanent status negotiations (i.e. Jerusalem, the border and the colonies). It was agreed that:



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

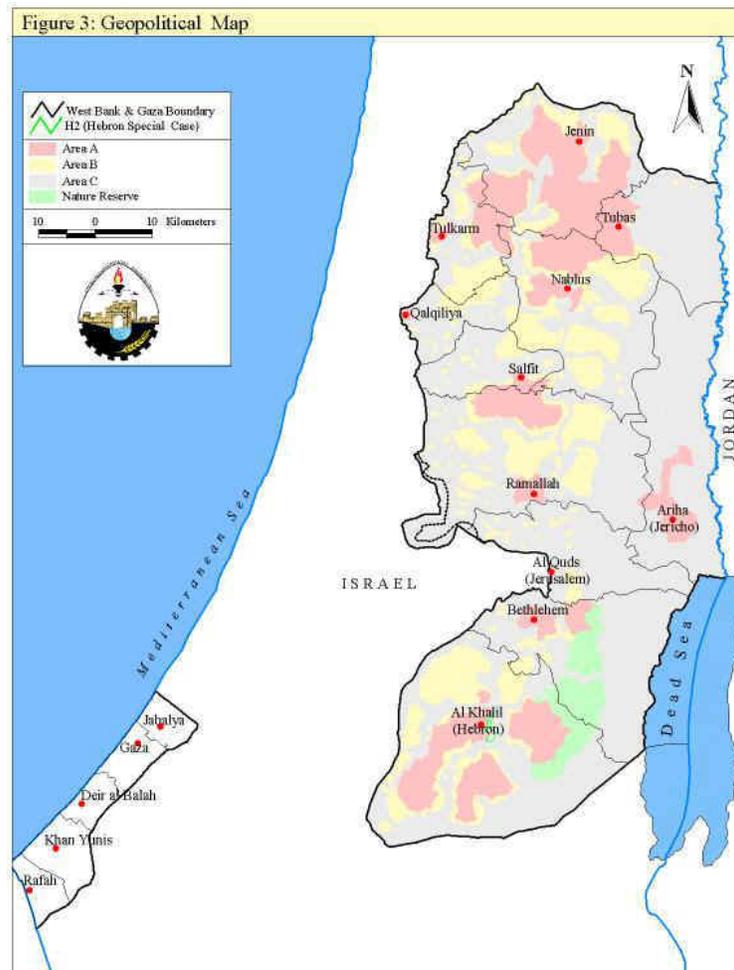
“West Bank and Gaza Strip territory, except for issues that will be negotiated in the permanent status negotiations, will come under the jurisdiction of the Palestinian Council in a phased manner, to be completed within 18 months from the date of the inauguration of the Council...”

Yet 60% of the West Bank and 30% of Gaza Strip remains under Israeli control.

- The two sides declared that they “view the West Bank and the Gaza Strip as a single territorial unit, the integrity and status of which will be preserved during the interim period”.

Yet Israel has built colonies and bypass roads that hinder or totally prevent the connection between Palestinian localities.

- No issues of the interim period should have been deferred to the final status negotiations (paragraph 6 of the preamble, Israeli-Palestinian Interim Agreement on the West Bank and The Gaza Strip). The Sharm El-Sheikh Memorandum rescheduled the final redeployments of the interim period to be concurrent with the final status talks.
- Normal and smooth movement of people, vehicles, and goods within the West Bank and between the West Bank and the Gaza Strip was supposed to be secured without obstacles.
- (Article I, Annex I, Israeli-Palestinian Interim Agreement on the West Bank and The Gaza Strip). However checkpoints have become a daily feature in the life of ordinary





Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

Palestinians.

- The Planning and Zoning of Area C were to be transferred to Palestinian jurisdiction “except for issues that will be negotiated in the permanent status negotiation, during the further redeployment phases, to be completed with 18 months from the date of the inauguration of the Council.” (Article 27, Appendix 1, Annex III: Protocol Concerning Civil Affairs, Israeli-Palestinian Interim Agreement on the West Bank and the Gaza Strip). But in fact land confiscation, house demolition, and tree uprooting continue.
- The release of prisoners was delayed so much that many ended up being released just a few weeks before the end of their prison sentence. In fact the Israelis even tried to bargain the release of some criminal convicts rather than political prisoners.
- All the agreements reaffirm in one way or another that both sides should refrain from unilateral steps that prejudice the status of the West Bank and Gaza. Yet the growth of Jewish colonies has continued at an unprecedented pace.

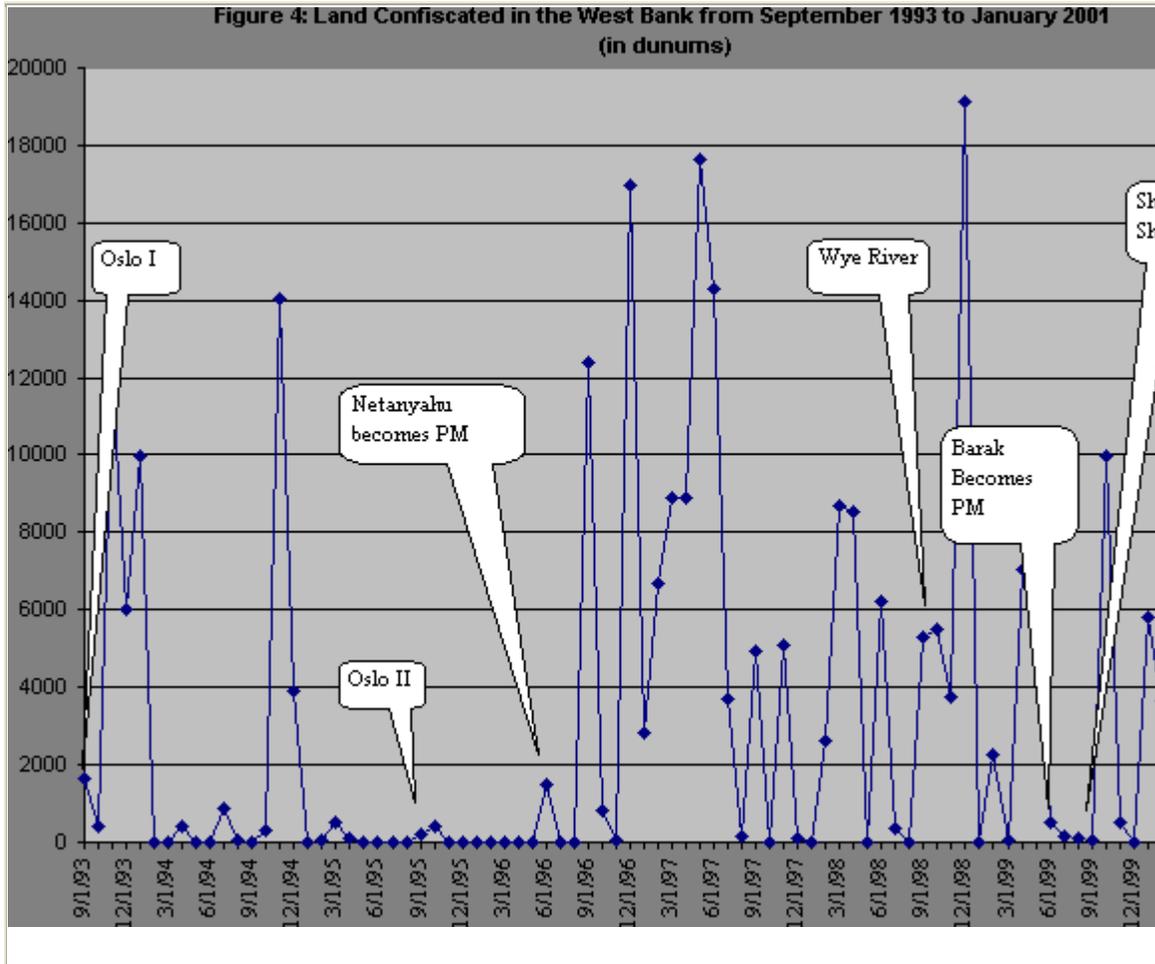
Statistics show that Israeli encroachments on Palestinian rights rose significantly after the signing of the Oslo II agreement in September of 1995. Prior to the agreement, the violations were scattered and relatively low compared to those after it (Figures 4). The graph shows a sharp rise in lands confiscated starting from the last quarter of 1996

The logic of “might make right” cannot make a just and lasting peace. If this peace is to be a comprehensive and sustainable peace, it must rise up to the Palestinian’s legitimate claim of self-determination, national independence, and equitable distribution of economic dividends.

### **Impacts on the Ground:**

Since the signing of the Declaration of Principles in 1993, Israel has followed a policy of creating de facto realities on the ground to affect the outcome of the final status negotiations. Israel has accelerated its colonizing activities by confiscating more Palestinian land to establish new colonies on hilltops and build a comprehensive network of by-pass roads. These activities have been a main source of the instability in the peace negotiations between the government of Israel and the Palestinians.

According to Israeli data, there are 137 colonies in the West Bank and Gaza, however satellite images show 282 Jewish built-up areas in the West Bank including East Jerusalem and 26 in Gaza. This is excluding military sites. These built-up areas cover 150.5km<sup>2</sup> (Table 2) (GIS database, ARIJ, 2000). Israeli sources consider those Jewish built-up areas in East Jerusalem as neighborhoods of the municipal Jerusalem and not as settlements. Currently the total number .



of colonists in the West Bank and the Gaza Strip number around 400,000 of which nearly 200,000 are in East Jerusalem alone

Table 2: Land Use in the West Bank

Lands	Area in sq. km	Percent of the West Bank
Palestinian built-up areas in the West Bank	367.7	6%
Jewish colonies in the West Bank	150.5	3%
Israeli Military Base	37.9	1%
Closed Military Area	999.1	18%

Source: ARIJ database 2000

In the Gaza Strip, Israeli Colonies cover 53.8 km<sup>2</sup>. This area is occupied by only around 7,000 colonists. Jewish colonies are scattered all over the West Bank and lie predominantly to the south along the



**Applied Research Institute – Jerusalem (ARIJ)**  
 P.O.Box 860, Caritas St.  
 Bethlehem, Palestine  
 Tel: +972-(02)-277-0535  
 Tel: +972-(02)-274-1889

coast in the Gaza Strip. Successive Israeli governments have encouraged the development of specific blocks more than others.

**In the West Bank, the focus has been on the following areas:**

- The Jerusalem area to create demographic barricades in front of any Arab claims to it,
- Along the West Bank’s western edges so as to make the return to the 1967 borders practically impossible, and so as to make the colonies appealing to colonists commuting to work inside Israel
- The Jordan valley for its presumed importance to Israel’s security as well as for its agricultural resources

Furthermore, the growth of colonies is mainly geared to the formation of blocks; i.e. they grow outwards and towards each other. The end result of such a growth is the grouping of Palestinian towns and villages into three or four cantons. Indeed, the Israeli intention is to make the contiguity of any Palestinian State in the future practically unattainable.

The Labor and Likud Israeli governments have maintained progressive expansions of these colonies. To achieve this goal, they have confiscated Palestinian land, demolished their houses, and uprooted thousands of trees. Since the signing of the Declaration of Principles in 1993 and until September 2000, more than 215,928 dunums of land have been confiscated, more than 359,841 dunums have been threatened, over 608 houses demolished and 107,000 trees have been uprooted in the West Bank alone. The reasons given for these activities include: building without a permit, the Absentee Law (which states that land not in use for three continuous years is subject to Israeli confiscation), and security purposes. At ARIJ, the change in the size of West Bank colonies is monitored by satellite. Table 3 presents the growth of Israeli settlements in the West Bank.

Table 3: The growth of Colony Area in the West Bank

Year	Colony Area (sq. km)	Percent of the West Bank
1997	108.9	1.9 %
1999	147.8	2.6 %
2000	150.5	2.7 %

Table 4, details the expansions in the West Bank detected from the satellite images for August 1999 and October 2000.

The colonies vary in size, function, and type. Some are big and have acquired city status (e.g. Ariel, near the Palestinian town of Salfiet) while others are small and amount to no less than a few caravans and a water tank (e.g. Magen David, south of the Palestinian village of Yatta). The Israeli colonies differ in their function too. The difference stems from the fact that colonizing activities in the West Bank and Gaza serve a prime Israeli political objective; dominating the demographic and economic aspects of Palestinian life.

Table 4: Details of Colony Area Expansion in the West Bank (August 99-December 2000)

District		Mother Colony	Expansion	Area in Dunums
Bethlehem	1	Har Gilo	New Expansion	332
	2	Neve Daniyyel	New Expansion	263



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

	3	Kefar David	Outpost_Sdeh Bar Farm	125
	4	Tekoa	New Expansion	122
	5	Betar Illit	New Expansion	28
	6	Alon Shevut	Outpost_Givat Ha'hish	19
	7	Har Homa	New Expansion	18
	<b>Total</b>		<b>907</b>	
<b>Hebron</b>	1	Migdal Oz	New Expansion	104
	2	Ma'ale Amos	Outpost_Ivei Ha'nachal	87
	3	Maon	New Expansion	33
	4	Metzadot Yehuda	Outpost_Nof Nesher	31
	5	Tene Omarim	Outpost_Tene Omarim SE Caravans	26
	6	Suseya	Outpost_Magen David Farm	10
	7	Tene Omarim	Outpost_Tene Omarim N Caravans	4
	8	Maon	Outpost_Maon Farm	2
	<b>Total</b>		<b>297</b>	
<b>Jericho</b>	1	near_Maale Efrayim	New Site	159
	2	Pezael (Fezael)	New Expansion	22
	<b>Total</b>		<b>181</b>	
<b>Jerusalem</b>	1	Pisgat Amir	New Expansion	77
	2	Adam (Geva Benyamin)	New Expansion	62
	3	2091950_near Ramot	New Expansion	38
	4	Kokhav Yaacov	New Expansion	29
	<b>Total</b>		<b>206</b>	
<b>Nablus</b>	1	Homesh	New Expansion	32
	2	Bracha	Outpost Beracha A	16
	3	2030350_Gvaot Olamn	New Expansion Gvaot Olamn	12
	4	Mpe Rahel (Shvut Rahel )	Outpost Ahiya (Hill D)	9
	5	Shilo	New Expansion	8
	6	Itamar	Outpost Hil Neighborhood (Hill 777)	8
	7	Yitzhar	Outpost Yitzhar Eastern Hill	7
	8	Yitzhar	Outpost Ahuzat Shalhevet	4
	9	Bracha	Outpost Sneh Ya'akov	1
	<b>Total</b>		<b>97</b>	
<b>Qalqiliya</b>	1	near Alfe Manashe	New Site	219
	2	near Zufin	New Site	185
	3	Neve Oranim	New Expansion	142
	4	2050760 - near Alfe Manashe	New Expansion	9
	5	Karne Shomron	Outpost_Nof Kane Farm	7
	<b>Total</b>		<b>562</b>	
<b>Ramallah</b>	1	2081360 next to Shilo	New Expansion	156
	2	Shilo	Outpost Shillo East 2	48
	3	Kochav Ha'shachar	Outpost Mizpe Keramim	35
	4	Ofra	Outpost Amona	26



Applied Research Institute – Jerusalem (ARIJ)  
 P.O.Box 860, Caritas St.  
 Bethlehem, Palestine  
 Tel: +972-(02)-277-0535  
 Tel: +972-(02)-274-1889

	5	Shilo	Outpost Givat Harel (Hill 740)	17
	6	Menora	New Expansion	15
	7	Shilo	Outpost Shillo East 1	10
	8	Halamish	Outpost Zofit Farm	7
	9	Talmon North	Outpost Haresha	4
	10	Shevut Rachel	Outpost Adi Ad (Hill F, Hill 799)	1
	<b>Total</b>		<b>319</b>	
<b>Salfit</b>	1	Ginnot Shomeron	New Expansion	53
	2	Yakir	New Expansion	39
	3	Kefar Tapuah	Outpost Kefar Tapuah Hill 660	35
	4	Between Gavri'el , Barqan	New Site	7
	<b>Total</b>		<b>134</b>	
<b>Tulkarm</b>	1	Avnei Hefetz	Outpost Avnei Hefetz Eastern Caravans	6
	<b>Total</b>		<b>6</b>	
<b>Grand Total</b>			<b>2709</b>	

Source: ARIJ database 2000. (1 Dunum = 1000m2)

The great majority of colonies are situated in militarily strategic locations (e.g. Ariel has a strategic view over the Jordan Valley and the North). Some of the colonies overlook major Palestinian towns (e.g. Psagot over Ramallah). On the other hand, some act as wedges between Palestinian towns (e.g. the Gush Etzion block separating Bethlehem from Hebron). Colonies are categorized mainly as urban, agricultural, industrial, and military. Thus the type of structures and their numbers differ from one colony to the other. The urban ones may have buildings with several stories while the agricultural have large tracts of cultivated land. They also have barracks and other structures that accompany agricultural activity. Hence the difference in type entails a difference in density and effect on the surrounding. The industrial type for example comprises a more serious threat to the Palestinian localities than the other types.

All Israeli colonies in the West Bank and Gaza are illegal according to International Law. Article 49 of the Fourth Geneva Convention specifically states that: "The Occupying Power shall not deport or transfer parts of its own civilian population into the territory it occupies".

Figures released recently by the Israeli Housing and Construction Ministry show the public construction of 1,943 housing units in the occupied territories in the year 2000, while Labor Prime Minister Barak was in power. This is the highest number since the now Prime Minister Ariel Sharon (Likud) served as housing and construction minister in 1992<sup>[1]</sup>. According to the Israeli Interior Ministry the Colonists population in the West Bank excluding Jerusalem, grew by 8% last year (Average annual growth rate within the State of Israel is less than 2.5%, Israeli Abstract yearbook, 1999). Certain settlements continue to show huge growth rates, notably Betar Illit (24.6%) and Kiryat Sefer (28.1%). [Figure 5](#) shows a comparison of growth rates.

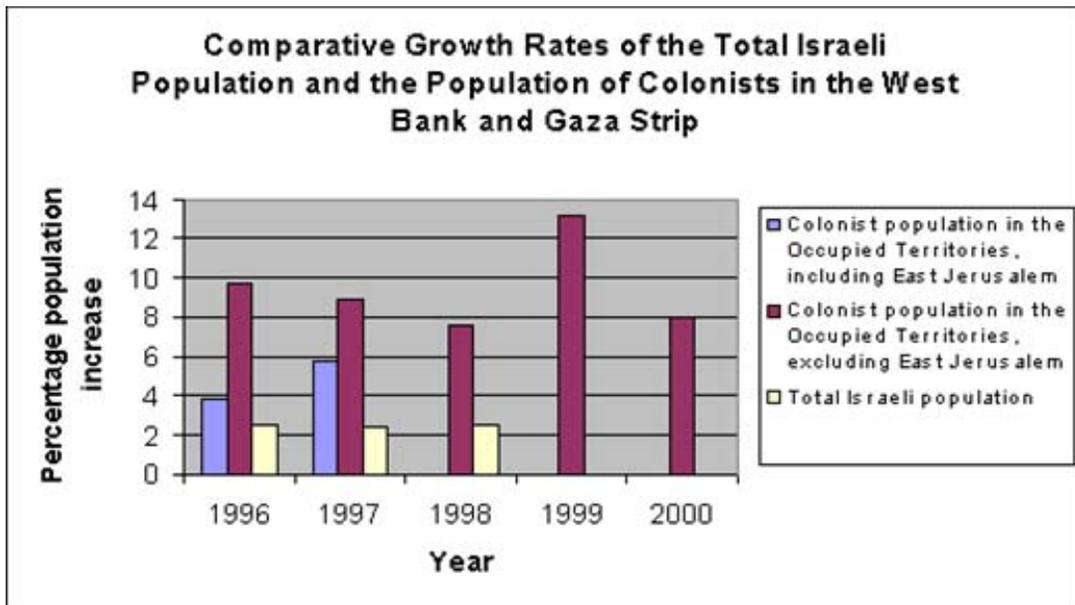


Figure 5: Growth rates of the Colonist population and of the total Israeli population

Prime Minister Sharon’s administration has declared that they will not shy away from building in colonies in order to accommodate their natural population growth. But figure 5 shows clearly that the growth of the colonist population is far from natural. The tax breaks and cheap housing, coupled with the ideological drive means huge numbers of Israelis are moving into the occupied territories each year. It seems likely that this is the growth that the Sharon government will build to accommodate.

**b. The “Illegal” Outposts:**

In a bid to show that its policy is different from that of the preceding government, Barak’s government revised the status of 42 colonial outposts established after the signing of the Wye River Memo. The military establishment had advised Barak to dismantle 15 of the 42 outposts since they had legal problems:

- 8 outposts had proper permits,
- 27 had improper or incomplete permits,
- 7 had no permits at all.

Nevertheless, on October 13, 2000, a compromise was reached between the government and the Yesha council (speaking on behalf of the colonists) over the fate of those outposts. **The number of outposts slated for removal was narrowed down to ten of which:**

- 5 were empty or unmanned sites (i.e. containers or water tanks),
- 3 were relocated to nearby sites,
- 2 to be evacuated at a later time.

Thus 32 outposts remained.



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

### **c. House Demolition:**

The Israelis strictly monitor Palestinian land use within Area C. Building without a permit is forbidden, however, it is next to impossible for a Palestinian to obtain a building permit. Planted trees are consistently uprooted to discourage anything, which could lead to an attachment to the land. Vast tracts of Palestinian agricultural land, which lies in, this area continues to be confiscated by the Israelis under the pretext of the Absentee Law or security reasons.

The Israeli army repeatedly demolishes houses if they are built without a permit, or if they get in the way of Israeli construction plans (i.e., by-pass roads, settlements, military zones, etc.). At least 769 houses have been demolished since 1993 in the West Bank and Gaza<sup>[2]</sup>. The reasons given for these activities include: building without a permit, the Absentee Law (which states that land not in use for three continuous years is subject to Israeli confiscation), and security purposes. A small portion of these was demolished as punishment for Palestinians suspected or convicted of violence against Israel. Many of these charges have been challenged in a court of law, however, the Israeli court system very seldom rules in the favor of Palestinians. Through field studies, and using GPS positioning, ARIJ has mapped the location of Palestinian houses demolished, or slated for demolition, by the Israeli government. The locations of these acts of destruction repeatedly occur along both planned and existing by-pass roads, and at the outskirts of Palestinian communities. This serves to limit the growth and movement of Palestinians, and further the Israeli commitment to creating “facts on the ground.”

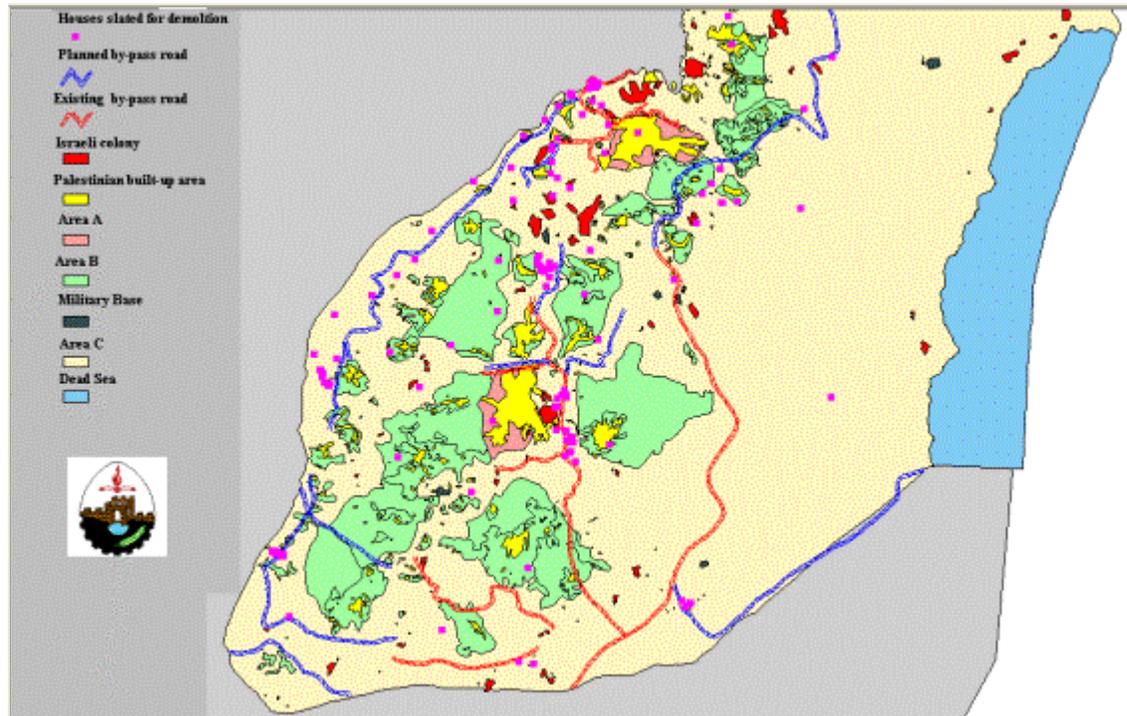
Figure 6 produced after a survey in the south of the West Bank of 170 houses demolished or slated for demolition in 1998 (demolition order received by the household), reveals clearly the deliberate pattern behind the demolition of Palestinian homes in the West Bank. **The homes indicated on the map in purple indicate three trends:**

**Nearly all homes slated for demolition are located in Area C, territory not yet handed over to the Palestinian Authority for governing control;**

- Nearly half (41% by ARIJ figures) are located along the perimeter of the West Bank, along the west and south borders as well as south of Jerusalem, between the Green Line and areas of Palestinian control;
- Nearly all the homes are either along bypass roads or along the outskirts of Jewish settlements.

From these visual patterns indicated by the map, an analysis can be constructed of the rationale behind the demolition of homes. Demolition allows Israel to establish facts in Area C, to clear the area of Palestinian inhabitants and establish a claim to the territory in final status negotiations. Additionally, demolishing Palestinian homes effectively isolates Palestinian controlled areas, leaving Areas A and B as islands in a sea of Israeli control.

The map establishes that the construction of Israeli bypass roads is indeed a threat to Palestinians, whose homes are demolished in order to allow for a buffer zone around the roads.



Additionally, the roads appear to establish a new Green Line border, farther within the West Bank, reinforced by the demolition of Palestinian homes along the west and south of the West Bank, and south and east of Jerusalem. Finally, the proximity of demolished homes to the perimeter of Jewish settlements indicates that the goal of settlement expansion is driving the Israeli government's demolition campaign. Not only does the expansion of these settlements threaten the homes of Palestinians living near the borders, it also creates a barrier to the expansion of Palestinian towns such as Bethlehem and Nablus.

#### **d. Bypass Roads:**

The term bypass roads came with the advent of the Oslo Accords and were not present before. Figure 6 marks those roads built by the Israelis since the Oslo Accords. These roads are used by the Israelis to link colonies with each other and with Israel. In the agreements they are called "Lateral Roads" but people usually call them "bypass" roads because they are meant to circumvent (i.e. bypass) Palestinian built up areas. These roads are of course under Israeli control and entail a 50 to 75 meter buffer zone on each side of the road in which no construction is allowed.

The construction of by-pass roads commonly occurs along the perimeter of Palestinian built-up areas. As a result, these roads carve up the Palestinian areas into isolated ghettos and often deprive Palestinians of vital agricultural land. These practices have fragmented both land and people. This situation is very serious within the major cities of the West Bank where by-pass roads form asphalt boundaries that limit the expansion and development of the Palestinian communities, and further disconnect Palestinian communities from each other (Table 5).



Table 5: Bypass roads' length and buffer area in the West Bank

	Existing bypass roads	Bypass roads under construction	Total
<b>Total length</b>	316.7km	24.1 km	340.8km
<b>Area of the roads including 75m buffer zone on either side</b>	47.5km <sup>2</sup>	3.6 km <sup>2</sup>	51.1km <sup>2</sup>

*ARIJ GIS Database*

The results obtained for the changes in the by pass roads between August 1999 and October 2000 are shown in Table 6.

Table 6: The Changes in bypass roads between 1999 and 2000 in the west Bank

Bypass Road	District	Length in kilometers
West of Negohot	Hebron	1.9
West of Adora	Hebron	4.7
Close to Shima	Hebron	3.2
South of Dolev	Ramallah	2.2
South of Shilo	Nablus	2.3
Between Barqan and Alei Zahav	Nablus	8.0
North of Maale Amos	Hebron	1.7
<b>TOTAL</b>		<b>24.1</b>

*ARIJ GIS Database*

**e. Closed Military Areas and Military Bases:**

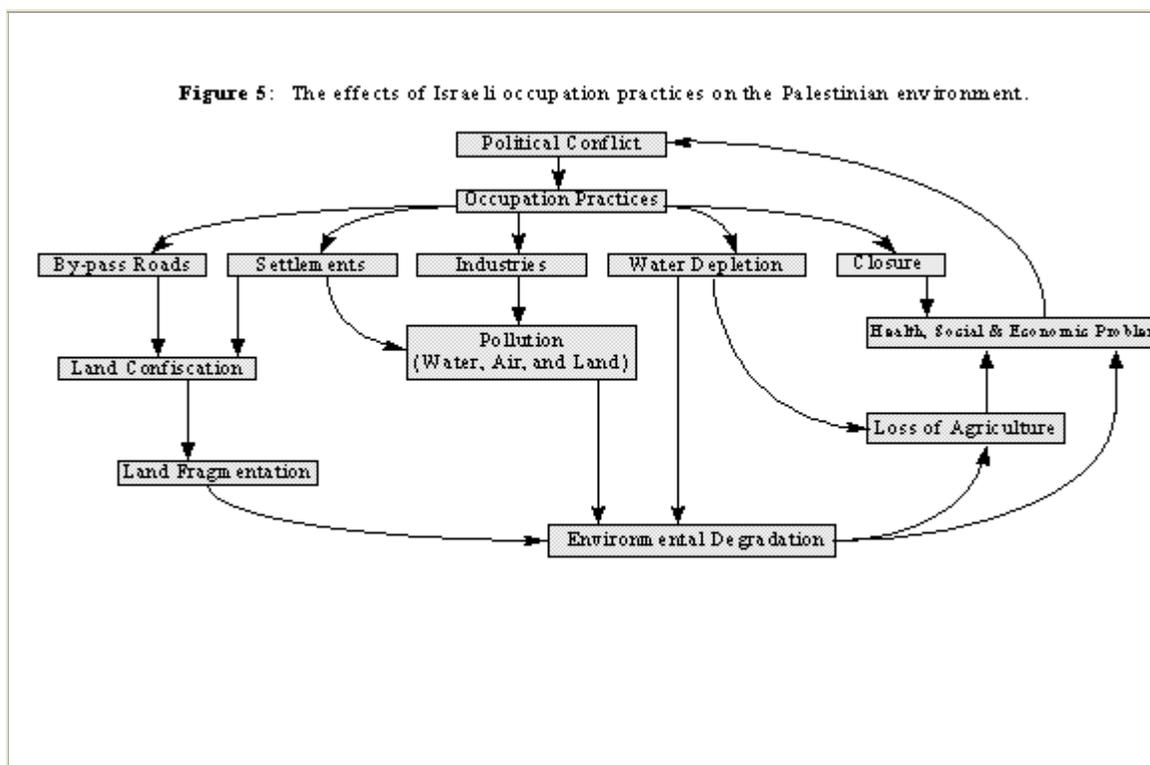
Currently 999.1 km<sup>2</sup> of the West Bank is declared as closed military area by the Israelis (17.6% of the total land area of the West Bank) as closed military areas. However this figure is the lowest since the occupation started in 1967. Before the Sharm El Sheikh Memorandum 1214.7 km<sup>2</sup> was declared as closed military areas. In addition military bases in the West Bank cover a total area of 37.9 square kilometer. 2.27 km<sup>2</sup> of the Gaza Strip is taken up by a military base, a further 53.69 km<sup>2</sup> is occupied by the Israeli security zone.

The closed military areas are mainly found in the Jordan Valley. Although most of these areas have low agricultural value, they constitute the major grazing areas in the West Bank. Since Palestinian pastoralists are denied access to these areas, the remaining grazing areas currently suffer from severe overgrazing and are under threat of permanent desertification. Furthermore, the wildlife and the rich biodiversity, which characterize the closed military areas, are threatened by the action of the heavy military tanks and vehicles.

**Palestinian Environmental dilemma:**

The case of Palestine is a striking example for the organic relationship between environmental degradation and the political conflict. Sovereignty over natural resources is one of the key elements for any nation to achieve sustainable development and sound environmental management. The case of Palestine is different

than other nations as it is passing from occupation to liberation over periods and phases. Without the ability to regulate land use over a contiguous piece of land, natural ecosystems cannot be maintained, the status of the environment cannot be properly monitored, and environmental protection cannot be implemented. The division of Palestine’s land into areas A, B, and C has produced two different and parallel planning schemes: one Israeli, to serve the Israeli settlers living in the West Bank and Gaza Strip, and the other Palestinian, to serve the Palestinian people. The plans of the Israeli authority, the controlling power in the area, have systematically hindered the development of the Palestinians and damaged the environment in the process. All these practices have created a geographical discontinuity at the lands under the Palestinian control. This discontinuity has resulted in a major physical impediment towards accomplishing sustainable development in Palestine. [Figure 7](#) schematically details such relations and dilemmas.



Although the peace process is providing increased opportunities for Palestinian self-determination, the fact also remains that Palestine is not only underdeveloped but also still occupied. Sovereignty on land is one of the key elements for any nation to achieve sustainable development and sound environmental management.

Palestinians now have limited access to a large portion of the natural resources in the West Bank. Areas such as the Jordan Valley, and the Eastern Slopes are considered as major natural resources of the region. Palestinians maintained a high natural growth rate reaching 4 %. Population densities in Palestine are high when taking into consideration the strict limitations on land use imposed by the Israeli Authorities. Nearly half of the Palestinian population (53%) in Palestine is composed of individuals under age 18.

A major dilemma facing Palestinian decision makers and planners is how to promote sound environmental management strategies given the many uncertainties related to the outcomes of the final status negotiations and their implications on the actual land and water resources available to the Palestinians. Nevertheless and regardless of the outcome of these negotiations, the amounts of land, water and other natural resources



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

**which will be available to the Palestinians will most likely continue to be limited and subject to increased competition between:**

1. the need to intensify agricultural development efforts to generate additional employment and income opportunities, enhance food security and promote agricultural exports;
2. the need to expand urban areas to create sufficient additional housing and non-agricultural employment opportunities to absorb the rapidly increasing local population as well as the returnees;
3. the need to ensure the sustainable management and conservation of the very limited natural resources and maintain their quality for the use of future generations of Palestinians.

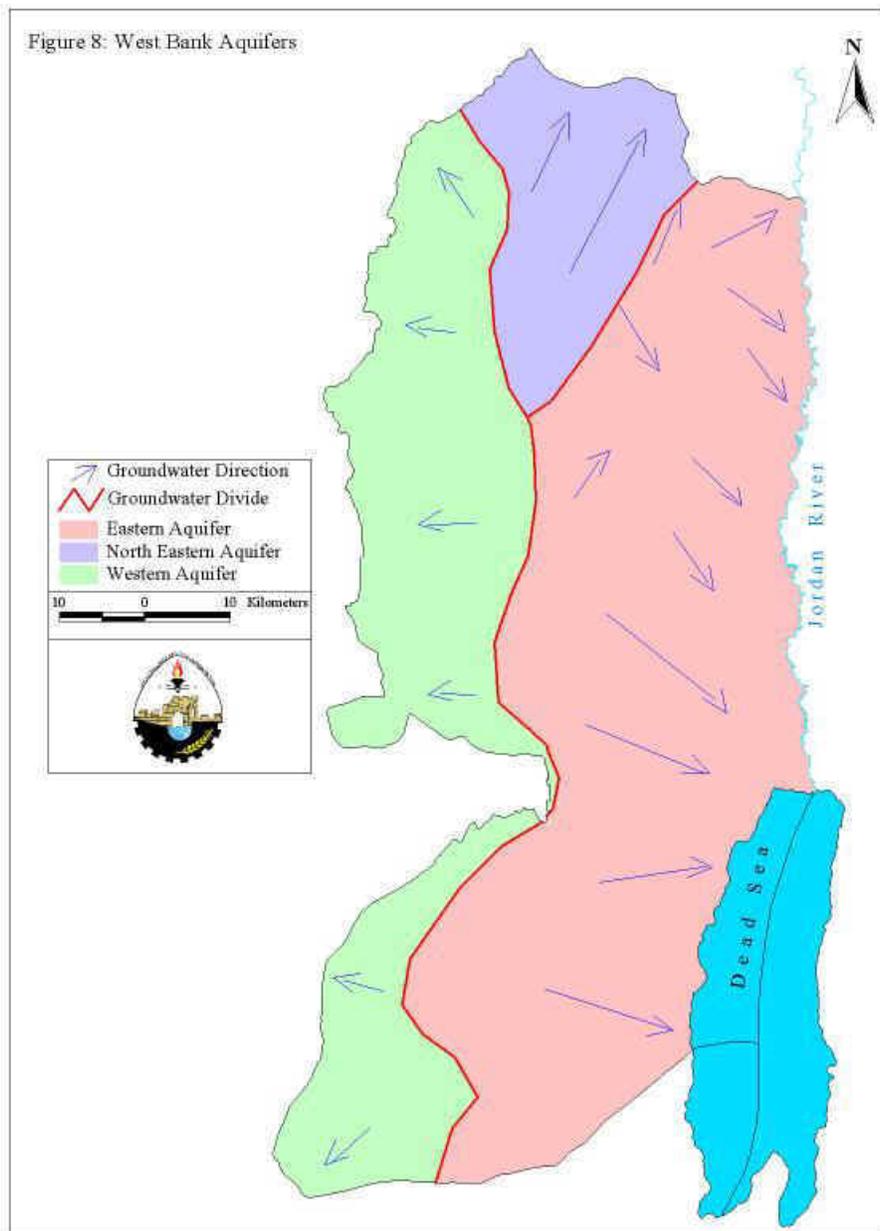
Palestinian environmentally human rights were and are still violated by the reality of existing conditions. Israel has ignored the state of the Palestinian environment in the midst of the political and social turmoil surrounding its occupation. After more than eight years since the start of the peace process, Palestinians still do not have sovereignty over their natural resources, which is an essential prerequisite for sound environmental management. Some of the Israeli practices which represent an environmentally human rights violation are: confiscation of land, relocation of Israeli industries to Palestinian neighborhoods, the abuse of Palestinian water and other natural resources, and many more. In addition to what was detailed earlier with respect to confiscation of Palestinian land for Jewish colonies, **the following represents a summary of some of the violations:**

### **1.0 Depletion of Water Resources:**

Palestinian entitlements for water include the underground water of the West Bank and Gaza aquifers, in addition to their rightful shares in the waters of the Jordan River as riparian. The annual renewable freshwater water of this aquifer ranges from 600 MCM to 650 MCM. The hydrological system related to the West Bank can be divided into three major aquifer Systems, the Western, the Northeastern and the Eastern Aquifer System (or basins) ([Figure 8](#)).

- The Western Aquifer System, which is the largest, has a safe yield of 362 MCM per year. Israel exploits most of the water of this aquifer system through 300 deep groundwater wells. The Palestinians, however, are limited to utilize 22 mcm/year from this aquifer system.
- The Northeastern Aquifer System has an annual safe yield of 145 MCM. Palestinians are limited to 42 mcm/year while Israel utilizes 103 mcm/year.
- The Eastern Aquifer System has a safe yield of 100-150 MCM per year (of which 70 MCM are brackish). It lies entirely within the West Bank territory and was used exclusively by Palestinian villagers and farmers until 1967. After 1967, Israel expanded its control over this aquifer and began to tap it, mainly to supply Israeli colonies implanted in the area. Out of the Eastern Basin, the Palestinians extract 54 mcm/year and the Israelis extract 40 mcm/year.

### **Gaza Coastal Aquifer:**



The main Gaza Aquifer is a continuation of the shallow sandy/sandstone coastal aquifer. About 2200 wells tap this aquifer with depths mostly ranging between 25 and 30 meters. Its annual safe yield is 55 MCM, but the aquifer had been over-pumped at the rate of 110 MCM resulting in a lowering of the groundwater table below sea level and saline water intrusion in many areas. The main sources of salinity are deep saline water intrusion from deeper saline strata, sea water intrusion, and return flows from very intensive irrigation activities.

The main Gaza Aquifer is a continuation of the shallow sandy/sandstone coastal aquifer. About 2200 wells tap this aquifer with depths mostly ranging between 25 and 30 meters. Its annual safe yield is 55 MCM, but



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

the aquifer had been over-pumped at the rate of 110 MCM resulting in a lowering of the groundwater table below sea level and saline water intrusion in many areas. The main sources of salinity are deep saline water intrusion from deeper saline strata, sea water intrusion, and return flows from very intensive irrigation activities.

### **The Jordan River system**

The only permanent river, which can be used as a source of surface water in Palestine, is the Jordan River, which is an international river basin. The riparian of the Jordan River are Lebanon, Syria, Palestine, Israel and Jordan. The current allocation of the Jordan River water resources in the region is not the outcome of agreements, negotiations or equitable principles. Rather they reflect the asymmetries of power in existence and the abilities of the strong to impose their wills on the weak. The full control of Israel over the headwaters of the Jordan River has led to reduce the Arab water shares in the River basin far beyond those that any rational allocation system consistent with basic international law governing transboundary resources would entitle them to Israel has unilaterally diverted most of the waters of the Jordan River through its national water carrier to irrigate the Negev. Consequently, the River Jordan, which, in 1953, had an average flow of 1250 mcm per year at the Allenby Bridge, now records annual flows of just 152-203 mcm. The Palestinian use of the Jordan River before 1967 was through 140 pumping units. Immediately after the occupation these pumping units were either destroyed or confiscated by Israeli authorities. In addition, large irrigated areas of the Jordan Valley used by Palestinian were closed as a military zone and later given to Jewish Settlers.

Israel has restricted Palestinian water usage and exploited Palestinian water resources. Presently, more than 85% of the Palestinian water from the West Bank aquifers is taken by Israel, accounting for 25 % of Israel's water needs. As a result of Israeli policies, Palestinians are currently utilizing 246 MCM of the water resources to supply 3 million Palestinians in both West Bank and Gaza Strip with their domestic, industrial and agricultural needs. For comparison, the less than six million Israelis are utilizing 1959 MCM. On a per capita basis, water allocation to Palestinians is 82 m<sup>3</sup> compared to 340 m<sup>3</sup> for Israelis.

Jewish settlers in both the West Bank and Gaza Strip consume huge amounts of the scarce Palestinian water resources. The 5,500 settlers in the Gaza Strip and 400 thousand settlers in the West Bank including East Jerusalem are consuming 10 and 65 MCM per year respectively. Israeli settlements in both the West Bank and Gaza Strip consume unsustainable amounts of water. While the annual per capita Palestinian domestic / urban / commercial / industrial / tourist water demand is estimated to an average 25 cubic meters, an Israeli uses an average 125 cubic meters per year. Jewish settlers receive continuous water supply, largely from Palestinian water resources, while Palestinians are receiving intermittent supply of water especially during summer months. At present, there are still more than 220 Palestinian communities in the West Bank (25% of total Palestinian communities) that are not linked to public water distribution systems and Israel is hampering the efforts of the Palestinian Water Authority to provide them this essential service (Al Quds Arabic Newspaper # 11400, Saturday May 19, 2001). Most Palestinian communities are experiencing water shortages during summer time and a water black market for supplying Palestinian homes with water through tankers at extremely high prices is developing. In addition, Hebron, Bethlehem and Qalqilia Districts suffered from destruction to their main water lines, and work in the under construction Salfiet wastewater treatment plant was interrupted (Al-Quds Arabic Newspaper, *ibid*).

A report from the Palestinian Hydrologist's Group indicated that more than 200 Palestinian villages have suffered water cuts during the current hostilities (from September 2000 –May 2001). For example, the villages of 'Azmut, Talfit, and Umm el Tut in the Nablus district, which receive their water through Israeli settlements, have all suffered from water cuts. In addition, Hebron, Bethlehem, and Qalqilia Districts



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

suffered from destruction to their main water lines, and work in the under construction Salfiet Wastewater treatment plant was interrupted (Al-Quds Arabic Newspaper, *ibid*).

Coastal aquifer management programs (CAMPS) intended to improve the water situation for approximately 1.20 million Palestinians over the next 20 years have missed the implementation of their second phase as experts have pulled out from the area. The main water pump in Jenin, was out of use for long periods of time due to repeated power cuts and replacement parts being stuck in Israeli airports.

## **2.0 Pollution caused by Jewish settlers:**

The Israeli settlements common location on top of hills overlooking Palestinian communities, for various reasons of security and intimidation, allows them to easily pollute Palestinian land. The wastewater from many settlements is collected and discharged to the nearby valleys without treatment. Many cases of pollution have affected the adjacent Palestinian communities. Wadi Qana, Qatanna, Nahhalin, Al-Khader, Al-Jania, Al-Walajah, Dura and Bani Na'im are some examples of affected localities.

Israeli settlements in the occupied Palestinian territories are environmentally unsustainable, incongruent with indigenous land use and are a source of regional conflict. Palestinian objection to the existence of Israeli settlements in the occupied Palestinian territories is not limited to the issue of their illegality. These settlements impose a serious threat to the sustainability of Palestinian natural resources and continue to be one of the leading causes of their degradation. The actions of the settlements and industrial zones seem to indicate a double standard towards environmental protection, with practices differing in the Palestinian territories and Israel.

Most settlements are built on confiscated Palestinian agricultural or communal grazing lands, which have led to the uprooting of thousands of fruit trees and, as a result of the reduction in land cover, has increased soil erosion

It has been estimated that in 1997 the 300,000 Israelis living in the West Bank and East Jerusalem produced nearly 30 MCM of wastewater annually. This is to be compared with an estimated 31MCM of wastewater produced in the same year by the 1,870,000 Palestinians living in the West Bank. Thus, despite the Israeli settlers are less than one sixth of the Palestinian population in the West Bank, they discharge similar amounts of wastewater. The Kfar Darom Israeli settlement in the Gaza Strip releases its sewage and chemical waste left from the industrial plants to the Palestinian Al-Saqa Valley in the central part of the Gaza Strip.

Other Israeli settlements in the West Bank are primarily cattle and livestock farms. The manure from these farms is also dumped in concentrated form into Palestinian valleys and agricultural lands, destroying the soil structure and polluting water resources. In addition, the dumping of animal manure creates breeding grounds for mosquitoes and flies, increasing the potential of major diseases. An example is the village of Nahalin, southwest of Bethlehem, where livestock farm effluents from the nearby Rush Tsorim colony are dumped on village land.

Field surveys have indicated the Palestinian communities affected by the discharge of untreated sewage from settlements. The available information shows that settlements in all Palestinian districts discharge untreated sewage. In addition to affecting these Palestinian communities, much of this discharge occurs in the recharge area of the shared Western aquifer. This affects the drinking water supplies for both Israelis and Palestinians. Recent water samples analyses of spring water in Salfiet District near Ara'el Israeli settlement showed contamination with *E.coli*. Wastewater discharges from Ara'el settlement in Salfiet



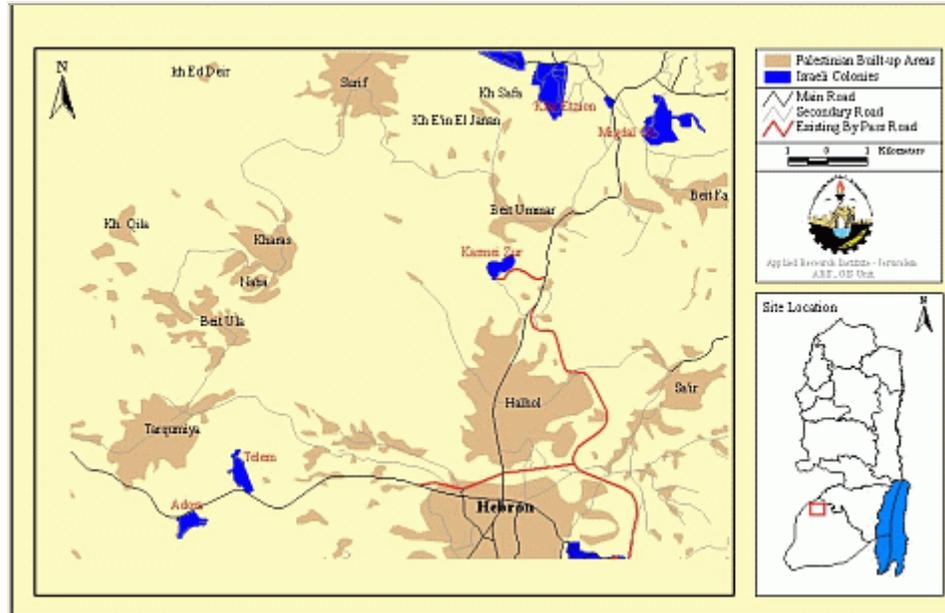
Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

District have been discharged as raw sewage to a dry creek passes less than four meters from Salfiet drinking water well ([Figure 9](#)).

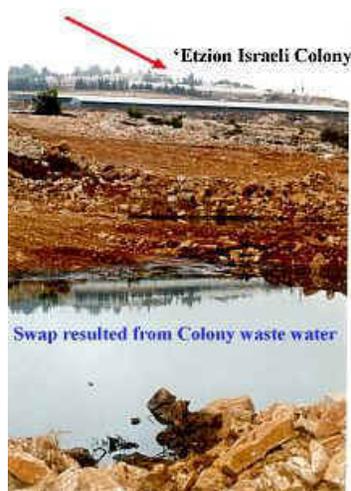


Israeli colonizing activities have long caused problems for Palestinians because of their wastewater disposal methods. During the current intifada, settlements have continued to dump untreated wastewater into valleys leading to Palestinian agricultural land and population centers.

The village of Beit Omar is greatly affected by sewage dumping from nearby Israeli settlements. Their case provides a vivid example of human suffering and environmental damage from sewage dumping. Beit Omar is an agricultural village located 15 kilometers northwest of Hebron city. The village buildings and agricultural areas are located on a hillside surrounded by mountains on two sides and by the Israeli settlements of Gush Etzion and Karme Zur on the other two sides ([Figure 10](#)).



Etzion colony is the largest colony built on Beit Omar agricultural land housing approximately 2,200 populations. On its establishment in 1967, Etzion colony contained a small unit for wastewater treatment. However, it seems that with the vast expansion of this colony and the subsequent increase in its population, the wastewater treatment plant soon became unable to meet the large quantity of effluent from the colony. Annually, in October for the past few years, the untreated wastewater has been channeled into a valley, which leads to the agricultural lands of the Beit Omar village (Figure 11). This coincides with the harvest time for the grapes. This October, around 30-35% of the agricultural land has been severely damaged by the wastewater dumping. Such damage affects the income of approximately 5,000 inhabitants of Beit Omar. The crops from approximately 800 dunums of orchards and grapevines have been lost this year (about 400 tons). (Figure 12)





Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889



In addition to the wastewater from Etzion colony, there is also pollution from Karme Zur. Karme Zur is an agricultural colony located to the northeast of Beit Omar. The colony has several large livestock dairy farms. The manure from these farms is collected in cesspools at the edge of the farm. Frequently, when the cesspools become full, their contents are dumped into the valley of Beit Omar, covering extensive agricultural areas and destroying cultivation and trees.

In 1991, Israel ratified the International Covenant on Economic, Social and Cultural Rights. This obligation makes these actions clearly illegal. Israelis living in settlements are able to discharge their water in ways that would be unacceptable in Israel. Palestinians have no control over these practices and no information as to the content of the water being discharged. It is important that firm and immediate action be taken by all concerned parties to stop the dumping of sewage by the Israeli settlements so that there might be an end to people's suffering from the negative impacts of such careless practices. These Israeli activities show a total disregard for the Palestinian people and their environment. The social costs inflicted by sewage dumping from Israeli settlements should be covered by the Israeli authorities as part of their responsibilities as occupiers of the Palestinian territories and the Palestinian natural resources.

During the month of February 2001, Israel discharged over 3.5 Million cubic meter of wastewater mixed with rainwater into Gaza Strips northern towns. Up to now no data are available to describe the extend of the damage and its impacts on the surrounding environment. Since the water table in the area is so high, possible contamination of the coastal aquifer is imminent.

Similarly, solid wastes from Israeli settlements are dumped without restriction on Palestinian land, fields, and side roads. The solid waste generated in West Jerusalem, for example, is transferred to the unsanitary dumping site of Abu Dies in the West Bank which overlays the infiltration area of the eastern sector of the aquifer. The settlements of Ari'al, Innab, Homesh Alon Morieh, Qarna Shamron, Kadumim and many others dispose their solid waste at different locations in the West Bank. Moreover, many military camps and settlements inside the green line dispose their solid waste in Palestinian areas.

### **3.0 Industrial wastes from the Jewish colonies:**

Israel has moved many of its polluting industries from places inside Israel to areas near the 1967 border or inside settlements. For example, Geshuri Industries, a manufacturer of pesticides and fertilizers, in Kfar Saba has been moved to an area adjacent to Tulkarm inside the West Bank since 1987. It is worth mentioning that the reason behind the movement is the plant's closure by an Israeli court order in 1982 because of its environmental effects on land, public health and agriculture. The waste from the factory has damaged the citrus trees and polluted the soil in the area, in addition to the potential damage to



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

groundwater. As a further example, the Dixon gas industrial factory, which was located in Netanya, has been moved into the same area of Tulkarm.

The Israeli industrial sector has followed the way of thinking of the government. The Israeli government constructed at least seven industrial zones in the West Bank. These occupy a total area of approximately 302 hectares, located mainly on hilltops, which often result in the flow of industrial wastewater into adjacent Palestinian lands. Information about industries in the Israeli industrial zones is not accessible to the Palestinians. The indicators for these industries can be guessed from the wastewater flowing from the industrial area and from the solid waste found in nearby areas. It is estimated that at least 200 factories are located in the West Bank. Some of the products are identifiable, but detailed information on quantities produced, labor, and waste generated is not available. Aluminum, leather tanning, textile dyeing, batteries, fiberglass, plastics, and other chemicals are among the major industries within these Jewish settlements.

Evidences show that pollution prevention measures are not followed inside the Israeli factories. The industrial solid waste generated by these factories is often collected and dumped in areas near Palestinian villages as well. The Barqan industrial zone is a clear example of polluting the environment. Aluminum, fiberglass, plastic, electroplating, surface coating, waste oil recycling, metal fabrication and military industries are found inside Barqan. The industrial wastewater flows untreated to the nearby valley, damaging agricultural land, which belongs to the three Palestinian villages of Sarta, Kufra-Deek, and Bruqeen, and polluting the groundwater with heavy metals. Chemical analyses of the collected soil samples from the discharge area within the village of Bruqeen revealed that elevated concentrations of heavy metals and organic solvents are present. Solid wastes generated from these facilities are dumped in a municipal dump site near the village of Jayous in the northern part of the West Bank ([Figure 13](#)).



Figure 13: View of Jayous solid waste dump site with close proximity to Town of Jayous

Furthermore, wastewater from Israeli settlements in the West Bank is not restricted to domestic effluent. Many settlements house industries such as plastics, pesticides, leather and tanning, aluminum, asbestos, batteries, cement and canned food factories. The wastewater from these settlements contains carcinogenic and hazardous compounds such as chromium, zinc, cadmium and acidic compounds. It seems that part of



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

the reasons firms had been relocated within the West Bank is the ability to avoid Israeli environmental restrictions and regulations.

#### **4.0 Deforestation and Uprooting of Trees :**

Afforestation programs in the West Bank and Gaza were first implemented during the British Mandate and it accelerated during the Jordanian Administration, but were stopped completely following the Israeli occupation. According to a recent study by the Ministry of Agriculture, the total forest area within the officially designated areas decreased from 300,736 dunums in 1971 to 231,586 dunums in 1999. More than half of the decreased area was in Gaza, where 95% of the forests disappeared (from 42,000 dunums in 1971 to 2,000 dunums in 1999). About 80% of destroyed areas of official forest are attributed to the Israeli occupation as a result of establishment of military bases (2%) settlements (78%) and by-pass roads (less than 1%). Only 14% of forests were cut down by local people and 6% of the forest has changed to private ownership. Only 35 % (80,101 dunums) of the current 231,686 dunums of official forest area is accessible to the Palestinians. The Israeli army and the Jewish settlers have uprooted more than half a million fruit trees mainly olive trees.

Israel declared 48 nature reserves in West Bank with a total area of 330,700 dunums or 5.68% of the West Bank. These nature reserves are mostly distributed over the Eastern Slopes and the Jordan Valley. Palestinians question the ecological value of these nature reserves, which they see are another way, which Israel used to deny Palestinians their rights to their land.

In addition to the injuries and death of thousands of Palestinians, the Palestinian territories for the last eight months (Sep. 2000-May 2001) have been exposed to physical and property destruction of houses and different other buildings. The Israeli authority has also completely destroyed large Palestinian agricultural fields containing thousands of dunums of agricultural products. These actions are probably the most environmentally damaging of all the current Israeli army activities. Between September 2000 and March 2001 a total of 2975 dunums of land were shaved by Israeli forces in the Gaza Strip (Israeli army uses this expression to indicate complete removal of any living thing from the surface of the area). The documented cases of cleared land from trees in the Palestinian territories already reach 271,797 trees (Report by the Palestinian Ministry of Agricultural). If an average tree sequesters about 6 kg. Of CO<sub>2</sub> a year, then the total additional load of CO<sub>2</sub> will remain in the air accumulate to 1.6 Million kilogram or 1630 tons per year adding more GHG.

The indirect impacts on agriculture have also been very severe. As a result of the closure, farmers have been prevented from reaching their fields and have been prevented from taking their goods to market. The agricultural inputs have become less accessible and more expensive, and transportation costs (in those cases where transport is possible) have risen. In those cases where it has been possible to sell the produce, farmers have often been forced to sell their crops at much reduced prices. The value of losses has been huge.

#### **5.0 Desertification:**

Approximately 2,180,000 dunums (35% of the total area of the West Bank and Gaza Strip) are considered as natural grazing areas. The Eastern Slopes region makes up most of the Palestinian Territories rangeland. It represents about 1,500,000 dunums or 69% of the range area. Of the total grazing area only 700,000 dunums are accessible to Palestinian livestock owners, while the remaining 1,480,000 are currently not accessible as a result of land confiscation for the Israeli settlements, nature reserves or closed military areas. This led to overgrazing and progressive desertification in these areas.



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

## **6.0 Illegal Movement of Hazardous Waste from Israel to Palestine:**

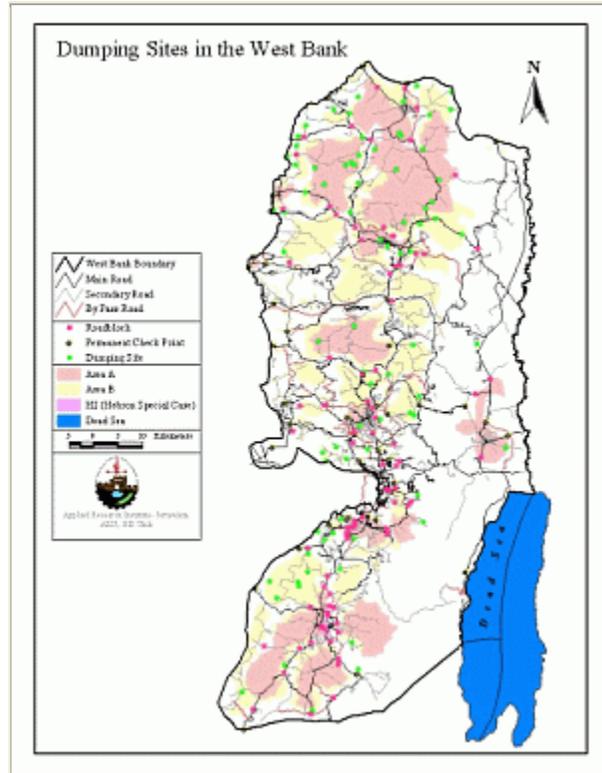
Israel illegally transfers hazardous and toxic wastes generated inside Israel into the West Bank. The Palestinian Authority has discovered several cases. In 1998, Israel has illegally transferred 2-3 trucks filled with toxic and hazardous waste to two locations in the northern area of the West Bank. The first location is near the eastern border of the Tulkarm municipality. The second dumping site is located in close proximity to the residential area of A'zoun municipality and 50 meters from their groundwater well used for drinking purpose. The Israeli company Telbar, moved its medical waste disposal site from Afulla to a site close to the colony of Yafit in the Jordan valley. The Palestinian Environmental Authority has also discovered the transfer of hazardous and toxic wastes generated from a paint factory located in the Israeli settlement "Ganim" into Umm Al Tut village. Illegal movement of hazardous waste is banned by international conventions (Basel Convention), to which Israel is a signatory.

## **7.0 Solid Wastes Management in Palestine:**

With the existing management system of solid waste, Palestine faces an increasing solid waste management problem. Over the past 30 years, management of solid waste at all stages of collection, transportation and disposal has not been given enough attention from the Israeli occupier. The pressure on the Palestinian environment from solid waste management practices is further intensified by the considerable amount generated by Israel settlers. Solid waste from Israelis is dumped without restriction on Palestinian lands, fields, and side roads. Palestinians have no access to information about the composition nor the disposal of solid waste generated by settlers; however, evidence shows that much of this waste is being disposed of on the many illegal dumped sites within the Palestinian\_Territory. The solid waste generated in West Jerusalem, for example, is transferred to the dumping site of Abu Deis in the West Bank. A number of settlements and military bases are also known to dump their waste on Palestinian land, including Enav near Tulkarm and Homesh, Elon Moreh near Nablus and Ariel near Jayous. ([Figure 13](#))

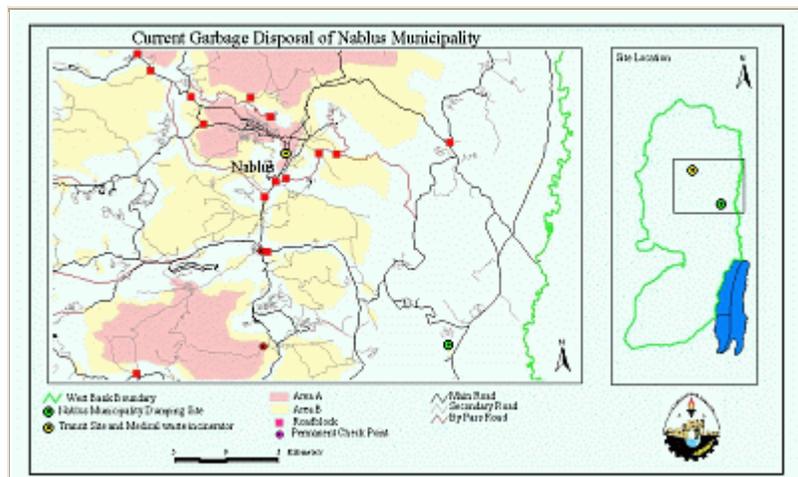
Regarding the Israeli solid waste generation within the Israeli settlements in the West Bank and East Jerusalem, it is assumed that an individual generates about 1.8 kg daily (*ARIJ, 2000*). Thus, the total annual quantity of solid waste generated by settlers is estimated to be 224,000 tons of solid waste i.e. about 614 tons per day. It is estimated that approximately 500 thousand tons of domestic waste is generated yearly by the West Bank Palestinians, i.e. about 1,370 tons per day (*ARIJ, 2000*). Again about one sixth of the population generates about one half of the solid wastes quantity.

Furthermore, throughout the months of hostilities, the Israeli authority has restricted the mobility of Palestinians within the Palestinian territories, and between the Palestinian territories and the rest of the world. This has been done by placing checkpoints or digging deep ditches at the entrance of each Palestinian city or town so that nobody is able to exit or enter into a different location from where they are. The restricted mobility of Palestinians has disabled and prevented solid waste from being delivered to the disposal sites. ([Figure 14](#)). In addition, work on the Hebron-Bethlehem joint landfill project funded by the European Investment Bank has stopped (as a result of worker and materials being prevented from reaching the site). Preparations for the GTZ/KFW solid waste project in Ramallah have also been halted. The World Bank sanitary landfill project in Jenin has stopped, and two projects in Tulkarem (the installation of an incinerator in Anabta along with Italian landfill project) have been delayed indefinitely.



### Case Study – Nablus Municipality:

The solid waste generated in Nablus city is normally collected and disposed of at a disposal site in the Jordan Valley near the Israeli colony Beqa'ot. However, due to the closure imposed by the Israeli army and the restricted mobility of Palestinians, this site is currently inaccessible (Figure 15). The municipality has been obliged to draw up an alternative waste disposal plan. Fortunately for the residents of the city, garbage collection has continued through out this period, though collection now occurs between 3-4am as opposed to the normal 6-7am in order to avoid clashes.





Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

Disposal of the collected garbage is the real difficult problem the cities are facing. The city is now using an alternative temporary disposal site, located in a residential area ([Figure 16](#)). Beyond some spraying of insecticides, this site has no environmental controls. Nablus city produces around 150-200 tons of waste per day. The temporary site has a capacity of somewhere between 4000 and 5000 tons, providing temporary storage for 33 days of waste at the most.



### Case Study – Hebron :

In addition to the extended periods of closure suffered by Palestinian areas, Hebron has also been placed under curfew. This has made solid waste collection very difficult. In addition to the restrictions on access, many workers are unwilling to enter area H2 due to the tensions and the fear that colonists will target them. As a result, only one truck has been entering this area to collect refuse. In normal times, four trucks are used to collect rubbish.

**The closure of waste site and the use of such sites by Israeli users, has also led to further impacts including:**

- The fear of disposing hazardous material, this is valid as it happened before in a number of sites. The impact of this depends on the nature of the disposed material and waste
- The future possibilities of having joint systems or any form of cooperation are no further considered with these practices in mind.
- The monitoring system for the disposal sites is no further working, and previous results and reports are not valid any more.
- The newly opened by pass roads to enable Israeli trucks reaching the sites was on the expense of Palestinian agricultural land.

### **8.0 Noise Pollution:**

Under normal conditions, the main cause of noise pollution in Palestinian towns is transportation. Since September 2000, clashes have added to the noise pollution. However, most of the noise disturbances have come from Israeli shelling from helicopters and tanks, helicopters hovering over towns and an increase in sonic booms from military aircrafts being flown over population centers. Constant sleep deprivation and



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

fear caused by this noise pollution can be assumed to have a very severe impact on the psychological well being of the population particularly children.

## **9.0 Palestinian Wastewater:**

Many Palestinian communities are not connected to mains sewage systems and rely on cesspits and tankers for their wastewater disposal. Extensive periods of closure over the past few months and numerous permanent roadblocks erected by the Israeli forces ([Figure 17](#)) have made it impossible for tankers to reach villages. In Tulkarem and Jenin districts, municipality workers have been prevented from accessing the wastewater treatment stations.

The inability to provide maintenance services to waste water systems, as in Tulkarem, Bir Nabal, and in Beit Sahour, lead to the escape of raw sewage into the agricultural land, wadies, and possibly to the ground water aquifers. If this the case, the soil contamination can be reversible as well as the wadi contamination with the rain water washing, but the ground water pollution can be irreversible and impacts may start be evident soon. The cost of handling the damage is increasing daily as the deterioration is still going on.

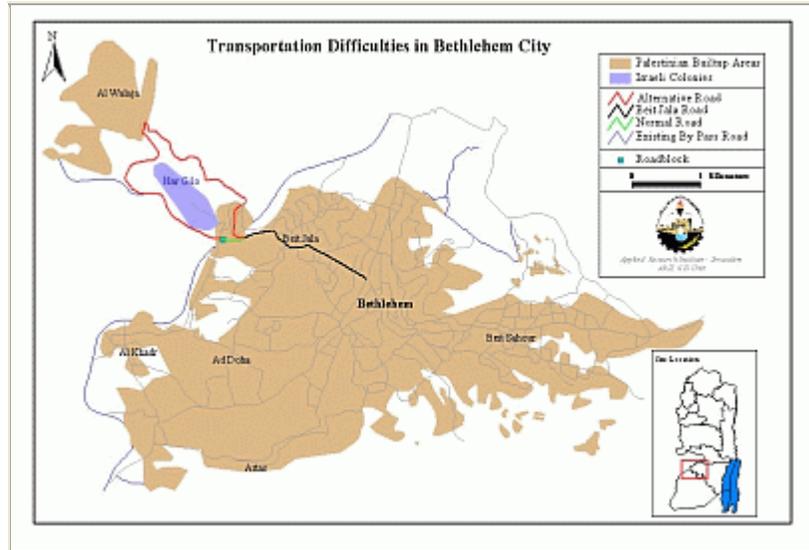
The stored material for the Salfit new wastewater plant was a target for two Israeli rockets. The financial loss is great, but importing these items from Germany will take time, and that is only if the cost was covered. Otherwise, the completion of the treatment plant will take few more years.

## **10.0 Transportation and air pollution problems :**

The current political situation has caused a complete blockade of all Palestinian main roads in areas B and C. Naturally this has caused Palestinians to search for alternative tracks and secondary roads by which to enter and exit area “A”. In those cases where an alternative route can be found, it is usually along unpaved roads, which lack any transportation management. The traveling time is increased, causing increased vehicle emission and damage can be done to land. Another important air emission factor is the roadblocks set up by Israeli army on main roads at the entrance to area “A”. Palestinian cars at road blocks are often required to wait idle in long queues and some cases for long period of time while the motor is kept running.

### **Case Study –Beit Jala :**

A common way to drive from Bethlehem to Hebron is to go via Beit Jala on to the By-pass road ([Figure 18](#)). To travel from one side of Beit Jala to the other is normally a short journey of around 400m. However, the roadblocks that have been built by the Israeli army mean that the only way to travel between these two points is by taking a circuitous route around the hillside. The length of this route is around 5.6 km. The estimated increase in the amount of emissions using the W.H.O. standard amounts to 0.1573 kg CO, 0.0162 kg SO<sub>x</sub> , 0.0178 kg NO<sub>x</sub> and 0.0223 kg VOC per kilometer driven. This journey is currently extended by 5.6 km. This extension adds to the emissions from the journey by 0.88 kg of CO, 0.09 kg of SO<sub>x</sub>, 0.10 kg of NO<sub>x</sub> and 0.12 kg of VOC.



Two other air emissions are emitted by Israeli activities into the West Bank environment. The air emissions from the heavy traffic in Tel Aviv, where Air pollution at the Tel Aviv urban area is moved to the West Bank by the Western winds. Studies showed that NO<sub>x</sub> generated from the traffic at Tel Aviv is found as Ozone at Bethlehem, Jerusalem and Nablus. The second emissions have been generated from the uncontrolled and unmonitored Israeli industries scattered within the West Bank.

The used tear gas, three types of which are observed so far, can lead to blindness, dermatitis, shortness and difficulties in breathing, irritation to various skin parts, edema as well as bronchitis.

Some of these impacts may take some time before becoming clear, but those subjected to direct contact with tear gas in the previous Intifada, have developed such symptoms and cases. The possibilities of cancer cases or impacts on human genes, or genetic mutations are not scientifically proven yet, but there is evidence in Palestine that this is a valid case. The number of miscarriages due to direct contact with gas is higher than in any other place in Palestine.

### Conclusions :

The current situation has highlighted the extent of damage to the Palestinian environment that is inflicted by the Israeli occupation. Pressure needs to be placed on Israel, perhaps through the international community, to cease such activities. It is essential that this damage be accurately recorded so that a clear comparison can be made between the way Israelis act in the Palestinian areas and in Israel. But most importantly, until Israel withdraws from the Palestinian Territories occupied in June 1967, there should be an environmental audit for the Israeli actions against the Palestinian environment. Environmental management in Palestine is particularly critical. The limited natural resources and destructive policies of Israel impose a challenge to those working in this field.

- Israel needs to apply the Geneva Convention in Palestine. This means that confiscation of land, construction of settlements, annexation and closure of Jerusalem has to be halted.
- Utmost priority should be given to restore Palestinian water rights over the surface and ground water resources in final status negotiation so that the PNA can supply all its citizens with their water needs.



**Applied Research Institute – Jerusalem (ARIJ)**  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

- Israelis and Palestinians need to come to an agreement based on international water law on how to allocate water in the shared water resources.
- Exert pressure on Israel to fulfill its obligations related to water allocations according to signed agreements.
- Secure Palestinian sovereignty over its water resources.
- Include the issue of compensation for Israel's past and current use of Palestinian natural resources.
- Israel need to approve the construction of the West Ghour canal, which is part of the Johnston's plan for dividing the waters of the Jordan River among its riparian.
- Israel need to grant immediate permission to the Palestinian Water authority to construct water networks within and between districts to provide people with water.
- Require Israel to stop diversion of saline springs around Lake Tiberias, which renders water at the lower Jordan to be unsuitable for irrigation and provide compensation for damages caused by this act.
- Israel should allow Palestinians full freedom to implement wastewater treatment plants in most suitable areas.
- Emphasize the need for ultimate withdrawal of Israel from all Palestinian land occupied in June 1967 including the evacuation of settlements, abolition of closed military areas, annexation and closure of Jerusalem and reexamining the ecological significance of nature reserves.
- Demand an immediate halt on tree cutting by the Israeli army and settlers.
- Demand that Israel clears all the mined areas in Palestine.
- Ensure that Israel provide Palestinians with all the data and information on land and water as well as on settlement activities
- Call for a regional management of the international Jordan River Basin according to international norms
- Palestine need to have ability to demand restitution for perceived violation of that right both through exercise of their rights to freedom of expression as well as through a functioning legal system, free of political influence that will allow them to press claims.



Applied Research Institute – Jerusalem (ARIJ)  
P.O.Box 860, Caritas St.  
Bethlehem, Palestine  
Tel: +972-(02)-277-0535  
Tel: +972-(02)-274-1889

## References:

- ARIJ (Applied Research Institute-Jerusalem), Geographic Information System (GIS) Database, Bethlehem, 1996-1998.
- ARIJ (Applied Research Institute - Jerusalem), The Status of the Environment in the West Bank, Bethlehem, October, 1997.
- Coad, A., An Evaluation of the Current Solid Waste Management Situation in Palestine, Palestinian Solid Waste Institutions Project, Environmental Planning Directorate, Ministry of Planning and International Co-operation, 1997.
- PEnA (Palestinian Environmental Authority), Environmental Strategy Plan, Third Draft (unpublished), Ramallah/Gaza, October, 1998, pp. 16-20.
- PEPA (Palestinian Environmental Protection Authority) and Euroconsult/Iwaco, Gaza Environmental Profile: Part One, Inventory of resources, Arnhem/Rotterdam, The Netherlands, June, 1994, pp. 11-53.
- Stauffer, T., Water and War in the Middle East: The Hydraulic Parameters of Conflict, The Center for Policy Analysis on Palestine, Washington, D.C., 1996.
- Israeli-Palestinian Interim Agreement on the West Bank and Gaza Strip Oslo II, Washington, Ministry of Foreign Affairs, Jerusalem, September 1995.
- PCBS (Palestinian Central Bureau of Statistics), Preliminary results for the census of population and Establishments-1997.
- Qumsieh, V., The Environmental Impact of Jewish Settlements in the West Bank, Palestine-Israel Journal of Politics, Economics and Culture. Volume V, No. 1, 1998, p. 32
- Jonathan Kuttab and Jad Isaac, (1994), Approaches to the Legal Aspects of the Conflict on Water Rights in Palestine/Israel, in J.Isaac and H. Shuval ed., Water and Peace, Proceedings of the First Israeli-Palestinian International Academic Conference on Water, Zurich, December 10 -13, Elsevier Science Publishers.
- Jad Isaac and Jan Selby, (1996),The Palestinian water crisis; Status, projections and potential for resolution, Natural Resources Forum, Vol. 20, No. 1, pp. 17-26.
- Walid Sabbah, Jad Isaac et al, (1998), Water Resources and Irrigated Agriculture in the West Bank, ARIJ.
- Atif Kubursi and Jad Isaac(1998), Water scarcity, water wars, or dry peace in the Middle East, reports and papers no.19,Water and dispute prevention;South perspectives, Center for the Global South, American University, Washington,D.C.
- H. Mao, I. Ishaq and J. Isaac (1999), The status of transportation in the West Bank, World Transport Policy and Practice 5,4, 18-25 (1999).
- J. Isaac (2000), The essentials of sustainable water resource management in Israel & Palestine, Arab Studies Quarterly, 22,2,13-31.
- J. Isaac et al,(2000), An Atlas of Palestine( West bank and Gaza), ARIJ

[1] *Haaretz Newspaper March 5th 2001*

[2] *Sources: ARIJ database and Btselem records.*